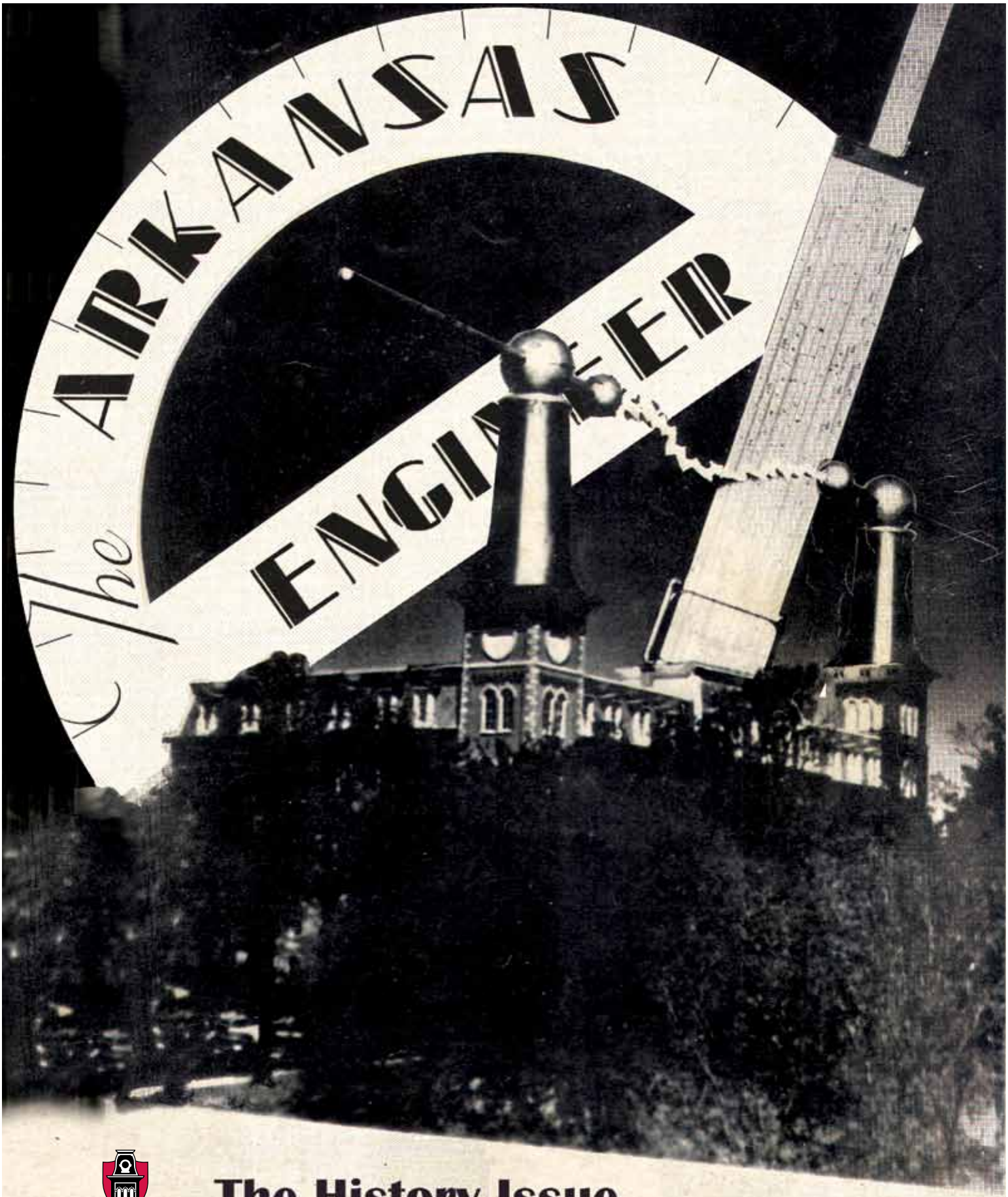
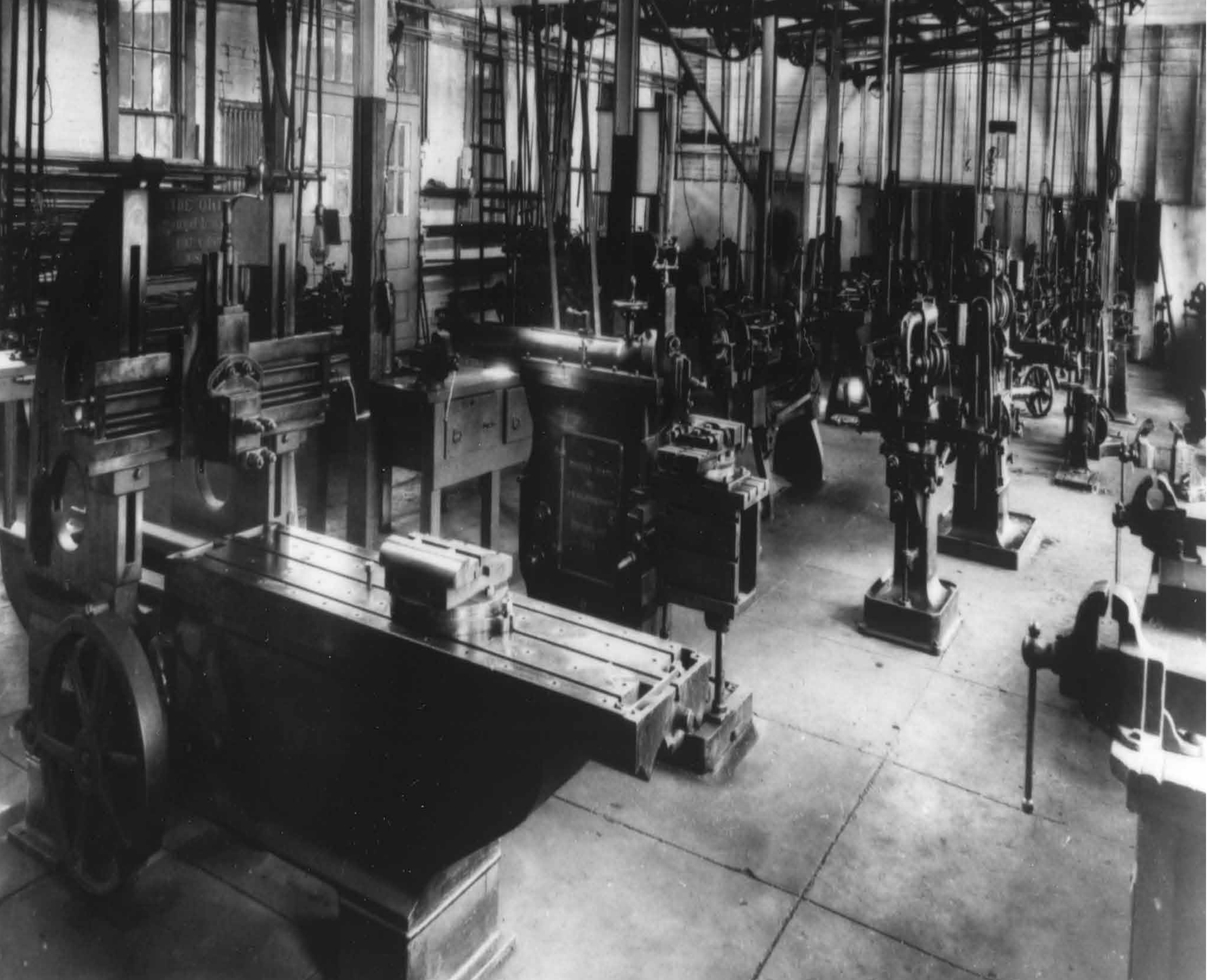


UNIVERSITY OF ARKANSAS

The History Issue

Fall 2012 • From the College of Engineering at the University of Arkansas



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Terry Martin

Interim Dean of Engineering
Professor of Electrical Engineering

On June 30, Dr. Ashok Saxena stepped down as dean of the College of Engineering in order to take a new position as vice chancellor of Galgotias University, a new private, multidisciplinary research university near Delhi, India.

