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# Kaleidoscope



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## Kaleidoscope

The *University of Kentucky Journal of Undergraduate Scholarship* is a refereed journal published annually by the eUreKa! office of the University of Kentucky. The journal is dedicated to the advancement of knowledge through the publication of the results of the intellectual pursuits of undergraduate students. The journal accepts reports of all forms of creativity and scholarship by undergraduate students including, but not necessarily limited to, artistic and musical creations, creative writing and poetry, and reports of studies and research in the humanities, the social, natural, and medical sciences, agriculture, business, architecture, and engineering. The journal is published in traditional print format and as a Web site. The Web site may include creative materials, such as performances and art work, that cannot be reproduced on paper.

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**Lee T. Todd, Jr.,  
President**

Our Provost, Kumble Subbaswamy, has said often that we cannot be a top-twenty university unless we have a top-twenty undergraduate program. I could not agree more. This fifth volume of *Kaleidoscope* is clear evidence that we are well on our way to that status. The superb material submitted by our students gives me great pleasure as well as confidence that they are second to none in the quality of their scholarship.

The range of subjects is impressive and reflects the breadth of our undergraduate offerings. We have classic liberal arts subjects, such as English, Psychology, and the natural sciences represented. In addition, we have fine arts, health sciences, and architecture, among others. The depth of scholarship demonstrated by the authors is astonishing and gratifying. The authors have my considerable respect.

Another highlight of this issue is the extensive coverage of the work of students who are associated with several of the programs of the Chellgren Center for Undergraduate Excellence. The Chellgren Center brings together many of the outstanding undergraduate programs at the University, including the Discovery Seminar Program, the Honors Program, eUreKa!, the Living-Learning Communities, education abroad, the office of external scholarships, and the intercollegiate debate program. This union results in vastly increased synergy among the programs and enhanced support for undergraduates in all disciplines. The students from the Discovery Seminar Program, education abroad, and eUreKa! who have contributed to this issue are representative of the hundreds of students whose undergraduate experiences are enriched each semester by these and the other Chellgren-associated programs.

Again this year, I want to congratulate and thank the professors who have mentored our student authors. It is clear that our professors' care and support of their students is sincere and of the highest professional caliber. Their dedication is evident in the work of their protégés.

Please join me in congratulating the many young women and men whose outstanding works are published in this issue of *Kaleidoscope*. These students are but a few of the thousands of highly creative and productive undergraduate scholars who are active at UK. Together they are making contributions to the enhancement of knowledge and are being recognized and honored nationally and internationally through their presentations, performances, publications, and productions. Once more it is clear that UK undergraduates are the equal of those at any other university.

It doesn't seem possible, but this is the fifth volume of *Kaleidoscope*. I have been looking back over the previous issues and renewing my acquaintance with some of the superb articles that were published in volumes one through four. I was wondering how could this year's student authors live up to those extremely high standards? But, once again, there is no doubt they have matched and exceeded the fine quality of their predecessors.

This issue contains wonderfully interesting articles on art, both classical (sixteenth century) and contemporary (computer-generated images by two undergraduates), health sciences, drug delivery systems and nutrition, the early (sixteenth century) theater, psychology, architecture, and the biological sciences. It also contains numerous reports of the scholarly endeavors of many recipients of summer research and creativity awards and undergraduate travel grants. I have the great privilege of reading these articles and other submissions as they are received, learning from them, and appreciating the intellectual effort that goes into their creation. It is also my privilege to work with the authors and share their enthusiasm for their scholarship. Our UK students are the equal of any I have had the opportunity to know in more than forty years of teaching. I am proud to be able to work with them.

This year's section devoted to the Chellgren Center for Undergraduate Excellence and its related programs is considerably expanded from last year. I especially appreciate the contributions of the two students who served as undergraduate instructional assistants (UIAs) in the Discovery Seminar Program. They bring yet another dimension to our consideration of undergraduate scholarship. They were, themselves, teachers and mentors for the students who are following them. What higher honor and calling could there be than to pass on their knowledge and experience to younger students? In addition, the images of our students who traveled to festivals and conferences abroad should serve as models for others to emulate. The undergraduate travel funds administered by the eUreKa! office are available for students who are presenting at or otherwise actively participating in a professional conference. eUreKa! includes a number of other programs designed to support undergraduate scholarly activities by undergraduates, including UKURP, the Beckman Scholars program, AMSTEMM, the Oswald Research and Creativity Awards, the Showcase of Undergraduate Scholars, and S.P.U.R., the Society for the Promotion of Undergraduate Research. You may find out much more about eUreKa! at [www.uky.edu/EUREKA](http://www.uky.edu/EUREKA).

As always, I want to give the deepest thanks to the faculty members who have served as mentors for the students who are represented in this volume and to countless other undergraduate students at UK. Their enthusiasm motivates the many students who seek mentored undergraduate research experiences in virtually every academic discipline through both the UK Undergraduate Research Program (UKURP) and the independent research programs of their individual departments. Most of the reports in *Kaleidoscope* are the direct products of such mentored studies.

It is my pleasure to acknowledge the essential contributions of Evie Russell who handles all of the administrative details of *Kaleidoscope*, Teresa Shear who develops the wonderfully creative design, and Matt Smith who produces the entire web site and the on-line version of the journal. If you are a student, please consider submitting your work to the next issue of *Kaleidoscope*. Submission guidelines and deadlines are available on the inside back cover and at [www.uky.edu/kaleidoscope](http://www.uky.edu/kaleidoscope). If you are a faculty member, please consider mentoring an undergraduate researcher and encouraging her or him to submit the resulting work for consideration for publication. If you are a parent, please be supportive and proud of your student's creativity, and suggest that it be submitted to *Kaleidoscope*. Participation in creative and research undertakings is what can set apart an education at a comprehensive research university, and make it the superior professional experience that launches a student's career.




**Robert S. Tannenbaum,  
Editor**



Less than two years ago I was a grad student studying school psychology. I was twenty-two years old, happily married, and certain about my future. Then, for reasons I'll never fully understand, I asked myself what life might be like if I chucked psychology, a subject I like, and leaped into something I love: writing.

Months later I became an undergraduate again. I began with journalism but then discovered literature and picked up an English major. Why had it taken me so long to find literature? Beats me! Over the next year and a half, I met Melville and Faulkner and Whitman and Joyce and Nabokov — all for the first time.

Still, after quitting grad school and the future as I had known it, life felt slippery. Gradually, I found my footing in books, in Tom Marksbury's American literature courses, and in Kim Edwards's fiction writing workshops.

Erik Reece mentored the essay before you. I am grateful he grabbed me by the arms, plucked me from a world of comfortable material, dropped me into the strange and the scary, and then said: now write.

I'll graduate Summa Cum Laude with a B.A. in English in May, 2006 and a B.A. in journalism in August, 2006. By September I'll be writing in New York City, where my wife, Kelli, begins doctoral training in nursing. Because of her devotion, I can say I remain happily married. You will meet her at a young age in this essay, "On Lust."

## On Lust

When I was thirteen, I had a friend named Doe Hamilton who lived way out on Cobb Fork — out in the boonies, you might say — in a modest, three-bedroom brown brick house that sat on the edge of the woods. The road that led you there was narrow and cratered. If you drove it fast, you could simulate the sound of a jackhammer with your tires pounding over the potholes. If you met another car on it, one car had to pull off, dip down a little into a ditch, and let the other pass. From this road you could easily spot Doe's house: it was the one with the enormous ivory satellite dish parked like a flying saucer in the front yard.

The dish was a relic from the 1980s, a still-functioning satellite spawned long before the tiny, inconspicuous DirecTV-type dishes now attached to houses. The Hamilton's dish stood proudly in their front yard, blocking out a chunk of their home, tilted back, its antenna aimed at God. I'm not sure how, but that dish captured signals for hundreds of channels, all of which the Hamilton's had ceased paying for some time during the 80s.



### Mentor:

**Erik Reece**

**Senior Lecturer, Department of English**

It is generally agreed that Michel de Montaigne invented the literary essay (from *essai*: to attempt), taking his cue from Plutarch. Montaigne's subjects ranged from justice to friendship to body odor. His method was to take an abstraction and ground it in the person, the concrete, the idiosyncratic. Each essay was titled "On . . ." you name it. This technique proved so influential that modern essayists still return to it.

Last semester, in my creative nonfiction workshop, I passed around a hat that contained fourteen pieces of folded paper. On each was written one of the seven deadly sins or the seven cardinal virtues. Chance determined who wrote about what. But the goal was to emulate Montaigne, to make new for readers these persistent virtues and vices. Joe Hall drew *lust* as his subject, and he treated the subject brilliantly, comically, even tenderly in this evocative examination of American adolescence. Montaigne would be proud of such a young heir.

The foundation of my friendship with Doe was a curious infatuation with professional wrestling, which his satellite played for hours daily. In fact, the dish picked up all of the World Wrestling Federation pay-per-view events for free (although the audio was in Spanish). Such pay-per-views were a sore subject at my home. I lost a chunk of my childhood begging my mom to order *Wrestlemanias* and *SummerSlams* and *Royal Rumbles*. Never, not once, did she budge. “Drop it with the wrestling,” she said. “And no, I’m not driving you to Madison Square Garden to watch *Wrestlefest*.”

“*Wrestlemania*,” I corrected.

“What?”

“It’s *Wrestlemania*, not *Wrestlefest*.”

“Well I’m not driving you to New York for *that* either.”

She did, however, drive a half hour to Cobb Fork one November night in 1994. Doe had been inviting me over for some time, and Mom had finally relented for the last major show of the year: the *Survivor Series*.

Stoked with the anticipation of seeing my first live pay-per-view event, I pressured Mom to drive faster and faster. She was game, deftly handling her Toyota Celica over the legendary Cobb Fork craters as if she were a seasoned astronaut maneuvering a lunar rover. Suddenly she said, “Good lord,” and slowed down to gaze at the satellite dish in the Hamilton’s front yard.

“This is it,” I told her. “This is the Doe’s house.”

Mom pulled into the gravel driveway. “Well get out,” she said.

I stepped out and walked around the front of the Celica. “Wait a minute,” Mom said through her rolled-down window. “Who is this boy again? What’s his name?”

“Chad Hamilton,” I said. “I’ll be fine. I’ll call you later.” I waved her on.

Doe’s real name was Chad, but we had called him Doe, short for Doughboy, ever since we had seen *Boyz n the Hood*. Ice Cube plays a character named Doughboy in that movie. There’s nothing special about him; we just thought it was a cool nickname. Doe embraced the title despite its somewhat cruel overtones. He was indeed pudgy and a bit of a lunatic, even at thirteen. He had a lazy eye, and later, when we were in high school, he drank too much, stumbled down the bleachers at a basketball game, and bounced his other eye off a concrete floor. He lost vision in it for a few hours. When I walked into his room at the hospital, his sister, Renee, turned to their dad and said, “Oh my God, he does have friends.”

Doe’s dad reminded me of Johnny Cash. He answered the door that first night I visited Doe’s house, and I instantly noticed he had a head full of remarkable jet-black hair curling in a tall wave above his forehead. The wave looked as if it could break at any moment. “Hello,” he said in a low, rumbling, unrolling voice. I don’t remember him saying anything else the rest of the night.

I waved goodbye to Mom, again, and she backed out of the driveway and clattered onto the pock-marked road. Doe was sitting inside with my other friend, Moe. They weren’t speaking; they hated each other, always did and always would, but I was friends with both of them, and the three of us together got along fine. I do realize that together we were Moe, Doe, and Joe. Never mind that. We huddled around the Hamilton’s big-screen television and watched the countdown show tick away. Doe’s dad settled into the corner of the couch next to me. A cigarette appeared suddenly in his mouth, and the smoke trailing off its ashen end began a long night of saturating my clothes.

The countdown show transitioned to a thank you message for ordering the pay-per-view, which of course we were stealing. Apparently we were not the only ones. The gentle voice that had been saying thanks commenced a quick lecture on the penalties for stealing satellite signals. We brushed the warning off as tough-talk, but then the voice changed strategies for its conclusion. “If you’re stealing satellite signals,” it chided, “what kind of example are you setting for your children?”

The question seemed to linger in the smoky air of the Hamilton’s living room for a full, silent minute. I didn’t realize I was staring at Doe’s dad until he had turned and locked eyes with me. I smiled and felt an incredible impulse to crawl over the back of the couch or possibly slink out a window and hide myself in one of Cobb Fork’s many potholes. That impulse passed the moment the pay-per-view began. It was *Survivor Series 1994*, the Undertaker versus Yokozuna in a casket-match main event, Chuck Norris as the special guest referee!

And that’s about all I remember about the show. I have no recollection of the match, no memory even of who won. Within another year or two, I would find professional wrestling outrageously silly and stop watching it all together.

I do remember eating pizza that night, though, and cheering and arguing and agreeing and scooting the coffee table into the kitchen to clear enough room for slapping full nelsons and Boston crabs on each other. Doe’s dad never said a word. He just sat on the couch and smoked and looked mysterious. Sometime



after midnight he went to bed.

Seconds later Doe said, “All right. You want to watch some porn?”

“Some what?” I asked.

“Hell yeah!” Moe answered. Moe was one of those dark-haired kids who started puberty a year before everyone else. He had underarm hair in the fifth grade and was therefore too embarrassed to raise his arms when playing zone defense during basketball games. Coach Kouns would sit him at the end of the bench, which was fine with Moe as long as he could keep his arms down and gawk at the cheerleaders. Apparently Moe had known all along that Doe’s satellite picked up multiple porn channels.

I wasn’t even certain what “porn” was. I knew it was sexual. I knew it rhymed with “corn,” which confused me a little, I think, at some subconscious level. It also rhymed with “horn,” as in “horny,” and I knew there was a definite relationship there. I wasn’t a complete novice. More than a few times, I had crawled out of bed in the middle of the night, snuck into the living room, turned the television volume low, and secretly convened with host Gilbert Gottfried (and later, Rhonda Shear) for the USA network’s “Up All Night,” which seemed for years to repeat a single movie: *The Bikini Car Wash Company*. I had also consumed a few episodes of HBO’s *Real Sex* series, which taught me that sex was a bizarre transaction between unattractive, meditative old people, though young people walking down the right New York City sidewalk were permitted to comment on it.

I had also slipped a *Penthouse* inside a *Pro Wrestling Illustrated* at the Little Professor Bookstore when I was twelve. I was thirteen now, though, and I was in love with Kelli Stidham, the girl who sat to my left in algebra class and in front of me during English. She had a boyfriend and braces and an enormous, electrifying smile that when turned your way coaxed you into believing you shared some intimate connection with her, some unspoken bond that transcended the parameters of boyfriend-girlfriend. She was short, maybe five-feet, and they called her Rudy on the soccer field on account of her hustle. Despite having a boyfriend, Drew Jones, who once cried when I tackled him during a backyard football game at Avez Bashadi’s house, I knew Kelli liked me. We had secretly traded handcrafted valentines on back-to-back years. I kept hers in my underwear drawer next to my Kirby Puckett 1984 Fleer Update rookie card. I knew Kelli kept mine somewhere intimate too.

I was waiting for her to break up with Drew when Doe turned off the lights. We repositioned

ourselves on the couch to give each other plenty of room, though we still huddled under a single blanket of silence and darkness as Doe tapped away at three different controllers. That was the only way we could have done it, I think. The quiet and the dark gave us anonymity, freedom to indulge. I had slid down into the cigarette-singed corner of the couch where Doe’s dad had been sitting. The spot was warm but uncomfortable.

Doe pressed a few secret, magical buttons, and the screen flashed from a gray snow to white flesh. Two bodies — shockingly naked bodies, a man and a woman — had materialized on the television, and a car too, a bright red Corvette, across the hood of which the woman lay. The man stood, his legs brown up to the backs of his thighs, then pale, pale skin, paler, giving way to a blinding white buttocks. His eyes were closed, his face twisted into what looked like an expression of agony. The woman was not really a woman at all, just two nipples, two breasts, two red lips curled into an oval. Her tongue emerged from her mouth and licked across her top lip. Her expression contrasted his; she countered his agony with ecstasy, answered his snarls with shouts of “Yes!” He was clearly doing something right, and I wondered what it might be. Occasionally, he’d muffle one of her shouts with a sloppy kiss. They went on like this, repositioning themselves and what not, for ten mesmerizing minutes. We watched without saying a word to each other, our eyes stuck to the screen. I felt an image of the man and the woman’s colliding skin etching itself permanently into my consciousness, and I let it. I wanted to remember. I wanted to bottle what I felt right then and keep it.

Mom picked me up the next morning. Right away I sensed her looking at me, smelling me. My eyes were bloodshot from not sleeping, and my clothes reeked of cigarette smoke and sweat. “Shew,” she said. “You stink.”

“Doe’s dad was smoking,” I explained.

She didn’t reply. She seemed distant, off somewhere on a far-away world. Maybe she was just focused on guiding the Celica out of Cobb Fork, down that narrow road, over the craters, toward home.

When we got there, the man and the woman on the Corvette were waiting on me. I had already forgotten their faces but not their bodies or their movements. They visited every day for a week, and each time they came by, I considered Kelli. I saw an image of her passing me in the hallway. I could count her white teeth as she smiled, but I could not see her against the hood of the red Corvette.



I am a fourth-year student, completing a major in English and minors in French and Philosophy. My interest in Renaissance literature developed during a year abroad at Lancaster University, and I have been able to continue working on this subject with the help of Dr. Jenn Lewin, who mentored an independent study course and a handful of other projects with me. One of these projects began as a question of what contemporaries of Shakespeare thought when his works were first played. Simply, I wanted to determine what opinions of the theater were circulating in early modern England and then perform an archaeological study of those texts to uncover the ideological concerns moving through them. This became a summer research project that I carried out at the Newberry Library in Chicago, the findings of which developed into my undergraduate thesis with the Gaines Center for the Humanities. This paper is an excerpt from that work.



**Mentor:**  
**Jennifer Lewin, Ph.D.**  
**Assistant Professor, Department of English**

The argument of this original and thoughtful paper is that the circumstances surrounding the creation of the financially independent early modern playhouses led to myriad controversies about the meaning of theater, waged in the period's antitheatricalist treatises, and that those controversies, more crucially, led to the ever-shifting meanings of theatrical spectacles. Mr. Bozio carefully reviews the evidence for these claims in the primary and secondary literature on his topic, noticing, for instance, that: "With the playhouse, then, performance became an independent form of discourse, not only in an economic sense of being partially liberated from royal and aristocratic patronage, but socially as well, in that the playgoers now commanded the spectacles set before them." He is particularly concerned to demonstrate the importance of anti-feminist and religious language in the work of Northbrooke, Gosson, and Stubbes, and to show how subjectivity, an important topic in contemporary studies of early modern literature and culture, emerges through such language.

## Antitheatricalism and the Movement of Sexual Difference

Excerpt from Gaines Thesis

### Introduction

When the first London playhouse was constructed in 1567, the meaning of the theater as a social institution was anything but fixed. Not only was the *Red Lion* amphitheater shortly replaced by the *Theatre* in 1576 and the *Curtain* in 1577, but these two successors faced a new type of playhouse in the private hall of Paul's Choir School, built in 1575 to host a boy's company rather than professional players. The first type of performance venue was modeled on bear-baiting pits while the other looked to the banquet hall for inspiration; this difference meant that the immense space of the public playhouse opened performance to thousands of playgoers each afternoon, whereas the size of the hall restricted its audiences to a few hundred people, suggesting that drama was something of an elite pastime (Gurr, 1996, 13-23).

The architectural difference between the public and the private playhouses demonstrates that, at its inception, the early modern theater was gesturing toward two contexts for performance. Here, the physical space of performance can be taken as a manifestation of the ideological architecture surrounding the texts of the plays themselves, in which the construction of the playhouses reflects two interpretations of the meaning of drama; the public playhouse treats performance as popular entertainment, akin to bear-baiting, whereas the hall presents drama as a class ritual, anticipating the masques of the Jacobean court. As Gurr (1996, 13) notes, the differences between the two houses "indicate more about the social antecedents of each type

than any difference in their commercial function.” The fact of this duality, in which playing negotiated itself as entertainment and as ritual, suggests that a profound ambiguity governed the identity of the early modern theater at the moment of its birth.

Indeed, as the theater eschewed its medieval origins in church pageantry in order to establish social and economic independence, the playhouses became the symbol for a new type of performance that was emerging in the late sixteenth century. Drama was no longer limited to being “either religious, and sponsored by local churches, or presented by traveling actors at inns and great houses throughout England,” as had been the case in the medieval period (Pollard, 2004, xi). Rather, as Agnew (1986, 17-56) argues, the playhouse converted performance into a form of market exchange, decreasing its status as religious ritual while simultaneously giving the playgoers a means of shaping the stage through their patronage. This power is reflected in the changing repertoire of the playing companies, constantly amended in order to keep the playgoers interested.

According to Gurr (1996, 119), “Henslowe’s *Diary* ... was above all an account of how intimate the interaction was between what the playgoers enjoyed and what the impresarios bought for them.” With the playhouse, then, performance became an independent form of discourse, not only in an economic sense of being partially liberated from royal and aristocratic patronage, but socially as well, in that the playgoers now commanded the spectacles set before them. Made by the market in this way, the theater developed a Protean quality as it moved from the church to the public and private playhouses, as its identity emerged from this movement of social and economic differences.

Given this instability with regard to the identity of the playhouse, it is not surprising that the theater became the subject of a fierce ideological campaign, waged by the independent factions of preachers, former playwrights, and city officials, who took up the pen in order to protest the disorder associated with performance. These antitheatricalists, as they have been termed, wrote in fear “of the collapse of identity within a new symbolic space, itself located in the incomprehensible new economic and social conditions of developing London.” (MacCabe, 1998, 13) Responding to the ambiguities discussed above — the instability regarding the meaning of performance, caused by the emergence of the playhouse — critics published a series of treatises in which the theater is depicted as the devil’s tool for drawing the audience into idleness and sensuality, as a pageantry of lies that undermine the distinction between reality and representation. In this way, the antitheatricalists attempted to fix the meaning of the playhouse through description and rhetoric. Seeking to limit what they considered to be the subversive potential of the theater, they wrote commentary on the playhouse in order to construct and thereby control its meaning in early modern England.

Considering the antitheatricalist campaign, one must wonder how its treatises were constructed, not in the corporeal sense in which one investigates how the author penned and printed a manuscript, but in terms of the internal, ideological construction through which the text produces meaning. How the text writes itself as an argument, how it structures its claims through juxtaposition, how it employs concepts such as “idleness” and “sensuality” to construct a meaning for the theater — these must be examined in order to understand what the antitheatricalist treatises were attempting to do with regard to the theater and

the social milieu in which it functioned.

The first printed attack on the stage, John Northbrooke’s *A Treatise wherein Dicing, Daucing, Vaine plaies or Enterludes with other idle past, &c, commonly used on the Sabboth day, are reprovved, by the authoritie of the worde of God and auncient Writers*, formulated many of the claims that would determine the antitheatricalist campaign. Although it is instructive to consider the development of these concepts in later treatises, such as Stephen Gosson’s *The Schoole of Abuse*, one can simply note this movement through a reading of Gosson’s later text, *Plays Confuted in Five Actions*, and thereby condense the argument for the sake of space.

At the same time that Gosson’s treatise contains echoes of these other texts, it extends antitheatricalist discourse to the point that its ideological underpinning, the concern for the position of women in early modern society, is made manifest. The following analysis demonstrates the validity of this thesis by tracing the movement of antitheatricalism through *Plays Confuted*, beginning with an ontological argument taken from Northbrooke’s treatise and concluding with the development of this ontology into a patriarchal concern.



## Analysis of Gosson’s Treatise

As noted above, Gosson’s *Plays Confuted in Five Actions* writes itself through to the claims of earlier antitheatricalist treatises, notably John Northbrooke’s *A Treatise wherein Dicing, Daucing, Vaine plaies or Enterludes with other idle past, &c, commonly used on the Sabboth day, are reprovved, by the authoritie of the worde of God and auncient Writers*. In that text, Northbrooke constructs an understanding of human existence that would become indispensable to later critics of the stage. He makes church-going a necessary fulfillment of one’s soul in being; that is: “the ende that we were created and redeemed for, that is, to learne to know God, to honour him, worship him, glorifie him, to feare him, love him, and obeye him.” (Northbrooke, 1579, C2r-v)

By the fact of one’s existence, a person is obligated to serve the Lord, a claim that the treatise pushes further to suggest that without this fulfillment of purpose that comes from worshipping God, one simply does not exist. Humans suffer as a result of “our owne infirmities, for that we are nothing, we knowe nothing, nor can perceive anie thing, as of our selves, without the helpe of Gods spirit, and the word of his promise.” (Northbrooke, 1579, C2v) Essentially, this is an

ontological argument, positing that humans exist and have knowledge to the degree that they serve God.

Taking this ontology as its foundation, Northbrooke's treatise proceeds to explain how a person's daily life should be structured in order to fulfill this divine purpose. Regarding the world, the text explains that while everything is inherently good, being created by God, these good things turn into sinful temptations when they turn away from their own good nature: "All which things of them selves, and by themselves, are good and lawfull. But when these things are occasions to hinder us, and drawe us backe from our obedience unto our God in his word, then are they turned into sinnes." (Northbrooke, 1579, D2v). In other words, sin is that which distracts a person from the worship of God, and one is required to direct all personal actions to the fulfillment of this purpose, as the text explains in quoting Dionysus: "Thou livest not to eate, but eate as thou mayest live: For there must bee a government to use it for thy health, and not to incontinence." (Northbrooke, 1579, D2r) Because all actions must return one to the holy purpose of living, it is necessary to avoid those pastimes that, being marked by a fundamental idleness, draw one into a sinful laziness. Thus one "forbid[s] (by Paules words) evil and unprofitable artes, as of Enterludes, Stage plaies, Juglings, (& false sleights, witchcrafts, Speculations, Divinations, or fortune tellings, and all other vaine and naughtie curious kinde of arts." (Northbrooke, 1579, F1r) These various activities are comparable in that each one constitutes a distraction that draws the individual away from the proper worship of God and into an idyll of sin. According to the assumptions of Northbrooke's treatise, each one entails the risk of returning the sinner to a state of nothingness, outside the meaning that comes with God's creation.

Gossen's *Plays Confuted* reproduces this ontology in articulating a distinction between carnal delight and spiritual pleasure. While the latter concerns one's purpose in existence, the former draws one into the nothingness of sin: "Carnall delight is the rest of sensuall appetite in the thing desired when it is felt," which suggests that performance provokes the body into desiring the spectacles it sees before it, both on-stage and among the bodies of other playgoers (Gosson, 1582, F3v). In distinction to carnal delight, one finds that spiritual pleasure is simply "the operation of vertue consisting in a meditation of the life to come purchased to us by the bloode of Christ, & reveiled for our comforte in the word of God." (Gosson, 1582, F3v) Spiritual pleasure can only be experienced in a life devoted to God, meaning that the theater, in stimulating the senses, offers a carnal delight that

distracts playgoers from devotion. The Fourth Action makes this argument more explicit: "Tragedies and Comedies stirre up affections, and affections are naturally planted in that part of minde that is common to us with brute beastes." (Gosson, 1582, F1r) Repeating the claim that playing encourages sensuality and thereby brings about a corruption of human nature, the treatise makes the assertion that the theater turns God's noble creatures into beasts.

As *Plays Confuted* develops this argument, it articulates the spiritual repercussions of playgoing, further drawing on the ontology of Northbrooke's treatise to do so. Because the theater emphasizes carnal delight at the expense of spiritual pleasure, it distracts the playgoers from their existence as spiritual entities, as beings created by God for the purpose of serving His divinity. Thus, the text states: "Our life is not his, excepte wee crucifie the flesh, with the affections and concupiscences of the same, we crucifie not the affections of our flesh, when we resort unto plays to stirre them upp, therefore running to playes we live to ourselves, and not to Christ." (Gosson, 1582, F8r) Thus the carnal delight that comes from playing has the effect of turning the playgoer away from God. Living for their own desires rather than according to their divine purpose, the playgoers repeat the sins that Christ redeemed in the Passion, effectively demanding that the Savior be crucified a second time rather than reform their ways. The text thereby implies that people exist solely for the purpose of worshipping the divine, so that it repeats the ontology of Northbrooke's treatise in critiquing the pleasures of playing.

*Plays Confuted* uses the First Action to develop these assertions into a cosmological argument, in which the world is depicted as a battleground for the forces of good and evil. As the treatise states to the reader, "this life of ours is a continuall warrefare, a pitchte field, wherein, as the lickerous toungue of our mother Eve hath justly provoked the Lorde, to set the devill and us at deadly feude." (Gosson, 1582, B5r) Drawing from the distinction between carnal delight and spiritual pleasure, the passage implies that human life consists in navigating between these two experiences. The text in turn reinforces this divide, as it associates the fall of humanity with the "tongue of our mother Eve," which, as the fleshy instrument by which the soul expresses itself, represents the intersection of the body and the spirit. In this context, the line suggests that as the literal embodiment of human frailty, the flesh is what condemns the soul to continual warfare on earth.

According to Gosson's treatise, Satan preys on the weakness of the flesh as a means of corrupting the soul. The reader is therefore warned: "he hath sett up many trappes, shott many nettes, bayted many hookes, to take us, to tangle us, to thrattle us. Which is enough to make us suspecte everie pleasure that hee profereth." (Gosson, 1582, B5v) The hunting imagery of this passage suggests that the Devil, using pleasure as a lure, captures people by depriving them of their human qualities, by turning them into the brute beasts that the treatise describes as populating the playhouse. As "the Prince of this world" rather than a king in any incorporeal realm, the Devil commands the flesh with carnal delight, the very means by which he draws individuals away from their spiritual obligation to God (Gosson, 1582, B5r-v).

Because the theater also entices people with idle pleasures and distracts them from their spiritual life, the treatise describes it as an instrument of the Devil. At a time when plague was rampant, the Devil

devised playing as a means of corrupting the pagan Romans: he “taught the Romanes by the oracles of Sibilla to set forth plaies to appease the anger of the Gods, that the pestilence ceasing after this solemnising of their plaies, might nusstle them in idolatrie and wantonnesse ever after.” (Gosson, 1582, C1v) Thus, the Devil conceived of plays as a means of teaching vice and concealed this function in convincing the Romans that theater could save them from the plague. The illusion that playing benefits a community merely disguises the theater’s function as a satanic device.

Having defined the theater in this way, the treatise interprets the struggle between the church and the playhouse as evidence of a cosmological war between God and the Devil. At the same time that God manifests Himself in the church and leads his followers to spiritual pleasure, the Devil occupies the playhouse in order to command his minions, which the treatise explains in an extended comparison:

Because that as in the Church singing and praying the Lorde together as hee him selfe hath instructed us in his worde, is a sign by whiche the true God is assured that we sacrifice our hearts unto him with the Calves of our lips: so the Divell, perceiving us to advaunce the offeringes or sacrifices of the Gentiles, after the same manner of houses, of apparell, of Stages, of Plaies, that he instructed the Gentiles by his Oracles, hath greate cause to bee merrie, and to holde him selfe honoured thereby. (Gosson, 1582, C2v)

The Devil, in addition to inventing performance as a tool for corrupting souls, has converted the playhouse into his chapel, using the space to enjoy the same worship that God is shown in church. Because playing is a stimulation of the senses, and therefore a means of drawing the playgoer out of a state of pious devotion, the theater is thoroughly the Devil’s institution.

With this religious foundation, *Plays Confuted* devotes its Second Action to an analysis of performance, seeking to demonstrate that the pedagogical theater advocated in Thomas Lodge’s *In Defence of Poetry, Music, and Stage-Plays* is impossible given the nature of theatrical representation. Although the “Yonge Master Lodge” asserts that “a Play is the School-mistresse of life; the lookinge glasse of manners; and the image of trueth,” the treatise counters these definitions by stating that plays represent an assortment of vices and virtues (Gosson, 1582, C4r). As such, they do not function as a moral guide but merely reproduce the confusion of everyday life: “The best play you can picke out, is but a mixture of good and evill, how can it be then the Schoolemistres of life?” (Gosson, 1582, C5v)

In making this assertion, Gosson’s treatise reveals its preference for a didactic theater, one that does not expect the playgoers to make judgments for themselves but rather gives them explicit moral instructions, much like a sermon. Here, the antitheatricalist interest in the church is coupled with a fear that people do not have the authority to judge moral dilemmas on their own. As the treatise explains:

At Stage Plays it is ridiculous, for the parties accused to replie, no indifferency of judgement can be had, beecause the worste sorte of people have the hearing of it, which in respecte of

there ignorance, of there ficklenes, and of there furie, are not to bee admitted in place of judgement. (Gosson, 1582, C8v)

Because individuals lack the ability to make good judgments, to interpret morality in the way that Gosson’s treatise demands, it argues that the mixture of vice and virtue in playing will always lead the playgoers astray. In merely representing the continual warfare that defines the playgoers’ time on earth, performance does not help them to resist the temptations of the flesh but merely plunges them back into confusion.

Having critiqued the plays on the basis of this ambiguity, *Plays Confuted* enters into a discussion of the nature of playing itself and, in doing so, develops the first sustained analysis of representation in the antitheatricalist campaign. The treatise begins by stating: “The perfectest Image is that, which maketh the thing to seeme, neither greater nor lesse, then indeede it is.” (Gosson, 1582, D5r) Because this definition does not distinguish between empirical and allegorical truth, it would seem that a symbol could be a perfect image in representing an abstract reality. The text, however, immediately negates this possibility by objecting to the fictions represented onstage: “those things are fained, that never were, as Cupid and Psyche played at Paules.” (Gosson, 1582, D5r) Accordingly, one finds that allegorical representations, such as those of Love and Mind, are objectionable because the symbols themselves never existed. Even in dealing with historical subjects, plays misrepresent their referents and thereby fail to appear as perfect images: “if a true Historie be taken in hand, ... the Poets drive it most commonly unto such pointes, as may best showe the maiestie of their pen, in Tragically Speeches; ... or wring in a shewe, to furnish the Stage, when it is to bare.” (Gosson, 1582, D5r) According to the text, then, plays are incapable of offering a true representation, either as a result of their content or the means by which this content is rendered onstage.

From these observations, Gosson’s treatise critiques the theater according to the nature of its representations, using an epistemological argument that implicates playing in the same manner as its effects on the playgoers. Borrowing a definition from Aquinas, the text begins this argument by defining a lie as:

an acte executed where it ought not. This acte is discerned by outward signes, every man must show him selfe outwardly to be such as indeed he is. Outward signes

consist either in words or gestures, to declare our selves by wordes or by gestures to be otherwise than we are, is an act executed where it should not, therefore a lie. (Gosson, 1582, E5r)

In equating an action with outward signs, this passage argues a lie to be more than a deception of words. Rather, a lie is the act of misrepresenting, the work of introducing a gap between truth and the signs that declare it. Not only does performance constitute a lie, therefore, but this description points to the epistemological disorder caused by playing as well. Because the players use words and gestures to persuade an audience that they are not what they are, they undermine the distinction between reality and representation.

*Plays Confuted* mixes this argument on the relationship of lies to playing with the same patriarchal concern. The cross-dressing boy, in putting the signifiers of sexual identity into play, undermines the distinction between the sexes that makes patriarchy possible. The treatise states this concern as follows:

The law of God very straightly forbids men to put on women's garments. Garments are set down for signs distinctive between sex and sex: to take unto us those garments that are manifest signs of another sex is to falsify, forge, and adulterate, contrary to the word of God. (Gosson, 1582, E3v)

The anxiety of this passage emphasizes that the outward signs of garments are necessary for distinguishing one sex from another, which suggests that the reality of any physical difference can be completely undermined by the misrepresentation that is cross-dressing. Indeed, Greenblatt (1989, 80-1) notes that, in early modern studies of the body, the biological difference between men and women was profoundly mutable. The vagina and the penis were understood to be the same organ, situated inside or outside the body according to its temperature, as Galen explains in his medical treatise *On the usefulness of the parts of the body*:

the female was made cold, and the immediate consequence of this is the imperfection of the parts, which cannot emerge on the outside on account of the defect in the heat... [R]emaining within, that which would have become the scrotum if it had emerged on the outside, was made into the substance of the uteri. (Aughterson, 1995, p. 48)

Although temperature refers to the heat of the body as it is formed in the uterus, and seems to suggest that once one's sex is determined, it cannot change, the rest of the passage implies that sexual identity, being determined by the position of a single organ, may metamorphose if given the right conditions. Greenblatt (1988, p. 81) cites an example of a French peasant girl who transformed into a boy while running through the fields; "Marie in midpursuit leaped over a ditch, 'at the very moment the genitalia and male rod came to be developed,'" a change ostensibly caused by having stretched her legs "too wide."

If such an act can cause the vagina to fall outside of the body and thereby transform into the penis, then cross-dressing also has the ability to cause this organ to change its position. Altering the heat of the body with different attire, one could effectively become the sex that one was pretending to be. Not only does cross-dressing play with the signs required for telling the sexes apart, but it also points to the moment in which representation can turn into reality, in which the transvestite becomes the impersonated sex.

In Phillip Stubbes' *The Anatomy of Abuse* (1583), the relationship between cross-dressing and the metamorphosis of sexual identity is succinctly articulated, demonstrating that this concern was circulating in the discourse of the antitheatricalism. Describing female transvestites who roam the streets of London, the treatise states: "these women maie not improperly bee called Hermaphroditi, that is, Monsters of bothe kindes, halfe women, halfe men," since "to weare the apparell of an other sexe, is to participate with the same, and to adulterate the veritie of his owne kinde." (Stubbes, 1583, F8r) The antitheatricalist campaign against cross-dressing, then, is an attempt to control clothing as a sign that determines, rather than reflects, sexual identity. Thus Targoff (1997, 52) states of the antitheatricalists, "Behind their arguments against theatrical hypocrisy lies a far more profound concern: that what began as a purely hypocritical performance would have become a transformative experience." This section of *Plays Confuted* attempts to stop a play of sexual identity, literally with regard to the placement of the vagina/penis and symbolically according to the position of gender in patriarchal society.

In advancing this critique of the theater, *Plays Confuted* develops the concepts circulating in antitheatricalist discourse in order to write a comprehensive attack that would end the English stage forever. Taking the ontology of Northbrooke's treatise as its foundation, the text articulates a distinction between carnal delight and spiritual pleasure, adding that the former draws one away from a necessary devotion to God. Insofar as the critique of sensuality is an attempt to preserve the sanctity of human reason, *Plays Confuted* develops this argument in stating that theater confuses the playgoers by representing a mixture of vice and virtue. Because playing is nothing more than seeming to be what one is not, the theater is a pageantry of lies, an affront to reason in its corruption of distinction between reality and representation. Its argument on the immorality of cross-dressing, when interpreted in light of early modern theories of the body, reveals an antitheatricalist attempt to fix sexual identity by controlling the signs of its construction.



## Summary

When the first playhouses removed performance from the religious context that had controlled it throughout the medieval period, the theater became associated with the marketplace, offering plays as a commodity that could be purchased with a penny. For the antitheatricalists, this transformation led the self away from God, literally in taking playgoers out of the church and symbolically in corrupting the soul through sensual pleasure. As Hawkes (1999, 262) asserts, “The antitheatricalists argue that the idolatrous commodification of the theater produces a fleshy, carnal mode of perception — a thoroughgoing *objectification* of consciousness.” The concern that develops in Northbrooke’s treatise, that playing celebrates corporeality and, thereby, turns a playgoer into a nothingness of sin, has its corollary in this perception of the theater, that it reifies consciousness and, like a marketplace of the soul, puts this thing into circulation. *Plays Confuted* offers the most explicit evidence of this antitheatricalist concern, because its critique of playing is expressed as the fear that this inherently deceitful art plays with the signs that determine identity.

Because costume has the power to rewrite sexual identity, the cross-dresser is a literal embodiment of this threat. His body functions as a site of ambiguity, determined according to representation, as Sedigner notes in the following passage:

the crossdresser is not a visible object but rather a structure enacting the failure of a dominant epistemology, in which knowledge is equated with visibility. This epistemology subtends an early modern sexual politics that sought to inscribe gender on the individual body not as representation but as ontology. (1997, 64)

Cross-dressing suggests that the self, like sexual identity, is not stable but rather constructed through the signs by which it represents itself. Determining identity as a function of discourse, playing represents selfhood as the exchange of signifiers, a circulation that mirrors the transactions of the emerging market. Considering this pseudo-commodification of the self to be an adulteration of the soul, antitheatricalists “were trying to stop the visible transformations of the self encouraged by the theater and the marketplace,” as Howard (1994, 35) states, “by championing the view that one’s place was in the hierarchical social order determined by God and was, properly speaking, immutable.” Constructing the theater as a haven for sensual pleasure, as a space in which lies may become truth, antitheatricalism responds to the emergence of the playhouse by attempting to write the self as unchanging. Taking “playing” as its object, this discourse aimed to construct the playhouse through language and thereby finalize the meaning of this institution by making it a signifier of sin.

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## Works Cited

- Agnew, Jean-Christophe. *Worlds Apart: The Market and the Theatre in Anglo-American Thought, 1550-1750*. Cambridge: Cambridge University Press, 1986.
- Aughterson, Kate. *Renaissance Woman: A Sourcebook*. New York: Routledge, 1995.
- Gosson, Stephen. *Plays Confuted in Five Actions*. London: 1582.
- Greenblatt, Stephen. “Fiction and Friction.” *Shakespearean Negotiations*. Berkeley: University of California Press, 1988. pp. 66-93.
- Gurr, Andrew. *Playgoing in Shakespeare’s London*. Cambridge: Cambridge University Press, 1996.
- Hawkes, David. “Idolatry and Commodity Fetishism in Antitheatrical Controversy.” *Studies in English Literature, 1500-1900* 39:2 (Spring 1999): 255-73.
- Howard, Jean E. *The Stage and Social Struggle in Early Modern England*. New York: Routledge, 1994.
- MacCabe, Colin. “Abusing self and others: Puritan accounts of the Shakespearean stage.” *Critical Quarterly* 3 (Autumn 1988): 3-17.
- Northbrooke, John. *A Treatise wherein Dancing, Daucing, Vaine plaies or Enterludes with other idle past, &c. commonly used on the Sabbath day, are reprooved, by the authoritie of the worde of God and auncient Writers*. London: 1579.
- Pollard, Tanya, ed. *Shakespeare’s Theater: A Sourcebook*. Malden: Blackwell, 2004.
- Sedinger, Tracey. “‘If Sight and Shape be True’: The Epistemology of Crossdressing on the London Stage.” *Shakespeare Quarterly* 48:1 (Spring 1997): 63-79.
- Stubbes, Phillip. *The Anatomy of Abuses*. London: 1583.
- Targoff, Ramie. “The Performance of Prayer: Sincerity and Theatricality in Early Modern England.” *Representations* 60 (Autumn 1997): 49-69.

I am a senior level student in the College of Nursing and a fifth year student at the University of Kentucky. I became a research intern in the spring semester of 2005, working under the guidance of Dr. Patricia V. Burkhart, Associate Professor of Nursing, whose research focuses on children and adolescents with asthma. In my role as a research intern on a clinical trial supported by a grant awarded to Dr. Burkhart from the National Institutes of Health and a Faculty Research Support Grant at the University of Kentucky, I have expanded my understanding of the basic concepts of conducting research and gained experience working with the pediatric and adolescent populations.

Throughout my internship I have participated in and contributed to research team meetings; developed an understanding of the Institutional Review Board process; scheduled and attended monthly video conferences with the University of Iceland to develop a grant proposal and to conduct a pilot study; assisted with mentoring a fellow research intern; and developed an abstract and Power Point presentation for the Closing Address at the 2006 Student Scholarship Showcase, in the College of Nursing at the University of Kentucky.

I was one of the co-authors, with Dr. Burkhart, of an abstract accepted for an oral podium presentation at the Sigma Theta Tau 17th International Nursing Research Congress held in Montreal, Canada, in July, 2006. I attended and co-presented with Dr. Burkhart at this conference after obtaining funding to support my travel expenses. I attribute much of my success and accomplishments to the support and encouragement I continuously receive from Dr. Burkhart. She stands out as one of the most positive role models in my life.

In addition to being an undergraduate student and a research intern, I currently work as a Nursing Care Tech at the University of Kentucky Hospital, working throughout the summer of 2006 as a SNAP (Student Nurse Apprentice Program) participant in the UK Hospital Emergency Department. In addition, I am a member of the Delta Psi Chapter of Sigma Theta Tau International, Honor Society of Nursing; a member of the National Society of Collegiate Scholars; and a National Dean's List member since 2003. I enjoy spending time with my family and friends and I love the outdoors.

I am focused, confident, self-assured, and interested in learning and becoming a high quality nurse. I strive for success and enjoy dedicating the time and energy needed to achieve positive outcomes in each endeavor. My involvement as a research intern has been an excellent opportunity to learn about childhood asthma and to reach out to those who suffer from this disease. Nursing is an evidence-based practice and our research efforts are helping to advance the profession's understanding of pediatric asthma self-management. I will graduate from the College of Nursing in May of 2007 and work as a registered nurse while pursuing a graduate degree. My long-term goals are to provide patient care, offer health care leadership, utilize and implement research findings in a patient-care setting, as well as assist in the development of programs intended to improve patient awareness and management of health conditions.

**Mentor: Patricia Vernal Burkhart, PhD, RN, Associate Professor, College of Nursing**



## Peak Flow versus Symptom Monitoring to Manage Childhood Asthma

### Abstract

Asthma is the most prevalent chronic respiratory disease in children. If asthma is not well managed, it can result in significant morbidity and mortality. The purpose of this paper is to assess the effects of peak flow versus symptom monitoring on asthma health outcomes in children. A literature review was conducted for research articles related to peak flow and symptom monitoring as they relate to asthma outcomes in children. The MEDLINE, PubMed, and CINAHL databases were accessed. The search was narrowed to include articles from the years 2000-2006 using the search terms child, asthma, peak flow meter, and symptom monitoring. The benefits of peak flow monitoring versus symptom monitoring in improving health outcomes is a controversial issue. Reliable evidence that can be generalized to the child asthma population is equivocal. Further evidence-based research is needed to determine whether peak flow monitoring or symptom-based asthma action plans promote the best health outcomes in children with asthma.

My program of research focuses on testing effective self-management strategies, including peak flow monitoring, to improve health outcomes and quality of life for children with asthma. Results of our studies have significant implications for improving the health and well being of children diagnosed with asthma. This paper summarizes some of the literature regarding the use of peak flow meters to improve asthma self-management and health outcomes, including the intervention we tested in our own randomized, controlled clinical trial funded by the National Institute of Nursing Research at the National Institutes of Health. I feel this paper is quality work for an undergraduate student, and I am excited to assist Ms. Ohlmann to achieve her research internship goal of becoming a published author. It is with pleasure that I endorse this work for publication in Kaleidoscope.



## Introduction

Asthma education including avoidance of asthma triggers, self-monitoring of asthma symptoms, the use of asthma action plans, and adherence to prescribed asthma medications are recommended as part of asthma self-management. Written asthma action plans that direct asthma self-management interventions have been found to be beneficial in reducing asthma morbidity (NAEPP, 1997; 2003). However, there is much debate regarding whether the patient's action plan should be based on symptom monitoring or peak flow monitoring. This clinical controversy is part of the quest for best practices to help in the management of this chronic disease. Adequate disease management is a critical factor in the effort to reduce asthma-related morbidity and mortality.

The National Asthma Education and Prevention Program (NAEPP, 1997; 2003) *Guidelines for the Diagnosis and Management of Asthma* recommend that patients with moderate or severe persistent asthma and those who do not perceive their symptoms until airflow obstruction is severe be taught to use a peak flow meter (PFM) at home. This is particularly relevant for children who generally have poor symptom perception (Yoos & McMullen, 1999). Peak expiratory flow rate (PEFR) provides a quantitative measure to detect the existence and severity of airway obstruction during an asthma exacerbation and guides therapeutic decisions. Once the child's personal best PEFR is determined, an asthma action plan can be developed so that the child and family know what to do if the PEFR decreases, indicating compromised airflow. However, "evidence neither supports nor refutes the benefits of written action plans based on peak flow monitoring compared to symptom-based plans in improving health care utilization, symptoms, or lung function," (NAEPP, 2003, p. 85). The purpose of this literature review is to compare the effects of peak flow monitoring versus symptom monitoring for children with asthma.

## Prevalence and Impact of Childhood Asthma

According to the National Health Interview Survey conducted by the Centers for Disease Control and Prevention (CDC, 2003), asthma is a chronic respiratory disease affecting 9.1 million (12%) children in the U.S. under the age of 18. Of the respondents, 4.0 million children (5.4%) reported having an asthma attack in the past year. Asthma is characterized by episodes of inflammation and narrowing of the small airways in response to asthma triggers, such as allergens, infection, exercise, abrupt weather changes, or exposure to airway irritants. Symptoms of asthma include cough,

shortness of breath, wheeze, and chest tightness (CDC, 2002). Among the children 5-17 years of age who reported having at least one asthma attack in the past year, 14.7 million school days were missed due to an asthma related episode. Children aged 0-17 years had 5 million visits to private physician offices and hospital outpatient departments (687 visits per 10,000). Over 727,000 Emergency Department visits were reported (100 per 10,000) among children aged 0-17 years, with the highest being children aged 0-4 years. Asthma deaths are rare among children; however, 187 children aged 0-17 years died in 2002 from asthma (0.3 deaths per 100,000), with Non-Hispanic blacks having the highest mortality rate (CDC, 2002). The possibility of exposure to the many environmental and physiological triggers signifies the importance of children with asthma having a dependable written action plan to serve as a guide for self-management.

## Guidelines Recommended for Asthma Self-Management

One of the objectives of *Healthy People 2010* (ODPHP & DHHS, 2000) is to reduce asthma deaths, hospitalizations related to asthma, emergency department visits for asthma exacerbations, activity limitations, missed school days related to asthma episodes, and to increase the proportion of persons with asthma who receive formal patient education. The importance of asthma education, including interventions to improve the ability of children and their parents to recognize changes in airflow, is also emphasized. The NAEPP guidelines suggest that available scientific evidence regarding objective peak flow monitoring versus symptom-based asthma self-management is equivocal. Comprehensive asthma self-management programs that include peak flow monitoring may improve patients' health outcomes, but the guidelines suggest that the issue needs to be studied further (NAEPP, 1997; 2003).

An Expert Asthma Panel agreed that there are two distinct arguments for recommending peak flow monitoring: (a) clinician-patient communication is enhanced by the use of peak flow monitoring, and (b) patient awareness of the disease status and control is increased by peak flow monitoring if taught correctly (NAEPP, 2003). PEFR monitoring is recommended as part of asthma self-management for children with moderate and severe persistent asthma, to detect the presence and severity of airway obstruction. In addition, the Expert Panel recommended prescribing a PFM for any patient with asthma who prefers to rely on an objective measure, rather than perceived signs

and symptoms of an asthma exacerbation (NAEPP, 1997; 2003), because symptom perception is often difficult and inaccurate. For subjective symptom monitoring to be effective, the child must understand that coughing, wheezing, chest tightness, and breathlessness are symptoms of an asthma exacerbation (CDC, 2002). Accurate and early recognition of these symptoms allows for adequate treatment to be implemented. Nurses are responsible for educating children with asthma on how to manage their disease by teaching these self-monitoring strategies.

### Teaching Asthma Self-Monitoring Strategies

Peak flow monitoring provides a simple objective measurement of airway narrowing and can be taught to children. According to the NAEPP guidelines, peak flow meters are recommended for patients with persistent asthma. During an asthma exacerbation the airways of the lungs narrow. A PFM can measure how well air moves out of the lungs during forced expiration and can detect narrowing hours or even days before symptoms occur. PFMs can be used by children age five and older to help them learn what makes their asthma worse, decide if the treatment plan is working, decide when to add or stop medicine, and decide if emergency care is necessary (NAEPP, 1997).

