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2014

## **Annual Report, 2013-2014**

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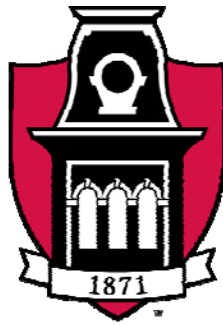
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College of Engineering

2013-2014

Annual Report



UNIVERSITY OF  
ARKANSAS

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COLLEGE OF  
ENGINEERING

August 15, 2014

## TABLE OF CONTENTS

<b>DEAN’S EXECUTIVE SUMMARY .....</b>	<b>2</b>
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### **ACADEMIC UNITS**

I. EXECUTIVE SUMMARIES.....	3
II. SIGNIFICANT ACHIEVEMENTS .....	11
III. ACHIEVEMENTS IN TEACHING, RESEARCH & PUBLIC SERVICE.....	24
IV. ACHIEVEMENTS OF STUDENTS & ALUMNI.....	42

### **APPENDICES**

APPENDIX A - FACULTY HONORS.....	54
APPENDIX B- STUDENT HONORS .....	55
APPENDIX C - PUBLICATIONS.....	56
APPENDIX D - CHAIRS, PROFESSORSHIPS, DISTINGUISHED PROFESSORSHIPS AND LECTURESHIPS .....	120

# COLLEGE OF ENGINEERING

## Dean's Executive Summary

Over the past fiscal year, the College of Engineering has accomplished a great deal. Under Dean John English, a research task force created a report identifying our most important areas of research and laying out strategies for further developing and promoting our research program. In addition, a strategic plan task force has begun the task of creating a new strategic plan for the college.

In the fall, five new assistant professors joined the College of Engineering faculty: Qinghua Li in computer science and computer engineering, Michelle Bernhardt and Clinton Wood in civil engineering and Arun Nair and Paul Millet in mechanical engineering.

In the fall of 2013, we welcomed 688 new freshmen. The college also continued to grow in diversity, making significant increases in the number of female and African American students. As of fall 2013, the College of Engineering had 2,905 undergraduate students, the largest number of students in our history.

The following list illustrates some of the achievements of our programs, students and faculty over the past year.

- The online Master of Science in Engineering program was ranked No. 4 in a list of the best values in online graduate engineering education by GetEducated.com.
- The Master of Science in Engineering degree was ranked No. 4 in U.S. New and World Report's list of "Best Online Graduate Engineering Programs for Veterans," and No. 23 of 55 online graduate engineering programs in the publication's "Best Online Programs" rankings.
- AlliedHealthWorld.com, a health information website, has included the University of Arkansas on its list of "10 Schools Driving Healthcare Innovation." The University of Arkansas was recognized for the industrial engineering department's research on the health care supply chain.
- Engineering researchers received a \$1.4 million grant from the U.S. Department of Transportation to create the Maritime Transportation Research and Education Center.
- The Membrane Science, Engineering and Technology Center was established with the support of a grant from the National Science Foundation.
- The University of Arkansas was designated a National Center of Academic Excellence in Information Assurance/Cyber Defense Research for academic years 2014-2019 by the Department of Homeland Security and National Security Agency.
- NanoMech, a company co-founded by Ajay Malshe, Distinguished Professor of mechanical engineering and holder of the Twenty-First Century Endowed Chair in Materials, Manufacturing and Integrated Systems, received an R&D 100 in recognition of its TuffTek product. TuffTek also received a 2014 Edison Award.
- Silicon Solar Solutions LLC, a company located at the Arkansas Research and Technology park and associated with the college, received the SunShot Incubator award from the U.S. Department of Energy.

# **ACADEMIC UNITS**

## **I. EXECUTIVE SUMMARY**

### **BIOMEDICAL ENGINEERING**

The Calendar Year 2013 marked the first full year of operation for the new Biomedical Engineering Department in the College of Engineering. The number of undergraduate and graduate students in the department grew to over 200. The program attracted students with an average High school GPA of 4.0 and an average ACT score of 31. The new undergraduate and PhD curricula were fully implemented. Several new undergraduate and research laboratories were commissioned by the Biomedical Engineering faculty. The faculty also established several strong collaborations with faculty from other units/colleges on campus and at UAMS. The 13 new external research awards to BMEG faculty for the fiscal year 2014 grew to more than \$2M with bulk of the funding being received from the federal government. Faculty and students contributed both to the presentation and review of research findings by participating in more than 14 lectures/oral presentations, publishing 3 refereed articles, 1 un-refereed publication, and through peer reviewing more than 24 conference publications and abstracts among other forms of conference participation. The department initiated the search for two new tenure-track faculty and received a very rich pool of candidates to choose from. Several of the Biomedical Engineering graduates received top honors in college-wide, campus-wide, national and international competitions including the outstanding senior award from the college, the Barry Goldwater Fellowship, top recognitions from the Honors College and the RISE Fellowship from the German Academic Foundation. In addition, BMEG undergraduate students competed very well in national business plan competitions in partnership with students from the Walton College of Business.

### **BIOLOGICAL & AGRICULTURAL ENGINEERING**

Our mission is “to develop and disseminate engineering knowledge to address problems dealing with sustainable food, water and energy systems.” Our faculty is delivering the Biological Engineering curriculum of sustainable food, water and energy systems. BAE Department is truly unique as it resides in the UA System Division of Agriculture and UA College of Engineering and the Bumpers College. Research and teaching faculty are on campus while our extension colleagues are in the state office of the UA System Division of Agriculture’s Cooperative Extension Service, and at the Rice Research and Education Center in Stuttgart. Our academic, research and extension programs address problems important and relevant to our state and nation dealing with challenges in sustainable food, agriculture, water and energy systems in support of the Arkansas agriculture enterprise. These are very much in line with the grand challenges being faced by society in general.

The addition of an academic year Instructor has been very helpful. One senior design team “Design of a Low-Cost Prosthetic Foot for the Dominican Republic.” won first place in the

ASABE International competition in July 2013. Dr. Verma serves as President of the American Society of Agricultural and Biological Engineers (ASABE). Dr. Scott Osborn was awarded the 2013 Presidential Citation by American Society of Agricultural and Biological Engineers for his extraordinary service and invaluable contributions to the society. Drs. Brian Haggard and Marty Matlock have been appointed by Governor Mike Beebe to serve on the Illinois River Study Committee to oversee a two-year study. Drs. Scott Osborn, Julie Carrier and Yi Liang were recognized with the departmental faculty awards for teaching, research, and service to students, respectively. Ms. Linda Pate, Departmental Administrative Manager was recognized with the Employee of the Semester and also the Employee of the Year awards.

The monthly departmental seminars brought back our alumni, Kyle Kruger of Garver, Drake McGrudder of Kraft Foods, and Tyler Gipson of U.S. Corps of Engineers. One outstanding alumnus, Mr. Glenn Davis, was inducted in the Arkansas Academy of Biological and Agricultural Engineering on April 4. The Senior Design Expo, under Dr. Tom Costello's leadership, was held on April 30 with eight senior design students in three teams showcasing their projects. We had 88 undergraduates (sophomores to seniors) and 21 graduate students. There were 12 graduates of the B.S. in Biological Engineering and five M.S. in Biological Engineering at the 2014 commencement. Our undergraduate enrollment is back on the rise after a drop following the establishment of a separate Biomedical Engineering program and department. The fall 2014 sophomore class is on track to be one of our larger ones. The faculty submitted twenty three grant proposals. There were thirty eight grants received in the amount of \$9,796,211. The faculty share of these grants was \$3,115,836.

The faculty produced the following publications:

• Books, book chapters or conference proceedings	2
• Peer reviewed publications or juried professional events	37
• Oral conference presentations	35
• Non-refereed publications	32
• Abstracts presented at national, international or regional meetings	5
• Invited lectures and/or professional presentations	43

BAE extension faculty delivered information and skill-development to assist Arkansans in maintaining and improving their access to sustainable food, water and energy systems through programs in nutrient management, design and practices for animal manure management; GIS-coupled sensing, web and mobile-device information delivery, modeling of watersheds, climate-change variables, and biomass resources; grain drying and storage, irrigation engineering, water management and quality; air-emission quantification for control and mitigation of air-pollution, poultry-house indoor air-quality; poultry farm energy efficiency, thermal energy-conversion, and residential energy conservation and efficiency. Our programs provided a biological and systems perspective to the state-wide extension team.

## **CHEMICAL ENGINEERING**

Dr. R. E. Babcock has stepped down as Department Head of the Ralph E. Martin Department of Chemical Engineering as stipulated by prior agreement at the time he assumed the position July

1, 2012. Dr. Ed Clausen will become the Interim Department Head effective July 1, 2014. Two faculty members, Drs. Rick Ulrich and Roy Penney have retired effective December 31, 2014 and May 15, 2015 respectively. The international resurgence of the petro-chemical industry, in combination with the ever increasing trend of modifying chemical engineering curricula towards bio/biomedical and green engineering, presents the need for careful contemplation in filling these faculty positions. Approval for filling these two positions during FY 2015 has been granted. The department has plans for curriculum review during FY 2015.

The department's safety awareness and training is discussed in more detail elsewhere in this report, but specific training activities for the year included OSHA-GHS, DOT, IATA, and IMO training and recertification for Mr. Leldon King and Dr. Tammy Lutz-Rechtin on March 18-20, 2014 in Indianapolis, Indiana. This is significant because all departmental safety training presentations were then updated to reflect changes to EPA guidelines and OSHA's move toward international standards. Both Drs. Christa Hestekin and Shannon Servoss were successful in their promotions to associate professor, effective the 2013-2014 and 2014-2015 academic years, respectively. The department granted 64 BSChE degrees, two MSChE degrees, and two PhD degrees with a 96% placement. The CHEG graduation rate of the 2007 cohort was 65%, and the University graduation rate of that cohort was 85%. Faculty external contracts and grants for FY 2014 totaled \$1.32M and refereed publications totaled 32. Research expenditures for CY 2013 totaled \$1.9 M.

Faculty development activities and special assignments include Dr. Keith Roper's acceptance of a second year prestigious appointment as Program Director of the National Science Foundation Engineering Education and Centers in the Engineering Directorate. Dr. Greg Thoma continues to serve as the lead scientist for the United Nations Food and Agriculture Organization's Technical Advisory Group for Poultry, as well as The Sustainability Consortium (TSC) representative on the Board of the United Nations Environmental Program/Society for Environmental Toxicology and Chemistry Lifecycle Initiative. Dr. Ranil Wickramasinghe served as the overall Program Chair of the Annual Meeting of the American Institute of Chemical Engineers (AIChE) in San Francisco, Calif., in November 2013. In addition, Wickramasinghe was successful in establishing the Center for Membrane Science, Engineering, and Technology (MAST) on campus, which is a NSF/Industry/University Cooperative Research Center.

Student achievements include the following: four recent graduates (Jeremy Dunklin, Megan Dunn, William Erwin, and Justin Norman) received prestigious National Science Foundation Graduate Research Fellowships for the upcoming academic year; Hailey Dunsworth was selected as a 2014 Goldwater Scholar, with Michael West receiving an Honorable Mention; and Lindsay Hoggatt was selected as the 2013-2014 Outstanding Senior in the College of Engineering.

## CIVIL ENGINEERING

### Metrics

Graduate Program Ranking (U.S. News and World Report)	84
New Grants / Awards (number):	17
New Grants / Awards (dollars):	\$2,088,250
Publications:	
Books	0
Book Chapters	1
Refereed Articles	26
Unrefereed Publications and Proceedings	30
Invited Lectures	4
Other Lectures, Papers, and Oral Presentations	50
Other Creative Endeavors	0
Patents	0
New Faculty (3):	
Dr. Michelle Bernhardt (Ph.D. Texas A&M)	
Dr. Clinton Wood (Ph.D. UT Austin)	
Dr. Gary Prinz (Ph.D. BYU; Post-Doc EPFL, Switzerland)	

## COMPUTER SCIENCE AND COMPUTER ENGINEERING

	FY 2013	FY 2014	Annual Growth
<b>Undergrads (Fall 2013)</b>	443	544	101
<b>In CSCE Dept.</b>	333	422	89
<b>In Freshman Engineering</b>	110	122	12
<b>Grads (Fall 2013)</b>	54	54	0
<b>M.S.</b>	30	26	-4
<b>Ph.D.</b>	25	28	3
<b>T/TT Faculty</b>	15	15	0
<b>Instructors</b>	1	1	0
<b>Student/Instruct Fac (Fall 2013)</b>	31.1	37.4	6.3
<b>Number of New Research Awards</b>	8	7	-1
<b>Value of New Research Awards</b>	\$849,000	\$841,562	-\$7,438
<b>Refereed Publications</b>	28	50	22

The Computer Science faculty size of 9 is roughly a third of the national average for Ph.D. granting public universities whom average 25.2 tenure track faculty. The Computer Engineering faculty size of 6 is also less than a third of the national average of 23.6 tenure track faculty.

The CSCE department grew by 101 undergraduate students with no additional instructional staff. Including freshmen in FEP who declared CSCE, the department has a student/instructional faculty ratio of 37.4. The number of graduate students remained essentially steady with a



decrease of 4 M.S. students nearly matched by an increase of 3 Ph.D. students. Compared to our peers, we teach roughly three times as many undergraduate students per tenured/tenure-track faculty and roughly half as many graduate students

Despite the increasingly heavy undergraduate teaching load, the number of funded proposals remained essentially steady with 7 new awards totaling \$841,562.

Dr. Qinghua Li (cybersecurity) was hired to replace a faculty member who left for another institution.

### **Significant Achievements**

The US World and News Report ranking for Computer Engineering jumped 12 spots from 109 to 97/143.

The University of Arkansas was designated a National Center of Academic Excellence in Information Assurance/Cyber Defense Research for academic years 2014-2019 by the Department of Homeland Security and National Security Agency.

CSCE graduated 58% more undergraduate students in 2013-2014 compared to 2012-2013 (60 vs 38). Most of this growth occurred in Computer Science (43 vs 19). CSCE students who graduated in May 2013 had a 100% placement in jobs or graduate school within six month of graduation; their average starting salary was over \$63,000.

## **ELECTRICAL ENGINEERING**

Samir El-Ghazaly stepped down as Head of Department to accept a three year off-campus assignment at the National Science Foundation. Juan Carlos Balda was appointed Head of Department, to serve a three year term ending June 30, 2017.

The Department of Electrical Engineering, led by Department Head, Juan Carlos Balda, has had a very productive FY14. The faculty members have been very busy, submitting over 85 research proposals from January 1, 2013 to December 31, 2013, and receiving 30 awards, totaling \$3,686,208 during Fiscal Year 2014. They attended over 75 professional meetings, serving as conference organizers, board members, session chairs, invited speakers, and technical Committee members.

Faculty and students authored over 120 papers and three textbooks were published. The 2013 international IEEE symposium Power Electronics for Distributed Generation Systems and the 4<sup>th</sup> international workshop on “Bismuth-Containing Semiconductors: Growth, Properties and Devices” were hosted in the summer of 2013, as described in more detail later in this report. The Dean’s office and the Department collaborated to offer three summer camps in summer 2013 for middle, junior high and high school students to stimulate new student’s interest in electrical engineering, and thereby, enhance retention. The camps were for 6<sup>th</sup>-7<sup>th</sup>, 8<sup>th</sup>-9<sup>th</sup> and 10<sup>th</sup>-12<sup>th</sup> graders, respectively.

Our undergraduate student population has not changed much in numbers, but the diversity ratios have changed. At the start of Fall 2012, 16.39% of our student population were from minority/underrepresented groups and at the start of Fall 2013, 19.07% of our students were from those minority/underrepresented groups. At the start of Fall 2012, we had 21 female undergraduate students, and at the start of Fall 2013, that number increased to 25. While not a significant increase, it does show that we are reaching a diverse group of students. The graduate program has shown a similar increase in diversity. In Fall 2012, 12.5% of the student population was female. In Fall 2013, that number increased to 17.44%.

Dr. Silke Spiesshoefer has been hired as Coordinator of the Electrical Engineering program at the University of Arkansas Fort Smith, replacing Dr. Randle Overbey, who retired at the end of the Spring 2014 semester. Dr. Spiesshoefer is a University of Arkansas electrical engineering alumnus and we are excited about the impact she will have on the Fort Smith program. Dr. Baohua Li and Dr. Michael Glover were promoted to the position of Research Assistant Professor, and are actively writing proposals for further research funding.

Dr. Randy Brown also retired at the end of the Spring 2014 semester. In addition to his teaching load, Dr. Brown had served the department for a number of years as the Graduate Coordinator. The Department greatly appreciates Dr. Magda El-Shenawee agreeing to take on those duties. Dr. Shui-Qing (Fisher) Yu was a successful candidate for promotion to the rank of Associate Professor during AY13-14.

Members of the faculty have received numerous awards, bringing recognition to the department and the college on both a national and international level; for example, Dr. Hameed Naseem was made a fellow of the National Academy of Inventors in December 2013.

The department was awarded the Gold Medal 2014 by the UA Office of Nationally Competitive Awards, and Dr. Juan Carlos Balda was awarded the 2014 Faculty Gold Medal by the same office.

## **INDUSTRIAL ENGINEERING**

FY14 was a productive, yet challenging year for the Department of Industrial Engineering led first by department head, Dr. Kim LaScola Needy and then interim head, Dr. Ed Pohl. There were two faculty retirements (Dr. Johnson, Dr. Rardin); Dr. Meller was on a leave of absence, and Dr. Buyurgan departed for a new position. Sadly, during the fall, our friend and colleague Dr. Ernie Fant passed away. His passing left a tremendous void both professionally and personally. In April 2014, Dr. Needy was named interim dean of the Graduate School and International Education. This prompted the appointment of Dr. Pohl as interim department head. In June 2014, Dr. Heather Nachtmann was named Associate Dean of Research for the College. Dr. Nachtmann and Dr. Pohl were both promoted to full professor in the fall of 2013. The faculty participated in a search to fill an endowed chair and two assistant professor positions. In the end, only one position was successfully filled. Dr. Harry A. Pierson will join the faculty as an assistant professor in fall 2014. Despite the turbulence, our team worked together to continue to achieve success and bring positive visibility to the department, college and university.

In an effort to meet the changing needs of the department we successfully recruited Dr. Greg Parnell to join as Visiting Professor to teach (Systems Engineering, Decision Models, and Senior Design) and contribute to research. He is a retired Colonel in the U.S. Air Force, retired Professor of Systems Engineering from the United States Military Academy at West Point and was a Distinguished Visiting Professor at the U.S. Air Force Academy. He has teaching experience at Virginia Commonwealth University and the Air Force Institute of Technology. He is recognized expert and leader in the areas of decision analysis, risk analysis, and resource allocation for defense, intelligence, homeland security, and environmental applications. He is a Fellow of INFORMS, MORS, the International Committee on Systems Engineering (INCOSE), the Society for Decision Professionals, and the Lean Systems Society. Dr. Parnell received his Ph.D. from Stanford University.

Research endeavors are steadfast. In FY14 our faculty members had active research grants exceeding \$8.8M, including 17 new awards (\$2,720,809). The department is home to The Center for Innovation in Healthcare Logistics (CIHL) which was recognized by AlliedHealthWorld.com as one of “10 Schools Driving Healthcare Innovation.” CIHL launched the Health Systems Engineering Alliance in 2012 which currently has 34 active member programs. A second research center within the department is the Center for Excellence in Logistics and Distribution (CELDi). CELDi is a multi-university center with 5 academic partners. It is in its eleventh year of support from member organizations (13) and the National Science Foundation (NSF). During FY14, Dr. Heather Nachtmann led a successful proposal to fund a USDOT Tier 1 University Transportation Center called the Maritime Transportation Research and Education Center (MarTREC). The funding for the consortium represents more than \$1.4M in research support.

There were 300 full-time students (BSIE 238, MSIE 26, PhD 36). Among the BSIE 35% were women and 17% minority. We recruited 74 (11%) of the freshman engineering class for fall 2013. Forty-five (73%) graduate students received assistantships or support. The MSOM program had 819 students enrolled in the program for the fall semester and a total of 3190 course enrollments for the year. The MSOM program continues to be the University’s largest graduate program with 212 students completing their degree in the past fiscal year.

## **MECHANICAL ENGINEERING**

Mechanical Engineering continues to remain as the most popular major in the College of Engineering at the University of Arkansas. 27% of our Freshman Engineering Program students declared MEEG as their major on Decision Day. Total number of students in MEEG increased by 14.1% over the 2012-2013 academic year. We now have over 500 undergraduate students (sophomore through senior).

Teaching effectiveness in MEEG, as evidenced by course evaluation results and senior exit interviews, showed impressive improvements. We now have more of our colleagues teaching many undergraduate courses incorporating design and manufacturing projects consistent with the Conceive, Design, Implement, Operate (CDIO) initiative. The new Virtual Machine Shop

(VMS) is up and operational, and all the resources in this lab are utilized very heavily. MEEG's national rank moved up 10 spots among all the mechanical engineering programs.

Despite our extremely high teaching load, scholarly activities continued to expand, as well. MEEG faculty published 37 refereed articles, 17 unrefereed technical papers & proceedings, 6 book chapters, and one book. Individual contributor and team-based research proposal productivity continued to expand, which resulted in \$668,938 worth of funded research.

MEEG faculty and staff compiled quite an impressive list of honors, awards, and significant accomplishments. A relatively small sample of this extensive list includes the following: (1) Ajay Malshe, Darin Nutter, and Min Zou were elevated to Fellow status in the CIRP, ASHRAE, and STLE organizations, respectively; (2) Doug Spearot received the Faculty Distinguished Rising Teaching Award from the Arkansas Alumni Association, and the Imhoff Outstanding Teaching Award from the COE; and (3) Melynda Hart and Laura Cochran served as staff senators representing 1,500 staff members working for the UofA, and Melynda Hart was appointed to the Chancellor's Commission on Women.

Economic development activities are continuing and expanding into many industries. MEEG reached out to eight aerospace defense companies in southern Arkansas (Camden area) in an effort to establish an effective working relationship. After two trips to develop a feel for their workforce and technical issues, some of the major companies, such as Lockheed Martin & General Dynamics, came to visit MEEG. We are on our way toward establishing student projects (CDIO and senior capstone design), internships and COOP programs, and technical research to help these companies even better in the global marketplace. With the help of Arkansas Economic Development Commission and COE staff, MEEG is now expanding these activities into automotive, energy, oil & gas industries.

## **II. SIGIFICANT ACHIEVEMENTS**

### **BIOMEDICAL ENGINEERING**

The Department of Biomedical Engineering was established on July 1, 2012 within the College of Engineering. The department continued its operation into its second year under the leadership of Dr. Terry Martin, Interim Department Head during the 2013 calendar year. Dr. Ashok Saxena, Distinguished Professor and Dean Emeritus was appointed as the permanent Department Head and is scheduled to join in May 2014. Professors Kaiming Ye and Sha Jin moved to State University of New York (SUNY) Binghamton as Department Head and Associate Professor, respectively. Dr. Michelle Kim joined the department as an instructor to assist with the considerable teaching load in the new department. The department also initiated the search for two new tenure-track faculty in 2013.

The Biomedical Engineering program continues to attract high ability students and their success rates are also high as shown in Fig.1. In the fall of 2013, the number of students in Biomedical Engineering in the sophomore, junior and senior years was approximately 190.

The average High School GPA among the cohorts who joined the freshman program in 2011 to 2013 and chose Biomedical Engineering after their freshman year was 4.0 and their average ACT scores for the various cohorts varied between 30 and 31.8. The graduation rate among the 2011 cohort is expected be 74% of those who chose Biomedical Engineering after their freshman year. This number is high for engineering but we expect to improve it further in the near future. The average GPA among all Biomedical Engineering is 3.4 that is consistent with high success rates.

The student attrition in the BMEG program primarily occurs in the sophomore year. We believe that the reasons for attrition were related to (i) renovations of lab and office spaces that was ongoing during 2013 (ii) several courses in the curriculum were being offered for the first time and (iii) the new advisement processes were being implemented for the first time. Since those reasons are no longer relevant, we expect the success rates in the future to be even higher than 75%. Our goal will be to achieve a graduation rate of 85% of those that enter Biomedical Engineering after their freshman year. The BMEG advisement system will also ensure that those that leave Biomedical Engineering are able to be successful elsewhere within the College of Engineering or in the University of Arkansas.

Several students transferred into Biomedical Engineering from other programs and 8 among them received their BS degrees in 2013 as the new program's inaugural class. Seven of the eight graduates of the program are pursuing graduate degrees in Engineering, Business or Medicine.

The Department completed its Continuous Improvement Plan in preparation for the ABET visit in the fall of 2014 and also the draft of its self-study document.

The department moved into the newly renovated space on the first floor of the John A. White, Jr. Engineering Hall. The new space includes state-of-the-art office space for faculty and staff, meeting rooms and also modern laboratories for undergraduate instructions.

The department made great strides into research and several of the faculty engaged in pursuing extra-mural funding that is now paying-off. The faculty places strong emphasis on integrating their research into the class rooms via elective undergraduate courses, graduate courses and research experience for students.

BMEG faculty have taken an interdisciplinary approach to establishing research connections, collaborating with UAMS and faculty from various other disciplines across campus that include Kinesiology, Chemistry and Biochemistry, Cell and Molecular Biology, as well as other College of Engineering departments including Chemical Engineering, Mechanical Engineering, Biological and Agricultural Engineering, Electrical Engineering and Computer Science and Engineering.

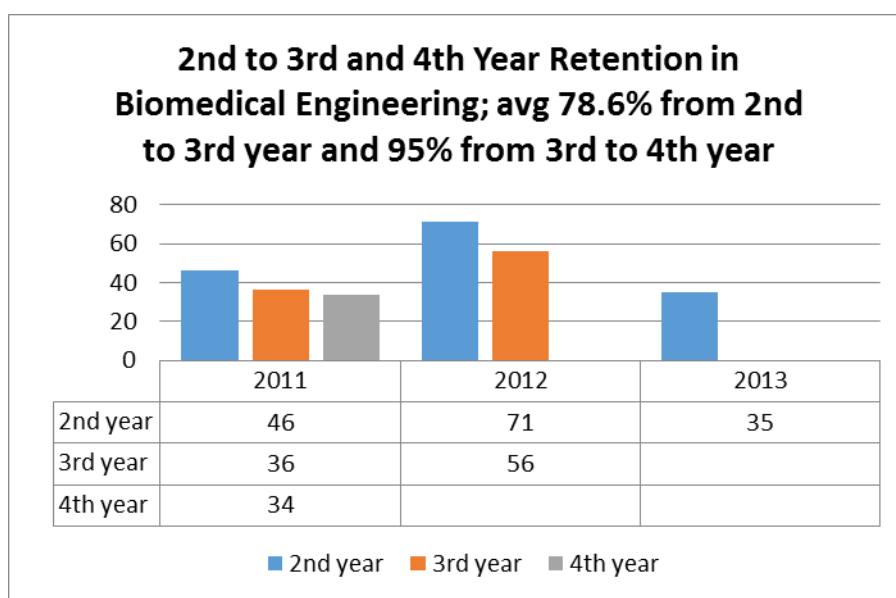


Fig. 1- Retention data for Biomedical Engineering students for the freshman classes of 2011, 2012 and 2013.