Though Dr. Saxena will be missed, the college is grateful for the legacy he leaves behind: soaring enrollments, innovative programs such as the Freshman Engineering Program and the Engineering Career Awareness Program, a nationally competitive faculty and a brand new department of biomedical engineering. After he completes his two year term, we look forward to welcoming Dr. Saxena back as a faculty member in the department of mechanical engineering.

The University will be conducting a dean's search over the next year and it is our goal to have the new dean in place in the fall of 2013. More information can be found on our website, engr.uark.edu.

As interim dean, I am proud to lead the college during this next year. As a native Arkansan, an alumnus of the University of Arkansas and a member of the engineering faculty since 1983, I am pleased to be able to serve my university in this new role. Over the past eight years I have worked closely with Dean Saxena in the position of associate dean to address the opportunities and challenges in providing an engineering program of excellence for our students.

I am also looking forward to this opportunity to get to know the alumni and friends of the College of Engineering. I encourage you to catch up with the college at our Homecoming Open House on November 3, and at the Alumni Awards Banquet in the spring.

In this issue of the magazine, we celebrate the history of the college, and I invite you to help us celebrate our future. In addition to another record-breaking class of freshman, we are welcoming eight new faculty members this year, including two new members of the biomedical engineering department. The college is growing rapidly, in both size and reputation, and now is a great time to show your support and help us move into a new era.

Warm Regards,

Terry Martin

The Accomplishments of Dean Ashok Saxena

By John A. White

Though we are all very happy for Dean Saxena, the university and the College of Engineering already miss him. In the nine years he was dean, Saxena used his insight and leadership skills to accomplish great things, many of which are listed below.

In addition to the accomplishments resulting from his leadership of the college, Saxena modeled what he expected from the faculty in teaching, research, and service. Saxena continued to teach, direct graduate student research, publish his research, and serve the profession. Internationally renowned for his research contributions in time-dependent fracture mechanics, Saxena's research resulted in new standards being established by the American Society for Testing and Materials. His awards and recognitions in the past 8 years included the Wohler Fatigue Medal (2010) from the European Structural Integrity Society, Fracture Mechanics Medal (2009) from the Committee E08 of ASTM International, election to the Fellowship of the International Congress on Fracture (2009) and a Best Paper Award at the Twelfth International Congress on Fracture (2009).

Saxena will be remembered most for elevating the sights of all who are associated with the college–faculty, staff, students, and alumni. In just nine years, he truly transformed the college.

Ashok Saxena

The Alumni Awards Banquet, which has honored **601** alumni since 2005

The first degrees in **biomedical engineering** and the first department of biomedical engineering in the state of Arkansas.

9 faculty members have received CAREER Awards

100% increase in number of doctoral degrees awarded

The Engineering Career Awareness Program, which has been recognized by several national organizations. **ECAP**

The Freshman Engineering Program which has increased the freshman retention rate from **58% to 70%**

Close to **400%** increase in endowment for the college

85% increase in new freshman enrollment

- **Richard Cassady** and **Manuel Rossetti**, both professors of industrial engineering, have been named fellows by the Institute of Industrial Engineers. Cassady has taught at the University of Arkansas since 2000, and his teaching and research focus on reliability and maintainability engineering, statistical quality control, operations research and probability and statistics. Rossetti is the holder of the John L. Imhoff Chair in Industrial Engineering. He teaches courses in the areas of probability modeling, discrete event simulation, object-oriented and database systems, transportation/logistics modeling, and inventory modeling.
- **Brady Cox**, assistant professor of civil engineering, has been named by President Barack Obama as one of 96 recipients of the Presidential Early Career Awards for Scientists and Engineers. The award is the highest honor bestowed by the U.S. Government on science and engineering professionals in the early stages of their independent research careers.
- **Ajay Malshe**, Distinguished Professor and Twenty-First Century Endowed Chair in Materials, Manufacturing and Integrated Systems, has been selected as a fellow of ASM International, formerly known as the American Society for Materials. Malshe is recognized worldwide for his fundamental and applied contributions to the fields of nanotechnology, electronics packaging and materials surface engineering.
- **Kim Needy**, head of the department of industrial engineering and holder of the Twenty-First Century Professorship in Engineering, was recently voted president-elect of the Institute of Industrial Engineers. Needy is recognized for her passion as a professor and her dedication to the Institute of Industrial Engineers, a professional society that helps advance and promote the industrial engineering profession. Needy also received the Distinguished Service Award for the Industrial Engineering Division at the conference of the American Society for Engineering Education.
- **Roy Penney** and **Tom Spicer**, both professors of chemical engineering, have been named fellows by the American Institute of Chemical Engineers. Penney's work at the university focuses on industrial mixing research and development, and he recently received the Award for Excellence and Sustained Contributions to Mixing Research and Practice from the North American Mixing Forum. Spicer holds the Ralph E. Martin Endowed Leadership Chair in Chemical Engineering, and served as head of the Ralph E. Martin department of chemical engineering from 2001-2012. Spicer's research interests include the assessment of hazards from airborne contaminants, as well as hazards from fire and explosion phenomena.
- **Ronald L. Rardin,** Distinguished Professor of industrial engineering, is the 2012 recipient of the David F. Baker Distinguished Research Award from the Institute of Industrial Engineers. Rardin is the holder of the John and Mary Lib White Endowed Systems Integration Chair in Industrial Engineering. He also heads the Center on Innovation in Healthcare Logistics.
- **Fisher Yu** has been awarded the Faculty Early Career Development award, also known as the CAREER award, by the National Science Foundation. Yu is an assistant professor in the department of electrical engineering. This grant will provide $400,000 over five years, to fund Yu's research of bismuth, a relatively unexplored material system.