According to Piaget's cognitive developmental theory (1962), school-age children are in the stage of concrete operations and begin to develop an understanding of the relationship between objects and ideas. During this stage, a child can mentally process how to use a peak flow meter and can understand what the meter is measuring. When teaching a child to use a PFM, the nurse should first have the child move the indicator to the bottom of the PFM. The child should stand up, take a deep breath filling the lungs completely, and blow out as hard and as fast as possible in one single blow. The number noted on the meter should be written down as long as a mistake in technique was avoided (NAEPP, 1997). If the child coughs or needs to repeat the blow again, the child should be reassured and encouraged to try again. School-age children are eager to build skills and engage in tasks, such as using a PFM, which can help them to obtain a sense of competence or mastery (Hockenberry et al., 2003). After achieving a successful reading on the PFM, the steps need to be repeated two more times and the highest of the three PEFr values should be recorded in the child's asthma diary (NAEPP, 1997).

The NAEPP (1997) guidelines describe a child's personal best PEFr number as the highest peak flow number achieved over a two-to-three week period when the child's asthma is under good control, meaning that the child is not experiencing any asthma symptoms. Peak flow monitoring should be performed first thing in the morning, between noon and 2 PM each day, each time a short-acting inhaled bronchodilator medication is administered to relieve symptoms, and at other times suggested by the health care provider. The child's personal best is used as a baseline to guide the development of a written action plan that includes appropriate interventions based on whether the child is in the green zone (at least 80% of personal best), yellow zone (50-80% of personal best), or red zone (< 50% of personal best). The green zone indicates good asthma control, and the patient's current asthma medications should be taken as prescribed. The yellow zone represents caution, the airways are constricting, and the patient's prescribed bronchodilator medication is needed. The red zone signifies a medical alert for which the child should seek medical attention immediately in the emergency department

or from the health care provider. The asthma diary should be used daily to keep track of the child's peak flow values and should be shared with the patient care provider at each health care visit.

The NAEPP recommends that all children with asthma be taught to recognize symptom patterns that indicate poor asthma control, especially those who choose not to use a PFM and prefer to treat their asthma based on their perceived symptoms. Understanding can be achieved by teaching children the signs and symptoms of an asthma exacerbation and by explaining how each symptom will make them feel. Uncontrollable coughing, periods of breathlessness, notable wheezing while breathing, and chest tightness or pressure indicates the emergent need for asthma treatment. When children experience these symptoms, it is important that they recognize them as the onset of an asthma exacerbation and report them to someone who can help facilitate appropriate treatment measures. Symptoms can occur in the early morning, during the day, at night, while at rest, and during exertion. Failure to recognize or the inaccurate interpretation of asthma symptoms creates serious concern and puts the child's life at risk. It is critical that children understand the symptoms signaling the onset of an asthma exacerbation and are prepared to treat their symptoms, based on a written asthma action plan provided by their health care provider (NAEPP, 1997).

### Review of Relevant Literature

To achieve a better understanding of asthma self-management strategies and the possible benefits, a literature review of the most current studies on symptom and peak flow monitoring for children with asthma was conducted. The computerized databases of MEDLINE, PubMed, and CINAHL were accessed. The search was narrowed to include articles from the years 2000-2006 using the search terms child, asthma, peak flow meter, and symptom monitoring. Five publications, representing four studies, were found that compared PEFr with symptom monitoring in children with asthma (see Table 1).

A longitudinal randomized clinical trial compared the effect of PEFr with symptom monitoring in children (Yoos et al., 2002). The purpose was to determine whether PEFr monitoring decreased asthma morbidity compared with self-management guided by symptom recognition alone for children (N = 156) ages 6-19 years of age. Children were randomly assigned to one of three treatment groups: 1) subjective symptom monitoring, 2) PEFr monitoring when symptomatic, or 3) PEFr monitoring twice daily and when symptomatic. Each group received

asthma education, including training in subjective symptom recognition, as well as a personal action plan for asthma management. At three months post intervention, children using a PFM when symptomatic had lower asthma severity scores, fewer symptomatic days (symptoms decreased by 1 day per week), and less healthcare use for asthma three months after completing the intervention. Significant improvements were found in minority and poor children compared with Caucasian children of higher socioeconomic status when they used PFMs. These findings suggest that children who have greater asthma severity and those who face socioeconomic challenges seem to benefit most from using objective

peak flow monitoring to manage their asthma (Yoos et al., 2002).

Using the same sample as the Yoos et al. (2002) study, the authors assessed 136 children who remained in the study, completing a one-year follow-up. Of the children continuing to use a PFM one year after completing the study, 6% of the children were daily users, 63% reported use when symptomatic, and 30% discontinued use (McMullen, Yoos, & Kitzman, 2002). Children who reported more frequent symptoms also reported more frequent use of their PFM ( $r = 0.48$ ;  $p < 0.0001$ ). When the parents reported on their child's reaction to PFM use, 50% reported PFMs as beneficial because the objective data was reassuring to their child, promoting confidence and a sense of mastery. When parents were asked about their child's attitude toward PFM use, 15% reported it as neutral and 35% described their feelings as negative because regular use became a burden and the child became resistant to its use. Benefits were

**Table 1. Studies of Approaches to Childhood Asthma Management**

Authors	Year	Sample Size	Age in Years	Study Design/ Sampling	Measurement of Asthma Systems	Health Outcomes/ Conclusions
Burkhart, P.V., Rayens, M.K., & Revelette, W.R.	2006	N = 77	7-11	Experimental Design: Simple Ran- dom Sam- pling	Electronic PEFR Monitor	Children using PEFR monitors experienced a significant decrease from baseline to week 16 in asthma episodes, physician or clinic visits for exacerbations, and missed school days. Of those who were at least 80% adherent, 33% had an asthma episode in the last 8 weeks compared to 57% of those who were less adherent.
McMullen, A.H., Yoos, L., & Kitzman, H.	2002	N = 136	6-19	Experimental Design: Longitudinal Clinical Trial; Stratified Random Sampling	Self-Report	One year after the intervention study, the majority of PFM users were only using the PFM during symptomatic times. Only 6% were daily users, 63% reported use when symptomatic, and 30% discontinued use. Daily use is not perceived as useful by most families and is an unrealistic expectation for most children.
Tinkelman, D. & Schwartz, A	2004	N = 41	5-15	Quasi- experimental Design: Longitudinal; Non-random Convenience Sampling	Self-Report	After 6 months of the education program, the number of missed school days and unscheduled doctors visits decreased by 67% and 60%, respectively. An 11% increase in the child's activity level was found. 14 children experienced a 62% decrease in symptom frequency during the day and a 34% reduction at night. One year into the program, the daytime and nighttime symptoms decreased by 69% and 100%, respectively. At 6 months, 71% of the children used their diary three times a week and about 90% used it once a week.
Wensley, D. & Silverman, M.	2004	N = 90	7-14	Experimental Design: Open, Prospective, Parallel-group Controlled Trial; Simple Random Sampling	Electronic PEFR Monitor	No significant differences were found in children's symptom scores, lung function tests, quality of life scores, PEFR, or their health care utilization. Based on these results, knowledge of PEFR did not enhance asthma self-management, even in acute episodes. Children were able to recognize changes in symptoms and respond accordingly before the PEFR recording was < 70%.

perceived by 36% of parents whose child used a PFM daily compared to 63% of parents of symptom-time PFM users. Most parents and children did not perceive the use of a PFM during asymptomatic times as beneficial in detecting lung function changes; therefore, children using PFMs while experiencing symptoms sustained better long-term adherence. Adolescents were twice as likely to discontinue PFM use compared with school-aged children. These findings support the use of PFMs for children who experience difficulty perceiving and controlling their asthma symptoms. New strategies are needed to engage adolescents in managing their asthma (McMullen et al., 2002).

Wensley and Silverman (2004) studied 90 children with asthma to determine whether incorporating PEFr recordings into a symptom-based asthma self-management program improved the child's symptom score, lung function tests, and quality of life. The children, ages 7-14 years, were randomized into a PEFr plus symptom-based management group or the symptom-only management group. Both groups recorded their symptoms in an asthma diary. The PEFr group performed twice daily monitoring. In both groups, adherence to monitoring decreased from 90% in Month 1 to 79% in Month 3 of the 12 week trial. No significant differences were found in their symptom scores, lung functions tests, quality of life scores, PEFr, or their reported health care utilization. The results of this study suggest that knowledge of PEFr did not enhance asthma self-management, even in acute episodes. Children were able to recognize changes in symptoms and respond accordingly before the PEFr recording was less than 70%. Possible limitations exist within this study: the study was not blinded after the subjects were randomized; more boys were randomized into the PEFr group; and both groups were given written asthma actions plans, so it could not be determined if guided self-management was effective. A small sample size may have impeded the ability to obtain statistically significant differences among the groups, and the thoroughness of the asthma self-management education provided to both groups may have improved the skills of the symptom management group and reduced the benefit of the twice daily PEFr monitoring (Wensley & Silverman, 2004). This suggests the need for a thorough nursing assessment to determine the child's ability to perceive symptoms and to ultimately decide if a PFM may help with asthma control.

Tinkelman and Schwartz (2004) reported on the experiences of children (N = 41) and their caregivers who participated in a six-month comprehensive, school-based asthma management program. Their aim was to determine whether the designed self-management interventions would reduce measures of asthma control, student absenteeism, and caregiver lost workdays. Study subjects were given two peak flow meters (one for school and one for home use), training in PEFr, a computerized asthma diary, monthly educational sessions on an asthma-related topic, and access to an asthma education resource. Parents of the children also received asthma education and an asthma action plan. At 6 months, the number of missed school days and unscheduled doctor visits decreased by 67% and 60%, respectively. An 11% improvement in the caregiver's perception of their child's activity level was found. Daytime and nighttime symptom frequency decreased by 62% ( $p < 0.07$ ) and 34% ( $p < 0.03$ ), respectively. Reduced symptom frequency persisted at 12 months post-intervention. Although this study did not specifically

focus on the outcomes when using a peak flow meter for self-management versus symptom-based asthma management, the results were supportive of asthma education and monitoring that involves the use of a peak flow meter. The children were taught to recognize symptoms and to take appropriate management steps (Tinkelman & Schwartz, 2004). These findings support nursing implementation of an asthma management program that includes the use of a PFM to improve child asthma control and quality of life.

In a recent clinical trial, asthma-related health outcomes were assessed for school-age children (N = 77; ages 7-11 years) who were taught daily peak flow monitoring (Burkhart, Rayens, & Revelette, 2006). Significant clinical findings were noted among all participants using a PFM, including a decrease from baseline to week 16 in asthma episodes, missed school days, and physician or clinic visits for asthma exacerbations. Of the subjects whose peak flow monitoring adherence rate was at least 80%, 33% had an asthma episode during the last 8 weeks. For those who were less than 80% adherent, the asthma episode rate during the last 8 weeks was 57% ( $p < 0.04$ ). These findings suggest that frequent self-monitoring with a PFM may have enhanced children's awareness of their disease status signaling the need for early intervention to prevent asthma exacerbations. This daily self-monitoring strategy may have promoted asthma self-management, so that fewer school days were missed due to asthma and fewer visits to acute care centers were necessary for asthma exacerbations.

### Significance to Nursing

Nurses caring for children in a primary care or in a hospital setting will frequently encounter children with asthma and be responsible for educating the child and family about asthma self-management. Intensive one-on-one asthma education, guidance, and support from a nurse educator may positively impact the patient's health outcomes (NAEPP, 1997; 2003). Based on the current research, nurses cannot confidently say that using a peak flow meter daily or during asthma episodes to guide treatment yields better outcomes than patient perception of symptom severity. When patient education is needed for a child with asthma, the research question being reviewed becomes an issue. Should nurses teach parents and their children how to use a peak flow meter and keep a daily diary of their peak flow recordings and symptoms or should nurses put more emphasis on teaching subjective-symptom monitoring to determine the plan for treatment?

## Conclusion

A review of recent data-based research articles published during the last five years that compared health outcomes for children who used objective PEFR versus symptom monitoring was conducted. Only four studies were found, with one of the studies published in two separate articles (i.e., McMullen et al., 2002 and Yoos et al., 2002). The available evidence regarding peak flow monitoring versus symptom monitoring for improving asthma outcomes in children remains equivocal. Some results were supportive of asthma education and monitoring involving the use of a peak flow meter (Burkhart et al., 2006; Tinkelman & Schwartz, 2004), but others concluded that knowledge of PEFR did not enhance asthma self-management, even in acute episodes (Wensley & Silverman, 2004). It has been suggested that all children may not benefit from PFM use, but those who have greater asthma severity, those who face socioeconomic challenges, and those who experience difficulty in perceiving and controlling asthma symptoms may benefit most (McMullen et al., 2002; Yoos et al., 2002). Further evidence-based research is needed to determine whether peak flow monitoring or symptom-based asthma action plans promote the best health outcomes for children with asthma. These findings would provide nurses with the evidence to incorporate these self-management strategies into their practice to enhance the quality of patient care and improve patient health outcomes.

## Recommendations for Future Research

The NAEPP guidelines (2003) suggest that future research needs to center on studies:

- With adequate power and objective measurement tools to determine whether peak flow monitoring provides benefits over symptom monitoring when managing childhood asthma
- Focusing on children, because children may not be able to readily recognize and report asthma symptoms as well as adults
- Comparing short-term (i.e., only during exacerbations of asthma) versus long-term (i.e., daily) use of peak flow meters for asthma management
- Evaluating the influence of disease severity and age of the child in determining the benefits of peak flow monitoring

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## Works Cited

- Burkhart, P.V., Rayens, M.K., & Revelette, W.R. (2006). "Asthma outcomes improve with peak flow monitoring." *The Journal of Allergy and Clinical Immunology*, 117(2), S90.
- Centers for Disease Control and Prevention (2002). National Center for Health Statistics: "Asthma prevalence, health care use and mortality." Retrieved January 20, 2006, from <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/asthma.htm>
- Centers for Disease Control and Prevention (2003). National Center for Health Statistics: "Summary health statistics for U.S. children: National Health Interview Survey." Retrieved January 20, 2006, from <http://www.cdc.gov/nchs/fastats/asthma.htm>
- Hockenberry, M.J., Wilson, D., Winkelstein, M.L., & Kline, N.E. (2003). *Wong's nursing care of infants and children (7th ed.)*. St. Louis: Mosby.
- McMullen, A.H., Yoos, L., & Kitzman, H. (2002). "Peak flow meters in childhood asthma: Parent report of use and perceived usefulness." *Journal of Pediatric Healthcare*, 16, 67-72.
- National Asthma Education and Prevention Program (NAEPP) (1997). *Expert Panel Report II: Guidelines for the diagnosis and management of asthma* (NIH publication 97-4051). Bethesda, MD: National Heart, Lung, and Blood Institute, National Institutes of Health.
- National Asthma Education and Prevention Program (NAEPP) (2003). *Expert Panel Report: Guidelines for the diagnosis and management of asthma: Update on selected topics 2002*. Bethesda, MD: National Heart, Lung, and Blood Institute, National Institutes of Health. Retrieved January 20, 2006, from [www.nhlbi.nih.gov/guidelines/asthma/asthmafullrpt.pdf](http://www.nhlbi.nih.gov/guidelines/asthma/asthmafullrpt.pdf)
- Office of Disease Prevention and Health Promotion [ODPHP] & U.S Department of Health and Human Services [DHHS] (2000). *Healthy people 2010: Objectives for improving health (2nd ed.)* Retrieved February 18, 2006, from <http://www.health.gov/healthypeople>
- Piaget, J. (1962). "The stages of the intellectual development of the child." In J.L. Menninger (Ed.), *The Bulletin of the Menninger Clinic*, 26(3), (pp. 120-128). Topeka, KS: Menninger Foundation.
- Tinkelman, D., & Schwartz, A. (2004). "School-based asthma disease management." *Journal of Asthma*, 41, 455-462.
- Wensley, D., & Silverman, M. (2004). "Peak flow monitoring for guided self-management in childhood asthma: A randomized controlled trial." *American Journal of Respiratory and Critical Care Medicine*, 170, 606-612.
- Yoos, H.L., & McMullen, A. (1999). "Symptom perception and evaluation in childhood asthma." *Nursing Research*, 48, 2-8.
- Yoos, H.L., Kitzman, H., McMullen, A., Henderson, C., & Sidora, K. (2002). "Symptom monitoring in childhood asthma: A randomized clinical trial comparing peak expiratory flow rate with symptom monitoring." *Annals of Allergy, Asthma & Immunology*, 88, 283-291.



I am a senior in the College of Arts and Sciences, majoring in psychology and philosophy, and I am a member of the UK Honors Program.

This project, “Friend over Foe: Friendship Quality and Chronic Peer Victimization,” describes my senior honors thesis and is part of the Capstone segment of my undergraduate psychology degree. In August, I will pursue graduate studies in Emory University’s Clinical Psychology Ph.D. program, where I am a recipient of a merit fellowship from the Graduate School of Arts and Sciences. At Emory,

I will work with Scott Lilienfeld, conducting research in the areas of impulsivity, disinhibition, and personality disorders, such as psychopathic personality disorder. I will also focus on problems in diagnosis, assessment, and treatment of various psychopathologies.

The project I am reporting here has been formative in my upcoming pursuits in many ways. Broadly speaking, being responsible for a research project and working under the instruction of my project mentors has given me a taste of the kind of work that graduate training entails. Indeed, it has afforded me basic foundations in research design and methodology and given me a grasp of the literature in a way that classroom learning can never match; more specifically, the content domain is highly germane to my future interest. Because the precise causes of adult psychopathology and personality disorders are yet to be determined, gaining insight into childhood disorders and developmental trajectories may be a fruitful route for better understanding the etiology of psychopathology in myriad domains.

Working with Dr. Milich and Dr. Kern has been a singular experience in my undergraduate studies, one that every student should be so fortunate to enjoy. Receiving close attention and direction from accomplished researchers has provided a venue for understanding this sphere of inquiry that is utterly distinct from anything I could acquire in a passive learning environment. Initially, Dr. Kern and Dr. Milich directed me to articles describing relevant theories in the child psychology literature and made sure I understood the models and questions driving this research. They met with me regularly to discuss these ideas and helped me carve out a unique niche for my honors thesis by helping me to understand critical issues for the study. Under their instruction, I have been both encouraged and challenged; I cannot imagine a better milieu for beginning to learn the art of scholarly research and writing. This project has been presented at Posters-at-the-Capitol in Frankfort, KY; it will be revised and submitted to a journal of psychological scholarship.

I grew up in Lexington, KY, and have enjoyed volunteering with at-risk kids, tutoring, and being a member of Psi Chi. I most enjoy being outdoors, whether hiking or playing sports, gardening or reading a good book. My experience with this project has been the acme of my undergraduate career, and it is one that I will continually use as a referent for my future pursuits in academia.

## Friend over Foe: Friendship Quality and Chronic Peer Victimization



**Mentors: Monica J. Harris, Ph.D.**  
**Associate Professor, Department of Psychology**  
**Richard Milich, Ph.D.**  
**Professor, Department of Psychology**

Kristin’s research extends past work in our lab on the moderating effects of friendship quality on peer victimization, by looking at its relation with implicit measures of victimization. The project is quite ambitious; we are recruiting 200 children between the ages of 9 and 13 from the community and bringing them into the laboratory for an extended protocol. They complete a variety of self report measures, take two computer-administered measures of implicit victim status (the IAT and the Emotional Stroop), provide oral narratives of a victimization and a bullying episode in their lives, and, finally, provide a narrative about a time a friend of theirs helped them out, as well as respond to a structured interview about their friendships. Because there has been very little research done on the social cognitive processes underlying peer victimization, this project has the potential to make a genuine contribution to the literature. Assuming the results turn out as expected, we believe Kristin’s project will be publishable in a high quality peer-reviewed journal.



## Abstract

The present research builds on the extensive literature in the field of peer victimization. Specifically, it examines whether friendship acts as a buffer in the relation between implicit socio-cognitive biases and peer victimization among 82 children ages 9-13. Children completed two implicit measures of victimization in order to detect cognitive biases in socio-emotional processing among chronically victimized children. Levels of friendship quality were assessed and shown to have a main effect on peer victimization indices. The emotional Stroop task related negatively to peer victimization, indicating a cognitive avoidance of emotionally-salient stimuli. The IAT and peer victimization were related such that chronic victims displayed greater identification of self as a victim. Implications for various social interventions among these peer groups are discussed.

## Introduction

Schoolyard bullies and cliques are nothing new; virtually everyone can remember times during childhood when he or she was the target of peers—it seems that such experiences, though painful or embarrassing, are part and parcel of social development. However, for some children, being the victim of peer harassment is not an occasional bother; rather, it is the source of constant chagrin and fear, and a never-ending battle that colors their whole experience of growing up. Startling events in the news have generated greater concern for the matter, highlighting the fact that relentless victimization may have serious ramifications for some children, and there has been much more air time given to violence and hostility in schools. Terms like “mean girls” and “queen bees” have been integrated into the vernacular to describe girls who, although not physical in their hostility, use cliques, social ostracism, and manipulation to wield pernicious attacks on other girls.

In recent news, five girls in Casey Co., KY have filed a lawsuit against school officials, claiming that their requests for help and protection from peer harassment were ignored. In fact, the problems were not merely left unchecked, but the girls claim that even following extreme physical attacks and ruthless bullying, they were chastised by officials for coming forth with their complaints, to the extent that they themselves were suspended from school on certain occasions. They all have transferred to other school systems or finished high school under homebound instruction. These girls are not unique to Casey County, and epidemiological reports studying peer victimization show that it is a problem that persists across many demographic divisions.

The present research is directed toward identifying the processes behind peer victimization, with the intention of finding viable solutions for actual instances of hostility as well as for the negative effects victims experience as a result.

In a laboratory narrative, a child related the following to describe the dread and isolation he feels every day:

“I hate walking down the hallways between classes. Everyone can see me. I know they are just looking for an excuse to hit me or tease me or something. It’s so unfair, they don’t pick on anyone else. Just me. I don’t look at anyone, because they’d get me if I did. No one ever walks with me. Sometimes I get so scared that my legs start feeling like rubber, or I can’t breathe. I try to just keep my head down and walk. The worst thing is that I can’t fight back, ‘cause I’d just get beat up if I did. One time a kid tried to help me, but I ran away anyway because I thought he wanted to get me too. Once I’m in the classroom then it’s OK because then I can hide at my desk, and I can relax again.”

Evan, age 12.

## Background

Evan’s heartrending account expresses the torment and isolation he has come to expect each time he walks down the hallway at school. Incidentally, these social fears are not peculiar to Evan; in fact, as many as 10 percent of children report that they are the frequent and repeated targets of bullying. (Kochenderfer & Ladd, 1996; Olweus, 1978, Perry, Kusel, & Perry, 1988; Nansel et al., 2001) In Norway, 85 percent of all elementary and middle-school aged children completed a survey regarding their encounters with bullying and peer victimization. (Olweus, 1993) Of these, 15 percent of the children admitted to regularly taking part in bullying. Nine percent of students reported being regular targets of peer victimization. Moreover, these data are not unique to Norway; in many other countries, children rate their bullying and victimization experience at a comparable level or higher. (Smith et al., 1999) Evidently, hostility among children and adolescents is a pervasive problem that persists across cultures, gender, and economic strata. (Juvonen & Graham, 2001)

Unfortunately, these phenomena cannot be ignored as isolated instances or passing phases, because victimization and bullying trends remain highly stable over time and both have been linked to negative adjustment indices, including school avoidance, poor academic performance, rejection, suicidal ideation, anxiety, and low self-concept, to

name a few. (Boivin & Hymel, 1997; Boivin, Hymel, & Bukowski, 1995; Egan & Perry, 1998; Olweus, 1978) For frequently targeted children, peer victimization may portend sadly bleak outcomes. As cause for still greater concern, the negative correlates do not seem to be limited to a discrete event or period in childhood. Rather, children who are perpetual targets of hostility have been shown to exhibit lingering behavioral effects, including academic dysfunction, enduring internalizing (e.g., depression, anxiety, negative affectivity, suicidality), and externalizing disorders (e.g., criminal misconduct, explosivity, disruptiveness, risk taking). (Bollmer et al., 2003, 2005; Olweus, 1978) Evidence likewise suggests that chronic peer victimization is a predictor for deficits in subsequent adult relationships. (Olweus, 1993; McMaster et al., 1998) In short, being victimized as a child can have lifelong consequences.

Peer victimization is thus widely recognized as a critical issue and was recently declared a threat to public health. (American Psychological Association, 2004) A large corpus of literature has emerged to better identify features of children's behavior that place them at risk among peers. It is, indeed, sobering that a childhood phenomenon as detrimental as peer victimization is as ubiquitous as the evidence indicates. Peer victimization, traditionally defined in terms of physical aggression, is no longer limited to the sphere of overt hostility; it is often more subtle, and these subtle forms of victimization can be at least equally as hurtful.

The current study utilized Juvonen and Graham's (2001) definition, in which peer victimization is negative social behavior "that entails face-to-face confrontation (e.g., physical aggression, verbal abuse, nonverbal gesturing) or social manipulation through a third party (e.g., social ostracism, spreading rumors), meaning that some forms of harassment avoid overt and direct conflict, but instead employ relational ostracism and derision." (Juvonen & Graham, 2001)

Evidence suggests that the incidence of chronic peer victimization is not significantly different across genders (Duncan, 1999); nonetheless, boys and girls tend to victimize and be victimized in different ways. Boys often use physical aggression to vie for dominance, while girls are more prone to relational bullying and ostracism. (Crick & Bigbee, 1998; Schwartz et al., 1993). It remains unclear whether girls perceive their relational means of aggression as equally hostile, nor is it entirely clear in the literature whether relational aggression constitutes a legitimate subtype of conduct disorder. (Moffit et al., 2001; Olweus, 1991; Tiet et al., 2001) However, it may be that, although the precise form of hostility may differ for boys and girls, the

underlying motivations and emotional consequences will be the same. (Crick & Grotpeter, 1995)

Evidence further indicates that reactions to peer victimization are linked to individual differences in temperament and personal history. In one study, researchers found that even relatively mild teasing can generate animosity towards the teaser and teasing event. (Bollmer et al., 2003) The same study identified certain personality traits as being related to emotional responses to victimization. Particularly, the Agreeableness dimension of the Big Five personality inventory was important for interpretation and response in teasing interactions; there was a strong positive relation such that as level of Agreeableness increased in the recipient of the taunt, so did the negativity associated with the short interaction. Essentially, people who score higher on the Agreeableness facet of the Big Five personality scale are therefore more negatively affected by a conflictual or tense interaction. Dill et al., (2004) found strong associations between chronic victimization experiences and the display of general negative affect. It is not clear whether peer victimization precedes negativity, or if it is the reverse, that maladaptive behavior precedes victimization; these two factors most likely operate in a reciprocal manner.

It appears that children with a long victimization history will be prone to suffering adverse consequences, regardless of personality, race, gender, or socio-economic status. This chronically bullied group is not behaviorally homogeneous. Two classes of victims emerge from the literature: Olweus (1978) labels these groups as "passive victims" and "provocative victims." The passive victim is one who seldom provokes the bully directly and tends to be socially withdrawn, submissive, and anxious. It is not uncommon for such passive victims to also be highly agreeable, which may, in turn, heighten their sensitivity to taunts. Early on, children who exhibit these inclinations are recognized as easy targets for their aggressors. (Egan & Perry, 1998; Hodges and Perry, 1999)

For provocative victims, that is, those who tend to initiate aggression and elicit retaliation from their peers, negative responses often manifest themselves externally, in hostile, disruptive, restless, and attention-seeking behaviors. (Olweus, 1978) Schwartz et al. (1998) found positive relations between victimization and aggression, hyperactivity, and impulsiveness. Children displaying this constellation of traits are what Perry, Perry, and Kennedy (1992) termed "ineffectual aggressors." Their angry and out-of-control behavior and antisocial conduct further alienate them from the peer group and escalate the likelihood that



they will become future and perpetual targets of peer victimization.

There is much evidence to suggest that children are generally savvy and quick to perceive emotional dysregulation and interpersonal deficiencies; once these perceptions are established, it is very difficult to dispel the stigmas, even when the other children are given disconfirming evidence. (Milich, McAninch, and Harris, 1992) For example, within only five minutes of interacting with a behaviorally dysregulated child (one who displayed characteristic ADHD behaviors), peer participants in the Diener and Milich (1997) study expressed dislike for the dysregulated child. The peer group's negative perception of a disinhibited or dysregulated child may contribute to the stable pattern of peer victimization for this population. Both classes of victims, passive and provocative, seem to be especially prone to debilitating emotional arousal and poor coping skills when faced with socially threatening situations. (Perry, Hodges, & Egan, 2001) Certainly, poor self-esteem is a defining factor among victim populations, which may also aggravate perception of and responses to social threats. (Asher & Gottman, 1981)

Recent theories attribute the lack of emotional control that is characteristic of chronically victimized children to implicit cognitive biases, which impede calm, impassive, and adaptive responses to social threats. Crick and Dodge (1994) identified the importance of children's cognitive processes in response to social interactions. In the face of ambiguous or overtly threatening situations, they propose, children who experience high levels of peer victimization employ a top-down processing style that interprets the scenario as extremely hostile and aggressive. Moreover, early distressing social experience has been shown to cultivate negative social cognitions and attributions. Dodge & Coie (1987) theorize that these biases occur when a child defers to an implicit cognitive interpretation that does not correspond to the actual social event. When asked to determine the cause of an ambiguous social interaction, chronically victimized children are more likely to respond with a hostile attribution bias and so perceive their social atmosphere as significantly more threatening than the situation actually warrants. For instance, a child using a cognitive bias may see two students whispering and laughing in the hallway and automatically assume that it is a jibe directed toward her or him. In this and other such ambiguous or neutral scenarios, such an interpretation may exacerbate the child's preexisting fears and sensitivity to social threat, making it more difficult to successfully navigate the social environment.

Recently, Rosen et al., (2005b) applied the implicit cognition premise to develop a Victim Schema Model. The model proposes that victimization experiences affect children's social-cognitive and socio-emotional processing, whereby present emotional distress interacts with children's prior social information processing to put them at risk for further victimization. Under this model, children with an easily accessible victim schema (i.e., a mental representation and organization of the social environment wherein they view themselves primarily as targets of hostility) are identified as being more likely to attend to threatening cues during social interactions, because individuals often attend to and incorporate environmental information that is highly salient and congruent with more easily accessible social schemas. (Baldwin, 1992; Baldwin & Dandeneau, 2005) In other words, a child operating under a victim schema walks onto the playground expecting to be treated harshly by his or her peers. If s/he is hit with a dodge-ball, it is much easier for him or her to perceive this event as done "on purpose" or "because nobody likes me" than it is to see it as just part of the game.

The intense emotional arousal prompted by victimization cognitions is likely to interfere with appropriate responses and, thus, perpetuate highly maladaptive behaviors. The visible distress that results from such intense emotional arousal could, thus, elicit added persecution from the peer group; for many bullies, the sight of a victim reacting with distress, anger, or tears is highly rewarding. As the implicit victimization associations increase in magnitude, so do the child's ineffective responses, which leads to subsequent peer rejection, and thus confirms his or her own implicit victimization associations. A major goal of the current study is to validate the Rosen et al. (2005b) theory and to glean insight into the association between implicit cognitions and peer victimization.

As mentioned, debilitating emotional arousal and anxiety induced in victims by implicit cognitive processes are proposed to impede calm and effective social interaction and responses. For such children, "just ignoring" or "laughing off" an insult — real or perceived — is particularly difficult, if not impossible. Indeed, for Evan, who described his painful perceptions of the school hallway, virtually every event was colored by his victim schema. It makes sense, then, that when a chronically victimized child feels threatened by an event, the response is so debilitating that it does not correspond to the actual event. In other words, a child might in fact know his or her response is ineffective, even exaggerated, and that it may potentially instigate more jeers, but s/he is

so overwhelmed by automatic, “gut” reactions, that s/he is paralyzed from responding more appropriately. Consider this account from a participant in the Bollmer et al. (2005) study:

“Okay, it was at school my friends and I playing a game of freeze tag. I stink at, I stink at running so when I was ‘It,’ I couldn’t really catch anyone. Well, I was trying to run away from whoever was It or posing to be It. I ran right near one of my good friends and, puff, he was It. Getting me frozen. People kept on tagging me even when I told them not to. Then I, uh, it happened. I started crying, whining, trying to get them to stop freezing me. I even pleaded at some point. I was feeling really angry and sad at that moment because no one would leave me alone. I told Mom and Dad about it but they said just to avoid it. I think it happened because they all know that it is more fun to pick on me.”

(Bollmer et al., 2005)

Even though this child understood that crying and pleading would only encourage the others’ jeers, his emotional arousal precluded a more effective response. One vital fact to note is that although all these implicit events occur internally, they have extensive ramifications for social interactions, both in the moment of a victimization encounter and during future interactions. The cyclical and reflexive character of an implicit victim schema thus creates a robust and largely automatic heuristic — one that is very difficult to change or disengage once it is in place.

Accordingly, the severity of these distressing implications must be addressed. One approach is to explore possible moderating factors to the cycle — that is, factors that could buffer or protect these children from future victim experiences. It has been shown that friendship can act as a moderator of the relation between externalizing behaviors and bullying. (Bollmer et al., 2005) Likewise, in a recent study investigating social attribution biases in 6th-8th graders, Prinstein et al. (2005) examined risk factors for internalizing disorders and peer relations; among girls in particular, they found that friendship quality, reassurance-seeking, and depressive symptoms were cyclically related.

The current study extends these existing findings by attempting to further elucidate the role of friendship in these peer victimization and implicit cognitive mechanisms. Cassidy & Asher (1992) found copious evidence to suggest that children who exhibit high levels of loneliness and social dissatisfaction do so as a consequence of poor quality friendships. (Asher, Hymel, & Renshaw, 1984) Perhaps the resources and emotional validation associated with good quality

friendship could allay some of the negative outcomes related to chronic peer victimization and rejection.

Specifically, close dyadic friendships are regarded as a possible mitigating factor, which can decrease the risk for the onset and maintenance of deviant behavioral inclinations. (Schwartz et al., 1999) Hodges, Malone, and Perry (1997) propose that friends actually buffer vulnerable children from prospective victimizers, as bullies may view the friends as obstacles to their dominance. More interestingly, though, is the hypothesis that close friendships are more important and operate differently than group popularity. (Ladd et al., 1997) It has been suggested that intimate, trusted friendship — a best friendship — serves to satisfy emotional needs during adjustment that are not provided by group acceptance, even if the friend is not present to defend the child in a distressing social encounter. Ladd et al. (1997) argue for a multidimensional representation of the child social dynamic. They suggest that it is likely that both group acceptance and dyadic friendship are valuable for adjustment, but each operates via a distinct mechanism to meet diverse developmental needs.

Indeed, the findings of Schwartz et al. (1999) corroborate this hypothesis. Dyadic friendship was shown to moderate the predictive link between peer victimization and recurrent externalizing behaviors. More encouraging, though, is that children who were at high risk for peer victimization, when given friendship support in kindergarten, were thus buffered from chronic victimization several years later. Schwartz et al. (2000, 2001) speculated that if, indeed, dyadic friendship could offer support to at-risk children during early childhood, efforts to mimic such validation and integration into a social network may serve a relatively long-term protective function. When viewed from a developmental perspective, friendship, particularly with a trusted confidante, offers personal validation and a safe forum for children to air feelings and concerns; likewise, friendship of this sort also gives children a medium for learning appropriate interpersonal behavior. Whether or not friendship quality is a key factor for resilience among children with long histories of peer victimization is yet to be determined. Perhaps intimate companionship meets important emotional needs that enable targeted children to regulate their emotions and act with more social aplomb.

Newcomb and Bagwell (1996) also distinguish friendship from group popularity by arguing that dyadic or quality friendship is marked by egalitarian interactions, with less emphasis on dominance, competition, and status. The social support literature recognizes distinct facets of friendship quality — companionship,

intimacy, trust, help, security — that seem to bear unique developmental consequences. (Bukowski et al., 1994) In the present study, research was directed toward investigating the specific of friendship quality in the relation between implicit victimization cognitions and recurrent peer victimization.

## The Study

To understand how this relationship between implicit victimization cognitions and recurrent peer victimization may happen, it is essential that the construct is clearly defined. Intrinsic friendship quality can be evidenced, in part, by a child's perception of his or her best friend and the kind of support he or she feels is regularly available from that friend; it may be that such support is best observed by rating frequency of supportive behavior. Moreover, to fully understand the quality of friendship, it may be important to include the degree to which chronically victimized children sense their own role, not merely as recipient of but also as provider of support to their friend.

Although mutual peer nomination has historically been favored as a way to measure best friendship (Furman, 1996; Landau & Milich, 1990), it is not clear that mutual nomination indicates better friendship quality. (Bowker, 2004) One benefit of using peer nomination is that it provides objective evidence that friendship actually does exist between two individuals; however, it is insufficient to determine the precise nature of that dynamic relationship. Bowker (2004) argues that requiring reciprocity to ascertain friendship quality might overlook the organic development of genuine, stable relationships in which gradually, persisting through childhood phases, loyal friendship does occur. Bukowski et al. (1994) developed the Friendship Qualities Scale (FQS), a questionnaire involving descriptions of a best friend, to assess friendship quality. Given the complex, unconscious nature of implicit victimization processing, this study used the Friendship Quality Scale, as opposed to peer nomination or ranking, to more richly assess the various dimensions of best friendship.

Demaray and Maleki (2003) also suggest that social support can be exhibited in many ways: emotional or caring support (listening), instrumental support (providing time or resources), informational support (providing needed information), and appraisal support (providing feedback). They also recognize that social support can emerge from a number of sources, such as teachers and mentors, in addition to peers. For the current study, research was thus concentrated specifically on peer friendship quality, given that the question is whether this precise form of support can

moderate the link between implicit cognitions and peer victimization.

Measuring and defining peer victimization is also challenging. Rather than categorizing children in a black or white manner as either victims or nonvictims, we analyzed peer victimization as a continuous dimension. The intent is to identify the specific support that best moderates the implicit cognition-peer victimization relation. The present study also adopted a narrative methodology for studying friendship. In prior studies from our lab, victimization and bullying narratives have proved effective techniques for obtaining measures of socially-generated emotional distress. (Bollmer, Harris, & Milich, in press; Rosen et al., 2005b) It is, thus, believed that friendship narratives will inform future research and serve as pilot data for further study of these complex childhood phenomena. Discerning whether chronically victimized children construe friendship differently from their peers may be fertile, because documenting their subjective experiences may identify untapped areas for intervention strategies that better reflect their respective problems.

In sum, this study tested the following predictions: (a) Friendship Quality will moderate the relation between implicit cognitive processing and peer victimization. That is, there will be an interaction between Friendship Quality and measures of implicit cognitive biases such that children who have a high quality of friendship, even if they display implicit biases on the cognitive tasks, will still report an overall lower incidence of peer victimization than will their counterparts who report poor friendship quality. (b) Friendship Quality and both implicit measures of victimization (IAT and the Emotional Stroop Task) will each be associated, independently, to peer victimization. (c) These relations will hold true across genders, age, and ethnicity. The present project also assessed whether children who report higher levels of peer victimization employ a defense or avoidance when presented with threatening cues, or if they suffer cognitive interference from such cues (Emotional Stroop Task, see below).

## Method

### Participants

Participants were 82 children (43 boys and 39 girls) between the ages of 9 and 13 years ( $M = 10.82$  years), who were recruited through notices sent home from their schools and after school programs, and in the local newspaper. The notices stated that researchers in the Psychology Department at the University of Kentucky were examining children's peer relationships. Children were accompanied by at least one parent or

Table 1. Methods

	Reference(s)	Description	Notes
<b>Parent Measures</b>			
Demographics Sheet		This basic questionnaire provided information regarding participants' age, ethnicity, grade level, school, information concerning siblings, etc.	
Perception of Peer Support Scale—Parent Version (PPSS)	34, 35	The PPSS consists of 22 items pertaining to peer victimization to indicate the parents' perspectives on their child's social behavior over the past school year.	Kochenderfer and Ladd's (1997) child version of the PPSS was modified to measure the parents' perceptions of the frequency their child is the target of negative behavior from her or his peers.
Questions on Victimization History	54, 55	Five additional items asked parents to assess the frequency of actual episodes of social conflict their child has expressed or endured within the last school year.	These items are included to increase the reliability and validity of an overall victimization composite.
Emotion Regulation Checklist (ERC)	60	This 24-item questionnaire asks parents to rate their child's typical emotional states and patterns over time; parents rate their child's characteristic emotional reactions in various situations.	This questionnaire forms two subscales, an Emotional Regulation scale and a Liability/Negativity scale.
Child Behavior Checklist (CBCL)	1	This widely-used scale is comprised of 113 parent-rated items, yielding scores on eight subscales. Essentially, the CBCL is a global measure of childhood pathologies.	Various subscales can be combined to yield an Internalizing scale (including Withdrawn, Somatic complaints, and Anxious/Depressed subscales) and an Externalizing scale (composed of the Delinquent Behavior and Aggressive Behavior subscales).
<b>Children's Computer Measures</b>			
Emotional Stroop Task	39, 65	In the present study, the Emotional Stroop is used to measure variation in verbal response time when children are confronted with threatening social words. Participants were asked to say the color of the word appearing on the middle of the screen as quickly and clearly as possible, while ignoring the actual content of the word itself.	Difference scores were produced for each participant using Greenwald's "D" procedure, in which individual mean scores for each content domain are divided by the individual's standard deviation across all scores to control for reaction time.
Implicit Association Test	26, 27, 30	The IAT assessed the latent degree to which a child associates him or herself with the role of victim. Based on response time and errors, the IAT measures whether the child can respond faster when a word like "victim" is paired with "me" (a victim-congruent association) than when it is paired with "not me" (a victim-incongruent pairing).	Each individual's degree of implicit association with the victim role is measured by obtaining the difference in reaction times between the victim-congruent and victim-incongruent trials.
<b>Children's Questionnaires</b>			
Perception of Peer Support Scale (PPSS)	34	The PPSS is a 22-item self-report measure used to evaluate children's perceptions of their history with peer victimization.	In prior research, multi-informant composites were superior in reliability and predictive efficacy than single-informant measures. Along with the five additional items, we found high convergent validity, and thus merged the two for an overall victimization composite ( $r = .58, p < .01$ ).
The Reactive-Proactive Aggression Questionnaire (RPAQ)	53	The RPAQ is a 23-item self report survey used to gauge aggression manifest in both reactive and proactive manners.	
Friendship Quality Scale (FQS)	13	The FQS is a 23-item assessment of a child's perceived quality of his or her intimate friendships.	Items can be divided into 5 subscales: Companionship, Conflict, Help, Security, and Closeness. A total was created by obtaining the mean of the 23 items (reverse scoring when appropriate).
Bullying/Victimization Narratives	9, 10	Children recounted two social experiences: one in which they were the target of victimization and one in which they were party to bullying another child.	The child was handed a reminder sheet containing a list of specific details to include in each of his or her 2-minute narratives.

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**Table 1. Methods (continued)**

	Reference(s)	Description	Notes
<b>Children's Questionnaires (continued)</b>			
General questions about teasing	54, 55	Participants were administered orally a questionnaire in which they rate themselves in relation to their peers on the frequency they experience or are involved in certain bullying/victimization events.	These questions generate a representation of the degree to which the child attributes negative experiences with peers to internal or external causes.
Friendship/helping narratives	10, 11	Children described two experiences with friends: a time when they helped a friend with a problem their friend was having, and vice-versa.	The friendship narratives were transcribed and viewed by multiple experimenters, blind to the hypotheses, who coded the narratives for descriptions of friendship quality.
Questions about friends		In this final measure, experimenters asked participants to describe their best friend and prompted to think of ways they feel supported by him or her.	Children were afforded the freedom to describe any qualities that came to mind, because this measure was exploratory rather than confirmatory in nature.

**Table 2**

<i>Correlations among predictor variables and victim composite.</i>	
Measure	Victim Composite
Implicit Associations Test	.26*
Emotional Stroop Task	-.19
Friendship Quality Scale	-.22

Note: N = 82  
\*p < .05

guardian to the study and were required to be between 4th and 8th grades in school and able to read on at least a 3rd grade level. They were also screened for colorblindness. Participants were compensated with \$20 upon completion of the study.

**Overview of Procedure**

All study procedures were approved by the Institutional Review Board at the University of Kentucky. Upon arrival at the laboratory, and after receiving consent from the parent and assent from the child, an experimenter took the child to a separate room where s/he performed the emotional Stroop task and the Implicit Association Test (see Table 1). While the child participated in the experiment, the parent completed a series of written measures (see Table 1). After these cognitive tasks, the child responded to a series of social vignettes. He or she then completed three self-report questionnaires assessing his or her friendship and victimization experiences. Next, the child related a narrative describing a bullying and victimization event and answered some general questions pertaining to social interaction. He or she then described two helping scenarios that took place with a friend. Lastly, the participant related several qualitative aspects of his or her best friend.

**Table 3**

<i>Summary of Hierarchical Regression Analysis for Variables Predicting Peer Victimization.</i>				
Variable	B	SE B	B	Sig.
Step 1				
Gender	0.18	0.22	0.10	0.42
Age	-0.08	0.08	-.12	0.33
Race	0.08	0.11	0.09	0.47
Step 2				
Stroop	0.00	0.00	-0.28	0.07
IAT	0.33	0.15	0.25*	0.03*
Friendship Quality Scale	-0.26	0.11	-0.29*	0.02*

Note: R<sup>2</sup> = .03 for Step 1 (p = .58); ΔR<sup>2</sup> = .17 (p = .007).  
\* p < .05

**Results**

**Bivariate Correlations**

All measures were standardized prior to analysis. Correlations were then computed to assess the concordance between the friendship quality and peer victimization, as well as the concordance between each implicit measure and peer victimization. The IAT ( $r(82) = .26, p = .02$ ) and Friendship Quality ( $r(70) = 0.29, p = .03$ ) each significantly predicted peer victimization (see Table 3). (Due to delays in IRB approval, 12 participants were unable to complete the friendship measures). Significant positive associations were indicated between victimization scores and IAT reaction time; in other words, children reporting a higher instance of peer victimization were slower to react on victim-incongruent trials relative to their response on victim-congruent trials (see Table 2). Moreover, the present study replicated the Rosen et al. (2005b) finding wherein a negative correlation existed between the Emotional Stroop reaction times and the victimization composite scores, which was interpreted to reflect cognitive avoidance of threatening cues. Finally, the significant relation between friendship quality and peer victimization suggests that children lower in friendship quality are at higher risk for

peer victimization than those children demonstrating superior friendship quality.

### Multivariate Analysis

The researchers hypothesized that friendship quality would moderate the relation between implicit cognitive processing biases and peer victimization. Although the bivariate correlates indicated intriguing relations among friendship quality, the IAT, the Emotional Stroop, and peer victimization, a multivariate regression analysis yielded no moderating effects of friendship quality on this relation. A hierarchical regression model was used in which quality of friendship was regressed on the measures of implicit victimization cognitions. No significant moderating effects of friendship quality on the association of victim schema accessibility and peer victimization emerged, all  $p$ s > .05, even when controlling for demographic characteristics (see Table 3). Thus, this hypothesis was not supported.

### Discussion

The present study demonstrated three important associations with peer victimization. Given our hypotheses, we expected several trends to emerge. As predicted, there was a negative relation between friendship quality and peer victimization. In other words, children who have a lower quality best friendship are more likely to report being victimized. Further, the hypothesis that there would be a positive association between IAT response time and peer victimization, was supported by our results, indicating cognitive interference in victim-incongruent pairings.

As expected, there was also a correlation between the Stroop and peer victimization, and this negative correlation replicates the Rosen et al. (2005b) finding that response time was faster for chronic victims on socially-threatening trial types. Both of the results on the IAT and Stroop suggest the existence of a highly accessible victim schema as proposed by the Victim Schema Model. Further, it seems that there are two distinct mechanisms occurring at the implicit level. On the one hand, in being forced to make dissonant associations on the IAT, chronically victimized children suffered interference and were significantly slower to make the association. On the other, when presented with potentially threatening word content, the children high in victimization sped up their response. This result is interpreted to indicate that a cognitive defense mechanism is in effect, by which chronic victims avoid the aversive stimulus altogether by not attending to the word content.

On the theoretical level, this work suggests that

chronically victimized children who are also faster when presented with threatening word content are bypassing the content of the words altogether. However, for the defense to be activated in the first place, they must have immediate recognition of the perceived aversive cue. If on the implicit level, children with preexisting schemas are hypervigilant to potential threats, then they should be primed to notice noxious terms and quickly employ the cognitive defense. Indeed, the faster response times suggest this explanation to be the case, and it may be that they employ this defense in order to avoid any cue that could trigger emotional distress. It may be that they both want to avoid the direct discomfort generated by the threatening cue, but that their hypervigilance also works as a self-regulation device, to preclude the emotional distress and victimization cycle before it is activated. Unlike a real life teasing scenario, the lab task affords them the choice to attend or avoid and, in so doing, preemptively curtail an emotional meltdown.

The results also show that friendship quality is related to peer victimization: children high in friendship quality demonstrated lower degrees of peer victimization, as expected. Contrary to our predictions, however, there were no significant moderating effects of friendship quality on the association between either score of implicit victimization (IAT or Stroop) and peer victimization. The reason for the lack of moderating significance is not entirely clear. It may indeed be that friendship quality, as indicated, does not significantly buffer victimized children from the detrimental victim schema cycle.

Perhaps, in this case, friendship quality is too distal a factor to interrupt this escalating and emotional cycle. As Hodges et al. (1997) demonstrated, though, close friends can in fact buffer children from victimization when physically present, so it is likely that certain other aspects of friendship, even when the friend is not physically present, may provide important tools that equip the victimized child with skills to forestall the recurrence and magnitude of peer victimization. The emotional dysregulation that is associated with negative cognitive attributions may moderate the relation between an implicit victimization schema and friendship quality earlier on in the development of a victimization cycle. Schwartz et al. (2001) established emotional dysregulation as an integral factor along the pathway toward peer victimization. Perhaps good friendship can mitigate the maladaptive responses spurred on by emotional under-control.

The present study thus yields some important implications for intervention strategies. Perhaps helping

to create just one close, caring friendship could provide vulnerable children with enough emotional and peer support to protect them from the most devastating long-term aspects of peer victimization — it may at least diffuse the acute blow chronic harassment has on their internal attributions. A confidante or trusted ally can provide a safe environment in which to reinforce positive social behaviors for any child; this benefit may serve a vital role, especially in terms of emotional and social adjustment indices for socially ostracized kids. Such empirical support for the buffering nature of high quality friendship is encouraging.

As mentioned, the emotional Stroop task is structured such that it can discern two mechanisms in cognitive processing: on the one hand, it may record delays from construct interference, as represented by larger response time (RT) latencies. (Williams et al., 1996) On the other hand, it may register construct avoidance, as implied by smaller RT latencies for highly emotionally-salient stimuli. (Newman & McKinney, 2002; Rosen et al., 2005b) The present findings replicate heretofore anomalous results: among children scoring higher in victimization, a cognitive avoidance seems to occur. Children who experience higher levels of peer victimization, rather than suffering interference, actually responded more quickly to victim-related words, suggesting that there occurs a cognitive defensiveness in the face of exposure to threatening terms. (Rosen et al., 2005b).

The fact that children experiencing higher levels of victimization also displayed longer RTs on victim-incongruent trials in the IAT suggests that a different mechanism may be involved in the IAT than in the Stroop. If, during both tasks, children scoring high in peer victimization employed a cognitive defense and demonstrated faster response times on both, it would imply that a third factor may be influencing the results; for instance, perhaps impulsive kids are responding preemptively, but their impulsiveness also places them at risk for being targeted by peers. However, it appears as though in the IAT victim-congruent associations are more in keeping with their implicit belief systems, whereas victim-incongruent trials prompt a delayed response. The dissonant association is confusing, and thus they stumble on the association. However, when actually presented with threatening terms, as on the Emotional Stroop, the implicit processing system employs a defense in order to preclude a debilitating emotional response to the potentially threatening stimulus.

Our goal was to understand better the relation among friendship quality, implicit victimization cognitions, and peer victimization; in this way, the

present project yielded important insights into these complex dynamics. Given the evidence provided by the current study, it may prove fruitful to develop more focused interventions targeting children's implicit cognitive biases as well as their deficits in friendship quality. Rather than merely telling children to "ignore" hostility, or even equipping them with more adaptive behavioral responses, the present research suggests a more holistic program. Teaching useful social skills is a noble cause, but remains impotent if the children who need them most are too overwhelmed by emotional distress to access these tools. Perhaps a more effective strategy would be preventative, in that teaching children to realign misguided attributions as well as to develop intimate friendships may defer the development of an implicit victimization schema.