## **BIOLOGICAL & AGRICULTURAL ENGINEERING**

### **Statement of Progress toward Strategic Goals and University Priorities**

#### Summary Statement

Our vision is to be a leading Biological and Agricultural Engineering Department in the nation, providing biological engineering expertise of value to the public. Our teaching, research and

service activities will significantly contribute to the quality of life, security, economic development, and environmental stewardship for Arkansas and the World

## **Strategic Goals for Biological and Agricultural Engineering**

### Research Program

The objective of the Department of Biological and Agricultural Engineering Research Program is to conduct basic and applied biological and agricultural engineering research that addresses the needs of Arkansas and the World, consistent with the mission of the Division of Agriculture, Dale Bumpers College of Agriculture and Life Sciences, and the College of Engineering. Outcomes for Research Objectives are measured based upon the Departmental Full Time Equivalent (FTE) appointments for Research. These outcomes reflect expectations of the Department community as a whole, not of each individual faculty member. We recognize that individual faculty will contribute differently to the overall community productivity. While these numeric outcomes are measurable, the more difficult task is to measure the effectiveness of the research program in meeting the vision of the Department of Biological and Agricultural Engineering.

### Undergraduate Education Program

The objective of the Department of Biological and Agricultural Engineering Undergraduate Education Program is to produce graduates of BS program in Biological Engineering who are well prepared for sustained professional careers in biological engineering. These careers could include professional, competent and ethical contributions to clients and society through the design or management of sustainable systems involving food, water and/or energy.

### Graduate Education Program

The objective of the Department of Biological and Agricultural Engineering Graduate Education Program is to educate Biological Engineering professionals with advanced degree (MS and PhD) that are prepared for future challenges in biological engineering, including creation of knowledge through research, life-long learning, and professional and ethical contributions to society.

### Technical Transfer/ Extension Program

The objective of the Department of Biological and Agricultural Engineering Technical Transfer/Extension Program is to provide technical knowledge, technology, and development of intellectual properties, support and education to the citizens of Arkansas while addressing the needs of Arkansas and the World. The mission of outreach is not solely the responsibility of the faculty with predominant Cooperative Extension Service appointments, but rather is shared by the entire faculty community.

### Faculty/Staff Development Program

The objective of the Department of Biological and Agricultural Engineering Faculty Citizenship Program is to support the institutional needs of the Division of Agriculture, Dale Bumpers College of Agriculture and Life Sciences, the College of Engineering, and the University of Arkansas, and to encourage the professional growth of the faculty and staff.

### **Actions & Initiatives** taken to address goals and needs

Faculty initiated:

1. Implemented the revamped undergraduate program in biological engineering to prepare graduates prepared to solve problems dealing with sustainable food, water and energy systems.
2. Conducted and delivered engineering research and extension programs involving sustainable food, water and energy systems to serve agriculture.

### **Milestones achieved**

1. The revised BSBE program was implemented and delivered.
2. A comprehensive review of the graduate programs in Biological Engineering was conducted.

### **Projected milestones for the coming year**

1. Add instructional and tenure-track faculty.
2. Strengthen the graduate program, increase graduate student enrolment and offer more graduate level courses.
3. Continue effective research and extension programs to address the engineering needs of agriculture, including environmental sustainability, food, water and energy systems.

## **CHEMICAL ENGINEERING**

The endowment of the department remains strong thanks to strong support from alumnus and corporate sponsors. The department has four endowed chairs and seven endowed professorships. The department's total endowment is over \$11 M with total foundation End Net Assets of \$16 M. Current names of the holders of the endowed chairs and professorships are identified later in this report.

In an effort to support highly active research faculty as well as the increase in undergraduate enrollment, Dr. Jeremy Herman, a recent graduate of the department, was hired in January 2014 as an Instructor for graduate and undergraduate coursework. His appointment will change effective August 18, 2014 to Clinical Assistant Professor. In addition, postdoctoral fellow Dr. Alice Jernigan, who works under Dr. Christa Hestekin, was given 50% appointment to teach undergraduate courses. Dr. Heather Walker 25 % appointment was converted from a Research Assistant Professor position to a Clinical Research Professor position.

The department faculty has been looking at approaches to improve graduate student recruitment, and it is anticipated that several of the current research programs will thrive, which will provide additional opportunities for graduate students and post-doctorate hiring. Efforts have been made to enhance the intellectual environment of the graduate program by inviting external speakers to the department, and this plan will continue. An ad hoc committee composed of Dr. Jamie Hestekin, Dr. Ed Clausen, and Ms. Peggy Anderson collected benchmarking data and made a presentation to the faculty calling for essentially doubling the number of graduate students and research expenditures.



### **Safety Awareness**

A departmental safety committee comprised of Departmental Head Dr. Buddy Babcock, Safety Officer Mr. Leldon King, graduate student Mr. Phillip Turner, and postdoctoral researcher Tammy Lutz-Rechtin initiated several directives to improve safety procedures and training for department faculty, staff and students, including the requirement of intensive internal safety reviews of each laboratory on a tri-annual basis. The committee standardized the use of the National Fire Protection Association NFPA Hazard diamond identification for all chemicals and developed a set of standard training practices to include the use of internal presentations and tests combined with the University's Environmental Health and Safety on-line tests, as well as separate autoclave and bio-safety training. A rigid shipping policy for biologics and hazardous chemicals has been implemented, requiring either Mr. King or Dr. Lutz-Rechtin to first approve package contents, as they are both DOT, IATA, and IMO certified. The committee also emphasized an open communication, open door policy for all students and faculty to create a "Culture of Safety" within the department. Chemical inventories for each laboratory have been standardized, and laboratory door postings for emergency contact personnel are updated regularly.

Specific training activities for the year included: OSHA-GHS, DOT, IATA, and IMO training and recertification for Mr. King and Dr. Lutz-Rechtin on March 18-20, 2014, in Indianapolis, Ind.; updating and standardizing safety training presentations for all personnel to reflect changes to EPA guidelines and OSHA's move toward international standards; one hour of lab training and testing for all undergraduates in lab courses at the beginning of the semester; and insuring all graduate and undergraduate students working in labs have received training from safety personnel or faculty and taken online hazard communication. A specialized fire hazard lecture and demonstration was conducted by Mr. Wayne Brashear, Fire Marshall, for all department faculty, students, and staff. Additionally, graduate students and office personnel have reviewed safety committee recommendations addressing specific issues and clarifications pertinent to their job descriptions. Graduate students also participated in a training Q&A session pertaining to these issues.

### **Benchmarking data**

As part of the procedure to assess the effectiveness and productivity in comparison with other chemical engineering departments, our department is an active participant in the Southeast Region Chemical Engineering Department Alliance. Representatives from chemical engineering departments from universities across the southeastern United States meet annually to compare vital department statistics and discuss common problems and approaches to solutions.

To facilitate the comparison of the department with other departments, two groups of departments were identified: Peer Group and Stretch Group. The Peer Group consists of southeast regional chemical engineering departments in the top 50 to 100 of the *U.S. News and World Report* list of the "Best Undergraduate Engineering Programs", including University of South Alabama, Clemson University, University of Kentucky, Louisiana State University, University of Tennessee and Texas Tech University. The Stretch Group consists of southeast regional chemical engineering departments in the top 20 to 50 of the *U.S. News and World Report* list of the "Best Graduate Chemical Engineering Programs", including Auburn University, University of Florida, University of Maryland, North Carolina State University,

Vanderbilt University, and University of Virginia. The following observations can be made based on data from calendar years 2011, 2012 and 2013.

Number of tenured/tenure-track faculty: Until the recent hiring of new faculty members, the department tenured/tenure-track faculty had been smaller than the Peer Group by at least one faculty position and nearly half that of the Stretch Group. At present, the faculty is roughly the same size as both the Peer and Stretch Groups.

Externally funded research: The amount of externally funded research is significantly lower than that of both the Peer and Stretch Groups, though it has steadily increased over the last three years. The current yearly research expenditure per faculty member is approximately \$124,000, which is well below the goal and expectation of \$300,000.

Undergraduate enrollment: The undergraduate enrollment sans freshmen is at 224, the highest in the history of the department, putting the undergraduate sophomore thru senior student-to-tenured/tenure-track faculty ratio at approximately 14, which is significantly smaller than that of the Peer and Stretch Groups.

Undergraduate placement rate: The undergraduate placement rate is excellent. The department actively seeks to place students, even after graduation, and in recent years, each of the BS graduates who have sought a professional position have been placed. Placement performance for this year remained competitive (92% placement), compared to the Peer and Stretch Groups percentages which are 84% and 74%, respectively.

Graduate enrollment: Graduate enrollment remains low compared with that of the Peer and Stretch Groups. The department has graduated and placed five graduate degree recipients this year. Next year's graduate enrollment is projected to be 28 showing a 10% decrease. A plan has been implemented in which departmental foundation funds will be used to match externally funded graduate students on research projects where additional graduate student labor accelerate the pace or allow for the expansion of the research work plan. This will lead to additional graduate students entering the program and expand the number of externally funded research projects.

The department recognizes that untenured faculty members will need to demonstrate their ability to attract external funding sources. A principal resource the department can offer to new faculty members is the availability of departmentally-funded graduate assistants. It is also recognized that the department's most far-reaching success has been in the education of undergraduate chemical engineering students from Arkansas and the surrounding regions. These efforts are reflected in the successful placement of undergraduates and very positive feedback from corporate constituents. Put simply, University of Arkansas chemical engineering undergraduates are well respected and sought after, both in industry and as graduate students at nationally recognized institutions. It is vitally important that this success is continuously communicated to graduates and to potential students. To this end, the faculty recognizes the commitment to pursuing externally funded research must be balanced with a commitment to undergraduate education, and that such a balance is possible.

## **CIVIL ENGINEERING**

Alumni and employer assessments continue to show a high level of satisfaction with the preparation of our graduates, particularly in comparison with graduates from other universities. Graduates of the Department of Civil Engineering remain in high demand, despite the lagging economy. For those graduates receiving job offers, the average starting salary (approximately \$55,000) continues to compare favorably to the national average.

In 2013, the Department was able to award financial support – primarily scholarships – to over 90 students. Graduate student financial support remained strong in 2013, with approximately 75 percent of graduate students receiving some form of financial assistance.

The Mack-Blackwell Rural Transportation Center (MBTC), partnering with the Departments of Civil and Industrial Engineering, successfully landed two University Transportation Centers (UTC) in 2013. The UA is the lead institution on the “Tier 1 UTC” Maritime Transportation Research and Education Center (MarTREC), and a partner (under the University of Oklahoma) on the “Regional UTC” Southern Plains Transportation Center (SPTC). The MarTREC award represents approximately \$1.4M in federal funds; the UA share of SPTC is approximately \$225k.

Dr. Julian Fairey received notification of his selection for the National Science Foundation (NSF) CAREER Award. Dr. Micah Hale and Ms. Frances Griffith were each named a Fellow of the American Concrete Institute (ACI). Mr. C. Larry Weir received the College of Engineering Distinguished Alumni Award in 2013.

## **COMPUTER SCIENCE AND COMPUTER ENGINEERING**

### **Significant Changes**

*Undergraduate enrollment* in CSCE (sophomores-seniors) jumped 27% last year, from 333 in Fall 2012 to 422 in Fall 2013. This is on top of a 24% growth in the previous year.

In the past 5 years, from Fall 2008 to Fall 2013, undergraduate enrollment (sophomores – seniors only) increased by 262, from 160 to 422. During the same time period, one instructor has been added to the department.

The *student/faculty* ratio has increased to 29.8 from 25.9 last year. When the FEP students who declared CSCE are added for consistency across campus, the student/faculty ratio is 37.4.

We *graduated* 58% more undergraduate students in 2013-2014 compared to the previous year (60 vs 38). Most of this growth occurred in Computer Science that more than doubled the number of undergraduate degrees awarded (43 vs 19).

The number of *refereed publications* produced by CSCE faculty nearly doubled from 28 last year to 50 this year.

*Research expenditures* dropped precipitously, from \$2,168,910 in FY2013 to \$317,411 in FY2014. Some of this drop can be attributed to the completion of several large high performance computing (HPC) grants originally awarded to Amy Apon (who left to be program chair at Clemson). New HPC grants are run through the high-performance computing center rather than CSCE. We have 6 junior faculty (4 hired in the previous 2 years) who are just beginning to establish their research programs. CSCE faculty already received 4 new awards for FY2015, so this number should increase next year.

*The US World and News Report ranking* for Computer Engineering jumped 12 spots from 109 to 97/143. US World and News did not produce a new ranking for Computer Science departments last year, so Computer Science remains ranked at 140/156.

### **Significant Achievements**

The University of Arkansas was designated a National Center of Academic Excellence in Information Assurance/Cyber Defense Research for academic years 2014-2019 by the Department of Homeland Security and National Security Agency. This is a very prestigious national recognition of the quality and quantity of cybersecurity-related research being conducted by CSCE faculty. This effort was led by Dr. Brajendra Panda.

In August, 2013, the CSCE department hired a new assistant professor Dr. Qinghua Li. Dr. Li received his Ph.D. in 2013 from Penn State University. His research focuses on new algorithms for privacy protection, particularly within mobile applications. He adds to the capabilities of our Center for Excellence in Cybersecurity. Dr. Li was a replacement hire for a faculty member (Banerjee) who left for UMBC.

On April 18 and 19, 2014, ACM hosted their First Annual Hackathon. Over 30 students attended the event. A hackathon is an event in which computer programmers collaborate intensively on software projects. Students had 21 hours to work on an application that would help U of A students. Students competed in teams of one, two, or three, that were judged by a panel of CSCE faculty and alumni on several criteria including usefulness, technical difficulty, polish, and creativity. Team HAK, consisting of graduate students Zac Kindle, Jon Hammer, and Stephen Ashmore took home first place and a set of Raspberry Pi's.

The CSCE department has been focusing on activities to promote its research and reputation among its colleagues. The significant accomplishments below all work towards that goal:

Dr. Miaoqing Huang helped organize a regional conference to further improve our external visibility. The Department of Computer Science and Computer Engineering at the University of Arkansas hosted the Fifth Central Area Networking and Security Workshop - CANSec (originally known as Greater Kansas Area Security Workshop - KanSec) on April 4th and 5th, 2014. The CANSec workshop brings together researchers and practitioners in security and networking related fields in the central area of US. The goal of this workshop is to provide a regular forum for presenting research and education activities in all areas related to computer and communication security and networking, as well as promoting interactions and collaborations among scholars and students and between academia and industry.

Dr. Matt Patitz and the CSCE ACM student group participated in a new outreach activity to engage young students in computing. CSCE students volunteered at Happy Hollow Elementary School in Fayetteville during a national Hour of Code project. The project encourages students to learn computer science. Several Fayetteville schools participated in the project that demonstrated that anyone can learn how to build technologies associated with computers. This activity was featured in Northwest Arkansas Times article "Fayetteville Students Introduced to Computer Coding," published on December 13, 2013  
<http://www.nwaonline.com/news/2013/dec/13/fayetteville-students-introduced-computer-coding/>.

The Computer Science and Computer Engineering (CSCE) department at the University of Arkansas was one of the hosts for the ACM/ICPC Collegiate Programming Contest Mid-Central Region on Saturday, November 2, 2013. Fifteen teams from Arkansas and Missouri competed. The contest is touted as the "oldest, largest, and most prestigious programming contest in the world" according to ACM. From its beginning in 1970, the contest held its first finals in 1977 and has operated under the auspices of ACM and headquartered at Baylor University since 1989. Over 30,000 contestants from universities in 91 countries on 6 continents participate in regional contest, trying to advance to the World Finals to be held in Ekaterinburg, Russia in June 2014 by placing in the top five in the region.

### **Benchmarks**

All benchmarking is done using data reported to the Computing Research Association. The CRA Taulbee Survey is available at: <http://cra.org/uploads/documents/resources/crndocs/2013-Taulbee-Survey.pdf>. The Taulbee Survey collects data from 266 Computer Science, Computer Engineering, and Information Systems PhD granting institutions in the US and Canada. The most recent data is for the 2013-2014 academic year.

#### *Peer Group:*

US Public Universities that offer a Ph.D. in Computer Science and/or Computer Engineering.

#### *Faculty Size*

**US Public Average CS Tenured/Tenure Track Faculty Size: 25.2**

**University of Arkansas Tenured/Tenure Track Faculty Size: 9**

**The University of Arkansas is roughly a third of the size of its average peer.**

**US Public Average CEng Tenure Track Faculty Size: 23.6**

**University of Arkansas Tenure Track Faculty Size: 6**

**The University of Arkansas is less than a third of the size of its average peer.**

#### *Undergraduate Enrollments*

US Public Average CS Undergraduate Enrollment: 410

University of Arkansas CS Undergraduate Enrollment: 353

US Public Average CEng Undergraduate Enrollment: Not reported

University of Arkansas CEng Undergraduate Enrollment: 191

University of Arkansas CSCE Undergraduate Enrollment (CS+CEng): 544

The CSCE department has 18% fewer CS majors than the average CS department. When Computer Engineering majors are included, the CSCE department had 33% more majors than the average US Public CS department.

#### *Undergraduate Student/Faculty Ratio*

US Public Average CS undergraduate student/tenure-track faculty ratio:  $410/25.2 = 16.3$

University of Arkansas CS undergraduate student/tenure-track faculty ratio:  $353/9 = 39.2$

University of Arkansas CEng undergraduate student/tenure-track faculty ratio:  $191/6 = 31.8$

University of Arkansas CSCE undergraduate student/tenure-track faculty ratio:  $544/15 = 36.3$

**The CSCE tenured/tenure-track faculty teaches more than twice as many undergraduates ( $36.3/16.3 = 2.2$ ) as the average US Public CS department. This is unsustainable.**

#### *Graduate Enrollments*

US Public Average CSCE PhD Enrollment: 85

University of Arkansas CSCE PhD Enrollment: 28

US Public Average CSCE MS Enrollment: 96

University of Arkansas CSCE MS Enrollment: 26

Normalizing by size:

US Public Average CSCE PhD Enrollment/Tenured/Tenure-Track Faculty: 3.34

University of Arkansas CSCE PhD Enrollment Enrollment/Tenured/Tenure-Track Faculty: 1.87

US Public Average CSCE MS Enrollment/Tenured/Tenure-Track Faculty: 3.53

University of Arkansas CSCE MS Enrollment Enrollment/Tenured/Tenure-Track Faculty: 1.73

Even when normalized by size, the CSCE department has roughly half the number of graduate students per faculty compared with their peers. This is a likely side effect of having more than double the number of undergraduate students per faculty. Growing the graduate student population will require more faculty to decrease the undergraduate teaching load, allowing time to secure the necessary research expenditures to support and grow a vibrant graduate program.

#### *Research Expenditures*

US Public Average Research Expenditures (total): \$3,743,800

University of Arkansas CSCE Research Expenditures (total): \$317,411

The CSCE faculty generated less than 10% of the expenditures of the average CS department.

Normalizing by size:

US Public Average Research Expenditures (per faculty): \$148,563

University of Arkansas CSCE Research Expenditures (total): \$21,161

The CSCE faculty generated less than 15% of the expenditures of the average CS department per faculty member. This is a precipitous drop from last year that was \$144,594/faculty member, right on par with our average peer. With the undergraduate enrollment increases, senior faculty

are carrying very heavy teaching loads, affecting their ability to seek external funding, and many junior faculty are recent hires just now establishing their research programs. Between these two factors, research funding is likely to grow slowly without additional faculty resources.

The funding available for Computer Science from the NSF is as large as the budget for the entire Engineering directorate. An investment in tenure track faculty to handle the student growth in CSCE has the potential to pay off through greatly increased funding.

## **ELECTRICAL ENGINEERING**

The UA Department of Electrical Engineering Graduate Program rankings went up from 122 to 102. This increase in ranking is a result of the hard work of our faculty and the concentrated effort on the part of the faculty and staff to make the public aware of everything that is going on in our department, through attendance at conferences, collaborative research, and publication of the bi-annual Sparks newsletter.

During the July 8<sup>th</sup>-11<sup>th</sup> 2013, the NSF GRAPES Center (GRid-connected Advanced Power Electronic Systems) hosted the 4<sup>th</sup> Annual IEEE Symposium for Power Electronics for Distributed Generation Systems (PEDG 2013). More than 100 researchers from around the world gathered at the John Q. Hammons Center in Rogers, (AR) to participate in the conference. Important issues in distributed generation technology areas such as solar energy, wind energy, microgrids and more were addressed. Dr. Juan Carlos Balda was the technical chairman and will continue to work with the IEEE PELS Sustainable Energy committee over the next several years as the conference moves to other locations. Dr. Alan Mantooth was the Chair of the Local Arrangements Committee, Dr. Simon Ang was a Technical Co-Chair, and Dr. Roy McCann was the Treasurer.

Shui-Qing (Fisher) Yu, Assistant Professor of Electrical Engineering, hosted the 4<sup>th</sup> International Workshop on Bismuth-Containing Semiconductors in Fayetteville July 13<sup>th</sup>-17<sup>th</sup> 2013. Bismuth-containing semiconductors are increasingly important in the development of various electronic devices, and as such, the research discussed at the meeting was of interest to both academic and industrial researchers. The workshop brought together researchers from eight different states and 13 different countries and from diverse fields such as physics, chemistry, materials science, and engineering. Dr. Gregory Salamo (PHYS) and Dr. Shane Johnson of Arizona State University were co-organizers of the workshop.

The IEEE student chapter (advised by Mr. Robert Saunders) has taken the lead in getting our student societies to be more active and getting more students involved. They sponsored some educational field trips and some social activities which included not only the Electrical Engineering students, but were open to all College of Engineering students, faculty and staff.

Hameed Naseem was awarded the “Margaret and Bill Brown” Outstanding Electrical Engineering Faculty award for academic year 2013-2014. This award is given to a faculty member who not only excels in the teaching, research and service missions of the Department but also shows collegiality when interacting with others.

Dr. Hameed Naseem was elected as a member of the National Academy of Inventors in May 2013, and was named as a Fellow of that organization in December 2013.

Sharon Brasko was awarded the “Margaret and Bill Brown” Outstanding Electrical Engineering Staff award for academic year 2013-2014. This award is given to a staff member who not only excels in the task of supporting the Department operations but also shows collegiality when interacting with others. Sharon was also promoted to the position of Fiscal Support Analyst.

Kathy Kirk was named College of Engineering employee of the semester for Fall 2013 and was promoted to the position of Fiscal Support Supervisor.

The Department currently houses five centers, High Density Electronics Center (HiDEC), NSF I/UCRC GRId-Connected Advanced Power Electronic Systems (GRAPES), National Center for Reliable Electric Power Transmission (NCREPT), NSF/EPSCoR GREEN Research Center for Nanoplasmonic Solar Cells, and NSF/EPSCoR Vertically-Integrated Center for Transformative Energy Research (VICTER). HiDEC, GRAPES and NCREPT are ADHE approved centers. The faculty members in these centers were responsible for over 55% of the submitted proposals and 66.86% of the funded proposals.

## **INDUSTRIAL ENGINEERING**

The UA Department of Industrial Engineering is following a 5-year strategic plan established in 2010. Members of the faculty, staff, and Arkansas Academy of Industrial Engineering contributed to the formulation of this plan. The vision is to be a nationally-competitive, student-centered, Industrial Engineering program serving Arkansas and the world through undergraduate and graduate studies, through leading-edge research programs, through contributions to the profession, and through our unique access to major organizations with world-class logistics and distribution operations. To be a model program providing a broad, personalized undergraduate experience, contemporary graduate and professional programs, and research emphasizing the application of quantitative modeling and analysis. To be leaders in the industrial engineering profession. The five main areas encompassing the mission include undergraduate education, graduate education, research, service, and departmental visibility. Values and strategic initiatives have also been defined.

A specific focus to improve the undergraduate educational experience has been to expand the opportunities for students to study abroad. Three initiatives were established toward this goal. First, a survey was developed and administered to help determine why students would or would not study abroad, what obstacles they faced, and where they most preferred to study. The second initiative was to secure additional funding to support students who chose to participate. The third effort was to find ways to allow students to study abroad without delaying their graduation. The survey provided valuable feedback about needs and preferences. Additional funding has been provided by the department and the Academy to help more students to have this global experience. As a result of this emphasis on the study abroad program, our department was able to offer a study abroad experience to nine students for the spring or summer of 2014. An



international internship program was piloted this year with Wal-Mart as a way to make study abroad experiences more affordable for our students.

Our Liaison Committee serves as our advisory board and meets annually to evaluate the department. It is the opinion of this year's Liaison Committee that overall, the Industrial Engineering Department continues to be extremely successful in delivering its mission. Across the board, student, faculty and staff successes over the past year are testament to this. Departmental leadership remains strong and committed to continuous improvement.

The department received a positive outcome from the 2013 Graduate Program Review. Both the MS and Ph.D. programs in IE as well as the Operations Management programs underwent reviews. The committee reported that they found the programs to be well led, well staffed, and of high quality.

## **MECHANICAL ENGINEERING**

On the teaching excellence front, our CDIO initiative related activities expanded into the MEEG curriculum. A significant support infrastructure, the Virtual Machine Shop (VMS), became fully operational in support of all our CDIO projects implemented in undergraduate courses. Outstanding teaching effectiveness gains in the entire department culminating in one of our colleagues, Doug Spearot, sweeping departmental, college and university teaching excellence awards. MEEG was selected to host the annual North America Region CDIO meeting. This region encompasses all the countries in Central America, the U.S.A, and Canada. Jim Leylek is now the co-director of the CDIO NA Region. These CDIO activities provide much needed and very valuable national and international exposure to our program.

“Bio Inspired Surfaces,” proposed by a group of MEEG faculty, was the core research topic selected by the State EPSCoR Office for the \$20M NSF EPSCoR funding opportunity. A massively large effort, led by Min Zou and supported by six additional MEEG professors, formed the basis for a multi-departmental & multi-institutional full proposal that involve researchers across the entire State of Arkansas. Strategic hiring that led to the formation of the critical mass in materials research area enabled us to compete at such a high level. A similar strategic plan is actively building the critical necessary mass in thermal/fluids area in an effort to compete in an equally large funding opportunity in the near future. The thermal/fluids group conducted two dedicated brainstorming sessions on grand challenge type problems – such activities will continue.

Our economic development effort is extremely well received by all the companies we approached thus far. Initially, attention was focused on companies in the aviation and aerospace defense industries. This list of companies includes Dassault/Falcon Jet, Lockheed Martin, General Dynamics, Aerojet Rocketdyne, Raytheon, Esterline, Spectra, NTS, and Zodiac Aerospace. Our primary offering is centered-around CDIO and unique research capabilities. CDIO initiative resonates well with our corporate partners. It is designed to help students engineer immediately upon graduation. These companies are equally impressed with MEEG's unique research capabilities, and its impressive experimental and computational research

facilities to conduct relevant research for industry. Our industry affiliation covers the entire spectrum, including internships, COOP opportunities, M.S. thesis and Ph.D. dissertation funding, and faculty consulting. This highly focused effort is now being expanded to many other industries, which include automotive, machining, energy, chemical, and oil & gas.