Richard Cassady


Manuel Rossetti


Brady Cox


Ajay Malshe


Kim Needy


Roy Penney


Tom Spicer


Ronald L. Rardin


Fisher Yu


Kartik Balachandran


Michael Gashler


David Jensen


Timothy Muldoon


Matthew Patitz


Kelly Sullivan


Tingxin Yan


Jing Yang

- **Kartik Balachandran** received a Ph.D. in bioengineering and an M.S. in mechanical engineering from the Georgia Institute of Technology and a B.A. in engineering from the National University of Singapore. Previously, Balachandran was a postdoctoral fellow at Harvard University's Wyss Institute for Biologically Inspired Engineering. His primary research interests are in mechanics, mechanobiology and tissue engineering.
- **Michael Gashler** has a Ph.D., an M.S. and a B.S. in computer science from Brigham Young University. In addition, he has worked for the Waterford Institute, developing educational software for children, and he has created programs and patented technology for Microsoft. Gashler's primary research interest is machine learning, and he is particularly interested in automated systems that can learn to make sense of visual imagery.
- **David Jensen** earned a Ph.D., M.S. and B.S. in mechanical engineering from Oregon State University. His research focuses on incorporating safety into the design of complex systems such as power plants and spacecraft. He focuses on the early stages of design, and looks at ways to include risk assessment in this phase of the process in order to prevent accidents.
- **Timothy Muldoon** has an M.D. from Baylor College of Medicine, a Ph.D. in bioengineering from Rice University and a B.S. in biomedical engineering from Johns Hopkins University. He comes here from Columbia University, where he was a postdoctoral research scientist. Muldoon's research has focused on high-speed and depth-sensitive optical imaging.
- **Matthew Patitz** holds a Ph.D., an M.S. and a B.S. in computer science from Iowa State University. He comes to the University of Arkansas from the University of Texas Pan American, where he was an assistant professor of computer science. He has also worked as the Software Engineer and Engineering Team Lead for Support.com in Redwood City, Calif. Patitz has authored a number of publications in the field of self-assembly, and he has developed several software packages to support research in this area.
- **Kelly Sullivan** has a Ph.D. in industrial and systems engineering from the University of Florida and an M.S. and B.S. in industrial engineering from the University of Arkansas. His research interests include network optimization and interdiction, integer programming, large-scale optimization, robust optimization, defense applications and optimization in sports.
- **Tingxin Yan** received a Ph.D. in computer science from the University of Massachusetts at Amherst, an M.S. in computer engineering from the Chinese Academy of Sciences Institute of Software and a B.S. in computer engineering from Nanjing University. His research interests are primarily in the areas of mobile and embedded systems, wireless sensor networks, ubiquitous computing, and crowdsourcing.
- **Jing Yang** received a Ph.D. in electrical and computer engineering from the University of Maryland and a B.S. in electrical engineering and information science from the University of Science and Technology of China. Her research interests include information and network theoretical aspects of energy harvesting communication networks; wireless communication theory and networking; service scheduling and energy management in large-scale systems; and high dimensional graph structure learning and its applications to wireless, biological and social networks.

on the move

McMullen Appointed AHPCC Director

Rick McMullen, former director of research computing at the University of Kansas, has been appointed director of the Arkansas High Performance Computing Center.

In addition to his primary academic and administrative positions at the University of Kansas, McMullen has served as a research associate at the university's Biodiversity Institute. He is also senior research associate with the Great Plains Network, a large consortium of Midwestern universities, of which the University of Arkansas is a member.

Energy Conservation Center Unveils Outreach Vehicle

Vasundara Varadan, director of the GREEN center, shows off the GREEN Mobile.

A converted Winnebago is the newest, and perhaps most unusual, addition to the University of Arkansas vehicle fleet. It's called the GREEN Mobile Solar Energy Laboratory and it is taking to the Arkansas highways to bring hands-on solar energy experiments to schools and public events across the state.

The mobile laboratory is housed in a converted 33-foot Winnebago and uses a conventional gasoline engine to get around. But it is equipped with six 230-watt solar panels that can power the lab's equipment, computers, television and other features for two hours at a time.

The mobile lab is the latest addition to an outreach program with a goal of exposing Arkansas students to fun and interactive projects in the science, technology, engineering and mathematics (STEM) fields.

Engineering Career Awareness Program Recognized

The Engineering Career Awareness Program, or ECAP, continues to receive accolades from national education and engineering organizations.

In April, ECAP was selected by the National Academy of Engineering to be one of 29 undergraduate engineering programs featured in its Real World Engineering Education publication. ECAP is among 29 undergraduate engineering programs that, according to the NAE, "have successfully infused real world experiences into engineering or engineering technology undergraduate education." NAE, along with Advanced Micro Devices, Inc. plans to widely disseminate information about these programs as examples of best practices in engineering education.

In July, ECAP received two Grand Gold Awards from the Council for Advancement and Support of Education. The program was chosen for a Grand Gold Award from among more than 20 entries in the category of diversity programs and also received a Grand Gold Award in the sub-category of recruitment and retention.

The idea for ECAP oringinated with College of Engineering alumnus Troy Alley in 2007. The program is designed to recruit underrepresented engineering students with financial need, and to give these students the support they need to graduate and begin their careers. ECAP provides financial assistance, a summer bridge program and a network of academic and social support opportunities.

Information Assurance Excellence

The University of Arkansas Center for Information Security and Reliability has been designated a National Center of Academic Excellence in Information Assurance Research by the National Security Agency and the Department of Homeland Security. The field of information assurance includes strategies to protect information against hackers and viruses, policies to ensure that employees are handling information correctly and tactics to mitigate harm when malicious or accidental events do occur.

University of Arkansas College of Engineering Welcomes Its Largest and Most Diverse Class

The University of Arkansas College of Engineering continues to grow. Recruitment and retention efforts combined have led to the largest engineering enrollment in the history of the College of Engineering with 2,726 undergraduates currently enrolled. This is a 73 percent increase since 2007.

This year, the college welcomed another record-breaking 775 new freshmen, an increase of almost 12 percent over last year's record, and more than double the number of new freshmen entering the college five years ago.

The number of female freshmen has increased by 33 percent. Since 2007, the number of undergraduate female students in the College of Engineering has more than doubled, from 247 in 2007 to 519 in 2012.

The college has grown in ethnic diversity, as well. This year, the number of new African American freshmen has increased by 30 percent. Over the past five years, the number of new African American freshmen has increased by 300 percent, from 16 to 64, and the total percentage of engineering students from an ethnic minority has increased by over 40 percent. Minority students now make up a fifth of the college's undergraduate student population.

Data show that the retention and graduation rates for the College of Engineering are also improving, thanks to the innovative Freshman Engineering Program, which provides guidance and resources to new engineering students.

Richard Cassady, director of the program, explained that the number of students who return for their sophomore year has risen from an average of 61 percent to an average of 70 percent, and this gain has remained steady even in the face of skyrocketing enrollment.

The combined increases in enrollment and retention have yielded a sophomore class in the college that is twice as large as the average sophomore class before the Freshman Engineering Program.

New Patent Improves Speed of DNA Analysis


Donald K. Roper

Donald K. Roper, associate professor of chemical engineering and holder of the Charles W. Oxford Endowed Professorship in Emerging Technologies, has patented a process that reduces the time it takes to perform DNA analysis from hours to minutes. Roper's process, which he developed while working at the University of Utah, uses gold nanoparticles to increase the efficiency of the polymerase chain reaction.

Researchers Discover New Method of Making Nanoparticles

Roper and his colleagues at the University of Utah have discovered a new method of making nanoparticles and nanofilms to be used in developing better electronic devices, biosensors and certain types of microscopes. The researchers' nanoparticles are nontoxic and inexpensive to make and have superior dimensions, densities and distribution when compared to other nanoparticles and conventional methods of producing nanoparticles. The unique deposition technique can rapidly coat fragile, three-dimensional and internal surfaces at the temperature and pressure of its surroundings without requiring conductive substrates or expensive, sophisticated equipment.