Because it is unlikely that such alliances will come easily for socially awkward or targeted children, it may be that more proactive efforts are required. Personality has been shown to be a great predictor for interpersonal efficacy, so "scaffolding" children with one or two socially adept peers (ideally ones who tend to be more empathic and agreeable) could have a twofold advantage: first, the chronically victimized child would have someone with whom to interact and from whom to draw support; and, second, the peer group at large may come to view this child less negatively. (Coté & Moskowitz, 1998) If a popular child befriends a shunned peer, it may be enough social proof to generate positive feelings for the befriended child; indeed, it may allow both victim and peer to form a constructive friendship and override deeply entrenched attitudes toward their social roles.

Of course, no answer is a magic bullet, and much is yet to be understood regarding the complex dynamic of children's peer interactions. One limitation of the present study is that it is cross-sectional in nature, and thus any causal relations can, at best, only receive speculation. Insofar as this project is part of a larger longitudinal project, we are optimistic that much more can be learned regarding the precise nature of socio-cognitive processing and friendship quality in peer victimization. Due to time constraints on the present study a more detailed analysis of the qualitative data was not feasible. No doubt, further analyses of the children's perceptions of their peer relations may generate more fascinating and promising avenues for research in the area.

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## References

1. Achenbach, T. M. (1991). *Manual for the Child Behavioral Checklist/ 4-18 and 1991 Profile*. Burlington, VT: University of Vermont Department of Psychiatry.
2. American Psychological Association (2004, Fall/Winter). "APA resolution on bullying among children and youth." *Clinical Child and Adolescent Psychology Newsletter*, 19 (3), 5, 7.
3. Asher, S. R., Hymel, S., & Renshaw, P. (1984). "Loneliness in children." *Child Development*, 55, 1456-1464.

4. Asher, S. R. & Gottman, J. M. (Eds.). (1981). *The development of children's social relationships*. New York, NY: Cambridge University Press.
5. Baldwin, M. W. (1992). "Relational schemas and the processing of social information." *Psychological Bulletin*, 112, 461-484.
6. Baldwin, M. W., & Dandeneau, S. D. (2005). "Understanding and modifying the relational schemas underlying insecurity." In M. W. Baldwin (Ed.), *Interpersonal cognition* (pp. 33-61). New York, NY: Guilford.
7. Boivin, M., & Hymel, S. (1997). "Peer experiences and social self-perceptions: A sequential model." *Developmental Psychology*, 33, 135-145.
8. Boivin, M., Hymel, S. & Bukowski, W. M. (1995). "The roles of social withdrawal, peer rejection, and victimization by peers in predicting loneliness and depressed mood in childhood." *Development and Psychopathology*, 7, 765-785.
9. Bollmer, J. M., Milich, R., & Harris, M. J. (2003). "Behavioral and emotional reactions to teasing." *Journal of Personality*, 71(4), 557-603.
10. Bollmer, J. M., Milich, R., Harris, M. J., & Maras, M. (2005). "A friend in need: Friendship quality, internalizing/externalizing behavior, and peer victimization." *Journal of Interpersonal Violence*, 20, 701-712.
11. Bollmer, J. M., Harris, M. J., Milich, R. (in press). "Reactions to bullying and peer victimization: Narratives, physiological arousal, and personality." *Journal of Research in Personality*.
12. Bowker, A. (2004). "Predicting friendship stability during early adolescence." *Journal of Early Adolescence*, 24, 85-112.
13. Bukowski, W. M., Hoza, B., & Boivin, M. (1994). "Measuring friendship quality during pre- and early adolescence: The development and psychometric properties of the Friendship Quality Scale." *Journal of Social and Personal Relationships*, 11, 471-484.
14. Cassidy, J., & Asher, S. R. (1992). "Loneliness and peer relations in young children." *Child Development*, 63(2), 350-365.
15. Coté, S., & Moskowitz, D. S. (1998). "On the dynamic covariation between interpersonal behavior and affect: Predictors from Neuroticism, Extraversion, and Agreeableness." *Journal of Personality and Social Psychology*, 75, 1032-1046.
16. Crick, N. R., & Bigbee, M. A. (1998). "Relational and overt forms of peer victimization: A multiinformant approach." *Journal of Consulting and Clinical Psychology*, 66(2), 337-347.
17. Crick, N.R., & Dodge, K.A. (1994). "A review and reformulation of social information processing mechanisms in children's social adjustment." *Psychological Bulletin*, 115, 74-101.
18. Crick, N. R., Grotpeter, J. K. (1995). "Relational aggression, gender and social psychological adjustment." *Child Development*, 66, 710-722.
19. Demaray, M. K., & Malecki, C. K. (2003). "Perceptions of the frequency and importance of social support by students classified as victims, bullies, and bully/victims in an urban middle school." *School Psychology Review*, 32, 471-489.
20. Diener, M. B., Milich, R. (1997). "Effects of positive feedback on the social interactions of boys with attention deficit hyperactivity disorder: A test of the self-protective hypothesis." *Journal of Clinical Child Psychology*, Vol 26(3), 256-265.
21. Dill, E. J, Vernberg, E. M., Twemlow, S.W., & Gamm, B. K. (2004). "Negative affect in victimized children: The roles of social withdrawal, peer rejection, and attitudes toward bullying." *Journal of Abnormal Child Psychology*, 32(2), 159-173.
22. Dodge, K.A., & Coie, J.D. (1987). "Social information processing factors in reactive and proactive aggression in children's peer groups." *Journal of Personality and Social Psychology*, 53, 1146-1158.
23. Duncan, R. D. (1999). "Maltreatment by parents and peers: The relationship between child abuse, bully victimization, and psychological distress." *Child Maltreatment: Journal of the American Professional Society on the Abuse of Children*, 4, 45-55.
24. Egan, S. K.; Perry, D. G. (1998) "Does low self-regard invite victimization?" *Developmental Psychology*, 34(2): 299-309.
25. Furman, W. (1996). "The measurement of friendship perceptions: Conceptual and methodological issues." In W. M. Bukowski, A. F. Newcomb, & W. W. Hartup (Eds.), *The company they keep: Friendship in childhood and adolescence* (pp. 41-65). New York: Cambridge University Press.
26. Greenwald, A. G., & Farnham, S. D. (2000). "Using the Implicit Association Test to measure self-esteem and self-concept." *Journal of Personality and Social Psychology*, 79(6), 1022-1038.
27. Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). "Measuring individual differences in implicit cognition: The Implicit Association Test." *Journal of Personality and Social Psychology*, 74(6), 1464-1480.
28. Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). "Understanding and using the Implicit Association Test: An improved scoring algorithm." *Journal of Personality and Social Psychology*, 85(2), 197-216.
29. Hodges, E. V. E., Boivin, M., Vitaro, F., & Bukowski, W. M. (1999). "The power of friendship: Protection against an escalating cycle of peer victimization." *Developmental Psychology*, 35, 94-101.
30. Hodges, E. V. E., & Perry, D. G. (1999). "Personal and interpersonal antecedents and consequences of victimization by peers." *Journal of Personality and Social Psychology*, 76(4), 677-685.
31. Hodges, E. V. E., Malone, M. J., & Perry, D. G. (1997). "Individual risk and social risks as interacting determinants of victimization in the peer group." *Developmental Psychology*, 33, 1032-1039.
32. Juvonen, J., & Graham, S. (Eds.). (2001). *Peer harassment in school: The plight of the vulnerable and victimized*. New York, NY: Guilford.
33. Kochenderfer, B. J., & Ladd, G. W. (1996). "Peer victimization: Manifestations and relations to school adjustment in kindergarten." *Journal of School Psychology*, 34(3), 267-283.
34. Kochenderfer, B. J., & Ladd, G. W. (1997). "Victimized children's responses to peers' aggression: Behaviors associated with reduced versus continued victimization." *Development and Psychopathology*, 9, 59-73.
35. Kochenderfer-Ladd, B., & Ladd, G. W. (2001). "Variations in peer victimization Relations to children's maladjustment." In J. Juvonen & S. Graham (Eds.), *Peer harassment in school: the plight of the vulnerable and victimized* (pp. 25-48). New York: Guilford.
36. Ladd, G. W., & Kochenderfer, B. J., & Coleman, C. (1997). "Classroom peer acceptance, friendship and victimization: Distinct relational systems that contribute uniquely to children's school adjustment?" *Child Development*, 68, 1181-1197.
37. Ladd, G. W., & Kochenderfer-Ladd, B. (2002). "Identifying victims of peer aggression from early to middle childhood: Analysis of cross-informant data for concordance, estimation of relational adjustment, prevalence of victimization, and characteristics of identified victims." *Psychological Assessment*, 14(1), 74-96.
38. Landau, S., & Milich, R. (1990). "Assessment of social status and social competence." In M. La Greca (Ed.), *Through the eyes of a child: Obtaining self reports from children and adolescents* (pp. 259-291). New York: Allyn and Bacon.



39. Martin, J. M., & Cole, D. A. (2000). "Using the personal Stroop to detect children's awareness of social rejection by peers." *Cognition and Emotion*, 14(2), 241-260.
40. Milich, R., McAninch, C.B., & Harris, M.J. (1992). "Effects of stigmatizing information on children's peer relations: Believing is seeing." *School Psychology Review*, 21, 400-409.
41. McMaster, L. E., Connolly, J., Pepler, D., and Craig, W. M. (1998). "Sexual Harassment and Victimization Among Early Adolescents." Paper presented at the Biennial Meeting of the Society for Research on Adolescence, San Diego, CA.
42. Moffitt, T.E., Caspi, A., Rutter M., Silva, P.A., (2001). *Sex Differences in Antisocial Behavior*. United Kingdom University Press: Cambridge.
43. Nansel, T. R., Overpeck, M., Pilla, R. S., Ruan, J., Simons-Morton, B., & Scheidt, P. (2001). "Bullying behaviors among US youth: Prevalence and association with psychosocial adjustment." *Journal of the American Medical Association*, 285, 2094-2100.
44. Newcomb, A. F., & Bagwell, C. L. (1996). "The developmental significance of children's friendship relations." In W. M. Bukowski, A. F. Newcomb, & W. W. Hartup (Eds.), *The Company They Keep* (pp. 289-321). Cambridge: Cambridge University Press.
45. Newman, L. S., & McKinney, L. C. (2002). "Repressive coping and threat-avoidance: An idiographic Stroop study." *Personality and Social Psychology Bulletin*, 28(3), 409-422.
46. Olweus, D. (1978). *Aggression in the schools: Bullies and their whipping boys*. Washington, DC: Hemisphere.
47. Olweus, D. (1991). "Bully/victim problems among school children: basic facts and effects of a school based intervention program." In D. Pepler & K. Rubin (Eds.), *The development and treatment of childhood aggression* (pp. 411-448). Hillsdale, NJ: Erlbaum.
48. Olweus, D. (1993). *Bullying at school: What we know and what we can do*. Malden, MA: Blackwell.
49. Perry, D. G., Hodges, E. V. E., & Egan, S. K. (2001). "Determinants of chronic victimization by peers: A review and new model of family influence." In Juvonen & S. Graham (Eds.), *Peer harassment in school: The plight of the vulnerable and victimized* (pp. 73-104). New York, NY: Guilford.
50. Perry, D. G., Perry, L. C., & Kennedy, E. (1992). "Conflict and the development of antisocial behavior." In C. U. Shantz & W. W. Hartup (Eds.), *Conflict in child and adolescent development* (pp. 301-329). New York: Cambridge University Press.
51. Perry, D. G., Kusel, S. J., & Perry, L. C. (1988). "Victims of peer aggression." *Developmental Psychology*, 24, 807-814.
52. Prinstein, Mitchell J., Borelli, Jessica L., Cheah, Charissa S. L., Simon, Valerie A., Aikins, Julie Wargo (2005). "Adolescent Girls' Interpersonal Vulnerability to Depressive Symptoms: A Longitudinal Examination of Reassurance-Seeking and Peer Relationships." *Journal of Abnormal Psychology*, 114(4) 676-688.
53. Raine, A., Dodge, K., Loeber, R., Kopp, L., Lynam, D., Reynolds, C., & Stouthamer Loeber, M., (2006). "The reactive-proactive aggression questionnaire: Differential correlates of reactive and proactive aggression in adolescent boys." *Aggressive Behavior*, 32(2), 172-180.
54. Rosen, P. J., Milich, R., & Harris, M. J. (2005a). "Towards a social cognitive understanding of the development, process, and maintenance of chronic peer victimization." Manuscript in preparation.
55. Rosen, P. J., Milich, R., & Harris, M. J. (2005b). "Victims of their own cognitions: Implicit social cognitions, chronic peer victimization, and the victim schema model." Manuscript under review.
56. Schwartz, D., Dodge, K. A., & Coie, J. D. (1993). "The emergence of chronic peer victimization in boys' play groups." *Child Development*, 64, 1755-1772.
57. Schwartz, D., Dodge, K.A., Pettit, G.S., Bates, J.E., & the Conduct Problems Prevention Research Group (2000). "Friendship as a Moderating Factor in the Pathway Between Early Harsh Home Environment and Later Victimization in the Peer Group." *Developmental Psychology*, 36, 646-662.
58. Schwartz, D., McFadyen-Ketchum, S.A., Dodge, K.A., Pettit, G.S., & Bates, J.E. (1999). "Peer group victimization as a predictor of children's behavior problems at home and in school(abstract)." *Clinician's Research Digest: Briefings in Behavioral Science*, 17.
59. Schwartz, D., Proctor, L. J., & Chien, D. H. (2001). "The aggressive victim of bullying: Emotional and behavioral dysregulation as a pathway to victimization by peers." In J. Juvonen & S. Graham (Eds.), *Peer harassment in school: The plight of the vulnerable and victimized* (pp. 147-174). New York: Guilford.
60. Shields, A. & Cicchetti, D. (1997). "Emotion regulation among school-age children: The development and validation of a new criterion Q-sort scale." *Developmental Psychopathology*, 33(6), 906-916.
61. Shields, A. & Cicchetti, D. (1998). "Reactive aggression among maltreated children: The contributions of attention and emotion dysregulation." *Journal of Clinical Child Psychology*, 27(4), 381-395.
62. Shields, A. & Cicchetti, D. (2001). "Parental maltreatment and emotion dysregulation as risk factors for bullying and victimization in middle childhood." *Journal of Clinical Child Psychology*, 30(3), 349-363.
63. Smith, P. K., Morita, Y., Junger-Tas, J., Olweus, D., Catalano, R. & Slee, P. (Eds.). (1999). *The nature of school bullying*. London: Routledge.
64. Tiet, Q.Q., Wasserman, G.A., Loeber, R., McReynolds, L.S., Miller, L.S. (2001). "Developmental and Sex Differences in Types of Conduct Problems." *Journal of Child and Family Studies*, 10(2) 181-197.
65. Williams, J. M. G., Mathews, A., & MacLeod, C. (1996). "The emotional Stroop task and psychopathology." *Psychological Bulletin*, 120, 3-24.



I am fourth year architecture major at the University of Kentucky. The research for this paper was initially conducted with the help of an Undergraduate Research and Creativity Grant in the Summer of 2004. Last year I resumed the work as the subject of my senior thesis for the Gaines Center for the Humanities, of which this paper is a chapter. A separate paper on general use of stone walls in the contemporary Bluegrass landscape was presented in the Fall and Spring of 2004 and 2005 for the Honors Roundtable and College of Design Student Lecture Series, respectively. In addition, it was presented as a poster in the Posters at the Capitol event in Frankfort in the Spring of 2005. This work has allowed me to have a sustained relationship with Dr. Raitz and other faculty in the Geography department, College of Design, and Landscape Architecture program, which has been very enriching and rewarding. I hope to take the knowledge of the cultural landscape gathered from this research and apply it to my future study and practice of architecture.



#### Mentor:

**Dr. Karl Raitz**

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Jason Richards is an astute landscape observer with a particular interest in the structures that comprise the built environment. He has a keen interest in trying to understand and explain the rationale that individuals and corporations employ when they erect distinctive structure types on the landscape. Intrigued by the remnants of the historic dry-laid rock fences that once laced the Inner Bluegrass countryside, Jason noted that these now rare fences were being urbanized, and “reproduced” in Lexington by builders, shopping center developers, and others as visual links to a rural past. These fence reproductions, found in the Stonewall Shopping Center, Palomar Shopping Center, Turfland Mall, Thoroughbred Park, and several other places across the city are post facto stonewalls, in Jason’s terminology. Post facto walls are epigonic, having the outward appearance of the original but without the original internal structure. Their character thus casts them as imitative representations that are intended not to function as fences at all but rather to serve as visual links to the admired, now rare, historic stone fences and one of the region’s signature structure types. Jason’s essay adds an interesting dimension to a growing literature on such landscape structures, which have become elements in a regional landscape symbol vocabulary.

## Stone Walls and Shopping Malls: Retail Landscapes in the Bluegrass

### Abstract

This paper is an analysis of the recent use of veneered stone walls in the contemporary retail landscapes of the Bluegrass. These walls have been used in conjunction with other elements of the region’s landscape symbol vocabulary to re-create the equine landscape of Central Kentucky in commercial spaces. They seek to evoke the region’s symbolic landscape of wealthy horse estates, utilizing their inaccessibility to elicit an associative attitude of aspiration in the shopper. But they also speak to the values of the businesses and citizens who produce them. The earliest of these walls were found in the street frontage and signage of shopping centers. Most recently, stone veneer has been incorporated in contexts other than landscape walls in order to indicate a center’s amenity relative to other shopping centers.

### Post Facto Walls

A casual observer of the Kentucky Bluegrass would likely remark on the qualities of its rural landscape. The image of the Bluegrass countryside has been widely published and diffused through literature on the region, and is instantly recognizable. A closer examination would, however, reveal that this image is also represented in the region’s everyday landscape — in the homes, shopping malls, and civic spaces of its cities and towns. The strong regional image associated with Bluegrass horse farms today includes limestone fences and formal stone entryways, large frontal green lawn areas, formal, tree-lined entry drives, post-rail fences, and lanterns and cupola elements on the tops of roof structures. Together these elements constitute part of the landscape symbol vocabulary of the Bluegrass Region.

One element of that landscape that has received special attention in contemporary constructions is the region's limestone fences. They are built with increasing frequency in ever more varied contexts as references to the popular symbol of the horse farm, the local distinctiveness of dry masonry rock fences, and the larger cultural heritage of Central Kentucky. But, by recreating these fences as symbols of regional heritage, those who recreate them necessarily instill their own values and meaning into the landscape.

For the sake of clarity, I shall refer to these walls henceforth as post facto walls. Contemporary walls can be defined as post facto in several ways: with few exceptions, they no longer serve as functional enclosures, functioning instead purely as symbols; they exist in varied contexts, unlike their historic counterparts, whose origins were tied to the life and landscape of the farm; their form varies wildly from example to example and cannot often be easily traced to a particular historic precedent: cut and shaped stone has been substituted for roughly quarried native limestone, and mortared concrete masonry units for dry-laid techniques. At their best, post facto walls are visually accurate facsimiles, at worst, an irreverent and eclectic mix of historic form, modern construction, and symbolic content.

Contemporary retail spaces provide perhaps the best starting point for understanding the way in which post fact walls' suburban context has transformed their form and meaning in the landscape. Commercial landscapes have increasingly been designed as landscapes of aspiration. Such an image is highly compatible with that of the rural Bluegrass landscape, which still remains a largely inaccessible landscape to the average citizen. The attraction of exotic places and distant locales has resulted in the use of "iconic metonyms, or objects which function as signs of other places and times ... metaphors for the spatial experience of other places" in order to elicit an associative attitude in the shopper in a retail environment (Goss, 1993, 40). Longstreth (1997, 269) documents interwar community shopping centers such as Country Club Plaza in Kansas City, Missouri, and Highland Park Village in Highland Park, Texas, that "projected a highly idealized image of a preindustrial village" as an ideal form of community to which its suburban residents aspired. More recently, Cosgrove (1997, 99) has elaborated on contemporary landscapes where "architectural references ... in the recycled heritage landscapes of cities ... are a key element in the success of spaces designed for consumption."

It is no small wonder, then, that the idealized gentry landscape of post-bellum Bluegrass estates has been so thoroughly incorporated into the commercial

developments that have slowly begun to replace them. If not as distant or exotic for the middle and upper-middle class residents of the suburbs of Central Kentucky as, say, a reconstructed Parisian streetscape or Spanish-colonial architecture, the aristocratic horse farms surrounding them are nonetheless socially distant places. The carefully manicured nature of Bluegrass horse farms is for the passerby a landscape of aspiration, a place desirable yet unattainable without a significant investment of wealth, time, and land. The shopping center, like the horse estate, viewed through the eyes of less affluent citizens, is also a site of conspicuous material and symbolic production in the landscape.

Though the common traits of commercial and gentry landscapes are apparent in hindsight, their incorporation in landscapes of consumption was slow to gain prominence in Central Kentucky. The first shopping center to incorporate post facto walls in its design (Stonewall Center) was not constructed until 1964, and the idea was not fully embraced by producers of the Bluegrass landscape until the last decade of the twentieth century. This delay can be attributed to several factors.

First, the symbol vocabulary of the region through which much of the symbolic production related to shopping centers was to occur was still under development until the Second World War. The diffusion of the Bluegrass estate image from George Widener's steeplechase barn in Pennsylvania to local farms, Calumet, Dixiana, and Elmendorf, continued until the 1930s (Raitz and Van Dommelen, 1990, 115-16). Given that this modern landscape image was not recreated wholesale in new horse estates until the 1970s, it is no surprise that its use in shopping centers was even slower to be adopted.

Second, postwar commercial development in America, as opposed to its interwar precedents, employed minimal, modern exteriors as opposed to ornate historical reproductions. Longstreth (1997, 289) attributes this shift away from historicizing exteriors to "changes in taste, coupled with steady rises in the cost of construction and the allocation of a greater percentage of that cost to building systems and to equipment for display." The drive for utility replaced earlier efforts at creating "distinct signifiers of place" and the historicizing forces that had provided the vehicle for doing so.

Incorporating the region's landscape symbol vocabulary in commercial developments was, therefore, a slowly evolving process, beginning in the mid-to-late 1960s and reaching a local predominance in the urban and suburban landscape some thirty to forty years later. The evolving use of horse barn cupolas and Palladian architectural motifs in the shopping centers of Lexington during this time has been documented elsewhere (Raitz and VanDommelen, 1990, 116-118). The earliest attempts at incorporating these landscape symbol elements into retail development yielded highly abstract interpretations of traditional architectural forms. Whether through popular acceptance or the increasing familiarity of architects and planners with regional architectural forms, newer shopping centers incorporated increasingly bolder and more "authentic" reproductions of the Bluegrass landscape symbol vocabulary.

The incorporation of post facto walls into the region's retail developments follows a similar evolutionary trajectory — from subtle suggestion to practiced manipulation. Given the interrelated nature of the various aspects of the region's symbol vocabulary, such similarities should be expected. Yet the differences in development between the two can also shed light on the nature of the stone wall as a symbolic



**Figure 1:**  
*Stonewall Center entry sign and post facto wall.*  
Source: author

artifact and its particular suitability to the purposes of landscape image manipulation.

To understand the changing relationship of the stone wall to commercial developments, three sites will be considered. The first, Stonewall Center built in 1964, was among the first “strip mall” shopping centers to be built in Lexington. The second, the re-skinned Turfland Mall, renovated in 1997, will be presented as an example of the growing trend of refitting existing shopping centers and malls with elements of the landscape symbol vocabulary, in which the stone wall is a prominent feature. Finally, early 1990s Palomar Centre will be used to illustrate the radical change in the application of stone walls in the twenty-five years separating it from Stonewall Center. That these three commercial spaces are located in close proximity to one another provides both a useful comparative tool and an unavoidable necessity. Their location along major corridors in the south of Lexington reflects the history of development in Lexington during the second half of the twentieth century and the audience for which reinterpreted stone walls have become desir-

able landscape elements in middle and upper-middle class suburban neighborhoods.

Stonewall Center lies on Clays Mill Road in Lexington, just beyond the circular beltway that divides the inner-half of the city from the post-1960s suburban outer-half. In a trend common at the time, the shopping center and its surrounding community take their name and much of the stone used for their construction from the farm land they replaced. The center was conceived of as a community shopping center to serve the needs of the growing suburban developments along the Clays Mill corridor. Like many commercial developments of the time, Stonewall Center was opposed by many members of the community (Williamson, 1967, 52).

Aside from changing tenants, the shopping center appears today much as it did at the time of its construction. The building itself is an unadorned concrete “shoebox” typical of shopping centers across the country. What small connection the shopping center evokes to a regional image occurs at its entry (Figure 1). Compared to many contemporary constructions, the Stonewall Center’s use of stone is modest and somewhat a-historical. The wall, which is typical of early post facto walls, occupies the median of the parking lot’s entry road and is constructed without coping. Its horizontal bands of stone resemble in scale the dry-laid masonry of historic rock fences, but do not attempt to hide their mortared nature. The stones themselves constitute a literal “recycled landscape” in that they originate from an older fence. The stone wall, significantly, appears only at the entryway and not at the frontage.

Stonewall Center presents a number of features that would be important in the use of the regional landscape vocabulary in future commercial developments. First, the symbolic landscape elements (here being a stone wall) are associated not with the building, but the landscaping fronting the parking lot. Second, the symbolic content, evoking the history of the site and the traditional form of dry-stone masonry, is clustered around the sign that designates the name and entry of the shopping center.

This pattern can be seen repeated and elaborated in the refitting of Lexington’s oldest indoor shopping mall. Turfland Mall opened in 1964 alongside the expanding residential developments of Harrodsburg Road. It was the first shopping mall built in Lexington and was soon followed by Fayette Mall in 1971 and Lexington Mall in 1975. None of these regional malls originally incorporated elements of the landscape symbol vocabulary, which was at the time employed mainly in the construction of new horse estates and farms in the countryside, including non-farm

applications of a regional idealized landscape in places such as the Kentucky Horse Park.

Like many early suburban regional malls, the image of Turfland Mall was anything but regional. Its low, linear roof-line, brick façade, and surrounding parking lot set in a sea of newly-developed residential neighborhoods could be found almost anywhere in the United States in the 1960s and 70s. Like nearly every other shopping mall in the nation, Turfland Mall saw changing stores, occasional vacancies, and new growth. For thirty years, the mall's character remained virtually unchanged; it saw a minor renovation in 1988 and the loss of one of its major anchor department stores in the early 1990s.

In 1997, the Rubloff Development Group of Hoffman Estates, Illinois, purchased Turfland Mall. The Lexington Herald-Leader described the \$5 million renovation of Turfland Mall as including "construction of faux roofs in varying heights to give the 1960s linear-style mall a more dynamic look." (Baldwin, 1998) Yet, more than simply increasing its attractiveness or "newness," the renovation of Turfland Mall established a consumer-oriented landscape that utilized selective elements of the region's landscape symbol vocabulary. The "new" Turfland Mall with its surrounding landscape featuring a veneered-stone entry sign (Figure 2), post-rail fences, and tree-lined driveways, became a precedent for the region's other existing malls, as evidenced by the recent renovation of Fayette Mall, which employs cast-in-place concrete retaining walls with stone patterning along its entryway. Just as Turfland was Lexington's first regional mall, so, too, it became Lexington's first "regional image" mall.

Compared to many other shopping centers such as Lexington Green and Goodwin Square in Lexington, which incorporate rural horse-barn and neo-Palladian architectural elements in their buildings, the Turfland Mall façade remains less regionally symbolic (Raitz and Van Dommelen, 1990, 117-18). Instead its surroundings — namely the parking lot that borders Harrodsburg Road — have become the major symbolic space.

The mall's most visible image from the street is its Post Modern, classically-styled entry sign (Figure 2). Though its neo-classical shallow-arched top and oversized rusticated sides speak little to the regional image of Central Kentucky, the veneered stone base upon which it rests indicate the mall's sensitivity to the landscape symbol vocabulary of the region. The stone veneer patterning utilizes the dry-laid-look common to many post facto walls.

Sensitivity to the local landscape is also evoked in the mall parking lot, which is separated from the

street by a post and rail fence resembling those found throughout the Bluegrass Region. The fence and surrounding trees shield the parked cars from the view along the street while creating a scene that is at least partly recognizable as part of the Bluegrass landscape vocabulary. To the extent that many nearby properties incorporate traditional residential stone walls and post-rail fences, the streetscape of the Turfland Mall also seeks to re-integrate the once bland suburban shopping mall with the city's existing fabric.

But, Turfland Mall's regional symbolism extends beyond its constituent parts. The parking lot in fact reinterprets the processional entry of the traditional Bluegrass estate. According to Raitz and Van Dommelen (1990, 112), the use of woodlands in nineteenth-century Bluegrass estates "can be traced to a long tradition of English practice where the same land was used for both trees and grazing." This practice eventually transformed into the manufacture of wooded lanes, both along public



**Figure 2:**  
*Turfland Mall entry sign*  
**Source:** author

roads (such as the numerous turnpikes of Central Kentucky) and private country lanes. Most often this landscape incorporated a linear arrangement of trees along the entry road, flanked on the property's frontage by a stone wall, a post-rail fence, or a combination of the two.

The Turfland Mall parking lot reconstitutes a regional landscape in a machine space, changing the scale and positioning of elements to suit their re-interpreted context and symbolism (Figure 3). The trees that line the four-lane entry drive are planted in the medians that divide the parking spaces from the entry road; similar to the trees along Harrodsburg road, this landscape design feature allows for a sense of neatness, effectively hiding the cars from sight from a passing vehicle. The median dividing the two lanes of the entry road is occupied by miniature post-rail fences with small stone end posts, as if the entry drive was a landscape in miniature, compressed to the width of a three-foot median planter. These miniature fences reinforce the symbolic quality of each part, identifying them as two distinct elements of the Bluegrass landscape that work together to create a regional image. Yet the fences are likely necessitated by the extraordinary width of the road, which would look barren without them.

Contemporary stone veneer construction techniques have increased the range of surfaces on which traditional stone wall symbolism can be employed. This development has allowed the stone to become a symbolic surface detached from its context as a free-standing wall. Early attempts at employing this extended post facto wall were manifested as cladding for the exterior of houses and other buildings, as previously mentioned. In contemporary retail spaces, however, the use of stone veneer outside of its traditional context has resulted in ostentatious use of the material in scale and context. Such

constructions seek to equate the quantity and use of limestone with an increased perception of amenity.

This isolation of the symbolic surface from its traditional form in post facto walls is demonstrated best by the Palomar Center, a shopping center designed to service upper-middle class planned neighborhoods in south Lexington. The surrounding neighborhoods are represented by a community organization that regulates many aspects of the neighborhood, from consolidating garbage pickup times to maintaining consistent mailboxes. The center was built in 1989, shortly after the neighborhood development began construction, in order to cater to these neighborhoods.

The major road frontages are marked by over-scaled stone walls that incorporate the center's signage into the wall. The shopping center uses stone as a signifier of status in the manner of turn-of-the-century Bluegrass estates through the exaggerated scale and application of stone veneer. The columns along the store frontage of the shopping center are veneered in limestone of a similarly small-scaled ashlar pattern seen in many post facto walls. The structure's oversized, postmodern pediments call attention to the anchor stores of the center.

In a process similar to the way in which national chains have been "coopted by local interests and incorporated into their sense of place" along interstate highways, the free-standing chain service buildings in Palomar Center are clad in limestone (Schein, 1996, 392) (Figure 4). The exuberant use of materials on these buildings, in addition to defining their locality, raises the status of the otherwise recognizable elements of the everyday landscape at the Palomar Centre; the use of nationally recognizable restaurant chains in their standard configuration with non-standard materials sets the center apart from its nearby competitors. Unlike either of the



**Figure 3:**  
*Traditional wooded lane with stone entry and Turfland Mall entry*  
*Sources: Kentuckiana Digital Library; author*

two shopping centers mentioned previously, Palomar Center employs cultural artifacts as a means of indicating amenity, thus instilling in post facto walls some of the elite meaning originally associated with their rural precedents.

Examining these three retail spaces and their surrounding landscapes brings several important aspects of the use of post facto walls in a contemporary suburban context into focus. The maxim of shopping center construction seems to be newer is better. In the spirit of constant renewal, malls and shopping centers are often renovated inside and out within ten to fifteen years of their construction. Thus, commercial spaces are particularly indicative of the values of landscape producers at the time of their production. That there was no significant use of the region's landscape symbol vocabulary in retail spaces from the 1970s to the late 1980s is a sign of values of that particular time. The renovation of Turfland Mall can, therefore, be seen as indicative of significant changes to the larger culture of consumerism in the Bluegrass Region. If the intention of its developers was to update Turfland Mall to a contemporary standard, expressing the view that "malls need to keep current," then its renovation necessarily expresses those values that are most contemporary to the Bluegrass Region: namely, the representation of its past through landscape design (Baldwin, 1997).

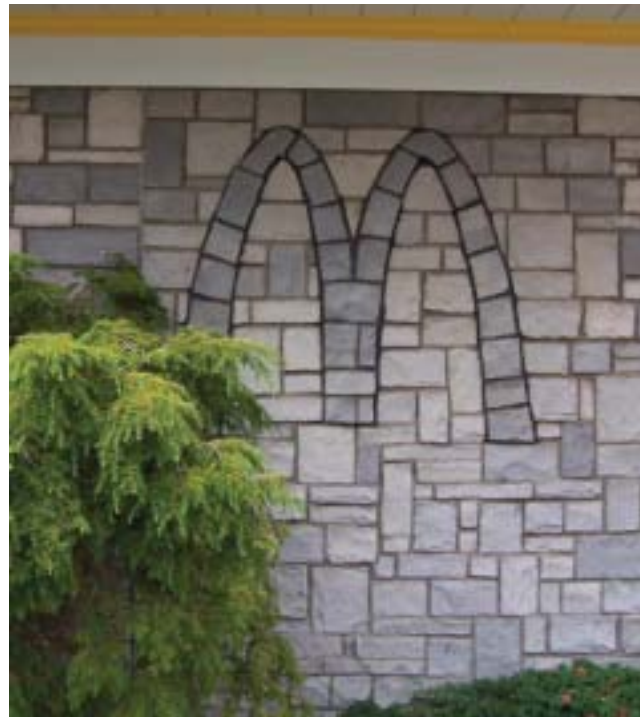
Also, the meaning of the stone wall as a symbol seems to be dependent upon the context and scale (both in the sense of size and quantity) in which it is employed. For example, examining the amount of stone veneer constructed in each of the three examples presented in this paper, there seems to be no correlation of the increasing use of stone over time, as might be expected. Rather, the use of stone in a particular commercial site seems to correspond to its targeted consumer audience. The conservative use of stone at both the Stonewall Center and Turfland Mall indicate an interest in regional distinction without the exorbitant costs associated with limestone construction. Granted, these two shopping centers do to varying degrees invest in other components of the landscape symbol vocabulary (such as post and rail fences, etc.) that also aid in the establishment of a particular identity. Palomar Centre, on the other hand uses traditional materials in non-traditional ways in order to become a landscape of aspiration. The use of an unfamiliar material (stone) on a familiar structure such as McDonalds provides just the sort of exotic, "alternate" shopping experience that Goss describes as defining the contemporary retail environment.

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I would like to thank Dr. Raitz for his patience and help, the Gaines Center for the opportunity to write this paper, the Office of eUreKa! for a summer research grant to initiate the project, and the Warwick Foundation for a scholarship that provided me a quiet place to work.

## Works Cited

- Baldwin, Amy. "Renovation is in Store for Turfland Mall." *Lexington Herald-Leader* 12 Aug. 1997: C7.
- Baldwin, Amy. "Taking away the 60s." *Lexington Herald-Leader* 11 July 1998: B1.
- Cosgrove, Dennis. "Spectacle and Society: Landscape as Theatre in Premodern and Postmodern Cities." In *Understanding Ordinary Landscapes*. Ed. Paul Groth and Todd W. Bressi. New Haven: Yale University Press, 1997. 99-110.
- Goss, Jon. "The 'Magic of the Mall': An Analysis of Form, Function, and Meaning in the Contemporary Retail Built Environment." *Annals of the Association of American Geographers*, 83 (1993): 18-47.
- Longstreth, Richard. "The Diffusion of the Community Shopping Center Concept during the Interwar Decades." *Journal of the Society of Architectural Historians*, 56, no. 3 (1997): 268-93.
- Raitz, Karl and Dorn Van Dommelen. "Creating the Landscape Symbol Vocabulary for a Regional Image: The Case of the Kentucky Bluegrass." *Landscape Journal* 9.2 (1990): 109-121.
- Schein, Richard. "The Interstate 70 Landscape," In *The National Road*. Ed. Karl Raitz. Baltimore: Johns Hopkins University Press, 1996. 318-347.
- Williamson, Duane Edward. "A Study of the Stone Fence as a Landscape Feature of Fayette County, Kentucky," MS Thesis, University of Kentucky, 1967



**Figure 4: Stone veneer McDonalds in Palomar Centre**  
Source: Author



I am a senior, from Nicholasville, Kentucky, graduating in May 2006 with a bachelor's degree in Human Nutrition. I recently attended the 2006 "Posters at the Capitol" event, where I presented this research and received awards from both the House and the Senate Representatives. Outside of school I enjoy playing the piano and volunteering with my sister's preschool classroom. My future plans as of today are to continue my nutrition education with a master's degree, and then proceed to either a medical position, or a doctoral degree in nutrition.

## The Dietary Habits and Nutrition Education Levels of Parents of Pre-School Children at a Community Head Start Program



**Mentor:**  
**Tammy J. Stephenson, Ph.D.**  
**Lecturer, Nutrition & Food Science**

Two-thirds of American children today are either over-weight or obese. This is a nearly three-fold increase in childhood obesity over the past 25 years. Children who are overweight have an increased risk for diabetes, heart disease, and other chronic medical problems that used to be seen only in adults. It is recognized that several factors contribute to this obesity, including family life, media influences, and school. Ms. Keys designed an innovative study to evaluate the dietary habits and health knowledge of parents at a Lexington Community Head Start Program and to correlate their habits with those of their preschooler. An interesting component to this research was comparing normal dietary habits between Hispanic and non-Hispanic families. It is essential that we better educate parents regarding healthy eating and wellness habits in an effort to curb the rise in childhood obesity.

### Abstract

The health of America's youth is jeopardized as obesity, often beginning in childhood, becomes a major epidemic. Parents have exceptional influence on their children, especially nutritionally, which impacts how their children grow and develop. Parents with minimal nutrition education and who do not practice healthy eating habits may unintentionally influence their children in practices that could lead to nutrition-related disease and/or obesity. This research evaluated the dietary habits and nutrition knowledge of parents of preschoolers at a community Head Start program in Lexington, KY, which served a high percentage of Hispanic children. The parents were given a survey evaluating their educational background, ethnicity, and knowledge of healthy eating guidelines. Results indicated that Hispanic parents reported they did not adequately meet the US Dietary Guidelines when following a traditional Hispanic diet. The African-American and Caucasian parent group also showed deficient



knowledge in general nutrition questions and overall unhealthy eating habits. Therefore, effective nutrition education programs need to target parents who can, in turn, influence and guide their children in developing healthy lifestyles.

### Introduction

Nutrition is an integral part of sustaining life. The foods that individuals choose to eat have a direct impact on overall health and risk for chronic disease. As an adult, one chooses one's food. However, children are dependent on their caretakers to provide them with adequate nutrition for normal growth. Caregivers greatly influence a child's eating habits. Even the most well-intentioned caregiver may face obstacles such as work, time constraints, and cost, which interfere with providing appropriate nutritious choices. (Omar et al., 2001) These factors affect the perceptions that children form and adopt throughout their lives regarding nutrition.

All cultures abide by specific food and nutrition beliefs based on fact, tradition, and experience. In any culture there are concerns regarding the level of knowledge and experience in the nutrition arena, which may limit the ability for sound nutrition information to be disseminated. A study evaluating the dietary practices and food intakes of Spanish children and adolescents demonstrated that on average the nutrition intake of both children and adults, ages 2-24 years, was inadequate, therefore placing the study subjects at risk of developing nutrition-related health problems. (Majem et al., 2003) Beech and her collaborators studied African-American girls and their weight patterns. Results indicated that parental and cultural views influenced both the girls' waistlines and their physical activity levels. (Beech et al., 2004) Over the past three decades, the number of overweight children, 2-5 years of age, has almost tripled. (Nicklas and Johnson, 2004) This trend is supported by a study

indicating nutrition education and parental influence during childhood has lasting effects on weight management. (Birch and Davison, 2001)

The purpose of the present study was to determine the dietary habits and nutrition education levels and practices of parents of pre-schoolers at a Community Head Start Program. Results of this research may provide direction for planning wellness education programs for pre-school aged children and their families.

### Methodology and Results

The participants in this study consisted of parents and children at a community Head Start program. A questionnaire assessing general personal information, nutrition education, and typical dietary intake was distributed to parents to complete and return. The general information consisted of questions regarding age and ethnicity of the parents and child and the parents' highest education level. The nutrition education assessment measured the parents' current basic nutrition knowledge. The personal nutrition assessment regarded the parents' eating habits and measured parental knowledge of their child's eating habits. An oral assessment of the pre-school aged children, 3-5 year of age, was taken through a series of questions assessing nutrition knowledge, habits, and influences. The children answered the questions to the best of their ability without any influences. Because this was a preliminary study, with a rather low number of subjects, it was decided not to compute measures of statistical significance, but only to observe any obvious trends.

Two parental groups were identified: 1) Hispanics, and 2) African-American/Caucasian. The results for these groups were compared based on the percentage of correct answers to the questions in the Nutrition Education section and are reported in Table 1. The four questions assessed were at an

**Table 1. Number of Correct Answers to the Nutrition Education Section (n = 13)**

Questions Assessed	Hispanic (n = 6)	AA/Caucasian (n = 7)
How many food groups are on the food pyramid?	0	3
Please list the food groups and daily servings that you know.	1	3
Which food group should you eat the most of?	1	4
Which food group should you eat the least of?	2	4

**Table 2.**  
*Personal Eating Habits of the Hispanic (N = 6) and non-Hispanic (N = 7) Populations*

	Once a month		1-2 days		3-4 days		5-7 days	
	Hispanic	non-Hispanic	Hispanic	non-Hispanic	Hispanic	non-Hispanic	Hispanic	non-Hispanic
# times eat candy/sweets per week	0	0	4	1	0	2	2	4
# times eat at home/week	0	0	0	1	0	0	6	6
# times eat at restaurants/week	1	0	5	4	0	2	0	1

**Table 3.** *Oral Assessment 3-5 years old boys and girls (n = 20)*

Questions	Correct	Correct	Correct	Incorrect	Incorrect	Incorrect
	Hispanic	non-Hispanic	Total	Hispanic	non-Hispanic	Total
Do you know what the food pyramid is?	0	11	11	7	2	9
How many groups are on the pyramid?	1	2	3	6	11	17
Do you know the names on the pyramid?	1	5	6	6	8	14
What food groups does a carrot belong to?	0	3	3	7	10	17
Meaning of nutrition	0	0	0	7	13	20
Knowledge of the group names	0	1	1	7	12	19
Candy and sweets are not good choices	5	10	15	2	3	5

elementary level of difficulty. To better assess the Hispanic parents, the questionnaire was translated into Spanish. The results of the parent nutrition education assessment indicate a lack of knowledge of nutrition education issues in both groups, with the Hispanic group answering the lower percentage of correct answers throughout.

Results from the personal eating habits of the Hispanic population and the African-American/Caucasian population questions are reported in Tables 2 and 3. Data from the Hispanic group indicated that this group, on average, ate at home more often than they ate at restaurants. Consumption of candy or sweets was moderate in this set of subjects. The African-American/Caucasian group data indicated results similar to those of the Hispanic groups; i.e., meals eaten at home more than at a restaurant. The number of times they consumed candy per week was somewhat higher in comparison to the Hispanic group.

Table 3 shows the quantitative results of the child assessment. Part of the child assessment was designed to measure the nutrition knowledge of the children and part was designed to gather a generalized food pattern. The child assessment information indicated that children were familiar with some nutrition concepts; however, as the questions became more

detailed, the ability to correctly answer the questions decreased. The children were able to respond to the more common questions: “What is your favorite food?” and “What did you eat for dinner last night?” and “Who tells you the most about good and bad food choices?”

The more detailed questions resulted in less response. These questions were “Do you know what the food pyramid is?” and “How many food groups are on the pyramid?” and “Do you know the names that are on the food pyramid?” There were no correct answers when the children were asked, “Has anyone told you what nutrition means?” The children responded with simple “yes” and “no” answers as well as a few general responses such as “McDonald’s,” and “milk and cheese.” On the other hand, 75% of the children knew that sweets and candy were not good choices. The majority of the children reported their mom or dad have the most influence on their eating habits, and 95% said they liked to eat what their parent(s) eats.

The Hispanic children were more deficient in basic nutrition knowledge than the non-Hispanic children. Of the eleven children who correctly answered the question regarding what a food pyramid is, none were Hispanic. Also, with questions regarding the number of groups on the pyramid and the category a

carrot belongs in, the Hispanic children were unable to respond correctly. On the other hand, about 70% of both the Hispanic children and the non-Hispanic children were aware that candy and sweets were not good choices. Overall, the Hispanic children were less knowledgeable in the detailed nutrition concepts than the non-Hispanic children; however, the two groups shared similar generalized food patterns.

### Conclusion

Outcomes of this research project indicated a lack of nutrition knowledge within the study population. Interestingly, the data supported the premise that the parent population of 3-5 year old children is not aware of the nutrition needs of their children and, therefore, may exert potentially harmful influences. Although the children are very young, learning about nutrition has the potential to greatly impact their lifestyle and health for life. Even very young children have the ability to understand simple nutrition concepts. The results of this study indicate that children are capable of learning what is being taught them and are very impressionable. The influence exerted by immediate family, especially the mother or father, supports the need for sound nutrition information at all levels of the family structure.

As a preliminary study, this work should be considered a starting point for further research in the field of nutrition education and health behaviors in children. This pilot study involved only 20 preschoolers and 13 parents. A relatively small number of the parents were surveyed and, thus, they may not be representative of the entire parent population. However, the results do show strong trends worth pursuing in future research. By promoting health education we can potentially decrease chronic disease risk for conditions such as obesity, heart disease, diabetes, and cancer. Nutrition is a subject that should

be more highly emphasized and that children need to learn as they grow older in order to live healthy and productive lives.

### Acknowledgements

I would like to thank Dr. Stephenson for supporting the idea of this research and giving me the opportunity to present it in many forms, including the “Posters at the Capitol” event and this publication. I would also like to thank my sister, Stacy Keys, for allowing me to conduct this research in her preschool classroom. As well, I would like to thank all the parents for participating and the children for trying so hard to give the correct answers to all the questions.

### Works Cited

- Beech, Bettina M., Shiriki K. Kumanyika, Tom Baranowski, Marsha Davis, Thomas N. Robinson, Nancy E. Sherwood, Wendell C. Taylor, George Relyea, Ainong Zhou, Charlotte Pratt, Ayisha Owens, and Nikko S. Thompson (2004). “Parental cultural perspectives in relation to weight-related behaviors and concerns of African-American girls.” *Obesity Research*, 12, 1-17.
- Birch, Leann L. and Kirsten K. Davison. (2001). “Family environmental factors influencing the developing behavioral controls of food intake and childhood overweight.” *Pediatric Clinical of North American*, 48(4), 893-907.
- Majem, Serra L., Barba L. Ribas, Rodrigo C. Perez, Vinas B. Roman, and Bartrina J. Aranceta. (2003). “Dietary habits and food consumption in Spanish children and adolescents.” *Journal of Medicina Clinica*, 121 (4), 126-131.
- Nicklas, Theresa and Rachel Johnson. (2004). “Position of the American Dietetic Association: dietary guidance for healthy children ages 2 to 11 years.” *Journal of the American Dietetic Association*, 104(4), 660-677.
- Omar, Mildred A., Gayle Coleman, and Sharon Hoerr. (2001). “Healthy eating for rural low-income toddlers: caregivers’ perceptions.” *The Journal of Community Health*, 18(2), 93-106.



I just graduated with my bachelors degree in Chemical Engineering this past May. I am originally from Indonesia, and my journey in the University of Kentucky started in Spring, 2001. During my studies, I was a runner-up in the Physical and Engineering Sciences category of the 2006 Oswald Research and Creativity Program. Also, I was member of Tau Beta Pi, the Engineering Honor Society, and the American Institute of Chemical Engineers (AIChE). In the Summer of 2005, the Nanoscale Engineering Certificate

Program (NECP) granted me a summer fellowship that has partially supported the research reported here.

Based on my two previous research experiences and my future plan to attend graduate school in Pharmaceutical Science, I was looking for another research opportunity after I came back from my co-op, a year-long internship at ISP Chemical Inc., Calvert City, KY. At that time, a new faculty member in the department of Chemical and Material Science, Dr. J. Zach Hilt, offered me an opportunity to take part in his joint project with Dr. Razvan Arsenescu in the department of Internal Medicine and Gastroenterology. The project involves developing a polymer-based (PLGA) drug delivery system for Crohn's disease. Through support from my mentors and the continuation of this project, I was able to work on this research independently for one and a half years and also obtain a strong foundation for the drug delivery-focused PhD program in Pharmaceutical Science that I am about to pursue in Fall, 2006. Moreover, from the preliminary data obtained during this research, we are currently in the process of filing a patent application on this novel device.

Outside of my books, I enjoy playing musical instruments, but mostly keyboard. During the school year, I usually play keyboard at the International Christian Fellowship (ICF). Besides being a worship leader in ICF, I am also involved with lots of other activities that are oriented mostly to international students. These activities include but are not limited to serving as secretary for the International Student Council in 2002-2003 and volunteering in several welcome weeks, activities that are put together to welcome new international students who have just arrived on campus.



**Mentors:**

**J. Zach Hilt, Ph.D.**

**Assistant Professor, Chemical and Materials Engineering**

I am pleased to be writing this endorsement on behalf of Christin Pramudiati. Her submission for publication in Kaleidoscope is original research that she completed within my laboratory in collaboration with Dr. Razvan Arsenescu (Internal Medicine, Gastroenterology). Christin is an exceptional student whose meticulous methods and outstanding work ethic in the laboratory have separated her from her peers. The specific research presented in this submission is novel and has led to a patentable technology that promises to have application in the controlled delivery of therapeutic agents from degradable Setons.

## The Study of PLGA Drug Delivery Systems: Implications for Management of Crohn's Disease

An Oswald Paper Competition entry

**Abstract**

The purpose of this research is to develop biodegradable drug delivery systems. One of the delivery systems that we have developed is a suture-like structure for the treatment of Crohn's disease that utilizes a biodegradable polymer, poly(DL-lactide-co-glycolide) acid (PLGA). Crohn's disease is an inflammatory bowel condition. Aside from the gut involvement, perianal complications develop in the form of enterocutaneous fistulas. Medical management of Crohn's disease consists of various drugs with immunosuppressive properties. Complicated disease manifestation requires surgical interventions in the form of bowel resection or fistula drainage with Setons. Setons are suture-like devices that help to drain associated abscesses and close secondary fistulous tracts. They are often removed prematurely to prevent entrapment as the proximal and distal ends of the fistula heal. In their current form, Setons are not degradable and are not able to deliver drugs. Thus, the patients typically receive their drugs systemically.



**Razvan Arsenescu, M.D.**

**Assistant Professor, Gastroenterology, College of Medicine**

The novel device, biodegradable Setons from PLGA, that we developed promises superior treatment by providing adequate drainage, uniform healing, and a lower level of immunosuppression. Currently, there is a patent application filed on this novel device.

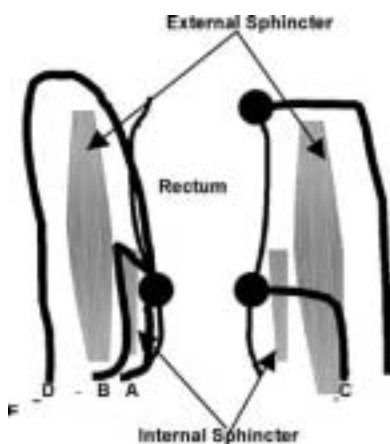
The chronic inflammation is driven by cells of the innate and acquired immune system. Macrophages and dendritic cells (innate immune system cells) sample luminal (gut) antigens and trigger more specialized acquired immune responses. Targeting these cells may break a vicious cycle that creates a chronic state of inflammation within the gut. Drug incorporated-biodegradable nanoparticles can mimic inert particulate matter present in the lumen of the gut. Thus, they may be actively sampled by dendritic cells. Most of these cells remain within the lamina propria of the gut or travel to the gut-associated lymph nodes. By targeting these antigen-presenting cells, we anticipate preventing ongoing activation of B and T cells (acquired immunity) and limiting the systemic exposure to immunosuppressive drugs.

