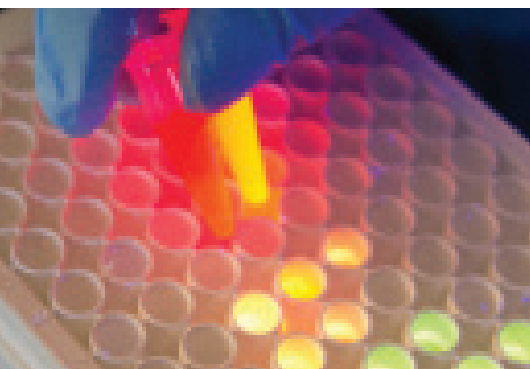




NANOSCIENCE » FIREFLY POWER



WHAT DO FIREFLIES, NANORODS, AND Christmas lights have in common? More than you might think, since someday consumers may be able to purchase multicolor strings of light that don't need electricity or batteries to glow. Using nanoscience, scientists in the College of Arts and Sciences have created a new method for harnessing bioluminescence—the natural light produced by fireflies. Their breakthrough produces a system 20 to 30 times more efficient than those produced during previous experiments.

For chemistry professor Mathew Maye and chemistry doctoral candidate Rabeka Alam (pictured above), it's all about the size and structure of the custom, quantum nanorods produced in Maye's laboratory. "Firefly light is one of nature's best examples of bioluminescence," says Maye, a member of the Syracuse Biomaterials Institute. "The light is extremely bright and efficient.

We've found a new way to harness biology for nonbiological applications by manipulating the interface between the biological and nonbiological components."

Documentation of their work, "Designing Quantum Rods for Optimized Energy Transfer with Firefly Luciferase Enzymes," was published in a recent edition of *Nano Letters*, a premier journal of the American Chemical Society. They collaborated on the research with Connecticut College professor Bruce Branchini.

Fireflies produce light through a chemical reaction between luciferin and its counterpart, the enzyme luciferase. In Maye's laboratory, the enzyme is attached to the nanorod's surface; luciferin, which is added later, serves as the fuel. The energy released in the interaction is transferred to the nanorods, causing them to glow—a process called bioluminescence resonance energy transfer (BRET). "The trick to increasing the efficiency of the system is to decrease the distance between the enzyme and the surface of the rod and to optimize the rod's architecture," says Maye, whose research was funded by a Department of Defense PECASE award sponsored by the Air Force Office of Scientific Research (AFOSR). "We designed a way to chemically attach genetically manipulated luciferase enzymes directly to the surface of the nanorod."

The nanorods are composed of semiconductor metals, featuring an outer shell of cadmium sulfide and an inner core of cadmium selenide. Manipulating the size of the core and the length of the rod alters the color of the light produced. Maye's nanorods glow green, orange, and red—colors not possible for fireflies, which naturally emit a yellowish glow. The efficiency of the system is measured on a BRET scale. The researchers found their most efficient rods (BRET scale of 44) occurred for a special rod architecture (called rod-in-rod) that emitted light in the near-infrared light range.

Maye's and Alam's firefly-conjugated nanorods currently exist only in their chemistry laboratory. Additional research is ongoing to develop methods of sustaining the chemical reaction—and energy transfer—for longer periods of time and to "scale up" the system. Maye believes the system holds the most promise for future technologies that will convert chemical energy directly to light; however, the idea of glowing nanorods substituting for LED lights is not the stuff of science fiction. "The nanorods are made of the same materials used in computer chips, solar panels, and LED lights," Maye says. "It's conceivable that someday firefly-coated nanorods could be inserted into LED-type lights that you don't have to plug in." —*Judy Holmes*



INCLUSIVE MUSIC EDUCATION » STUDIO SESSIONS ARE A HIT FOR ALL

BEAUTIFUL MUSIC IS MADE ON A DAILY BASIS AT SUBCAT Studios, a 10,000-square-foot professional sound recording complex in downtown Syracuse where dozens of bands lay down tracks and seven locally based labels produce CDs. But SubCat hits a particularly sweet note when it plays host to The Inclusive Recording Studio, an intensive six-week summer course in which music education graduate students teach people with disabilities—most of them area high school students—to operate the studio’s recording equipment. “Through intense instruction and mentoring relationships, we get the kids past any fears they may have of technology and show them what’s possible,” says James Abbott, audio technology instructor at the Setnor School of Music in the College of Visual and Performing Arts.