## **II. ACHIEVMENTS IN TEACHING, RESEARCH AND PUBLIC SERVICE**

### **BIOMEDICAL ENGINEERING**

#### **Teaching**

Dr. Kartik Balachandran endeavored to give students more research experience with real world biomedical engineering problems in the classroom through his newly designed senior/graduate elective, BMEG 4243/570V: Advanced Biomaterials. Students were instructed to conceptualize and work through a real research problem from discovery through initiating a grant proposal solution. This addition to the curriculum was implemented to address and better prepare biomedical engineering students to pursue both industry and graduate research careers.

Dr. David Zaharoff developed and implemented a “flipped” teaching style for the new BMEG 4623: Biomedical Transport Phenomena required senior level course, which was a well-received addition to the department curriculum.

BMEG 4823: Senior Design II, instructed by Dr. Jeff Wolchok, participated in “one campus one book” in using Rebecca Skloot’s “The Immortal Life of Henrietta Lacks” to better teach biomedical ethics in the classroom.

BMEG 4813/4823: Senior Design I and II, both instructed by Dr. Jeff Wolchok, partnered with UAMS and other local clinicians to serve as project mentors to various student projects.

BMEG 2613: Introduction to Biomedical Engineering was improved to include problem-based learning modules under the direction of Dr. Michelle Kim. Dr. Kim, with help from other faculty integrated design based engineering problem solving, providing motivation for learning of various topics in biomedical engineering.

Biomedical Engineering faculty continued to focus on providing undergraduate research opportunities to students. Faculty mentored more than twenty-five individual research projects with undergraduate students in the Biomedical Engineering laboratories at ENRC. These numbers included numerous Honors College and Surf funding awards.

#### **Research**

The Department of Biomedical Engineering faculty were collectively awarded over two million research dollars in the 2013 – 2014 academic year. Over one and a half million dollars of this amount was awarded from federal funding sources. This award money is the result of fifteen individually funded research projects.

Biomedical Engineering faculty initiated several multi-disciplinary projects by reaching out to other departments in the university such as Kinesiology, Biological Sciences, Chemistry and Biochemistry, Biological and Agricultural Engineering as well as with various physicians and research teams at UAMS in Little Rock, Arkansas in an effort to expand the department research program.

David Zaharoff continued to cultivate inter-disciplinary projects with Dr. Thallapuranam in Chemistry, Dr. Kim in Biological and Agricultural Engineering and Dr. Haggard in Biological and Agricultural Engineering. He continued his collaboration with Dr. Suzanne Klimberg, Dept. of Surgery and Dr. Matthew Katz, Dept of Urology, UAMS, in an effort to translate his novel immunotherapies in to clinical trials.

Drs. Zaharoff, Wolchok, Balachandran and Muldoon all individually sought funding from the National Institute of Health (NIH) for their research. As a campus the NIH funding is low but the Biomedical Engineering faculty are aggressively pursuing opportunities available to them from NIH. Most of the proposed projects are for translational research that will lead to novel cancer therapies and treatment, development of novel optical imaging techniques and for developing biomaterials that mimic human muscle for treatment of traumatic injuries. We expect the Biomedical Engineering research expenditures to grow dramatically in 2014 as a result of this initiative. The new awards received by Biomedical Engineering faculty are shown in the chart shown in Fig.2.

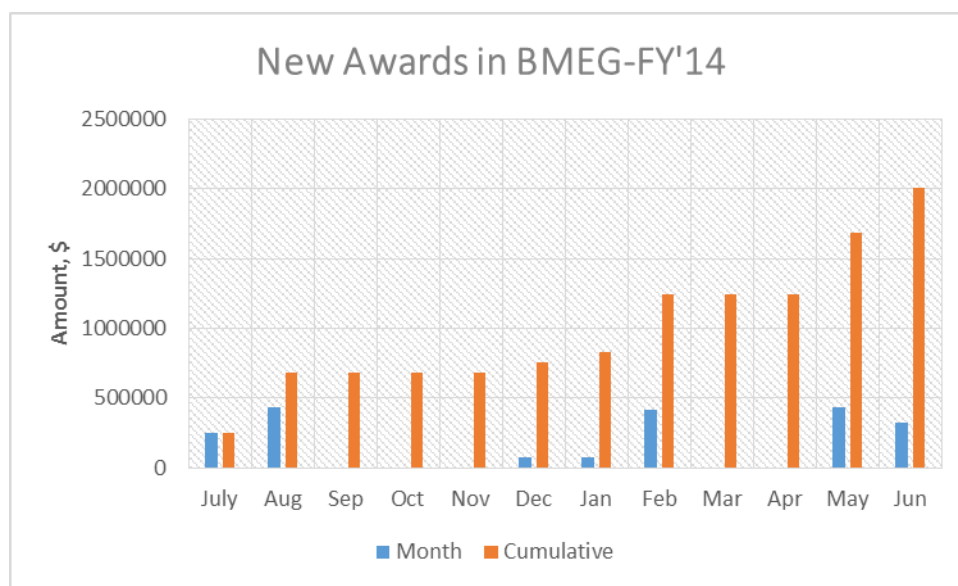


Fig. 2- Externally funded research support brought in by Biomedical Engineering faculty in FY'14. The chart shows new awards by month and the cumulative amounts.

### **Service**

Biomedical Engineering faculty peer reviewed numerous journal papers for scientific journals including *Expert Opinion on Drug Delivery*, *Journal of Applied Polymer Science*, *Nanomedicine*, *Cardiovascular Engineering and Technology*, *Optics Letters*, *PLOS ONE*, *Journal of Tissue Engineering and Regenerative Medicine*, *Acta Biomaterialia*, *Processes*, and *Biomatter*.

Dr. Kartik Balachandran participated as a conference reviewer for the Southern Biomedical Engineering conference held May, 2013 in Miami, Florida by reviewing more than ten abstracts.

Biomedical Engineering faculty both chaired and served on numerous committees at all department, college and university levels including multiple department faculty & staff search committees, the College Co-op committee, COE Curriculum committee, COE Safety committee, COE Technology committee, COE Associate Dean for Research & Development Search committee, COE Research Task Force, COE Dean Search committee, Institutional Animal Care & Use committee, participation in the STEM Education Working Group and University-wide STEM Education planning meetings.

Dr. Tim Muldoon accepted to serve as faculty advisor for the Golden Key Honor Society, University of Arkansas Chapter.

Dr. Jeff Wolchok co-developed a Biomedical Module and participated in the College of Engineering “Explore Engineering” summer camp. This was Biomedical Engineering’s first involvement with the camp. Students toured research labs, dissected pig heart tissue, and built an EKG during the half-day module which served approximately 20 middle school students.

Biomedical Engineering faculty attended several national conferences including the annual meeting for Biomedical Engineering Society, the American Society for Mechanical Engineers, International, Summer Bioengineering Conference, and the Annual Conference of the Society for Biomaterials.

Dr. David Zaharoff was invited to the Harvard Medical School/Beth Israel Deaconess Medical Center as a part of the ARC Seminar Series to give a talk on “Engineering Immunotherapies for Bladder and Breast Cancers.”

Dr. Kartik Balachandran was invited Oklahoma State University to give a presentation on “The Mechanobiology of Cardiac Valve Disease.”

## **BIOLOGICAL AND AGRICULTURAL ENGINEERING**

### **Faculty achievements, Honors & Awards**

Dr. Jin-Woo Kim received the “Imhoff Outstanding Research Award”, College of Engineering, the University of Arkansas, the “Outstanding Researcher” award for the Biological & Agricultural Engineering Department, College of Engineering, the University of Arkansas, and the “John W. White Outstanding Research Award”, the Division of Agriculture, the University of Arkansas. Dr. Kim is also the “Conference General chair-elect” for the 9<sup>th</sup> IEEE International Conference on Nano/Molecular Medicine and Engineering (IEEE-NANOMED), November 2015, Hawaii, USA and was appointed as Research Professor for the Computer Science Department at the State University of New York, Korea.

Dr. Marty Matlock was sponsored by *Architect* magazine for the 2013 61<sup>st</sup> Progressive Architecture program. For *Fayetteville 2030: Food City Scenario*, a collaborative plan and policy platform involving the Fay Jones School of Architecture, Dept of Biological and Agricultural Engineering, Center for Agricultural and Rural Sustainability, School of Law and LL.M. Program in Agricultural and Food Law, Dept of Food Science, and the City of Fayetteville, AR.

Dr. Scott Osborn received the 2013 Imhoff Most Outstanding Teaching Award, College of Engineering, the University of Arkansas. Dr. Osborn's SDOX technology from his research and patents were selected as 1 of 20 inventions from the US to be displayed at the US Patent and Trademark Office Expo. This required a proposal submission that he completed. However, the EXPO was cancelled because of sequester budget cuts. He also received the Presidential Citation for Path Forward Committee work by the American Society of Agricultural and Biological Engineers (ASABE) and the University of Arkansas's "Outstanding Mentor" Award.

Dharmendra Saraswat received the Gamma Sigma Delta Extension Award of Excellence by the Arkansas Chapter of Gamma Sigma Delta. He also received the 2013 ASABE Education Aids Blue Ribbon Award – American Society of Agricultural and Biological Engineers (ASABE) – It recognizes outstanding effort and achievement in developing noteworthy educational materials and was presented to 21% of the entries. "Corn Advisor" app was selected for the award (Shared with other extension colleagues). Dharmendra Saraswat received the Excellence in Remote Sensing and Precision Agriculture Award (State) – National Association of County Agricultural Agents (NACAA) and the John W. White Statewide Extension Faculty Award 2013.

## **CHEMICAL ENGINEERING**

As Associate Department Head, Dr. Ed Clausen is involved with teaching, advising, job placement, education research, K-12 workshops, ABET reporting, committee work, and the Freshman Engineering Program. His continued work with Mr. Bryan Hill, Dr. Carol Gattis, Dr. Christa Hestekin, and Mr. Brian Horne of Springdale Public Schools as Co-PIs in training junior high and middle school science and mathematics teachers is truly significant. This project is part of the University of Arkansas Engineering and Science Partnership Program. Equally significant is his work with Mr. Bryan Hill, Drs. Carol Gattis and J. Woodland as Co-PIs in the University of Arkansas Engineering and Math Partnership Program, both sponsored by the Arkansas Department of Education. In addition, he continued to help organize and facilitate the Chemical Engineering Summer Academy, College of Engineering Explore Engineering program, and the Math, Science and Engineering Academy (MSEA), the latter sponsored by Fort Valley State University and the University of Arkansas College of Engineering and departments of Mathematical Sciences and Geology. The K-12 programs were expanded in 2013 to include workshops for 80-85 middle school math teachers from Northwest Arkansas, Eastern Arkansas, and Southwest Arkansas.

Dr. Bob Beitle and his research team were awarded continuation of an NSF I-Corps grant in 2013 for the redesign of *Escherichia coli* to provide for a simpler and cost-effective purification of protein therapeutics via biochromatography. The biotechnology-based start-up company became operational as Boston Mountain Biotech, LLC, headed by two graduates of Dr. Beitle's research group, Drs. Ellen Brune and McKinzie Fruchtl. The work is currently being "moved" into a different expression host by a cell and molecular biology PhD student, as well as continuing to be assessed in *E. coli*. Dr. Beitle has also been involved in two campus-wide projects through the Office of Research and Economic Development to assist in the renewed interest in economic development. He is currently designing a program with Jeff Amerine to educate faculty members on the importance of securing intellectual property without

compromising the process of tenure and promotion and is co-chairing an initiative with Nan Smith-Blair to foster research and education in the area of healthcare. Beitle mentored eight doctoral students in chemical engineering, including one co-advised by Dr. Michael Ackerson, and one in the cell and molecular biology (CEMB) program. Three of these doctoral candidates graduated this academic year.

Dr. Michael Ackerson began collaborating with department faculty members to bring more of his research at Process Dynamics, Inc., into the University, and has now returned to fulltime faculty status. He continues to serve as a board member for the Fayetteville Public Education Foundation and as a member of the National Petrochemical and Refiners Association (NPRA).

Dr. Tom Spicer assumed the directorship of the Chemical Hazards Research Center (CHRC) in August. The CHRC is an active participant in research pertaining to the regulation of liquefied natural gas (LNG) transportation and storage, as well as hazard assessment of toxic industrial contaminants. Funded primarily by the Gas Technology Institute (GTI) and the Department of Energy (DOE), past research at the CHRC developed methods for determining exclusion zones around LNG land-based storage facilities. Spicer continued his collaboration with representatives of the Departments of Transportation Safety and Administration and Homeland Security on the assessment of hazards connected with chlorine rail transport in the United States. This program is planned for a multi-year initiative, including the development of modeling support (sponsored by the Department of Defense) for field testing at Dugway Proving Grounds in Utah. In addition, Spicer and Kim Ogden of the University of Arizona presented a webinar on ABET's new requirement for including chemical process safety in BSCHE curricula. Spicer currently mentors two graduate students in chemical engineering, one MS and one doctoral.

Dr. Jerry Havens served as Graduate Coordinator for the department. His continued service on the Society of International Gas Tankers and Terminal Operators (SIGTO) Working Group on Fire Performance of LNG Ship Containment Systems, has garnered effective improvements in the national and international regulatory framework for LNG/chemical safety and major Fire and Explosion Research Programs by fostering consideration of changes and clarifications (by DOT, NFPA, and FERC) in U.S. regulations governing LNG terminal siting, international regulations governing LNG shipping safety, and most recently international regulation directed to prevention and mitigation of major flammable fuel releases such as the Buncefield Explosion. Havens also mentored two doctoral students in chemical engineering, graduating one this academic year.

Dr. Christa Hestekin received additional funding in 2013 for her research on amyloid protein aggregation for improved diabetes treatment and continued research on similar aggregation for use in treatment of Alzheimer's disease, both funded by Arkansas Biosciences Institute (ABI). She was elected Vice President of the AES Electrophoresis Society. In addition, Hestekin graduated one doctoral student in chemical engineering and one MS student in biomedical engineering, as well as mentors one MS student each in chemical engineering, biomedical engineering, and CEMB.

Dr. Shannon Servoss was successfully promoted to the rank of Associate Professor for the 2014-2015 academic year. She continued research on an NIH subcontract from Detroit R&D to develop a multiplex device for early cancer detection, as well as PI-research on an NSF/CBET

project to expand research to include the detection of glycan-binding immunoglobulin molecules (IgG) from patient samples for disease detection, in addition to continuing her research and collaboration with Dr. Melissa Moss of the University of South Carolina on the development of synthetic, peptoid-based affinity reagents for early diagnosis and treatment of Alzheimer's disease. Servoss continued her collaboration with Dr. Jeff Wolchok in biomedical engineering to investigate the use of peptoids to prevent the degradation of material injected into the vocal cords, with a proposal to NIH pending. Servoss also continued her involvement with Dr. Clausen in organizing the chemical engineering portions of four College of Engineering summer workshops for high school and middle school students, including the Chemical Engineering Summer Academy. Servoss mentors four doctoral students and one MS student in chemical engineering and co-advises one doctoral student in microelectronics and photonics (MicroEP).

Dr. Jamie Hestekin continues to serve as appointed editor of the North American Membrane Society's *Membrane Quarterly* and as secretary and office manager of NAMS. He continues to serve as director for the Membrane Separations Center (MSC), along with support by Dr. Beitle and Mr. Robert Cross. His service on the College of Engineering Distance Education Committee is strategic to some plans the department has for distance education degrees. Dr. Hestekin mentors three doctoral students and one MS student in chemical engineering.

Dr. Keith Roper continued his appointment as Program Director in Engineering Education and Centers in the Engineering Directorate at the National Science Foundation. In this capacity, Roper manages a \$23M annual budget and is responsible for three Engineering Research Centers in Biotechnology, Biomedical, and Advanced Manufacturing Sectors; two Nanotechnology Science and Engineering Centers; and one Nano/Bio node for the Network for Computational Nanotechnology. Dr. Roper continues to serve as Assistant Director for the MicroEP graduate program, served in five separate NSF Working Groups, and was inducted in the Arkansas Academy of Sciences. Roper mentors one doctoral student each in the chemical engineering program and in MicroEP, and graduated one doctoral and two MS students in chemical engineering.

Dr. Greg Thoma remains active in Life Cycle Assessment (LCA) and The Sustainability Consortium (TSC) related projects with global presence. In addition to his work with TSC, Thoma has been a leader in developing expertise at the University in the area of sustainability and particularly LCAs of consumer goods, primarily in the food and agricultural sectors. In collaboration with Drs. Richard Ulrich, Darin Nutter (Mechanical Engineering), and Marty Matlock (Biological and Agricultural Engineering), Thoma has led the group in collaborative research in actively funded projects by the National Pork Board and the Innovation Center for U.S. Dairy focused on developing new tools to enable the U. S. Agriculture and Livestock sectors to aid in managing their resources from a systems perspective to enable continual improvement both in terms of productivity and enhanced sustainability. In his efforts, Thoma has helped establish the University as a well-known and respected institution in agricultural LCA, as evidenced by a \$5 M USDA NIFA grant for which he serves as PI. This project is approximately 26 months into a five year project life.

Thoma is also the primary contact for a newly formed group, AgMIP, which is an agricultural model integration project funded through the U. S. Department of Agriculture (USDA). The goal



here is to provide a harmonized suite of models for use by the agriculture sector to continue the trajectory of sustainable food production in the face of our growing global population. Thoma also supervises two postdoctoral researchers, one for LCA work in the dairy and cheese industries, and one for LCA research on cheese, milk processing, and General Mills (sweet corn). Thoma was selected to act as an expert in agricultural LCA on the steering committee for the Swiss National Research Program (NRP69), “Sustainable Nutrition”, and he has served as the scientific lead for the UN Food and Agriculture Organization’s Technical Advisory Group for Poultry, in an effort to coordinate an international group of experts to prepare a detailed guidance document that will define the metrics and methodology for evaluation of poultry supply chains globally. Thoma mentors three doctoral students, two in chemical and one in biological and agricultural engineering.

Dr. Rick Ulrich continued his National Pork Board funded research entitled “Integration of GHG Emissions and Tradeoff Cost Models for Swine Barn Operations” and collaboration on a water LCA for which a similar model has been developed. Ulrich graduated one doctoral student in the space and planetary sciences program.

Dr. Xianghong Qian continued her research as an NSF CAREER awardee on the investigation of *ab initio* molecular dynamics of glucose to 5-hydroxymethylfurfural conversion and received \$600,000 in NSF funding for research on three separate projects: biomass hydrolysis (co-PI with Dr. S. Ranil Wickramasinghe), ammonia removal from fish ponds/vets, and EDC removal for municipal waste water. Qian mentors three doctoral students in her program, including two co-advised with Dr. Wickramasinghe, and one MS student. Dr. Qian transferred to the biomedical engineering department effective July 1, 2014.

Dr. Wickramasinghe was awarded an NSF planning grant to help establish the Membrane Science, Engineering and Technology (MAST) Center on the University campus, with successful sponsorship from Garver USA, Arkansas Bait and Ornamental Fish Growers Association, Southwestern Energy, and Tyson Foods, Inc. He also continued research on an NSF project entitled “Advanced Responsive Low-Fouling Membranes for Water Treatment” for the development of a new class of stimuli responsive nanofiltration and ultrafiltration membranes for water treatment using nanobrushes that can be magnetically activated. This surface modification technique has potential for use in suppressing fouling by hydrodynamic mixing at the actual membrane fluid interface as well as creating an anti-fouling surface layer on the membrane and could have practical applications in other areas, such as bioseparations. Further, he has eight active NREL, MAST and ABI awards for research projects in the areas of membrane filtration and bioseparations, including an STTR award with Symbios Technologies LLC for commercialization of research related to development of catalytic membranes for biomass hydrolysis. Dr. Wickramasinghe mentors four MS and seven doctoral students in his program, including two co-advised with Dr. Qian and one co-advised through Colorado State University.

In addition to department and college service activities, our faculty members are also involved in other service activities. Dr. Beitle continued to serve on the University’s Academic Integrity Committee and on the Faculty Senate as co-chair of the University Health Initiative. Beitle was also inducted into the National Academy of Inventors and served on the executive committee of the American Chemical Society’s BIOT division. Dr. Clausen continued to serve as Associate

Department Head as well as the College of Engineering representative to the Honors College, the University's ISIS Use Committee, advisor for the University's American Institute of Chemical Engineers (AIChE) and Omega Chi Epsilon Student Chapters, served as the University's ASEE faculty representative, served as an adjunct professor for the Department of Biological and Agricultural Engineering, and served on the Honors College Dean search committee.

Dr. Havens continued to serve on the Society of International Gas Tankers & Terminal Operators (SIGTTO) Working Group on Fire Performance of LNG Ship Containment Systems. Dr. Christa Hestekin served on the Honors College Fellowship Selection Committee and continues to serve as faculty co-advisor for the University's Alpha Chi Sigma (ACS) chapter and as board member and vice president of the American Electrophoresis Society, and as co-chair of the AIChE Annual Meeting. Dr. Jamie Hestekin served on the University's Honors College Fellowship panel, as well as served as a Session Chair at both the AIChE Annual Meeting and the North American Membrane Society (NAMS) Annual Meeting. He also serves as Secretary and Office Manager for NAMS.

Dr. Penney continued to chair the University's Institutional Biosafety Committee and served on the University's Calendar Committee and the AIChE Contest Problem Subcommittee, as well as served as a session chair at the AIChE Annual Meeting. Dr. Qian continued to serve on the University's Academic Standards Committee and served as a session chair for the 7th Joint U.S.-Sino Chemical Engineering Conference in Beijing, China, the AIChE Annual Meeting, and the NAMS Annual Meeting. Dr. Roper continued to serve as assistant director of the University's Microelectronics/Photonics (MicroEP) Graduate Program and served as a co-chair at the CMOS Emerging Technologies Conference. Dr. Servoss serve as an advisor for the Omega Chi Epsilon student chapter and continues to serve as advisor for the Arkansas Chemical Engineering Graduate Student Organization (ACHEGS), as well as session chair at the AIChE Annual Meeting. Dr. Spicer continued to serve as a member of the Safety and Chemical Engineering (SACHE) Committee of the American Institute of Chemical Engineering, and maintains the SACHE website, which is used to distribute safety training materials to participating academic units and corporations throughout the world. Spicer also continued his service as co-chair of the University's Health and Occupational Safety Committee and service on the AIChE Education and Accreditation Committee, which oversees accreditation activities with ABET. In addition, Spicer served as the Arkansas Academy of Chemical Engineers (AAChE) secretary.

Dr. Thoma continued to serve as a member of the University's Toxic Substances Committee and as a steering committee member for the inaugural SEC Renewable Energy Symposium in Atlanta and the Indian Lifecycle Management Conference in Delhi, India. Thoma also served as an adjunct professor in the Department of Biological and Agricultural Engineering. Dr. Ulrich served on the MicroEP Program Director Search Committee. Dr. Wickramasinghe continued to serve on the North American Membrane Society's Board of Directors, AIChE Career and Education Operating Council, and as the AIChE representative to the National Council of Examiners for Engineering and Surveying (NCEES) Examinations for Professional Engineers Committee. Dr. Wickramasinghe also served as Meeting Program Chair of the AIChE Annual Meeting, including co-chair of the Meeting's Membrane Separations for Sustainability Topical Conference, and co-chair on the 7<sup>th</sup> China-U.S. Joint Conference of Chemical Engineering's Symposium on Resources and Green Technologies.

The department faculty actively participates in review activities for other organizations. Dr. Beitle served as a reviewer for *Biotechnology and Bioengineering*. Dr. Clausen served as a reviewer for *American Society for Engineering Education*, *Energies*, *Journal of Chromatographic Science*, *Biochemical Engineering Journal*, *International Journal of Chemical Engineering*, and the University's Honors College Study Abroad Grants and Fellowships. Dr. Havens served as a reviewer for the U.S. Department of Transportation for LNG facility siting. Dr. Christa Hestekin served as a reviewer for *Electrophoresis* and as a grant reviewer for the Alzheimer's Association. Dr. Jamie Hestekin served as a reviewer for *AIChE Journal*, *Environmental Progress and Sustainable Energy*, and *Fuel*. Dr. Qian served as a reviewer for *Journal of Physical Chemistry*, *Carbohydrate Research*, *Journal of American Society of Mass Spectroscopy*, and *PLOS ONE*, and *Macromolecule*. Dr. Roper served as a reviewer for the *Journal of Physical Chemistry B and C*, *Journal of Physical Chemistry Letters*, *Optics Letter*, and as a review panelist for the NSF.

Dr. Servoss served as a reviewer for the NIH and Alzheimer's Association. Dr. Spicer served as a reviewer for *Process Safety Progress*. Dr. Thoma served as subject editor for *International Journal of Life Cycle Assessment* and as a reviewer for *Environment, Development and Sustainability*, *Agricultural Systems*, *Journal of Agricultural Science*, *Journal of Cleaner Production*, *Journal of Industrial Ecology*, *Environmental Science and Technology*, and served as a reviewer for the Swiss National Science Foundation and the European Commission AgreenSkills mobility proposal. Dr. Ulrich served as a reviewer for the *Journal of the Electrochemical Society*, *Journal of Environmental Progress*, *ASME Journal of Electronic Packaging*, and served on NASA's proposal review panel, Outer Planets Research. Dr. Wickramasinghe served as a reviewer for the NSF Membrane Separations Proposal Review Panel and for seven top tier journals.

The department's faculty members have been recognized with several awards during the 2013-2014 fiscal year. Dr. Ed Clausen received the University's Imhoff Award for Outstanding Teaching and Student Mentorship. Dr. Greg Thoma received the Outstanding Faculty Award for Service to Students. Dr. Bob Beitle was presented the Outstanding Faculty Award for Teaching. Dr. Keith Roper received the Outstanding Faculty Award for Research.

## **CIVIL ENGINEERING**

### **Achievements in Teaching**

Micah Hale was named the Outstanding Teacher in the department for 2013. Dr. Norm Dennis serves as the Chair of the American Society of Civil Engineer's (ASCE) Committee on Education (COE). Dr. Kevin Hall serves as a Senior Director in the Civil Engineering Division of the American Society for Engineering Education (ASEE). Dr. Andrew Braham was named an ExCEED Fellow by completing ASCE's ExCEED (Excellence in Civil Engineering Education) program.

### **Achievements in Research**

Rick Coffman was named the department's Outstanding Researcher for 2013. Dr. Julian Fairey was notified in late 2013 of his selection for the National Science Foundation (NSF) CAREER Award.

### **Achievements in Service**

Dr. Rod Williams was recognized for Outstanding Service to Students. Dr. Kevin Hall serves as the Chair of ASCE's National Department Heads Coordinating Council (DHCC). Dr. Micah Hale (Professor) and Ms. Frances Griffith (Administrator, CTPP) were each named a Fellow of the American Concrete Institute (ACI).