These innovative methods present a more efficient and safe drug delivery that addresses both the chronic gut inflammation (via nanoparticles) and the associated perianal complications (via Setons).

## 1. Introduction

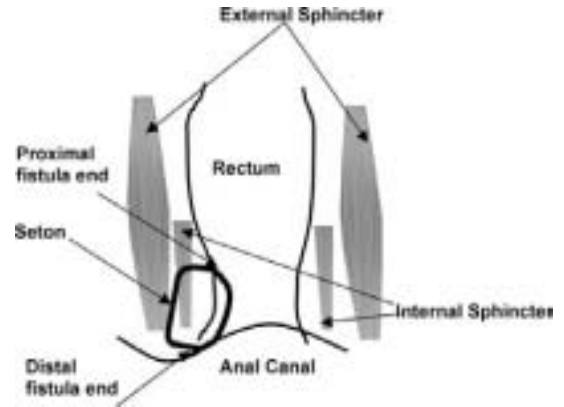
### 1.1. Crohn's Disease

Crohn's disease is an inflammatory bowel disease that results from a deregulated immune response to the commensal intestinal flora. Aside from the gut involvement, perianal complications develop in the form of enterocutaneous fistulas. Medical management of Crohn's disease consists of various drugs with immunosuppressive properties. Complicated disease manifestations require surgical interventions in the form of bowel resection or fistula drainage with Setons.



**Figure 1.**  
*Types of fistulas based on anatomical locations*

**Figure 2.**  
*Seton placed in a perianal fistula*



The cumulative frequency of perianal fistulas in patients with Crohn's disease has been reported to range from 14% to 38% in referral centers [1], with 17% to 28% of patients requiring surgery [2]. For treatment of the fistulas, Tacrolimus and Infliximab are the only drugs shown to be effective in prospective, randomized, placebo-controlled studies. The former can be used orally and topically. In addition to side effects associated with large dose administrations, recurrence after treatment cessation is a major problem with both drugs. In other cases, anatomically complex and medication refractory fistulas require surgical treatment. Continuous drainage with surgically placed Setons (see Figure 1 and 2), is an effective, less invasive, complementary, or stand-alone management. However, for treatment with current Setons, the caveats are patient discomfort, associated with long term placement of these non-resorbable sutures, and absence of complete closure.

Therefore, creating a drug eluting, biodegradable Seton from a PLGA system promises great benefits: (i) the incorporated drug will be slowly and continuously released over time while providing targeted delivery of a lower dose, (ii) uniform healing, because the Seton will be present in the fistulous tract even after the distal and proximal ends (see Figure 2) have closed, (iii) Seton entrapment is no longer an impediment, given the biodegradable nature of these polymers. Overall, this novel device will translate to long-lasting therapeutic success, improved safety, and quality of life for these patients.

### 1.2. Poly (DL-Lactic-Glycolic) Acid (PLGA)

There has been a great amount of research conducted on controlled drug delivery using biodegradable polymer systems. Compared to other biodegradable polymers, poly (D,L-lactide-co-glycolide) acid (PLGA) systems, copolymers of poly(lactic acid)

(PLA) and poly(glycolic acid) (PGA), have generated great interest due to their favorable properties, including excellent biocompatibility, biodegradability, and mechanical strength. Also, PLGA systems have been approved by the Food and Drug Administration (FDA) for use in drug delivery applications. PLGA is advantageous because it biodegrades into lactic and glycolic acids, which can then be metabolized and eliminated from the body as carbon dioxide and water [3].

The degradation of PLGA systems is dependent on their physical properties (i.e., the molecular weight and polydispersity index) and molar ratio of the individual monomer components (lactide and glycolide) (see Figure 3) in the copolymers [3]. PLGA polymers with a 50:50 ratio of lactic acid and glycolic acids are hydrolyzed much faster than those containing a higher ratio of either monomer [4] (see Figure 4).

For degradation analysis purposes, we are mainly focusing on three different ratios of PLGA: 75:25, 65:35, and 50:50. From figure 4, it can be seen that within the range of PLA ratios from 50% to 100%, copolymers with higher ratios of lactide exhibit a higher half-life, thus degrading more slowly. Therefore, as expected, PLGA with a ratio of 50:50 degrades first, followed by 65:35 and 75:25. Degradation of this biodegradable polymer results in a mass loss due to the resorption or dissolution of the material, accompanied by a reduction in molecular weight and changes in mechanical properties such as strength and stiffness.

### 1.3. PLGA Nanoparticles

The chronic inflammation of Crohn's disease is driven by cells of the innate and acquired immune systems. Macrophages and dendritic cells (innate immune system cells) sample luminal (gut) antigen and trigger more specialized acquired immune responses. The significant roles that macrophages and dendritic cells play in the regulation of immune responses in the gastrointestinal tract as antigen-presenting cells are well known [5,6,7]. Targeting these cells may break a vicious cycle that creates a chronic state of inflammation within the gut [8]. Drug eluting, biodegradable nanoparticles, can mimic inert particulate matters present in the lumen of the gut. Thus, they may be actively sampled by dendritic cells. Most of these cells remain within the lamina propria of the gut or travel to the gut associated lymph nodes. By targeting these antigen-presenting cells, we can prevent the ongoing activation of B and T cells (acquired immunity) and limit the systemic exposure of immunosuppressive drugs.

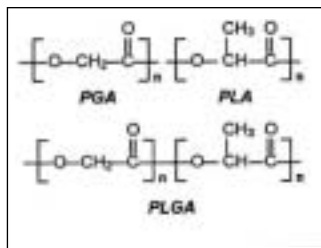


Figure 3. Chemical Structure of PLGA

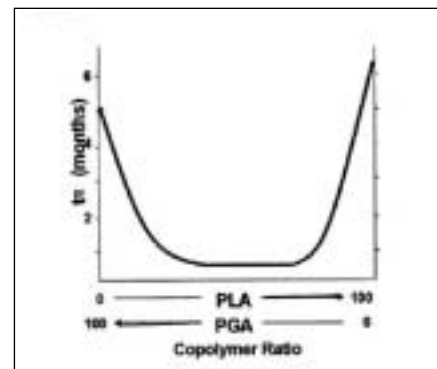


Figure 4. Half-life of PLA and PGA (Adapted from Reference [4])

In order to target these specific cells, the drug delivery system needs to be designed in the nanoscale range. Particles that are less than 500 nm can cross the microfold (M) cells in the Payer's patch or be actively sampled by dendritic cells [9]. Therefore, based on the previous research of Tabata [10,11,12,13] and Nakase [8] that has proven the efficient uptake of microparticles by activated macrophages, we attempted to tailor a controlled drug release from PLGA nanoparticles with size of less than  $1\mu$ .

PLGA nanoparticles were obtained by using an oil-in-water emulsion method. With the help of a surfactant, polyvinyl alcohol (PVA), and stirring the emulsion at about 7900 rpm for 2 minutes, 150-250 nm particles can be obtained by using acetone as the solvent. The size of the nanoparticles acquired depends on several different variables, including (i) solvent choice, (ii) PLGA concentration in the solvent, (iii) the concentration, volume, and type of surfactant, (iv) the volume ratio of PLGA and surfactant, and (v) speed of stirring.

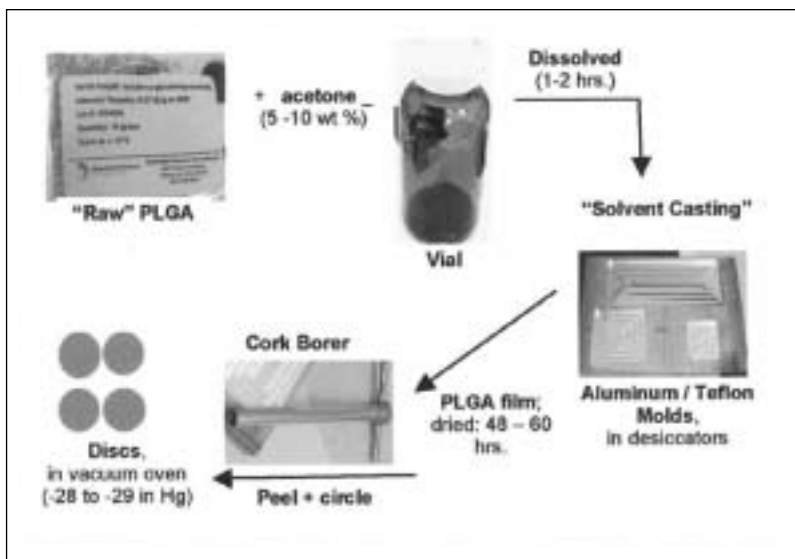
### 1.4. Polyphenols (Green Tea)

Green tea polyphenols are natural plant antioxidants found in tea leaves. Much research has been done to prove that antioxidants can prevent damage caused by free radicals to DNA and other molecules [14]. In addition to several cancer preventive properties, these compounds may reduce abnormal cell growth and inflammation, free the body from cancer causing agents, and restore communication between different cells in the body. Green tea polyphenols have also been shown to be effective in murine models of Crohn's disease. Polyphenols were used as a model drug system in these experiments.

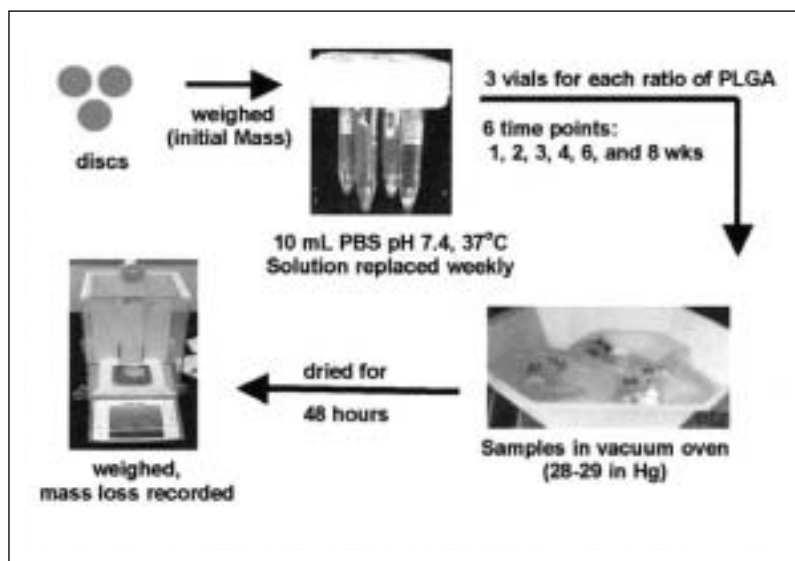
## 2. Experimental Method

### 2.1. Preparation of the PLGA films

Three ratios of PLGA films were prepared by casting a solution of PLGA (75:25, 65:35, or 50:50) and acetone into either aluminum or Teflon molds. Films were dried for at least 48 hours before being peeled and circled with a cork borer into discs with an average diameter of 8.4 mm (see Figure 5). Films with different thicknesses were obtained by dissolving PLGA with acetone. Drug-loaded PLGA films with different ratios (75:25, 65:35, and 50:50) were prepared in a similar manner.



**Figure 5.** Preparation of PLGA film without drug incorporated. When drug needs to be incorporated, it can be added to the system once the polymer has dissolved.



**Figure 6.** Degradation study of PLGA system using mass loss analysis

## 2.2. Degradation Study

A degradation study of different ratios was carried out by analyzing the mass loss of PLGA discs at six time points: 1, 2, 3, 4, 6, and 8 weeks, and that of different thickness of PLGA film done with 10 time points. For error analysis, samples were prepared in triplicate. PLGA discs were immersed in PBS (Phosphate Buffered Saline) (see Figure 6). At each time point, discs were taken from the water bath for mass analysis, while the PBS in the remaining samples was replaced weekly with fresh PBS. The mass of the discs at the various time points was then compared to their initial mass. Then, the degradation (mass at time point divided by initial mass) was calculated.

## 2.3. Quantification of Polyphenols' Concentration

Prior to calibration, solutions of green tea polyphenols and PBS pH 7.4 were prepared in various concentrations: 0.0005, 0.001, 0.005, 0.010, and 0.015 mg/ml. Calibration was carried out by measuring the absorbance of each concentration in a UV-Visible Spectrophotometer over the wavelength range of 200 to 250 nm. Polyphenols have their strongest absorbance at 207 nm.

## 2.4. Drug Release Study

Discs loaded with the drug were immersed in PBS. Samples for each ratio of PLGA (75:25, 65:35, and 50:50) were prepared in quadruplicate. For infinite sink conditions, the PBS solution in each vial was replaced at each time point with a fresh solution. The absorbance of each solution was measured using a UV-Visible Spectrophotometer at 207 nm. Then, the absorbance data was translated to the concentration by using the calibration curve.

## 2.5. PLGA Nanoparticles

Currently, the most optimized nanoparticles were obtained by the following method: PLGA was dissolved in acetone in a centrifuge tube. If polyphenols or another compound was to be encapsulated, it was added after the polymer was dissolved. To this solution, a surfactant, poly(vinyl alcohol) (PVA), was added, and the resulting emulsion was very briefly hand shaken before being homogenized. The emulsion was then transferred to a vacuum with additional water used as a rinse. To remove the residual acetone, the emulsion was stirred while under a modest vacuum. While stirring continued, a small volume of emulsion was removed from the flask for sizing. All the materials used in the procedure were simply multiplied proportionally by a factor of 1/4, 1/2, 2, 5, etc, to obtain various quantities of nanoparticles. To remove the drug present in the surfactant, the nanoparticles were separated using centrifugation. The supernatant was collected and analyzed using a UV Visible spectrophotometer (at 207 nm) to detect the amount of polyphenols that was not encapsulated in the nanoparticles. The pellets of nanoparticles were combined and re-suspended in PVA solution for release study purposes. Currently, we are still in the process of developing a better, more efficient way to synthesize these nanoparticles and to evaluate the polyphenols released from this system.

### 3. Results and Discussion

#### 3.1. Degradation Study of Different Ratios of PLGA

The degradation and drug release of PLGA varies depending on the ratio of the PLA to PGA. The 50:50 ratio starts to degrade in 2 weeks, followed by 65:35 and 75:35. Often, we performed molecular weight analyses instead of mass loss analyses to obtain a more accurate degradation study. However, because this research was conducted with a target of in vivo drug delivery, mass loss analysis can give a good representation of the degradation and a rough estimation of the residence time of the system in the body. To obtain a preliminary estimate of the PLGA degradation in vitro, we carried out the study using the PLGA discs. Wu et al. [15] reported the study of various ratios of PLGA in the form of rods. The difference in the geometries (between discs and rods) might give a slightly different degradation response. However, an in vivo study using Seton-like structures is being planned to be carried out in the near future. Thus, more accurate degradation of PLGA and its inflammatory response will be studied further.

The summary of the preliminary PLGA degradation study based on different ratios is presented in Figure 7. The relatively large error bars associated with the figures were caused by several factors, including variance of PLGA weight percent in the system and mass loss during solution replacement in the experimental methods. The use of a filter and mesh could be a way to reduce the error. Also, by making larger PLGA films, all the discs used for the experiment will be somewhat more homogenous, thus, decreasing the error.

#### 3.2. Degradation Study of Different Thicknesses of PLGA Film

Figure 8 indicates that the degradation of PLGA also varies depending on the thickness of the film. The thicker PLGA film degrades a lot faster compared to the thin one. This is due to the fact that the thicker PLGA film tends to lower the pH of the media, causing the film to be even easier to degrade. Due to difficulties in handling and weighing the discs, large errors were generated with the thinnest film.

#### 3.3. Quantification of Polyphenols Concentration

Figure 9 shows the correlation between the concentration of the polyphenols and their absorbances, obtained from a UV-Visible spectrophotometer. The absorbance data used was normalized at 207 nm, where polyphenols absorbance is at its maximum. By determining the absorbance of five different concentrations (listed in section 2.2), the constant value of  $\epsilon b$ , 169.49, can be obtained from the linear plot,

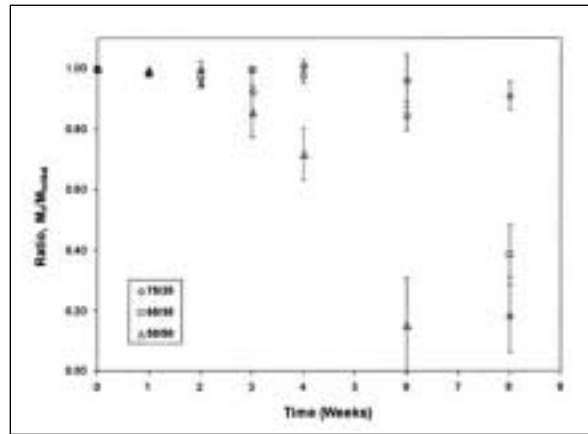


Figure 7. Degradation of three different ratios of PLGA (75:25, 65:35, and 50:50), N = 3

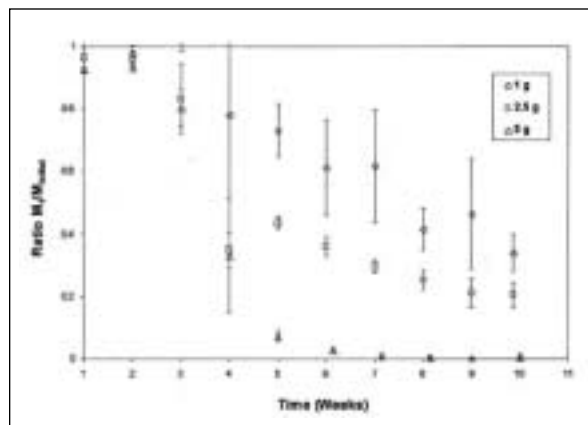


Figure 8. Degradation of PLGA 50:50 (I.V.: 0.58) with three different thicknesses by mixing PLGA (1, 2.5, and 5 g) and acetone at 10% w/w, N = 3

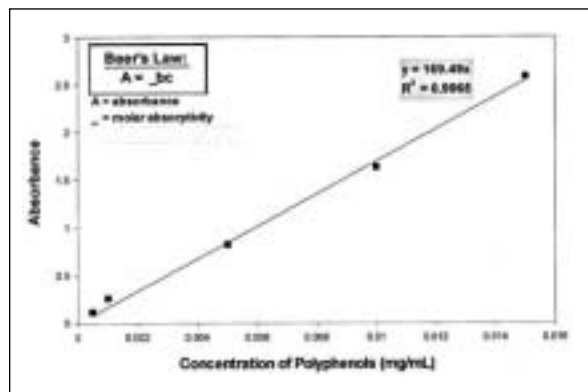


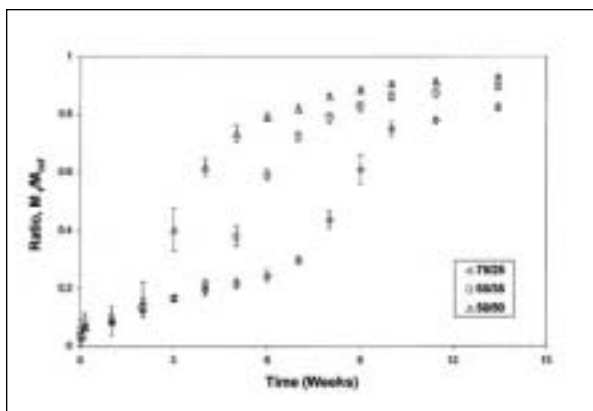
Figure 9. Correlation between concentration of polyphenols and absorbance, described by Beer's Law

Mass of PLGA	Volume of acetone	Concentration of PVA	Volume of PVA	Ratio Vol of PLGA and PVA	Polyphenol ratio to acetone (mg/ml)	Homogenize speed	Homogenize Time	Avg Size (nm)	Std. Dev (nm)
200 mg	6 ml	1.5 mg/ml	20 ml	3:10	-	11500	2 min	196.61	436.8
100 mg	3 ml	1.5 mg/ml	10 ml	3:10	-	hand shaken	-	235.8	52.2
50 mg	1.5 ml	1.5 mg/ml	2.5 ml	3:5	0.6	7960	2 min	123.57	13.3
500 mg	15 ml	1.5 mg/ml	35 ml	3:5	1.87	7960	2 min	144.84	16.2

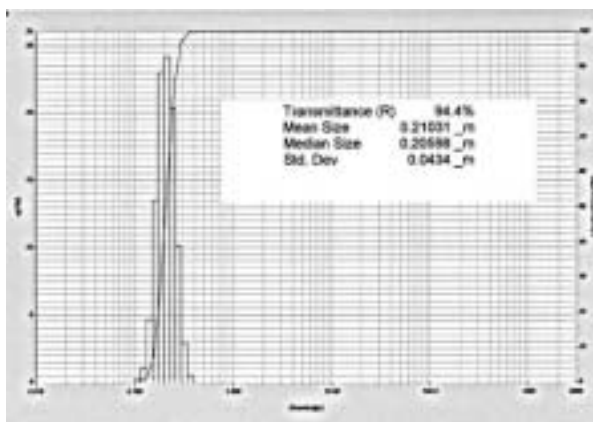
Table 1. Summary of particle average size and the standard deviation due to the effects of various variables



**Figure 10.**  
Polyphenols  
release rate  
from 3 different  
ratios of PLGA,  
N = 4



**Figure 11.**  
Particle  
analyzer result:  
nanoparticles  
size taken right  
after being  
homogenized



following Beer's law. In the release study, the polyphenols incorporated in the discs were slowly released to the PBS solution in which they were incubated. At its time point, the absorbance of these PBS solutions was measured using a UV-Visible Spectrophotometer. Thus, by utilizing the attained  $\epsilon b$  value, the only unknown variable, concentration ( $c$ ), can be calculated from the measured solution absorbance ( $A$ ).

### 3.4. Release Study

From the release study data summary (see Figure 10), it can be seen that the release of drug is directly related to the physical properties of the PLGA system. Here, the ratio of the mass released at time  $t$ ,  $M_t$ , over mass released at time infinity,  $M_{inf}$ , is plotted versus time. The PLGA with a ratio of 50:50 released the polyphenols first, followed by 65:35 and 75:25. Using this release data, we can possibly tailor the release of the drug in a similar dosage over a period of up to 4 to 5 months. The errors in the release study data were partially generated by the inhomogeneous distribution of polyphenols in the PLGA films, which results in a slightly different loading concentration in each disc being studied.

### 3.5. Nanoparticles

Table 1 shows some values of the particle average size along with standard deviations due to the combinations of different variables. There are many factors that determined the size of the nanoparticles, including: the ratio of the PLGA over the surfactant, the amount of PLGA in the solvent, concentration and volume of the surfactant, homogenizing time and speed, solvent and surfactant choices, and many more. By utilizing acetone as the solvent to dilute the PLGA and PVA as the surfactant, the smallest size of particles obtained during experiments were from a ratio volume of PLGA and PVA of 3:5. At this volume ratio, nanoparticles with the size of 150-250 nm have been successfully synthesized.

Figure 11 shows the size of the particles,  $202.15 \pm 41.9$  nm, that were used for the release study. The size of the particles was confirmed using a scanning electronic microscope (Figure 12). The "strings" observed in Figure 12 were most probably formed due to excessive PVA that still had not been removed from the system. PVA was kept in the system to avoid particles aggregating. Again, we are in the process of developing a better, more efficient method to synthesize these nanoparticles, and the release study of nanoparticles still also needs to be further developed.

## 4. Conclusions

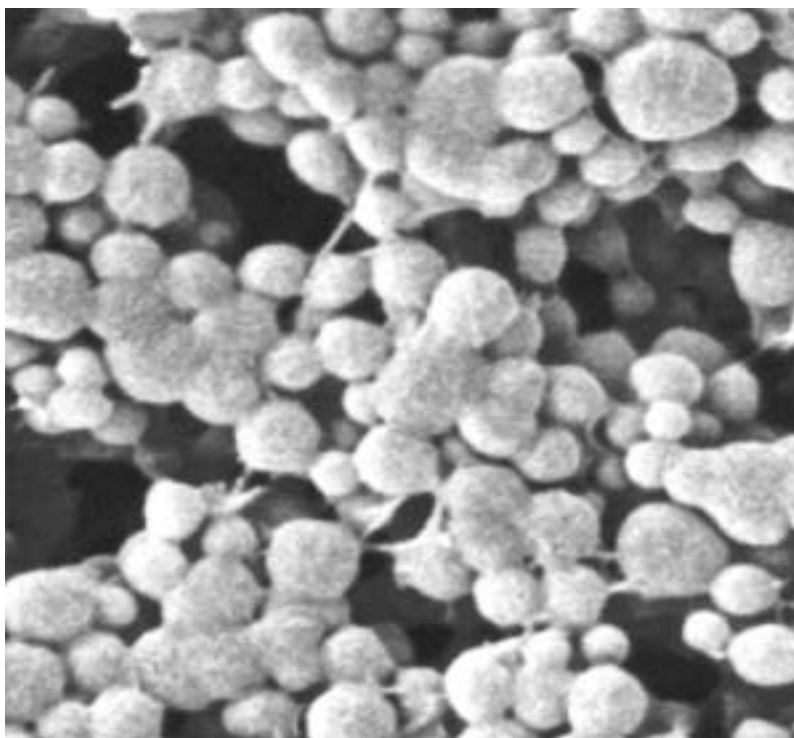
Through this research, we have successfully developed a degradable Seton from PLGA that also will be able to release drugs locally. Because the PLGA degradation rate in any form of device can be tailored based on its dependency on the physical properties, such as ratio, molecular weight, and polydispersity index, this device promises a better therapeutic system for Crohn's disease patients. With these preliminary experiments, we were able to determine the degradation rate of the PLGA at different ratios (75:25, 65:35, and 50:50) and thicknesses using mass loss analysis. Although there were errors associated with the mass loss analysis, trends were observed. The release of polyphenols in PLGA discs with different ratios was quantified using the calibration data obtained. A Phase I clinical study for patients with fistulizing Crohn's disease is in the process of being developed. We are also attempting to optimize the nanoparticle production and ways to analyze the release of a model drug (e.g., polyphenols). Overall, we believe that these drug delivery methods present a more efficient and safe drug delivery that addresses both the chronic gut inflammation (via nanoparticles) and the associated perianal complications (via Setons).

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- Dr. J. Zach Hilt, Department of Chemical and Materials Engineering at the University of Kentucky, for advising this project
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## References

- [1] Farmer, R.G. and Hawk, W.A., Turnbull RB Jr. (1975). "Clinical patterns in Crohn's disease: a statistical study of 615 cases." *Gastroenterology* 68:627-35.
- [2] Hobbiss, J.H. and Schofield, P.F. (1982). "Management of perianal Crohn's disease." *Journal of the Royal Society of Medicine* 6:414-17.
- [3] Jain, R.A. (2000). "The manufacturing techniques of various drug loaded biodegradable poly(lactide-co-glycolide)(PLGA) devices." *Biomaterials* 21:2475-2490.
- [4] Middleton, John C. and Tipton, Arthur J. (1998). "Synthetic Biodegradable Polymers as Medical Devices." *Medical Plastics and Biomaterials Magazine*. March:30 accessed at <http://www.devicelink.com/mpb/archive/98/03/002.html> (26 Oct. 2005).
- [5] Seldenrijk, C.A., Drexhage, H.A., and Meuwissen, S.G.M. (1989). "Dendritic cells and scavenger macrophage in chronic inflammatory bowel disease." *Gut* 30:484-491.
- [6] Wilders, M.M., Drexhage, H.A., and Kokje, M. (1984). "Veiled cells in chronic idiopathic inflammatory bowel disease." *Clinical and Experimental Immunology* 55:461-468.
- [7] Allison, M.C., Cornwall, S., Poulter, L. W., Dhillon, A.P., and Pounder, R.E. (1988). "Macrophage heterogeneity in normal colonic mucosa and in inflammatory bowel disease." *Gut* 29:1531-1538.
- [8] Nakase, Hiroshi, Kazuichi Okazaki, Yasuhiko Tabata, Suguru Uose, Masaya Ohana, Kazushige Uchida, Yumi Matsushima, Chiharu Kawanami, Chikashi Oshima, Yoshito Ikada, and Tsutomu Chiba. (2000). "Development of an Oral Drug Delivery System Targeting Immune-Regulating Cells in Experimental Inflammatory Bowel Disease: A New Therapeutic Strategy." *The Journal of Pharmacology and Experimental Therapeutics* 292:15-21.
- [9] Brannon-Peppas, L. (1995). "Recent advances on the use of biodegradable microparticles and nanoparticles in controlled drug delivery." *International Journal of Pharmaceutics* 116:1-9.
- [10] Tabata, Y. and Ikada Y. (1988). "Macrophage phagocytosis of biodegradable microspheres composed of L-lactic/glycolic acid homo- and copolymers." *Journal of Biomedical Materials Research* 22:837-858.
- [11] Tabata, Y. and Ikada Y. (1990). "Phagocytosis of polymer microspheres by macrophages." *Advances in Polymer Science* 94:107-141.
- [12] Tabata, Y. and Ikada Y. (1990). "Macrophage activation for antitumour function by muramyl dipeptide-protein conjugates." *Journal of Pharmacy and Pharmacology* 42: 13-19.
- [13] Tabata, Y. and Ikada Y. (1990). "Drug delivery system for antitumor activation of macrophages." *Critical Reviews in Therapeutic Drug Carrier Systems* 7:121-148.
- [14] National Cancer Institute. Division of Cancer Prevention. Accessed at: [http://www3.cancer.gov/prevention/agents/Tea\\_Polyphenols.html](http://www3.cancer.gov/prevention/agents/Tea_Polyphenols.html) (26 Oct. 2005).
- [15] Wu, X.S. and Wang, N. (2001). "Synthesis, characterization, biodegradation, and drug delivery application of biodegradable lactic/glycolic acid polymer. Part II: Biodegradation." *Journal of Biomaterial Science Polymer Edition* 2 (1): 21-34.



**Figure 12.**  
Scanning  
electron  
microscope  
image of  
nanoparticles

## Ben Drewry and Johannes Kohler



### Ben Drewry

I am currently a Junior Philosophy major at the University of Kentucky. My interests include the interrelationship between art, perception, and creativity, ultimately within a non-dual “framework.”

This article was written for and presented at the “Altered States: transformations of place, performance, and perception” conference in England. (Information about the conference can be found here: <http://www.planetary-collegium.net/conferences/> and the speech that was presented here: [http://www.valleysequence.com/text/conference\\_speech.htm](http://www.valleysequence.com/text/conference_speech.htm).) The conference took place in the summer of 2005 and was sponsored by the Planetary Colligium, which is an international group of innovative scholars, scientists, and artists working together through a transdisciplinary approach. The founding member, Roy Ascott, is a leading pioneer of interactive and collective art projects using the internet and other forms of modern technology.

One of the Collegium’s main focuses is the study of consciousness through the integration of various modern and esoteric perspectives. That is also what we attempted to do in this article. The writing process was deeply insightful. Through utilizing personal experience, modern scientific knowledge, and esoteric understandings, an expansive perspective was gained of the art process and its relation to perception. The painting experiment itself came from a very simple idea. Without any training or practice of any kind, we created the experiment naturally. It arose from a passion within us, a deeper knowing that we can act and speak out of our own authority. Without the conditioning of formalized patterns of thought, we strove to expand the realm of ‘painting’ and open the art viewer to directly experiencing the creation process.

Presently, I am continuing the attempt to expand the painting process through a combination of traditional and digital mediums. In the future, we would like to animate the process more fully, using digital animation software.

Under the name Valley Sequence, I also produce abstract electronic music that has been featured on WRFL. It correlates closely to the images and can be found on my website, <http://www.ValleySequence.com>, along with other artworks. Anyone who is interested in collaborating may contact me.



### Johannes Kohler

I am a Senior Architecture student at the University of Kentucky. My interests include horseback riding and World War II reenacting.

This project helped inform the possibilities I see in my main field of study, architecture. It helped reveal the limitation of specific definitions of application, and that all application arises from the way we perceive the medium in which we are involved. If we operate based upon a limited or conventional perception, it will be reflected and reinforced in the buildings we create and inhabit. Therefore, I see the process of building-making, from initial drawings to “completion,” as an open one to be engaged in directly as it unfolds in the present moment. Buildings may then open us more directly to their living essence as evolving spaces created moment to moment through our perception.

I am looking forward to graduating and working on similar projects, possibly extended into installation type environments.



More images can be seen in the on-line version  
of the journal at [www.uky.edu/kaleidoscope/  
fall2006](http://www.uky.edu/kaleidoscope/fall2006).



**Mentor:**  
**Daniel Breazeale, Ph.D.**  
**Professor, Department of Philosophy**

This essay is in part a report on a (filmed) “experiment in experiential painting” and in part an experiment in its own right: an experiment in articulating issues and claims regarding “transformed perception” and the “nature of consciousness itself.” The basic thesis — namely that the experience of creating a certain sort of art indicates the presence of a “prereflective self prior to all perceptual experience” — is surely controversial, but also quite interesting and worthy of further exploration. The authors do a fine job not only of conducting (and filming) their experiment, but also of connecting the results of the same with a large body of literature concerning the relationship between attentiveness and consciousness. The question concerning the “origin of the work of art” is as old as art itself, and these authors are to be congratulated for their fresh approach to the same, an approach that synthesizes empirical research into consciousness, phenomenological accounts of consciousness by various philosophers, and Eastern wisdom literature, and then combines these various theories and accounts with close attention to the actual process of creating abstract painting. What is most original about this paper, as a contribution to aesthetics, is the way it links the experience of “observing” with that of theories of art production and appreciation. The video that was made of the “experiment” described in this paper is also quite illuminating (and the painting itself is — or rather, was — quite beautiful). It is refreshing to encounter such a novel and creative approach to such ancient and difficult issues.

## Art, Attention, and Consciousness: An Experiment in Experiential Painting

**Abstract:** A “transformation of perception” is investigated by looking both at the interrelationship among art, attention, and consciousness and by looking into their common origin. The role attention plays in consciousness is considered. A new model of consciousness is summarized that claims that attention is the primary factor in creating consciousness, and posits a prereflective self prior to all perceptual experience. This model is compared to states of pure consciousness described by Eastern sages, and the role attention plays in achieving those states is examined. Our experiment in experiential painting is described, and we then attempt to tie together the three main topics.

### Introduction

Through what process is art created and experienced? What is the nature of looking at the origin of an artwork, not as an object or a thing in itself, but as the entirety of *its* unfolding within consciousness? Could such a looking expose a deeper process that gives light to consciousness itself? Here we will explore the interrelationship between art, attention, and consciousness.

We examine the role attention plays in consciousness. We will take a brief overview of a recent theory of consciousness in which attention plays a primary explanative role. This theory seeks no less than to solve the “hard problem” of consciousness by using a model based on cognitive science and incorporates a prereflective state of consciousness (Chalmers, 1995).

With a wider perspective on the role attention plays both in consciousness and art in general, we will then describe our experiment in experiential painting and highlight some of its experiential qualities.

Through our painting experiment, we hope to grasp intuitively what is involved in the experience of art and to speculate on what this experience can mean for experience and perception in general. It is our view that in order for a “transformation of perception” to take place, one should begin with understanding, or rather intuitively realizing, the origin of perception itself, which upon realizing, allows transformation to emerge.

### Attention and Consciousness

The problem of consciousness (at least as far as modern science is concerned) has been an elusive one. The “hard problem” was put forth by Chalmers (1995) as the simple fact that we have conscious experience yet we do not know how to account for it. Materialists give functional or reductive answers, while others simply attempt to prove its insolvability, yet there has been no consensus answer (see Block et al., 1997, for relevant literature).

Varela (1996) called for a new approach when he coined the term “neurophenomenology” to describe a shift in the way consciousness should be studied. He proposed using both a rigorous phenomenological method along with modern cognitive science, related through a system of “mutual constraints,” in order to eventually “dissolve” the hard problem of consciousness. Latter, this shift in epistemological study was declared to be a fundamental shift comparable to that of Darwinism. (Bitbol, 2002)

This method has now laid the groundwork for broad new studies in consciousness. In a recent review, Taylor (2005) proposes that attention is “the gateway to consciousness.” He uses a single control model to map the movement of attention and the model works for both bottom up control (glimmer of light), and top down control (searching for a friend in a crowd). Though these are examples for vision, his model applies to other sensing modalities as well as to motor operations.

Through the execution of his model, working memory buffers are created, and “gaps” emerge within consciousness as content-free experience. He claims that these “gaps” are the result of a prereflective self and lead to the conscious experience of ownership, which is the “error free ‘I’ experience” that is ever present within consciousness.

The ‘I’ experience is best described by Husserl:

When I say *I*, I grasp myself in a simple reflection. But this self-experience [*Selbsterfahrung*] is like every experience [*Erfahrung*], and in particular every perception, a mere directing myself towards something that was already there for me, that was already conscious, but not thematically experienced, not noticed. (Husserl 1973, 492-493)

Therefore, we can only reflect on ourselves. Yet, when we have the experience of pain for instance, we have the continuous feeling that it is our experience. According to Taylor, he solves this problem by introducing a prereflective self, at the center of all perceptual experience, as an integral part of his model of consciousness.

Further, he claims that this prereflective self can be experienced in heightened states of awareness in which the subject “attends his own attention.” He cites studies of subjects meditating that relate both phenomenological observations with data from various types of brain imaging that support the claim of an experience of pure consciousness (prereflective self) during the period of meditation. (Taylor, 2002)

Accounts of pure consciousness have been around for thousands of years as an essential part of many Eastern religious traditions. During the third century before Christ, an Indian sage named Patanjali compiled religious texts called *Yoga S tras*. They consist of short sections guiding one on the inner sections toward pure consciousness. The following is a passage that strikingly resonates with what we have been considering:

... The mind itself is always experienced because it is witnessed by the unchanging Self.

The mind does not shine by its own light. It too is an object, illuminated by the Self.

Not being self-luminous, the mind cannot be aware of its object and itself at the same time.

Nor is the mind illuminated by another more subtle mind, for that would imply the absurdity of an infinite series of minds, and the resulting confusion of memories

... And the mind, despite its countless tendencies, exists for the sake of the Self, because it is dependant upon it. (Patanjali, 18-24)

Further, the *S tras* describes a process of increasing levels of attention from the “gross” level of “mental absorption,” to a state in which “the mind is quiet enough to be absorbed in the object of attention.” In this state, the “object of attention is subtle” and the “range of subtle objects includes all the levels of

creation.” As the light of the Self shines forth, “consciousness perceives only the truth.” Finally, when even the subtlest level of mind is transcended, and the mind becomes perfectly still, the “unbounded Consciousness of the Self – alone remains.” (Pantanjali, 41-51)

Not only is attention a primary factor in creating consciousness, it can also be used in realizing consciousness. For in training ones attention onto attention itself, one may realize a pure consciousness that lies implicit yet unrecognized within all of experience.

If we are to take this extended account of attention and apply it to the “matrix of experience” from which a subject forms a representation, a new ground emerges. It is the ground of prereflective or pure awareness, that lies at the center of experience, providing the “gap” between each attended moment of consciousness.

This consciousness has no object of reflection, thus it is not extended in time and can be viewed as eternal. Being timeless, it completes our vision of the “matrix of experience” in that the vivid aesthetic or spiritual experience eventually reaches a timeless state that simultaneously turns out to be its origin.

Now, if our attending to each “object,” whether of external or internal perception, becomes a more vivid experience as the awareness of time is reduced, are we intuitively glimpsing not only the subtle mental processes at work (recognition of symmetry, color, perspective, etc.), but also the ground of all experiencing itself? What kind of art, if any, could make this “apparent” to one’s self?

### Experiential Painting

Hegel claimed that traditional art no longer served the “highest needs of the human spirit.” Although he did not conceive of the non-image abstract art of today in saying so, it could be argued that his philosophical history of art, which leads toward greater abstraction in artistic representation, is a precursor to this modern development. (Pippin, 2002)

While Hegel had in mind a greater reflexivity in the way art is represented, such as paintings about “paintingness,” he could not have imagined the moment in time we are in today in which we have begun to reflect on our aesthetical experience both by rigorous phenomenological methods and by the expanding field of cognitive science.

As Noë (2000, 2002) has pointed out, art can assist us in phenomenological study by engaging ourselves in our perceptual consciousness. He primarily used examples of modern sculpture to propose a theory of engagement in which an “enac-

tive” approach to temporally extended perceptual experience is to be developed. However, it is clear that attention plays a key role in his theory as well: “the painter must attend ... the way the scene looks” (Noë, 2002, his emphasis) and “one must direct ones attention to the temporally extended fully embodied and environmentally situated activity of exploration of the environment.” (Noë, 2000)

He argues against phenomenological introspection by stating, “phenomenological study of experience is not an exercise in introspection, it is an act of attentiveness to what one does in exploring the world” (Noë, 2000). If we are to consider the broad view we took above for the role attention plays in consciousness, the same process would be occurring in attending to a visual scene, attending to the exploration of an environment (a combination of both motor function and sense modalities), and attending to one’s own consciousness (introspection). Although each of these may consist in different “objects” of attention and extend through different parts of the brain, the underlying process would be the same. Therefore, we will accept his view of phenomenological study as one of temporarily extended events, but we will also inquire into introspection, as it is our purpose here to probe the phenomenological aspects of art to see if it can lead to a greater awareness not only of temporally extended phenomenological experience, but of consciousness itself.

The works of Jackson Pollock are a continuing source of inspiration for us, as well as those of Wassily Kandinsky. The painting mentioned here was produced for an art history class assignment to make a painting by “mimicking” his style. This is the only previous painting experience we have had prior to making our experiential paintings. Although we did not maintain Pollock’s dynamic “action painting” in our latter works, his understanding of the use of paint has continued to influence us. We use paint in a process of layering which is akin to creating a thin sculpture, with a wide range of color, on a flat plane (all painting to some extent can be seen as such, although our work makes it explicit). Therefore, although some techniques may be learned and repeated, any constraint in the way we use paint is unnecessary, as we are manipulating it in any way possible to form a type of structure. We will continue to use “we” or “one of us” in regard to our artwork in order to continue the narrative, however it will be noted here that the paintings and music were created by Ben Drewry, and the filming and editing was produced by Johannes Kohler.

The idea for our experiment began with a reflection. While in the process of painting an abstract

painting similar to that of Jackson Pollock, the entire process was observed and we found it difficult to designate a point when the painting was finished. More importantly, upon paying close attention to the process, we noticed that the painting seemed to contain more meaning in its entirety as it unfolded in time rather than what was “left over” when it was deemed complete.

Reflecting on this observation, we decided to film the painting process. We used two digital cameras, one on a tripod, the other hand held, to capture dynamic shots of the painting. No reference points were filmed (i.e., frame of the painting, hand, or brush), because we wanted to capture only the painting itself.

One of us would paint a portion, and then the other would film it at different angles with various dynamic movements. We would then repeat the process, stopping to film about every fifteen minutes. After repeating this a dozen times or so, we concluded by tearing the painting apart, setting it on fire, and filming it as it burned. The film was then edited and self-produced electronic music was thematically added.

In the experience of creating our experiment, there was no “outcome” of representation in our minds. While paying attention to the fact that each “step” of the painting was going to be filmed, every use of paint was a fully present movement, in and for itself. Our minds were fully concentrated on the present moment, for the present moment was what was being recorded.

What eventually emerged was a detailed abstract structure with apparent symmetries and correlations of color. The emergent patterns could be viewed as a generative order explicating the implicate orders of our minds (Bohm, 1980). Bohm and Peat (1987) describe the process of painting beginning with a “general idea, a feeling that contains, in a tacit or enfolded way, the whole essence of the final work.”

Yet, whatever emergent structure or pattern came to life, it was only in the background of our attention, as we were focused not on the development of form, but on attending to each moment.

Such attention demanded an inward looking that could penetrate the layers of self, for the temporal functions of the mind only extended and diluted the present moment that we were attempting to represent. This is not to claim that such functioning did not exist at the time, or that it did not affect the painting, but it only existed as a residual experience “outlining” the greater movement of the present moment.

With this attention, the actual physical activity of painting became effortless. The separation between

the painting and ourselves was fully penetrated, as the expanded space of mind enveloped the entire process.

Now what remains of it? Dispersed ashes of paper, and bits of information are all that are left. However, we should not focus our attention on these remains, but rather the experience of viewing the unfolding of the painting within consciousness as the images are received from a viewing screen. This can only be experienced fully in that from which it came, the present moment.

One may simply perceive it as moving images on a television screen, or look at it is an interesting array of colors and patterns that please the eye. Some could label it as some kind of new form of abstract art, pick out some features that appeal to them, attempt to analyze or ignore the rest, and be done with it.

However, without deeply attending to the experience, not only as visual information received from the screen, but as the entirety of the unfolding process within one’s consciousness, one may be entertained or inwardly satisfied, but no “transformation of perception” will occur.

Let us take a look for a moment at the beginning, middle and end of the experience. From a blank screen, an image materializes and the experience begins. Sound waves vibrate through the atmosphere of the viewing space, drawing one in to pay attention to all the vibrations around her or him.

The middle is the “flow” of the film, bringing the painting to life, not as a linear series of images, but as an amorphous entity within consciousness in which the “observer,” between the images and sounds, the screen and the eyes, even the space between each photon and sound wave, exists as Pure Consciousness.

In the end, the sound is compressed into a single tone and fades away, the screen fades to black, and the “observer” is left with nothing but the inner workings of his or her own mind.

## Conclusion

It is not our purpose here to create a hierarchical definition of art or to somehow classify art purely by the transformative experience it may produce. Art is inherently indefinable and the range of meanings that it generates is endless. One needs only to look at the cultural and developmental necessities of all varieties of art, and representations of consciousness in general, to appreciate its various forms. No doubt, it is by fulfilling these necessities that we are able to communicate the broad range of our shared experience.

Throughout history, humanity has used particular forms to represent the entire spectrum of conscious

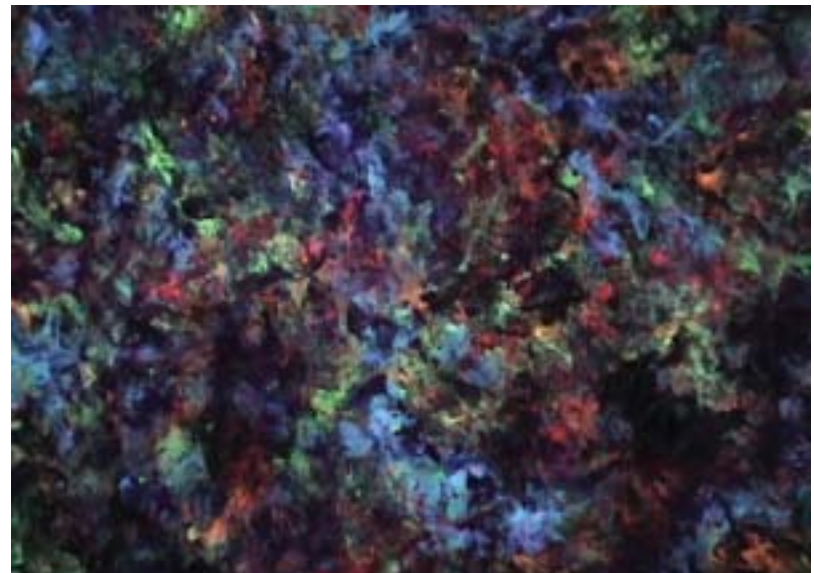
experience. Some forms of art correlated to the emerging understanding generated from human's inherent and expanding ability to reflect. Often, these forms of art reflected in abstract ways an understanding of our world just prior to similar understandings based on science. (See Shlain (1991) for examples)

Now, we are in a time when our understanding has delved into the depths of quantum reality and expanded outward to chart the vastness of our Universe. The greatest temporally extended event conceivable, the beginning of our Universe, in which the forces of nature were undivided, is theoretically reflected upon and "observed" through the use of high speed atom colliders. With such knowledge, there have even been so called "Theories of Everything" proposed that are awaiting the missing observations and concepts that will make them complete.

Theories of consciousness are emerging that may one day create fully working models of consciousness that could even be used to create artificially intelligent computers. The interest and human effort in which both our outer and inner realms are reflected on increases as our perceptive capabilities through the use of instruments expands exponentially.

Suppose these theories come to light. What is art to be when both the Universe and our minds are fully understood and predictable? Clearly, to contact once again the unknown through an experience that transcends our conceptions, art must look to the origin. That is what we have proposed here and have attempted to manifest through our experiment in painting.

The realization may emerge that no matter what one directs her or his attention to whether it be a "Theory of Everything" or a work of art, one is continuing a processes of becoming that has removed one's self from the inner Self or State of Pure Consciousness. This State is one in which the "matrix of experience" is fully penetrated and truly unitary perception comes to life as the subject-object duality is transcended, leaving That perceiving That. Inner time ends as the Source contacts itself in a spontaneous Recognition of Self.