Music education professor John Coggiola, who co-teaches the course with Abbott, believes that learning to use advanced technology empowers and enables students with disabilities, while offering special advantages to music teachers entering the profession. “It’s important for teachers to see how much these kids can accomplish in a ‘no limitations’ environment,” Coggiola says.

Jointly sponsored by the Setnor School, the School of Education, the Burton Blatt Institute, and the Taishoff Family Foundation, The Inclusive Recording Studio is part of the Music Technology Access Project, an ambitious initiative with at least three related goals: to teach people with disabilities the skills necessary for professional digital recording, editing, and mixing with Avid Pro Tools and Apple Logic Pro software; to develop and codify effective methods for the teaching of these skills for educators across the country and around the world; and to refine and adapt the software programs toward universal accessibility. “The addition of options to available industrial software may open up new career paths in music recording, television broadcasting, and related areas for people with various types of disabilities,” Abbott says.

Mia Quatrone '12, G'13 (pictured above), a master’s degree candidate from LaFayette, New York, was among the students enrolled in the course this summer. “During the first weeks, we are taught everything there is to know about running the studio, with constant reminders from our professors that we will soon be teaching what we are learning,” says Quatrone, who plans to teach music at the elementary school level. “Then we begin working with our students, who come to the program presenting a wide range of teaching challenges, including autism, Down syndrome, and attention deficit hyperactivity disorder. Seeing them working in the studio, setting up equipment, and operating the mixing board really opened my eyes to teaching students with disabilities.” Andrew Dolloff, who teaches instrumental music at Onondaga High School in Nedrow, New York, agrees. “Being part of this first-of-a-kind program really helped me look at music education from an entirely different and exciting perspective,” says Dolloff, who has a master’s degree from Stony Brook University and took the course through University College. “The growth I saw in these students in only a few weeks was tremendous—and very inspiring to me as a music teacher.”

Abbott points out that most SU students taking the course are not planning for careers specifically focused on teaching students with disabilities, and that makes the experience all the more valuable for them. “It gives them the professional edge of having worked in an inclusive environment,” he says. “They’re going to go out and teach in all kinds of schools, and one day a special education teacher is going to knock on the door and say, ‘Hey, I’ve got this student with a disability who is a really talented singer. Would you let this kid take your voice class? Would you let this kid sing in your chorus?’ And when that happens, they will be ready to include that student.”

—David Marc



VETERANS' WRITING GROUP » WAR STORIES

IT'S 10 A.M. ON WHAT LOOKS LIKELY TO BE A TOTAL washout of a Saturday. The summer sun has given way to a brisk fall wind and large gray storm clouds that have rolled in over campus, seemingly out of nowhere. The sky is about to crack open at any moment and pour buckets of water, trapping the few students who had been lured out onto the Shaw Quad by the promise of early morning sunlight.

Steps away, inside the Syracuse University Writing Center in Huntington Beard Crouse Hall, a group of writers has managed to escape the impending weather—but there's still homework. Professors Eileen Schell and Ivy Kleinbart have just passed out the latest in a long line of writing prompts to their monthly gathering of military veterans turned poets and memoirists. The collection of nine veterans that makes up this morning's circle of desks spans decades of patriotic service, with representatives from the wars in Korea, Vietnam, Iraq, and Afghanistan. Over plates of fruit and pastries, they turn their attention toward the next great battle ahead of them.

"The experience of being a writer is the experience of actively grappling with the desire and perpetual failure to communicate. But such difficulties also define our daily life experiences and relationships.... Try to remember a few specific memories of the military that are shaped by a failure to communicate," reads the prompt.