Optoelectronics Research Lab Receives Grant for High-Resolution Microscope


Omar Manasreh

The Optoelectronics Research Lab in the College of Engineering looks at things like no other lab on campus. The lab uses high-tech instruments to investigate new nanomaterials capable of harnessing the powerful energy of the sun. Electrical engineering professor Omar Manasreh, who runs the lab, will now be able to add a new piece of equipment for researchers: a micro-photoluminescence/Raman high-resolution microscope. The purchase is possible thanks to a grant of $200,000 from the Department of Defense and an additional $50,000 from the University of Arkansas.

The new lab instrument will be used to help characterize and test semiconductor nanocrystals, metallic nanoparticles and semiconductor nanostructures known as quantum dots. Once a material's properties are determined, its applications and potential uses can be developed.

Manasreh and researchers in the Optoelectronics Research Lab have developed new materials that will enable greater efficiency of photovoltaic cells in solar arrays. Currently, the light-to-energy capabilities for solar arrays deployed on spacecraft and the International Space Station are topped out at 23 percent. However, new materials such as metallic nanoparticles can significantly increase that ratio, allowing longer and more far reaching missions.

Researcher Develops Personalized Search Engines


Susan Gauch

With little more than basic information about Web users' behavior – that is, the hyperlinks they click on daily and the content at those sites – Susan Gauch can build a better search engine. In information systems research, this work is known as "implicit" user profiling, meaning there are basic assumptions about user interest and intent based on the sites they frequent and the content they view.

Gauch, department head of computer science and computer engineering, will contribute her expertise to the work of Hypothes.is, a project started by Dan Whaley, the coder and entrepreneur who built the first Web-based travel reservation system. Hypothes.is is trying to build a system of annotation for the Web. Based on a model of community peer-review, the system will be an open-source platform that will enable annotators to comment on individual sentences.

"Since the very beginning of the Web, there has been an issue of trust," Gauch said, "because there has always been this ubiquitous ability for anyone to create and distribute information. What Hypothes.is is trying to do is build confidence and trust about information obtained on the Web."

The system will function as an overlay on top of stable content, including news, blogs, scientific articles, books, terms of service, ballot initiatives, legislation and regulations, software code and more. Gauch holds the Rodger S. Kline Endowed Chair in Computer Science and Computer Engineering.

Engineers Develop Sensors that Monitor Cardiac Signs and Work with Smart Phones

A team of engineers at the U of A has developed a wireless health-monitoring system that gathers patient information and communicates that information in real time to a physician, hospital or the patient herself.

Vijay Varadan, Distinguished Professor of electrical engineering, explained that the system includes a series of nanostructured textile sensors integrated into a sports bra for women and vest for men. Via a lightweight and wireless module that snaps onto these garments, the sensors communicate with system software that relies on a smart phone to collect information, compress it and send it over a variety of wireless networks.

The system monitors blood pressure, body temperature, respiratory rate, oxygen consumption, some neural activity and all the readings provided by a conventional electrocardiograph (ECG). The system does not require a cuff or any extra accessories to measure blood pressure and could therefore replace conventional blood-pressure monitors. It could also replace the cumbersome combination of ECG sensors and wires attached to patients while they walk on treadmills.


Vijay Varadan

The sensors, which are smaller than a dime, include gold nanowires, as well as flexible, conducting textile nanosensors. The sensors are made of arrays of gold nano-electrodes fabricated on a flexible substrate. The textile sensors are woven into the bra material. These sensors do not require conventional sticky electrodes or the use of gel.

Electrical signals and other physiological data gathered by the sensors are sent to the snap-on wireless module. As the critical wireless component, the module is essentially a tiny, low-powered laptop computer that includes an amplifier, an antenna, a printed circuit board, a microprocessor, a Bluetooth module, a battery and various sensors. Varadan said that anticipated battery and Bluetooth upgrades will allow the researchers to build a smaller, lighter and flexible module that will replace the rigid box.

Data from the sensors then stream to commercially available cell phones and hand-held devices, which expand the use of the system beyond health care. By carrying a cell phone, athletes can monitor all signs mentioned above and other metrics, such as number of calories burned during a workout. To render clean data, the software includes filtering algorithms to mitigate problems due to motion of the hand-held device during exercise.

Varadan holds the College of Engineering's Twenty-First Century Endowed Chair in Nano, Bio and Medical Technologies.

The College of Engineering, a history

One hundred and fifty years ago, the Morrill Land-Grant Act was signed into law by President Lincoln. This act allowed the states to set up universities by providing federal land for these institutions. The University of Arkansas, which held its first classes in 1872, is one of these land-grant institutions. Until 1899, the school was known as the Arkansas Industrial University, and the engineering department was an important part of the university from early days.

One hundred years ago, in 1912, the College of Engineering, along with the College of Education and Health Professions, separated from the College of Arts and Sciences and appointed its own dean. William Gladson, who had taught engineering since 1894, became the first dean of the new College of Engineering.

Over the past century, the university and the college have made great strides, making their way into the top tiers of education in this country. In this issue of the magazine, we're looking back at life in the past, and at how the engineering student experience has changed. The print issue focuses on two important aspects of student life in the College of Engineering: the changing role of women in the college and the celebration of Engineer's Day, an event that showcased the best (and sometimes the worst) of engineering student achievements.

For more articles, see our online magazine.

All images in this section are courtesy of Special Collections, University of Arkansas Libraries, Fayetteville, Ark.

1862

The Morrill Act, or Land Grant Act, provided federal land that states could use to establish universities. It was signed into law by Abraham Lincoln.

1871

Arkansas Governor O.A. Hadley signed an act into law, creating the Arkansas Industrial University.

1872

Arkansas Industrial University opens its doors with eight students and three faculty members. By the end of the term, however, over 100 students had enrolled. Engineering was taught in the department of mechanical arts.

1875

University Hall (now called Old Main) completed.

1876

The first students graduated from the Arkansas Industrial University.

1888

The first civil engineering degree was awarded.

1891

The first mechanical engineering degree was awarded.

UNIVERSITY OF ARKANSAS

1897

The department of mechanical arts was divided into civil, electrical and mechanical engineering departments.

1899

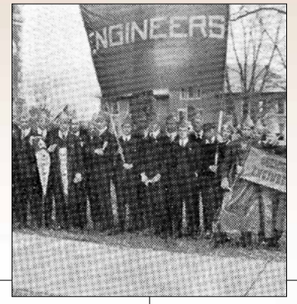
The Arkansas Industrial University changed its name to the University of Arkansas.

1903

A chemical engineering curriculum was established in the department of chemistry.

1904

The first Engineering Hall was constructed at a cost of $25,000



1909

First Engineer's Day celebrated on the University of Arkansas campus.

1912

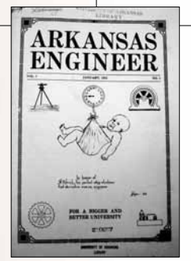
The College of Engineering was established. William Gladson became the first dean of engineering.

1920

The Engineering Experiment Station was established by the state legislature to investigate and study engineering problems of general interest to Arkansas.

1922

First edition of *The Arkansas Engineer* published by engineering students



1927

The present Engineering Hall was completed.

1928

The first master's degree in engineering was awarded.