## **COMPUTER SCIENCE AND COMPUTER ENGINEERING**

### **Teaching**

The Capstone II students presented their projects at a poster session during the annual meeting of the Arkansas Academy of Computing on April 17, 2014 on the University of Arkansas campus.

We offered a wider variety of technical electives than in the past. The department offered new undergraduate technical electives in Game Design (J. Gauch), Cluster Computing (Beavers and HPCC staff), and Computer Security (Panda).

We offered five new graduate classes that enriched our graduate program. Several supported our research focus on cybersecurity. The new courses were: Secure Digital System Design (Di), Data Mining (Gashler), Crowdsourcing (Yan), Applied Graph Theory (Patitz), and Security and Privacy in Mobile Systems (Q. Li).

There has been significant growth in the number of Computer Science undergraduates receiving their degrees. The BSCS graduating class doubled and the BACS graduating class tripled. The number of Computer Engineering undergraduate degrees awarded and the number of graduate degrees awarded remained stable. At the December 2013 and May 2014 Commencements, 17 BS degrees in Computer Engineering (vs. 19 last year), 33 BS degrees in Computer Science (vs. 16 last year), 10 BA degrees in Computer Science (vs. 3 last year), 1 M.S. degrees in Computer Engineering (vs. 1 last year), 8 M.S. degrees in Computer Science (vs. 9 last year), 1 Ph.D. degree in Computer Engineering (vs. 1 last year) and 0 Ph.D. degrees in Computer Science (vs. 0 last year).

Dr. John Gauch developed an automated grading system for the CSCE 2004 Programming Foundations I lab. This was used by almost 400 students in the 2013-2014 academic year. It gives the students immediate feedback on the correctness of their coding exercises and frees the lab TAs from grading, allowing them to spend more time teaching and helping students complete the activities.

Dr. Christophe Bobda has created a set of online tutorials about system on chip and embedded systems that students can use for self-paced learning. This has helped foster undergraduate

students' interest in computer engineering and a mechanism for students to discuss computer engineering concepts with faculty outside of structured classroom activities.

### **Research**

The CSCE faculty was very active in research, publishing 50 refereed publications, serving on multiple program committees and NSF panels, and mentoring graduate students.

Indicative of the quality of our faculty members' research, Dr. Matt Patitz's paper was selected as one of only four highlighted papers from the 19th International Conference on DNA Computing and Molecular Programming. The research explored the relationship between passive and active self-assembly and showed that static tiles can simulate signal-passing tiles at the cost of an extra dimension (moving from 2D to 3D). He attended the conference with CSCE students Jacob Hendricks and Trent Rogers.

Dr. Tingxin Yan and his student Jon Hammer won the best poster award at the MobiSys conference held in June, 2014. MobiSys is the most prestigious conference on mobile computing.

#### *New Research Funding*

Dr. Bobda, Christophe - NSF: REU Supplement, to Collaborative Research: Self-coordination in Cooperative Smart Camera Networks Incorporating System-on-Chip Reconfiguration, \$12,800, Dec. 2013-Nov. 2016, NSF: US-Cameroon Planning Research Visit: Combined Binary Code-Translation and synthesis for Heterogeneous Multiprocessor Systems, NSF, \$28,538; May 2013-July 2014, and NSF: CSR: Medium: Collaborative Research: Self-coordination in Cooperative Smart Camera Networks Incorporating System-on-Chip Reconfiguration, NSF, \$357,786, Sept. 2013-Aug. 2016

Dr. Jia Di - Asynchronous A/D Converter for In Situ Instruments Operating under Extreme Environments, NASA, \$240,501, Nov 2013-Oct. 2015 and PaDSP: A Parallel Asynchronous Digital Signal Processing Architecture for Energy Efficiency, Performance, and Scalability, DARPA, \$178,350, Nov. 2013-Nov. 2016

Dr. Wing Ning Li - A Computational Approach to Identifying Heparin Binding Motifs, ADHE (SURF, \$2,125), Jan. 2014-May 2014

Dr. Qinghua Li - Access Control Policy Verification Mechanism Comparison and NIST Access Control Policy Tool Enhancement, NIST, \$50,000, May 2014-May 2015.

### **Public Service**

Dr. Gordon Beavers, associate department head and graduate coordinator, Computer Science and Computer Engineering received an award at the Sponsored Student Recognition Dinner on Monday, April 7 at the Alumni House for appreciation of his service to sponsored students. Each year, an award is presented to a faculty member and staff member who facilitate an aspect of the sponsored student process, encourage or mentored the program's sponsored students and exemplify outstanding contributions to the program.

Dr. Susan Gauch participated as a panelist at the "Girls in IT" conference held at J.B. Hunt Transport Services on Wednesday, Oct. 9, 2013. Local businesswomen and academics touted

technology jobs to the 125 girls in attendance. Women met with the girls in small groups for brainstorming sessions, and spoke in a panel about their jobs, how they became interested in technology fields and the future of technology.

On November 2, 2013, the Arkansas Red team from the University of Arkansas, under the coaching direction of Dr. Gordon Beavers, placed first at the U of A location of the ACM/ICPC Collegiate Programming Contest Mid-Central Region and 18th overall in the region out of 129 teams competing. Also at the U of A location, Southwest Baptist Purple from Southwest Baptist University took second, the Drury Red team from Drury University placed third and the MSU Bear 1 team from Missouri State University walked away with fourth.

This was the second year that the CSCE department offered an Engineering Summer Academy in computer science and computer engineering. High school students entering grades 10 through 12 were introduced to computing while focusing on writing programs and designing hardware. This was in addition to also participating in Explore Engineering I for rising 6th and 7th grader students and Explore Engineering II for rising 8th and 9th grade students. All three of the computing camps were developed by, and delivered by, current CSCE students under the direction of Dr. Susan Gauch with help from Eric Specking and the College of Engineering recruiting team.

The Computer Science and Computer Engineering Department, along with Acxiom Corp. and the Arkansas chapter of the Association for Computing Machinery (ACM), hosted the annual High School Programming contest on Saturday, March 15, 2014. Dr. Wing Ning Li organized the event with the assistance of the CSCE office and technical staff. Members of the ACM student organization and current CSCE students as well as CSCE alumni contributed their time and talent by serving as tour guides, photographers, contest monitors, and contest judges. Thirty teams, averaging three students per team, from Arkansas and Louisiana registered to compete.

## **ELECTRICAL ENGINEERING**

### **Teaching**

For the academic year 2013-2014, Dr. Jingxian Wu received the Department Outstanding Award for Teaching because of his dedications to the teaching mission of the Department.

### **Research**

Dr. Fisher Yu received the 2014 John L. Imhoff Award for Outstanding Researcher.

For the academic year 2013-2014, Dr. Alan Mantooth received the Department Outstanding Award for Research

### **Public Service**

For the academic year 2013-2014, Mr. Robert Saunders received the Department Outstanding Award for Service.

Dr. Simon Ang served as faculty advisor for the IEEE Component and Packaging Manufacturing Technology (CPMT) Society, UAF Chapter.

Dr. Juan Carlos Balda served as advisor for the local chapter of the IEEE Power Electronics (PELS) Society.

Dr. Alan Mantooth served as the chief advisor to the engineering student society Tau Beta Pi, member of the IEEE Power Electronics Society (PELS) Advisory Committee Liaison, and chairperson of the PELS Standards Committee.

Dr. Roy McCann served as treasurer of the Ozarks Section of the Institute of Electrical and Electronic Engineers and organized the program for the monthly meetings.

In addition to their teaching and research work load, many of the Electrical Engineering faculty members also work with the student groups. Robert Saunders served as chief advisor to the IEEE Student Chapter. Dr. Randy Brown served as faculty advisor for the departmental Graduate Student Social Activities committee. Dr. Hameed Naseem served as faculty advisor to the Al-Islam Students Association, the Friends of India Student Association, and the Kerala Students Association. Dr. Scott Smith was the faculty advisor of the student team which participated in the NASA Lunabotics Mining Competition at the Kennedy Space Center (FL) during May, 2013. Robert Saunders was the faculty advisor of the Solar Boat Team which participated in the Solar Splash Competition in Dayton, OH during June 2014.

T.A. Walton regularly conducted tours of the NCREPT facility for different constituencies ranging from elementary to high schools as well as some corporate visitors. In coordination with the Dean's office, he has also taken several recruiting visits to several schools in the Arkansas delta region.

## **INDUSTRIAL ENGINEERING**

In support of the Department's goal to create a student-centered educational experience, we strive to create and maintain professional, engaging, and effective classroom and laboratory experiences for undergraduate and graduate students. During the 2013-2014 academic year the average undergraduate course evaluation was 4.51/5.00. The average graduate course rating was 4.57/5.00. Exit interview scores from undergraduate students during AY13-14 provided the average rate of 4.19/5.00 for faculty members. Exit interview scores for faculty from graduate students averaged 4.46/5.00.

Relative to scholarly activities, a separate submission details the numerous publications. In summary, the faculty of the Department of Industrial Engineering at the University of Arkansas contributed 1 book, 3 book chapters, published 42 refereed articles, recorded 5 unrefereed publications, and offered 27 invited lectures, along with more than 41 contributed papers and presentations. There are 5 notable creative endeavors included in the report.

As part of our student focused educational experience we were pleased to host Dr. Philip Condit, former Chairman and CEO of Boeing as a distinguished classroom lecturer on April 2. Dr.

Condit discussed the concept of “Working Together” which was central to the process of designing and manufacturing the Boeing 777 airplane. Having an industry expert of such notoriety enhances the student experience and was very well received.

Notable achievements were numerous this fiscal year. Among the most prestigious honors was the 2013 Charles & Nadine Baum Faculty Teaching Award which was presented to Dr. Manuel Rossetti. Dr. Rossetti was also elected as a Fellow of the Teaching Academy signifying his outstanding performance as a teacher at the University.

The Arkansas Alumni Association and the University of Arkansas named Dr. Russell Meller as the recipient of the *Distinguished Achievement Award*. Dr. Meller was honored during the 2013 homecoming ceremonies.

In May 2014 the College of Engineering recognized industrial engineering faculty members with the following awards: *Outstanding Teacher* – Dr. Chase Rainwater; *Outstanding Researcher* – Dr. Manuel Rossetti; and *Outstanding Service to Students* – Dr. Justin Chimka.

In addition, Dr. Heather Nachtmann received the Arkansas Academy of Industrial Engineering (AAIE) *Faculty Member of the Year Award*. AAIE also presented two staff awards in April 2014 to support staff member Sandy Sehon and administrative support staff member Karen Standley.

Dr. Heather Nachtmann led efforts to secure \$1.4M from the U.S. Department of Transportation to create the Maritime Transportation Research and Education Center (MarTREC) to increase economic competitiveness through efficient, resilient and sustainable transportation systems on U.S. navigable waterways.

Dr. Kim Needy and Dr. John A. White co-authored a new engineering textbook, *Fundamentals of Engineering Economic Analysis*, published by John Wiley & Sons. Their book features learning objectives, key terms, real-world vignettes with discussion questions, enhanced summary sections, and over 800 end-of-chapter problems.

Dr. Needy completed her 3-year term in office for the Institute of Industrial Engineers (IIE). The term included serving as President-Elect, President, and then Past-President of this global professional society.

Dr. Shengfan Zhang, an assistant professor in the College of Engineering, and Kristen Jozkowski, an assistant professor in Health, Human Performance and Recreation, received a research grant from the University of Arkansas Women’s Giving Circle for their Personalized HPV (Human Papillomavirus) Vaccination Program. She and colleagues from NC State are performing a study to help physicians and policymakers better identify specific patient groups who may be at a greater risk for HIV infection and help hospitals better plan resources. Dr. Zhang’s research article “Characterizing the Impact of Mental Disorders on HIV Patient Length of Stay and Total Charges” was featured in the national research magazine *Industrial Engineer*.



Another of our rising assistant professors was featured in *Industrial Engineer*. Dr. Kelly Sullivan was the focus of a spotlight in the magazine. The article expressed the commitment Dr. Sullivan has to build relationships with his students. Dr. Chase Rainwater was noted as a peer mentor for Dr. Sullivan. This snapshot adds to the positive visibility of our department.

The journal *Interfaces*, a part of the Institute for Operations Research and the Management Science (INFORMS) published the 10th ranking of universities according to their contributions to the INFORMS practice literature. Faculty members from the University of Arkansas, College of Engineering were among those ranked. Putting the University of Arkansas at #23 in the visibility rankings for US universities were faculty members, Dr. Sarah Root, Dr. Chase Rainwater, and Dr. Richard Cassady. The ranking was based on the following articles:

- Amy Cohn, Sarah Root, et al. (2009), “Scheduling medical residents at Boston University School of Medicine,” *Interfaces* 39(3).
- Brian McClure, Richard Cassady, Chase Rainwater, and Justin Chimka (2012), “Optimizing the Sunday singles lineup for a Ryder Cup captain,” *Interfaces* 42(2).

Two rankings are given, each based on a different metric: visibility is the number of times a university is listed as the primary academic affiliation in the INFORMS practice literature; yield is the equivalent number of INFORMS practice papers attributable to each university based on author primary academic affiliation.

Dr. Cassady is the founder of the FIRST Lego League team at Bernice Young Elementary School in Springdale involving 3<sup>rd</sup>-5<sup>th</sup> grade students. He continues to serve as the mentor for the group. FIRST Lego League is an international program that aims to get students excited about science and technology. FIRST, an acronym of “For Inspiration and Recognition of Science and Technology,” teamed up with the Lego company to create the league program. Participants work alongside adult mentors to design, build and program robots to perform tasks and exercises. In addition, Dr. Chase Rainwater serves as mentor for Springdale High School’s award-winning FIRST robotics team called the GearHogs.

Dr. Ed Pohl is the current holder of the John L. Imhoff Chair in Industrial Engineering. This is a two-year appointment that began in January 2014. The chair was established in 1983 honoring the memory of John L. Imhoff, founding head for the Department. Additionally, Dr. Pohl serves as director of the online Master of Science in Engineering (MSE) degree which was ranked as # 4 (out of 44) in the nation! The program has been found to offer one of the best values in online graduate engineering education by Get Educated. The program was also recognized by *U.S. News & World Report* as a Best Online Graduate Engineering program for Veterans in 2014.

Dr. Ed Pohl continues to mentor two middle school teachers funded by the National Science Foundation in the program Research Experiences for Teachers (RET). In April 2014 he and the two RET representatives hosted the eighth annual IE Challenge, a competition for grades 6-12 that encourages students to explore industrial engineering concepts through hands-on activities. The project supplied a downloadable interactive hospital game that required students to design the facility layout, hire the necessary staff, and keep incoming patients happy with drink machines, benches and radiators for heat, all while diagnosing them and directing them to the correct treatment room. The goal was to create and maintain an efficient hospital. The students’

hospital finances, reputation, happiness of the patients, cure rate and death rate were tracked by the game. This event supports the college and campus initiative for K-12.

Staff member Ms. Tamara Ellenbecker was a keynote speaker for the International Association of Administrative Professionals – Razorback Chapter. Her talk "Persuasion Principles" was focused on why smart professionals are using the art of persuasion, rather than sales, to get others to see things from your point of view. Ms. Ellenbecker is a past president of the Razorback Chapter of IAAP and is currently serving as the foundation chair. She credits her involvement with IAAP as being a key component to her success at the University of Arkansas. Ellenbecker is a two-time winner of the College of Engineering Employee of the Semester and was chosen Employee of the Year for the College of Engineering in 2011-12.

As evidenced above, the faculty and staff continue to be leaders in our professional community. In addition, our faculty members serve as reviewers for NSF, reviewers and editors of leading journals (such as *IIE Transactions*, *The Engineering Economist*, and *Journal of Military Operations Research*), hold national level positions in professional societies and continue to provide leadership for notable conferences around the world.

## **MECHANICAL ENGINEERING**

David Albers received a New Faculty Commendation for Teaching Commitment from the Wally Cordes Teaching and Faculty Support Center in September 2013.

David Albers was recognized as Mechanical Engineering's Outstanding Service to Students in May 2014.

Laura Cochran and Melynda Hart served as elected members of the University of Arkansas Staff Senate.

Dr. Rick Couvillion received the ASME Dedicated Service Award from American Society of Mechanical Engineers International in April 2013.

Melynda Hart was appointed to the Chancellor's Commission on Women in June 2014.

Dr. David Jensen was a recipient of the Wally Cordes Teaching and Faculty Support Center's "Best Practices" grant award in November 2013.

Dr. Ajay Malshe was named Fellow by the International Academy for Production Engineering (CIRP) in August 2013. Dr. Malshe's University of Arkansas affiliated NanoMech and their invention of Tufftek, was recognized as one of the year's top technological innovations by R&D magazine's 2013 list, along with NanoMech being named a 2014 Edison Award Winner by internationally renowned Edison Awards by Edison Universe in April 2014. He was also invited talk at the 23<sup>rd</sup> National Science Foundation EPSCoR conference in Nashville in November 2013.

Dr. Darin Nutter received the 2013 Technical Paper Award from American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE) in February 2014. Dr. Nutter was named Mechanical Engineering's Outstanding Teacher in May 2014 and also received the Energy Department's Distinguished Alumni Award in May 2014.

Doug Spearot gave the invited keynote lecture at the 2014 International Symposium on Plasticity in February and gave the keynote presentation at the Minerals, Metals and Materials Society annual meeting in March 2014. Dr. Spearot received the Faculty Distinguished Rising Teaching Award from the Arkansas Alumni Association and the Imhoff Outstanding Teaching Award from the College of Engineering in April 2014.

Uche Wejinya was promoted to Associate Professor.

Min Zou was named Mechanical Engineering's Outstanding Researcher in May 2014 and was elevated to the status of Fellow by the Society of Tribologists and Lubrication Engineers in April 2014.

Six faculty members served on ten University of Arkansas committees.

Nine faculty members served on thirty-five professional committees.

Nine faculty members served on fifteen College of Engineering committees.

Ten faculty members served as reviewers for fifty-six publishing entities.

Fifteen faculty members were members of twenty-two professional organizations.

### **III. ACHIEVEMENTS OF STUDENTS AND ALUMNI**

#### **BIOMEDICAL ENGINEERING**

##### **Student achievements**

Biomedical Engineering Honors student, Jimmy Vo, was awarded Most Outstanding Senior for both the department and the College of Engineering. Jimmy received several accolades during his tenure under the direction of Dr. David Zaharoff including being awarded a Barry M. Goldwater Scholarship, the AACR- Thomas J. Bardos Science Education Award, an invitation to present at the AACR Annual Meeting, the Research in Science and Engineering (RISE) Fellowship from the German Academic Exchange Service, and was selected to present research at “Arkansas STEM posters at the Capitol”.

Senior Design Team for “Bicycle Powered Centrifuge,” mentored by Dr. Jeff Wolchok, was featured as a part of the University of Arkansas “Short Takes” video series titled “Engineering Better Healthcare.” Series highlights special points of pride at the university. Project was also featured in the Honor College Publication A+.

Senior Design Team for “Bicycle Powered Centrifuge,” mentored by Dr. Jeff Wolchok, traveled to and competed in the Rice University “Beyond Traditional Borders Global Health Design Competition”.

Honors Biomedical Engineering student, Katelin Cherry, was awarded a Fulbright Teaching Fellowship under the direction of Dr. Jeff Wolchok.

Honors Biological and Agricultural Engineering students under the direction of Dr. Jeff Wolchok, Ryan Yarnal and Katie Atkins, were accepted into medical school programs at University of Oklahoma and Oklahoma State.

Dr. Jeff Wolchok’s honors Biological and Agricultural Engineering student, Nadia Bhatia, accepted a graduate research assistantship at Dartmouth College in Hanover, New Hampshire.

Dr. David Zaharoff’s honors Chemical Engineering student, Kyle Lorensten, accepted a graduate research assistantship at the University of Albany, New York.

Incoming Biomedical Engineering Ph.D candidate, Nasya Sturdivant was awarded a Doctoral Academy Fellowship under the direction of Dr. Kartik Balachandran.

#### **BIOLOGICAL AND AGRICULTURAL ENGINEERING**

##### **Student achievements, Honors & Awards**

Nadia Bhatti, BSBE student name the Most Outstanding Senior in BENG.

Kala Rajan 2<sup>nd</sup> Place in Poster Competition organized by the Provost.

Danley, B., T. Jenkins, J. Mazurkiewitz, K. Perrin, R. Yarnall. 2013. “Design a Low-Cost Prosthetic Foot for the Dominican Republic.” First place, G.B. Gunlogson National Student Design Competition, held at the 2013 annual international conference of the American Society of Agricultural and Biological Engineering (ASABE), Kansas City, MO, July 21-24, 2013. Faculty mentor: T. A. Costello.

Zach Callaway, Ph.D. student in Biological Engineering, won the 1st place of AAFP 2013 Graduate Student Poster Competition, September 10-11, 2013, Fayetteville, AR. His paper title is “Modeling the electro-magnetic properties of avian influenza virus in a flow cell with an interdigitated nanoelectrode using Comsol”.

Best Poster Award to Grace Richardson 2013 Annual Watershed and Research Conference, Arkansas Water Resources Center “Effects of Oxygenation of Resuspended Sediment from a Eutrophic Lake”.

Grace Richardson MSBENG student under Dr. Osborn’s advisement named Most Outstanding Graduate student in BENG.

Mahmoud Sharara. 1st Place. Abstract to Contract. University of Arkansas and 1st Place. ASABE Section Meeting.

Gurdeep Singh, Ph.D. student to Dharmendra Saraswat received 3<sup>rd</sup> place for the 2013 Boyd-Scott Graduate Research Award – ASABE – for his MS thesis based paper “A Novel Simulation Approach for Biofuel Crop Production on Marginal Lands.”

Gurdeep Singh, Ph.D. student to Dharmendra Saraswat, received the 1<sup>st</sup> place 2013 Poster Award from the Arkansas Chapter of ASABE.

#### **Alumni achievements, Honors & Awards**

Dr. Naresh Pai, Dharmendra Saraswat’s Ph.D. advisee received the Honorable Mention for the 2013 Dissertation Award by the Universities Council on Water Resources (UCOWR).

The senior design team of Brent Danley, Thomas Jenkins, John Mazurkiewicz, Kristin Perrin, and Ryan Yarnall won first place in the 2013 G.B. Gunlogson Student Environmental Design “Open” Competition at the 2013 annual international ASABE conference. Their advisor was Dr. Thomas Costello.

Glen Davis (BS 1967) was inducted into the Arkansas Academy of Biological and Agricultural Engineering.

## CHEMICAL ENGINEERING

The department has developed a tradition of devoting one section of our senior level design class to participating in two nationally competitive design competitions: WERC and P3. WERC is a consortium of universities and national laboratories in New Mexico that holds an annual design competition aimed at the development of human resources and technologies to address environmental issues. Teams from the department have competed very successfully in 16 of the past 18 years. This year, Dr. Penney mentored two teams that competed in separate tasks. Dr. Christa Hestekin mentored a team of students for the Environmental Protection Agency's People, Prosperity, and Planet (P3) competition in Washington, D.C. Her team consisted of Cayla Tichy, D. J. Lee, Shumon Hasan, Lauren Cole, Florencio Serrano Castillo, Keiron Durant, and Omar Qasem. With more than 50 teams competing from top universities around the country, the University of Arkansas delegation won the American Society of Civil Engineers Sustainable Development Award. Additionally, Haley Cleous won first place at the AIChE Mid-America Regional Conference paper competition, and Florencio Serrano-Castillo won first place at the AIChE National Meeting Poster Competition and second place at the SHPE Conference Poster Competition.

Chemical Engineering students received a total of \$1.97 M in scholarships and awards during 2012-2013. Four chemical engineering graduates—Jeremy Dunklin, Megan Dunn, William Erwin, and Justin Norman—received prestigious NSF Graduate Research Fellowships for the 2014-2015 academic year. Hailey Dunsworth and Gayatri Suresh Kumar were awarded SURF Research Fellowships. Nicholas Kordsmeier, Alex Moix, and Kelly McKenzie received Bodenhamer Fellowships. Hailey Dunsworth was selected as a 2014 Goldwater Scholar, and fellow student Michael West received Honorable Mention for the award. Senior Lindsay Hoggatt was selected as the 2013-2014 Outstanding Senior in the College of Engineering and gave a Commencement address.

The Arkansas Academy of Chemical Engineers inducted eight alumni as new members this past year including: Deva Hupaylo (BSChE 1980), Marji McNeill (BSChE 1991), Rick Moore (BSChE 1980), James Palmer (BSChE 1992, PhD 1997), John Parks (BSChE 1976), Lee M. Riley (BSChE 1981, MSChE 1983), Brent Stratton (BSChE 1992), and Robin Weitkamp (BSChE 1993). The academy also continued its campaign to fund the Thomas O. Spicer III Endowed Scholarship in Chemical Engineering in honor of his service as department head and his work in establishing the academy.

Mr. Jean Leger, Vice President of OG&E, Oklahoma City, Oklahoma received a College of Engineering Distinguished Alumnus award.

## CIVIL ENGINEERING

### Achievements – Students and Alumni

In 2013, a total of 27 students were inducted into Chi Epsilon, the national Civil Engineering honor society. The department named Sadie Smith as the E. Walter LeFevre Outstanding Senior; Courtney Hill as the Outstanding Junior; and Michael Deschenes as the Outstanding Sophomore in the Department. Civil Engineering students Kaisha Plambeck and Matthew Watters placed third nationally in the ACI pervious concrete cylinder competition. Matt Strasser received a “First Prize” in the poster competition at the UA “Abstract to Contract” event in February 2013.

Julian and Nana Stewart announced a \$1M gift to the Department of Civil Engineering. An initial portion of the gift creates an endowment for the Julian C. and Nana B. Stewart AACE Access Arkansas Scholarship program.

Mr. C. Larry Weir received the College of Engineering Distinguished Alumni Award in 2013.

Ten alumni were elected and inducted into the Arkansas Academy of Civil Engineering. A listing of the 2013 inductees follows.

- John Balgavy  
*U.S. Army Corps of Engineers, Little Rock, Arkansas*
- George Bollier  
*Black and Veatch, Burlington, Massachusetts (ret.)*
- John Burkhalter  
*Burkhalter Technologies, Inc., Little Rock, Arkansas*
- H. Michael Burns  
*Crafton, Tull, and Associates, Rogers, Arkansas*
- Lane Crider  
*McGoodwin, Williams, and Yates, Fayetteville, Arkansas*
- Brad Hammond  
*McGoodwin, Williams, and Yates, Fayetteville, Arkansas*
- Jerry D. Holder, Sr.  
*Pulaski County Special School District, Little Rock, Arkansas*
- Mike Marlow  
*U.S. Army Corps of Engineers, Little Rock, Arkansas*
- Ron Petrie  
*Garver LCC, Fayetteville, Arkansas*
- Lyndal Waits  
*Arkansas State Highway and Transportation Department, Batesville, Arkansas*

Four alumni served on the College of Engineering’s Dean’s Advisory Council in 2013: Grady Harvell (AFCO Steel); Gus Vratsinas (Vratsinas Construction); and Charles Zimmerman (Wal-Mart).