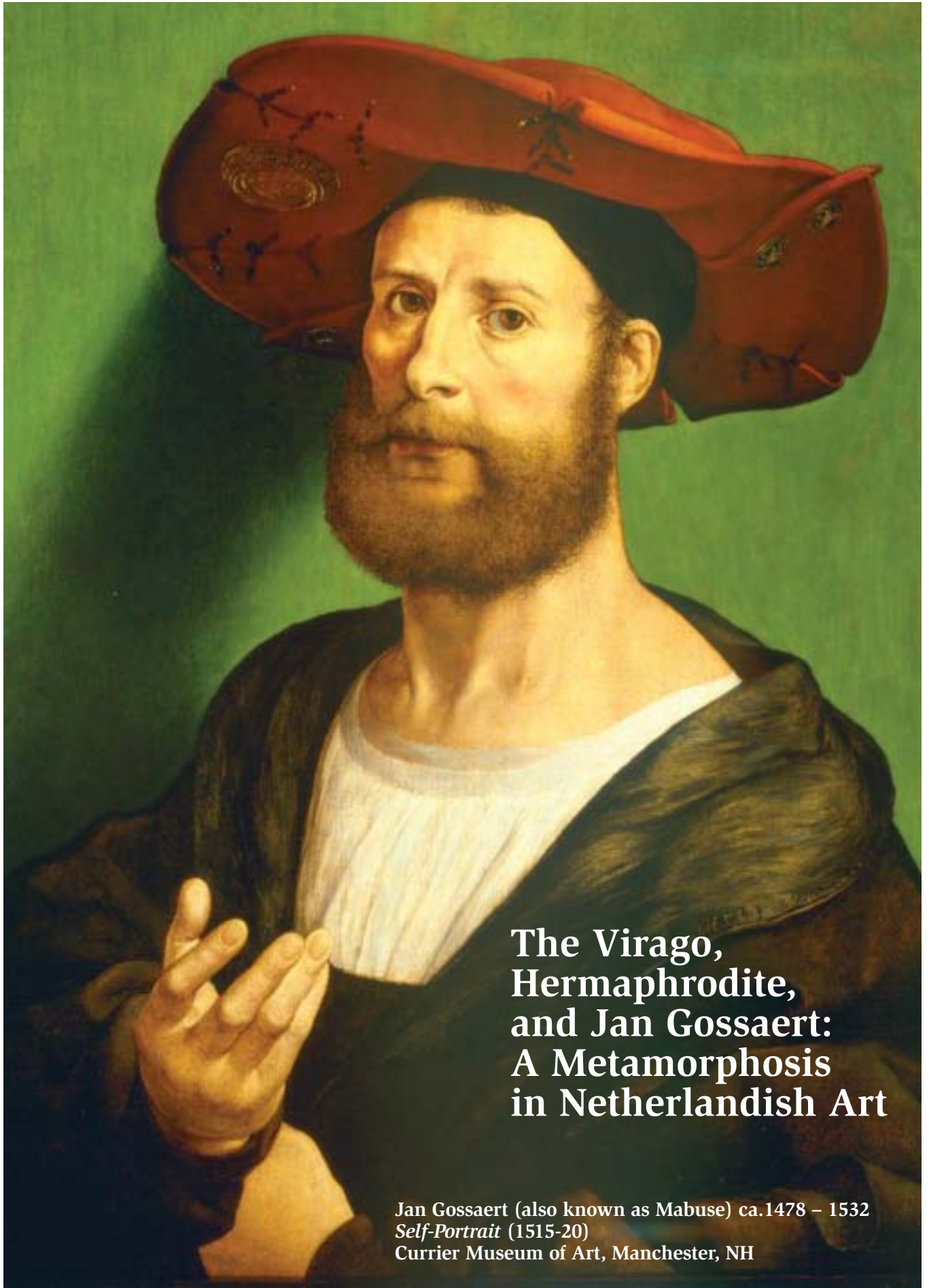
## References

- Bitbol, M. (2002) "Science as if situation mattered." *Phenomenology and the Cognitive Science*, 1: 181-224. Available at: <http://perso.wanadoo.fr/michel.bitbol/situation.html>
- Block, N., Flanagan, O., and Guzelder, G. (1997) *The Nature of Consciousness*. Cambridge: MIT Press.
- Bohm, David. (1980) *Wholeness and the Implicate Order*. New York: Routledge.
- Bohm, David and Peat, David F. (1987) *Science Order and Creativity*. New York: Bantam Books.
- Chalmers, D. 1995, "Facing up to the problem of consciousness", *Journal of Consciousness Studies*, 2: 200-220. Available at: <http://consc.net/papers/facing.html>
- Husserl, E. (1973). "Zur Phanomenologie der Intersubjektivität II." *Husserliana XIV*. Den Haag: Martinus Nijhoff. Passage translated by: Gallagher, Shaun, Zahavi, Dan, "Phenomenological Approaches to Self-Consciousness," *The Stanford Encyclopedia of Philosophy (Spring 2005 Edition)*, Edward N. Zalta (ed.) Available at: <http://plato.stanford.edu/entries/self-consciousness-phenomenological/>
- Noë, A. (2000) "Experience and Experiment in Art." *Journal of Consciousness Studies*, 7: 123-35. Available at: [http://people.ucsc.edu/~anoë/art.pdf#search= 'Experience%20and%20Experiment%20in%20Art'](http://people.ucsc.edu/~anoë/art.pdf#search=Experience%20and%20Experiment%20in%20Art)
- Noë, A. (2002) "Art as enaction" *Art and Cognition virtual conference*. Available at: <http://www.interdisciplines.org/artcog/papers/8>
- Patanjali. *Effortless Being, The Yoga Stras of Patanjali*. Trans. By Shearer, Alistair. (1982) London: Wildwood House Ltd.
- Pippin, R.B. (2002) "What was Abstract Art? (From the Point of View of Hegel)" *Critical Inquiry*, 29(1): 1-24. Portions available at: <http://www.uchicago.edu/research/jnl-crit-inq/issues/date/v29/v29n1.pippin.html>
- Shlain, Leonard. (1991) *Art and Physics: Parallel Visions in Space, Time, and Light*. New York: William Morrow & Co.
- Taylor, J.G. (2002) "Pure Consciousness in Meditation and the Self." *Science and Consciousness Review*, June. Available at: <http://scicon.org/news/articles/20020602.html>
- Taylor, J.G. (2005) "Mind and consciousness: Towards a final answer?" *Physics of Life Reviews*, 1: 1-45.
- Varela, F.J. (1996) "Neurophenomenology: A Methodological Remedy for the Hard Problem." *Journal of Consciousness Studies*, 3: 330-349 Available at: [http://www.ccr.jussieu.fr/varela/human\\_consciousness/article01.html](http://www.ccr.jussieu.fr/varela/human_consciousness/article01.html)









**The Virago,  
Hermaphrodite,  
and Jan Gossaert:  
A Metamorphosis  
in Netherlandish Art**

Jan Gossaert (also known as Mabuse) ca.1478 – 1532  
*Self-Portrait* (1515-20)  
Currier Museum of Art, Manchester, NH



*The Metamorphosis of Hermaphroditus and the Nymph Salmacis*  
The Museum Boijmans Van Beuningen, Rotterdam, Netherlands

Artist: Jan Gossaert, 1516



I graduated from the University of Kentucky in December of 2005 with a BA in Art History. As a student there, I was on the Dean's List every semester except one from the fall semester of 2002 to fall, 2005. I am a member of the National Society of Collegiate Scholars, Phi Beta Kappa, and the Alpha Lambda Delta Academic Honor Society. In April, 2006, I received second place in the Humanities: Critical Research category of the Oswald Research and Creativity

Program for this paper, which was written while participating in a class on Renaissance Art. My professor and faculty mentor, Dr. Jane Peters, was very supportive during its development, encouraging me to think beyond what has been said about the subject of Jan Gossaert and his impact on sixteenth-century Netherlandish art. In the future, I hope to continue researching this individual and his development as an artist. I am currently in my first year of graduate school at the University of Louisville, where I am pursuing a master's degree in Critical and Curatorial Studies.

I want to thank Dr. Peters for her guidance and support during the research and writing of this paper.



#### Faculty Mentor:

**Jane S. Peters, Ph.D.**

**Associate Professor, Art History, Department of Art**

I am pleased to endorse Heidi Caudill's research paper, "The Virago, Hermaphrodite, and Jan Gossaert: A Metamorphosis in Netherlandish Art." for publication in *Kaleidoscope*. For her research project in A-H 334: Renaissance Art (Fall, 2005), Heidi selected a challenging image by Jan Gossaert, with an obscure mythological Ovidian subject: *The Metamorphosis of Hermaphroditus and the Nymph Salmacis* (1516). Her assigned task was to explore issues of women in the Renaissance using the evidence of art. Heidi went far beyond course requirements, however, by exploring the implicit messages and meanings in terms of societal gender construction (male and female) and by further proposing a patron and the reasons for the commission of such a unique work. It was without question the most original research and best written paper in the class, one that deserves to be published.

## The Virago, Hermaphrodite, and Jan Gossaert: A Metamorphosis in Netherlandish Art

### Abstract

In this paper, I examine the origins of the 1516 painting *The Metamorphosis of Hermaphroditus and the Nymph Salmacis* by the artist Jan Gossaert. Because there are no known representations of the myth in post-classical European art before Gossaert's version, the existence of the painting provokes questions about its patronage, background, and possible implications. Derived from the myth of Salmacis and Hermaphroditus in Ovid's *Metamorphoses*, the focus of the work is on the physical struggle between a male and female figure. The artist casts these individuals into the roles of victim and aggressor, with the female as the dominant character. This depiction reflects common attitudes at the time toward women and their scorned position in a male-dominated society. I suggest that the subject of Gossaert's painting is related to themes found in the popular art of Northern Europe, which focused on the reversal of traditional gender-roles and often acted as warnings to men about women with too much freedom and power. Proposing that *The Metamorphosis* could be viewed as a satirical representation of women having political power, I argue that there is more to the painting than what appears on the surface.

### Introduction

The Museum Boijmans Van Beuningen in Rotterdam has in its possession a remarkable painting titled *The Metamorphosis of Hermaphroditus and the Nymph Salmacis*, hereafter called *Hermaphroditus and Salmacis*. Produced in 1516 by the Netherlandish artist Jan Gossaert, the work stands as one of the earliest depictions in Northern Europe of a mythological scene. (Durante, 2004) Its subject



derives from Ovid's *Metamorphoses*, a Roman poem dating from 9 C.E. that was widely popular and widely distributed in the Renaissance. Visual representations of the *Metamorphoses* were common in Italy but not the Netherlands during the period when Gossaert made his painting. Yet, while certain stories in the poem were prevalent as subjects, some were almost never illustrated by artists. One case in point is the myth of Salmacis and Hermaphroditus. It is, consequently, significant that Gossaert, as a Netherlandish artist, created the first known rendering of the myth since the fall of the Roman Empire.

Some intriguing questions are raised simply by the fact of the existence of *Hermaphroditus* and *Salmacis* at this moment in history. There are no known representations of the myth in European art before Gossaert's version in 1516. Another representation did not appear until forty-seven years later, in 1563, as an illustration for a version of Ovid's book (Virgil Solis. *Salmacis and Hermaphroditus* from the *Metamorphoses Ovidii*. Vienna: 1563). After that, the story of Hermaphroditus and Salmacis started to appear in more and more works, its presence not abating until the nineteenth century.

Given the chronological isolation of Gossaert's painting, it is strange that this particular myth was chosen when representations of so many other stories from the *Metamorphoses* were available. This problem brings up the issues of patronage and originality in Renaissance art. It follows that the first question to ask is who made the decision to select a subject that would require the artist to invent virtually every detail of the composition without the benefit of existing precedents? Or were there precedents in other subjects and media? Furthermore, what connotations did the myth hold that would compel the patron to commission a painting of it? The answers to these questions reflect the position of Gossaert as an innovator who created a new hybrid art by fusing some of the themes and stylistic qualities of Northern and Italian Renaissance art.

### The Myth

The myth of Hermaphroditus and Salmacis centers on the idea of aggression and pursuit as well as the reversal of gender roles. Hermaphroditus, a handsome and innocent youth, crosses paths with the nymph Salmacis. She immediately develops a passion for him but he resists her advances, telling her to leave him alone. Salmacis pretends to comply, but then secretly watches as he bathes in a pool of water. Overcome with lust at the sight of his naked body, she undresses and rushes into the pool after him. As they struggle in the water, Salmacis shouts to the gods to let them remain together forever. Granting

her request, the gods fuse their bodies together into a single form with both male and female features. Hermaphroditus in turn calls on the gods to curse the pool in which he was emasculated and to diminish the manhood of any male who might bathe in that pool thereafter.

### The Portrayal

As one of the many artists during the Renaissance who made visual representations of the *Metamorphoses*, Gossaert proved his knowledge of and respect for the poem through the literalness of his depiction. Using contrasting forms and ideas, he imparts a strong sense of drama and dynamism to the viewer in his portrayal of the violent collision between Salmacis and Hermaphroditus. These figures, shown as a nude male and female, wrestle with each other in the midst of an idyllic landscape set with rocks, a shallow pool of water, and green grass.

Ovid wrote that the pool in which Salmacis and Hermaphroditus fought was "perfectly clear right through to the bottom, entirely empty of marshy reeds, unfertile sedge-grass and spiky rushes; the crystalline water was lushly fringed by a circle of fresh and evergreen grass." (Ovid, 4.297-300) There are no reeds or rushes around the water's edge in Gossaert's painting; the only vegetation is grass of a deep, healthy green color as prescribed in the poem. The clearness of the water is evidenced by both the sight of Salmacis and Hermaphroditus' feet and the rocks that extend below the surface. The agitated movement of their struggle is meant to be viewed in contrast to the tranquility of the surrounding scene, further emphasizing the disturbance caused by the female attacking the male.

Gossaert uses the composition of the landscape to communicate the struggle for power between the two figures. He positions the rocks behind the woman to imitate the curve of her lower body and outstretched arms. The sloping earth behind the man echoes the defensive stance of his torso and legs, in which his weight is shifted to one side to support himself in the struggle. Just as the hill is inclined downward from left to right, so is the left side of his body higher than his right side. Indeed, even the height difference between the rocks and the ground reiterates the dynamic of power in the scene.

Conforming exactly to the description by Ovid of the intense confrontation between Hermaphroditus and his pursuer Salmacis, the artist follows the poet by showing the woman in the role of aggressor. Gossaert uses the contrast of the male's and female's physical expressions to distinguish the assailant and victim. The female is obviously the stronger, dominant presence because of her fierce look and the

strength of her posture. She pulls the struggling man toward her in a very realistic manner, twisting her waist and standing at a slight angle. Also Gossaert uses the curves and diagonals of her body to express a greater degree of movement and a more aggressive stance. The diagonals created by her arms and legs cut across the body of the male, surrounding and imprisoning him. In contrast to the woman, the man is represented as weak and powerless. He is attempting to escape the situation, as shown by the way his body leans away from contact with hers. It is clear though that he is overwhelmed by her force.

In his poem, Ovid describes Salmacis as shouting, "Victory! He's mine!" as she jumps into the water to embrace Hermaphroditus. (Ovid, 4.356) It is almost possible to imagine Gossaert's Salmacis uttering this phrase, given the fierce and triumphant expression on her face. Overwhelmed by her passion, she wrestles with Hermaphroditus in the hope of bending him to her will. According to Ovid, Salmacis "dived in after her quarry, grabbed hold of his limbs as he struggled against her, greedily kissing him, sliding her hands underneath him to fondle his unresponsive nipples and wrapping herself round each of his sides in turn." (Ovid, 4.357-360) Gossaert emphasizes the physical aggressiveness of Salmacis' character through his portrayal of the rigidity and strength of her body. Hermaphroditus by contrast appears weak because of the vulnerable stance of his body.

Gripping the male's left wrist in her right hand, the female uses the other hand to pull his head toward her. She draws his body to her with all of her strength, as Gossaert makes evident in the way that she leans to the side, pushing her heels into the ground. He braces himself by bending his knees and upper torso to the opposite side. His recognition of the futility of the struggle is marked by the panic and terror in his facial expression. Grasping the fingers that clutch him, the man desperately pulls at them while his other hand moves to break the rigidity of the arm that has given added support to the woman's hand at his neck. This action is swiftly blocked by the woman, who is shown grasping his raised hand in mid-air. The painting perfectly captures the emotional intensity of the moment. He stares up at their hands, stunned by her surprise movement. She gazes directly at him, the determination to completely overwhelm him clear in her expression. This is the moment when the male, helplessly or willingly, succumbs to the female's control.

The consequence of Hermaphroditus' surrender is indicated by Gossaert through the ghostly apparition standing in the background. When examined closely this creature appears to be composed of the

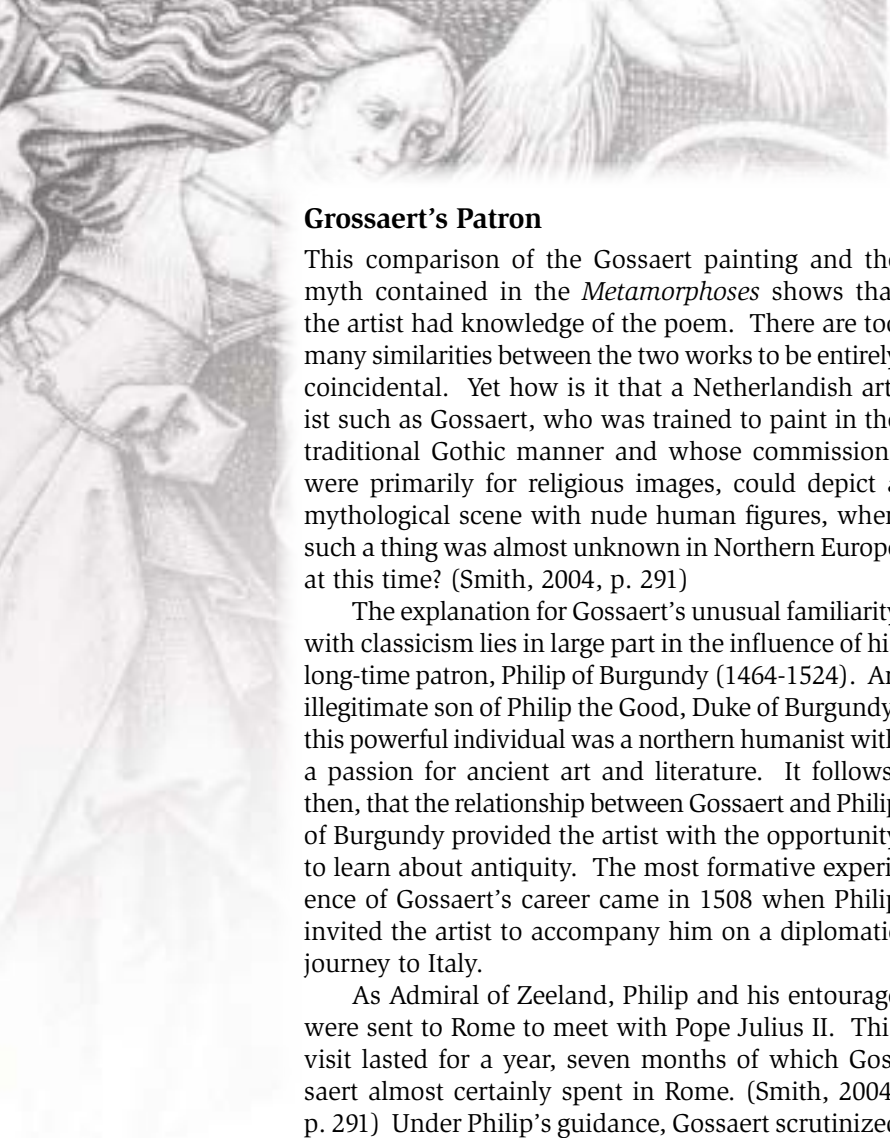
conjoined bodies of the man and woman. Though it has one torso, two legs and two arms like a normal human, the creature possesses the two heads of the fighting male and female. The appearance of this creature is the most noticeable deviation from the poem that is visible in Gossaert's work.

Ovid in the *Metamorphoses* portrays the unusual being in this way: "the bodies of boy and girl were merged and melded in one. The two of them but a single face...they were two no more but of double aspect, which couldn't be fairly described as male or as female. They seemed to be neither and both." (Ovid, 4.375-383) Gossaert shows Hermaphroditus and Salmacis as being joined in one body, but two heads. The poem in contrast calls for a body with a single head. It would have been difficult for the artist to show the creature with only one head because of its position in the background behind the two main figures. Its facial and bodily features are unrecognizable except for the two heads, which are the only indication to the viewer of its abnormality.

All of the antagonism that is evident in the foreground couple is completely purged from the conjoined couple in the background. The heads of the man and woman, known from the poem to be Hermaphroditus and Salmacis, are drawn close together in an intimate conversation while below their hands are raised in the air and clasped together. In keeping with his use of contrast as a way to emphasize the disparity between a powerful, domineering woman and a weak, submissive man, Gossaert emphasizes the differences in the relationships between the two pairs of figures.

For example, the willing embrace seen in the background is the complete opposite of the forced embrace of the man and woman in the foreground. The heads on the creature gaze directly at one another and its hands are clasped together in a friendly manner. This denotes an equality of status and power that is missing in the association between the two figures in the foreground. There the male fixes his stare above the female's head, while she watches his face. There is no eye contact between them. Their bodies are intertwined as a result of the fight and the placement of their arms and hands reveal the tension of their situation. Also, the creature stands in a stationary pose on the solid earth while the separate man and woman thrash violently about in the shallow pool of water. Differences such as these serve to further emphasize the painting's central point, which is not only the struggle between a strong-willed female and her unfortunate male victim, but also the consequences of a man surrendering power to a woman.





### Gossaert's Patron

This comparison of the Gossaert painting and the myth contained in the *Metamorphoses* shows that the artist had knowledge of the poem. There are too many similarities between the two works to be entirely coincidental. Yet how is it that a Netherlandish artist such as Gossaert, who was trained to paint in the traditional Gothic manner and whose commissions were primarily for religious images, could depict a mythological scene with nude human figures, when such a thing was almost unknown in Northern Europe at this time? (Smith, 2004, p. 291)

The explanation for Gossaert's unusual familiarity with classicism lies in large part in the influence of his long-time patron, Philip of Burgundy (1464-1524). An illegitimate son of Philip the Good, Duke of Burgundy, this powerful individual was a northern humanist with a passion for ancient art and literature. It follows, then, that the relationship between Gossaert and Philip of Burgundy provided the artist with the opportunity to learn about antiquity. The most formative experience of Gossaert's career came in 1508 when Philip invited the artist to accompany him on a diplomatic journey to Italy.

As Admiral of Zeeland, Philip and his entourage were sent to Rome to meet with Pope Julius II. This visit lasted for a year, seven months of which Gossaert almost certainly spent in Rome. (Smith, 2004, p. 291) Under Philip's guidance, Gossaert scrutinized the architecture and art of ancient and contemporary Rome. He was supposed to make sketches of these works, which probably were to be used later in Philip's humanistic studies. (Hope and McGrath, 1996, p. 164) Five pen-and-ink drawings remain from this trip; one was a sketch of the Coliseum and four were depictions of classical sculpture. There must have been many more sketches made during Gossaert's time in Rome, but now only the surviving drawings and the transformation of his art attest to the deep impression left on him by his direct contact with Italian culture.

It is the general opinion of those who have researched Gossaert's life that the impact of his journey to Rome did not surface in his commissioned work until several years after he returned to the Netherlands. Durante (2004) has attributed this supposed delay to the "suddenness" of his discovery of ancient and Italian Renaissance art, and the continued demand in the North for pious subject-matter. Even though opportunities to depict nude human figures and mythological scenes were few and far between, it can be shown that Gossaert did have the ability to test his new-found ideas through his religious scenes.

Like his German contemporary Albrecht Dürer, Gossaert used the biblical story of Adam and Eve to

practice representing nudes in classical poses. There is a painting of Adam and Eve dated from 1509 and now in the Museo Thyssen-Bornemisza, Madrid, that clearly shows the influence of both his studies in Rome and the prints of Dürer. While the style of the picture remains in the traditional Northern manner with its great attention to detail, realism, subtle shadowing and use of light to create textural surface, the contrapposto poses of Adam and Eve along with the degree of anatomical accuracy shown in their bodies is reminiscent of Italian art.

These are characteristics also found in Dürer's popular 1504 print of Adam and Eve (now in the Graphic Collection of the Academy of Fine Arts, Vienna), which was done ten years after his first journey to Italy. (Panofsky, 1955, p. 8) Dürer was another Northern artist who was trained in the Gothic aesthetic but discovered Renaissance humanism and classical themes after coming into direct contact with Italian culture. As with Gossaert, Dürer had to find opportunities to explore the idea of the nude figure in his art. He recognized that the nudity of Adam and Eve was acceptable to northern audiences because it had a purpose. Gossaert, who definitely knew of Dürer's print (Smith, 2004, p. 266), utilized this same tactic in his 1509 Adam and Eve and the others that came afterward. Perhaps he viewed Dürer as a model for how to incorporate classical motifs into conventional Northern subject-matter. In that case, it would not be coincidental that Gossaert's 1509 painting was one of the first instances in his career in which he attempted to synthesize the artistic traditions of the Netherlands and Italy. Gossaert presumably would have continued to further develop this idea through similar religious works until 1516, when he produced *Hermaphroditus and Salmacis* for his old patron Philip of Burgundy.

There are several sound reasons to believe that *Hermaphroditus and Salmacis* was commissioned by Philip of Burgundy. Mensger (2002, p. 114) states that the first known record of the painting's existence is contained in an inventory of Margaret of Austria's possessions dated 1524. There it is listed as a gift from the "Monsgr d'Utrecht." According to Lins (2003), Philip of Burgundy was appointed Bishop of Utrecht in 1518; because he held this post until his death in 1524, he is most likely the person mentioned in the record. In addition it is known that, in 1515, Philip of Burgundy commissioned Gossaert to decorate his palace near Middelberg with mythological scenes. (Durante, 2004) It is probable that *Hermaphroditus and Salmacis* was made during this time. Though he often worked for other European royalty, Gossaert became Philip of Burgundy's court painter soon after

his appointment as Bishop of Utrecht, and he resided with the nobleman at his residence. (Durante, 2004) Therefore, given his extended patronage of Gossaert, his love of the ancient world, and the record mentioning him as the former owner, it is almost certain that Philip was the person who commissioned the painting.

The identification of Philip of Burgundy as the patron is critical to the question of why the myth of *Hermaphroditus and Salmacis* was chosen as a subject. Smith (2004, p. 278) asserts that “the mutually stimulating association between artists and humanists resulted in creative twists to familiar genres.” This was certainly the case in the creation of *Hermaphroditus and Salmacis*. As the artist, Gossaert was forced to invent almost every detail of the painting’s composition without the benefit of existing precedents, because there are no known visual representations of the myth of *Salmacis and Hermaphroditus* in post-classical European art before Gossaert’s version in 1516; subsequent depictions would not be created for another fifty years. It seems strange that this particular myth was chosen when illustrations of other stories from the *Metamorphoses* were available and in common use. Yet it is important to remember that in situations involving patronage and commissions, the patron and not the artist usually chose the subject of the work.

Philip of Burgundy almost certainly was the person who chose the theme of *Hermaphroditus and Salmacis*, both because of his position as patron and his knowledge of ancient works of literature such as the *Metamorphoses*. It would have been Gossaert’s role to find a way to translate the action of the literary text into a clear visual image. In order to do this, he would have had to employ both the poem and other models that were independent of the myth.

### Weibermacht Scenarios

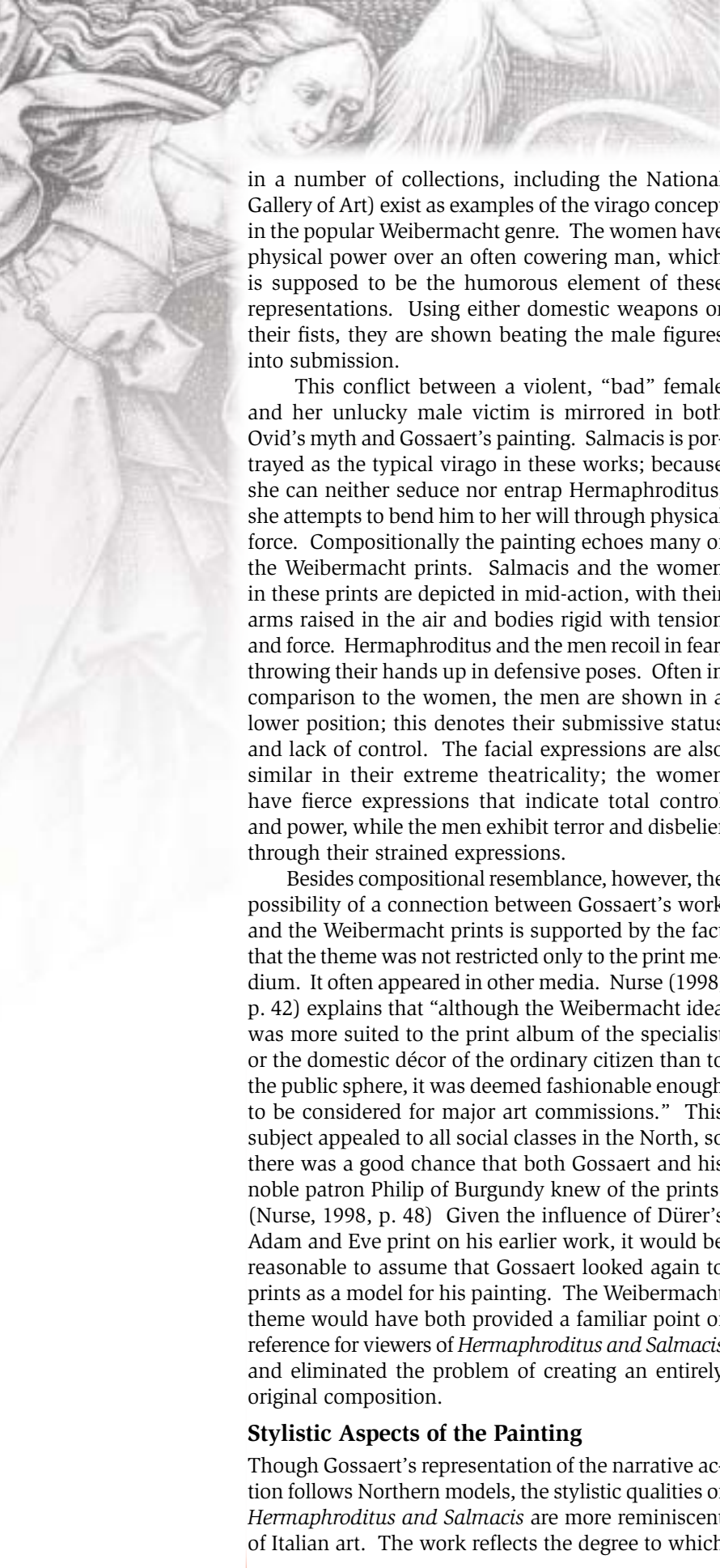
It has been shown that Gossaert closely followed the story of *Salmacis and Hermaphroditus* as told by Ovid in the *Metamorphoses*. This text was the only source that he possessed for information about the characters and details of the landscape. However, even though the poem is particularly descriptive, it would have still been difficult for Gossaert to execute a representation effectively. He needed visual precedents resembling the central action of the myth, which is the struggle between *Hermaphroditus* and *Salmacis*. It follows that some of the most accessible models available to Gossaert at this time were the satirical portrayals in Northern prints of dominant women and submissive men, known collectively as ‘Power of Women’ or *Weibermacht* scenarios. (Nurse, 1998, p. 41)

As a Netherlandish man, Gossaert almost certainly would have known about these illustrations and the assumptions connected with their subject matter. The ‘Power of Women’ theme was very popular around the time that Gossaert was painting *Hermaphroditus and Salmacis*. (Nurse, 1998, p. 42) The theme centered on the reversal of traditional gender-roles and often acted as warnings to men about giving women too much freedom. Many concerns and fears during the fifteenth and sixteenth centuries were indeed focused on women, who often acted as scapegoats for natural disasters, economic troubles, war, and other misfortunes. The print medium allowed deep prejudices and misogynistic attitudes to be distributed to a wide audience; therefore the success of the *Weibermacht* prints indicates a general distrust of women in Northern society.

One of the most popular portrayals was that of the ‘virago’ or woman who would use physical force when she could not subdue men through sexual advances or entrapment. Prints such as *The Angry Wife* by *Israhel van Meckenem* (copies of which are held



*The Angry Wife* by *Israhel van Meckenem* 1495-1503  
National Gallery of Art



in a number of collections, including the National Gallery of Art) exist as examples of the virago concept in the popular Weibermacht genre. The women have physical power over an often cowering man, which is supposed to be the humorous element of these representations. Using either domestic weapons or their fists, they are shown beating the male figures into submission.

This conflict between a violent, “bad” female and her unlucky male victim is mirrored in both Ovid’s myth and Gossaert’s painting. Salmacis is portrayed as the typical virago in these works; because she can neither seduce nor entrap Hermaphroditus, she attempts to bend him to her will through physical force. Compositionally the painting echoes many of the Weibermacht prints. Salmacis and the women in these prints are depicted in mid-action, with their arms raised in the air and bodies rigid with tension and force. Hermaphroditus and the men recoil in fear, throwing their hands up in defensive poses. Often in comparison to the women, the men are shown in a lower position; this denotes their submissive status and lack of control. The facial expressions are also similar in their extreme theatricality; the women have fierce expressions that indicate total control and power, while the men exhibit terror and disbelief through their strained expressions.

Besides compositional resemblance, however, the possibility of a connection between Gossaert’s work and the Weibermacht prints is supported by the fact that the theme was not restricted only to the print medium. It often appeared in other media. Nurse (1998, p. 42) explains that “although the Weibermacht idea was more suited to the print album of the specialist or the domestic décor of the ordinary citizen than to the public sphere, it was deemed fashionable enough to be considered for major art commissions.” This subject appealed to all social classes in the North, so there was a good chance that both Gossaert and his noble patron Philip of Burgundy knew of the prints. (Nurse, 1998, p. 48) Given the influence of Dürer’s Adam and Eve print on his earlier work, it would be reasonable to assume that Gossaert looked again to prints as a model for his painting. The Weibermacht theme would have both provided a familiar point of reference for viewers of *Hermaphroditus and Salmacis* and eliminated the problem of creating an entirely original composition.

### Stylistic Aspects of the Painting

Though Gossaert’s representation of the narrative action follows Northern models, the stylistic qualities of *Hermaphroditus and Salmacis* are more reminiscent of Italian art. The work reflects the degree to which

his tendency and ability to fuse Netherlandish and Italian artistic traditions had increased since his 1509 *Adam and Eve*. As one of his first opportunities to depict a mythological scene containing nudes, *Hermaphroditus and Salmacis* demonstrates Gossaert’s familiarity with the Italian style of painting. He understood that Italian art favored simple and idealized forms. Both Hermaphroditus and Salmacis are shown in the work as classical nudes with a sense of monumental three-dimensionality. They are perfectly beautiful figures without the realistic blemishes or defects that Northern artists typically would feel compelled to include.

The color tone of the entire painting is thin and cold like that of an Italian fresco; it does not have the rich vibrancy of most fifteenth and sixteenth century Netherlandish paintings. In addition, two events from different moments in time are presented in the same pictorial space. Gossaert shows the struggle between Hermaphroditus and Salmacis in the foreground and the later fusion of their bodies in the background. This convention was associated more with Italian than Netherlandish art.

All in all, the visual style of *Hermaphroditus and Salmacis* is closer to that of the Italians than Gossaert’s contemporaries in the Netherlands. This similarity can probably be attributed more to the demands of his humanistic patron, Philip of Burgundy, than to Gossaert himself. As Durante (2004) explains, Gossaert “became absolutely adept at switching back and forth between an ‘Italianate’ style, and a distinctly Netherlandish one. He could invoke either mode according to the particular impact he wished to create and became very skilled at manipulating and fusing elements from different sources within a single composition.” It is known that when Philip commissioned Gossaert to decorate his palace in 1515, the decorations were ordered to be Italian in style. (Durante, 2004) In view of the fact that *Hermaphroditus and Salmacis* was produced around that same time, it is reasonable to assume that Philip dictated the style of this painting as well. He was the real force behind the appearance of the work; Gossaert simply attempted to fulfill his wishes.

### Why Portray this Subject?

The collaboration between Gossaert and Philip consisted of the artist following the orders of the patron, who made the decisions about the content and style of the work. Yet the question remains unanswered as to why the myth of *Hermaphroditus and Salmacis* was chosen as a subject in the first place. What connotations could the myth hold that would compel Philip to commission a painting of it? A possible

answer can be found in the political situation of the Netherlands during the late fifteenth and early sixteenth centuries.

In this period, two women, Mary of Burgundy and Margaret of Austria, were appointed to the position of regent of the Low Countries, which encompassed what is now present-day Belgium, Luxembourg, and the Netherlands. The first female regent, Mary of Burgundy, held power from 1477 to 1482. She did much to weaken Burgundian power and eventually brought about a decade of civil war and revolt. The second female regent, Margaret of Austria, was a far better leader. Reigning from 1507 to 1530 as a representative of King Charles I of Spain, she negotiated deals to improve the economy and protect the military interests of the Low Countries.

Philip of Burgundy lived through the governments of both women, experiencing both turmoil and prosperity under their respective reigns. *Hermaphroditus and Salmacis* was completed during the rule of Margaret of Austria, who was responsible for sending Philip to Rome in 1508, and later appointing him Bishop of Utrecht. Though he owed much of his political success to this woman, could he have also harbored some apprehension about her ability to govern? This is a rather hypothetical idea but, given the fears in Netherlandish society about powerful women, it must have been difficult for Philip as a man to accept Margaret of Austria as a ruler.

Memories of the chaos and unrest during Mary of Burgundy's reign probably reinforced the cultural stereotypes perpetuated by the *Weibermacht* prints about women in positions of command. Men who yield to the authority of women are always shown in these illustrations as weak, vulnerable fools. Likewise, the myth of Hermaphroditus and Salmacis revolves around this same idea of the inherent connection between female power and emasculation. Bearing in mind that Philip was serving under Margaret of Austria at the same time that he commissioned a representation of the myth, it seems plausible that *Hermaphroditus and Salmacis* might be connected to his relationship with the female regent. Though the possibility of a correlation between the subject of the painting, cultural attitudes toward female authority, and Philip's personal biases seems strong, more research needs to be done in this area before definite conclusions about a possible deeper meaning can be made.

## Conclusion

The 1516 painting *The Metamorphosis of Hermaphroditus and the Nymph Salmacis* by Jan Gossaert embodies his innovative fusion of some of the themes and stylistic qualities of sixteenth century Italian and Northern European art. He consciously made the connection between a popular subject in his own Netherlandish culture, that of the virago or violent woman, and the classical myth of Hermaphroditus and Salmacis. It was through his collaborative association with a humanist that Gossaert was able to completely synthesize the two different artistic cultures; this synthesis now sets him apart from his contemporaries and identifies him as one of the first artists during the Renaissance to attempt to bridge Northern and Italian art.

## Works Cited

- Durante, Stephanie-Suzanne. "Sacred Icon or Secular Portrait?" *Art and Architecture*. Courtauld Institute of Art. 2004. Accessed October 15, 2005, at: <[http://www.artandarchitecture.org.uk/insight/durante\\_gossaert.html](http://www.artandarchitecture.org.uk/insight/durante_gossaert.html)>
- Grossinger, Christa. "The Evil Woman." In *Picturing Women in late Medieval and Renaissance Art*. New York: Manchester University Press, 1997. pp. 95-138.
- Hope, Charles and E. McGrath. "Artists and Humanists." In *The Cambridge Companion to Renaissance Humanism*, ed. Jill Kraye. Cambridge: Cambridge University Press, 1996. pp. 161-189.
- Lins, Joseph. "Archdiocese of Utrecht." *The Catholic Encyclopedia*. Vol. XV. 2003. Accessed October 15, 2005 at: <<http://www.newadvent.org/cathen/15245a.htm>>
- Mensger, Ariane. Jan Gossaert: *Die niederländische Kunst zu Beginn der Neuzeit*. Berlin: Dietrich Reimer Verlag, 2002.
- Nurse, Julia. "She-Devils, Harlots and Harridans in Northern Renaissance Prints." *History Today* 48.7 (July 1998): 41-48. Accessed November 11, 2005 at: <<http://search.epnet.com/login.aspx?direct=true&db=aph&an=787909&scope=site>>.
- Ovid. *Metamorphoses*. Trans. David Raeburn. London: Penguin Books, Ltd., 2004.
- Panofsky, Erwin. *The Life and Art of Albrecht Durer*. Princeton, NJ: Princeton University Press, 2005.
- Smith, Jeffrey Chips. *The Northern Renaissance*. London: Phaidon Press, Ltd., 2004.



I am a senior at UK in the Economics department, after having fulfilled the degree requirements for a Bachelor of Arts in History and Philosophy. I joined Phi Beta Kappa this year. I am the recipient of the Charles Brent Award in History, Departmental Honors in Philosophy, and the Traveling Scholars Award from the Office of International Affairs. I have also just been offered the David L. Boren Scholarship through the National Security Education Program, which will allow me to study Amharic, History, and International Relations at Addis Ababa University in the fall. I intend to pursue graduate studies in International Affairs and work in the federal government, working on African affairs.

*"We saw not clearly nor understood,  
But, yielding ourselves to the master hand,  
Each in his part, as best he could,  
We played it through as the author planned."*

*-Alan Seeger*



**Mentor: James Fackler, Ph. D.**  
**Professor of Economics, Gatton College of Business and Economics**

Trace Lasley has undertaken an extensive investigation into the economic conditions leading to the war between Eritrea and Ethiopia in 1998. Eritrea, which was peacefully transformed from a province of Ethiopia to an independent nation in 1993, wanted to have special trade status with Ethiopia, without trade barriers. In late 1997, Ethiopia erected significant barriers, harming the Eritrean economy in the process. Furthermore, Eritrea introduced its own currency at an exchange rate with the Ethiopian Birr that was far from its equilibrium value, heightening the economic tensions between the two countries. Lasley makes a persuasive argument that these economic factors were the primary reasons for the initiation of hostilities in May, 1998.

This paper is the result, in part, of research conducted in Ethiopia by Lasley after he won a travel grant from the University of Kentucky. In addition, he has worked with the U.S. State Department and the Ethiopian Embassy in developing data sources as well as obtaining background interviews with government officials knowledgeable about the conflict.

## We Saw Not Clearly Nor Understood: The Economic Background of the Ethiopian- Eritrean War

### Editor's Note

*The University of Kentucky Office of Public Relations provided the following press release:*

Trace Lasley, a fifth-year senior at the University of Kentucky majoring in history, philosophy, and economics, has been working for a year to be able to attend his last year of college in Addis Ababa, Ethiopia. The hard work paid off. Lasley, a native of Paducah, KY., has been awarded a \$19,500 National Security Education Program (NSEP) Boren Scholarship to study Amharic language at Addis Ababa University.

"Ethiopia has a lot of powerful stereotypes," Lasley said. "My interest in Ethiopia started in high school and I haven't been able to stop reading and studying about the area since. The more I read, the more I see a glorious culture."

Lasley received his scholarship May 31 at an awards ceremony in Washington, D.C. Created in 1991, NSEP awards scholarships to American students for study of world regions critical to U.S. interests (including Africa, Asia, Central & Eastern Europe, Eurasia, Latin America & the Caribbean, and the Middle East). NSEP was designed to provide American undergraduates with the resources and encouragement they need to acquire skills and experiences in areas of the world critical to the future security of the U.S., in exchange for a commitment to seek work in the federal government.

"My goal is to do analytical work focused on East Africa for the U.S. government," Lasley said. "While in Addis Ababa, I will be taking Amharic language classes as well as political science and international relations classes focused on African politics and Ethiopian history classes." Lasley's first time traveling outside the United States was when he visited Ethiopia in March to finalize paperwork. He will be in Ethiopia from October 2006 to July 2007.

"When I received the scholarship I really felt as though all of my career doors opened and my future became clear," Lasley said. "This is the best thing that could have happened for my career — everything is coming into focus."

## Abstract

In 1991 hope reigned in Ethiopia. There was a peaceful transition of governments after a long period of civil strife. The main guerrilla movements in Ethiopia, the TPLF and the EPLF emerged from the war as brothers-in-arms ready to embark on a new era of peace and prosperity. Just seven years later, Eritrea invaded Ethiopia and a war ensued that cost 70,000 lives and did incalculable damage. This paper explores the economic relations between the two countries to show their significance in the eruption of the Ethiopian-Eritrean War.

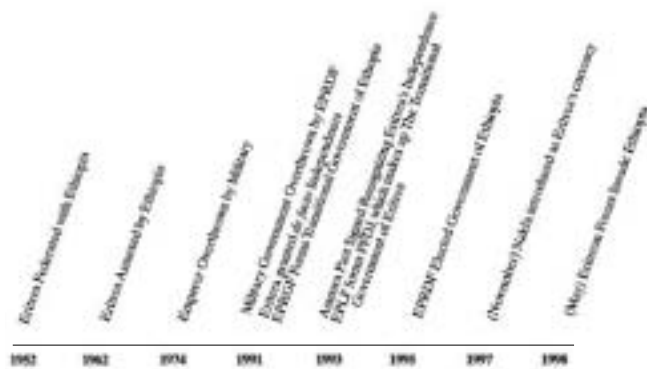
There are three recurring themes in the recent economic history of these two nations: protectionism, Eritrean status, and the introduction of Eritrea's new currency, the Nakfa. My work explores the ideas of the TPLF and EPLF when they were emerging guerrilla movements. An examination of the economic climate of the region sheds light on the policy concerns of the governments, culminating with the introduction of the Nakfa, which was the point of no return. It is through these concepts that the decade preceding the war must be analyzed. In this paper, I re-examine statistics, policies, and documents with the hope of revealing a new understanding of the implications of economic relations, and maybe providing a better avenue through which to pursue peace.

## Introduction

Many factors drive nations to war. There are wars of conquest, wars to gain access to resources, and, of course, the big one – religious wars. But some wars seem to have much more complex causes. World War I escalated due to the significant problem of entangling alliances. The different battles of the cold war were fought due to ideology and fear. International conflicts always seem to flare up, each with its own special causes and concerns. At times, war seems inevitable. Therefore, when what seemed to be a minor border incursion in the Horn of Africa prompted two of the world's poorest countries to engage in open combat for two years at the end of the millennium, it didn't seem too surprising. Especially in this war-torn region of the world, some might even have called it predictable.

"Eritrea won independence from Ethiopia in 1993 after a 30-year struggle but relations between the two remained tense and exploded into war in 1998, that cost some 70,000 lives." (Reuters, 2006)

This excerpt from Reuters Alertnet shows the limited extent of the information most news sources share about the background of the current conflict. None of these sources conveyed the complexities of the situation. For instance, this 30 year struggle for



## Timeline of Key Events

### Acronyms

TPLF	Tigrayan People's Liberation Front
EPLF	Eritrean People's Liberation Front
ELF	Eritrean Liberation Front
EPRDF	Ethiopian People's Revolutionary Democratic Front
PFDJ	People's Front for Democracy and Justice
TGE	Transitional Government of Ethiopia

independence saw not only the overthrow of the centuries old Solomonic dynasty of Haile Sellasie I, in 1974, but also ended only when guerrilla groups in Ethiopia allied themselves with the main Eritrean separatist group and jointly toppled the socialist government. After that, the transitional government of Ethiopia peacefully acknowledged Eritrea's independence.

In May of 1998, war broke out in the Horn of Africa. The two nations, which seemed to be embarking on a new period of peace, instead launched a two-year campaign that saw 70,000 people killed and close to a million displaced, and did substantial damage to the region. My goal is to show that the causes of this war, while complex, stem directly from the economic relations between Ethiopia and Eritrea. I have examined the policies of the Ethiopian government and the position of the Eritrean side. Given the dependence Eritrea had on Ethiopia, and the barriers Ethiopia erected, economics contributed the most to the cessation of negotiation and to the commencement of open hostilities. It is not my objective to assess blame.

This work relies on a few assumptions. First I assume that the Statistical Data obtained from the World Bank is reasonably accurate. However, as is the case with many underdeveloped nations, statistical data is sparse. I try to stick with the big numbers — GDP, imports, and exports — to arrive at my conclusions. Second, as is the case with most conflicts, especially modern ones, there are (at least) two sides to every story. Unfortunately in this case, both sides are polar opposites. I found a few sources that seemed more objective than others. I believe that I was able to account for any bias that is present in my sources. I tried to stick to positive statements only, as opposed to normative. Finally, the biggest assumption is not my own. According to the Ethiopian-Eritrean claims commission, Eritrea invaded Ethiopia, in violation of international law. If this is indeed the case, it allows study of what motivated them to pursue military action. (EECC, 2005)

First, I will examine the policies of the Ethiopian Guerrilla movement that emerged from the socialist period as the main group in the new coalition government of Ethiopia. Second, I will explore what status the Eritrean government had envisioned for the new nation in the shared future of the neighbors. Finally, I will show how the introduction of Eritrea's new currency, the Nakfa, in 1997 was ill-timed, ill-received, and proved to be the "straw that broke the camel's back," because it was only 6 months after introduction that the war broke out. I will also briefly discuss the other possible causes of the war and why they are not as likely to be correct as the economic causes presented here.



**Map 1: Horn of Africa**  
 Source: United Nations Cartographic Section,  
 map no. 4188 Rev.1  
 January 2004

## I. Protectionism

From the 1980s, protectionism steered Ethiopian economic policies, which angered Eritrea. The Tigrayan-dominated Ethiopian government operated to ensure past slights would not return. Before 1889 and the rise of Amharic rulers, the northernmost province of Tigray held high importance. It was marginalized during subsequent rulers. After the rise of socialism in 1975, guerrilla movements in Tigray evolved and eventually took control of Ethiopia. Upon its ascension, the new government embarked on policies that gave special treatment to businesses of Tigrayan origin. With this treatment came bureaucratic hurdles for the importation of Eritrean goods that directly competed with Tigrayan facilities.

Tigrayan favoritism specifically angered Eritrea, as opposed to the rest of Ethiopia, because Eritrean exports accounted for more than half of its GDP. The evolution of Ethiopian trade policy began to directly affect Eritrea, as favor toward Tigray grew.

The Horn of Africa is home to four nations: Somalia, Djibouti, Ethiopia and, as of 1993, Eritrea (See Map 1). Eritrea was once part of Ethiopia. Before World War II, it was a colony of Italy. Following the occupation of Ethiopia by Italy during 1936-1941, the territory was under British military administration. After the war, a special committee was formed to determine what to do with Italy's former colonies. In 1952, after 11 years in political limbo, the United Nations determined, after polling the Eritrean people that it was to become an autonomous state, federated under the Ethiopian crown.

This solution seemed to make most parties happy. The Ethiopians were happy because they retained access to the ports on the red sea, Assab and Mas-sawa. The Eritreans were happy because they had their own government. This arrangement worked for only a short period, however. Soon Ethiopian policies seemed to disregard Eritrea's autonomy. The Ethiopian official language Amharic was to be taught in the schools and the Monarch was exercising too much control over Eritrean affairs. In 1962, the Eritrean parliament voted to abolish the federation and it became a province of Ethiopia. Many argued that this action was due to political corruption and previously marginal separatist movements flooded into the scene. One group rose to the top: The Eritrean Peoples Liberation Front (EPLF). They began small but quickly grew in power and popularity. (Marcus, 1997)

On May 21, 1991, with guerrilla forces surrounding the capital and EPLF forces secure in nearly all of the major towns and cities in Eritrea, the dictator of Ethiopia, Mengistu Haile Mariam fled Addis Ababa. In the first week of June, many events occurred in the capital. Meles Zenawi declared himself acting head of state, to be followed 5 days later by the establishment of a provisional government with Tamrat Layne as Prime Minister. The EPLF had agreed to postpone the referendum for independence for 2 years and announced "unrestricted Ethiopian use" of the port facilities of Assab. (Henze, 1995, 26) On July 1, a National Conference to form a Transitional Government convened. Among others, the EPLF was in attendance. At Africa Hall, the famous building where the Organization of African Unity had been founded in 1962 by Haile Selassie, over 20 groups were represented by nearly 100 representatives. Under the constitution that they adopted, previous regime institutions were to be dismantled. It also

affirmed “The right of nations, nationalities, and peoples to self-determination [and] of independence when the concerned nation/nationality and people is convinced that the above rights are denied, abridged, or abrogated.” (Henze, 1995, 28)

Perhaps ironically (at least for this study) economic discussions and the agreement on Eritrea to decide its own fate, convened on the same day as the National Conference. “While the people should decide about economic issues themselves, no power should impose its own economic policy on them by putting this in the program as part of the Charter. The [Ethiopian Government’s] proposal that an economic directive which governs the economic activity of the transitional period be [later] drafted by the Council was adopted by an overwhelming vote.” (Henze, 1995, 29) The position of Finance Minister also was not filled. The pattern of postponement of economic issues would continue, as Ethiopian expert Paul Henze, traveling extensively in Ethiopia at that time, noted, “Ethiopia is in a condition of political effervescence with economic issues taking lower priority.”

This postponement was believed to be the best course of action, so the bureaucratic system of the previous government could be discharged. It was not until November, 1991, that the economic policy of the newly formed Transitional Government of Ethiopia (TGE) was released. Among other things, it stressed privatization and free-market policies. Optimism waned as the reality of governing set in. Political tolerance eroded as did the official strategy of liberal economic policies. This euphoric period would not last. Due to TPLF influence within the Ethiopian Government, the original political theory of the guerrilla movement would return. As rights eroded, it seemed that many of the beliefs of the TPLF, during the dark days out in the bush, would return. Soon, the holding action on economic decisions collapsed.