1937

George P. Stocker became the second dean of the College of Engineering.

1945

Chemical engineering became a part of the College of Engineering.

1948

The departments of agricultural engineering and industrial engineering were established.

George F. Branigan became the third dean.

1958

A Doctor of Philosophy degree was approved.

1964

The mechanical engineering department moved into a new building.

The first doctorate in engineering was awarded.

1972

Loren R. Heiple became the fourth dean of the College of Engineering.

1975

The Engineering Extension Center was developed to provide continuing education opportunities to practicing engineers.

1976

A computer science engineering program was initiated within the industrial engineering department.

1979

James E. Halligan became the fifth dean of the College of Engineering.

1982

The college took possession of an empty women's hosiery manufacturing facility that evolved into the ENRC.

1983

Neil M. Schmitt became the sixth dean of the College of Engineering.

1985

Computer science engineering became a separate department.

1987

The Bell Engineering Center was formally dedicated.

1989

The department of agricultural engineering became the department of biological and agricultural engineering.

1991

The name of the computer science engineering department was changed to computer systems engineering.

1996

Otto J. Loewer became the seventh dean of the College of Engineering.

1998

The departments of computer systems engineering and computer science merged, creating the department of computer science and computer engineering.

1999

The Master of Science degree in microelectronics and photonics was established.

2000

The Doctor of Philosophy degree in microelectronics and photonics was established.

2002

The Walton Family Charitable Support Foundation gave the University of Arkansas a $300 million challenge gift.

2003

Ashok Saxena became the eighth dean of the College of Engineering . He is also the first U of A faculty member to hold an endowed chair funded by the Walton gift.

2005

A Master of Science degree in biomedical engineering was approved.

2012

Terry Martin became interim dean of the College of Engineering.

The department of biomedical engineering was established and Bachelor of Science and doctorate degrees in biomedical engineering offered for the first time.

Historic Engineering Hall was renamed the John A. White Jr. Engineering Hall, in honor of the former University of Arkansas chancellor.

At the first Engineer's Day in 1909, students line up on what is now Old Main lawn to see engineering demonstrations.

Knights, Queens and Agris

A History of Engineer's Day at the University of Arkansas

In the middle of a spring night in the 1940s, several engineering "knights" steal across the lawn in front of University Hall. They are carrying cans of green paint, specially formulated in a chemical engineering lab. They are heading for the Agriculture Building. The building looks dark and empty, but the engineers are cautious. When they are about 30 feet away, they pause to remove the lids from the cans and dip their brushes. Green paint dripping, they dash toward the building.

They have almost reached it when the counter attack begins. Smelly brown globs the consistency of mud shoot from a window in the upper floor, splattering on the ground and covering the engineers in foul-smelling goop. The agriculture students have engaged their manure spreader. Wiping the dung from their faces, the engineers persevere and quickly paint several large green shamrocks on the front of the building. Thanks to the ingenuity of the chemical engineering students, the paint will be impossible to wash off, and will have to be sanded from the walls.

Their mission complete, the engineering students run back across the lawn, dodging the last efforts of the manure spreader. Engineer's Day has officially begun.

History

Beginning in 1909, the University of Arkansas College of Engineering set aside a day to celebrate several things: St. Patrick's day, the field of engineering and the glory of being a young college student with a day free from classes. The association of St. Patrick with engineering students began in 1903 at the University of Missouri in Columbia.

Like every good tradition, this one has more than one explanation. In one version, a class discussion leads to the conclusion that "St. Patrick was an engineer, of course," and that the following St. Patrick's day should be set aside for revelry, to the dismay of the Missouri faculty.

The other story is more fanciful. The website of the University of Missouri explains that

> According to engineering tradition, the discovery that St. Patrick was an engineer began with the excavations for the Engineering Annex Building. During the excavation, a stone was unearthed with a message in an ancient language. This message was translated into "Erin Go Bragh." Although those of Irish descent may recognize "Erin Go Bragh" as "Ireland Forever," the engineers loosely translated this phrase as, "St. Patrick was an engineer." The stone, now known as the Blarney Stone, is an integral part of the St. Pat festivities. The engineers looked to the legend that St. Patrick drove the snakes out of Ireland as proof of his engineering skills. They further credit St. Patrick with the invention of calculus.

Whatever the explanation, the tradition of Engineer's Day spread to Arkansas several years later, and eventually made its way into colleges across the nation. By the sixties, Engineer's Day at the University of Arkansas had blossomed into an entire week of engineering and revelry.

Events

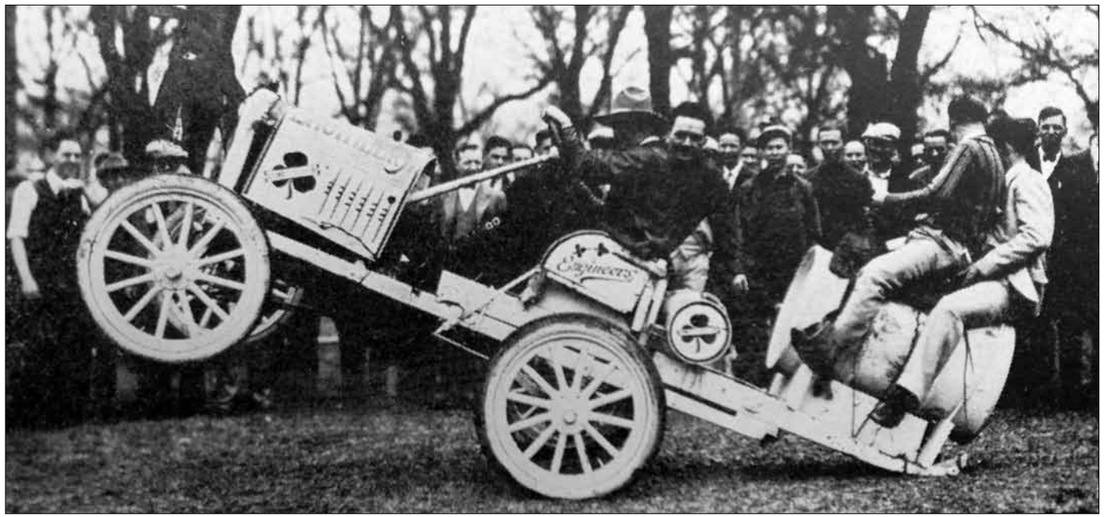
Engineer's Day traditionally presented a balance of academic and entertaining activities. From the beginning, the holiday included lab tours and engineering demonstrations.

In 1929, The Arkansas Engineer provides a list of engineering marvels for that year. The electrical engineers exhibited "automatic motors started by voice and heat, reversing motors, rainbow wheels, Tesla coil, arc lights, high voltage and current transformers, mystic drums and lights, and a bowling alley," while the mechanical engineers had a small replica of a steam turbine and "mysterious balloons, gyroscopes and frozen suckers." The civil engineering department displayed "miniature roads, hydroelectric plants and a magic fountain. Also testing of road material, of cement briquettes, of steel, wood, concrete and copper columns and the measurement of the flow of water by Peitot tubes and Venturi meters."

The engineers showed off their skills in other aspects of the celebration, as well. In addition to the non-washable paint, Colonel William Myers, an alumnus and former faculty member in the chemical engineering department, remembers another yearly triumph of the engineers.