The assignment cuts straight to the heart of the group's mission: to turn memories and experiences of their military service into stories. Schell, the former director of the Writing Program in the College of Arts and Sciences (2007-12), founded the group shortly after Captain Shannon Meehan,

an Iraq vet and author of *Beyond Duty: Life on the Frontline in Iraq* (Polity Press, 2009), spoke on campus. Inspired by Meehan's work and spurred by her own experiences with an uncle who returned home from Vietnam shattered, she established the Veterans' Writing Group in spring 2010 as a way for former combatants to create narratives that could be shared more widely. "My concern is that veterans are coming back to a society that forgets they were at war," Schell says. She worries that some people only understand the military through the prism of television or movies. The program, one of many popping up around the country, provides veterans with a way to cement and circulate their stories in writing, allowing real voices of experience to begin to drown out the commercial bellowing of Hollywood.

Once a month, Schell and Kleinbart, a writing program instructor, offer their expertise to those who have served, critiquing drafts and helping to put their war stories into print. Today's first piece is shared by Dawson Brown, a naval veteran who is looking to eventually shape his tales from the tail end of Vietnam into a book. Neatly stapled, the three- or four-page document from which he begins to read was typed by his wife, Pat, whom the others jokingly refer to as his editor. Brown's story about a hellish bus ride from Syracuse to Orlando, Florida, for basic training—a rollicking epic that features an angry drill sergeant, a shaking bus, and more than a few four-letter words that he politely omits—is immediately met with snorts of appreciative laughter.

Frank Hobitz, who enlisted in the Navy at age 17 and worked as an electronics crew chief during the Korean War, says it was the pecking order established by his fellow

Members of the Veterans' Writing Group (facing page) listen as Frank Hobitz (in green fleece), a Navy veteran of the Korean War, comments on a story. Ralph Willsey (pictured at left in top photo), an Army veteran of the Iraq War who is now a student at Onondaga Community College, looks on as Derek Davey, a Marine Corps veteran, offers feedback to a writer. Air Force veteran Lee Savidge G'77 (middle photo) listens to a group member read. Writing Program professor Eileen Schell (bottom photo) is the founder and co-leader of the group, which she established in 2010.



“The things we learn in concert with other veterans help us deal emotionally and psychologically and that’s something good that comes out of these groups.”

—Pete McShane '72, G'73

soldiers—not their superiors—that gave him the most abuse. Heather Faulkner, a member of the Navy reserves who recently returned from a tour of duty in Afghanistan, can't remember the name of her drill sergeant, only that her brutal mid-winter training in Chicago could have benefited from some southern sun. “The things we learn in concert with other veterans help us deal emotionally and psychologically and that’s something good that comes out of these groups,” says Pete McShane '72, G'73, a special forces medic who served in Vietnam.

McShane's work is the last shared of the day. He asks the group if he's read them his piece about his ex-wife yet. “No, but I'm looking forward to it!” Hobitz says. “The Lie” is the story of McShane's relationship with his former wife, who succumbed to stage 4 uterine cancer shortly after the two came to terms over their failed marriage. At first, his words fly off the page with an angry, accusatory flair before slowing to a somber crawl as the writer ultimately claims responsibility for the divorce, collateral damage in his battle with post-traumatic stress disorder.

Silence. Finally, it's time to offer feedback, to give McShane insight into how he can make his writing sharper, clearer, more accessible. Brown's hand is the first in the air. “Pete, you're being too hard on yourself,” Brown tells him.

Murmurs of consent echo around the room, proof that if writing is actively grappling with the desire to communicate and the perpetual failure to succeed at it, then it helps to work with people who speak the same language.