## **COMPUTER SCIENCE AND COMPUTER ENGINEERING**

### **Students**

Trent Rogers, incoming Computer Science and Computer Engineering Ph.D. student, was awarded a National Science Foundation (NSF) Research Fellowship. Trent received his B.S. in Mathematics in May and will continue his education in the Ph.D. program in Computer Science under the direction of Dr. Matthew Patitz. The Fellowships are awarded to students early in their graduate studies based on demonstrated potential for significant achievements in science and engineering.

Jackson Schmandt (B.S. CEng 2014) was awarded a NSF Scholarship for Service. He will be continuing his education at the University of Maryland – Baltimore County. The scholarship is awarded to students pursuing studies in cybersecurity-related fields. This program will allow Jackson to do important research in that field both in school and for the government after he graduates.

William Bouillon was the Outstanding Senior in Computer Engineering. William worked as an intern at Data-Tronics in Fort Smith as a member of a three person team that developed software in the Imaging department, created business applications to help with security requests, and presented projects to the directors to show the importance of the intern program. In addition to his excellent academic achievements, William has served as a peer mentor in the Freshman Engineering Program and continues to be a worship leader at Thrive Student Ministries.

Grant Slatton was the Outstanding Senior in Computer Science. Grant has worked at the Department of Veteran Affairs, implementing algorithms to extract information from a database and process in seconds what took days to do by hand. He has worked on multiple projects and research and received Best Paper, Best Presentation Honors Research Symposium 2012. Grant has numerous academic achievements, including Chancellors List, Dean's List, Honors College Fellow, Arkansas Governor's Distinguished Scholar and National Merit Scholar. In addition, he participated in the UARK Competitive Programming Teams, volunteered at the Honors College, and has been an Open Source Contributor.

Headquartered in Fort Smith, Arkansas, Data-Tronics (DTC) is a subsidiary of Arkansas Best Corporation, a Fortune 1000 transportation and logistics supplier. DTC develops and supports IT applications for the Arkansas Best corporate family. In the summer of 2013, CSCE undergraduates Jarrett Alexander and Bill Bouillon were among nine interns. On August 6, 2013, the students presented their summer work to DTC management and faculty representatives from five Arkansas universities.

### **Alumni**

Marisabel Guevara (B.S. CEng. 2008) received her Ph.D. in Computer Science from Duke University, studying new ways to design and manage energy-efficient data centers, the large distributed centers that underpin cloud computing. Instead of building datacenters with all high-power components such as processors or memory, Guevara's research modeled datacenter management as an economic market wherein applications such as web search, email, and iTunes



all bid for resources. Her research has been presented at Google and more recently at the High Performance Computer Architecture Conference, one of the field's premier venues.

Tracy Black, BSCS 1988, received a College of Engineering Distinguished Alumni Award in April 2014. She is Senior Vice President of Information Technology, J.B. Hunt Transportation Services, Inc. in Springdale, AR. Tracy Black is originally from Rogers, Arkansas. She began her career as a programmer in the Data Tronics unit of Arkansas Best Freightways. She started working for J.B. Hunt in 1989, and worked her way up to the position of vice president in 2001. She was named senior vice president in 2005. As senior vice president for information technology, Tracy is responsible for technology strategy for all of J.B. Hunt's business units.

Kyle Rogers, BSCS 1997, received a College of Engineering Early Career Alumni Award in April 2014. He is Chief Technical Officer at SOAPware, Fayetteville, AR. Kyle Rogers grew up in Fayetteville. He began his professional career as a programmer analyst with MCI Communications in Colorado Springs in 1997. In 1999, he returned to Arkansas, joining Acxiom as a software engineer development lead, then moved to H. Walker Foods in 2007 as the corporate director of operations, leaving in 2010 to become the chief technical officer at SOAPWare, Inc. In that role, he directs R&D, design, development, quality assurance and deployment for all of the company's software product lines. Kyle serves as a member of the advisory board for the computer science and computer engineering department.

Greg Whitsitt, BSCSE 1999, received a College of Engineering Early Career Alumni Award in April 2014. He is Managing Architect, Cerner Corporation in Kansas City, MO. Greg Whitsitt grew up in Lee's Summit, Missouri. Greg joined Cerner upon graduation and since then has received several promotions. In his current position, Greg leads an R&D team that is responsible for building infrastructure supporting the company's next generation big data platforms. Greg has stayed connected with his alma mater, coming to campus to recruit for Cerner, serving on the advisory board for the computer science and computer engineering department and contributing to the Hog Tags program.

## **ELECTRIAL ENGINEERING**

The department inducted 8 former students into the Arkansas Academy of Electrical Engineering during a banquet on April 4, 2014. Those induced were Barbara A. Derryberry (BSEE, 1985, MSEE, 1987), Alan Hannah, (BSEE, 1976), Eugene Jenkins (BSEE, 1986), Matt R. Lovelace (BSEE, 1980), Bill Luther (BSEE, 1978), Randall Robinette (BSEE, 1987), Lance T. Shinall (BSEE, 1982), and Rudy Timmerman (BSEE, 1990).

The College of Engineering honored several of our alumni at the CoE Annual Banquet on April 5, 2014. Charles Mayfield received the Distinguished Alumni Award, Douglas Hutchings and Kevin Speer received Early Career Alumni Awards, and Neil Schmitt was inducted into the College of Engineering Hall of Fame.

Two Ph.D. students of Dr. Hameed Naseem, Matthew Young and Seth Shumate, who created another company (Picassolar, under Silicon Solar Solutions, Inc.) last year based on a new patent

pending process to increase the efficiency of solar cells by 15% were awarded the prestigious Sunshot Award of \$500,000.00 by DOE. This is the first for Arkansas. Governor Beebe visited Dr. Naseem's labs at the press conference held at its formal announcement.

Dr. Magda El-Shenawee's former PhD Student, Ahmed Hassan, is currently working at NIST. Ross Liederbach, a senior honors college student majoring in electrical engineering with a minor in mathematics was one of twelve University of Arkansas students to receive the highly competitive Graduate Research Fellowship. Ross graduated in Spring 2014, and will be attending graduate school at the University of Illinois at Urbana-Champaign. Ross also received the Electrical Engineering Outstanding Senior Award and was recognized at the College of Engineering Awards and Honors Reception on April 28.

Brent Bell, William Curbow, and Ross Liederbach, were recognized at the College of Engineering Awards and Honors Reception for having maintained a 4.0 grade point average for coursework completed on this campus. Weston Barger received the Senior Scholar Award for maintaining a 4.0 grade point average that included transfer credits. Brent Bell, William Austin Curbow, and Ross Liederbach received awards as Outstanding Seniors at the Student Recognition Banquet held in April 2014.

## **INDUSTRIAL ENGINEERING**

The Student Chapter of the Institute of Industrial Engineers (IIE) at the University of Arkansas was the host for the IIE 2014 South Central Regional Conference in February 2014. Dr. Chase Rainwater serves as the faculty advisor with staff member, Ms. Sandy Sehon, as a co-advisor. There were more than 90 students, faculty and speakers from 10 different universities including Arkansas, Kansas State, Wichita State, Texas Tech, Missouri, Oklahoma, Oklahoma State, Houston, Lamar and UT Arlington in attendance. Dr. John A. White was the keynote speaker. Industrial engineering graduate student, Kelsey Lamb received second place in the technical writing contest. Dr. Needy is Lamb's faculty advisor.

The College of Engineering recognized several students and faculty and staff members at a college-wide reception in May 2014. Joseph Castrodale was among the nine students in the COE that received Outstanding Senior Awards. Kelli Schlais received the *Porter Stone Co-Op Award*, which is given to engineering students who have excelled in cooperative education. First Ranked Senior Scholars (4.0 GPA) included Katy Accurso, Christopher Bayles, and Hannah Corbitt.

Annually, the Department honors industrial engineering students at the Awards Banquet. In March 2014, 46 IE students received various departmental and named scholarships. The total dollar value of these scholarships exceeded \$89,000, including \$74,000 provided by our distinguished alumni group, the Arkansas Academy of Industrial Engineering (AAIE) or by members of AAIE.

Dr. Brian K. Smith received his MSIE and Ph.D. in industrial engineering from the University of Arkansas, and was the focus of a spotlight for his outstanding leadership in IIE and for exceptional service to the Society for Engineering and Management Systems (SEMS). He has

championed and assisted with a number of SEMS initiatives over the past four years, and his efforts have created value for many SEMS members in numerous ways. His involvement includes serving as SEMS board member from 2013-present; *Industrial Management* "SEMS Says" Contribution Liaison from 2013-present; ISERC Annual Conference Engineering Management Track co-chair for 2013 & 2014; ISERC Engineering Economy Track co-chair for 2012; and ISERC invited session chair for 2009-2011.

Alumnus, Mr. Sam Chaffin received *The Marie Award 2013*. This award recognizes Arkansans who have made a significant contribution to the advancement of public interest by word, action, and example through interfaith engagement and civic service over a number of years.

Alumnus David E. Douglas (BSIE 1969, MSIE 1971, PhD 1973), a university professor of information systems in the College of Business at the University, was one of 14 professors worldwide recognized with a 2013 Big Data and Analytics Faculty Award from IBM. The 14 professors singled out for the award receive \$10,000 for top-rated curricula designed to develop the business and technical skills required for data-crunching jobs. Dr. Douglas received the award for continuing to develop business analytics course modules designed for teaching customer insights and discovery using a number of datasets hosted by the University of Arkansas, including demographic data provided by major corporations with a focus on data mining and visualization of big data — the 2.5 quintillion bytes of information generated daily from such sources as sensors, RFID networks, mobile devices and social media.

Alumnus and Dean of Engineering Dr. John English with his wife Elizabeth established two scholarships at the University with a \$100,000 gift to the departments of Industrial and Electrical Engineering. The Sara English Crismon Endowed Scholarship in Industrial Engineering is being established with a \$50,000 endowment.

The College of Engineering recognized outstanding alumni at their annual event in April. From the Department of Industrial Engineering the following awards were presented.

- 2014 College of Engineering Hall of Fame – Bob Davidson, BSIE 1970, ABF Freight Systems, Inc. (retired), Frisco, TX 2014
- 2014 College of Engineering Distinguished Alumni Award – Dana Sedgass, BSIE 1981, Accenture (retired), Frisco, TX
- 2014 College of Engineering Early Career Alumni Award – Drew Harrison, BSIE 2000, Harrison Energy Partners, Little Rock, AR

The Institute of Industrial Engineers Honors and Awards banquet was held in June during the Industrial and Systems Engineering Research Conference (ISERC) in Montreal, Quebec. Eleven U of A faculty members, one staff member and fourteen students attended the conference. The department co-hosted a reception for 100 attendees.

At this event, Dr. Kim LaScola Needy, interim dean of the Graduate School and holder of the Twenty-First Century Professorship in Engineering, was recognized and honored as the IIE Immediate Past President. Dr. Ed Pohl was named an IIE Fellow, the highest classification of IIE

Membership. Dr. John A. White, chancellor emeritus and Distinguished Professor of industrial engineering received the Wellington Award from the Engineering Economy Division of IIE.

White also received the Best Track Paper Award from the Industrial and Systems Engineering Research Conference, along with industrial engineering undergraduate students Jordan Sonnentag and Robert Imhoff and Jessica Matson of Tennessee Tech University for their paper entitled “An Analysis of Block Stacking with Lot Splitting.”

In addition, the IIE Board of Trustees awarded several University of Arkansas students scholarships and fellowships. Kaitlin Denny was awarded the Harold and Inge Marcus Scholarship. Luisa Janer and Hannah Koehn received Dwight D. Garner Scholarships, and Dia St. John, doctoral student, received the Gilbreth Memorial Fellowship.

Alumnus and AAIE member Bill Harrison, BSIE 1966, along with his wife and fellow UA alumnus, Margaret Harrison provided a generous financial gift to the Department of Industrial Engineering to transform an obsolete computing laboratory into the Bill and Margaret Harrison Family Video Conferencing Facility. The renovated space has provided a facility equipped with state-of-the art video-conferencing equipment that will enhance students’ learning experience and expand research collaborations while reducing travel expenses.

In April we received an announcement that alumnus and AAIE founding president, Mr. Larry Stephens has been selected to receive *The Andrew J. Lucas Alumni Service Award* in October 2014. This award acknowledges significant contributions of time and energy on behalf of the University and the Alumni Association.

The Department benefits from continued support and interaction with the AAIE whose leadership sponsors endeavors that aid in student academic success and enhance student preparedness such as the A4U program (Academy Focused on Recruitment/Retention/Readiness of Undergraduates), the Global Studies Endowment program, and Mock Interview initiative. The Academy inducted ten members this year bringing the active membership to 183. Inductees are distinguished graduates and are selected for sustained and outstanding contributions to the industrial engineering profession.

We are extremely proud to have the opportunity to list the many achievements of our faculty, staff, students, and alumni.

## **MECHANICAL ENGINEERING**

The AAME (Arkansas Academy of Mechanical Engineering) inducted four new members into the academy: Hamid Habibi (MSME 1987), Tom Weiss (BSME 1963 & MSME 1965) and Mechanical Engineering faculty Drs. Darin Nutter and Larry Roe.

The College of Engineering awarded Mechanical Engineering alumni, Robin Prince (BSME 2003) and Greg Schulterman (MSME 2002) Early Career Alumni awards.

Chris Weiser (BSME 1973) received the 2014 Civic Service Award from the Springdale, Arkansas Chamber of Commerce in January 2014.

Cristine Wolf (BSME 1983) was recognized for her service with the Directorate's Team Award for her work on the Air Force Space and Missile Systems Center WGS-5 Satellite Launch Team.

The inaugural Curtis Mann Award was presented by the Lafayette Parish Building Association of Louisiana in honor of alum Curtis Mann, BSME 1961.

Samuel Beckford, graduate student, received the Al Sonntag Award for Best Paper from Society of Tribologists and Lubrication Engineers.

Bryce Carlton, undergraduate student, was selected as the Mechanical Engineering Outstanding Senior in May 2014.

Shawn Coleman, graduate student, was invited to present at the American Physical Society meeting in March 2014.

Jesse Evans, undergraduate student, was awarded the George and Marion Branigan Scholarship from the College of Engineering.

Twenty-four scholarships were awarded to outstanding students: Seth Arnold, William Carlisle, James Coffin, Drew Creighton, Ahmed El-Abbadi, Jesse Evans, Melanie Garcia, Avery Hill, Soonho Hong, Daniel Huck, Braidon Hughes, Samuel Jenkins, Taylor Johnson, Russell Locetta, Madeline Monroe, Charles Osborn, Adam Osmon, Chris Reynolds, Cameron Saylor, Tyler Schluterman, Adam Stewart, Anthony Trinh, Josh Vines, and Michael Wise.

Caroline France, undergraduate student, was awarded an American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE) scholarship in March 2014.

Jake Pitts, undergraduate student, participated in the Arkansas Engineers Abroad Clinton Global Initiative program in Belize to help improve water quality in the Village of More Tomorrow.

Corey Thompson, graduate student, received first place in the MicroEP Video Competition; received first place in the Student Poster Competition, IEEE Photovoltaic Specialists Conference; recognized for Most Innovative Graduate Business Plan in the Reynolds Governor's Cup; Mid-South Champion in the Wal-Mart Better Living Business Plan Competition; placed third overall for the Graduate Business Plan in the Reynolds Governor's Cup; received the third place Business Plan in the Louisville Cardinal Challenge Business Plan Competition; and placed second in the MicroEP Poster Competition in the MicroEP Graduate Program.

Eleven students participated in the American Institute of Aeronautics and Astronautics, Design Build Fly competition. Eighty teams competed during the two-day event in Wichita, Kansas, and the University of Arkansas ranked as follows: 27<sup>th</sup> on presentation/report and 52<sup>nd</sup> overall.

Twenty students participated in the Society of Automotive Engineers' Mini-Baja competitions. Ninety-two teams entered the first competition in El Paso, Texas, and the University of Arkansas students ranked as follows: 45<sup>th</sup> overall, 60<sup>th</sup> in endurance, 32<sup>nd</sup> in suspension and traction, 36<sup>th</sup> in hill climb, 13<sup>th</sup> in maneuverability, 34<sup>th</sup> in acceleration, 8<sup>th</sup> in presentation, 56<sup>th</sup> in design and 47<sup>th</sup> in cost analysis. One hundred and nineteen teams entered the second competition in Pittsburg, Kansas, and the University of Arkansas students ranked as follows: 59<sup>th</sup> overall, 65<sup>th</sup> in endurance, 21<sup>st</sup> in suspension and traction, 18<sup>th</sup> in sled pull, 35<sup>th</sup> in maneuverability, 83<sup>rd</sup> in acceleration, 79<sup>th</sup> in presentation, 56<sup>th</sup> in design and 56<sup>th</sup> in cost analysis.

Six students participated in IEEE's Solar Boat and Solar Splash competition. Fifteen teams competed in the four day event held in Dayton, Ohio and the University of Arkansas placed 6<sup>th</sup> overall, 3<sup>rd</sup> in qualifying event, and received the Outstanding Hull Design award.

# APPENDICES

## Contents

APPENDIX A - FACULTY HONORS.....	54
APPENDIX B - STUDENT HONORS .....	55
APPENDIX C -PUBLICATIONS .....	56
APPENDIX D -CHAIRS, PROFESSORSHIPS, DISTINGHISHED PROFESSORSHIPS AND LECTURESHIPS.....	120

# **APPENDIX A**

## **FACULTY HONORS 2013-2014 COLLEGE OF ENGINEERING**

### **COLLEGE OF ENGINEERING OUTSTANDING TEACHER**

Scott Osborn, Biological & Agricultural Engineering  
Kartik Balachandran, Biomedical Engineering  
Bob Beitle, Chemical Engineering  
Ernie Heymsfield, Civil Engineering  
Christophe Bobda, Computer Science and Computer Engineering  
Jingxian Wu, Electrical Engineering  
Chase Rainwater, Industrial Engineering  
Darin Nutter, Mechanical Engineering

### **COLLEGE OF ENGINEERING OUTSTANDING RESEARCHER**

Julie Carrier, Biological & Agricultural Engineering  
David Zaharoff, Biomedical Engineering  
Ranil Wickramasinghe, Chemical Engineering  
Julian Fairey, Civil Engineering  
Miaoqing Huang, Computer Science and Computer Engineering  
Alan Mantooth, Electrical Engineering  
Manuel Rossetti, Industrial Engineering  
Min Zou, Mechanical Engineering

### **COLLEGE OF ENGINEERING OUTSTANDING SERVICE TO STUDENTS**

Yi Liang, Biological & Agricultural Engineering  
Jeffrey Wolchok, Biomedical Engineering  
Greg Thoma, Chemical Engineering  
Rick Coffman, Civil Engineering  
Dale Thompson, Computer Science and Computer Engineering  
Robert Saunders, Electrical Engineering  
Justin Chimka, Industrial Engineering  
David Albers, Mechanical Engineering

### **UNIVERSITY & COLLEGE AWARDS**

Doug Spearot	2013 John Imhoff Outstanding Teaching Award
Jia Di	2013 John Imhoff Outstanding Research Award
Fisher Yu	2013 John Imhoff Outstanding Research Award



## **APPENDIX B**

### **2013-2014 COLLEGE OF ENGINEERING STUDENT HONORS**

#### **COLLEGE OF ENGINEERING SENIOR SCHOLARS**

Weston Barger      Computer Science Computer Engineering

#### **COLLEGE OF ENGINEERING OUTSTANDING SENIOR**

Linday Hoggatt      Chemical Engineering

#### **DEPARTMENTAL OUTSTANDING SENIORS**

Russell Bair	Biological and Agricultural Engineering
Gage Greening	Biomedical Engineering
Lindsay Hoggatt	Chemical Engineering
William Bouillon	Computer Science Computer Engineering (CE)
Grant Slatton	Computer Science Computer Engineering (CS)
Courtney Hill	Civil Engineering
Ross Liederbach	Electrical Engineering
Joseph Castrodale	Industrial Engineering
Bryce Carlton	Mechanical Engineering

#### **PORTER STONE CO-OP AWARDS**

Hayley Archer	Computer Science Computer Engineering (CE)
Lindsey Gray	Chemical Engineering
Linday Hoggatt	Chemical Engineering
Kelli Schais	Industrial Engineering
Nadia Smith	Electrical Engineering

#### **PRESIDENTIAL SCHOLAR**

John Dominick, III      Chemical Engineering

## APPENDIX C

I. Books.....	57
II. Book Chapters.....	58
III. Refereed Articles.....	60
VI. Unrefereed Publications & Proceedings.....	87
V. Invited Lectures.....	94
VI. Other Lectures, Papers, and Oral Presentations.....	103
VII. Other Creative Endeavors.....	117
VIII. Patents.....	121

### **Books**

**Bobda, C.**, “Distributed Embedded Smart Cameras: Architectures, Design and Applications, Senem Velipasalar (Eds),” Springer; 2014 edition, June 30, 2014

**Jong, I.C.** *Engineering Mechanics: Statics, Second Edition*. Dubuque, IA: Great River Technologies, 2013.

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2-17 Ag Professional- Smartphone app determines dollar value of manure (**Dharmendra Saraswat**)

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12-5 UAEX News- Manure Valuator app automates calculating manure value (**Dharmendra Saraswat**)

10-16 Ashley News Observer - Government shutdown impacting agriculture (Scott Stiles, Tom Troxel, **Dharmendra Saraswat**, Yeshe Wamishe, Bob Scott)

10-11 Agfax - Shutdown trammels research and markets, changes editorial plans (Scott Stiles, **Dharmendra Saraswat**, Yeshe Wamishe, Bob Scott)

10-11 Pork Network - Federal shutdown trammels research, markets (Scott Stiles, **Dharmendra Saraswat**, Tom Troxel, Yeshe Wamishe, Bob Scott)

10-11 Cattle Network - Federal shutdown trammels research, markets (Scott Stiles, **Dharmendra Saraswat**, Yeshe Wamishe, Bob Scott)

10-11 Dairy Herd Network - Federal shutdown trammels research, markets (Scott Stiles, **Dharmendra Saraswat**, Yeshe Wamishe, Bob Scott)

8-26 RFD-TV- New apps (**Dharmendra Saraswat**)

8-22 Mountaineer-Echo - Corn Advisor, Hort Plants apps available through iTunes (**Dharmendra Saraswat**, Jim Robbins, Leo Espinoza, Jason Kelley)

8-15 Mena Star - Agriculture apps available through iTunes (**Dharmendra Saraswat**, Jim Robbins, Leo Espinoza, Jason Kelley)

8-14 Grand Prairie Herald - Corn producers, home gardeners have new apps available (**Dharmendra Saraswat**, Jim Robbins, Leo Espinoza, Jason Kelley)

8-12 West Memphis Evening Times - Agricultural apps available at iTunes (**Dharmendra Saraswat**, Jim Robbins, Jason Kelley, Leo Espinoza)

8-11 Pine Bluff Commercial - Corn advisor, Hort Plants apps available through iTunes (**Dharmendra Saraswat**, Jim Robbins, Jason Kelley, Leo Espinoza)

8-1 Arkansas Farm Bureau – Rice Expo to offer sneak preview of U of A ag apps (**Dharmendra Saraswat**, Mike Hamilton)

7-29 Arkansas Business – Arkansas farmers find apps, wireless essential to agricultural sector (**Dharmendra Saraswat**, Mike Hamilton)

7-24 Farm Industry News – 10 technologies changing farm machinery (**Dharmendra Saraswat**)

2-8 Mid-America Farmer-Grower – ‘Corn advisor’ app released by University of Arkansas Division of Agriculture (**Dharmendra Saraswat**)

2-5 Delta Farm Press – ‘Corn Advisor’ app released (**Dharmendra Saraswat**)

1-29 Drovers – ‘Corn Advisor’ app released by University of Arkansas (**Dharmendra Saraswat**)

1-29 Dairy Herd-Corn advisor app (**Dharmendra Saraswat**)

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**Spearot, D.E.** “Young professionals committee: Providing a service to young TMS members and the society.” Proceedings of JOM, (2013).

**Spicer, T.** “Comparison of DEGADIS Dispersion Model Predictions with Observations from the Jack Rabbit Chlorine Tests.” Proceedings of the Seventeenth Annual George Mason University Conference on Atmospheric Transport and Dispersion Modeling, Fairfax, VA, June 25-26, 2013.

**Spicer, T. O.** and E.C. Clausen. “Strengthening Writing (and Reading) Skills in a Senior-Level Lab Course while Reinforcing Life-Long Learning Skills.” Proceedings of the 2013 American Society for Engineering Education Midwest Section Annual Conference, Salina, KS, September 18-20, 2013.

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**Wood, C.**, Ellis, T., Teague, D., Cox, B., Analyst I: Comprehensive Analysis of the UTexas1 Surface Wave Dataset, 2014 Geo-Congress: Geo-Characterization and Modeling for Sustainability. Feb. 23-26, 2014

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### **Invited Lectures**

**Balachandran K.**, “The mechanobiology of cardiac valve disease,” Invited presentation at Oklahoma State University, October 8, 2013, Stillwater, OK.

**Beitle, R.** “Overview of NSF I-Corps Program.” Presented at the Arkansas Commercialization Retreat, Winthrop Rockefeller Conference Center, Petit Jean, AR, July 22-24, 2013.

**Carrier, D.J.**, Plenary lecture Windsor - Solvent-free extraction and centrifugal partition chromatography separation Natural Health Product Research Society of Canada, 10th NHP Research Conference, May 15th, 2013 Windsor, Ontario, Canada

**Carrier, D.J.**, Indian Society of Agricultural Engineering Jan 2013 Hyderabad, India Deconstruction of Biomass in a Fermentable Sugar Stream

**Carrier, D.J.**, Indian Agricultural Research Institute Jan 2013 Hyderabad, India Nutraceuticals from Biomass

**Carrier, D.J.**, Plenary lecture Association of Microbiologist of India November 2013 Rohtak, India Production of a Fermentable Sugar Stream and Extraction of Valuable Phytochemicals

**Carrier, D.J.**, Separation of phytochemicals and xylose oligomers using centrifugal partition chromatography (CPC), 8th International Starch Conference, University of Illinois, June 2013.

**Couvillion, Rick.** “Establishing Energy Metrics and Next Steps for Buildings and Industry.” Arkansas Manufacturing Solutions Workshop, Little Rock, AR, June 2013.

**Couvillion, Rick.** “Establishing Energy Metrics and Next Steps for Buildings and Industry.” Arkansas Manufacturing Solutions Workshop, Little Rock, AR, December 2013.

**Haggard, B.** and T. Scott. 2013. Final Project Update - Red River Regional Project. States Only Meeting, U.S. Environmental Protection Agency Regional Technical Assistance Group, Dallas, Texas.

**Haggard, B.** 2013. Conserving Our Two Watershed – Introduction to the Beaver Lake and Illinois River Watersheds. The League of Women Voters of Washington County, Public Library, Fayetteville, Arkansas.