> Where the science building is now in those days was the engineering shop and power plants. All engineers had courses in foundry work and blacksmithing. There was a big steel silver chimney.

Continued on page 16



The most popular exhibition of the twenties was something called the Bucking Ford, which, according to the student magazine, "did just what the name signifies."

> A few days before Engineers Day, every year, by some mysterious means there would be a large green shamrock five feet wide painted across the top. The chimney was at least a hundred feet tall. A few days after, the physical plant would paint it over, and it was a major operation. They would have a crane and chains and ropes and five people and it would take them all day. But it always appeared as if by magic.

While the painting of shamrocks was always an unofficial part of the celebration, frowned upon by faculty and administration, the day included plenty of less dangerous events. During the forties, the engineering students put on a fireworks display for the whole town, which Myers called "the best in Northwest Arkansas."

Throughout the years, the celebration also featured banquets, a tug of war against the College of Agriculture, basketball games, a beard-growing contest, a dance, and the presentation of the Chicken Award. According to *The Arkansas Engineer*, the Chicken Award ceremony "is where a few brave students present 'awards' to professor in various departments who have gained a certain measure of 'renown' for deeds above and beyond the call of duty."

Robert Babcock, professor of chemical engineering, has observed the Chicken Award presentation, and admits that he always suspected the recognition was a little tongue-in-cheek.

The cornerstone of the celebration was a rally where male engineering students and female students from across campus competed for the honor of being named St. Patrick and St. Patricia.

According to the student magazine, "the only requirements for St. Pat was that he had to be at least a junior enrolled in the college of Engineering. The requirements for St. Patricia were 'any female member of the student body of the University of Arkansas, of comely facial feature, pleasing personality, and streamlined curvilinear contour.'"

The College of Engineering, which was entirely male until the forties, and mostly male for long after that, took the choosing of St. Patricia very seriously. "Our Queen," proclaims the student magazine, "chosen by popular acclaim, symbolizes the Engineers' one manifestation of taste for beauty. Since the days of St. Pat, the hard boiled sliders have demonstrated the most abject servility to their Queen. They have always gladly suspended or even abandoned their everlasting pursuit of the elusive X to do her will."

The engineers' one manifestation of taste for beauty appeared in the form of photo spreads in the magazine during the 50s and 60s, but the real contest came during the yearly rally, where St. Patrick and Patricia candidates sang, danced, and participated in skits. The winning couple was crowned at the end of the event, and their main duty was to declare the senior engineering students to be Knights of St. Patrick.

"There was a big steel silver chimney. A few days before Engineers Day, every year, by some mysterious means there would be a large green shamrock five feet wide painted across the top. The chimney was at least a hundred feet tall."

St. Patrick and St. Patricia, circa 1925 (top) and 1970 (bottom)

Feud and Controversy

Not surprisingly, this event, organized yearly by undergraduate students, was often the subject of scrutiny. In 1934,George Stocker, dean of the College of Engineering at the time, wrote an editorial in *The Arkansas Engineer*, suggesting that Engineer's Day would be more valuable as a recruiting event than a college celebration, and he complained that all the planning was left to the last minute and that the purpose of Engineer's Day was unclear.

Later issues of the magazine lament the lack of participation in Engineer's Day, and sometimes bemoan the undignified content of the skits at the rally, but the most controversial aspect of the event was the feud between engineering and agriculture students.

Feuds between colleges were not limited to the University of Arkansas. An article in the student magazine for the agriculture college suggests that the idea of using a manure spreader in pranks against other colleges came from another university. Babcock remembers that engineering students at his alma mater had a feud with the Law School.

The engineering/agriculture feud at the U of A threatened to end both Engineer's Day and Agri Day when the pranks got out of hand. The agriculture students, who traditionally painted white footprints around campus before Agri day, were attacked by a high-powered hose one year when they attempted to paint the sidewalk in front of Engineering Hall. In 1947, engineers painted an entire picnic lunch that was left unattended on the back porch of an agriculture fraternity house, and the following year, the agriculture students whitewashed two sides of the engineering fraternity house.

This was the last straw for the administration, and in 1948, Dean Stocker formed a committee composed of the deans and student leaders from the two colleges. The committee resolved to limit pranks to painting on sidewalks with washable paint, and the celebrations were allowed to continue.

Engine Week Today

Engineer's Day, now usually referred to as Engine Week, continues to this day in the College of Engineering, but after the feminist movement of the seventies, the fading importance of St. Patrick and the eventual death of the engineering/agriculture feud, it is a very different event. The St. Patricia photo spreads ended with the sixties, and in 1979, Anne Lynch, the editor of the student magazine, pointed out that St. Ferdinand III, not St. Patrick, is the official patron saint of engineering. Shamrock painting, washable or not, is now a thing of the past.

The current version of the celebration features wholesome fun and educational activities, and often Engine Week coincides with National Engineers Week. In 2011, the event featured speakers on nuclear safety systems and spacewalking, several sports contests, tailgating, an engineering trivia contest, a picnic and the "Flying Egg Crash Lander," a contest in which students dropped insulated eggs from the top of the ramp in Bell Engineering, hoping they land unharmed.

During Engine Week today, St. Patrick is a distant memory, vandalism is unheard of, and women and men compete as equals. One thing remains the same, however: our engineering students are proud of their community and their accomplishments, and they know these things are worth celebrating.

It's a Man's World

Women in the College of Engineering

By April Robertson

In the course of its history, the University of Arkansas College of Engineering has helped a number of women forge successful careers in engineering and leadership. The initial female graduates were few and far between, and, like every engineering college, the ratio of male to female students has never been equal, but the college's diversity and atmosphere has come a long way since the first woman entered the college.

Dana Jesswein Steele, Betty Yantis, Marilyn McEver Head and Lee Johns Lane are just a few of the pioneers.

Candidates for the Engineer's Day beauty contest posing in the lab. Until the second half of the twentieth century, this was the closest most women got to engineering equipment.

Starting it All

Dana Jesswein Steele, now Dana J. Welsh, was the first female to graduate from the College of Engineering. She earned her degree in chemical engineering in 1948 and now lives in Albuquerque, New Mexico.

In 1948, it was very clear that the college was still adjusting to the idea of women becoming engineers. A vintage issue of *The Arkansas Engineer* from around that time features a photo of a female student and proclaims, "Look, we even have girls in the Engine School, too!" Although female students were in the college, ads referred to them as "laboratory experts," rather than engineers. Even the humor section of the student magazine had a gender gap, printing jokes such as, "A chemistry professor asked his class what the most outstanding contribution chemistry has made to the world," answered with a student shouting, "Blondes."

Female engineers were rare across the nation. Roughly 110 engineering degrees of the 35,332 awarded nationally in 1957 went to women, according to a Society of Women Engineers Panel.

Pursuing Her Passion

Betty Yantis worked to put herself through school because her father was staunchly opposed to women attending college. In 1958, she was the only female graduate from the College of Engineering, but two other ladies would graduate in the next few years. Yantis went on to the University of Texas in Austin, Texas A&M in Arlington and Corpus Christi University, where she earned master's degrees in civil engineering and economics, as well as a Ph.D. in economics. She said everywhere she went she found the same attitudes toward women in engineering: not welcome.