—Frank Ready



SONDHEIM UNBOUND

UNIVERSITY TREASURES

CLIMB HIGH
A New Musical
By
Stephen Sondheim

BACK IN THE AGE OF THE TYPEWRITER AND BEFORE, when writers gave substance to vision in ink on paper, it was not unusual to come across early drafts of works by masters. Some, filled with scribbles and doodles, could serve as hieroglyphic roadmaps of the creative process. In these digital times, not so much. Eric D. Sherman '91, partner in the Manhattan law firm of Pryor Cashman LLP and a collector of rare books, recently made a gift of one of these rare typescripts to the Syracuse University Library: a 169-page carbon copy of "Climb High," the first full-length musical written by Stephen Sondheim, circa 1952. Just a year out of college, Sondheim set the show at his alma mater, Williams College, but on advice of his mentor, Oscar Hammerstein, moved on to other projects. Fame would arrive some years later, when Sondheim took Broadway by storm as Leonard Bernstein's lyricist in the score of *West Side Story*. As if any peek into Sondheim's early work is not treasure enough, more than half the pages are spattered with annotations and deletions by Burt Shevelove, who later supplied the book for Sondheim's music and lyrics in *A Funny Thing Happened on the Way to the Forum*, the Tony Award-winning musical comedy of 1962. Sherman felt the library was the right place for "Climb High," which, he notes, has neither been published nor produced on stage. "It offers an excellent opportunity for scholars to analyze the creative process in developing a working manuscript," he says.

A political science major at SU who earned a J.D. degree at New York Law School, Sherman discovered the pleasures of collecting books and literary artifacts after an aunt left him a portion of her collection. "As I learned more about first editions and the art of book collecting generally, my interest grew pretty rapidly," he says. "It's an exciting adventure." In 2010, Sherman shared the benefits of that adventure with the SU Library, donating approximately 1,570 books and other printed materials. Post-World War II American fiction is prominent in the collection, which contains first editions by Henry Miller, Truman Capote, Saul Bellow, Philip Roth, and Norman Mailer. "Eric's gift also brings us a significant number of uncorrected proofs as well as some notable signatures," says Sean Quimby, SU Library's senior director of special collections.

"Climb High," which is not included or mentioned in a recently published two-volume compendium of Sondheim lyrics, is an extraordinary artifact, likely to draw the interest of musical theater scholars around the world. Asked how he managed to come upon it, Sherman credits Andreas Brown, the proprietor of the Gotham Book Mart, which obtained it through the purchase of a personal library. "Andreas became aware of my interests and showed it to me," Sherman says. "I was immediately intrigued. It's a unique piece of American literature."
—David Marc

Copyright 1962

2-3-49

David
Then come on, I'll prove myself. Right now!
(HE starts across the stage, but CHRIS holds him back)

Chris
Don't!
(HE stops)
Don't.
(Takes a deep breath)
I can't ~~marry~~ you, darling. I can't be engaged to you or marry you or anything.

David
(Evenly, a little angrily)
Why?

Chris
It's got nothing to do with the money. I know you think it has, but it hasn't.

David
(Desperate)
It's the play. You saw the play tonight and you're afraid I haven't any talent. You think I'm going to be a failure, is that it?

Chris
Part of it. Oh, not in the theater. A failure to yourself. A failure to me. You're not strong enough, Dave.

(DAVID is visibly shaken; CHRIS gives a short, hopeless laugh)

I thought it would be so hard to say. And it's easy. I'm sorry it's so easy. I've tortured myself about this, Davy. For weeks I've thought about nothing else, hoping I was wrong about you - about us.
(SHE begins to cry again)
I can't take it any longer -

(DAVID draws up a chair; SHE sits. Now that he has something tangible to fight, HE speaks not in desperation, but in earnestness)

David
No, let me talk this over calmly. Have I let you down?
Well, ~~not~~ that. Tell me when and where and I'll fix it.