The current political reality prevalent in the northernmost province, Tigray, is tied directly to the issues of the distant past. Tigray began its rise in importance with the Axumite Empire (ca. 5th century BCE – ca. 7th century CE). Christianity was introduced to the Horn of Africa through Tigray and King Ezana in the 4th century CE. It rapidly spread in power and influence until the rise of Islam (ca. 7th century CE) created a communications vacuum in the African Christian world. The Highlands of Ethiopia (in which Tigray is located) remained isolated for hundreds of years until Yohannes IV became Emperor of Abyssinia (Ethiopia) on January 21, 1872. Yohannes rose to power after aiding the British in a mission to defeat the Emperor Tewodros, who, after failing to receive British aid in conquest, poisoned some British subjects

in Ethiopia and imprisoned others. Yohannes ruled a sizeable area, demanding tribute from a large number of feudal lords. His capital was Mekelle. During his reign, he twice defeated a sizeable Egyptian Army, returned the ports of Assab and Massawa to Ethiopian control, lost them to Italy, and ultimately died in the Battle of Matemma on May 10, 1889 against Muslims from the East. (Marcus, 1997)

After Yohannes’ reign, Tigray fell from prominence and, under the reign of the next emperor, Menelik II, investment in development was intentionally diverted. Menelik located his capital at Addis Ababa, in central Ethiopia, far from Mekelle and Tigray. As an ethnic Amhara, his innovations and policy favored that region and its people. Notably he completed the Addis Ababa/Djibouti railroad, connecting the new capital to the French colony to the East. Menelik is famous for defeating the Italians at the Battle of Adwa in 1896, which successfully shielded Ethiopia’s independence from European conquest. However, this famous battle scarred the lands of Tigray and caused the slow deaths of thousands of the Tigrayan people. Seven years of famine followed the military expedition, after the 100,000 man army consumed local Tigray village food stores. (Marcus, 1997)

During the grand and popular reign of Haile Selassie I (1930-1974), Tigray was further marginalized. The year before his coronation, following a famine in the region and a refusal by the government for tax relief, peasants revolted. Called the Woyane Rebellion, it was quickly put down, thanks to the single plane that comprised the Ethiopian Air Force. The domestic concerns of Ethiopia were largely put on hold in 1935 as the Italians, based in Eritrea, invaded and occupied Ethiopia for six years. After this time, investment and growth was centralized in Addis Ababa and the other major ethnic Amharic cities and discouraged in the outer provinces. Meanwhile, “Tigray was drained of its human and material resources by heavy taxation and recruitment into the army.” (Minority Rights Group, 1983, 17)

The TPLF began operations during the fall of the monarchy and the rise of the socialist military government. In 1975, the TPLF fought its first battle in Dedabit in western Tigray. They resented the marginalization imposed by successive Ethiopian regimes and, perhaps, seeing an opportunity with the political chaos in Addis Ababa, began their revolution. While past revolutions had failed, the popularity of the socialist government (known as the Derg) was so low in Tigray and most other areas that the movement gained support. By 1979, guerrillas controlled nearly 85 percent of the countryside and a few towns and cities. (Young, 1995)



The TPLF was a guerilla movement that favored protectionism based on a strong sense of nationalism. Nationalism became a core context in the TPLF doctrine. The “Manifesto of the TPLF” stated “the first task of this national struggle will be the establishment of an Independent democratic republic of Tigray.” (Young, 1995, 97) They held the view, popular among many student unions, that Ethiopia was a “prison of nationalities,” and believed that “[self-determination] means the creation of VOLUNTARILY integrated nations and nationalities. However, if the present oppression and exploitation continues or intensifies, it means the creation of an independent [republic].” (emphasis in the original) (Young, 1995, 100) Economic nationalism is exercised through protectionist policies. Nationalism promotes the benefits and sanctity of the nation above outside nations and institutions. Protectionism seeks to impose tariffs or other restrictions to retain the sanctity of the nation through a healthy domestic market.

The TPLF formed a coalition government in Addis Ababa, but it retained most of the control over policy. The economic policies of the coalition government, the Ethiopian People’s Revolutionary Democratic Front (EPRDF), tended to favor the Tigray province, and reflected its protectionist past. Possibly because of the TPLF’s senior position in the coalition government, official policies of the Ethiopian government are seen as giving unfair advantage to the Tigray region. An Ethiopian hotel owner operating in Addis Ababa expressed the belief that the government, in its control of the banking mechanism and general regulatory authority, supplies businesses in Tigray with an unfair advantage. A US official supported these allegations by stating that the majority of bank loans and land leases go to Tigray- and TPLF-owned or affiliated companies. On a national level, the EPRDF policies toward Eritrea have centered on competition between Eritrea and Tigray. Trade barriers were erected so that the main outlet in Ethiopia for Eritrean goods, Tigray, was protected from competition. As late as April of 1998, the President of Eritrea believed that the “Ethiopian trade policy was designed to protect the market for Ethiopian (and Tigrayan) manufactured products” (Negash and Tronvoll, 2000, 44).

## II. Eritrean Status

The issue of Eritrea’s status raised unsettled economic problems that heightened tensions between the countries. During the period of 1991–1997 the status of Eritrea remained in question. Much of the debate was fueled by historic links and disconnects with Ethiopia. After Egyptian, Ethiopian, and Italian domination, Federation, Province-ship, and, finally,

independence, deciding how to treat Eritrea would not be an easy task. Tensions grew because of Eritrea’s demand that it be given special treatment with regard to trade. This policy conflicted with Ethiopia’s stance that Eritrea be treated as any other nation. Coinciding with growing dependence upon Ethiopia’s market, the question of status fueled the tensions between the two countries.

The euphoria following the defeat of the Derg was short lived. The EPLF agreed to postpone independence until a referendum could be held. The TPLF became the ranking members in the Ethiopian Transitional government. They agreed, over some opposition, that a referendum would be held in Eritrea alone, not the rest of Ethiopia as some influential groups had wanted. The referendum was held on the 24<sup>th</sup> of May, 1993, and Eritreans voted for their independence from Ethiopia. The new government of Eritrea, the Peoples Front for Democracy and Justice (PFDJ) was born of the ranking members of the EPLF. Isais Afwerki, leader of the EPLF became president. The problems between Ethiopia and Eritrea began almost immediately. The overarching problem was the question of Eritrean status. Was Eritrea to be treated as any other foreign nation, or was it something special? For all the care that went into making a peaceful transition from province to nation, neither government respected the issues that inevitably arose.

The questions concerning the status of Eritrea really began in 1941. At that time, the Italian colonial administration had been replaced by a British military mission occupying enemy territory. Almost immediately the question of what to do with Eritrea arose. It was generally agreed that the British should administer the territory until after World War II, at which time Great Britain, the USA, the USSR, and France began deliberation. While the USA and the USSR had geopolitical positioning to think about, France favored the colonial status quo, and the British wanted support for their east Africa holdings: Sudan and British Somaliland. After sending a UN delegation to Eritrea to determine what the people wanted, it was found that they were divided between independence and union with Ethiopia. The compromise became federation. Eritrea was to be an autonomous state, federated under the Ethiopian Crown. (Iyob, 1995)

The federation lasted only 10 years. Many argue that Ethiopian politics could not digest the term federation. There had always been a central government, with regional lords holding varying degrees of power. In 1962, Haile Selassie abolished the federation and declared Eritrea a province of the Ethiopian Empire. Just before this declaration, the Eritrean separatist

movements had begun. In 1958, a group of Eritrean exiles in Egypt launched the Eritrean Liberation Movement. The ELF was a Muslim peasant movement that began successful campaigns against the government after dissolution of the federation, and popular support both at home and abroad began to favor their cause. At the same time, the EPLF began its movement. Unlike the conservative ELF, the EPLF espoused Marxism and quickly grew in popularity amongst the peasantry. After much domestic infighting, the EPLF became the most significant group in the movement. (Pool, 2001) (Iyob, 1995)

Like the TPLF, the EPLF touted nationalistic rhetoric but focused more on independence as opposed to economic nationalism. Indeed, the economic status of Eritrea, as envisioned by the EPLF, centered on a liberal trade policy but with a peculiar Marxist ideology. The EPLF program was nationalist and envisioned independence as the first and foremost objective. "Its strategic goal was always Eritrean independence." (Pool, 2001, 60)

The primary objectives of the EPLF, as published in the official program, included: "Establish A People's Democratic State, abolish the Ethiopian colonial administrative organs and all anti-national and undemocratic laws, and punish severely Eritrean lackeys of Ethiopian colonialism who have committed crimes against their country and people." (Cliffe, 1988, 205) The trade status envisioned by the EPLF was a cross between free-trade and proletariat idealism. Encouraged no doubt by the historic status of Eritrea as a port region, the EPLF hoped to "establish trade relations with all countries irrespective of political systems." (Cliffe, 1988, 206) Contrary to typical liberal trade policies, the EPLF also intended to "ban exports of essential consumer goods and limit the import of luxury items." (Cliffe, 1988, 205-207).

The economic position adopted by the PFDJ rested on their belief in a special status for Eritrea. They attempted to operate as an autonomous nation but to have unfettered access to its historically primary trading partner, Ethiopia. The Eritrean government rejected the Ethiopian idea that it should be treated as any foreign nation would. The PFDJ believed that because of the nation's historically intertwined relations with Ethiopia, it should face no barriers to trade. The special status envisioned by Eritrea allowed it to trade as any other nation would to the rest of the world but, in trade with Ethiopia, it could essentially act as a province. Concerns arose in Addis Ababa when goods from Ethiopia were being bought, duty-free by Eritrea but sold abroad. Essentially Ethiopia was competing with itself, but due to Eritrea's operation of the main port of call for

Ethiopian exports, Assab, Eritrean businesses were receiving unfair advantage.

The trade agreements signed by both countries would have justified the Eritrean position. Among other things, the agreements hoped to establish a free trade area in which there would be no tariffs on goods originating in either of the two countries. However, problems arose on implementation. Most people in the EPRDF did not acknowledge that the question of Eritrean status would be a problem. The prime minister of the TGE, Tamirat Layne, who later lost his position officially on charges of corruption, believed otherwise. He thought the status of Eritrea needed to be settled quickly and concretely. In 1995 he went to Eritrea with the intent of solidifying the trade agreements. He was relieved of his position in 1996, and in 1997 he was arrested on charges of corruption that may have been true. However, it is important to note that many believe his arrest was politically motivated. It was his position on Eritrea that many felt caused dissension between him and the party line, in particular with the new Prime Minister Meles Zenawi. (Eritrean Profile) (Personal Conversation with Ethiopian Scholar)

### III. Introduction of the Nakfa

Eritrea's issuance of the Nakfa, and Ethiopia's unfavorable response, prompted the climax of the economic disputes. Eritrea's Nakfa was released at the height of poor economic relations between Ethiopia and Eritrea. After a number of demands regarding special status, and allegations over protectionism, Eritrea swiftly instituted their new currency. The Nakfa was circulated without any clear agreement as to how the currency would trade. Ethiopia had little time to prepare for the sudden introduction of the Nakfa and, as a result, erected significant hurdles for exchange. The new barriers that were created in response to the Nakfa proved too much for Eritrea to bear. The Nakfa was issued while Eritrea was at the height of its dependence on Ethiopia's market. Ethiopia's response to the Nakfa further frustrated Eritreans until they felt no recourse but to settle their harbored grievances with force.

The decade preceding the war was a turbulent period of economic shifts. At that time, both countries were being lead by former guerilla leaders who may not have grasped the complexities of governing a nation. The policies of both nations reflected strict adherence to party doctrine and neither allowed for criticism. The economic climate that resulted from these policies and/or influenced these policies reflects this inflexibility. In addition, when the trade patterns are examined, trends that hindered relations between

the countries become evident.

Although both governments agreed on implementation of a new currency in Eritrea, in 1997 the currency introduction caused severe disturbances in the trade conditions between Ethiopia and Eritrea. The first impasse arose when Ethiopia refused to accept the Nakfa on par with the Ethiopian Birr, as Eritrea had not only proposed, but intended. Ethiopia's reason was that the monetary policy of Eritrea did not reflect that of Ethiopia.

Ethiopian monetary policy is such that the government retains a certain degree of control over exchange and interest rates. The Ethiopians proposed a Letter of Credit System under which transactions of more than 2000 birr had to be conducted using a hard currency such as the US dollar. Eritrea feared that this would promote smuggling and would hinder cross-border trade. They believed that the Letter of Credit system was a protectionist policy designed to impede competition in Tigray from Eritrean goods. As a result, Eritrea rejected the system and did not help in the regulation along the borders. Ethiopia resented this failed cooperation and pressed for dual authority on the Letter of Credit's execution. (Negash and Tronvoll, 2000) (Fessehazion, 2002)

Eritrea's introduction of the Nakfa caused new fears that may have prompted the war. As late as April of 1998, just one month before the start of the war, Eritrea's president released a statement condemning Ethiopia's trade policy as being protectionist and unfair to Eritreans. He believed that the development of Tigray's industry was conducted to promote market substitution that would one day lead to the exclusion of Eritrea entirely from the Ethiopian market.

#### IV. Other Causes

##### Ideology

Ideological differences have also been posited as another potential cause of the war. From the beginning, both the TPLF and the EPLF were separatist movements. However, the EPLF cited their unified national identity as a cause for separation while the TPLF party line was that Ethiopia was a prison of Nationalities. The TPLF felt that the different ethnic groups in east Africa were militarily dominated by the Amharic monarchy and were only held together through force. It was only with EPLF urging that the TPLF would lessen this rhetoric for a more palatable unity-in-diversity theory. After forming the new Ethiopian government, the TPLF restructured Ethiopia into a federation of 9 ethnic states, any of which could separate if the cause was just. Many feel that it was this position that most frightened the Eritrean

government. Eritrea is also made up of different ethnic groups; unfortunately, close to 60% of Eritreans are ethnic Tigrayan. It was widely believed that if the idea of ethnic identity superseded national identity, then the Tigrayans of Eritrea would want to separate from Eritrea to join the state of Tigray. (Negash and Tronvoll, 2000)

Although the conclusion is sound, this belief ignores certain political realities. For instance, while the situation in the horn is far from stable, it is not likely that a citizenry that supported independence for over 30 years would suddenly opt for inclusion into an Ethiopian state. At this time, most Eritreans identify themselves as such and not by ethnicity. Also, this position ignores the dominance the Eritrean government has over the press. Despite the international praise of the "progressive" EPLF during the independence movement, upon ascension to power, they centralized the media and have strictly controlled its diffusion. It is unlikely that the idea of rejoining Ethiopia would ever be allowed to spread unhindered by the government. (Cliffe, 1988)

##### Border Demarcation

No discussion of the Ethiopian-Eritrean War would be complete without exploration of the primary cause described by the newspapers, and that now seems to be the major impasse to peace: the border (See Map 2). The border dispute arose because the border was not properly demarcated in 1993; even during the Italian colonial period the border was unclear. There are no major landmarks to establish a border; it is mostly open territory free of rivers and mountains. Thus, any attempt to demarcate must rely on maps dating back to the turn of the 19th century, and to treaties signed by monarchs in Italy and Ethiopia, neither of which holds power today.

My position is not to say that the border plays no significant role in the conflict. In fact, without demarcation, I believe that no amount of negotiation or compromise will ever bring peace. However, to claim that 70,000 soldiers lost their lives and billions of dollars were spent to go to war all for the small town of Badme, which even the Prime Minister of Ethiopia called a "Godforsaken Village," is misguided at best.

As late as August of 1997, both sides were agreeing to cooperate on border demarcation. After minor clashes in areas surrounding Badme, the two sides agreed to set up a commission to investigate the border claims and demarcate accordingly. On May 8, 1998, ironically while the newly formed border commission was in session, a group of Eritrean soldiers surrounded Badme. Failing resolution, soon more Eritrean troops

entered Ethiopian administered territory. Thus the border war started. (Henze, 2000) (Negash and Tronvoll, 2000)

The escalation of force did not match the diplomacy both sides seemed to advocate before (and during) May. It seemed that despite the agreements to take it slow and allow proper implementation of the border to commence, Eritrea used force and then refused to back down, at which point negotiations completely ceased. Ethiopia claimed its sovereignty had been violated, and that it would use “any means necessary” to rectify the situation and safeguard its territorial integrity. Eritrea essentially viewed this declaration as an act of war. At this point, the rhetoric and conspiracy escalated.

Ethiopia posited that this was another incident in a long pattern of behavior of Eritrea having disputes with its neighbors; Eritrea had had minor conflicts with Sudan, Djibouti, and Yemen. Eritrea said that Ethiopia had occupied their territory as a “fallback” position for the TPLF if the ethnic federal experiment failed, and they again called for an independent Tigray. The value of resources spent over a marginal territory does not support the contention that the primary cause of the war was border concerns. Furthermore, both sides were in agreement until May of 1998. There must have been another motivating force. (Negash and Tronvoll, 2000)

## V. Economic Causes of the Ethiopian–Eritrean War

The economic situation, for the period of 1993 to early 1998, before the war, was a bit confusing. Ethiopia adopted protectionist measures and wanted to treat Eritrea as it would any other nation. Eritrea wanted free trade and special status in the Ethiopian economy.

What was the overarching economic climate? Both countries experienced modest gains in this period. In Ethiopia the data show a steady growth period from 1993 through 1997. The GDP increased from US \$4.6 billion to nearly \$6 billion (See Figure 1). This increase coincides with a significant decrease in aid as a percentage of government expenditures, which dropped an average of 19.53% after 1993. Per capita income also increased dramatically, rising by nearly 24% (See Figure 2). National saving increased to over \$506,000 (2006 US dollars) by 1997, which is almost 4 times the amount of 1993.

Eritrea’s economy was also marked by growth, but it was much more dramatic. The GDP increased from \$487 million to \$716 million (2006 US dollars). Per capita income rose from \$759 (international \$) to over \$1000. (World Bank Online)



**Map 2**  
*Disputed Border*

Here is where it gets interesting. By 1997, 67% of Eritrea’s goods were heading to Ethiopia, accounting for over 20% of its GDP. Most of its imports, however, were agricultural products from Ethiopia. From 1993-1997, food production in Eritrea decreased. This decrease coincides with a rise in Ethiopia of not only food production but also food price. Food exports from Ethiopia, while the data is sparse, indicate a clear rise before 1998. Exports never made up more than 17% of Ethiopia’s total GDP. In Eritrea however, in 1997, exports accounted for a sizeable 30% of income (See Figure 3). Where were these exports going? To Ethiopia. The volume of exports going into the Ethiopian market reached nearly 70% of all goods and services exported in 1997. Therefore, access to the Ethiopian market accounted for nearly 20% of Eritrea’s GDP. Thus, to the extent that Eritrea’s economy depended on access to Ethiopia, the trade policies of the EPRDF were too much for Eritrea to bear. Therefore, only 6 months after the last of a series of trade barriers were erected, Eritrea invaded Ethiopia. (World Bank Online)

**Figure 1**  
**GDP (Current US\$)**

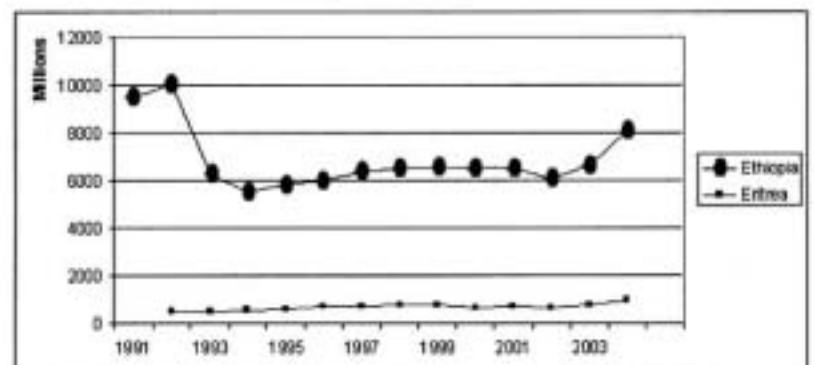


Figure 2

GDP per Capita  
(PPP Current International \$)

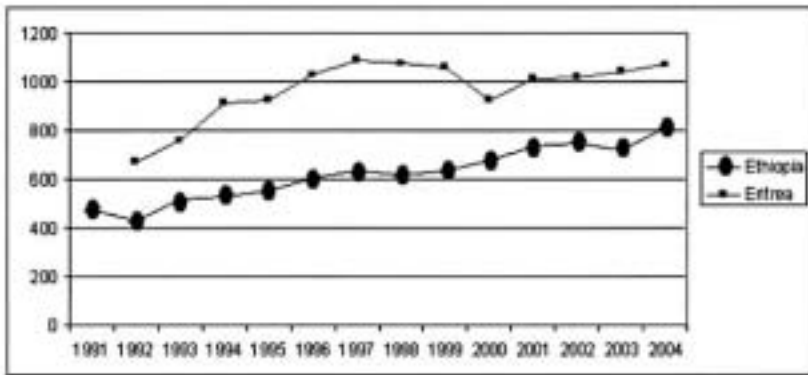


Figure 3

Exports as % of GDP

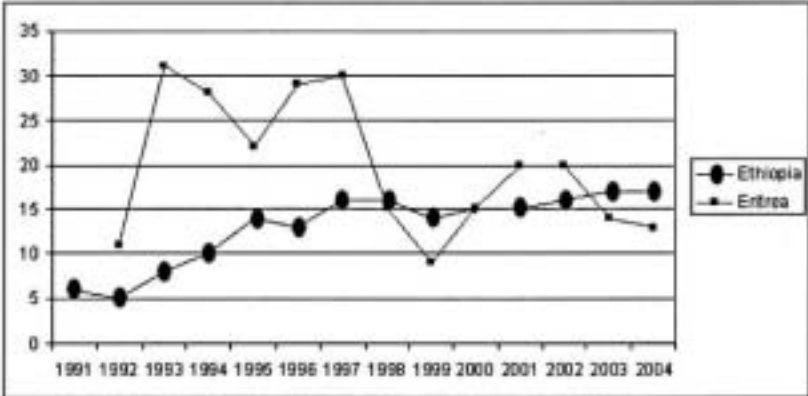
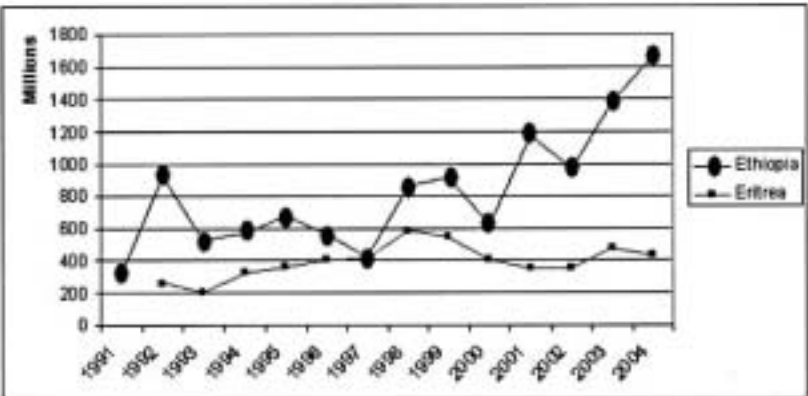


Figure 4

Net Trade in Goods and Services



**Conclusion**

After the fall of the Derg in 1991, the economic decisions of the new government began immediately to affect the relationship between Ethiopia and Eritrea. The impact of these policies on trade volume was significant (See Figure 4). The TPLF-led EPRDF issued policies favoring the Tigray province, due in large part to its past marginalization. The new government established manufacturing centers to serve as import substitutes. Also, they erected new trade barriers, such as targeted restrictions on certain goods and supporting poor import infrastructure. These measures seemed to target Eritrea, because many of the goods being produced in Tigray could and were often being provided by Eritrea. Eritrea grew frustrated at what seemed to be discriminatory practices that directly hurt its economy.

Eritrea had envisioned a special status in its economic relationship with Ethiopia. In its past relationship, the status of Eritrea was often in question. In less than a century the region of Eritrea changed from colony, to occupied territory, to a state federated with Ethiopia, to province, and, finally, to independence. In 1993 the newly established independent state of Eritrea saw itself occupying a special place in relation to Ethiopia because of this shared past. This was not a view shared by the Ethiopian government. After the euphoria of the post revolutionary period faded, the new government wanted to treat Eritrea as it did any other nation. Although some measures had been in place to facilitate their special status with Eritrea, Ethiopia soon negated these agreements. These actions ran counter to the primary economic policies of Eritrea. Due to the volume of trade it did with Ethiopia, special status would have reduced unnecessary costs and thereby boosted the economy of Eritrea. Ethiopia's disregard for this concern furthered the decline in relations between the two nations.

By the time the Nakfa was introduced in November of 1997, the trade agreements between Ethiopia and Eritrea had dissolved. Despite this hostile environment, when new disagreements arose regarding Eritrea's new currency, they issued it anyway. This sparked a problem regarding international trade between the two countries. Eritrea insisted on policies that Ethiopia had, in writing, said they would not uphold. In addition, the protectionist tendencies of the EPRDF were intensified during this period. Further restrictions arose regarding volume, and trade

facilities. These actions were seen by Eritrea as more in a series of trade barriers being erected by Ethiopia. Due to the increased reliance on access to Ethiopia, these policies further enraged Eritrea to the point that it pursued military intervention.

Due to the dependence the Eritrean economy had on unfettered access to Ethiopia, trade barriers would have a much greater impact than in other countries. The protectionist policies of the EPRDF, based on its dominance by the TPLF and the history of the Tigray region, had the potential to be devastating to the Eritrean economy. Finally, the introduction of the Nakfa took place without necessary agreement on its implementation. It was ill-timed by Eritrea and ill-received by Ethiopia. By 1997 the economy of Eritrea was so intertwined with Ethiopia's market that hindered access had potentially critical implications. Thus, when a further round of trade barriers was erected by Ethiopia, Eritrea invaded. This explanation seems to fit better than ideological differences or border disputes as the cause for war. Whatever the cause of war, all sides should want peace. In this case, peace cannot be realized until both sides cease the propaganda, recognize their shared concerns, and work toward a mutually beneficial future.

### Acknowledgements

I would like to thank Dr. James Fackler for being a true mentor and helping this project take flight; David Bettez, Melinda Miller, and Mary Ann Cooper at the Office of International Affairs for support and encouragement and the Traveling Scholars Award which helped greatly in my ability to travel to Ethiopia in search of information; Evie Russell and the eUreKa! office for helping fund my trip to Ethiopia; my family for financial support and understanding; the officers at the US Embassy, Addis Ababa, Ethiopia for their time and expertise; Almaz Sahle at Addis Ababa University for all of her enormous amount of enthusiasm and assistance; Sean Livingstone at William T. Young Library for his assistance in locating source material; and perhaps most importantly, my girlfriend Danielle who traveled halfway around the world to make sure she was present when I fulfilled a life-long dream.

### References

- Cliffe, Lionel and Basil Davidson (eds.). *The Long Struggle of Eritrea*. Red Sea Press: Trenton, NJ. 1988.
- Eritrea Ethiopia Claims Commissions (EECC). "Partial Award – Jus Ad Bellum, Ethiopia's Claims 1-8." The Hague, December 19, 2005. <http://www.pcacpa.org/ENGLISH/RPC/EECC/FINAL%20ET%20JAB.pdf>. Accessed March 10, 2006.
- "Eritrea–Ethiopia Joint Communiqué." Eritrean Profile—Electronic, Vol. 2, no 4, 8 April 1995. <http://www.hartford-hwp.com/archives/33/039.html>. Accessed April 1, 2006.
- Fessehazion, Tekie (ed.). *Shattered Illusion, Broken Promise: Essays on the Eritrea-Ethiopia Conflict (1998-2000)*. Red Sea Press: Lawrenceville, NJ. 2002.
- Henze, Paul. *Eritrea's War*. Addis Ababa: Shama. 2001.
- Henze, Paul. *Ethiopia: The Fall of the Derg and the Beginning to Recovery Under the EPRDF (March 1990-March 1992)*. RAND: Santa Monica, CA. 1995.
- Iyob, Ruth. *The Eritrean Struggle for Independence*. University Press: Cambridge. 1995.
- Marcus, Harold G. *A History of Ethiopia*. University of California Press: Berkeley. 1997.
- Minority Rights Group. "Eritrea and Tigray." Report No. 5. November, 1983.
- Negash, Tekeste and Kjetil Tronvoll. *Brothers at War*. Ohio University Press: Athens, OH. 2000.
- Pool, David. *From Guerillas to Government*. Ohio University Press: Athens, OH. 2001.
- Reuters. "UN Eyes Scaling Back Its Ethiopia-Eritrea Mission." *Reuters Alertnet*. April 13, 2006. <http://www.alertnet.org/>. Accessed April 20, 2006.
- World Bank. "World Development Indicators – Online." World Bank.org. <http://devdata.worldbank.org/data-online/>. Accessed February 10, 2006.
- Young, John. *Peasant Revolution in Ethiopia*. University Press: Cambridge. 1995.

# THE CHELLGREN CENTER FOR UNDERGRADUATE EXCELLENCE

The Chellgren Center for Undergraduate Excellence <<http://www.uky.edu/chellgrencenter>> affords students and faculty unique opportunities to enrich the undergraduate experience at the University of Kentucky.

Every top-twenty university has, as a fundamental component, an outstanding undergraduate program. At the University of Kentucky, The Chellgren Center for Undergraduate Excellence is not only the symbol, but the embodiment, of its commitment to the finest undergraduate education. The Chellgren Center embraces a comprehensive array of teaching and research programs, professors, and services designed to enhance, develop, foster, and deliver the exceptional undergraduate experience that is one of the major components of the University's mission.

## **Mission**

The purpose of the Chellgren Center for Undergraduate Excellence is to advance and represent the University's commitment to excellence and diversity in undergraduate education, as stated in the University's mission statement and reiterated in its Top 20 Business Plan. The Chellgren Center acts as a catalyst for improvements in undergraduate education and, as such, inspires and guides creative and progressive reform to provide the finest academic experience possible for all students at UK.

## **Goals**

- support the creation and dissemination of best educational practices and teaching innovation for engaged learning
- support an endowed Chellgren Chair and five endowed Professorships that are filled by outstanding faculty members who contribute substantially to the mission of the Chellgren Center
- foster the integration of research-based learning into the undergraduate experience
- attract excellent students to UK from across the nation and the world
- provide students with exceptional learning, mentoring, and research opportunities, thus increasing their competitiveness in their professional and scholarly careers in the global arena
- create a formal collaboration among some of the University's most successful and prestigious programs, centers, and offices

## **Foundation**

Based on the recommendations contained in the Boyer Commission report, *Reinventing Undergraduate Education: A Blueprint for America's Research Universities*, the Chellgren Center seeks to make research-based learning the standard, to foster inquiry-based experiences, to enable faculty members to deliver curricula that build creatively on each successive course and include a capstone experience, to integrate communication skills with subject matter, and to use technology effectively where appropriate.

Specifically, the Chellgren Center accomplishes its mission in several ways. By supporting an endowed Chair and several endowed Professorships, the Chellgren Center provides an opportunity for dedicated faculty members to devote their efforts



to the development, dissemination, and delivery of innovative undergraduate programs. By offering student fellowships, the Chellgren Center enhances the education of a number of outstanding undergraduates through mentorship and various other enrichment opportunities. By facilitating a formal collaboration among outstanding, prestigious undergraduate programs, the Chellgren Center provides an opportunity for significantly enhancing the impact of each of the programs throughout the undergraduate career of all students. By including a wide range of practical faculty development and instructional support services, the Chellgren Center has a broad impact on all undergraduate instruction.

### ***Paul W. Chellgren***

The benefactors of the Chellgren Center for Undergraduate Excellence are Paul W. Chellgren and his family. A UK graduate, Mr. Chellgren was an Honors Program student and star intercollegiate debater. He subsequently earned a Harvard MBA and a D.D.E. from Oxford University, where he has been named an



***Paul W. Chellgren***

Honorary Fellow. In addition to a celebrated career in business, one that included service as the CEO of Ashland Inc., Mr. Chellgren has been a very active UK alumnus, having served for eleven years on the UK Board of Trustees. The generous gift from Mr. Chellgren and his family has helped establish the Chellgren Endowed Chair and five named professorships.

## **CHELLGREN CENTER HIGHLIGHTS FROM 2005-2006**

On the following pages, several of the highlights of Chellgren Center-associated programs during the previous academic year are described. First, two students who served as Undergraduate Instructional Assistants (UIAs) in the Discovery Seminar Program discuss their experiences. Then students from several of the programs that are part of eUreKa! relate their research. These include the Beckman Scholars Program, the summer research and creativity awards, the UKURP (UK Undergraduate Research Program), support for undergraduate travel to scholarly conferences, and the Oswald Research and Creativity Program. Finally, there is a gallery of images from the first annual UK Showcase of Scholars, sponsored by the UK student Society for the Promotion of Undergraduate Research (S.P.U.R.)



## The Discovery Seminar Program

The Discovery Seminar Program (DSP) is an optional program open only to all incoming first term students (including transfers) that offers:

- 3-credit hour courses
- Small seminars with no more than 25 students in each
- Greater flexibility in meeting one of the University Studies Program's Disciplinary Requirements
- Engaged experiences, inside and outside of class, with some of UK's most famous professors
- Detailed exploration of a fascinating problem at the core of diverse fields of knowledge

Fall 2006 will mark the eleventh year of the Discovery Seminar Program for first-year students. From the moment a first year student steps onto campus, we believe that her or his educational experience should include the most satisfying, exciting version of higher learning and this is what a Discovery Seminar offers: small classes with engaging, challenging discussions with outstanding professors who are teaching about their work at the frontiers of knowledge. Our faculty are excited to offer diverse seminars on subjects such as racial identity; horses in Kentucky; Vietnam; democracy; environmental problems; civil liberties; technology; jazz; and reproduction, just to mention a few.

All Discovery seminars have a budget to enable the provision of special enhancements to the educational experience, such as field trips, guest lectures, additional films and videos, and special class-related events such as performances. Furthermore, a number of the seminars are linked to special sections of UK 101, UK's Academic Orientation class. Every student in those seminars is also enrolled in the corresponding section of UK 101. Each of these dual classes has an Undergraduate Instructional Assistant (UIA) who serves as the peer instructor in UK 101 and as the instructional assistant in the Discovery seminar. Here, two UIAs from fall, 2005, describe their experiences.



**Joanna M. Badagliacco, Ph.D.,  
Director, DSP  
Associate Professor, Department of Sociology**



*"The Interplay of War and Culture." These students are visiting the Vietnam Memorial in Frankfort, Ky.*



*"Can Money Buy Happiness? — Poverty in Kentucky." These students are painting a home in Owsley County.*



*"The African American Experience in Kentucky." These students are visiting an old African-American burial ground.*

## Experiences with the Discovery Seminar Program

When I think about my college experience thus far, and reflect on the decisions that have led me to where I am today, I consider one of the best to be my involvement in the Discovery Seminar program here at the University of Kentucky. I remember attending my orientation in the summer of 2003, trying to seek out a schedule to fulfill both my interests and requirements as a first year student. My advisor asked me to consider a Discovery Seminar course, something that she assured me would be a small classroom setting compared to the larger classes that I would be taking in the fall. As I searched through the booklet she handed me, I came across one called, “Can Money Buy Happiness? Poverty in Appalachian Kentucky.” This seminar particularly interested me, because I have been a Kentucky resident all my life, and during high school I completed several community service projects. One project included a trip to Eastern Kentucky to help impoverished families in the surrounding areas. I quickly enrolled in the class and hoped it would be as good an experience as the staff at my orientation promised me.

I walked into the classroom the first day and was greeted by a group of about twenty other students, a female teacher, and a male undergraduate instructional assistant. I felt secure in the small classroom atmosphere and content to have discussions with such a diverse group of people who all had their own views on the topic of poverty. My teacher made it easy for us to feel comfortable in the classroom and made it known that everything discussed in the seminar would remain confidential. She had such a vast knowledge of the poverty situation in the surrounding Kentucky counties, we felt we could ask her any question we had and her answers would be greatly informative and beneficial to our understanding of the different subjects.

I felt that I could really learn a great deal in the classroom, because of the additional help



that was easy to access in a small setting of twenty students. Besides the unique curriculum and course load of the Discover Seminar classes, I believe that another aspect that makes these courses so strong is the opportunity for students to become close to the others in their class.

Our group of students met an additional day each week for UK 101, a course that discussed the University of Kentucky, Lexington, and other pertinent issues that face first-year students. Because we met three times a week, and often talked a great deal, our class became very close to one another. It was great to find others in the same position as I was as first-year students who were going through similar transitions during the first semester of school. I quickly began to look forward to our classes and made some of the best friends I have today in college.

Many Discovery Seminar courses have a required field trip that pertains to the course area being studied. Because our focus was poverty in Kentucky, we made a visit to a nearby place to assist impoverished families. We made our trip to Owsley County, in two vans, driving down old country roads in beautiful fall weather. We spent an entire Friday afternoon helping with miscellaneous projects around a house that to our eyes was underprivileged beyond belief. Even though I had participated in service assignments like this before, I myself remember being stunned by the chaotic appearance of the home and being amazed at how different it looked when we had finished.

The people who lived in the home were so grateful that we had come to help them and everyone in the community seemed to know that we were there. We ended our day at the church of the small town cooking a meal with the two nuns who resided there and who were close friends of our teacher. The field trip was a great extension to our classroom and truly gave our class an opportunity to bond additionally in a different setting. We wrapped up our semester that year with a final lunch party and I was genuinely sad to leave the class. I truly feel that my decision to take a Discovery Seminar that first semester was

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the best I could have made for myself. It helped me to learn how to be a good student in college and also opened my eyes to issues of poverty that I had never taken notice of before.

I am fortunate enough to say that my experience with the Discovery Seminar program did not end that fall semester, as most of my former classmates' did. I was contacted in May of 2004 by the Program Director with the opportunity to become an undergraduate instructional assistant for her class the following semester. I accepted the position, with mixed emotions as to what to expect in the fall. I was overwhelmed and nervous to be a sophomore doing something that I regularly thought an older student would do. When I was younger, I was never someone who enjoyed speaking in public and I rarely took leadership positions unless I was pushed into them. I approached the upcoming semester with anxiety and was introduced to a new side of myself that I never knew I was capable of expressing.

The group of students who were in our class were wonderful, intelligent, and unique all in their own distinctive ways. I loved being viewed in their eyes as someone who was older and could help them with the different situations that arise within the first year of being in college. Being the assistant gave me a whole different perspective on the class and helped me to gain insight into how a teacher must feel when I was asked to prepare certain UK 101 classes and take over responsibilities inside the classroom. I organized events outside the classroom for my students, with efforts to get them to bond like my class had freshman year. Through dinners, plays, and other activities they grew close to one another and, by the time of our field trip, they were more than happy to devote a Friday to a class field trip.

We visited Owsley County once again and this time separated into different teams, taking over diverse projects around the town and helping many people along the way. This time we also spent the night in the church and spent the next morning at Robinson Forest in Eastern Kentucky. Our field trip went really well, and the students had a great time getting to know one another. The responsibility of being an undergraduate instructional assistant was something that truly helped shape me into the person I

am today. After the course, I was comfortable in a setting that caused me to have responsibility for others, give presentations to the class, and also to organize activities for them. This experience led me to assume additional leadership positions in my sorority and also in retreats organized for high school students.

After such a great experience, my first year as an undergraduate instructional assistant I applied to the program again my junior year. I took a position working for a different instructor in a Discovery Seminar class that focused on the Vietnam War. This was also a very positive learning atmosphere for me, because I love history and learning new things about the past that I did not know before. Mr. Berres was a genuine and intelligent teacher who loved to invite our class over for home cooked meals at his house. We took a one-day field trip to Frankfort, to see the Vietnam Memorial, which was something that many of the students, myself included, did not even know was there. I loved being an assistant for a class that had historical importance and I feel that it strengthened my character to gain knowledge of a time that was controversial in our culture.

As I now begin my senior year at the University of Kentucky, I am involved with the Discovery Seminar program for a fourth and final time. I am the assistant for a class entitled, "Regulating Sex and Gender," which is going to include both the historical and social aspects of sex and reproduction. I am deeply saddened that this will be my final experience with this wonderful program, but very excited for a fresh beginning and new learning situations for myself and my students. My involvement with this remarkable program has led me to have a great respect for teachers — a feeling of respect that goes beyond the classroom and has enabled me to see the inner workings of a course and all the preparations involved. I also have admiration for the faculty who work within these programs, those who are determined to have unique classes and genuinely care about the knowledge the students receive in their first semesters of college. I also am pleased to see how much I have grown as a person and student and, for that reason, I am grateful to the Discovery Seminar program at the University of Kentucky for giving me such a wonderful opportunity to shine these past four years.

## Serving as an Undergraduate Instructional Assistant



*Kristy Tsou feeding pigeons in Paris, France.*

It was such an honor to be asked to facilitate a UK 101 class and assist in a Discovery Seminar Program course, that I didn't fully understand how important my position as Undergraduate Instructional Assistant (UIA) was. My own participation in the program has led me to admire the innovation that recognized the need for, as well as created this amazing program.

The Discovery Seminar Program (DSP) was initiated as a means of providing first-term students with a rich, more personal experience through the courses offered. The University of Kentucky can become a very intimidating place. The students who arrive at UK each fall represent the best and brightest from their high schools and their communities. These students have already proven their ability to be successful, now they must deal with the transitions. DSP introduces first-term students to a college seminar setting. The classes are led by an enthusiastic professor with expertise in and love for the subject.

In some DSP courses, students attending the seminar sign up for a specific section of UK 101. The transitions and basic campus knowledge are addressed in the UK 101 course. DSP students are able to take advantage of the comfortable atmosphere provided in a cohort setting with a group of peers. The DSP/UK 101 cohort program reduces a huge university to a group of friends and eventually a family. These students recognize that they are more than

a statistic, but are members of an educational community. This program also provides great faculty contacts and an upper-class mentor to guide students to comfort.

This is where my own experiences begin. I remember very distinctly the training sessions involved in becoming a UIA. Although relatively short, the lessons of what to do in "what-if" situations had me thoroughly frightened. I kept on thinking of the language the trainers were using in regard to the students I would be assisting. It made me think of my students as cookies fresh out of their molds. They suggested that some would be extroverted, while others introverted, some might have substance abuse problems, others depression issues. I kept wondering, how in the world with all of these possible concerns, does anyone make it through freshman year at UK?

Then the trainers began to supply a variety of answers; most would ultimately stem from me. As an instructional assistant I must perform several duties; in my studies I must serve as an exceptional student, in social situations an exceptional person, as an instructor and mentor I must be seen as a knowledgeable resource. I often wondered how the students would come to view me, and if it would



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be the revered way I viewed my own instructors and anyone associated with them.

Regardless of how they came to see me, I quickly tried to figure each of them out. My training had made me much more attuned to the hint of any possible problem. I was able to utilize the journals that my professor required the students to keep, to see that they had quickly come to trust me. Their entries reintroduced me to many of the emotions I felt upon entering UK, as well as new struggles. Although some of the problems were more serious than others, I quickly realized just how important the UIA position is.

The most important part of my position quickly became “my students.” They were each so unique, but I could see myself in each one of them. Each one of them left an indelible mark. They reminded me what it was like to begin reaching toward a new goal, and I was so pleased to have had the training and support to help them. The most amazing thing to witness throughout the class was how my students grew and matured. The friendships they forged, are still apparent as I see them on campus, and read their posts on facebook.

Our class was one that focused on a number of controversial issues within the history of civil liberties, including many topics that are still important. During the seminar, the students were introduced to a variety of opposing positions and were able to gain insights from many guest presenters. The environment fostered dynamic discussions, as well as increased awareness of contrary viewpoints. The students found their own voices as they listened to and evaluated the information that was presented. This increased the participation within the UK 101 orientation class. Because the students were comfortable with each other, they did not hesitate to express their views or answer questions. I hope that these qualities transferred to their other classes as well.

The last day of class was a huge milestone for my students; I could not wait to experience this wonderful goal with them. I was no longer their UIA. I no longer needed to tell students to “look at your syllabus,” nor would I be receiving journals and getting a glimpse

into their daily lives. Our meetings at the picnic tables, while dodging squirrels flinging acorns, ultimately came to an end. These students have proven that they are ready for college and my hope of them gaining independence is now fulfilled. I approached this ending with the same emotions that I approached the beginning of this experience, a mixture of honor and trepidation. While I am pleased to have been selected to occupy this position, I was reluctant to give it up. What will happen to my students, who will ultimately succeed and who, if anyone, will not? More importantly, what kind of a role have I played in each of those possibilities?

My DSP professor explained UK and the reasons for attending such a prestigious university exactly, when he said “students can take classes anywhere, it is the opportunities that make a university worth attending.” I wish that I could have had a mentor like him as a freshman, his discussion of various opportunities makes me want to get very involved with everything. I feel very fortunate to have him as a mentor now. I not only hope that he and this program have the same effect on my students as they had on me. I also hope that my students are able to grasp how fortunate they are to have had this experience.

My students have experienced a huge milestone in their academic career. The way that they have progressed will ultimately determine much of their futures. Some of them have clearly been ready for this since high school, while some are still working things out. This point, I believe reflects the ultimate goal of the Discovery Seminar Program as well as UK 101. Through assembling a variety of students, and attempting to create a “community,” they will be given the skills and role models to focus their goals and the journeys that will take them there. Even those who have not achieved academic or personal maturity are able to see what their goals require. Students can begin to understand what is expected and comprehend what they want to achieve, while simultaneously gaining a support system. I have very high hopes for each of them, and am happy to have had the chance to know them.

# BECKMAN SCHOLARS PROGRAM

The Beckman Scholars Program, established in 1997, is an invited program for accredited universities and four-year colleges in the US. It provides scholarships that contribute significantly to advancing the education, research training, and personal development of select students in chemistry, biochemistry, and the biological and medical sciences. The sustained, in-depth undergraduate research experiences and comprehensive faculty mentoring are unique in terms of program scope, content, and level of scholarship awards. The University of Kentucky has been invited to apply for the program three times, and was selected to participate for three years beginning in 2002, and for a second three years beginning in 2005.

The Beckman Scholars Program provides support for no more than three outstanding undergraduate researchers per year. Scholars receive support for two summers and the intervening academic year, including a generous scholarship award plus stipends for supplies and travel. Scholars must conduct their research in chemistry, biochemistry, the biological and medical sciences, or some interdisciplinary combination of these disciplines, in the laboratory of and under the mentorship of a University of Kentucky faculty member approved by the Beckman Foundation.

Being named a Beckman Scholar is an extraordinarily high honor. The process by which a scholar is selected is quite rigorous. The selection is conducted by a committee of research faculty members each with a strong record of mentoring undergraduate researchers. The selection process evaluates 1) the ability of the candidate in both written and oral communication by considering a required research essay and conducting an interview of each finalist; 2) the past achievements of the candidate by reviewing the entire undergraduate transcript, academic honors received, and all previous research experience; 3) the candidate's intellect, character, and potential to excel as a researcher by appraising

a required written research plan and at least three letters of support from current and prospective faculty mentors; and 4) the candidate's potential for a career in research by evaluating a required written statement of educational and career plans.

To apply to become a Beckman Scholar, a student must be a sophomore or junior at the University of Kentucky, majoring in Chemistry, Biology, or a closely related discipline (such as chemical engineering or agricultural biotechnology), and have already completed at least one semester of research experience.

The Beckman Scholars for the year 2005-2006 were Nicolas Badre (mentored by Professor Robin Cooper) and Jason Passafiume (mentored by Professor Bruce O'Hara). The Beckman Scholars named for the year 2006-2007 are Megan Culler (mentored by Professors Rebecca Dutch and Diane Snow) and Kathryn Schveri (mentored by Professor Chris Schardl). In the following articles, the 2005-2006 Scholars explain and discuss their research.

For more information on the Beckman Scholars Program at the University of Kentucky, visit [www.uky.edu/beckman](http://www.uky.edu/beckman).



Nicholas Badre



Jason Passafiume





### Selection Process

At the beginning of my sophomore year, I had finished writing about my research for my first principal-authored publication. At that time, Dr. Cooper informed me of the possibility of applying as a Beckman Scholar. The selection process mainly consisted of an extensive project proposal, a personal statement, a résumé, and letters of recommendation. The application having separated me enough from other candidates, I was not required to go through the interview process given to most candidates. The Beckman selection committee at the University already knew me from courses and personal interaction, so maybe I was really being interviewed throughout the year without even knowing it.

### Research experience

I have worked in Dr. Cooper's lab for three years. Since my first month at UK, Dr. Cooper has shown me work ethics, strong dedication, and involvement in the community. This time spent in the lab has resulted in 27 presentations and 8 publications. My mentor has the ability to expose and accentuate the best in all the students he encounters. As required of any UK Beckman Scholar, I work in the lab at least 10 hours per week during the year, and 20 hours per week during the summer. Those hours are, however, often extended to allow further testing and to perform demanding experiments.

Working in Dr. Cooper's lab has certain characteristics that differentiate it from other research lab experiences I have had. Contrary to a vast number of college professors, Dr. Cooper spends a large portion of his time following the advances of the projects done by undergraduates. It has been common for me to spend hours in his office discussing the best way to answer

a certain scientific problem, e.g., "How can I demonstrate whether the fly's central nervous system is involved in the response of the animal to a given substance?" The lab atmosphere is also very positive because every student (doctoral, masters, and undergraduates) is aware of each other's projects and makes time to help each other. Finally, being part of a lab as productive as Dr. Cooper's (11 peer-reviewed publications while I was a Beckman Scholar) has an extremely invigorating effect on the students who are already excited about research.

### Extra Activities

The Beckman Scholarship has given me much more than the opportunity to perform and present my research. This award has allowed me to be recognized as an undergraduate leader in the area of research throughout the University. This status has encouraged me to use available resources to promote more undergraduate research. As such, I co-founded the Society for the Promotion of Undergraduate Research (SPUR). This organization now includes more than 150 undergraduate student researchers and others interested in research. As an organization, we discuss current research performed by our fellow students, we offer help to find mentors and to deal with common problems, and we try to encourage even more involvement of students in research.

Because SPUR was such a success, I decided to contact the administration about creating an event that would showcase the research performed by undergraduates at the University of Kentucky. The event would publish an abstract of each project, would be entirely run by students, and would be friendly to a general audience. As a Beckman Scholar, I caught the direct attention of Dr. Philipp Kraemer, the Associate Provost for Undergraduate Education, who approved the funding for the project. As a result, the "Showcase of Undergraduate Scholars" became the largest academic event for undergraduate research at the university, presenting the work of more than 120 students.

My outreach activities have not all been done at the University. Growing up in France, I remember having the chance to attend some of the best and most demanding schools for my primary education. I vividly remember our teachers bringing guest speakers from universities to discuss complex concepts with us. This memory was decisive in my choice to become involved with middle and high school education in Kentucky. Dr. Cooper is always involved in outreach and offered me the opportunity to participate in a class he offers to teachers as part of their continuing education programs. The class was run by the Fayette County Public School and partially

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## BECKMAN SCHOLAR 2005-06

funded by the NSF. It enables middle and high school teachers to be updated on the latest research and find novel ways of teaching using lab equipment. As part of the teaching staff, I helped teachers understand some of the biological models, and I also took the initiative to teach one day when Dr. Cooper had to be absent. My presentation, entitled 13 tests to explain biology through *Drosophila*, was so appreciated that I was asked to be a teaching assistant the next time they had the class.

Now that I know many of the science teachers in Fayette county, I have started going to middle schools and high schools. When I go to schools, I particularly enjoy assisting students on science fair projects, for which I often serve as judge at the local and the regional level. I also often visit schools as a guest speaker, discussing my research and research in general. Going to schools has allowed me to assess the practicality of our teaching, thus allowing me insight into what to improve.

Another project I have pursued outside the University has been *Impulse*. This peer-reviewed journal, completely directed and reviewed by undergraduates, has been a most rewarding experience. I have been a reviewer for the journal for the past two years, and being able to help other undergraduates from around the world in their research is fascinating.

### Benefits From Beckman

I do not believe that half of the projects, I have been part of would have been possible without the Beckman Scholarship. Receiving this award has allowed me to be financially independent, thus not having to have part-time jobs during the year and full-time jobs in the summer. Further, my success as a Beckman Scholar has permitted me to inspire students of all ages to participate in research.

### Future Plans

I am not graduating until 2007; therefore, I plan on continuing all my activities for another year. There will certainly be plenty of lab work involved, but also some teaching, because I am a teaching assistant for two classes. My research will be more diverse because I will be working in three different labs in three different departments. I will continue going to schools in the community. I have recently planned a trip to an elementary school. The Showcase of Scholars will certainly be an important event this year and everyone is projecting another large attendance. SPUR will have the crucial task of finding new young talent to replace those of us who founded it and are about to graduate. *Impulse* has passed this problem and will certainly become a more and more well known journal as years go by.

As far as my career goals, I am still uncertain. I have a strong passion for people and research, thus, academic medicine may fit my personality. On the other hand, my eagerness to have a large impact pushes me toward public health. In that field, I would like to influence policy makers concerning the importance they place on research, and on the necessity to be aware of the latest research when creating guidelines or laws. I am currently applying to MD/PhD and MD/MPH programs around the country including at the University of California, San Francisco and Johns Hopkins.

### Current Research

The following is the introduction to the latest research article that Dr. Cooper and I are submitting:

The normal function of ion channels, such as  $Ca^{2+}$  channels, within a given tissue can range from being essential for cell survival to only slight disturbances in function, depending on the cell's requirements. A variety of pathological conditions exist in humans, due to altered ion channel function in various tissues (Flink et al., 2003). Many of the known diseases related to ion channel function are due to mutational effects (Flink et al., 2003). Some of these pathologies are not severe enough to be lethal in embryological development but allow survival to some period, albeit with a decreased quality of life. The use of genetic mutations in animal models allows one to investigate the broad actions of such mutations in various bodily systems over acute and chronic periods, depending on the severity of the mutation and the functional needs of the animal.