**Haggard, B.** 2013. Water Quality Monitoring in the Beaver Lake Watershed. Beaver Lake Watershed Symposium, Beaver Watershed Alliance, Huntsville, Arkansas

**Haggard, B.** 2013. How Do You Validate a Watershed Model without Calibration Data. U.S. Environmental Protection Agency Modeling Workshop, Dallas, Texas.

**Haggard, B.** 2013. Watershed Scale Phosphorus Management – the Movement of Phosphorus Downstream. ASA, CSSA, and SSA International Annual Meeting, Tampa, Florida.

**Haggard, B.** 2013. Great Plains Water Resources. Iowa Water Conference, Ames, Iowa.

**Hall, K.**, Implementing a Quantum Leap: Issues with the New Pavement Design Guide, University of Pittsburgh, February 13, 2013.



**Hall, K.**, Engineering a Pavement System – Linking Design, Materials, and Construction, Politecnico de Milano, Milan, Italy, October 15, 2013.

**Hall, K.**, Implementation of the Mechanistic-Empirical Pavement Design Guide in the U.S., Politecnico de Milano, Milan, Italy, October 14, 2013.

**Havens, Jerry.** “The Importance of Molecular Diffusion in the Buncefield Gas Cloud Formation.” Presented at the 50th Anniversary United Kingdom Explosion Liaison Group, Cardiff, Wales, July 9-12, 2013.

**Heysfield, E.** and Kuss, M., Implementing GigaPan Technology into an Airport’s FOD Management Program & Pavement Management System Program, presented to the AFD10(2) committee, Transportation Research Board Annual Meeting, Washington, D.C., January, 2013.

**J.-W. Kim.** 2013. Stealth Nanotube Theranostic Agents, IEEE International Conference on Nano/Molecular Medicine and Engineering (IEEE-NANOMED), November 10-13, Phuket, Thailand (as a “Keynote Speaker”).

**J.-W. Kim.** 2013. Self-Assembling Multifunctional Nanocomposites for Nanotheranostics of Circulating Tumor and Other Pathological Cells in Vivo. Nano Science and Technology Institute (NSTI) Nanotech Conference & Expo 2013, May 12-16, Washington, DC.

**J.-W. Kim.** 2013. Nano-Building Block Toolboxes (“Nano-Toolboxes”) for Programmable Self-Assembly of Multifunctional Nanocomposites, May 6-7, The State University of New York at Korea (SUNY-Korea), Incheon, Korea.

**J.-W. Kim.** 2013. Nano-Building Block Toolboxes (“Nano-Toolboxes”) for Programmable Self-Assembly of Multifunctional Nanotheranostic Agents, March 27-30, City University of Hong Kong, Hong Kong, China.

**J.-W. Kim.** 2013. Nano-Building Block Toolboxes (“Nano-Toolboxes”) for Programmable Self-Assembly of Multifunctional Nanocomposites with Arbitrary Sizes and Shapes. Invited Seminar at the Arkansas Biosciences Institute Fall Research Symposium, October 15, Little Rock, AR.

**J.-W. Kim.** 2013. Programmable Self-Assembly of Plasmonic Nanoagents. Biomedical Engineering Seminar, University of Memphis, September 6, 2013, Memphis, TN.

**J.-W. Kim.** 2013. Nano-Building Block Toolboxes (“Nano-Toolboxes”) for Programmable Self-Assembly of Nanostructures with Arbitrary Shapes and Functions. Invited Seminar at Center for Functional Nanomaterials, March 17-19, Brookhaven National Laboratory (BNL), Upton, New York.

**J.-W. Kim.** 2013. Nano-Building Block Toolboxes (“Nano-Toolboxes”) for Programmable Self-Assembly of Nanostructures. February 8, 2013, Sigma Xi Chapter Meeting, University of Arkansas, Fayetteville.

**Li, Y.** 2013. Biosensor methods for rapid screening of avian influenza H5N1 in poultry. An invited presentation at Huazhong Agricultural University, June 24, 2013, Wuhan, Hubei Province, China.

**Liang, Y.** 2013. Cooling chickens and turkeys using air velocity, sprinklers and cool cell pads. Annual Poultry Innovation Conference, London, Ontario. Canada. November 2013.

**Malshe, Ajay.** “Bio-inspired functional surfaces for advanced applications.” 2014 CIRP General Assembly Meeting, Copenhagen, Denmark, August 2013.

**Malshe, Ajay.** “Valve Engineering through Advanced Lubrication and Surface Engineering at Nanoscale.” One Cameron Technology Conference, Houston, TX, May 2013.

**Malshe, Ajay.** “Plenary: Materials Science Challenges and the Importance of Shared Best-Practices.” National EPSCoR Conference, Nashville, TN, November 2013.

**Malshe, Ajay.** “Nanomanufacturing and Energy.” Fourth American Energy & Manufacturing Competitiveness Partnership Dialogue, US Council on Competitiveness and EERE-DOE meeting, HQ of Applied Materials, Santa Clara, CA, October 2013.

**Matlock, M.** 2013. Frameworks for Sustainability in Agriculture, NC State’s Sustainable Agriculture Executive Course, Bayer Crop Sciences, Raleigh, NC. (as a “Keynote Speaker”).

**Matlock, M.** 2013. Water Resource Sustainability, National Pork Board Environmental Committee, Dallas, TX. (as a “Keynote Speaker”).

**Matlock, M.** 2013. A Framework for Sustainable Agriculture, National Pork Board, Des Moines, IA. (as a “Keynote Speaker”).

**Matlock, M.** 2013. The role of animal agriculture in feeding 10 billion people sustainably, Global Food and Feed Congress, Sun City, South Africa. (as a “Keynote Speaker”).

**Matlock, M.** 2013. Metrics for Water Sustainability in US Dairy Production, US Dairy Summit, Washington DC. (as a “Keynote Speaker”).

**Matlock, M.** 2013. Metrics for Sustainable Agriculture: Measuring what Matters, Center for Food Integrity, McDonald’s Campus, Chicago, IL. (as a “Keynote Speaker”).

**Matlock, M.** 2013. The Advantages and Risks of Nutrient Trading for Managing Non-Point Sources of Water Pollution, Senate Subcommittee on Water and the Environment, Washington, DC.

**Matlock, M.** 2013. Key Performance Indicators, Metrics and Benchmarks for Sustainable Soybean Production, Ohio Soybean Alliance, Columbus, OH. (as a “Keynote Speaker”).

**Matlock, M.** 2013. Key Performance Indicators for Sustainable Agriculture, National Pork Board, Des Moines, IA. (as a “Keynote Speaker”).

**Matlock, M.** 2013. Key Performance Indicators for Sustainable US Soybeans, United States Soybean Export Council, The Hague, Netherlands. (as a “Keynote Speaker”).

**Matlock, M.** 2013. Key Performance Indicators, Metrics and Benchmarks for Sustainable Soybean Production, Provimi Animal Nutrition Seminar, Barcelona, Spain. (as a “Keynote Speaker”).

**Matlock, M.** 2013. Key Performance Indicators, Metrics and Benchmarks for Sustainable Soybean Production, European Soybean Buyers Association Annual Meeting, Istanbul, Turkey. (as a “Keynote Speaker”).

**Matlock, M.** 2013. Frameworks for Sustainability in Agriculture, Ohio Farm Bureau Annual Meeting, Columbus, OH. (as a “Keynote Speaker”).

Thomas, L.M. (with **R.D. Meller**) “A Conversation on Warehouse Design.” *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (May 2013)

Ellis, K. (with **R.D. Meller**) “Establishing the Physical Internet Based Logistics System Gain Potential for the U.S.” *North American Strategy for Competitiveness (NASCO) Regional Meeting*, Montréal, Canada (April 2013)

**Milburn, A.B.**, “Uncovering Hidden Costs in Home Health Supply Chains.” *Institute for Operations Research and the Management Sciences (INFORMS) Healthcare*, Chicago, Illinois (2013)

Braham, A., **A.B. Milburn**, and J. McClinton, “Using LinkedIn in the Classroom.” *American Society for Engineering Education Midwest Section Annual Conference*, Salina, Kansas (2013)

Kirac, E., **A.B. Milburn**, and C. Wardell, “How Social Media Information Is Changing Disaster Relief Routing Plans.” *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (2013)

Lian, K. and **A.B. Milburn**, “Patient-Focused Considerations in Home Health Nurse Routing Problems.” *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (2013)

Kirac, E. and **A.B. Milburn**, “Social Media Usage in Disaster Relief Routing.” *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (2013)

**Millett, P.C.** “Novel Computational Approach to Modeling and Simulation of Colloidal Self-Assembly.” Colorado School of Mines, MEEG, 2013.

**Millett, P.C.** “Novel Computational Approach to Modeling and Simulation of Colloidal Self-Assembly.” Colorado School of Mines, Physics Department Colloquium, 2013.

**Nachtmann, H.**, “Supporting Secure and Resilient Inland Waterways.” *National Strategic Maritime Risk Stakeholder Alliance*, West Lafayette, Indiana (November 2013)

**Nachtmann, H.**, Jingjing Tong and J.R. Chimka, “A Cargo Prioritization Model for Inland Waterway Disruptions.” *Second Institute for Operations Research and the Management Sciences (INFORMS) Transportation Science and Logistics Society Workshop*, Monterey, California (June 2013)

**Nachtmann, H.** and Matthew Campo, “Supporting Secure and Resilient Inland Waterways.” *Committee on Marine Transportation Systems Speaker Series*, Washington D.C. (June 2013)

**Nachtmann, H.** and Matthew Campo, “Supporting Secure and Resilient Inland Waterways.” *USCG LANTAREA Academic Speaker Series*, Norfolk, Virginia (January 2013)

**Nutter, D.** “Looking Ahead and Resources within the State of Arkansas.” Arkansas Industrial Energy Efficiency Finance Forum (AIEEFF), Little Rock, AR, June 2013.

**Nutter, D.** “Industrial Energy Efficiency.” Sustainable Energy Scorecards and Education for Municipalities (SESEM), Summer Energy Academy, June 2013.

**Osborn, G.S.** 2013. Invited panelist for BENG Graduate Seminar to discuss careers in Biological Engineering.

**Osborn, G.S.** 2013. Invited presenter to Freshman Engineering Honors Colloquium “Economically Removing Nutrients from Surface Water” based on work from AWRC-NIWR project.

**Parnell, G.,** Participating in National Academy of Sciences Homeland Security studies, Department of Management, London School of Economics (October 2013)

**Pohl, E.A.** and H. Nachtmann, “Healthcare vs. Retail Supply Chain Gap Analysis.” *51<sup>st</sup> Annual Conference and Exhibition of the Association of Healthcare Resource & Materials Management (AHRMM)*, San Diego, California (July 2013)

**Pohl, E.A.** and M.D. Rossetti, “Healthcare vs. Retail Supply Chain Gap Analysis.” *Oracle Healthcare VCP Workshop*, Pittsburgh, Pennsylvania (December 2013)

**Pohl, E.A.** and M.D. Rossetti, “Healthcare vs. Retail Supply Chain Gap Analysis.” *51<sup>st</sup> Annual Conference and Exhibition of the Association of Healthcare Resource & Materials Management (AHRMM)*, San Diego, California (July 2013)

**Pohl, E.A.,** “Protecting Your Critical Infrastructure through Robust System Design.” *American Society of Engineering Management Conference*, Bloomington, Minnesota (October 2013)

**Pohl, E.A.,** “Comparing Education and Training Requirements for Retail and Healthcare Supply Chain Professionals.” *American Society of Engineering Management Conference*, Bloomington, Minnesota (October 2013)

**Pohl, E.A.,** “Determining the Right Sample Size for your Test: Theory and Application.” *Applied Reliability Symposium*, North America, Minneapolis, Minnesota (June 2013)

**Qian, X.** “Developing Antifouling Membranes by Localized Heating for Water Treatment.” Presented at the 7th Joint US-Sino Chemical Engineering Conference, Beijing, China, October 14-18, 2013.

**Qian, X.** “The Effects of Acetate Anion on Cellulose Dissolution and Reaction in Imidazolium Ionic Liquids.” Presented at the ACS National Meeting, New Orleans, LA, April 7-11, 2013.

**Qian, X.** “The Effects of Salt on the Dynamics and Thermodynamics of Protein Folding.” Presented at the 7th Joint U.S.-Sino Chemical Engineering Conference, Beijing, China, October 14-18, 2013.

Gedik, R., **C. Rainwater**, H. Nachtmann, E.A. Pohl, and K. Mitchell, “Optimizing Inland Waterway Infrastructure Maintenance for Supply Chain Operations.” *Euro-INFORMS*, Rome, Italy (July 2013)

**Rainwater, C.** and T. Sharkey, “A Constraint Programming Framework for Allocating Law Enforcement Resources.” *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (May 2013)

**Rainwater, C.**, T. Sharkey, A. Malaviya, R. Gedik, and F. Enayaty, “Integer and Constraint Programming Methods for a Dynamic Network Interdiction Problem.” *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (October 2013)

Schneider, K. (with **C. Rainwater**), “Multi-State Social Network Analysis under Conditional Influence with Limited Resources.” *2013 Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (May 2013)

**Root, S.E.**, and Crystal Wilson, “Load Mixing for Container Loading.” *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (May 2013)

**Roper, D. Keith.** “CSNE: Forging Neural Pathways: Engineering the Interface between Brains and Technology.” Presented at the NICT Forum: Brain Computer Interfaces, Washington, D.C., January 29, 2013.

**Roper, D. Keith.** “Electron Optics of Self-Assembled Nanocomposite Metamaterials.” Presented at the CMOS Emerging Technologies Research Symposium, Whistler, B.C., Canada, July 17-19, 2013.

**Roper, D. Keith.** “National Science Foundation Engineering Research Centers: Biotechnology and Healthcare; Manufacturing.” Presented at the NIBIB Program Staff Meeting, Bethesda, MD, January 30, 2013.

**Roper, D. Keith.** “Plasmonic Nanocomposite Metamaterials for Sustainable Energy Technologies.” Presented at the Inaugural SEC Symposium: Impact of the Southeast in the World’s Renewable Energy Future, Atlanta, GA, February 10-12, 2013.

**D. Saraswat.** 2013. Geospatial Technologies for Assisting Communities and Mitigating Environmental Concerns. In GIS Day Events organized at University of Arkansas, Fayetteville, November 20.

**D. Saraswat.** 2013. Unmanned Aerial Vehicles for Precision Agriculture Research-Opportunities & Challenges. Delivered via internet to Indian Council of Agricultural Research (ICAR) Summer School on “Machinery for Natural Resource Management and Technologies”, Ludhiana, Punjab, India, September 14.

J. Robbins and **D. Saraswat.** 2013. FAA Certificate of Authorizations (COAs) Process. In Arkansas Aerospace Alliance-Unmanned Aerial System Forum, Little Rock, AR, September 13.

**Saraswat, D.** 2013. StreBand DSS: A Riparian Buffer Decision Support System for Planners. In Arkansas Non Point Source Annual Stakeholder Meeting, Little Rock, AR, September 18.

**Saraswat, D.,** K. VanDevender, and J. Robbins. 2013. U of A Agriculture Related Websites and Mobile Apps. 2013 Rice Expo, Stuttgart, AR, August 2.

**Saraswat, D.** 2013. Use of Watershed Models for Assessing Environmental Impacts of Biofuel Crops- Challenges & Opportunities. In 47th Annual Convention of Indian Society of Agricultural Engineers & International Symposium on Bioenergy-Challenges & Opportunities. Hyderabad, India, January 28-30.

**Saraswat, D.** 2013. Mobile Resources for Corn and Grain Sorghum Producers. Arkansas Corn and Grain Producer Conference. Jonesboro, January 8 (repeated at Dumas on January 10).

**Servoss, S. L.** “Peptoid-based Therapeutics for Alzheimer’s Disease.” Presented at the University of South Carolina, Biomedical Engineering Program, Columbia, SC, May 2, 2013.

Barrows, W.A., Coleman, S.P., **Spearot, D.E.** “Atomistic Simulation of Ion Bombardment on Gamma-Alumina.” TMS 2013 Annual Meeting, San Antonio, TX, March 2013.

Barrows, W.A., **Spearot, D.E.** “Atomistic Modeling of Ion Bombardment on Gamma Alumina.” ASME 2013 Regional Conference, Oral Roberts University, April 2014.

Coleman, S.P., Barrows, W.A., **Spearot, D.E.** “In Situ Virtual Diffraction Analysis of Alumina during Ion Bombardment.” TMS 2013 Annual Meeting, San Antonio, TX, March 2014.

Simpson, J.P., **Spearot, D.E.** “Exploration into Properties of Molybdenum Disulfide using Atomistic Simulation.” ASME 2013 Regional Conference, Oral Roberts University, April 2013.

Dang, K.Q., Stewart, J.A., **Spearot, D.E.** “Mechanical Deformation of Bulk and Monolayer Molybdenum Disulphide (MoS<sub>2</sub>) via Atomistic Simulations.” Materials Science & Technology 2013, Montreal, Canada, October 2013.

**Spearot, D.E.**, Coleman, S.P. “Atomistic Simulations of Grain Boundary Associated Distortion in Metallic Materials via Virtual Diffraction.” TMS 2013 Annual Meeting, San Antonio, TX, March 2013.

**Spearot, D.E.**, Coleman, S.P. “Linking between Atomistic Simulation and Experiment via Virtual Diffraction Computation.” Society for Engineering Science 50th Annual Meeting, Providence, RI, July 2013.

**Spearot, D.E.** “Molecular Dynamics Simulations of Grain Boundary Structure and Grain Size Dependent Flow Strength in Nanocrystalline Materials.” International Symposium on Strength of Fine Grained Materials, University of Tokyo, July 2013.

**Sullivan, K.M.** and J.C. Smith, “Geographical Interdiction of a Maximum Flow Network.” *Institute for Operations Research and the Management Sciences (INFORMS) Computing Society Conference*, Santa Fe, New Mexico (January 2013)

**Sullivan, K.M.** and J.C. Smith, “Geographical Interdiction of a Maximum Flow Network.” *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (May 2013)

**Sullivan, K.M.**, “Mixed-Integer Linear Programming Models for Reliable System Design.” *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (October 2013)

Baycik, N. Orkun and **K.M. Sullivan**, “Robust Network Interdiction with Invisible Interdiction Assets.” *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (October 2013)

**Thoma, G.** “Introduction to The Sustainability Consortium.” Presented at the Sustainable Food Exporter’s Group meeting, hosted by the New Zealand Ministry of Finance and Trade, Wellington, New Zealand, July 22, 2013

**Thoma, G.** “Opportunities for Engagement with The Sustainability Consortium.” Presented at the Sustainable Business Council of New Zealand, Auckland, New Zealand, July 30, 2014.

**Thoma, G.** “Sustainability Activities in the United States.” Presented at the Annual General Meeting of the Life Cycle Association of New Zealand, Wellington, New Zealand, July 21, 2013. First presented at the Australian Life Cycle Assessment Society Conference, Sydney, Australia, July 13, 2013.

**Thoma, G.** “Use of LCA by the Industry to Respond to Sustainability Challenges: International Perspectives.” Presented at the Agriculture LCA in Australia, Industry Engagement Workshop: Building Connections between LCA Practitioners and Industry: An Initiative of the AusLCI Agriculture Sector Working Group, Sydney, Australia, Friday July 19, 2013.

**Ulrich, Rick**, Jennie Popp, H.G. Rodriguez, and Greg Thoma. “Greenhouse Gas Emission Calculation Tool for Swine Production.” National Pork Board Unified Research Meeting, Dallas, Jan 29, 2013.

**Ulrich, Rick.** “GHG Emissions Modeling for Swine Production Facilities.” Presented at the National Pork Producers Council, Washington, D.C., February 12, 2013.

**Ulrich, Rick.** “The U.S. Swine Industry's Carbon Footprint.” Presented at the ADSA/ASAS Joint Annual Meeting, Indianapolis, Indiana, July 12, 2013.

**Wejinya, Uchechukwu.** “Robot Based Simulation and Automation Approach for Agriculture.” Shanghai Jiao Tung University (SJTU), Shanghai, China, December 2013.

**Wejinya, Uchechukwu.** “Research Highlights: Characterization of Nanomaterials for Nanosensors and Nanorobotics Application.” Peking University Wuxi Campus, Wuxi, China, October 2013.

**Wejinya, Uchechukwu.** “Research Highlights in Nanomaterials and Nanorobotics.” Chinese Academy of Sciences, Shenyang, China, April 2013.

**Wejinya, Uchechukwu.** “Robot Based Simulation and Automation Approach for Formed Meat Products.” Northeastern University, Shenyang, China, April 2013.

**Wickramasinghe, S. R.** “Advanced Membrane Separations.” Presented at the Department of Chemical Engineering, University of Louisville, Louisville, KY, February 12, 2014.

**Wickramasinghe, S. R.** “Membrane Processes for Biorenewables.” Presented at the European Membrane Society Summer School, University of Duisburg-Essen, Essen, Germany, July 25, 2013.

**Wickramasinghe, S. R.** “Responsive Membranes for Advanced Separations.” Presented at the Department of Chemical Engineering, McMaster University, Hamilton, ON, Canada, November 21, 2013.

**Wickramasinghe, S. R.** and Steven Jones. “Treating Hydraulic Fracturing Flowback Waters: Potential Membrane Applications.” Presented at the AIChE Webinar, December 11, 2013.

**Zaharoff, D.A.,** “Engineering Immunotherapies for Bladder and Breast Cancers,” ARC Seminar Series, Harvard Medical School/Beth Israel Deaconess Medical Center, October 16, 2013, Boston, MA.

**Zou, M.** “Nano Engineered Surfaces.” Changzhou University Invited Seminar, China, July 2013.

**Zou, M.** “Nanoscale Surface Engineering.” UA COE FEP Honors Research Colloquium Seminar, Fayetteville, AR, November 2013.



### **Other Lectures, Papers, and Oral Presentations**

**Apple, J. K.**, B. E. Bass, T. C. Tsai, C. V. Maxwell, J. W. S. Yancey, A. N. Young, M. D. Hanigan, R. Ulrich, J. S. Radcliffe, B. T. Richert, G. Thoma, and J. S. Popp. “Effects of Amino Acid Supplementation of Reduced Crude Protein (RCP) Diets on Performance and Carcass Composition of Growing-Finishing Swine.” Presented at the 2013 ASAS Midwestern Section/ADSA Midwestern Branch Annual Meeting, Des Moines, IA, March 10-13, 2013.

**Avram, Alexandru**, Jing Lei, Xianghong Qian, S. Ranil Wickramasinghe, and Andre Beier. “Novel Catalytic Membranes for Combined Biomass Hydrolysis and Sugar Recovery.” Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 3-8, 2013.

**Bhave, O.**, J. P. Turner, T. Rectin, M. Moss, and S. Servoss. “Aggregation Studies of Beta-Amyloid Using Peptoids.” Presented at the American Institute of Chemical Engineers Annual Student Meeting, San Francisco, CA, November 1-4, 2013. First presented at the INBRE Annual Conference, Fayetteville, AR, October 18-19, 2013.

Underwood, S., **Braham, A.**, Research Needs Statements: The Foundation of Successful Proposals, Transportation Research Board, Doctoral Workshop, Washington, DC, January 14, 2013.

**Braham, A.**, Howard, I., Barham, J., Effects of Emulsion Type on Bending-Beam Rheometer Field-Aged Asphalt Concrete Beams, Poster Presentation, Transportation Research Board, Washington, DC, January 16, 2013.

Charmot, S., **Braham, A.**, Zhang, K., Effect of Emulsion Content and Cement Loading on Cold Recycling Mixture Fracture Energy Measured Using the Semi Circular Bending Fracture Test, Poster Presentation, Transportation Research Board, Washington, DC, January 16, 2013.

Jackson, A., **Braham, A.**, Sample Size Reduction of Cold In-Place Recycled Roadway Testing Specimens, Abstract to Contract competition, Poster Presentation, University of Arkansas, Fayetteville, AR, February 8, 2013.

**Braham, A.**, Pavement Research at the University of Arkansas, SEC Travel Grant Presentation, University of Florida, Gainesville, FL, March 19, 2013.

Jackson, A., **Braham, A.**, Sample Size Reduction of Cold In-Place Recycled Roadway Testing Specimens, Association of Asphalt Paving Technologists, Poster Presentation, Denver, CO, April 7 – 10, 2013.

Yang, S., **Braham, A.**, The Investigation of R-Curve and Crack Propagation in Asphalt Concrete, Association of Asphalt Paving Technologists, Poster Presentation, Denver, CO, April 7 – 10, 2013.

Ryan, J., **Braham, A.**, Workability of Foamed Warm Mix Asphalt, Association of Asphalt Paving Technologists, Poster Presentation, Denver, CO, April 7 – 10, 2013.

Yang, S., **Braham, A.**, Research of Evotherm Warm Mix Technology and RAP Usage for Hebei Province, Presentation to Hebei Province research team, Shijiazhuang, China, May 30, 2013.

Yang, S., **Braham, A.**, The Investigation of R-Curves of Asphalt Concrete, Presentation at ASCE Airfield and Highway Pavement Conference, Los Angeles, CA, June 11, 2013.

Ryan, J., **Braham, A.**, Foamed Asphalt Viscosity, Presentation at Texas A&M University for Texas Transportation Institute, College Station, TX, August 5, 2013.

Philip G. Crandall, Dinesh Babu, **Danielle Julie Carrier**, Matthew Pelkki and Elizabeth Martin, Sweetgum bark: Production of Extract and Evaluation of its Antimicrobial Properties Institute for Food Technology, Chicago July 2013.

Kris Bunnell and **Danielle Julie Carrier**, Pretreatment kinetics of switchgrass. hemicelluloses 35th Symposium on Biotechnology for Fuels and Chemicals. Portland May. 2013.

Kala Rajan and **Danielle Julie Carrier**, Significance of inhibitors produced during dilute acid pre-treatment of wheat straw. 35th Symposium on Biotechnology for Fuels and Chemicals. Portland May. 2013.

Anjele Djioleu and **Danielle Julie Carrier**, Effects of hardwood mixtures on xylose and glucose yields during dilute acid pretreatment and enzymatic hydrolysis. 35th Symposium on Biotechnology for Fuels and Chemicals. Portland May. 2013.

Noaa Frederick and **Danielle Julie Carrier**, The effect of washing dilute acid pretreated Populus deltoides biomass on ethanol yields. 35th Symposium on Biotechnology for Fuels and Chemicals. Portland May. 2013.

Kala Rajan and **Danielle Julie Carrier**. 2nd generation biofuels: Production of inhibitors during dilute acid pre-treatment of wheat straw. American Society of Agricultural and Biological Engineers (ASABE) Annual Meeting, Kansas City, MO July 2013.

Angele Djioleu and **Danielle Julie Carrier**. Effect of Dilute Acid Switchgrass Hydrolysates on  $\beta$ -glucosidase activity American Society of Agricultural and Biological Engineers (ASABE) Annual Meeting, Kansas City, MO July 2013.

Holeman, N., M. D. Matlock, **D. C. Carrier**, C. V. Maxwell, W. Zhang and T. A. Costello. 2013. "Design of a Swine Wastewater Treatment Facility to Produce Periphytic Algae as a Biomass Energy Feedstock". Presented at the Institute of Biological Engineering Conference, Raleigh, NC, March 7-9, 2013.