Chris
(Shakes her head futilely)
It's I who've let you down. I've seen your weakness and I've known your loathsomeness and I've done nothing -

INFORMATION TECHNOLOGY »

SUart GOES MOBILE

WITH MORE THAN 500,000 MOBILE APPLICATIONS on the Apple platform, it seems the iPhone's unofficial slogan, "There's an app for that," is spot on. Apps range from guitar tuners to hearing aids to a taxonomic guide to dinosaurs. But prior to last spring, the SUart Galleries—one of the country's oldest university collections—was completely app-less. Fortunately, SU is brimming with tech-savvy students eager to test their burgeoning skills. Today, thanks to a collaborative effort between the School of Information Studies (iSchool) and the College of Visual and Performing Arts (VPA), when asked where to access information about its 35,000-piece collection, the SUart Galleries can proudly claim, "There's an app for that."

The app—called SUart Galleries—resulted from an innovative new course, Mobile Application Development and Design. Professors Carlos Caicedo of the iSchool and Denise Heckman of VPA partnered last fall to develop the curriculum. The inaugural class last spring attracted 45 students—roughly half from each school. "To really develop good apps, you need a multidisciplinary team," Caicedo says.

The course was the first of its kind at SU and posed a number of challenges to students. Since designers and programmers have their own languages, interdisciplinary communication reflects a common challenge in the workplace, Caicedo says. Another challenge involved working with a client with real needs—in this case, Domenic Iacono, director of SUart Galleries. "The professors wanted it to be a real-world experience, so Carlos told us to hold the students to task for their work," Iacono says. "The kids held up their end."

SUart was one of about 10 organizations to pitch app ideas to the class. Students split into teams and voted on which apps they wanted to develop. In all, the class built five apps, including Iacono's. Quinton Fletchall '13, an industrial and interactive design major at VPA, led the SUart team. "I saw it as a chance to make viewing art more interactive using technology," Fletchall says. "And I even learned some programming along the way."

The free app includes information about the gallery and displays works from the collection selected by Iacono. With a tap of the screen, users can access information about any piece of art, including dimensions, creation date, historical context, and other works by the artist. Iacono hopes to eventually digitize the University's entire collection. Although Iacono isn't aware of another university that has done a similar project, he has researched museums' digital efforts for years. His iPhone is filled with page after page of museum apps from around the world. He says the SUart app most closely resembles that of the Louvre. "This is done with national government funding," he says while scrolling through the Louvre's app. "And our students here at SU came up with an almost identical idea. Students always have the best ideas." —Chris Baker



The SUart Galleries app will soon be available for mobile devices as part of the official SU app (sumobile.syr.edu), which can be downloaded for free in iOS, Android, and Blackberry platforms.

RESEARCH SNAPSHOT

A FOCUS ON RESEARCH AT SYRACUSE UNIVERSITY



PROJECT:
CUED RECALL:
THEORY AND DATA

INVESTIGATOR: Amy Criss

DEPARTMENT: Psychology

SPONSOR: National Science
Foundation (CAREER Award)

AMOUNT AWARDED:
\$325,600 (September 1, 2010-August
31, 2015)

BACKGROUND: Understanding how memory shapes human behavior and decision making has implications for many facets of society, including education, medicine, and the justice system. Despite the importance of memory, the basic processes underlying the healthy function of the human memory system are not yet fully understood. Episodic memory is the ability to remember the components of a particular event, such as having a chicken salad sandwich and tea for lunch yesterday—in contrast to memory

of the fact that lunch is a meal eaten in the middle of the day. It can be difficult to remember the specific details of an event, especially when the same components appear in multiple events (e.g., bread consumed at various meals) and events often repeat (e.g., lunch is eaten every day). This project aims to evaluate three critical components of memory: first, the properties that contribute to the ability of a cue to successfully elicit a memory, independent of the content of the memory; second, the nature of the content of the memory that is successfully retrieved and reported, without regard to the cue; finally, the interaction of cue and content in which a cue is especially effective for particular content, but not for other content. For example, sometimes a cue—say, the scent of a distinctive perfume—elicits a very strong memory for a specific life event, such as the senior prom. To study these components of episodic memory, the researcher will create laboratory events for adult participants to remember. Later, memory for those events will be measured. This

research will advance understanding of episodic memory by investigating the use of behavioral measures of memory in adults and by building a computer model that behaves in the same way as a human memory system. The educational component of this project seeks to train graduate and undergraduate students to be critical and effective consumers of science, both inside and outside of the laboratory.