By the time she had earned her degrees, Yantis was simply used to it. From high school science and math classes to working as a draftsman in the engineering side of AT&T and even working for the City Engineer, she had been the only woman in all her work settings.

"It was not a big problem," in work settings, she said, but some of her professors discouraged her pursuits. "They let me know both privately and in class that they did not want me there or even in the field of engineering."

The ones who didn't do this were simply "tolerant" of her presence.

Her motivation to become an engineer stemmed from a love for learning how things, especially structures, worked. During a brief stint as an architecture instructor on the Fayetteville campus, she recalls being stunned by students' lack of preparation in math and physics and felt the familiar pull of missing engineering.

It was the natural choice for her, the girl who was always curious. "I wanted something that let me learn more than an office routine," she said. But getting started with a career was difficult.

"Career choices for women were not given much regard," Yantis said. "I was told by every administrative level that I could not even teach in the same college as my husband," an engineer who had returned from industry into academia.

Fortunately, she landed a position with a consultant who had hired a female architect and the job proved both successful for her career and gave her a life-long friend.

Yantis forged a path for her career by learning to say no. "I never learned to type," she said, and never volunteered to learn. Some of her bosses would bring all office visitors to her desk just to show off their "lady engineer," and she was often given the most tedious tasks available.

After calculating "a zillion tons of earth from highway cross-sections," she found a way into economics courses, earned her Ph.D. and had no trouble getting tenure track teaching and research appointments at universities. One notable moment of her career was becoming the founding director of the Center for Business and Economics Research at the University of Nevada, Las Vegas.

Yantis said that she worked harder in her civil engineering undergraduate days than for any of her graduate degrees. She believes that an engineering undergraduate degree is never wasted and that it is a terrific foundation for any degree field.

Top of Her Class

Marilyn McEver Head was the only woman in the class of 1959 and she graduated as the top-ranking student that year. Only six out of 1000 American engineering students were female at the time. Head went to a polytechnic college for the first two years of her college experience and was spurred by the achievements and education of her family.

"My older male cousins were chemical majors," she said. "We were competitive, and I thought to myself, 'If you can do it, I can do it."

Head's father was the department head of chemistry at Arkansas Tech University. She had always loved to design things, so when it came time for her to choose a major, the influences of her family and her strengths came together neatly in chemical engineering. Despite being in such a minority, Head said her experiences in class and college were very favorable.

"There were amusing times," she said, "but I was not discouraged at any point."

Among the funnier memories were professors' and students' surprise that she was a girl. "My first name, Bonnie, (was known as) a unisex name, so they assumed I was a guy," Head said. "It led to some amusing situations, but with my sense of humor, it was no problem."

Even though there weren't any overwhelming moments of discouragement, Head said some people believed that she would take engineering classes only to return to a life like so many women her age were leading.

"When I attended the university, most of the heads of engineering departments were retired army colonels," she said, laughing as she recalled that one of them "wanted to give me a really good technical vocabulary so I could be a top-notch secretary."

After graduation, Head worked for Humble Oil and Refining Company in Texas for five years. There, she said her professional development progressed normally and she didn't encounter any discrimination whatsoever. "I received promotions and enumeration," she said, but that was not without cost. Personal life was occasionally pushed lower on the priority list, such as the time that she missed her sister-in-law's wedding because of transitioning a new technology into the company's workplace. Thankfully, she said, "my husband understood because he's an engineer, too."

Head and her husband moved to San Francisco Bay area, and later New York, for his job opportunities. She didn't work as a professional engineer after leaving the refinery, but her life has been just as busy as if she had. She raised three children with her husband and spent a good part of her working life standing up for disabled rights and accessibility issues, inspired by her daughter, Stephanie, who has cerebral palsy.

"My time at the U of A taught me to use skills to think clearly, to take my time and to never give up, never forget the human factor," she said. "I hope students now learn the same things I did."

Gaining Momentum

By 1961, six girls were enrolled in the U of A College of Engineering and another six women were alumni. The current dean of the college at the time, Dean Branigan, wrote an editorial based on a Society of Women Engineers

Continued on page 20

Left: members of the Society of Women Engineers in the 1970s. Right: Lee Johns Lane, first woman to earn a PhD in engineering at the U of A, with her faculty mentor.

panel, which posed the question, "Can women engineers be effective (productive engineers)?" His opinion placed confidence in women's abilities as engineers.

Dr. Lee Johns Lane was the first woman to graduate from the University of Arkansas with a Ph.D. in engineering. It was the beginning of a successful career in the aerospace industry for her. Over the years, she worked for Dow Chemical Company, Northrop Electronics, General Dynamics corporate and General Dynamics Electronics, Autek Systems and as an instructor for San Diego State.

Now retired, Dr. Lane continues to split her time between her eight children, three grandchildren and a significant amount of boards and committees for various industry and educational efforts.

Modern Female Engineers

While women are still a minority in the college as a whole, they are always well-represented in the pool of high-achieving students. Recently, biological engineering graduate Abigail Washispack has exemplified what women can achieve in the college.

Washispack earned her biological/biosystems engineering degree from the college in 2012 while working with professor David Zaharoff to rally student support for the burgeoning biomedical engineering program. In November of 2011, she shared her research findings on nanomaterials for biomedical applications at the Biomedical Engineering Society Annual Meeting in Connecticut. Washispack now attends the Medical University of South Carolina.

These days, female students get plenty of support from several student organizations, which can help them prepare for the competitive and challenging industry. The Society of Women Engineers, Women in Engineering, Phi Sigma Rho and Engineers Without Borders are popular choices for these ladies.

The Society of Women Engineers was founded in 1950 and came to the U of A campus in 1975. The local chapter has a mission to "encourage female engineers to define themselves without intimidation, through networking and with a key focus on highlighting female contribution to the engineering field with a diverse touch." Students in this organization find a strong, welcoming sense of community with people who have a similar vantage point. They spend weekends together, working through class assignments and coordinating fundraisers that lead to national conferences, a major step in their professional development.

SWE is closely linked to Women in Engineering, which has similar activities for young professional women. The two organizations meet together a couple of times a year, when WIE members make time to speak on a panel about their experiences in the industry and prepare students for what is coming next. Many job, internship and co-op opportunities develop this way and foster strong mentoring relationships.

Phi Sigma Rho is a social organization for women in technical majors. Members enjoy dinners and weekend trips as a group. They help each other with homework and weather the job search process together. The U of A chapter is one of the very few in the South.

The building of a more gender-balanced community in the College of Engineering begins before girls reach college age, and continues until graduation, thanks to recruitment and retention programs such as the Engineering Career Awareness Program, which offers scholarships to female students, and Engineering Girl Camp, a summer program geared toward female elementary students interested in math and science.

These recruitment efforts seem to be paying off: in the past five years, the number of female undergraduate students in the College of Engineering has more than doubled, from 247 to 519.

A University of Arkansas Family Gives Back

Larry Stephens and his wife, Gwen, of Hot Springs have been giving to the University of Arkansas for 34 consecutive years, which makes them the longest continual donors to the University. Larry and Gwen consider the University of Arkansas to be their home away from home.

"We are a University of Arkansas family," said Larry, a 1958 graduate of the College of Engineering. "Both of our children graduated from the university, and we are all connected in business and personal relationships to friends we met during our time there. The campus is a fun place to be at any time of the year, but more specifically, the university gave us a good education that makes us want to give something back in return."