Jin, T. (with **C. Cassady**), "Understanding Operational Availability in Performance-Based Logistics and Maintenance Services." *Reliability and Maintainability Conference*, Orlando, Florida (January 2013)

Wiles, B. (with **C.R. Cassady**), "Incorporating Degrees of Separation into College Football Rankings." *Industrial Engineering Research Conference*, Reno, Nevada (May 2011)  
Singh, S., **V. F. Chevrier**, and R. Ulrich. "Numerical Modeling of Titan Fluvial Features." Presented at the 44th Lunar and Planetary Science Conference, Houston, TX, March 18-22, 2013.

**DeJarnette, D.**, J. Norman and D.K. Roper. "Fano Resonance from Constructive Interference of Scattered Light in Square Plasmonic Nanoparticle Arrays Tunable for Wavelength Specific Application." Presented at the International Conference on Surface Plasmon Photonics, Ottawa, ON, Canada, May 26-31, 2013.

**Dong, Robert**, Xianghong Qian, and S. Ranil Wickramasinghe. “High Performance Magnetically Responsive Membranes for Ultrafiltration.” Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 3-8, 2013.

**Du, Hongbo**, and Xianghong Qian. “The Effects of Salt on the Free Energy Surface for Protein Folding.” Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 3-8, 2013.

Pifer AD and **JL Fairey**, Assessing UV- and fluorescence-based metrics for prediction of trihalomethane formation potential, American Water Works Association (AWWA), Annual Conference & Exposition (ACE), Denver, CO.

Mash CA, T Do, and **JL Fairey**, Improving disinfection byproduct precursor characterizations and removal using asymmetric flow-field flow fractionation, American Chemical Society (ACS) National Meeting, New Orleans, LA.

**JL Fairey**, Balancing a tightrope: DBP challenges in Arkansas and the Mid-South, Arkansas Water Works & Water Environment Association (AWW&WEA) Annual Conference, Hot Springs, AR.

**JL Fairey**, Disinfection byproduct formation and control on Beaver Lake, Beaver Lake Symposium, Huntsville, AR.

Fernstrom, E.V., Carreiro, J.L. and **Grimmelsman, K.A.**, Evaluating Economical Dynamic Exciters for Bridge Vibration Testing, Sound & Vibration Magazine January, 2014, (<http://www.sandv.com/home.htm>)

Corral, J. and **B. Haggard**. 2013. Does Lake Frances Influence Phosphorus Transport in the Illinois River? Arkansas Water Resources Center Annual Research Meeting, Fayetteville, Arkansas.

Corral, J. and **B. Haggard**. 2013. The Influence of a Small Impoundment on Phosphorus Concentrations in the Illinois River. ASABE International Annual Meeting, Kansas City, Missouri.

**Haggard, B.**, I. Bailey and D. Zaharof. 2013. What happens when you mix chitosan and poultry litter? The Livestock & Poultry Learning Center, From Waste to Worth: 'Spreading' Science & Solutions, Denver, Colorado.

**Haggard, B.** and T. Scott. 2013. Phosphorus concentrations have been declining in the Illinois River. The Livestock & Poultry Learning Center, From Waste to Worth: 'Spreading' Science & Solutions, Denver, Colorado.

**Haggard, B.**, J. Mettrailer, D. Philipp, V. Skinner, T. Scott, and A. Sharpley. 2013. A nutrient mass balance of the Watershed Research and Education Center: where, when and how much? American Water Resources Association Spring Specialty Conference Agricultural Hydrology and Water Quality, St. Louis, Missouri.

Welch, M. and **B. Haggard**. 2013. Does Sampling Method Influence the Relation between Constituent and Discharge? Arkansas Water Resources Center Annual Research Conference, Fayetteville, Arkansas

Welch, M. and **B. Haggard**. 2013. Are Concentration – Discharge Relations Influenced by Water Sample Collection Methods? ASABE International Annual Meeting, Kansas City, Missouri.

Goad, D., Jones, C Kerby, J., and **Hale, W.**, Internal Curing, Arkansas State Highway and Transportation Department, Transportation Research Committee, November 14, 2013, Little Rock, AR.

Deschenes, Jr., R., Murray, C., Phillips, W., Ramirez, A., and **Hale, W.**, ASR Mitigation and Prevention, Arkansas State Highway and Transportation Department, Transportation Research Committee, November 14, 2013, Little Rock, AR.

**Hale, W.**, Emerging Concrete Technologies, Arkansas Society of Professional Engineers, November 7, 2013, Fayetteville, AR.

Byram, D., Xiao, X., Wang, K., **Hall, K.**, and Li, Q., Comparing MEPDG Distress Predictions to Automated and Manual Interpretations, Poster Presentation, Transportation Research Board 92<sup>nd</sup> Annual Meeting, Washington, DC, January 2013.

**Hall, K.**, Xiao, X., Nguyen, V., and Wang, K., A Reexamination of Traffic Data Preparation for the MEPDG, Poster Presentation, Transportation Research Board 92<sup>nd</sup> Annual Meeting, Washington, DC, January 2013.

**Hall, K.**, Special Provision: Percent-Within-Limits (PWL) Specification for HMA, Arkansas Asphalt Paving Association Quality Asphalt Conference, Little Rock, AR, January 10, 2013.

**Hall, K.**, Advances in Pavement Design and Performance, 95<sup>th</sup> Transportation Research Committee Meeting and Engineering Conference, Arkansas State Highway and Transportation Department, Little Rock, Arkansas, May 14, 2013.

**Heller Z.**, Wyatt J, Arnaud A, Wolchok, J. Development of a Traumatic Brain Injury Bioreactor, *Proceedings of the Annual Meeting of the Biomedical Engineering Society*, September (2013).

**Heller Z.**, Wyatt J, Wolchok JC, “Characterization of a Traumatic Brain Injury Bioreactor”, *Proceedings of the American Society for Mechanical Engineering Summer Bioengineering Conference (Presentation)*, June (2013).

**Heymsfield, E.**, and Kuss, M., Implementing GigaPan Technology Into an Airport’s Foreign Object Debris (FOD) Management System, 2013 Transportation Research Board Annual Meeting, Washington, D.C., January, 2013.

**Heymsfield, E.**, and Kuss, M., Implementing Gigapixel Technology to Highway Bridge Inspections, 2013 Transportation Research Committee Meeting, Little Rock, AR, May, 2013.

**Heymsfield, E.**, Osweiler, A., Selvam, R.P., Kuss, M., Incorporating Solar Energy to Develop Anti-Icing Airfield Runways, 2013 Airfield & Highway Pavement Conf., Los Angeles, CA, June 2013.

**Heymsfield, E.**, and Kuss, M., Implementing GigaPan Technology to Detect FOD and Pavement Cracking, 2013 Airfield & Highway Pavement Conf., Los Angeles, CA, June 2013.

**Heymsfield, E.**, Osweiler, A., Selvam, R.P., Kuss, M., Developing Anti-Icing Airfield Runways with Solar Energy, 2013 SWIFT Conference and Trade Show, Ottawa, Ontario, Sept 2013.

**Heymsfield, E.**, Deschenes, Richard, A., and Hale, W.M., ASR Prevention and Remediation at Northwest Arkansas Regional Airport (XNA), 2013 SWIFT Conference and Trade Show, Ottawa, Ontario, Sept 2013.

Z. Callahan, **A. Huang**. "Characterization of Nano-Channels in Different Environments for Use in a Micro-Propulsive Device." 2013 ASME International Mechanical Engineering Congress and Exposition, San Diego, CA, Nov 2013.

Lai, C. and **M. Huang**, "A Performance Autotuning Framework on Hybrid Computer Clusters," PhD Forum in the 28th *IEEE International Parallel & Distributed Processing Symposium (IPDPS)*, Phoenix, AZ, USA, May 19-23, 2014

**Hurd S.**, Kasukonis D, Cherry K, Ahmadi S, Wolchok JC, "Engineering a Muscle Mimetic Biomaterial", *Proceedings of the Annual Meeting of the Society for Biomaterials*, May (2013).

**Hurd S.**, Kasukonis B, Cherry K, Ahmadi S, Wolchok, J. "Engineering a Muscle Mimetic ECM Biomaterial, *Proceedings of the Annual Meeting of the Biomedical Engineering Society*, September (2013).

**Jernigan, A.**, M. May, T. Potts, B. Rogers, J. Hestekin, P. May, J. McLaughlin, R. Beitle, and C. Hestekin. "Effects of Storage on Extraction of Algal Carbohydrates and Oils for Biofuel Production." Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 3-8, 2013.

**Kasukonis B**, Wolchok, J. Development of a Novel Device for the Perfusion Driven Decellularization of Skeletal Muscle, *Proceedings of the Annual Meeting of the Biomedical Engineering Society*, September (2013).

**Kerr, R.**, Webb, N., Koppolu, B., Zaharoff, D.A., Kumar, T.K.S. The Role of Heparin in Acidic Fibroblast Growth Factor Signaling, Protein Society Annual Symposium, July 20-23, 2013, Boston, MA.

**Koppolu, B.**, Zaharoff, D.A. Encapsulation of antigen in chitosan particles enhances activation and antigen specific response by antigen presenting cells, Society for Biomaterials Annual Conference, April 10-13, 2013, Boston, MA.

**Kumar, S.**, Koppolu, B., Wallace, C., Zaharoff, D.A. Effects of Chitosan Modifications on Protein Release, Biomedical Engineering Society (BMES) Annual Meeting, September 25-28, 2013, Seattle, WA.

**Kurtz, S.L.**, Vo, J.L.N., Yang, L., Koppolu, B., Ravindranathan, S., Smith, S.G, Zaharoff, D.A. In situ Vaccination with Chitosan/IL-12 Generates Tumor Specific Immunity in Triple Negative Breast Cancer, Breast Cancer Challenge Conference, July 26-27, 2013, Branson, MO.

Brockman, L., R. Wang, J. Lum, L. Kelso and **Y. Li\***. 2013. Nanobead and aptamer based QCM biosensor for rapid detection of avian influenza virus. Presented at IBE 2013 Annual Meeting, March 7-9, 2013, Raleigh, NC. Paper No. 13.

Callaway, Z., Y. Fu, R. Wang, J. Lum, and **Y. Li**. 2013. Modeling the electro-magnetic properties of avian influenza virus in a flow cell with an interdigitated nanoelectrode using Comsol. ASABE 2013 Annual International Meeting, July 21-24, 2013, Kansas City, MO. ASABE Paper No. 131620936.

Hu, Q., X.H. Xu, M.Z. Li, Y. Zhang, and **Y. Li**. 2013. Rapid detection of acrylamide in food using a fluorescent sensing method based on functional CdSe/ZnS quantum dots. IEEE Sensors 2013 Conference, November 3-6, 2013, Baltimore, MD. Paper No. 7198.

Wang, L., R Wang, **Y. Li**, B.W. Kong, K. Ye and S. Jin. 2013. Engineering B-cell biosensors for specific, sensitive and rapid detection of E. coli O157:H7. Presented at IBE 2013 Annual Meeting, March 7-9, 2013, Raleigh, NC. Paper No. 12.

Wang, H., **Y. Li**, and M. Slavik. 2013. Rapid detection of Campylobacter jejuni in poultry products using quantum dots and nanobeads based fluorescent immunoassay. Presented at IAFP 2013 Annual Meeting, July 28-31, 2013, Charlotte, NC. Paper No. P2-108.

Wang, R., X. Yan, Z. Li, **Y. Li**, P. Jiao, D. An, M. Wang, M. Liao, and Y. L\*. 2013. Development of a cost-effective impedance immunosensor for rapid and specific screening of avian influenza virus H5:N1 Asian field strain. Presented at IBE 2013 Annual Meeting, March 7-9, 2013, Raleigh, NC. Paper No. 4.

**Liu, Zizhao**, Hongbo Du, Ranil Wickramasinghe, and Xianghong Qian. “Developing New Synthetic Copolymer for Protein Separations via Atom Transfer Radical Polymerization.” Presented at the 245th American Chemical Society Annual Meeting, New Orleans, LA, April 11-17, 2013.

**Liu, Zizhao**, Xianghong Qian, and S. Ranil Wickramasinghe. “High Affinity Membrane Adsorbers for Protein Purification.” Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 3-8, 2013.

**Malmali, M.**, J. Stickel, and S. R. Wickramasinghe. “Continuous Enzymatic Hydrolysis of Biomass in a Membrane-assisted Reactor.” Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 3-8, 2013.

Rajurkar, K. P., Jahan, M. P., **Malshe, A. P.** “Electro-machining (nano-EM) Processes.” International Conference on Precision, Meso, Micro and Nano Engineering, NIT Calicut, Kerala, India, Dec 2013.

Bautista, R. C., M. Leh, P. Bandekar, **M. Matlock**, G. Thoma, and R. Ulrich. “Greenhouse Gas Emissions, Energy, and Water Use Comparison in Two Types of Swine Gestation Barns.” Presented at the American Ecological Engineering Society 13<sup>th</sup> Annual Meeting, Lansing, MI, June 10-12, 2013.

Roesch, S. (with **R.D. Meller**), “Collaborative Freight Transportation to Improve Efficiency and Sustainability.” *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (May 2013)

Thomas, L.M. (with **R.D. Meller**), “Using Empirical Data to Assess Performance in Overall Warehouse Design.” *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (May 2013)

Montreuil, B. (with **R.D. Meller**), “Physical Internet Crossdocking Hub Design: A Simulation-Based Investigation.” *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (May 2013)

Kirac, E., **A.B. Milburn**, “Incorporating Needs From Social Media in Static Disaster Relief Routing Plans (Poster).” *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (October 2013)

Li, B., **A.B. Milburn**, “Scheduling Workers in a Warehouse Based on Productivity Performance.” *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (October 2013)

**Millett, P.C.**, Tonks M., Zhang Y., Biner S.B. “Multi-Scale Simulation of Intergranular Bubbles in Oxide Fuels.” The Minerals, Metals, and Materials Society (TMS) Meeting, San Antonio, TX, 2013.

**Millett, P.C.** “Novel Computational Approach to Modeling and Simulation of Colloidal Self-Assembly.” ME Grad Seminar, MEEG, 2013.

**Nachtmann, H.**, “A Cargo Prioritization Model for Inland Waterway Disruptions.” *INFORMS Transportation Science and Logistics Society Annual Workshop*, Pacific Grove, California (June 2013)

**Nachtmann, H.**, “Supporting Secure and Resilient Inland Waterways.” *Committee on the Marine Transportation System Speaker Series*, Washington D.C. (July 2013)

Gedik, R., **H. Nachtmann**, E.A. Pohl, C. Rainwater, and K. Mitchell, “Constraint Programming Approaches for Optimizing Inland Waterway Infrastructure Maintenance.” *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (October 2013)

Gedik, R., **H. Nachtmann**, E.A. Pohl, C. Rainwater, and K. Mitchell, “Dredge Equipment Scheduling with Environmental Windows.” *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (May 2013)

Campo, Matt (with **H. Nachtmann**), “Supporting Secure and Resilient Inland Waterways.” 2013 Inland Waterways Conference, Louisville, Kentucky (March 2013)

Oztanriseven, Furkan (with **H. Nachtmann**), “A Review of Economic Impact Analysis in Maritime Transportation.” *American Society for Engineering Management Conference*, Minneapolis, Minnesota (October 2013)

Oztanriseven, Furkan (with **H. Nachtmann**), “An Economic Impact Study of the Arkansas Navigable Inland Waterways.” *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (October 2013)

Oztanriseven, Furkan (with **H. Nachtmann**), “An Economic Impact Study of the Inland Waterways.” *Institute Of Industrial Engineers Annual Conference and Expo*, San Juan, Puerto Rico (May 2013)

Specking, Eric (with **H. Nachtmann**), “An Analytic Hierarchy Process Approach to Engineering Outreach Decisions.” *Institute Of Industrial Engineers Annual Conference and Expo*, San Juan, Puerto Rico (May 2013)

Tong, Jingjing (with **H. Nachtmann**), “A Cargo Prioritization Model for Inland Waterway Disruptions.” *Institute Of Industrial Engineers Annual Conference and Expo*, San Juan, Puerto Rico (May 2013)

Tong, Jingjing (with **H. Nachtmann**), “A Cargo Prioritization Model for Inland Waterway Disruptions.” *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (October 2013)

Tong, Jingjing (with **H. Nachtmann**), “Value-Focused Thinking for Inland Waterborne Cargo Prioritization.” American Society for Engineering Management Conference, Minneapolis, Minnesota (October 2013)

Tong, Jingjing (with **H. Nachtmann**), “A Cargo Prioritization Model for Inland Waterway.” *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (October 2013)

Tong, Jingjing (with **H. Nachtmann**), “A Cargo Prioritization Model for Inland Waterway Disruptions.” *Institute Of Industrial Engineers Annual Conference and Expo*, San Juan, Puerto Rico (May 2013)

Tong, Jingjing (with **H. Nachtmann**), “Multi-attribute Decision Model for Cargo Prioritization within Inland Waterway Transportation.” *Institute Of Industrial Engineers Annual Conference and Expo*, San Juan, Puerto Rico (May 2013)

Schneider, K., **E.A. Pohl**, and C. Rainwater, “Multi-State Social Network Analysis under Conditional Influence.” *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (May 2013)

Shbool, M.S., **E.A. Pohl**, M.D. Rossetti, and V. Varghese, “Comparing Educational and Training Requirements for Retail and Healthcare Supply Chain Professionals.” *ASEM 2013 International Annual Conference*, Minneapolis, Minnesota (October 2013)

Rodriguez, H. G., **J. Popp**, R. Ulrich, and M. Black. “Integrating a Life Cycle Costing Model into a GHG Emissions Model for Swine Production.” Presented at the 2013 Southern Agricultural Economics Association Annual Meeting, Orlando, Florida, February 2-5 2013.

**Pryor, E.**, M. Moss, and C. Hestekin. “Microchannel Electrophoresis Analysis of Amyloid Protein Aggregation.” Presented at the American Institute of Chemical Engineers / AES Electrophoresis Society Annual Meeting, San Francisco, CA, November 3-8, 2013.

**Purdy, H.** and S. Servoss. “A Peptoid-based Targeted Drug Delivery System for the Treatment of Metastatic Cancer.” Presented at the American Institute of Chemical Engineers Annual Student Meeting, San Francisco, CA, November 1-4, 2013.

**Qian, Xianghong** and Hongbo Du. “Free Energy Landscape for Folding/Unfolding of Poly(N-isopropylacrylamide) and the Effects of Salt Ions.” Presented at the 245th American Chemical Society Annual Meeting, New Orleans, LA, April 11-17, 2013.

**Qian, Xianghong**, Heath Himstedt, Hongbo Du, Kathryn Marshall, and S. Ranil Wickramasinghe. “pH-Responsive Nanofiltration Membranes for Sugar Separations.” Presented at the 23rd North American Membrane Society Annual Meeting, Boise, ID, June 8-12, 2013.



**Qian, Xianghong**, Jing Lei, Alexandru Avram, and Ranil Wickramasinghe. “Catalytically Responsive Membranes for Simultaneous Biomass Hydrolysis and Separation.” Presented at the 23rd North American Membrane Society Annual Meeting, Boise, ID, June 8-12, 2013.

**Qian, Xianghong**, Jing Lei, and S. Ranil Wickramasinghe. “Novel Polymeric Solid Acid Catalysts for Biomass Hydrolysis.” Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 3-8, 2013.

**Qian, Xianghong**. “From Cyclic to The Open Chain Form  $\frac{3}{4}$  Ab Initio Molecular Dynamics Simulations of Glucose Ring Opening Process.” Presented at the 245th American Chemical Society Annual Meeting, New Orleans, LA, April 11-17, 2013.

**Qian, Xianghong**. “Glucose Isomerization to Fructose and Mannose from Ab Initio Molecular Dynamics Simulations.” Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 3-8, 2013.

**Rainwater, C.**, “Optimizing Inland Waterway Infrastructure Maintenance for Supply Chain Operations.” Euro-INFORMS, Rome, Italy (July 2013)

**Rainwater, C.**, “A Refined Approach to Fourth-Down Decision Making.” *Industrial Engineering Research Conference*, Reno, Nevada (May 2011)

Gedik, Ridvan (with **C. Rainwater**), “Dredge Equipment Scheduling with Environmental Windows.” *Institute Of Industrial Engineers Annual Conference and Expo*, San Juan, Puerto Rico (May 2013)

Gedik, R., **C. Rainwater**, and S. Zhang, “Patient Scheduling in a Proton Therapy: An MDP Approach.” *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (May 2013)

St. John, D., **C. Rainwater**, and J.C. Smith, “A Parallel Approach for Solving Shortest Path Network Interdiction Problems.” *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (May 2013)

**Ravindranathan, S.**, Koppolu, B., Smith, S.G., Kurtz, S.L., Zaharoff, D.A. Functional characterization of chitosan. Biomedical Engineering Society (BMES) Annual Meeting, September 25-28, 2013, Seattle, WA.

**Rogers, L.**, J. P. Turner, and S. Servoss. “Peptoid-based Therapeutics for Alzheimer’s Disease.” Presented at the American Institute of Chemical Engineers Midwest Regional Meeting, Norman, OK, April 19-20, 2013.

Shbool, M.S., **M.D. Rossetti**, and E.A. Pohl, “Estimating Inventory Holding and Ordering Costs for Single Item Inventory Models.” *Proceedings of the 2013 Industrial and Systems Engineering Research Conference*, A. Krishnamurthy and W.K.V. Chan, eds., San Juan, Puerto Rico (May 19-22, 2013)

**Rossetti, M.D.**, “Applying Inventory Control Practices within a Healthcare Supply Chain – A Case Study.” Center for Excellence in Logistics and Distribution, *Fall Meeting and Research Symposium*, Chicago, Illinois (2013)

**Rossetti, M.D.**, “Inventory Performance Web-Services.” *Center for Excellence in Logistics and Distribution, Fall Meeting and Research Symposium*, Chicago, Illinois (2013)

**Rossetti, M.D.**, K.L. Needy, C. Gattis, E. Clausen, and M. Hale, “On the Development of a Student Integrated Intern Research Experience as a Pathway to Graduate Studies.” *Proceedings of the 2013 ASEE Annual Conference and Exposition*, Atlanta, Georgia (2013)

**Rossetti, M.D.**, M.S. Shbool, V. Varghese, and E.A. Pohl, “Investigating the Effect of Demand Aggregation on the Performance of an (r, Q) Inventory Control Policy.” *Proceedings of the 2013 Winter Simulation Conference*, R. Pasupathy, S-H. Kim, A. Tolk, and M.E. Kuhl eds, Piscataway, New Jersey: Institute of Electrical and Electronics Engineers, Inc. (2013)

Bright, J. and **M.D. Rossetti**, “A Comparison of (r, Q) Inventory Optimization Algorithms.” *Proceedings of the 2013 Industrial and Systems Engineering Research Conference*, A. Krishnamurthy and W.K.V. Chan, eds., San Juan, Puerto Rico (May 19-22, 2013)

Gorecki, P. and **R.P. Selvam**, Three-dimensional tornado simulation over complex terrain, Poster for High Performance Computing Group, University of Arkansas.

Gorecki, P. and **R.P. Selvam**, Three-dimensional simulation of tornado-hill interaction, Abstract to Contract competition, Poster Presentation, University of Arkansas, Fayetteville, AR, February 8, 2013.

Strasser, M. and **R.P. Selvam**, Cost and performance analysis of thermal energy storage for concentrating solar power plants, Abstract to Contract competition, Poster Presentation, University of Arkansas, Fayetteville, AR, February 8, 2013. ***Received first prize.***

Taylor, W., G. Mellott and **R.P. Selvam**, The effect of complex terrain on tornadoes, Freshman Honors Research, Proceedings of the 5th Annual FEP Honors Research Symposium.

Chavis, N., C. Maestri, **R.P. Selvam** and M. Strasser, Building a wood gas generator for practical use, Freshman Honors Research, Proceedings of the 5th Annual FEP Honors Research Symposium.

Raney, A., W. Chu, **R.P. Selvam**, M. Strasser, Wood gasification and filtration of wood gas, Freshman Honors Research, Proceedings of the 5th Annual FEP Honors Research Symposium. ***selected as best paper and received award***

**Serrano, F.**, C. W. Young, M. Hebert, and S. L. Servoss. “Microsphere Formation Using Peptoids.” Presented at the Society for Hispanic Professional Engineers Regional Leadership Development Conference, San Antonio, TX, April 18-21, 2013.

**Serrano, F.**, T. Rehtin, and S. Servoss. “NMEG Peptoids as a Method to Increase Proteolytic Stability of Protein Therapeutics.” Presented at the American Institute of Chemical Engineers Annual Student Meeting, San Francisco, CA, November 1-4, 2013. First presented at the Society for Hispanic Professional Engineers Annual Meeting, Indianapolis, IN, October 30–November 2, 2013.

**Servoss, S.**, J. P. Turner, K. Moore, and M. Moss. “Peptoid-based Therapeutics for Alzheimer’s Disease.” Presented at the American Chemical Society National Meeting, New Orleans, LA, April 7-11, 2013.

**Servoss, S.**, M. Hebert, J. P. Turner, D. Shah, and P. Blake. “Tunable Peptoid Microsphere Coatings.” Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 1-4, 2013. First presented at the Biomedical Engineering Society Annual Meeting, Seattle, WA, September 25-28, 2013.

**Smith, K.**, M. Hebert, D. Shah, and S. Servoss. “Targeted Drug Delivery with Peptoid-based Nanospheres.” Presented at the American Institute of Chemical Engineers Midwest Regional Meeting, Norman, OK, April 19-20, 2013.

**Smith, S.G.**, Yang, L., Zaharoff, D.A. Intravesical Chitosan/IL-12 Immunotherapy of Orthotopic Bladder Cancer Induces Tumor Specific Systemic Immunity, Biomedical Engineering Society (BMES) Annual Meeting, September 25-28, 2013, Seattle, WA.

**Song, Guanghui**, Xianghong Qian, and S. Ranil Wickramasinghe. “Magnetically Responsive Self-Cleaning Nanofiltration Membranes.” Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 3-8, 2013.

**Smith, S.G.**, Yang, L., Vo, J.L.N., Ravindranathan, S., Koppolu, B., Kurtz, S., Zaharoff, D.A. Intravesical Immunotherapy with Chitosan and Interleukin-12 Induces Systemic Tumor-Specific Immunity, American Urological Association (AUA) Annual Meeting, May 4-8, 2013, San Diego, CA. (Moderated Poster)

Bedekar, V.N, Lee, J., **Spearot, D.E.**, Malshe, A.P. “Learning How to Learn and Teach: Mentor and Mentee Team.” 2013 ASEE Annual Conference and Exposition, 2013.

**Spearot, D.**, Jacob, K., McDowell, D. “Fracture of CSL Boundaries in Cu and Al.” 11th International Conference on Fracture 2005, 2013.

**Spearot, D.E.** “What is Computational Materials Science and Why Should I Care?” Freshman Engineering Program Honors Colloquium, Fayetteville, AR, Oct 2013.