IMPACT: This research has the potential to inform educational testing and the criminal justice system on properties that make effective cues for episodic memories and memory content. It will contribute to understanding the fundamental processes that underlie human episodic memory and have the potential to contribute to successful treatments of memory disorders. Both the research and educational objectives serve to encourage and sustain the engagement of students with scientific practices and principles.

» NEWS MAKERS



Larry Martin

Larry Martin was named vice president for program development. Martin, the longtime head of the Office of Program Development (OPD), has been with the University since 1976. **Miguel Sapp '82, L'88, G'89** recently joined the OPD as executive director of development and alumni relations.



Miguel Sapp

The U.S. Green Building Council recognized **SU and Chancellor Nancy Cantor** with its 2012 Leadership Award. The council cited the Chancellor for elevating the mission of green building on campus through numerous Leadership in Energy and Environmental Design building projects and the University-wide goal to achieve carbon neutrality by 2040.

Arlene Kanter was named the Bond, Schoeneck & King Distinguished Professor at the College of Law for 2012-14. Kanter founded and directs the Disability Law and Policy Program, which houses the nation's first joint degree program in law and disability studies. She also co-directs the SU Center on Human Policy, Law, and Disability Studies.

University Professor **Jan Cohen-Cruz**, who served as director of *Imagining America: Artists and Scholars in Public Life* from 2007-2012, received the prestigious Award for Leadership in Community-Based Theatre and Civic Engagement from the Association for Theatre in Higher Education. The award honors a leader with a high level of commitment and longevity in the field whose work demonstrates an innovative approach, high artistic quality, community and field-wide impact, and deep civic dialogue.

Dawn Long received the Golden Key International Honour Society's Regional Advisor of the Year award. One of 11 people in North America to receive the honor, Long is an office coordinator and graduate secretary at the L.C. Smith College of Engineering and Computer Science.

Marshall Street Records, SU's student-run record label, released *Electro Cuse Vol. 2*, which features electronic music made by former and current Syracuse students.



Douglas Quin

Newhouse professor **Douglas Quin**, a sound designer and composer, debuted a live performance of "Aurora Passage" at the Arc Cinema in Australia. The multimedia composition combines piano, live narration, Antarctic soundscape recordings, and archival imagery based on the 1912-13 diaries of SY *Aurora* able-bodied seaman Bert Lincoln. The performance was the final in a series of live

events marking the National Film and Sound Archive of Australia's *Extreme Film and Sound Exhibition*, celebrating 100 years of Australasian Antarctic expeditions.

» SPORTS

SU Trustee **Art Monk '80** and Orange quarterback **Ryan Nassib '12, G'13** were among those honored at the 55th annual National Football Foundation Awards Dinner on December 4 in New York City. A 1979 All-America wide receiver, Monk was inducted into the College Football Hall of Fame. He is the 18th Orange man to enter the hall of fame. Nassib was honored as a 2012 National Football Foundation National Scholar-Athlete. He is the fifth Orange player to receive the award.

The **SU men's cross country team** finished 15th at the 2012 NCAA Championship in Louisville. The squad also collected its third Big East title in four years. **Martin Hehir '16** won the Big East race, and **Sarah Pagano '13** finished ninth in the women's race. She was named an All-Big East selection for the third straight year.

The **SU men's soccer team** advanced to the third round of the NCAA tourney for the first time in program history, defeating Cornell and Virginia Commonwealth.

The **SU women's field hockey team** won its third Big East regular season title in the last four years. Head coach **Ange Bradley** was named the conference's Coach of the Year for the fourth time, and **Iona Holloway '13** was selected as Defensive Player of the Year. In the NCAA tournament, the Orange women reached the Final Four for the second time in program history.

SU women's soccer player **Brittany Anghel '14** was named Big East Goalkeeper of the Year.