The Stephenses want their gifts to assist with educational opportunities for engineering students, whether in the form of scholarships, lab equipment or instructor salaries. They want the university and the college to grow its reputation across the nation and around the world, all the while providing students with the best education possible so they are able to secure high-quality job opportunities after graduation.

"All of my memories of the university are fond," Larry said. "From the fraternity house and sporting events to difficult engineering courses and graduation day, I cherish the time I was a student. I can see the value these experiences had on the rest of my life.

"We are most familiar with the leadership in the College of Engineering and the advancements that have been made there the past few years," he continued. "This kind of progress can only be made with financial support, large or small, from our alumni."

Larry and Gwen Stephens

As student enrollment continues to increase, private gift support is more important than ever in the College of Engineering. Scholarship support, student competitions, classroom improvements, technology upgrades and strategic support for up-and-coming faculty all require strong annual support to ensure the success of our students and faculty.

Simply put, gifts through the University of Arkansas Annual Fund directly support engineering students now. Every dollar counts and is put to immediate use. Please visit onlinegiving.uark.edu and make your gift today.

News From Our Alumni

Carl Yates (BSCE 1958) has been awarded the Lifetime Achievement Award from the American Council of Engineering Companies of Arkansas (ACEC/A). Yates is the chief executive officer for the Fayetteville engineering firm McGoodwin, Williams & Yates, Inc.

Randy McNulty (BSCE 1963) has been selected for the Arkansas Construction Hall of Fame. McNulty is the founder of Southern Pavers.

Robert Hart (BSCE 1977, MSCE 1981) recently elected to the AWW&WEA Glen T. Kellogg Water and Wastewater Hall of Fame. Hart is the technical services officer at Central Arkansas Water.

Brett Peters (BSIE 1987) has been named dean of the College of Engineering & Applied Science at the University of Wisconsin-Milwaukee.

For more alumni news, see our online edition: arkansasengineer.uark.edu

2012 Alumni Awards Banqet

In April, the college recognized 18 alumni for their contributions to their communities, to the field of engineering and to their alma mater.

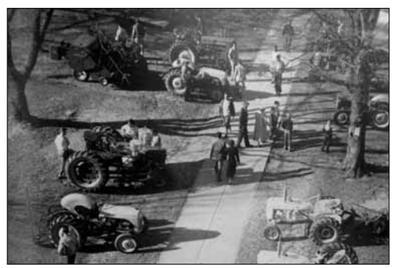
Top: Alumni Award Winners. Back row: Jim McClelland, Bruce Westerman, Steve Cousins, Thomas Duncan, Sherman Black, Tyler Gipson, Carl Imhoff, Jerry Rogers. Front row: Teuta Williams, Rex Eads, Kim Clower, Megan Berlau, Stephan Durham, Raegan Barnes, Heath Bebout, Anthony Doss, Mac Hogan. Bottom: Hall of Fame winner Ron Morris (fourth from left) with past winners Julian Stewart, Rodger Kline, Gus Vratsinas, Buck Johns, Jim White and Bill Cravens.

Top row, left: an elegant setting. Right: Unnice and Troy Alley. Middle row, left: Carl and Kristen Imhoff. Middle: Bruce Westerman and Steve Cousins. Right: Ron Morris. Bottom row, left: Heath Bebout catches up with Dean Saxena. Right: Hall of Fame winner Ron Morris (second from left) introduces Chancellor John White (far left) to his grandchildren. Bottom row: IE alums Palmer Terrell, Bill Cravens and Larry Stephens.

Then and Now

THEN: In the 1950s, the U of A yearbook proclaimed that the machine age was "here at last," thanks to the adoption of typewriters.

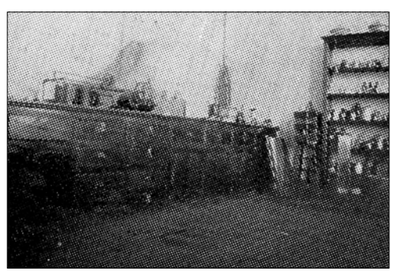
NOW: In the information age, students expect machines to do much, much more than put words on paper.



Biological and Agricultural Engineering

THEN: Until 1989, the university offered only agricultural engineering. This picture shows a tractor demonstration from 1951.

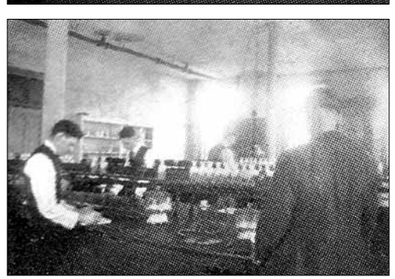
NOW: One of the research focuses of the department of biological and agricultural engineering is water quality. Here, a biological engineering student demonstrates some of the high-tech equipment used by the Water Quality Lab.



Biomedical Engineering

THEN: Although the medical field has always relied on engineering breakthroughs, biomedical engineering didn't emerge as an academic program until the second half of the 20th century.

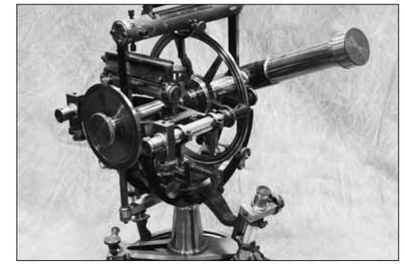
NOW: Many researchers in the college have focused on medical applications. In 2012, the U of A created a department of biomedical engineering, which currently has more than 100 students.



Chemical Engineering

THEN: A chemical engineering laboratory in 1915.

NOW: Doctoral student Ellen Brune is taking her research from the lab to the marketplace. Her company, Boston Mountain Biotech, LLC, has won numerous small business competitions.



Civil Engineering

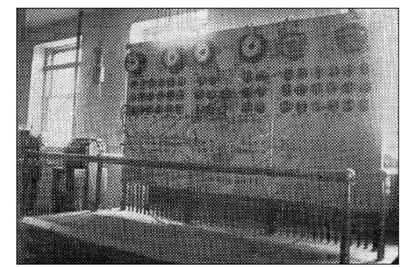
THEN: Around the time the university awarded its first civil engineering degree, civil engineers used instruments like this theodolite for surveying.

NOW: A student uses a ground-based radar interferometer, currently one of only two in the nation, to produce detailed images that help monitor slopes near roadways.

Computer Science and Computer Engineering

THEN: Computer performance is increasing exponentially. This means that computers from just a few years ago seem hopelessly outdated today.

NOW: With a focus on either software or hardware, computer science and computer engineering students are creating and programming the devices we'll have in our pockets and houses tomorrow.



Electrical Engineering

THEN: In 1915, huge electrical switchboards were standard equipment in an electrical engineering lab.

NOW: Today, electrical engineering professors and students investigate new ways of producing electricity, such as solar and thermoelectric power.

Industrial Engineering

THEN: Industrial engineering was first offered at the U of A in 1948.

NOW: Current industrial engineering students use computer modeling to find the most efficient approaches to the systems we rely on every day.

Mechanical Engineering

THEN: These 1915 ME students are using a plane from WWI to practice their skills.

NOW: Students on the SAE Baja team design and build a vehicle that must stand up to a demanding race course.

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