**Spicer, T.** “Comparison of DEGADIS Dispersion Model Predictions with Observations from the Jack Rabbit Chlorine Tests.” Presented at the Seventeenth Annual George Mason University Conference on Atmospheric Transport and Dispersion Modeling, Fairfax, VA, June 25-26, 2013.

**Sun, Xiaoquan**, Hongbo Du, S. Ranil Wickramasinghe, and Xianghong Qian. “Molecular Dynamics Simulations of Cellulose Interaction with Polymeric Solid Acid.” Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 3-8, 2013.

**Thoma, G.** and S. Valdivia. “Introduction to Key Elements of the Global Guidance Principles.” Presented at the 5<sup>th</sup> International Conference on Life Cycle Assessment, Mendoza, Argentina, March 24-27, 2013.

**Thoma, G.**, J. Popp, R. Ulrich, W. Salas, and C. Li. “Integrating Biogeochemical Process Models with Life Cycle Costing Model for Quantification of Greenhouse Gas Emissions from U.S. Swine Production Greenhouse Gases in Animal Agriculture.” Presented at the American Center for Life Cycle Assessment LCA XIII Conference, Orlando, FL, September 30–October 3, 2013. First presented at the Greenhouse Gases & Animal Agriculture Conference, Dublin, Ireland, June 23-26, 2013.

**Turner, J. P.,** O. Bhave, L. Rogers, T. Rectin, M. Moss, and S. Servoss. “Peptoid-based KLVFF Peptide Mimics to Inhibit Amyloid Beta Aggregation.” Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 1-4, 2013.

Marroquin, M., **A. Vu**, T. Bruce, S. R. Wickramasinghe, and S.M. Husson. “Location and Quantification of Biological Foulants in a Wet Membrane Structure by Cross-sectional Confocal Laser Scanning Microscopy.” Presented at the 23<sup>rd</sup> North American Membrane Society Annual Meeting, Boise, Idaho, June 8-12, 2013.

**Vu, Anh,** Heath Himstedt, Xianghong Qian, and S. Ranil Wickramasinghe. “Novel Membranes for Hydrophobic Interaction Chromatography.” Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 3-8, 2013. First presented at the 23<sup>rd</sup> North American Membrane Society Annual Meeting, Boise, ID, June 8-12, 2013.

**Wickramasinghe, S. R.** and T. O. Spicer. “Licensure – An Academic Perspective.” Presented at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 3-8, 2013. First presented at the American Institute of Chemical Engineers Spring Meeting, San Antonio, TX, April 28–May 2, 2013.

**Wickramasinghe, S. R.,** G. Song, A. Vu, H. H. Himstedt, and X. Qian. “Magnetically Responsive Membranes.” Presented at the 7<sup>th</sup> Sino-U.S. Joint Conference of Chemical Engineering, Beijing, China, October 14-18, 2013.

**Wickramasinghe, S. R.,** X. Qian, S. Husson, and J. Weaver. “Anion Exchange Membrane Adsorbers for Contaminant Removal: Antibody Recovery and Virus, Host Cell Protein, and DNA Clearance.” Presented at the American Chemical Society National Meeting, New Orleans, LA, April 7-11, 2013.

**Wickramasinghe, S. Ranil,** Jing Lei, Alex Avram, and Xianghong Qian. “Catalytic Membranes for Simultaneous Biomass Hydrolysis and Separation.” Presented at the 7<sup>th</sup> Sino-U.S. Joint Conference of Chemical Engineering, Beijing, China, October 14-18, 2013.

**Williams, S.,** RAS – Research Update, Arkansas Quality Asphalt Conference, Arkansas Asphalt Pavement Association (AAPA), Little Rock, AR, January 10, 2013.

**Williams, S.,** Hot Mix Paving Joints, Missouri Chapter APWA Spring Conference, Springfield, MO, April 15, 2013.

**Williams, S.,** Foamed Warm Mix Asphalt Design Issues (TRC 1304), 95th Transportation Research Committee Meeting, AHTD, Little Rock, AR, May 15, 2013.

**Williams, S.,** An Overview of Roller Compacted Concrete Pavement, Arkansas Chapter of the American Public Works Association, Spring Conference, Hot Springs, AR, May 16, 2013.

**Williams, S.,** Complying with the MS4 Stormwater Management Regulations, Arkansas Municipal League, 79th Convention, Hot Springs, AR, June 20, 2013.

**Williams, S.,** Hattieville RCC Project Review, 2013 Arkansas Concrete Pavement Conference”, ACPA, Little Rock, AR, August 13, 2013.

**Williams, S.,** Design, Construction, and Maintenance for Stormwater Management on Unpaved Roads, 2013 Road Seminar, County Judges Association of Arkansas, September 25, 2013.

**Williams, S.**, Roller Compacted Concrete Pavement, Arkansas Chapter of the American Public Works Association, 2013 APWA Fall Conference, Fayetteville, AR, October 24, 2013.

**Williams, S.**, Design, Construction and Monitoring of RCC in the FSP Area, 97th Meeting of the Transportation Research Committee, AHTD, Little Rock, AR, November 14, 2013.

**Williams, S.**, CTPP Annual Review 2013, presentation to CTPP Advisory Board Meeting, Fayetteville, Arkansas, December 16, 2013.

Cox BR, Bradley BA, Wotherspoon LM, Stokoe II K, Cubrinovski M, Teague D, **Wood CM.**, Deep Vs profiling for dynamic characterization of Christchurch, New Zealand: Towards reliably merging large active-source and ambient-wavefield surface wave methods. International Conference on Earthquake Geotechnical Engineering: In honour of Prof. Kenji Ishihara. 17-19 June 2013. Istanbul, Turkey. 2pp.

Bao, W. (with **S. Zhang**) "Optimizing the Dose and Delivery of Influenza Vaccine Using a Multi-Objective Simulation Approach." *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (October 2013)

Madadi, M. (with **S. Zhang**), "Cost Evaluation of Mammography Screening Policies Considering Imperfect Adherence." *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico (May 2013)

Madadi, M. (with **S. Zhang**), "A Nonlinear Programming Model to Optimize Mammography Screening." *Institute for Operations Research and the Management Sciences INFORMS Healthcare Conference*, Chicago, Illinois (June 2013)

Madadi, M. (with **S. Zhang**), "A Stochastic Nonlinear Programming Model for Mammography Screening Policies Considering Adherence." *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (October 2013)

Wang, F. (with **S. Zhang**), "Personalized Biopsy Referral Decision Making in the Presence of Breast Cancer Regression." *Institute for Operations Research and the Management Sciences INFORMS Healthcare Conference*, Chicago, Illinois (June 2013)

Wang, F. (with **S. Zhang**), "Optimizing Breast Cancer Mammography Screening Schedules Using a Regression-based Model." *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Minneapolis, Minnesota (October 2013)

Mash CA, **W Zhang**, and JL Fahey, The impact of continued nutrient enrichments on disinfection byproduct formation, Institute of Biological Engineering (IBE) Annual Conference, Cary, NC.

**Wen Zhang** and Ranil Wickramasinghe, Membrane Bioreactors for Treatment of Poultry Wastewater, MAST Center Meeting, Fayetteville, AR, April 2013.

**Wen Zhang**, Hadis Matinpour, Ranil Wickramasinghe and Xianghong Qian, Removal of Endocrine Disrupters from Wastewater Streams, MAST Center Meeting, Boulder, CO, Oct 2013.

**Wen Zhang**, Biofilm: Friend or Foe?, CHEG Seminar, Fayetteville, AR, Nov 2013

Thompson, C., **Zou, M.** “Nanostructured Antireflective Coating by Use of Polymer Adhesion Layer.” 23rd National NSF EPSCoR Conference, Nashville, TN, Nov 2013.

Thompson, C., **Zou, M.** “Nanostructured Antireflective Coating by Use of Polymer Adhesion Layer.” Arkansas ASSET Initiative Annual Conference, Little Rock, AR, June 2013.

Carter, J. **Zou, M.** “Friction and Wear Study of PTFE/Graphene Oxide Composite Thin Films.” STLE Annual Meeting and Exhibition, Detroit, MI, May 2013.

Fleming, R.A., Jenkins, S., Chen, J., and **Zou, M.** “Superhydrophilic and Superhydrophobic Surfaces with Incorporated Ag Nanoparticles for Potential Biomedical Applications.” ABI Fall Research Symposium, Little Rock, AR, Oct 2013.

Beckford, S. , **Zou, M.** “Development of a Low Friction and Wear Resistant PTFE Thin Film Modified with a Polydopamine Adhesive Layer.” STLE Annual Meeting and Exhibition, Detroit, MI, May 2013.

### **Other Creative Endeavors**

**Dr. Cassady** served as mentor to the GearHogs, a *FIRST* Robotics Competition team at Springdale High School. This program exposes high school students to robotics and engineering principles.

**Clausen, E. C.**, and T. O. Spicer. “Formative Teaching Evaluation: The Faculty Coaches Group.” Presented at the 2013 American Society for Engineering Education Midwest Section Annual Conference, Salina, KS, September 18-20, 2013.

Heeren, D.M., G.A. Fox, D.E. Storm, **B.E. Haggard**, C.J. Penn, and T. Halihan. July 21-24, 2013. Impact of Measurement Scale on Infiltration and Phosphorus Leaching in Ozark Floodplains. ASABE Annual International Meeting, Paper No. 1621213, Kansas City, MO.

Patterson, S.D., **B.E. Haggard**, and M.E. Boyer. 2013. Ecological Design in the Ozarks – Workshop and Lake Frances Charrette. Arkansas Water Resources Center Technical Publication MSC 368, 23 pp.

Massey, L.B. and **B.E. Haggard**. 2013. AWRC Annual Summary, Arkansas Water Resources Center MSC299NL40, 2 pp.

Stone, N., J.L. Shelton, **B.E. Haggard**, and H.K. Thomforde. 2013. Interpretation of Water Analysis Reports, Southern Region Aquaculture Center SRAC Publication Number 4606

Massey, L.B., J.A. McCarty, M.D. Matlock, A.N. Sharpley, and **B.E. Haggard**. 2013. Water-quality monitoring for selected priority watershed in Arkansas, Upper Saline, Poteau and Strawberry Rivers. Arkansas Water Resources Center Technical Publication MSC 369, 72 pp.

Gross, J. **C. Henry** and R. Stowell. 2013. Vegetative Treatment Systems Manual. University of Nebraska-Lincoln., Lincoln, Nebraska, 35pp.

**Henry, C.**, M. Daniels and J. Hardke. 2013. Water Management Chapter in Arkansas Rice Production Handbook. MP 192. The University of Arkansas Cooperative Extension Service, Little Rock. 20 pp.

**Henry, C.G.** and B. Stringham. 2013. How to Read Electric Meters. Irrigating Smart Factsheet Series. LSU AgCenter Publication 3241-I

**Henry, C.G.**, J. H. Massey, H. C. Pringle, L. J. Krutz, B. Stringham. 2013. Tips for Conserving Irrigation Water in the Southern Region. Irrigating Smart Factsheet Series. LSU AgCenter Publication 3241-K

Sheffield, R. E., **C.G. Henry** and D. Bankston. 2013. Measuring Irrigation Flow. Irrigating Smart Factsheet Series. LSU AgCenter Publication 3241-L

**Henry, C. G.**, R. E. Sheffield, N. Kenny. 2013. Irrigation Pumping Plant Safety. Irrigating Smart Factsheet Series. LSU AgCenter Publication 3241-M

**Henry C. G.** and B. Stringham. 2013. Variable Frequency Drives for Irrigation Pumping Plants. Irrigating Smart Factsheet Series. LSU AgCenter Publication 3241-B.

**Huang, Adam.** “NASA RID Year 1 Report”, NASA, 2013

**J.-W. Kim.** 2013. Nano-Building Block Toolboxes (“Nanotoolboxes”) for Programmable Self-Assembly of Nanocomposites with Arbitrary Shapes and Functions, Conference on Programmable Self-Assembly of Matter: Towards Rationally Designed Micro- and Nanoscale Systems, June 30-July 2, New York University, New York, NY.

N. Kotagiri PhD and **J.-W. Kim.** 2013. Stealth Nanotube Theranostic Agents with Immunological Disguising Proteins, IEEE International Conference on Nano/Molecular Medicine and Engineering (IEEE-NANOMED), November 10-13, Phuket, Thailand.

**J.-W. Kim.** 2013. Stealth Nanotube Theranostic Agents, IEEE International Conference on Nano/Molecular Medicine and Engineering (IEEE-NANOMED), November 10-13, Phuket, Thailand.

**J.-W. Kim.** 2013. Self-Assembling Multifunctional Nanocomposites for Nanotheranostics of Circulating Tumor and Other Pathological Cells in Vivo. Nano Science and Technology Institute (NSTI) Nanotech Conference & Expo 2013, May 12-16, Washington, DC

Tabler, G.T., **Y. Liang**, H.M. Yakout, J. Wells and W. Zhai. 2013. Evaporative cooling systems: How and why they work. Fact sheet 2774. Extension Service of Mississippi State University.

Tabler, G.T., **Y. Liang**, H.M. Yakout, J. Wells and W. Zhai. 2013. Intestinal health and necrotic enteritis in broilers. Factsheet 2771. Extension Service of Mississippi State University.

Tabler, G.T., J. Wells, W. Zhai , H.M. Yakout, and **Y. Liang.** 2013. What causes footpad dermatitis in poultry? Factsheet 2769. Extension Service of Mississippi State University

**Malshe, Ajay P.** Report, Leggett & Platt Aluminum Group (Pace Industries), 2013.

**Malshe, Ajay P.** NSF Report, 2013.

**Malshe, Ajay P.** “Phase-I STTR, HYPRES- Office of Naval Research”, 2013.

**Malshe, Ajay P.** “Energy Harvesting from Earth Movers”, Caterpillar, 2012.

**Malshe, Ajay P.** “Fundamental Understanding of Nanoparticle-Based Lubricants Tuned to Respond to Harsh Boundary Lubrication Conditions.” NSF, 2013.

**Millett, P.C.** Poster for “Materials Research Society Fall Meeting” MRS, 2013.

**Miskin, D. R.**, W. R. Penney, and E. C. Clausen. “Force Produced by Impingement of a Fluid Jet on a Deflector.” Presented at the 2013 American Society for Engineering Education Midwest Section Annual Conference, Salina, KS, September 18-20, 2013.

**Dr. Nachtmann** led a successful effort on the proposal to stand up a new Tier 1 University Transportation Center at the University of Arkansas. The new center, MarTREC - Maritime Transportation Research and Education Center, received initial funding of \$1.4M.

Liang, L., **Nutter, D.**, and Harding, A. “Energy Balance Analysis of a Poultry Processing Plant” U.S. Poultry and Egg Association, December 2013.

**Nutter, D.** “Arkansas Industrial Energy Clearinghouse 2012 Annual Report” Arkansas Energy Office, February 2013.



**Nutter, D.** “Arkansas Industrial Energy Clearinghouse 2012 Annual Report” Arkansas Energy Office, April 2013.

**Nutter, D.** “Arkansas Industrial Energy Clearinghouse 2012 Annual Report” Arkansas Energy Office, June 2013.

**Nutter, D.** “Arkansas Industrial Energy Clearinghouse 2012 Annual Report” Arkansas Energy Office, July 2013.

**Nutter, D.** “Arkansas Industrial Energy Clearinghouse 2012 Annual Report” Arkansas Energy Office, September 2013.

**Nutter, D.** “Arkansas Industrial Energy Clearinghouse 2012 Annual Report” Arkansas Energy Office, October 2013

**G.S Osborn**, Founder and Board Member of BlueInGreen, LLC, a company formed to commercialize UA owned inventions from my research. In 2013, BlueInGreen directly employed 16 people including the CEO, 5 full-time engineers, 1 part-time engineer, 1 full-time technician, 3 part-time undergraduate engineering students, sales staff, and support staff. BlueInGreen has generated approximately \$8.7 million in revenue since its creation in 2004.

**G.S Osborn**, Featured article “BlueInGreen: Pioneers in Water Treatment” from Arkansas Engineer Magazine, College of Engineering at the University of Arkansas, Spring 2013. Water Quality issue.

**G. S. Osborn**, BlueInGreen work subject of 3 UA press releases: emergency response for Hurricane Sandy in Virginia; ribbon cutting for SDOX unit to treat water at Lake Tenkiller dam; treating odor issues in sewer pipes in Houston, TX.

**G.S. Osborn**, Local television and newspaper coverage of BlueInGreen systems at Lake Tenkiller (Tulsa World). Article in Arkansas Democrat-Gazette about SDOX technology saving fish at Lake Tenkiller.

**Dr. Ed Pohl** served as director for the college program for a Master of Science in Engineering (MSE). The online MSE program received national recognition with the recent release of the *U.S. News & World Report's* ranking of the Best Online Graduate Engineering programs. The MSE program was ranked 25<sup>th</sup> in the country in 2012, 23<sup>rd</sup> in the country in 2013. The programs was ranked 18<sup>th</sup> among public institutions in 2013.

**Dr. Rainwater** served as the faculty mentor for two Upward Bound students (Yasmin Chavez and Stephanie Sandavol). The students were in the industrial engineering department 4 days a week over a 4 week period. They worked to develop interactive tutorials to enable high school students to learn Autodesk Inventor. The students utilized designs from the 2013 robotics program which Dr. Rainwater mentors to assist in the development of these tutorials.

**Rossetti, M. D.**, E. C. Clausen, C. S. Gattis, W. M. Hale, and K. L. Needy. “On the Development of a Student Integrated Intern Research Experience as a Pathway to Graduate Studies.” Presented at the 120th American Society for Engineering Education Annual Conference & Exposition, Atlanta, GA, June 23-26, 2013.

Development of Equilibrium Moisture Content Excel Sheet. **Samy Sadaka.**

Development of an Excel Sheet to decide if farmers need to heat drying air or no. “Will Natural Air-Drying Occur?”. **Samy Sadaka**.

Manure Valuator Mobile App, IOS and Android App, **Saraswat, VanDevender**

**Saraswat, D.**, N.Pai, and M. Daniels. 2013. Watershed Prioritization for Managing Nonpoint Source Pollution in Arkansas. (Fact Sheet- FSPPC116).

**Spearot, D.E.**, et al. “Acquisition of an Integrated Instrument for Computational Research and Education” NSF, 2013.

**Spearot, D.E.**, et al. “Upgrading to a Sustainable Infrastructure for Research Computing” NSF, 2013.

**Spicer, T. O.**, and E. C. Clausen. “Strengthening Writing (and Reading) Skills in a Senior-Level Lab Course while Reinforcing Life-Long Learning Skills.” Presented at the 2013 American Society for Engineering Education Midwest Section Annual Conference, Salina, KS, September 18-20, 2013.

**Tung, Steve**. “Development of a Flagellar Motor Biosensor Prototype for Trace Level TNT Detection” NSF, June 2013.

**Tung, Steve**. “Development of an Electron Tunneling Based Nanochannel System for DNA Sequencing” NSF, March 2013.

**Wejinya, Uche**. “NSF grant report on REU grant” NSF, 2013.

**Dr. Shengfan Zhang** participated in the Adopt-A-Classroom program by the University of Arkansas Education Renewal Zone, which aimed to allow K-12 teachers to see the best practices and up-to-date content knowledge modeled in their classrooms by university faculty and staff. She was paired with a 9th grade math teacher in Farmington High School. So far, Dr. Zhang has been able to teach linear regression and scientific notation, and used activities in classroom to engage active learning.

**Zou, M.** “CAREER: Nano-engineered Surfaces: Fabrication and Mechanical and Tribological Properties” NSF, November 2013.

**Zou, M.** “CAREER: Nano-engineered Surfaces: Fabrication and Mechanical and Tribological Properties” NSF, June 2013.

**Zou, M.** “NUE: Integrating Nanotechnology into Undergraduate Engineering Education at the University of Arkansas” NSF, August 2013.

**Zou, M.** “Surface Micro/Nano-texturing for Biomedical Applications” ABI, July 2013.

**Zou, M.**, Thompson, C., and Fleming, R. *Invention: Nanoparticle Coating for Self-Cleaning and Transparent Glass*, March 2013.

### **Patents:**

**Brune, E.**, R. Beitle, M. Ataii, P. Bartlow, and R. Henry. Separatome-based Protein Expression and Purification Platform. International Patent WO/2013/138351, filed March 12, 2013, and issued September 19, 2013.

**Gaddy, J. L.**, D. K. Arora, C. W. Ko, J. R. Phillips, R. Basu, C. Wikstrom, and E. Clausen. Methods for increasing the production of ethanol from microbial fermentation. U.S. Patent 20,030,211,585, filed July 23, 2001, and issued November 5, 2013.

**Hestekin, J.**, H. Dunsworth, and A. Lopez. Improved Reverse Electrodialysis for High Density Power Generation. U.S. Provisional Patent Application 61/832,388, filed June 7, 2013 Su, X., Z.

Ye, Q. Sun and **Y. Li**. 2013. Versatile Multichannel Capillary Biosensor System. US. Patent No. 8,545,773, October 1, 2013.

Su, X., Z. Ye, Q. Sun and **Y. Li**. 2013. Versatile Multichannel Capillary Biosensor System. US. Patent No. 8,545,773, October 1, 2013.

Kashyap, A., **H. A. Mantooth**, “Method for modeling and parameter extraction of LDMOS devices under cryogenic conditions,” U.S. Patent No. 8,608,376, Filed 2010, Issued Dec. 17, 2013.

Patent issued Canada #2,609,030 “System and Method for Dissolving Gases in Fluids and for Delivery of Dissolved Gases” Osborn, G.S., **M. Matlock**, S. Teltschik.

Patent Application US 2012/0325741 A1 Published. System and Method for Wastewater Treatment. G.S. Osborn, C. R. Thompson, **M. D. Matlock**.

Patent issued Canada #2,609,030 “System and Method for Dissolving Gases in Fluids and for Delivery of Dissolved Gases” Osborn, G.S., **M. Matlock**, S. Teltschik.

Patent Application US 2012/0325741 A1 Published. System and Method for Wastewater Treatment. G.S. Osborn, C. R. Thompson, **M. D. Matlock**.

Invention disclosure 14-14, “*Classification of Proflavine-Stained Intact Cells in Suspension with an Optofluidics Line Scanning Imaging Device*”. **Muldoon, T.**, Balachandran, K., Pierce, M (Rutgers University), Powless, A., Prieto, S. Submitted to University Patent Committee December 2013.

**Servoss, S. L.** and M. E. Moss. Peptoids and Methods for Treating Alzheimer’s Disease. U.S. Patent 20,130,102,539 A1, filed October 19, 2012, and issued April 25, 2013.

**Varadan, V.K.**, Wireless Nanotechnology based System for Diagnosis of Neurological and Physiological Disorders, U. S. Patent # 8,348,841 B2 .e-bra for cardiovascular and pulmonary monitoring with smart phone and wireless communication systems, U. S. Patent approved

## **APPENDIX D**

### **COLLEGE OF ENGINEERING CHAIRS, PROFESSORSHIPS, DISTINGHISHED PROFESSORSHIPS AND LECTURESHIPS**

Charles D. Morgan/Axiom Endowed Graduate Research Chair in Data Base, Craig Thompson, Professor, Computer Science and Computer Engineering

Irma F. and Raymond F. Giffels Endowed Chair in Engineering, John R. English, Professor, Industrial Engineering & Dean of Engineering

John L. Imhoff Endowed Chair in Industrial Engineering, Ed Pohl, Professor, Industrial Engineering

Maurice E. Barker Endowed Chair in Chemical Process Safety and the Environmental Fate of Chemicals, Tom Spicer, Distinguished Professor, Chemical Engineering

Ray C. Adam Endowed Chair in Chemical Engineering, Ed Clausen, Professor, Chemical Engineering

Rodger S. Kline Endowed Chair in Computer Science and Computer Engineering, Susan Gauch, Professor, Computer Science and Computer Engineering

The Twenty-First Century Endowed Chair in Materials, Manufacturing and Integrated Systems, Ajay Malshe, Professor, Mechanical Engineering

The Twenty-First Century Endowed Chair in Mixed-Signal IC Design and CAD, Alan Mantooth, Professor, Electrical Engineering

The Twenty-First Century Endowed Graduate Research Chair in Nano, Bio and Medical Technology, Vijay Varadan, Distinguished Professor, Electrical Engineering

The Twenty-First Century Leadership Chair in Mechanical Engineering, James Leylek, Professor, Mechanical Engineering

The Twenty-First Century Leadership Endowed Leadership Chair, Professor, Kevin Hall, Civil Engineering

Bates Teaching Endowed Professorship in Chemical Engineering, Greg Thoma, Professor, Chemical Engineering

Charles W. Oxford Endowed Professorship in Emerging Technologies, D. Keith Roper, Associate Professor, Chemical Engineering

James M. Hefley and Marie G. Hefley Endowed Professorship in Logistics and Entrepreneurship, Russ Meller, Professor, Industrial Engineering

James T. Womble Endowed Professorship in Computational Mechanics and Nanotechnology Modeling, R. Panner Selvam, Professor, Civil Engineering

Jim L. Turpin Endowed Professorship in Chemical and Biochemical Separations, Jamie Hestekin, Assistant Professor, Chemical Engineering

The Twenty-First Century Professorship in Engineering, Kim Needy, Professor, Industrial Engineering

Thomas Clinton Mullins Endowed Chair in Engineering, David Andrews, Professor, Computer Science and Computer Engineering

The Twenty-First Century Endowed Professorship in Biomedical Engineering, David Zaharoff, Assistant Professor, Biological and Agricultural Engineering

The Twenty First Century Professorship in Mechanical Engineering, Douglas Spearot, Associate Professor, Mechanical Engineering

The Twenty First Century Professorship in Mechanical Engineering, Min Zou, Professor, Mechanical Engineering

The Twenty First Century Professorship in Mechanical Engineering, Larry Roe, Associate Professor, Mechanical Engineering

Ralph E. Martin Endowed Professorship in Chemical Process Engineering, Shannon Seurnyck-Servoss, Assistant Professor, Chemical Engineering

Robert E. Babcock, Sr. Endowed Professorship in Chemical Process Safety and the Environmental Fate of Chemicals, Xianghong Qian, Associate Professor, Chemical Engineering

Ross E. Martin Endowed Chair in Emerging Technologies, Ranil Wickramasinghe, Professor, Chemical Engineering

John A. White Term Chair, John A. White, Distinguished Professor, Industrial Engineering

Ansel and Virginia Condray Endowed Professorship in Biochemical and Chemical Separations, Christa Hestekin, Associate Professor, Chemical Engineering

The Twenty-First Century Leadership Chair in Electrical Engineering, Juan Balda, University Professor, Electrical Engineering

George M. and Boyce W. Billingsley Endowed Chair in Engineering, Ashok Saxena, Distinguished Professor

**Vacant Chairs**

John and Mary Lib White Endowed Systems Integration Chair in Industrial Engineering

Ralph E. Martin Endowed Leadership Chair in Chemical Engineering

Louis Owen Endowed Professorship in Green Chemical Process Design and Development, Chemical Engineering