The cacophony gene (*cac*) in *Drosophila* codes for the  $\alpha 1$  subunit of a voltage-gated calcium channel. The  $\alpha 1$  subunit produces the pore of the voltage-gated ion channel. With the use of a transgene to express green fluorescent protein (GFP) with a *cac*-encoded  $\alpha 1$  subunit it has been demonstrated that motor nerve terminals in *Drosophila* express  $Ca^{2+}$  channels (Kawasaki et al., 2004). A mutation in this segment, has also been characterized in a temperature sensitive line (*cacTS2*) in which, the  $Ca^{2+}$  appear to have reduced flux when the temperature is raised, due to a conformational alteration in the channel. Synaptic transmission is reduced at the neuromuscular junction (Xing et al., 2004). *CacTS2* adults exposed to 38°C for 3 minutes stop flying and walking, which implies that the alterations measured electro-physiologically in the skeletal muscles of larvae also apply to motor units in the skeletal muscles of adults (Kawasaki et al., 2004) and, possibly, depresses other sites of synaptic communication centrally.





In this research, we used the *cacTS2* strain to investigate the potential effects on vision and olfaction in adult *Drosophila*. In larval *Drosophila*, we further assess regulation of heart rate as well as direct action in the heart at restrictive temperatures to further delineate the properties of the *cacTS2* strain. Mutations that are temperature-sensitive provide a good avenue to study the mechanisms of how homeostasis of an organism is regulated over time. Whereas complete knockouts of gene function can sometimes be lethal, the temperature-sensitive mutational forms can be pulsed for various increments of time to assess acute and chronic effects.

Because our knowledge of physiological mechanism largely derives from experiments in the larva (Koh et al., 2000), it is relevant to look at learning behavior in larvae with an alteration in  $\text{Ca}^{2+}$  function at the synaptic level.

Clinical approaches are used to regulate calcium channel function as a means to control pathological conditions such as epilepsy and convulsions (Warner et al., 2005). The outcome of long-term treatments of calcium channel blockers for regulation of such diseases needs to be addressed in terms of potential consequences in which homeostatic synaptic mechanisms may be compromised. It is possible that by examining effects on the long-term reduction of calcium influx and by simply revealing the mechanism induced by calcium blocking in defined model systems we will gain insight for clinical application.

### Works Cited

- Flink M.T. and Atchison W.D. (2003) "Ca<sup>2+</sup> channels as targets of neurological disease: Lambert-Eaton Syndrome and other Ca<sup>2+</sup> channelopathies." *J Bioenerg Biomembr.* 35(6):697-718.
- Kawasaki F., Zou B., Xu X., and Ordway R.W. (2004) "Active zone localization of presynaptic calcium channels encoded by the cacophony locus of *Drosophila*." *J Neurosci.* Jan 7;24(1):282-5.
- Koh, Y.H., Gramates, L.S., and Budnik, V. (2000) "*Drosophila* larval neuromuscular junction: Molecular components underlying synaptic plasticity." *Microscopy Res. Tech.* 49: 14-25.
- Warner G., Figgitt D.P. (2005) "Pregabalin: as adjunctive treatment of partial seizures." *CNS Drugs.* 19(3):265-72; discussion 273-4.
- Xing B., Ashleigh Long A, Harrison D.A., Cooper R.L. (2005) "Developmental consequences of neuromuscular junctions with reduced presynaptic calcium channel function." *Synapse.* Sep 1;57(3):132-4.

I spent the first one and a half years of my undergraduate career here at UK switching majors and mastering what I like to call the art of "add/drop." (I was just as indecisive in finalizing a semester's course schedule.) In fact, I once changed majors three times in a span of two days. Finally, after meeting with professors in areas such as Chemistry, English, and Journalism, I decided that Biology was the major for me. I was especially interested in biomedical research and medicine.

Because I had taken only one collegiate science course, I apprehensively enrolled in organic chemistry and cell biology courses for the spring semester of my sophomore year. At the time, I felt that the semester was greatly important and that my performance in these science courses would indicate, and maybe even shape, my newly founded undergraduate career. However, my Honors 202 course tested me most, but in a different manner than I expected.

Dr. David Wilke taught that course, entitled "The Contemporary World," which required a reading of A.H. Maslow's *The Farther Reaches of Human Nature*. In that book, I discovered the possibility of a different kind of education, and my discovery began with a realization that the state of my education in the opinion of Maslow, at the time, "summarizes the evils of extrinsically oriented education." That is, the numbers, names, facts, and formulas that I had simply been learning and memorizing (and later usually forgetting) are, according to Maslow, "in a certain, very profound sense, expendable."

Although, as I have already mentioned, I was enrolled in the Honors Program (which definitely promotes the development and use of creativity in a cross-disciplinary setting), I had fallen into

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the minimalist undergraduate mindset. At the time, anything above or beyond the requirements of a course were, to me, superfluous. I didn't attend many lectures by visiting professors or guest speakers, and, most importantly, I wasn't involved enough. So, as you can probably imagine, Maslow's idea of a "humanistic education" struck me as completely foreign and challenging but stuck with me. I recognized his idea as rather utopian, but I bound myself to expanding my education and to obtaining as much of an "intrinsic education" as possible in the remaining two years of my undergraduate stay.

Such a goal led me to consider earning credit in BIO 395, Independent Research, and my advisor, Dr. Sheldon Steiner, suggested some biology faculty members who were taking undergraduates in their labs. I studied the professors' areas of research and decided to meet with Dr. Bruce O'Hara, whose specialty is sleep and circadian rhythms. I didn't make an appointment but just showed up at Dr. O'Hara's office (definitely a testament to Dr. O'Hara's availability to his students and his productively relaxed attitude so conducive to creativity in learning and research). After five minutes of speaking with Dr. O'Hara about his research, I was intimidated, felt under-qualified, and wanted to leave; after half an hour, I was absolutely convinced that I was going to do research in Dr. O'Hara's lab. After about eight months of research in his lab, Dr. O'Hara brought to my attention the Beckman Scholars Award for Undergraduate Research and encouraged me to submit an application. It was extensive and required, among other things, a detailed project proposal, three faculty recommendations, and a personal statement concerning my future academic and career plans.

At some point during my first meeting with Dr. O'Hara (probably while he talked excitedly about his latest findings, because his passion and love of knowledge of all kinds is contagious), I was reminded of an essential component of Maslow's education: "peak experiences."

I firmly believe that Dr. Arnold Beckman either was well-acquainted with Maslow's work (or at least similar work), or independently discovered the same truths (brilliant minds think alike). Peak experiences form the foundation of the Beckman Scholars Program, and I'm convinced that Dr. Beckman had them in mind when he and his wife Mabel decided to encourage scientific education both financially and ideologically. Dr. Beckman himself must have lived by and thrived on peak experiences, because he made numerous medical and otherwise scientific inventions. "The picture of the creative scientist

must change, and is giving way to an understanding of the creative scientist, and the creative scientist lives by peak experiences," writes Maslow. "He lives for moments of glory when a problem solves itself, when suddenly through a microscope he sees things in a very different way, the moments of revelation, of illumination, insight, understanding, ecstasy. These are vital for him." I am especially grateful for the assistance that the Beckman Foundation has given to me in my goal of a more intrinsically-oriented education.

My main research project focuses on an examination of "clock-genes" (genes underlying mammals' circadian rhythmicity) that we believe are also important for sleep homeostatic regulation. I'm currently looking at clock-gene mRNA levels in response to sleep deprivation of varying durations in different parts of the mouse brain outside the mammalian master circadian pacemaker, and further comparing these results in different mouse strains with different sleep parameters. We've found that the clock-genes *period1* and *period2* mRNA levels increase with increasing sleep deprivation in both the forebrain and cerebellum of three mouse strains. Such a positive correlation with sleep deprivation further confirms our hypothesis that period clock-gene expression is also related to sleep homeostatic regulation.

I've also been involved in a study regarding human reaction-time performance in relation to meditation, sleep, exercise, and caffeine. We've found that meditation enhances reaction-time performance (i.e., reduces reaction-time) in a Psychomotor Vigilance Task more than sleep, exercise, or caffeine. For this study, we are currently seeking publication in the journal *Sleep*. Following the Dalai Lama's inaugural lecture on the neuroscience of meditation at the 2005 Society for Neuroscience Conference, the media has taken an interest in our meditation study. Dr. O'Hara has recently and frequently been interviewed, and already our findings in the meditation study have been featured in *Time Magazine*, *USA Today*, *New Scientist*, and *Science Update*. I will be presenting both studies' findings at the Society for Neuroscience Conference in October of 2006, and I've already presented preliminary findings of my molecular project at the Kentucky Posters-at-the-Capitol program and at UK's Showcase of Undergraduate Scholars.

The overall goal of my research (and presumably any research in the sleep field) is to contribute to a greater understanding of why we sleep. Today, we still have a poor understanding of the mechanisms underlying a process consuming approximately one-third of our lives! The function(s) of sleep is/are unknown; thus, my area of research is chock-full of peak experiences waiting to happen. But, above all, above the physiological and molecular pathways important for sleep that I've learned, and above the small contribution that I've made to the research community, I've had a lot of fun. This fall I'll be attending medical school at the University of Louisville, where I plan to continue laboratory research. My career goal is to become involved in the implementation of laboratory research in a patient setting.



**eUreKa!** (Experiences in Undergraduate Research and Kreative Activities) is one of the units comprising the Chellgren Center for Undergraduate Excellence.

The purpose of **eUreKa!** is to provide coordination and leadership for the many programs at the University of Kentucky that are designed to encourage and support undergraduate research, scholarship, and creativity. By bringing these programs together, they all benefit from the symbiosis of cooperation, and the University receives strengthened programs and more efficient administration.

**eUreKa!** includes the following programs:

- The UK Undergraduate Research Program (UKURP) (see pages 100-101)
- Society for the Promotion of Undergraduate Research (SPUR), undergraduate research club (see page 109)
- UK 100, Research Skills Orientation, open only to active UKURP participants (see pages 100-101)
- The “Bucks for Brains” summer research mentorship
- *Kaleidoscope*
- The Oswald Research and Creativity Awards Program (see pages 110-112)
- The Summer Research and Creativity awards program (see pages 90-99)
- The undergraduate research support and travel fund (see pages 102-103)
- The Beckman Scholars Program (see pages 83-87)
- The Showcase of Scholars (see page 89)
- The “Posters at the Capitol” program
- The NSF-funded AMSTEMM program (see [www.uky.edu/amstemm](http://www.uky.edu/amstemm))
- Coordination with undergraduate recruitment of students having an interest in research, scholarship, and creativity experiences

Each of these programs provides students with special opportunities and support for extended scholarly experiences, beyond the class room. A number of students who have participated in these programs are represented in the following pages. For more information about eUreKa!, please visit [www.uky.edu/eureka](http://www.uky.edu/eureka).



**Mentored Research**



**Summer Research and Creativity Awards**



**AMSTEMM Summer Program**

# Showcase of Scholars

On April 25, 2006, eUreKa! and SPUR (the Society for the Promotion of Undergraduate Research, UK's undergraduate research club) presented the first annual Undergraduate Showcase of Scholars. It was entirely organized and run by students. Over 100 students made poster presentations; approximately 20 students gave oral presentations; one student gave a dance performance; all of the refreshments were prepared and served by undergraduates in nutrition and food services; and a bound volume of abstracts was prepared and distributed by SPUR.

A number of students who participated as presenters at the Showcase have articles or abstracts published in this issue of Kaleidoscope. For example, see the picture of Casaundra Cox with her poster on page 100. The gallery below includes scenes from the Showcase. An extended version of the gallery is available in the on-line edition of the journal at < [www.uky.edu/kaleidoscope/fall2006](http://www.uky.edu/kaleidoscope/fall2006) > )



# Summer Research and Creativity Grants

*The following abstracts were submitted by the students who received Research and Creativity Awards for the summer of 2006. They are not final reports, because the projects were in process when the submissions were due. Rather, they are progress reports. However, they provide a clear and wonderfully diverse picture of the broad range of scholarly activities being undertaken by undergraduates at the University of Kentucky.*

## Sociologists Should Hang Out With Poor People

Meredith G. Amshoff

### Social Sciences

My project will be divided into two segments comprised of extensive research and a trip designed to study the real world implications uncovered in research taken from a study in Eastern Kentucky and urban poverty in the US.

I have been in New York City for the past 11 days now, and have been doing a great deal of work toward my research project. I live in community with a group of 8 nuns who work in various ministries in the surrounding area, catering to several social service-type groups. I go with them when they do their work, and meet various community organization leaders who do similar work. In the coming weeks, I will be conducting interviews with these people about their work in the community, and how they interact with those they serve. I am now doing research about ethnography and preparing to do the interview phase of my final project.



## Performance Art and the Monodrama: A Summer Tour of Fringe Festivals

Daniel T. Bernitt

### Theatre

“People keep telling me: ‘Jason, you’re doing too much.’ What about the people who aren’t doing anything?”

Nearly every night for two weeks I sat with Jason Bruffy, the producing director of the Cincinnati Fringe Festival and artistic director of the Know Theatre Tribe, having conversations about theatre until the bar kicked us out. From the broadest of arts administration techniques to the specifics of finding venues and performance spaces, Jason told me anecdotes about his experiences dealing with the business of theatre, summarizing each encounter in his no-nonsense way.

“The first step to starting the festival? I said I was doing it.”  
“Always talk in ‘we’ if you’re starting something new; it adds a



sense of community.” “Develop relationships with donors before you ask for money. It’s not like you would go up to a guy in a bar and immediately ask him to be your boyfriend.” “Marketing is the most important element of the business, even more than development and production.” “If you see problems starting, stop complaining, dammit, and find a solution.”

Life lessons offered in a Jersey accent and punctuated with profanity, the man as a metaphor: the harshness of the business with the warmth of knowledge, if you just ask for help.

“But I’m pontificating,” Jason sighed as he took another swig, lit cigarette between his fingers.

## The Children of Marx and Coca-Cola

Andrew Bozio

### English



In May 1968, the streets of the Parisian Latin Quarter were turned into a battlefield. The universities had been closed as a result of student demonstrations, and when the police force of de Gaulle’s France arrived to break up the trouble-makers, they found that their truncheons and tear-gas were met with a shower of cobble-stones and Marxist slogans. My research on the May Events began as the posing of an impossibly general question: what ideological forces guided the students as they demonstrated in the streets? In Paris, at la Bibliothèque publique d’information, I began to answer this question by reading the accounts of the events in *Le Monde* and *Le Nouvel Observateur*. From these articles, it became apparent that an ideological divide on the meaning of Marxism had taken hold. The French Communist Party, having recently gained a place in the National Assembly, was reluctant to lose its status in the Gaullist government and so was forced to denounce the uprisings, quibbling that the students were the children of the bourgeois power and lacked the class consciousness to bring the proletariat revolution to fruition. The students felt differently; true, they admitted their elite heritage, but at the same time they railing against the bourgeoisie mentality that they felt was being reproduced, rather than refuted, by the university system. In short, whereas the Communists defined ‘bourgeois’ in terms of economic status, the students preferred to conceive the word in cultural terms.

Currently, I’m working to determine if the origins of this distinction can be traced to the early writings of Louis Althusser, professor of philosophy at the Ecole Normale Supérieur. His texts rewrite the old Marxist

formula of base and superstructure to include consciousness — or more broadly, ideology — as a key determinant of class relations. The students — wittingly or not — were following Althusser’s revision when they argued that they were as proletarian as any factory worker. The position of Althusser’s texts in the May Events, then, opens a broader question, that of the political significance of French philosophy in the 1960s. Can it be said that the students, in attempting to break apart the structure of bourgeois society, were a deconstruction manifest in the Parisian streets? To pursue this question, my research is now a close reading of the student manifestos and the philosophical texts that surrounded 1968.

A short history of the Events points to another discursive formation at work and, indeed, the final stage of my research. In February, 1968, some three months before the cobblestones were first flung, the government’s decision to fire Henri Langlois, founder and head of la Cinémathèque française, inspired a large student protest. It is this event that causes me to wonder, did the cinema of Jean-Luc Godard, François Truffaut, and other Nouvelle Vague figures act as an ideological counterpart to the emerging philosophies of the day? Did the slogans of the Events, dipped in a venom of wit and absurdity, find their predecessors in *A bout de souffle* or *Week-end*? In the final weeks of July, with the resources of la Bibliothèque du film, I will watch the same films that were shown in Paris in the months leading up to the Events, to determine if these cinematic texts were in some ways writing the riots before they occurred.

## Localization of Defense Gene Expression in Plants

**Kimberly A. Cox**

### Agriculture

So far in the course of my research I have been practicing the protocols on control tobacco plants. The experimental plants are currently growing up to their optimal size. I am also growing my *Phytophthora ramorum* < <http://www.doctorfungus.org/thefungi/Phytophthora.htm> > on oatmeal plates. Every week I subculture them to another set of oatmeal plates. Next week, I will start inoculating my experimental plants with the *Phytophthora* and carrying out the protocol as I did with the control plants.



## Effect of Proteoglycan Structure on Nerve Growth Inhibition

**Chris Garnett**

### Biology



Currently in the United States there are approximately 250,000 individuals living with spinal cord injuries (SCI). This figure underscores the need for basic research aimed at treatments to promote nerve regeneration. The complexity of the cellular environment following SCI has made the development of treatments difficult, but strategies are beginning to emerge. One factor that contributes to loss of ability for nerve cells to regenerate is a family of extracellular matrix glycoproteins called chondroitin sulfate proteoglycans (CSPGs). CSPGs consist of a protein core to which one or more glycosaminoglycan (carbohydrate) side chains are covalently attached. The mechanisms of nerve cell inhibition by CSPGs are unknown.

From examining nerve cell behavior following exposure to intact and degraded CSPGs, it is clear that nerve cell growth cones (GC), the sensing, distal ends of the nerve cells, possess the ability to discriminate between various sub-domains of the CSPG structure. An understanding of this ability of nerve cells may allow us to develop strategies and treatments to encourage nerve growth and recovery of function following SCI. Dr. Diane Snow in the UK Department of Anatomy and Neurobiology, and collaborators Dr. Thomas Hering and colleagues at Case Western Reserve University, have developed a model of the glial scar in vitro to test growth cone responses to engineered specially mutated CSPGs, called “Designer PGs.” They are using these PGs in tissue cultures to test the behavior of sensory neurons. The hypothesis of this study is, “identification and manipulation of specific inhibitory CSPG domains using ‘Designer PGs’ in combination with a novel model of the glial scar will promote plasticity and regeneration in vitro and in vivo.”

During my first six weeks in the lab, I learned and practiced basic experimental protocols, including: dissection of a population of sensory neurons (dorsal root ganglion; DRG neurons) from embryonic chickens, reagent preparation, cell culture, and image analysis. Next, I will use “Designer PGs” to begin monitoring the behavior of primary neurons in the presence of these mutated CSPGs. Using time-lapse microscopy, I will measure morphological features of GCs, such as

# Summer Research and Creativity Grants (CONT.)

GC area, number of filopodia (actin-based extensions from the GC that sample the environment), filopodial lifespans, branching patterns, and degree of contact with the substratum. I will also measure behaviors of the GC, such as rate of outgrowth and GC turning. I will compare these GC characteristics between neurons encountering different CSPG structures to determine if certain portions of the GAG or protein components of CSPGs are most inhibitory.

These data will provide information that will move the research forward and allow the manipulation of the most inhibitory regions of CSPGs to render them less inhibitory, or even growth promoting. Once accomplished, the research will then move to a model in vivo to facilitate translational approaches to SCI studies.

## Efficiency Estimation of Power Plants

### Aydin Hatemi Engineering

The purpose of this project was to estimate the efficiency of power plants by observing the historical efficiency development of hydro-electric, nuclear, diesel, gas turbine, solar, wind, and fossil fuel burning steam power plants. The full project also includes classification of these power plants, economic analysis, theory of operation, and principles of gas turbine power plants. Although this research includes many types of power plants, gas turbine power plants were our main focus.



I obtained my data and information mostly from the United States Department of Energy–Energy Information Administration, the University of Kentucky libraries, and various Internet sources. In the first part of my research, by using these sources, I was able to determine the historical development of efficiencies of power plants and list these power plants by their efficiencies. In the second part, the main focus was the principles of the gas turbine cycle, the current situation of power production, and the economics of the combined cycle gas turbine. In the last part of my research, I focused on different power recovery methods in gas turbine power plants.

After extensive research on combined cycle gas turbine power plants, we conclude that GE's S109H has the best performance, with 60% over-all efficiency. Also we concluded that gas turbine power plants with multiple staged compressors have the highest thermal performance.

The final results suggested high efficiency in a combined cycle gas turbine with multiple staged compressors. This conclusion leads us to plan further investigations of this specific type of gas turbine cycle.

## Performing Ceramics Analysis of Pottery Sherds Excavated from an Archaeological Site in Tres Zapotes

### Alexander C. Conway

#### Anthropology

Hello from Tres Zapotes, Veracruz in Mexico. There is just enough time for me to get my feet wet before



I dive into my research project on Household Craft Production in Tres Zapotes.

This first week I have spent all of my time learning the ceramics classifications. This task involves knowing the different types, forms, and decorations of the ceramics. As part of my learning, I have begun to analyze and identify the ceramics that have not yet been catalogued, with the guidance of Dr. Georgia Britt from Washington University and Dr. Chris Pool from our own University of Kentucky.

The project Dr. Pool has assigned to me for the coming weeks is to classify pottery from the excavation of a Protoclassic (C.E. 1 – 300) household that was involved in the production of pottery as well as obsidian and basalt stone artifacts. It is from an operation entitled 3-B, units 21 and 22. There are seven units and six of them were excavated.

My objective is to contrast pottery from excavations on the south side of the house, away from the areas where firing pots were excavated, to provide comparative data for the identification of household activity areas.

## Exploring the Relationship between Peer Victimization and Learned Helplessness

### Megan Kleine-Kracht

#### Psychology & Family Studies

Peer victimization is an extremely important and pervasive issue for children; roughly 10% of children have described chronic victimization by peers. In fact, the American



Psychological Association has recently declared peer victimization a major public health issue of childhood. It has become essential that we learn more about this topic in order to find a way to decrease peer victimization and drastically improve quality of life for these children.

My particular interest in this research lies in examining the possible relationship between learned helplessness and victimization. Learned helplessness is the tendency to give up when encountering situations you do not believe you can control. Learned helplessness is associated with a certain attributional style, or way in which an individual explains why positive and negative events occur. For example, the typical attributional style for a negative event of someone suffering from major depressive disorder is internal, stable, and global. I am extremely interested in exploring differences in attributional style between frequently-victimized children and their not-victimized peers. I believe that children who are frequently victimized will be more likely to have the internal, stable, and global attributional style that is related to learned helplessness.

Although previous research has investigated both peer victimization and learned helplessness individually, the relationship between these two factors has not been sufficiently examined. Thus, the purpose of the current study is to see whether children with a history of peer victimization have adopted the specific attributional style associated with learned helplessness.

Currently, 120 participants aged 9-13 are being recruited from the Lexington area to take part in this study. Participants (and their parents) complete a variety of questionnaires and computer tasks, including the Children's Attributional Style Questionnaire (Revised), and they are also interviewed about their victimization experiences with other children. These responses will be analyzed to determine the nature of the relationship between learned helplessness and peer victimization, and they will, hopefully, provide us with deeper insight into processes underlying childhood peer victimization.

## Analysis of Isotopic Values in a Stromatolite Head to Interpret Micro and Macroscopic Environmental Changes

**Nathan Landrum**  
**Geology**

In geological research, we study this living planet with



the philosophy that the present is the key to the past and the future. By looking into the behaviors and lifestyles of modern life forms, we can find clues that help us to understand the behaviors and lifestyles of the ancestors of these organisms. Another branch of geologic research looks at isotopic ratios to study such environmental behaviors as the ocean temperature and salinity, storm patterns, and global climate changes. My research combines these aspects to learn more about organisms called stromatolites that are found in the Bahamas — a type of organism that has been around for ~3.4 billion years. Looking at isotope levels in different sections of a stromatolite sampled from Storr's lake on the island of San Salvador, I hope to learn more about how Stromatolites form, and how environmental changes affect their formation.

At this point I have taken 100 samples from a stromatolite taken from the Bahamas. The samples reflect the diverse forms of growth that have occurred during the stromatolite's formation, specifically clotted thrombolitic growth, and linear laminar growth. I have recorded the locations of the samples on electronic and hard copy scans of the stromatolite. The samples will be tested for isotopic variations in  $^{12}\text{C}/^{13}\text{C}$  and  $^{18}\text{O}/^{16}\text{O}$ . Variations in these levels will give insight into the climate and environment in which the stromatolite formed. My hope was to have the samples tested at the E.R.T.L. lab here at the University of Kentucky, but the lab has a backlog that makes this impractical. I have contacted a Stable Isotope laboratory run by the University of California, Davis. As soon as the samples have been powdered and weighed, I will ship them to this lab to be tested.

When the results are returned I will look for any variations between the isotopic ratios of thrombolitic layers and laminar layers. I will look for any sign of uniformity or variation in layering throughout the stromatolite, which might tell me more about how changes in the environment in which the stromatolite formed — a hypersaline lake that varies in salinity and acidity — affect stromatolite growth.

## Teaching English as a Second Language in Russia

**Rachelle Lazarus**  
**Russian Studies**

Privyet, from Vladimir, Russia! I'm having a wonderful time here with my project of teaching English to needy children and those in orphanages. It took a while to get things off the ground

*Rachelle Lazarus (center) with her Russian students*





## Summer Research and Creativity Grants (CONT.)

once I arrived in Russia, because most orphans are sent to various camps for the summer. I went to several different towns and villages to speak with the directors about teaching there, but everyone wanted special documents from me and a specific certification. Finally, I began working with a man who has been stationed in Russia for over 10 years and has many contacts and established relationships with people in this area.

Shortly thereafter, I visited two orphanages and spent great time with the kids there. One was a baby orphanage here in the town of Vladimir where I'm currently living, so I can't exactly say that that I had great linguistic success there, but I feel that the time was incredibly valuable, nonetheless. The other orphanage, in a town called Suzdal, is for children ages 3 to 10. The children there were quite distracted by the beautiful sunshine and having someone to play with outside, but we had a wonderful time practicing some basic English phrases together. From this experience, I could see that even the youngest of children appreciate the ability to communicate with someone from a different language background.

Besides these orphanages, I also visited a children's shelter for homeless children here in this town. We had a long talk together, and I asked them all about their plans for the future. I was sure to tell them over and over how much of a difference education can make in a person's life, and that concentrating on school work now can have a significantly positive impact on their lives in the future. Afterwards, I spent some time with 3 different children in a delinquent center in the same building complex as the shelter. These children were very quiet, and not too willing to speak about themselves or their situation, but I felt that this was an appropriate time to again speak of the future and my advice concerning it.

I told them that the most important thing in the entire world is family and to have love in our hearts. I advised them not to make choices in the present that could hurt the people who love them currently, as well as future relationships. I told them that it's better to consider the words of those who want to help them and improve their lives rather than pushing everyone away and always finding trouble. I don't think I'll ever know what kind of choices these kids will make from here on out, but I trust that their hearts will be touched by the kind words of someone from thousands of miles away.

After all these visits, I began working with a group of about 15 teenagers in a church building also here in Vladimir, teaching English consistently everyday, Monday through Friday, for about 2 hours

each lesson. These kids make such a great group! They're so excited to learn English, and all my lessons so far have been very successful, because of their enthusiasm to learn. We began with our A-B-C's and 1-2-3's, and slowly started tackling the mess of English grammar.

Tomorrow, I'm leaving Russia and travelling to Hungary for a few days in order to obtain a new visa for staying in Russia. Afterwards, my students and I have many plans together both inside and outside the classroom. Inside the classroom, we like playing games, having dialogues, listening to music with English lyrics, and so on. When I return, we plan on going bowling together and I'll teach them how to say "gutterball!"

I'm having such a great time here in Russia, and I can see what a difference it makes to my students that someone is willing to spend the time here and teach English intensively. I'm sure we will have accomplished a lot by the end. Keep having a great summer everyone ... I know I am!

### Organic and Hybrid Solar Cells

**Bhavananda Reddy Nadimpally**  
Engineering



I will discuss in this paper what I've been doing and what I intend on doing for this summer research. This is by no means a paper that focuses on the technical aspects of my research. Due to the nature of the research that I've been able to accomplish so far, I have not been able to come up with a constructive article that discusses the nuts and bolts of my research. I intend to do that once I get results that actually show some promise.

Dr. Vijay Singh's research team has for the last few years been working on a variety of photovoltaic prototypes to harness solar power more efficiently. These devices can be broadly classified into two categories: organic and inorganic solar cells. They both have their own advantages and disadvantages. The efficiencies of inorganic solar cells are much higher than those of organic solar cells. However, the cost of production of organic solar cells is much lower compared to that of inorganic solar cells. This very factor has made research in organic solar cells in the past couple of years a very hot topic of research. From the two categories we can branch out to yet another category of solar cells called the hybrid solar cells. The cells are fabricated using both organic and inorganic materials. In this way, the advantages of both organic

and inorganic solar cells can be obtained to a certain extent. My research involves understanding, fabricating, analyzing, and optimizing such devices.

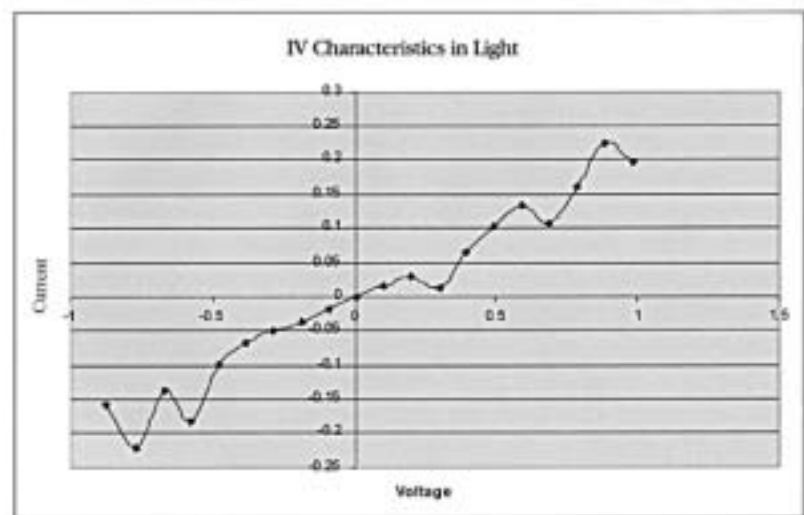
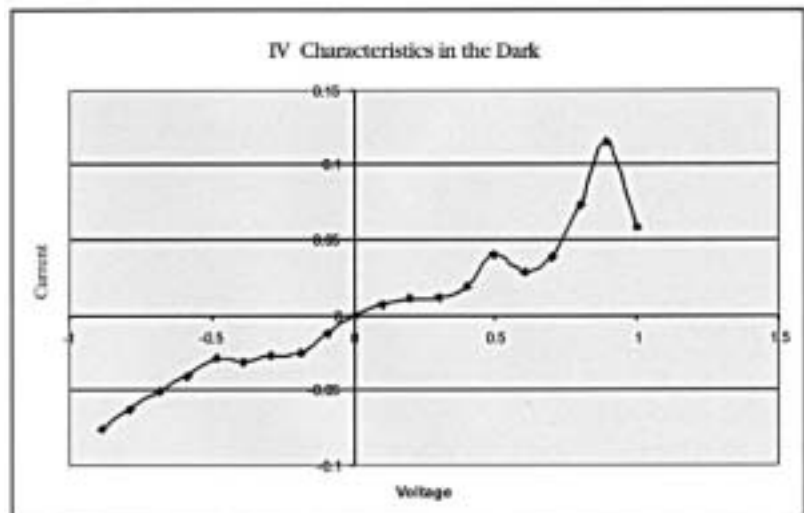
The first month of this research involved me being trained for various procedures and how to use various equipment. I also got a chance to participate in meetings in which the team brainstormed different novel ideas to come up with various different approaches to understand and build better devices. The second month involved fabricating devices that have in the past given desirable results. The goal of redoing the same process is to help optimize the performance of the devices by tweaking the device parameters.

The ITO layer of the device is a transparent layer that acts as a window material. It basically allows light to pass through it and at the same time release electrons. When the photons hit the CuPC layer, excitons in that layer are broken into individual components, which recombine after they travel a certain distance. Energy can be harnessed from these excitons. The thickness of the different layers is a particularly important parameter that can be used to enhance the efficiency of the devices. This research team currently holds a world record for organic devices producing the highest voltage from solar power. The drawback to such a device is, however, the extremely low current values. My present research includes work on the same device to enhance the values of current without having to compromise on the voltage values.

For the past several weeks, I've been plagued by technical glitches and difficulties with the equipment I have been working on as well as results that have been far from acceptable. The data from one device is shown here. The Current-Voltage characteristic curves clearly show that the devices I fabricated are all short circuited somehow. I have been trying to troubleshoot this problem alone for the last several weeks. I am hoping to find the reason and rectify things in order to get more desirable results in the near future.

As a part of the research, we also read all of the latest papers that are published in professional journals, to be able to keep ourselves abreast of the latest happenings in the same field of research.

I hope to learn and contribute toward something that so obviously is an urgent necessity in such demanding times for energy. Solar energy is what I very definitely see as something that will soon provide a viable alternative to fossil fuels and I would like to use my experience in this field of photovoltaics to the fullest extent.



## The Future of LEDs is Looking Bright: A Study on the Adaptation of Light Emitting Diodes to be Incorporated into Custom-Designed Lighting.

**Kate E. Obenour**  
**Engineering**



The nature of my research has focused on the efficiency of Light Emitting Diodes (LEDs) and how they can be adapted to the decorative lighting industry to create marketable custom-designed lighting. LEDs were once merely found in flashlights, cell phones, and traffic lights, but are now being adapted to countless other applications. Among their impressive characteristics are their efficiency and color availability. These tiny bulbs pack a long life (think 10,000-100,000 hours) while producing very little heat. Available in over 10 different colors with the ability to create color gradations, they are becoming

# Summer Research and Creativity Grants (CONT.)

the next big thing in the world of lighting design.

With style, construction, efficiency, and cost in mind, I first began examining the past of LEDs. Among the information that I collected, I found that their applications have been relatively limited due to the high price of semiconductors (a key component of the bulb) as well as the limitations within the bulb itself. Its narrow degree of illumination poses a large problem in trying to incorporate LEDs into the world of task, ambient, and general lighting. After gaining a good understanding of the past of LEDs, I furthered my research in the area of what the current and future development of LEDs is and will be. After reading case studies, periodicals, and analyzing current lighting design trends, I was truly able to determine how I am to create stylish, marketable, unique, and most of all efficient fixtures for the consumer using LED technology.

As I begin the design phase of two fixtures that I will construct, I hope to be able to manipulate LEDs in two very different ways. Though both fixtures will be practical and dynamic, the concepts behind the designs are very different. The first fixture will be designed with the concept of subtlety through light transmission and a sculptural quality in mind. With the help of a rheostat and varying bulb colors, an ambient glow will result. This relaxing glow will further be enhanced through the embedment of LEDs creating a state of translucence. The second fixture will be a mirror of the first in that it will convey a bolder message through the use of strong graphics and colors. The fixture will take on a more severe look with the employment of blue and white bulbs positioned in a more direct manner. With the extent of my research as well as the conceptual designs I have thus far, I am confident that my findings will speak loudly for the future of LEDs and lighting design.

## Desiccation Tolerance in a Tropical Rain Forest Nonvascular Plant

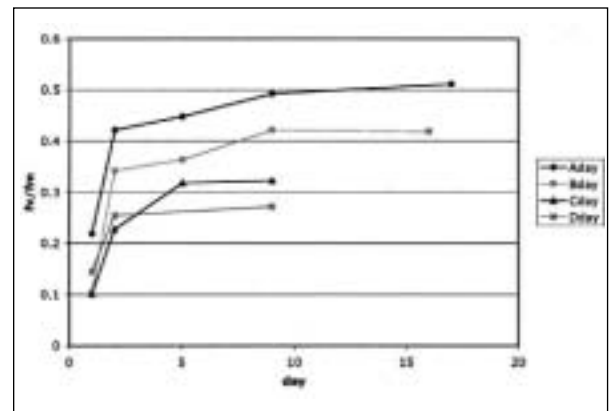


### Lauren Reynolds Biology and Chemistry

Most of the research on drought tolerant nonvascular plants is understandably done on species found in deserts. However, even in moist environments, there exist dry microhabitats. For example, the epiphyte plants, which can become extremely dry after rain-water evaporates. The focus of this study is on nonvascular plants that grow on the leaves of vascular plants. This specialized form of epiphytes is known as epiphylls. The goal

of this study is to test the length of recovery from desiccation of epiphylls under natural and artificial conditions. While in Trinidad, two different species of epiphylls from two different sites were collected and artificially dried. Their recovery was then recorded with a portable Fluorometer over a period of about two weeks. The results for each of the epiphylls showed a steady recovery over time.

**Figure 1: Shows the plants recovering from being dried for 1(Aday), 2(Bday), 4(Cday) and 8(dday) days and the recovery over a period of several days.**



The recorded results have not been completely analyzed. Compared to the desert moss I am working with that recovers in 72 hours, the epiphylls appear to not be quite as desiccant tolerant.

## Documenting the Basque Diaspora to Argentina

### Eric Rickert Travel



During my third year of study at UK, I spent six months living in San Sebastian, Spain, studying Spanish Basque culture and learning the Basque language. A sizeable chunk of my free time went to photographing my surroundings in an attempt to document a Western culture frequently overlooked in the bigger picture.

My time in Argentina is an extension of this documentary project. There is an interesting channel between the Basque country and Argentina: during the dictatorship of Francesco Franco throughout the latter half of the twentieth century, many Basques fled to Argentina as a means of escaping a government that forced them to silence their language and hide their customs behind closed doors. They chose

Argentina for its European leanings and its similarities to the Spanish state.

I went to Argentina to see if a Basque culture still thrives there the way it does in Europe, to see if the Basques who emigrated still fiercely protect their heritage. I wanted to see if they existed as a pocket of the larger culture, I wanted to see if they had any influence on the broader South American lifestyle.

## **An Examination of the Print Zine within Libraries and Academia**

**Shanna Sanders and Patrick Smith**

### **English**

According to the America Library Association's Bill of Rights, library resources are intended to serve for the enlightenment of everyone within a community. In order for a library to do this "materials should not be excluded because of the origin, background, or views of those contributing to their creation" and librarians should strive to provide their patrons with "materials and information presenting all points of view on current and historical issues." While librarians try their best to uphold these standards, some materials are often excluded from library collections. One such class of excluded materials is collectively known as "zines." These self-published magazines are typically products of disaffected youth, awkward individuals, and members of radical subcultures. They cover a wide-range of topics from science-fiction to anarchism. Although zines have been produced since the 1930s, they are quite difficult for librarians to obtain due to their idiosyncratic nature and small print runs, and even more difficult to catalog, because they often do not contain the information (place of publication, author's name, ISBN number) upon which library catalogs generally rely.

Despite the difficulties involved in obtaining and cataloging zines, their inclusion in UK's libraries would provide researchers with access to important, unique materials. Although zines are by and large a non-academic medium, they can still serve as great resources to the academic community as primary sources within a multitude of disciplines. Zine authors often publish first-hand accounts ranging from experiences with incest and rape to the individuals'



relationship with a particular geographic region. Documents such as these are invaluable to research performed in the humanities and social sciences, because they allow researchers direct access to the ideas of groups within society that are underrepresented or distorted in the mainstream media. A collection of this nature would be a great distinction to add to UK's library system, because it would make UK one of only a handful of libraries in the nation, either academic or public, with a zine collection. But most importantly, adding a collection of this controversial medium would help us as a university address the questions of what constitutes a valid academic source, who owns the information we consume, and who is considered an expert in this supposedly technocratic era.

Our research will be focused on developing a system for cataloging, preserving, and maintaining a zine collection at UK. We will achieve this by traveling to New York City to visit Barnard College, the New York Public Library, and ABC NO Rio to explore the zine collections at these institutions and interview the librarians who manage them. We will also travel to Portland, OR in August for the annual zine symposium at Portland State University, where we will be able to meet prominent members of the zine community and investigate ways for obtaining materials for the zine collection. The information and materials gathered during these trips will be used in meetings with members of the University's Special Collections Department in order to determine the feasibility of a zine collection at the university. Furthermore, if a zine collection is created within UK's library system, our research will be helpful in determining where the zine collection will be placed, how the materials will be cataloged and preserved, and how to go about building and promoting the collection.

After the report above was written, it was decided that a Zine Library will be located in the Breckenridge Room of the King Library.

## **Effects of Story Mapping on Story Comprehension of Children with ADHD**

**Sarah C. Sanderson**

### **Psychology and Family Studies**

Children with attention deficit hyperactivity disorder (ADHD) have significant academic problems, including difficulties effectively comprehending stories. Our research group has identified four areas of story comprehen-



## Summer Research and Creativity Grants (CONT.)

sion impairment common in children with ADHD: 1) difficulty understanding the causal relations among story events, which appear to be related to problems in sustaining cognitive engagement; 2) difficulty using the goal structure of a story to build a coherent story representation; 3) difficulty recognizing the important information in a story and using this information to guide recall; and 4) difficulty making inferences about story information and monitoring ongoing understanding of the story.

Although there are many types of medication that help a child to control ADHD, these treatments do little to improve the poor story comprehension that plagues these children's scholastic endeavors. My current research tests the effectiveness of story-mapping as a method of enhancing the ability of children with ADHD to understand and recall stories. Story mapping is a procedure employed in the educational field to help children learn to recognize the important events in a story, as well as the main characters' goals and how these goals may be thwarted or realized. We are testing the hypothesis that training children with ADHD in the story-mapping technique will help these children recall and understand more information from stories to which they are exposed.

Right now, I am still in the beginning phases of my research, because it will be a year-long project under Drs. Milich and Lorch in the psychology department. I am currently reading background articles on similar studies that will supplement and guide my own research. Supplemental articles are important for me in understanding more about ADHD, what other kinds of treatments are in use, and how the story-mapping procedure may address the specific problems children with ADHD experience in story comprehension.

The experiment is a 2x2x2 mixed design, with the between factors of diagnostic group (ADHD vs. comparison) and training condition (story mapping vs. studying), and the between factor of time (pre vs. post assessment). The participants are children between the ages of 9 and 13, who are randomly assigned to a studying or story-mapping condition. In the experimental procedure, all children listen to a story on an audio-recording and then recall as much of the story as they can. Next, children in the studying condition are given materials with which to study the story, whereas the other children are trained in the story-mapping procedure. After this, the children once again recall the story. After a distracter task, the generalization phase begins in which the children listen to a story different from the first one and then recall it. All children are then given materials with which to study again, including the story-mapping

worksheet. After an allotted amount of time, the children are again asked to recall the second story. The primary measure in the study is how much of each story the children recall.

My current activities include being trained in the experimental protocol so that I can administer it myself. I will also be working on becoming reliable in coding the children's story recalls. In addition, I will be devising criteria with which to do my own coding, with a special emphasis on developing coding systems for the children's behaviors during the story-mapping procedure. These criteria will allow my research to move in a separate direction from questions that have been previously explored. It is our hope that the story-mapping training will increase the comprehension of the stories, and will help to close the gap between the children with ADHD and the comparison group.

### Effect of E1 Allele on Reproductive Development in Glycine Max

#### Daniel Sheffler Agriculture

The control of flowering time is one of the most important properties governing geographic distribution of crop plants. Studies on the economically important soybean crop have found that a series of genes known as the E-gene series are important in the control of the flowering response in soybeans.

Among the E genes, the E1 gene has been found to have the greatest impact on soybean phenology.

The time from vegetative development to flowering can be broken down into four phases: a photoperiod insensitive pre-inductive phase, a photoperiod sensitive inductive phase, a photoperiod sensitive floral development phase, and a photoperiod insensitive floral development phase. The objective of this study is to investigate the role of the E1 gene in how soybeans transition from vegetative to reproductive development.

Two near isogenic lines that differ for the allele at the E1 locus were grown in a reciprocal transfer experiment under short and long day conditions. The plants were observed throughout early development to determine the difference between dominant and recessive E1 alleles in terms of the juvenile period, time to floral induction and floral development, and



the differential response to photoperiod. The pre-inductive phase is identical for the two alleles and under both photoperiods. Under the long-day treatment, both floral induction and development appear to be delayed by the dominant E1 allele.

## Gene Function in Adult Skeletal Muscle

**Peter S. Wulff**

### Biology

My Summer Research and Creativity Grant was spent in a lab that studies skeletal muscle. The long-term goal of this research project is to study gene function in adult skeletal muscle. The specific project developed over this summer is to have the ability to selectively knock-out (delete) a gene, in *Mus musculus* (the common mouse) only in skeletal muscle. To achieve this goal, the use of a recombinase (an enzyme that removes a segment of DNA) was necessary. However, the expression of the recombinase needs to be skeletal muscle-specific and able to be controlled temporally. Temporal expression is important because deleting a gene during development might be lethal. However, if done during adulthood, insight into gene function may be gained.

First, two strains of transgenic mice were obtained and bred together. One of the strains has a transgene that expresses rtTA (reverse tetracycline transactivator). rtTA is a molecule that is active only when bound by the drug doxycycline. This transgene is only expressed in the skeletal muscle because it is being driven by the muscle specific promoter Mck (muscle creatine kinase). The second strain of mouse contains a transgene that expresses Cre-recombinase only when in the presence of active rtTA. Thus, whenever expression of Cre-recombinase is wanted in these double transgenic mice, it can be induced via doxycycline. After these mice were generated, the presence of both transgenes was confirmed by genotyping. DNA was extracted and isolated from a small segment of tissue snipped from the tip of the tail.

The genotyping consisted of a Polymerase Chain Reaction (PCR) using the genomic DNA from the tail snip and primers designed to recognize both transgenes. PCR product was then run out on an agarose gel using a technique called electrophoresis. Electrophoresis is a method that relies on electrical current to separate DNA fragments by mass (indicating the number of nucleotide base pairs).



The transgenes Mck-rtTA and TetO-Cre-recombinase had bands from the PCR electrophoresis at 402 bp and 199 bp respectively. This was evidence that a new generation of mice containing both transgenes was created.

To confirm that this double transgenic system will actually knock-out a gene only in skeletal muscle when fed doxycycline, these mice were bred against ROSA transgenic mice. The ROSA mouse contains a stop codon that is upstream from the LacZ gene. The stop codon in the ROSA mouse is between two DNA fragments that are recognized by Cre-recombinase. In theory, the Cre-recombinase should loop out the stop codon and allow expression of the LacZ gene. LacZ drives expression of b-galactosidase. When tissue containing b-galactosidase is stained with X-gal solution, it should stain blue. To date, there has been only preliminary data with the latest generation of transgenic mice. Unfortunately, there was no blue in the skeletal muscle as predicted. However, further genotyping of the triple transgenic mouse revealed there were no flanking markers in the ROSA mouse. Therefore, we received the wrong strain of ROSA mouse and will need to breed our double transgenic mouse against the correct ROSA strain. Further testing will use Western Blot analysis to confirm the enzyme Cre-recombinase is being expressed only in skeletal muscle after activation by doxycycline.

If this double transgenic systems works well, it will serve as a tool for the investigation of gene function in adult skeletal muscle. One future project utilizing this new mouse system will be to study the function of the gene *c-myc* in skeletal muscle hypertrophy. After deleting *c-myc*, the mice will be subjected to normal growth stimulus. If no growth occurs, it can be inferred that *c-myc* is necessary for skeletal muscle growth. The mice generated this summer will be an invaluable tool for the study of skeletal muscle.

# UK Undergraduate Research Program

*The UK Undergraduate Research Program (UKURP) provides undergraduates, especially first- and second-year students, with the opportunity to identify and connect with faculty members who are seeking undergraduates to work with them on their scholarly projects. Projects are available in all disciplines and require varying levels of experience and sophistication. More information is available at <<http://www.uky.edu/EUREKA/UKURP/index.php>>.*

*Students who are actively engaged in a mentored scholarly research project through UKURP and who are spending an average of approximately ten hours per week on that project are eligible to register for a research methods course taught each spring. The final project in that course is for the student to prepare an abstract of his or her research. The following are samples of those abstracts from the spring semester, 2006, class.*

## Determining the Effects of Race and Gender on the Persuasive Power of Confrontation

Kathryn Braun

**Faculty Mentor: Margo J. Monteith, Professor, Department of Psychology**

Although the extent of explicit prejudice and overt acts of discrimination toward members of minority groups has decreased over the last few decades, subtle, implicit biases still remain deeply imbedded in our subconscious. An explicit prejudice is an opinion of a group of people that is openly expressed by the individual who holds the attitude; an implicit bias is a preference or inclination that is expressed without a conscious effort or intention by the individual. For social psychologists, the prejudices and biases studied are mostly negative ones held against groups to which an individual does not belong. Many social psychologists are focusing their research on creating and implementing techniques to get at the biases that individuals are unaware they hold, in order to reduce them. In Dr. Margo Monteith's lab, the effectiveness of confrontation as a tool to reduce bias has been explored in various ways. In these studies, a confrontation is constructed by creating a situation in which participants' prejudiced responses



are recognized by others and then pointed out to the participants who gave them.

The study in which I am currently involved attempts to tease apart the effects of race and gender on the persuasiveness of a confronter. My role in this experiment has been to elaborate upon the materials used in a similar experiment to fit the current research question and to administer the experiment to participants. Through the use of manipulated editorials given to participants, and questionnaires that record the participants' reactions, we hope to understand what characteristics make the most persuasive confronter. Each editorial's narrative provides a confrontation in which the reader is told he/she is the reason why racial or gender prejudices still exist. Different participants in this study were given different editorials. Specifically, the pictured author is varied so that participants believe the author of the editorial is a white male, white female, black male, or black female. Participants' responses will be evaluated to see if the race and/or gender of the pictured individual affected the effectiveness of the confrontation.

The results will likely illustrate that being a member of a target (minority) group reduces the effectiveness of the confrontation, and the individual providing the confrontation will likely be dismissed as a complainer. Several studies have illustrated this effect in the past, but this study further explores whether belonging to the specific target group being discriminated against or discussed is the cause for the reduced persuasiveness. At the conclusion of the data analysis, we may see that being a member of any target group reduces persuasiveness. For example, a white female may be viewed as less persuasive than a white male even when the white female is confronting about racial discrimination, an issue that she does not have a personal stake in because she is not black. With the results of this study, we hope to be able to establish an effective model for confrontations by any individual, in the hope of someday reducing the expression of prejudice no matter how subtle or subconsciously rooted.

## Hypertension

Casaundra Cox

**Mentor: Jeffrey Osborn, Professor, Department of Biological Sciences**

Hypertension, or high blood pressure, is a common and potentially harmful condition among people today. As a lab assistant, I am studying hypertension in rats. The rats are on different sodium diets to show the effects of high and low sodium intake. After a few weeks, the kidneys of some of the rats are bilaterally denervated. In this process, all the nerves connected to the main artery to the kidney are removed in hopes to reduce blood pressure. We perform a sham procedure on the control group, which consists of opening and exposing the organ,



*Casaundra Cox with her Undergraduate Showcase of Scholars Poster*

leaving it exposed for approximately the same amount of time as the denervation, and suturing it back up. This procedure is used in order to show that it was not the exposure of the kidney that led to reduced blood pressure, but the actual denervation itself. After the denervations, the blood pressures are monitored on both denervated and sham rats. Furthermore, the rat's hypothalamus gland will be extracted and tested to see if anything else was affected. Data from this experiment is still being collected.

The research that I participated in last year was a magnificent experience. The lab experience taught me the importance research has in developing improvements in patients with hypertension. I have learned a great deal about how research is performed in a laboratory setting. My previous lab experience was non-existent. Dr. Jeff Osborn took me under his wing as a new student. He helped me understand biology concepts and how the kidneys affect hypertension, through our research performed on lab rats. The people in the lab were so helpful in assisting me with the daily protocols such as obtaining blood pressures, and pre- and post-surgical procedures.

I feel this experience will be one that I will cherish for the rest of my life. I have developed skills, friends, and knowledge through this program. I believe this would not have been possible without the assistance of AMSTEMM, Dr. Osborn, the graduate students, and Dr. Tannenbaum. Every student should have the opportunity to participate in one form of research. The knowledge you obtain will assist in your career path. Trust me you will not regret it.

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## Does Accounting Work Experience Affect Students' Goals and Attitudes Toward Money?

**Brandon Edwards**

**Faculty Mentor: Dan Stone, Gatton Endowed Chair, School of Accountancy**



Work experience often changes young adults. It is a chance to grow intellectually and professionally. In college, many students gain career oriented work experience through internships. My research along with Prof. Dan Stone involved exploring a few of the many changes that young adults undergo during internship. Our focus during the course of this study was accounting internships and do they change a student's goals and attitudes toward money.

We predicted that after accounting students finished an internship they would perceive money as more important than they did prior to internship. We made this prediction based on the fact that many people enter the accounting profession because accountants are paid well. That being said, we can assume that once they receive temporary financial rewards, i.e., internship, they will continue to desire more money. We also predicted that accounting students' goals would decrease. These goals were all related to self-acceptance, self-affiliation, and community. We thought that these goals would decrease because increasing extrinsic goals, i.e., the desire to gain wealth, often negatively affect intrinsic goals, i.e., attainment of things that hold no monetary values.

We collected data using a survey asking a series of questions concerning the student's goals, the likelihood of obtaining those goals, and financial measures. Each of the main concerns of study were given as sub-categories. Student goals and the likelihood of obtaining those goals were given the following sub-categories: self-acceptance, self-affiliation, community, and financial. Financial measures had a different set of categories: perception of money as power, financial anxiety, financial self-efficacy — the belief that one can manage her or his money efficiently — and materialism. For each sub-category, there was a group of questions that measured these categories. We administered surveys before and after internship. Both surveys contained the same questions measuring the same categories previously mentioned. Each item on the survey asked the student to measure a statement using a scale from one to ten, with one equaling absolutely disagree and ten equaling absolutely agree. We then used t-tests to analyze the statistical data.

At the conclusion of the study, the evidence suggests that there is no change in the students' attitudes toward money or their goals. However, the sample size for this study was fairly small. The results could be possibly differ if we used a larger sample size.

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## A New Mouse Model to Study Gene Function in Adult Skeletal Muscle

**Peter S. Wulff**

**Mentor: Karyn Esser, Associate Professor, Department of Physiology**

For an abstract of Peter's research, see his report under Summer Research and Creativity Awards on page 99.





# Undergraduate Research and Travel Fund

*eUreKa!* offers undergraduate students a limited amount of travel support. The purpose of these funds is to help students gain experience in showcasing their work at and participating in professional conferences on a national and international scale. Keep in mind that research takes place in many different forms and in all disciplines. The study of social problems, the creation of a piece of fiction or poetry, the study of a scientific theory or a historic period of time, and the solution of engineering and mathematical problems all qualify as research, among many other activities.

Students may apply for travel scholarships to attend national, international, and professional conferences or competitions within the United States and abroad. To be eligible, a student must:

- be a full-time undergraduate student at the University of Kentucky
- have a faculty sponsor
- be registered for the conference or competition
- present (i.e., paper, poster, research, performance) and/or participate (orally).

Two of the students whose travel was supported during 2005-2006 are highlighted here.

## Lucca Music Festival, Lucca, Italy

**Kristen Kline**

**Violin Performance Major**

I participated in the Lucca Music Festival in Lucca, Italy from June 10 to July 16, 2006. I performed in Chamber Music, the concert orchestra, and the opera orchestra. I also took an advanced Italian language course. I was constantly surrounded by other musicians and teachers. My immersion in this intensive summer program helped me to grow musically and to develop better discipline habits.



## Cast Iron Workshops March-April 2006

Walter Early

### Art

The Ironbridge Open Air Museum of Steel Sculpture invited me to take part in an iron-casting workshop in March of 2006 in preparation for the 5th International Conference on Contemporary Cast Iron Art held at the Ironbridge Gorge World Heritage Site, United Kingdom. The main object of this workshop was to complete seven large-scale sculptures to be placed in an outdoor exhibition in association with the Conference. Artists from four different countries were invited to produce works of art. This group of artists and their assistants was made up of professors, professional artists, one Masters candidate, and me.

Each artist came to the workshop prepared with only a drawing or maquette. Within two weeks we had all seven pieces finished and installed at the exhibition site. All of the sculptures required multiple, complex iron castings, most mechanically fastened to other castings and/or fabricated steel superstructures. Each artist's pattern was subjected to a multi-part resin-bonded sand mold being taken from it, and then cast. The final object was cleared of any remaining mold residue and flashing, attached to the appropriate sculpture and patinaed on the Museum grounds. All the steel fabrication was also done on site.



During the workshop we installed two sculptures on the Museum's grounds as part of its permanent collection. Some of the artists and their assistants produced sculpture on a smaller scale as part of another conference exhibition entitled Iron 2006 held at the Museum of Iron in Ironbridge, UK. I chose to include one of my works as part of this exhibition.

This particular piece dove into the geological and social similarities between the Ironbridge Gorge and my birthplace in Southeastern Kentucky. Since my first visit to the area, I immediately understood why immigrants from that part of

the world decided to settle in what I consider my part. My sculpture deals with the similarities of living in the landscape and being susceptible to its changes, in particular the rise and fall of the nearest body of water, more specifically when that body floods. At the time I made the sculpture, and fortunately while it was on display, the River Severn, which establishes the Gorge, had risen enough to illustrate my point in real life. My sculpture, entitled *Grab the Baby*, currently resides 50 kilometers away at Stanford Contemporary Arts in Stanford on the Vale, UK; part of England's lake district.

The Museum's iron furnace was a featured part of the Conference. Throughout the Conference week, the Museum's guests continued to make small-scale sculpture and we hosted two exhibition Iron Pours. For those artists working with limited means, the Museum also hosted a presentation of an alternative to a time consuming, laborious process.

Instead of investing wax patterns in a luto mold and spending days wasting precious time and gas evacuating the wax and curing the mold; patterns are invested in resin-bonded sand along with electrical elements. Once the mold cures (this takes hours instead of days) the elements are plugged into a domestic outlet. They are left plugged in for 24 hours. This is enough time to properly evacuate the wax and sufficiently preheat the mold in preparation for casting. So, instead of a week-long process, the "Electromelt" does the job in a matter of hours.

My participation in this event was thanks to a student travel grant through the eUreKa! program. I will be returning to the Museum of Steel Sculpture with three others this July to dismantle the outdoor exhibition and host four weeks of iron-casting workshops.



# Undergraduate Awards and Honors

## Beckman Scholarship

**Megan R. Culler**  
**Kathryn Schweri**

Recipients for 2006-2007. Established in 1987, The Beckman Scholars Program is an invited program for accredited universities and four-year colleges in the US. It provides scholarships that contribute significantly to advancing the education, research training, and personal development of selected students in chemistry, biochemistry, and the biological and medical sciences. The sustained, in-depth undergraduate research experiences and comprehensive faculty mentoring are unique in terms of program scope, content, and level of scholarship awards. (\$19,300 for two summers and one academic year. (See pages 83-87 for reports from this year's Beckman Scholars)



*Megan R. Culler*



*Kathryn Schweri*

## Goldwater Scholarship

**Elizabeth Scoville**

A UK junior, majoring in Agricultural Biotechnology and Chemistry won a Barry M. Goldwater Scholarship worth \$7,500. Elizabeth was one of 323 students selected from a field of 1,081 mathematics, science, and engineering students. The recipients were selected on the basis of academic merit nationwide. The scholarship covers expenses for tuition, fees, books, and room and board up to a maximum of \$7,500. Elizabeth submitted an essay on manufacturing natural host defense proteins for use as therapeutic agents, and their potential to reduce the need for traditional chemotherapeutic agents such as antibiotics.



*Elizabeth Scoville*

## Jack Kent Cooke Foundation Graduate Scholarship

**Yuriy S. Bronshteyn**

Yuriy Bronshteyn is the second UK recipient of the Jack Kent Cooke scholarship award, one of the largest and most prestigious scholarships in the U.S. A chemistry major, Yuriy will use the scholarship to pursue an MD/PhD degree at Vanderbilt University, in Nashville, Tennessee. Seventy seven students were chosen out of a nationwide pool of 1,079 applications. Each award covers a portion of educational expenses, including tuition, living expenses, required fees, and books for the graduate degree chosen. The amount and duration of awards vary by student based on the cost of attendance and the length of the graduate program as well as other scholarships or grants received. The maximum available per student per year of study is \$50,000, and the maximum length is six years. The Jack Kent Cooke Foundation is a private, independent foundation established in 2000 through the will of Jack Kent Cooke. When he died on April 6, 1997, Mr. Cooke left most of his fortune to establish the Foundation. The mission of the Jack Kent Cooke Foundation is to help young people of exceptional promise reach their full potential.



*Yuriy S.*

*Bronshteyn*

## 2005 Otis A. Singletary Outstanding Senior Award

**Monica Hobson**

This award is presented to graduating students who have demonstrated superior leadership, academics, and service to the community. UK faculty members decided to begin the award for graduating seniors. They named the award after former UK president, Otis A. Singletary.



## Astronaut Scholarship for Research

**Ryan Fischer**

Ryan Fischer, a double major in Agricultural biotechnology and biology, was 1 of only 18 astronaut scholars named and awarded a \$10,000 scholarship by the Astronaut Scholarship foundation (ASF). The scholarship is presented to dynamic undergraduates or graduate students who exhibit motivation, imagination, and exceptional performance in the fields of science and engineering. Ryan plans to pursue his studies in the area of health sciences after graduation in 2007.



The money will be used to attend graduate or medical school. His ultimate goal is to be involved in cutting-edge biomedical research and to become a practicing physician/surgeon. ASF honors students whose talent foreshadows a career leading to advancement of scientific knowledge and technology. Established by the original astronauts in 1984, the foundation has grown to include more than 50 astronauts from the Gemini, Apollo, and Shuttle programs. The foundation is dedicated to helping the U.S. retain its world leadership in science and technology by providing scholarships to students pursuing careers in those fields.

## COLLEGE OF AGRICULTURE

### Department of Biosystems and Agricultural Engineering

**Grant Wonderlich**

Monetary award given to the highest achieving Biosystems & Agricultural Engineering Student

**Frank Woeste Award**

### Family & Consumer Sciences

**Monica Leigh Hobson**

**Daniel Stephen Turner**

**Sullivan Award**

The Algernon Sydney Sullivan Award is an annual award presented to an undergraduate male and female at graduation in recognition of their community service activities. Daniel Stephen Turner of Kevil, Kentucky, (Ballard County), was selected for his extraordinary commitment to community service as a leader in UK's Honors Program and as president of the Phi Delta Theta fraternity, while also spending summers teaching disadvantaged children. Monica Leigh Hobson of Hi Hat, Kentucky, (Floyd County), a member of the second graduating class in UK's Robinson Scholars Program, served as a mentor to other Robinson Scholars and as a student ambassador for the College of Arts and Sciences, while also working closely with children and their families during two internships with the Floyd County Family Court.

The Sullivan Awards were established by the New York Southern Society in 1925 in memory of Mr. Algernon Sydney Sullivan, a southerner who became a prominent lawyer, businessman, and philanthropist in New York in the late nineteenth century. The award seeks to perpetuate the excellence of character and humanitarian service of Mr. Sullivan by recognizing and honoring such qualities in others and demonstrating the spirit of love for helpfulness to other men and women through their heart, mind, and conduct. The first medallion was presented in June, 1925, at the George Peabody College for Teachers in Nashville, Tennessee, now a part of Vanderbilt University. The University of Kentucky is one of several southern universities that present the Algernon Sydney Sullivan award — sponsored by the Algernon Sydney Sullivan Foundation.

## COLLEGE OF ARTS AND SCIENCES

### Department of Biology

Erin Wyatt (Class of 06)

American Physiological Society

Aaron Fain (Class of 07)

Summer Research Fellowship

Erin Wyatt and Aaron Fain both received The American Physiological Society (APS) Undergraduate Summer Research Fellowships program for the summer of 2005 from a pool of 200 applicants nationally and internationally. The program funds 12 fellowships each summer and awards each student a \$3,000 stipend (10 week's support) and an unrestricted \$300 grant to the faculty sponsor/advisor. Student awardees also receive a travel grant (\$1,000 maximum) to allow them to present their research data at the following year's APS annual meeting (Experimental Biology 2006) or a 2006 APS fall Conference. These fellowships support full-time undergraduate students to work in the laboratory of an established investigator. The intent of this program is to excite and encourage students to pursue a career as a basic research scientist. Selection of participants is based upon academic merit, the perceived quality of the proposed experience, and the availability of appropriate faculty mentors. Special consideration is given to applicants whose socioeconomic background, access to educational opportunities, and other life experiences suggest that they would especially benefit from this type of program.

### Department of Geological Sciences

John Wesley Buchanan

Tarr Award

A National award presented to an Outstanding Senior Geology student for high academic and service accomplishments in the department. The recipient receives the Geology Hammer.

Travis Richards

Pirtle Scholarship

A \$1000 cash award to the academically outstanding junior Geology Major.

### Department of Political Science

Suneet Gautan

Second place in the

Bryan Gort

Franklin Shirley Invitational Debate Competition

Suneet Gautan and Bryan Gort, both freshman and political science majors, placed second in the novice division at the Franklin Shirley Invitational debate competition held at Wake Forest in November of 2005. Typically the team consists of 8-12 debaters. They spend between 20-25 hours a week preparing and practicing for competitions. A debate topic is chosen at the beginning of the season (August-April), and the year is spent researching and fine tuning their arguments. This year's topic was based on the U.S. Government's policies toward China. Traditionally, UK has a long history of successful debaters. Its first team formed in the 1930s but didn't begin competing until 1948.

Jamie Brown

Judicial Intern at the U.S. Supreme Court

Jamie Brown, a junior majoring in political science, was the first UK undergraduate in over 30 years to be selected as a judicial intern at the United States Supreme Court. The Judicial Intern Program provides advanced undergraduates a unique opportunity to work in the Office of the Administrative Assistant to the Chief Justice. Responsibilities of

this office are to assist the chief justice of the U.S. in his overall management of the Supreme Court and to serve as a liaison for the chief justice within the federal judiciary and also the executive and legislative branches. In addition, the office assists the chief justice in his ceremonial duties and provides background materials and research for his public addresses and publications.

### Department of Sociology

Laura Barry Calloway

Coleman Award

The Coleman Award is presented at the end of each spring semester to a graduating senior and carries a certificate and cash prize. Professor Coleman (1913-1995) was a long-time faculty member in the Sociology Department at UK and was particularly concerned with instructional activities. He conducted groundbreaking research on the diffusion of agricultural technology and promoted the cause of civil rights in Kentucky and the south. The selection process is based on scholarship, leadership, and involvement in sociological activities in research. Eligibility requires nomination by a faculty member or student, a GPA of 3.50, and submission of an application and example of an independent research project or course paper from a sociology course.

## COLLEGE OF BUSINESS AND ECONOMICS

### Department of Economics

Terry J Clayton

Adelstein Award

The Adelstein Award is named for the late Carols S. Adelstein, wife of retired UK English professor Michael Adelstein. Carol, who used a wheelchair because of polio, was an inspiration to persons with disabilities by leading a meaningful, successful life at a time when individuals with disabilities were not encouraged to be independent and contributing members of society. The Adelstein Award is given by the UK Disability Resource Center to students with disabilities who are inspirations to others.



Terry J Clayton

## COLLEGE OF COMMUNICATIONS AND INFORMATION STUDIES

### School of Journalism and Telecommunications

Team Members:

Student Advertising Team Finishes

Brittany Clark, Glenn Goodman,

Among the Top in the Nation

Ryan McCorry, Amanda Parrish,

Aimee Smith

UK's 5-person Integrated Strategic communications (ISC) team took 9th place honors over 16 other district team winners in the American Advertising Federation National Student Advertising Competition in San Francisco, CA, June 13, 2006. More than 6,500 students at 215 colleges and universities participated in the challenge to develop a strategic communications campaign for Postal Vault, a curbside locking mailbox designed for home use. Judges praised UK for being the only team among the finalists to recommend the use of radio. Considered to be the premier student advertising competition in the nation, the NSAC has become the proving ground for 80,000 students who have participated and an imperative for an increasing number of ad industry recruiters seeking new talent.

Brittany Clark, Glenn Goodman,

1st Place Winners American

Ryan McCorry, Amanda Parrish,

Advertising Federation Student

Aimee Smith, Danielle Cause,

Advertising District Competition

Andrea Coates, Angeline Durbin,

Jocelyn Eve, Kyle Fertig,

Heather Finocchio, Rachel Kirkwood,

Joanna McLean, Sara Poots,

Jacqueline Ridge, Brittney Riley,

Laurie Schulte, Nicole Stinson,

Christy Studer, Jenny Wells

The American Advertising Federation Student Advertising Competition is the premier college advertising competition. It provides more than 3,000 college students with real-world experience by requiring a strategic advertising/marketing/media campaign for a corporate sponsor. Schools from each district are selected to present their campaigns to a panel of industry executives at the AAF National Conference.

# Undergraduate Awards and Honors (CONT.)

## School of Journalism and Telecommunications

**Amanda Duckworth** 1st UK Student to Win Joe Hirsch Scholarship



**Amanda Duckworth**

A senior journalism major, Amanda Duckworth, is the first UK recipient of the Joe Hirsch Scholarship. The Hirsch Scholarship pays full tuition for the 2005-2006 academic year and includes an internship. Amanda hopes to intern with either the *Blood-Horse* or the *Thoroughbred Times*.

Financial support is provided through the National Thoroughbred Racing Association, *Daily Form*, and other industry groups. The scholarship honors the retired columnist of the *Daily Racing Form* after a career of 55 years, Joe Hirsch. Hirsch founded the National Turf Writers' Association and was its first president. He won numerous awards and is the author and co-author of 5 books, including *In the Winners Circle: The Jones Boys of Calumet Farm* and *Kentucky Derby: The Chace of a Lifetime*. He is considered the "dean of Thoroughbred racing writers" and was well-known for his willingness to help journalists new to the racing beat.

**Megan M. Powell**  
**Dustyn N. Bowman**

**James C. Bowling**  
**Scholarships**

The Bowling scholarship is award in conjunction with the James C. Bowling Executive-in-Residence program in the UK School of Journalism and Telecommunications. The scholarship and a lecture series was established through a generous endowment from the late Joseph M. Cullman III, former chairman of the board at Philip Morris. As part of the series, a nationally recognized public relations professional visits the UK campus each year.



**Megan M. Powell**

**Marc K. Blevins,**  
**Jeff Graf,**  
**Jessica Partington,**  
**Renee Storc**

**Chaplin**  
**Scholarships**

The Chaplin Scholarship, named for a popular Lexington radio talk show host, was established in 1998. The scholarship is awarded to incoming freshman and or undergraduate students. The students must be diagnosed with a certified disability, qualify for financial need, declare a pre-major or major in journalism and have 2.8 or higher GPA. Chaplin, remembered most by radio listeners as Herb Oscar Kent, was a radio host for the "The Herb Oscar Kent Show" that ran 25 years on Lexington station WLAP 630 am. The scholarship honors Chaplin, who despite being born with a deformed foot and contracting polio at 6, overcame impairments to have a successful broadcasting career.



**Dustyn N. Bowman**

**Ben Roberts, Adam Sichko,**  
**Ashley Davies,**  
**Crystal Little,**  
**Megan Boehnke,**  
**Tricia Spaulding,**  
**Whitney Watered, Keith Smiley**

**Outstanding**  
**Performances by**  
**UK Students at the Hearst**  
**Writing Competition**

UK had top 20 finishes in 5 of the 6 competitions making up the overall new writing score in the Hearst Journalism Awards Program. Three UK student photographers finished in the top 20 in two of the three separate photo competitions. Ben Roberts placed 1st in Sports writing, while Megan Boehnke took 11<sup>th</sup> place and Keith Smiley also placed in the top 20. Adam Sichko tied for 11<sup>th</sup> place in In-Depth writing and tied for 18<sup>th</sup> place in Personality/Profile Writing. Ashley Davies placed 17<sup>th</sup> in Radio News Feature; Crystal Little took 12<sup>th</sup> place in Feature Writing; Tricia Spaulding was 4<sup>th</sup> in the Picture Story/Series competition and will compete in the national semi-finals; Whitney Waters placed 17<sup>th</sup> in the Picture Story/Series.

The Hearst Journalism Awards Program is presented annually under the auspices of the Association of Schools of Journalism and Mass Communication (ASJMC) with funding by the William Randolph Hearst Foundation. The program's mission is to encourage and support excellence in journalism and journalism education in America's colleges and universities. This is the 43<sup>rd</sup> year of competitions, in which more than \$400,000 in scholarships and grants will be awarded to students and schools. There are six writing, three photojournalism, two radio broadcast news, and two television broadcast news competitions each academic year, beginning in October and ending in April. The monthly competitions honor the top ten winners with awards ranging from \$500 to \$2,000, with the schools receiving matching grants. The competition year culminates in June with the National Writing, Photojournalism and Broadcast News Championships, and is open to selected winning students from the monthly competitions who also received additional awards.

**Papers Accepted from**  
**UK Undergraduates at the Southern**  
**States Communication Association Undergraduate**  
**Honors Conference, Dallas, Texas, April, 2006**

**UK had the largest number of undergraduate papers (20)**  
**accepted at the conference.**

**Katie Arrow**

**Paper Presentation**

"Parent's Marital Relationship: No Difference of Child-Parent Communication"

**Katie Burgbacher**  
**Amanda Brewer**

**Paper Presentation**

"A Study of Adderall Use Among College Students: A New Upcoming Trend"

**Melissa Cowart**

**Paper Presentation**

"Does What You Watch Influence How You Think? The Relationship Between Media Exposure & Political Attitudes"

**Susanna Y. Dailey**

**Paper Presentation**

"What Happened When Harry Met Sally?: Intimate Self-Disclosure and Attraction in Cross-Sex Friendships"

**Erin Kathleen Day**

**Paper Presentation**

"The Effects of Occupational Stress on Marital Self-Disclosure"

**Matt Emery** **Paper Presentation**  
"Perceived Uncertainty in Athletes: Is it Related to Autocracy in Coaches?"

**John Gillispie** **Paper Presentation**  
"Rebel With A Rebel Yell, Raise Hell, We Gon' Let 'Em Know:" Comprehension and Perceptions of Eminem's "Mosh"

**Lynn Anne Gower** **Paper Presentation**  
"Love is in the Air: Self Disclosure and Text Messaging"

**Heather Hourigan** **Paper Presentation**  
"The Impact of Appearance on Perceptions of Trustworthiness"

**Brian K. Inman** **Paper Presentatio**  
"Looking to Become a Leader: Correlation Between Eye Contact and Self-Perceived Leader"

**Lauren Keller** **Paper Presentation**  
"Do Junky Kids Make Chunky Kids?: Media Exposure and Children's Sugar Preference"

**Danielle J. Lovejoy** **Paper Presentation**  
"How Long Will We Last?: Self-Disclosure Effects on the Longevity of Romantic Relationships"

**Lindsay Lurding** **Paper Presentation**  
"The Effect of Self-Disclosure on Romantic Relationship Satisfaction"

**Brad McDowell** **Paper Presentation**  
"The Long Term Effects of Exposure to Video Game Violence on Adult Aggressive Behavior"

**Erin Melchior** **Paper Presentation**  
"College and University Differences in Defining Sexual Assault Policy"

**Julia Perin** **Paper Presentation**  
"Like Father Like Daughter: Father and Daughter Communication Competence"

**Sarah Renfro** **Paper Presentation**  
"Should I Call You Reverend?: The Effects of Disclosure of Religiosity on Conversations Style"

**Brittany Rose** **Paper Presentation**  
"Working on Small Talk: Looking at Small Talk in the Workplace and Employees with Disabilities"

**Gary W. Williams** **Paper Presentation**  
"When Situation comedies Go Bad: Negative Depictions of Women on Television"

**David Woolley** **Paper Presentation**  
"Sports Watching Habits and Alcohol Consumption in the Greek Community"

## COLLEGE OF DESIGN School of Architecture Department of Architecture Design

**Brandi Berryman**  
**Amanda Hardaway**

**Recipients of National  
JELD-WEN Design  
Contest Scholarships**

Both Brandi and Amanda received top honors and a \$2000 scholarship each in the first JELD-WEN Student Door Design Contest. In addition, they were sent to the International Builders' Show in Orlando, FL. Both were selected from among a pool of student design contestants from 44 colleges and universities. JELD-WEN, the world's leading manufacturer of windows and doors, invited students to submit designs on-line in the fall of 2005. JELD-WEN and a panel of experts chose 3 winners. Brandi and Amanda tied for first place. Brandi designed her door with the idea of luck in mind and the visualization of crossed fingers. Amanda wanted her doors to be simple, and chose a door made of wood and glass with very clean lines. The statement from the panel of judges said: "The students captured elements in their designs that are both unconventional and refreshing." JELD-WEN, Inc., is based in Oregon and began as a small millwork plant; it has grown into a company with more than 150 divisions and 20,000 plus employees worldwide. The winning designs are shown here and on the inside cover.



*Design by Brandi Berryman*



*Design by Amanda Hardaway*

## COLLEGE OF EDUCATION

**Matthew Douglas,  
Brandy Le'Nae Fisher,  
Brian Johnson,  
Beth Kuhnhein,  
Jeremiah Lant,  
Allison Leet,  
Michael Lemaster,  
Jenna McKinney,  
Amanda Mills,  
William Nash,  
Silvia Timmerding, and Daniel Turner**

**UK's Class of 2006  
is the largest  
group of students from  
UK Seniors selected  
to serve in  
prestigious positions in  
Teach for America**

Teach for America (TFA) is a national program in which outstanding college graduates commit to teach 2 years in disadvantaged urban and rural public schools. TFA places its recruits in the nation's lowest income communities, both urban and rural, in an effort to close the achievement gap between economically advantaged and disadvantaged children. A holistic profile is sought in recruitment — a combination of characteristics that includes: perseverance, organization, achievement, critical thinking, the ability to motivate, and a desire to commit to the classroom. "Often times selected applicants have strong GPAs/academic achievement and have achieved measurable results as campus leaders" says Jessica Berg, TFA's recruitment officer. TFA recruited on more than 500 college campuses and received over 19,000 applications. The number of recipients will be between 2,100 and 2,500 with a GPA of 3.5 and 93% having held leadership roles on their campus. TFA participants receive a 1<sup>st</sup> year salary and are awarded a sum of \$4,725 from AmeriCorps for each year of participation, which can be applied to loans or the pursuit of further education.

# Undergraduate Awards and Honors (CONT.)

## COLLEGE OF ENGINEERING Department of Chemical Engineering

### 20th Consecutive Year UK's Kentucky Chapter of the American Institute of Chemical Engineers has been named "Outstanding Chapter"

The University of Kentucky chapter of the American Institute of Chemical Engineers (AIChE) has been named an "Outstanding Chapter" for the 20th consecutive year. "This award is in recognition of the membership and participation of UK's students and faculty, the quality and quantity of their meetings and activities, and their involvement in local, regional, and national events," stated Marvin Borgmeyer, chairman of AIChE awards committee. Only about 10% of chapters nationwide are selected as outstanding chapters.

## COLLEGE OF FINE ARTS Department of Art

Kristen Furlong

### UK Senior Theatre Major Took 1st Place in the Southeastern Theatre Conference Competition



Kristen Furlong, a senior in theatre took 1<sup>st</sup> Place in the Craft and Technology competition at the Southeastern Theatre Conference held in Orlando, FL, March, 2006. The project consisted of constructing a mid-19th century garment from an original design by Professor Fields. The assignment included evaluating the design, researching the period of cut and construction, as well as creating the proper silhouette through the construction of the garment and various undergarments. The silk dress was a large check print that had as its centerpiece a bodice front that is cartridge pleated and detailed with smocking. The cartridge pleated skirt sat over 4 petticoats and a bustle providing the necessary shape for the period. In addition to winning the competition, she received a job offer in the costume shop at the Utah Shakespeare Festival

for the summer of 2006, extending well into the fall. Kristen's dress is featured in the Oswald Awards section of this issue on page 111.

Matthew Herron  
Patrick White

### LEAP's First Two Commissioned Works of Art by UK Students

Two UK Fine Art students, Patrick White and Matthew Herron, are the first winners of the 'Inaugural Lexington Extraordinary Art Project' (LEAP) sculpture competition held in February. The artists garner public recognition for their work, fund-

ing to complete art pieces, and hands-on experience in the art commissioning process. Matthew's sculpture "Angelic Form" is a 12' high outdoor sculpture that is a steel abstraction of the healing angel, Raphael. Patrick's sculpture, an indoor work titled "Comfort," a 5' high female form, represents the care provided by Family Practice Associates



Angelic Form — Matthew Herron



Comfort — Patrick White

of Lexington (FPA) physician and artist, David P. Dubocq, the sponsor of both works. LEAP facilitates artwork through the funding of art in sculpture competitions such as the one sponsored by FPA. Pieces may be commissioned by businesses, groups, or individuals with an interest in public art. LEAP is a project envisioned by David Dubocq with the help of Garry R. Bibbs, head professor of the Sculpture Program at UK. The goal of LEAP is to enrich the Lexington community with privately funded, publicity displayed artwork. Beyond LEAP's mission, Dubocq's wish is to facilitate the construction of fifty public works of art throughout the Lexington community. Sponsoring organizations get positive publicity while supporting UK and acquiring outstanding works of art.

Michael Martinez  
Libby Purcell

### Awards at the first University Open

Two Art Students took honors at the first University Open, a juried competition between undergraduate fine art students at Kentucky colleges and universities that attracted more than 190 entries. Libby Purcell placed 2nd and Michael Martinez took third. Winners were chosen from 33 finalists. Submission represented 11 public and private colleges in the state. The top 3 artists received cash prizes of up to \$500. Over all, UK had 17 finalists who displayed their work at ArtsPlace from April-June, 2006.

## OFFICE OF STUDENT ACTIVITIES, LEADERSHIP, AND INVOLVEMENT (Student Volunteer Center)

Frederic J. Pollock

### Darrell VanMeter Award

Frederic J. Pollock, a Biology major, received the Darrell VanMeter Award. A selfless spirit award. For fourteen consecutive years, UK has recognized a student with The Darrell VanMeter Award in honor of Darrell A. VanMeter. Darrell, (a sophomore at the time of his death in 1991), was recognized by the University community and his home community for his positive contributions dedicated to serving others. The impact of his "good Samaritan" approach to helping others was apparent to faculty, staff and students alike. He touched the campus community with his selfless heart and continual acts of service.

## OFFICE OF MULTICULTURAL AND ACADEMIC AFFAIRS

Liria Morrell

### 2005 President's Award for Diversity

Liria Morrell, a Pharmacy major, received the 2005 President's Award for Diversity. The Strategic Plan of the University of Kentucky recognizes the importance of institutional diversity and has established a definitive goal for the University to nurture diversity of thought, culture, gender, and ethnicity. In recognition of that objective, the University established the President's Award for Diversity in honor and appreciation of those who have demonstrated outstanding efforts toward advancing the University's mission of embracing diversity while maintaining academic excellence. The 2007 call for nominations will be issued in early spring.

## S.P.U.R.

### The Society for the Promotion of Undergraduate Research

Railey White

Research is simply the expansion of current knowledge, and it occurs in every discipline and cross-discipline imaginable. Undergraduate research has been an integral part of the educational process for many past, current, and future undergraduates at UK and across the nation. SPUR aims to bring together the undergraduates at UK who are participating in scholarly, creative, and research projects, in a mentoring, networking, and social environment.

SPUR was founded in the summer of 2004 by four members of Dr. Tannenbaum's Research Methods and Orientation course. We set out to create an organization that would increase the number of undergraduates participating in undergraduate research and independent creative activities across campus. This simple mission, driven by our own experiences and passion for research, has led to an increased awareness on campus that is expected only to grow even larger in the future. Our efforts have been met with a great response of encouragement and support from the offices of eUreKa! and UKURP, and SPUR could not have been so successful without them. The fall semester of 2006 marks the beginning of SPUR's third year. This new year brings new challenges and new opportunities for the organization. Networking among SPUR



SPUR Board members, 2005-2006. Left to right: Peter Wulff, Michelle Bremmer, Nicolas Badre, Railey White.

members will continue through a variety of activities including, guest speakers, tours of research facilities, presentations of undergraduate research, and the annual Showcase of Undergraduate Scholars held in the spring, 2007.

The first annual Showcase of Undergraduate Scholars was held in the Grand Ballroom of the Student Center on April 25, 2006. For pictures of the event, see page 89. The Showcase was organized almost entirely by undergraduates, from arrangements, to photography, to catering, which is a unique aspect shared by no other such event at any other university across the country. In this first year, there were over 120 undergraduates participating in poster and oral presentations of their work in departments as varied as fine arts and chemical engineering. With the success of the first Showcase, we hope that in the years to come it will only continue to become bigger and better with more participants representing every department on campus. The second annual Showcase of Undergraduate Scholars is set to be held on April 25, 2007. We hope to see you there!

The 2006-2007 school year will also be one of particular change for the organization, because it is in this year that the last of the founders of SPUR and all of the current officers will be graduating, and handing over the reins to the next generation of leaders and undergraduate researchers. We, and the other graduating members of SPUR, will continue in our career paths in a great number of directions. For us, in whichever road we choose to follow, our skills and success will not be governed primarily by what we learned in the classroom, but by the life lessons we learned in applying the knowledge gained from the classroom at the bench top.

If you have questions or to get more information, please feel free to contact us at [spur.uk@gmail.com](mailto:spur.uk@gmail.com).



# Oswald Research and Creativity Program

Any current UK undergraduate (full- or part-time, enrolled for either semester) who does not already have a four-year degree is eligible for the Oswald Research and Creativity competition and is invited to submit papers and other projects in the following categories:

1. Biological Sciences
2. Design (architecture, landscape architecture, interior design, etc.)
3. Fine Arts (film, music, painting, sculpture, videotape, etc.)
4. Humanities: Creative
5. Humanities: Critical Research
6. Physical and Engineering Sciences
7. Social Sciences

Entries are judged on originality; clarity of expression; scholarly or artistic contribution; and the validity, scope, and depth of the project or investigation.

The following are representative winners in the 2005-2006 Oswald Research and Creativity Program:

(Extended versions of some of these entries are available at < [www.uky.edu/kaleidoscope/fall2006](http://www.uky.edu/kaleidoscope/fall2006) > )

## CATEGORY 1: Biological Studies

### 2nd Place

**NAME: Demetrius Abshire**  
**TITLE: Endotoxin as a Protective Factor for Asthma in Children Living on Farms**

Asthma is the most common chronic childhood condition, affecting about nine million children in the United States. Studies have suggested that children living on farms have a lower prevalence of asthma compared to children living in an urban setting. Endotoxin exposure has been suggested to be one of the factors in offering children protection against the development of asthma. The purpose of this literature review is to examine endotoxin exposure and its relationship to the occurrence of asthma in children.

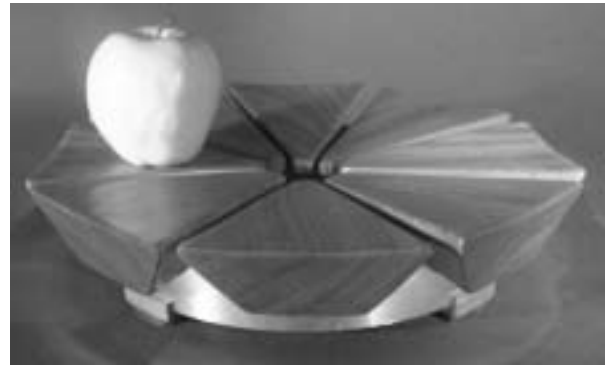


## CATEGORY 2: Design

### 1st Place

**NAME: Phil Schilffarth**  
**TITLE: Habitat for Fruit**

My *Habitat for Fruit* concept can be described with three individual ideas: Mass, Plane, and Armature. There are eight sculpted masses that are supported by a large planer ring. The way in which the masses are supported is an armature technique. The *Habitat for Fruit* is elevated by four small individual masses



to help enhance the planer element. The massing elements are made of rich mahogany wood. The planer ring is composed of 1/4" aluminum stock that was rolled and welded into a complete ring. These two materials complement and at the same time contradict each other in composition to help deploy the idea of armature. This is done by distinct division of materials.

### 2nd Place

**NAMES: Brock McKay and Tim Joice**  
**TITLE: A Master Plan for the Raven Run Retreat Center**

The master plan for the Raven Run Retreat Center focuses on having the least additional impact, and the buildings exhibit features of sustainable design. The least additional impact is evidenced by strategic site planning from our previous analysis. The master plan preserves the most valuable areas, while concentrating development in already manipulated or previously damaged areas. The main development takes place along the central entrance corridor already existing on the site. The historic features are maintained, along with much of the hiking trails. Building features that relate to sustainable design include orientation, sheltering, greening, and on-site water treatment.

Upon entering to the grounds, a view toward the main stables presents itself. Here, equestrian education will take place, allowing visitors the opportunity to care for and ride horses. In addition, the surrounding area provides opportunity for visitors to enjoy the sights of horses grazing in the fields. The New Nature Center will involve conservation education. The main building will be for artifact



Brock McKay



Tim Joice

display, while the other three buildings are reserved for education and interaction with the subjects of flora, fauna, and water quality.

Bridges incorporated into the master plan design add to the rustic character, while also creating interest and connection. The restaurant is partially earth-sheltered; visitors will enter the restaurant from the top floor, and proceed down an elevator to be seated. Southern-style cooking, views, and a council ring combine for a truly unique dining experience. The lodge will be built into the existing hillside. The lodge maintains a rustic character through its materials, and is located in the heart of the property, allowing for a complete experience in nature. With 22 rooms of various sizes, the lodge allows for visitors with varying income levels to participate in the Retreat Center. The unorthodox main exit off the second floor adds to the unique character created by the overall design. Finally, agriculture fields to the west allow for an on-site food source, reducing the global ecological footprint of the Center.

**CATEGORY 3:**

**Fine Arts**

**1st Place**

**NAME: Michael Martinez**

**TITLE: Sol Expansion**

Sol Expansion is a sculpture that is meant to pay homage to the stellar processes that produce the constituents of life and the reality that surrounds us. Every element heavier than hydrogen and helium is produced in the atomic cauldron of a dying star before it is expelled into the void of space, where they reform and accrete to form other stars, planets, and, eventually, life. Sol Expansion is my sculptural attempt to represent this process as it casts off its outer shells and releases rays of energy into its surrounding “space.”



**2nd Place**

**NAME: Kristin Furlong**

**TITLE: Recreating a Piece of History: An 1845 Day Dress**

The process of creating this 1845 gown began after receiving a rendering from my senior advisor. I began researching the period and what was worn. Specifically, I was looking for information on what was worn and how it was made, as well as what it was made from. After determining all of these factors, I began the construction process, drafting, draping, and patterning the different garment pieces, including chemise, bloomers, corset, two petticoats, and the actual dress. During the process, I consulted my research to produce the most accurate reproduction of an 1845 day dress, with the exception of minor alterations for the stage.



**CATEGORY 4:**

**Humanities: Creative**

**2nd Place**

**NAME: Andrew Crown-Weber**

**TITLE: Only A Game**

These are what may turn out to be the first chapters of a novel tentatively called “Only A Game,” which could possibly be finished some time in the future, maybe.

At present, this book-to-be deals with the life of a young man who is addicted to one of the few new drugs to be discovered this century: massively multiplayer online role-playing games. If you are unfamiliar with this digital scourge, have some time on your hands, and haven’t eaten recently, I recommend googling the term for an eye-opening experience. I won’t spoil all the many surprises and twists and intrigues that will appear later in the narrative (mostly because I don’t know them myself at the moment), but I will say that these chapters represent this young man’s interpretation of how he arrived at such an addiction. And, because this young man is diligent enough to begin his account in utero, we must at least commend him for his thoroughness.

I worked on these chapters under the mentorship of Professor Jane Vance and Kim Edwards and I am eternally indebted to them for their wisdom, patience, and willingness to give feedback about crappy writing long enough for said writing to become slightly less crappy.



# Oswald Research and Creativity Program (CONT.)

## CATEGORY 5

### Humanities: Critical Research

#### 1st Place

**NAME: Yury Bronshteyn**

**TITLE: What We Know Must Be: Hamlet, Religion, and Existential Theory of Mind**

This paper draws on recent empirical findings from cognitive and personality psychology to re-examine Shakespeare's rhetorical methods in *Hamlet* and Mircea Eliade's cross-cultural observations of religious belief. More generally, the paper advances a new theoretical model of how cognitive science can contribute to literary analysis and how literature can be used to test the "real-world" validity of certain cognitive theories.



#### 2nd Place

**NAME: Heidi Caudill**

**TITLE: The Virago Hemaphrodite and Jan Gassaert: A Metamorphosis in Netherlandish Art**

See Ms. Caudill's full article on p. 57.



## CATEGORY 6:

### Physical and Engineering Sciences

#### 1st Place

**NAME: Scott Pabian**

**TITLE: Shear & Flexural Reinforcement of Bridges Using Advanced Fiber**

Many civil engineering structures become damaged or deteriorated due to corrosion, weathering, overloading, or other forms of abuse. These structures can show damage in many ways, including the loss of shear capacity. The beams of the Carter County Bridge on KY-3297 (B-144) over the Little Sandy River in Kentucky, showed signs of shear cracking due to overloading. The Louisa - Fort Gay Bridge, which spans the Big Sandy River across the Kentucky and West Virginia state lines, also showed signs of flexural cracking due to overloading. Carbon Fiber Reinforced Polymers were used to reinforce the beams of both bridges. This report describes the shear strengthening process of the Carter County Bridge and the Louisa - Fort Gay Bridge, both of which include analysis and application of CFRP materials. The success of such repair indicates that this strengthening technique can be applied to other bridges having similar problems.

#### 2nd Place

**NAME: Christin Pramudiati**

**TITLE: The Study of Degradation and Drug Release of PLGA Drug Delivery Systems for Crohn's Disease Treatment**

See Ms. Pramudiati's full article on p. 13.



## CATEGORY 7

### Social Sciences

#### 1st Place

**NAME: Andrew Bozio**

**TITLE: Interpreting Power in the Political Poster**



Although the Cultural Revolution has been documented in numerous scholarly and autobiographical works, it remains to be explained in ideological terms, as an event constructed by various discourses circulating through Communist China.

This paper attempts such an explanation through an analysis of the propaganda posters of the Maoist government. First, it examines the attempts to advertise collectivized agriculture in the 1950s before moving to the posters of the early 1960s, in which caricature is used to demonize counterrevolutionaries. With reference to Mao's Talks at the Yan'an Conference on Literature and Art (1943) and a newspaper editorial entitled "Sweep Away All Monsters and Demons," the paper demonstrates that the posters provide a material connection between official Maoist philosophy and the appearance of this thought in the psyches of ordinary Chinese civilians.

This analysis, based on Louis Althusser's theory of Ideological State Apparatuses, therefore, discusses the syntax of Maoist propaganda and the methods by which it was produced. It concludes with an analysis of the personal experience of Xiaomei Chen, in order to evaluate the extent to which propaganda is responsible for inciting the Cultural Revolution.

# Special Programs

## **B.I.G. B.L.U.E. IV Balloon-Launched Experiment [www.engr.uky.edu/bigblue](http://www.engr.uky.edu/bigblue)**

The goal of the BIG BLUE Mars Airplane project for 2005-2006 was to combine the two successful projects of the previous year: the Vectran inflatable wings, successfully deployed at 95,000 ft on April 30, 2005, and the AIRCAT I and AIRCAT II aircraft, designed, built, and successfully flight tested at low altitude May-June 2005. Along with this, a new commercial autopilot system was to be used. Integration of these technologies was not straightforward, but the students developed new wing mounting designs, new wing-shaping designs, autopilot-activated inflation actuation, new camera systems, a new automatic mount/release for low-altitude flight testing, among others, and then conducted extensive laboratory testing, full-system

laboratory simulations, preliminary flight testing and, ultimately, the first flight of the AIRCAT with inflatable wings on May 31, 2006. Flight testing continued with the help of Ed King of the Lexington Model Airplane Club as test pilot. On June 21, 2006, the inflatable-wing AIRCAT was flying touch-and-goes and other maneuvers. A design review was held in March, 2006, at NASA Ames Research Center with NASA Mars Airplane program researchers offering advice. Students toured NASA Ames, which includes unique wind tunnel facilities, and spent a day in San Francisco. Plans for BIG BLUE in 2006-2007 include final “stepping stone” verification flight experiments toward a high-altitude flight demonstration of inflatable wings for Mars exploration.



## Special Programs (CONT.)

### Wildcat Pulling Team

[www.bae.uky.edu/qscale/tractor/htm](http://www.bae.uky.edu/qscale/tractor/htm).

The 2005–2006 Wildcat Pulling Team is very proud to report that we finished fifth place nationally in this year's competition out of a total of 28 entries. UK also received the Craftmanship Award and placed third overall in pull performance. In what is quickly becoming a tradition, UK also brought home top honors (for the seventh year in a row) in the Cook-Off competition. For more information about the event and the final scores from this year, please go to [www.asae.org/students/tractor](http://www.asae.org/students/tractor) or [www.bae.uky.edu/qscale](http://www.bae.uky.edu/qscale). The 1/4 Scale Student Tractor Design Competition is sponsored by the American Society of Agricultural and Biological Engineers along with a number of corporate sponsors. Each student team must design and build a 1/4 scale tractor capable of pulling a weight transfer sled. All designs must conform to a rigorous set of rules including many safety features. The design competition consists of performance assessment (tractor pull and maneuverability course), a formal design presentation, a formal written design report, and design judging in which teams of engineers assess features of the tractor that include safety, serviceability, and manufacturability. More than 80 professional engineers from industry donate their time to judge and score the competition.

We have already begun preparations for next year's competition in which our goal will be a top-two overall finish. Next year we plan to transport all eight of our pulling tractors to Minneapolis, Minnesota where the 1/4 Scale Student Tractor Design Competition will be held in conjunction with 100<sup>th</sup> year anniversary of the American Society of Agricultural and Biological Engineers, and their International Meeting.

We are optimistic about the upcoming year and look forward to once again representing all of our team sponsors and the University of Kentucky in this competition. Feel free to contact one of our advisors, Tim Smith ([tsmith@bae.uky.edu](mailto:tsmith@bae.uky.edu)), Scott Shearer ([shearer@bae.uky.edu](mailto:shearer@bae.uky.edu)), Larry Wells ([Iwells@bae.uky.edu](mailto:Iwells@bae.uky.edu)), or Tim Stombaugh ([tstomb@bae.uky.edu](mailto:tstomb@bae.uky.edu)), or call (859) 257-3000 if you have additional questions.

### Solar Car Team

[www.engr.uky.edu/solarcar](http://www.engr.uky.edu/solarcar)

The team worked hard during the 2005-06 school year to work out the kinks which inhibited The Gato Del Sol II from racing in the summer of 2005. Many of the parts were stripped from the car to be remodeled and perfected. The electrical system proved to be the



largest barrier to the team, but through the work of many talented Electrical Engineering students, such hurdles are being jumped. The team is currently putting the final touches on the essentials of the car. The car will be driving off the sun's power by mid-October. The car will be touring the Lexington area this winter to promote UK and solar energy. The race scheduled for summer, 2006, was cancelled nationally due to inadequate funding, but plans are being made for the car to attend the Formula Sun Grand Prix 2007 this summer.

Named for the 1982 KY Derby Winner, The Gato Del Sol II took 3 years and more than \$100,000 to build. Its nick name is the "Blue Bomb" and it has shocks from a mountain bike and a steering wheel from a kid's dragster, as well as an aluminum chassis, an electric motor, 8 square meters of solar paneling on it fiberglass shell, and a top speed of approximately 60 miles per hour. It looks like something out of "Flash Gordon."

The project started as a student-run engineering project with support from the College of Engineering. The team consists of multi-disciplines that require the best and most determined students. The team has individuals from electrical, computer, and mechanical engineering disciplines, as well computer science, business, and chemistry majors. Solar car racing is very competitive and most of the schools that race have been doing it since 1991. This will be The Gato Del Sol's third year in competition.





Cast iron workshops. Walter Early. See page 103.



## Upcoming Undergraduate Scholarship Events and Deadlines

### Kaleidoscope, Volume 5

The *University of Kentucky Journal of Undergraduate Scholarship* is published once each year, at the beginning of the fall semester. All contributions to the journal are refereed by a standing editorial board and guest referees and editors. Articles, reports, and other creative works may be submitted by any undergraduate student at the University of Kentucky. All submissions must be accompanied by an endorsement by a University faculty member who has agreed to attest to the scholarly quality of the work and to serve as faculty mentor for editing and final submission of the work. Detailed guidelines for submission are available at < [www.uky.edu/kaleidoscope](http://www.uky.edu/kaleidoscope) > .

### Deadlines for Volume 6, Fall, 2007:

**February 24, 2006:** Electronic letter of intent to submit, including a brief description of the nature and contents of the proposed submission sent to the editor. (rst@uky.edu)(optional)

**March 30, 2007:** Complete submission prepared according to the guidelines delivered electronically to the editor. (rst@uky.edu)

**May 4, 2007:** Notification of acceptance/rejection and instructions for suggested/required revisions.

**June 15, 2007:** Final, revised submission delivered electronically to the editor.

### National Conference on Undergraduate Research

“The mission of the National Conferences on Undergraduate Research (NCUR®) is to promote undergraduate research, scholarship and creative activity done in partnership with

faculty or other mentors as a vital component of higher education.”

**The 2006 NCUR conference will be held April 12-14, 2007**, at Dominican University of California. Visit the NCUR Web site at <http://ncur.org/basics/index.htm> for general information on NCUR; visit < <http://ncur20@unca.edu> or <http://ncur.unca.edu> > for details and deadlines for the conference.

### Oswald Research and Creativity Awards

All current UK undergraduate students are eligible to submit a paper or other creative work to be consider for an Oswald Research and Creativity award. The competition categories in which papers and projects may be submitted include: (1) Biological Sciences; (2) Design (architecture, landscape architecture, interior design, etc.); (3) Fine Arts (film, music, painting, sculpture, videotape, etc.); (4) Humanities: Creative; (5) Humanities: Critical Research; (6) Physical and Engineering Sciences; and (7) Social Sciences. **The deadline for submission is March 9, 2007.** Visit the eUreKa! website at: [www.uky.edu/eureka](http://www.uky.edu/eureka) for details, application forms, and official rules. See pages 110-112 for winning submissions from last year’s Oswald Awards program.

### Office of Undergraduate Studies Research and Creativity Awards

As a means of promoting educational experiences for students, the Office of Undergraduate Studies offers Research and Creativity Grants during the summer term. The grants are intended to take advantage of the rich resources available through the libraries, the laboratories and, most especially, the academic personnel at the University of

Kentucky. Undergraduates in all areas of intellectual inquiry are eligible, and students at many different levels of matriculation have received support. **The deadline to submit applications is February 9, 2007.** For details regarding eligibility, and application forms visit the eUreKa! website at: [www.uky.edu/eureka](http://www.uky.edu/eureka). See pages 90-99.

### UK Undergraduate Research Program

The University of Kentucky Undergraduate Research Program (UKURP) creates research partnerships between first- and second-year students and faculty researchers. The program offers students the opportunity to work and learn alongside a research faculty member. Undergraduate students are given the real-life experiences of working in laboratories and other scholarly settings; developing a research abstract; presenting their projects at symposiums and professional conferences; publishing their findings; and meeting others in the international community of scholars. In other words, students are given a jump-start on their career. For more details and deadlines for applications, visit [www.uky.edu/eureka/ukurp](http://www.uky.edu/eureka/ukurp). See pages 100-101.

### Additional Information

Additional information regarding undergraduate scholarship and creativity programs, conferences, competitions, and opportunities is posted on the Web site of the Office of Experiences in Undergraduate Research and Kreative Activities, eUreKa! at [www.uky.edu/eureka](http://www.uky.edu/eureka).

