Engaging undergraduate students in cutting-edge research projects takes the students beyond the traditional passive lecture/test experience,” said Steven Bellovich, dean of the college. “The students learn about their specific projects, but they learn much more than that. They learn to be independent; they learn to be self-confident; they learn to handle the unexpected; and they learn that there may be no right answer — only a best answer — for the problems they encounter.”

That research experience leads to additional benefits such as increased self-confidence, independence, knowledge and the ability to improvise, the dean said. The benefits gained from a meaningful research experience will last far beyond the students’ undergraduate years, empowering them in their professional and personal lives.

Thanks in part to its well-rounded students, The University of Tulsa has boosted its reputation in the past 10 years and currently ranks among the top 100 U.S. higher education institutions, according to U.S. News and World Report. For the 2010 incoming class of freshmen, 56 percent of TU’s National Merit Scholars are engineering and science majors. Their average SAT and ACT scores are 1305 and 29.9, respectively. More than 30 percent go on to pursue advanced degrees and, of those seeking employment, more than 90 percent are employed within a year of graduation. TU graduates enjoy the highest salary potential in Oklahoma and one of the highest in the region according to a 2009 report by PayScale, a market leader in global online compensation data. (continued on page 2)

Food network regular ties science to sauté at TU lecture

Corriher said with a chuckle. “It’s a challenge, and I’m always learning something new. I want people to have fun and have curiosity, thinking about food in a different way.

For more than 40 years, Corriher has solved cooking problems for home cooks, editors and writers, large companies like Pillsbury and Procter & Gamble, and Julia Child. She has appeared on many TV shows, even once on ABC’s Jimmy Kimmel Live with Snoop Dogg as her fry chef.

Framing her culinary adventures in terms that a mystery detective might use, she relied on hunches, step-by-step scientific analysis and research to get to the bottom of even the most baffling baking mishaps.

Corriher’s lecture also helped TU students understand the broad application of skills for those with a science foundation and how a passion for science can lead to a passionate career.

“Studying the chemistry of cooking illustrates how commonplace activities relate to what we teach in the classroom,” said Keith Symcox, chemistry instructor for TU’s own “Chemistry of Cooking” class, which uses Corriher’s book, CookWise. “Being able to associate everyday life to what you learned as a student is what creates a lifelong learner.”

Corriher received her bachelor’s degree in chemistry from Vanderbilt University in 1956. She has taught from Vancouver to Sicily, written a syndicated column since 1996 and is an award-winning author. Her book CookWise has sold more than 400,000 copies and was the James Beard Award winner for Best Reference and Technique Book of 1997, earning her worldwide recognition in what Time magazine calls “the Oscars of the food world.” Her book BakeWise also won the 2009 James Beard Award and is a best seller.

She has been a speaker for the Smithsonian Institution, American Association for the Advancement of Science, National Institutes of Health, Monell Chemical Senses Center, Cal Tech and the American Chemical Society.

Recipes are simply laboratory experiments that you can eat.”
— Keith Symcox

Corriher’s presentation is the third event in the Norman M. Hulings, Jr. Memorial Lecture series, which was established to honor the late TU alumnus and longtime executive with ONEOK and Oklahoma Natural Gas Co.

To read more about Corriher’s work, visit her blog at http://authors.simonandschuster.com, or to see what’s cooking in TU’s chemistry classes, visit www.utulsa.edu/chemistry.
There’s a lab for that?

TU research laboratories shape an exciting future

Walking through the hallways of the university’s science and engineering buildings, it might be easy to miss the exciting breakthroughs taking place behind laboratory doors. Yet, what seems like quiet work is making a big bang in the halls of industry and academia.

Unlevering the power of the human genome

Bioinformatics at TU explores a new area of research that infuses medical science with the power of computing. Advances in computation have led to the development of methods to model and analyze the function at the cellular and molecular levels, providing a new method for biologists and researchers with tools to search for susceptibility factors in a sea of medical data.

Brett McKinney, a regular scholar in computational genomics with a background in theoretical physics, joined TU in 2009 as the William K. Warren, Jr. Chair in Bioinformatics. McKinney’s bioinformatics lab searches for genetic factors that increase susceptibility to several brain conditions, such as major depressive disorder and bipolar disorder, as well as other traits.

In partnership with the William K. Warren Foundation’s Laureate Institute for Brain Research (TURC), McKinney’s lab has helped develop a new approach for enhanced signal resolution for large format focal plane arrays. Their work has led to the recognition of molecular techniques that could map and track regions of interest in biomedical science.

McKinney’s research investigates how to detect environmental toxins through chemical sensing technologies for underwater applications. They are developing new algorithms that can be applied to other problems such as molecular biology factors in a sea of medical data.

The human genome project gave rise to important information for unraveling genes and, in turn, how genes interact as part of pathways, or networks like the World Wide Web. To date, “humanomics” has contributed to the genetic analysis of complex diseases.

The primary objectives of this phase is to develop better models to reduce the uncertainty in predictions of human behavior. The $3.7 million project is supported by the National Institute of Mental Health.

By building the computer models, McKinney’s lab is contributing to a better understanding of genes and the brain, which, in turn, will improve the lives of those suffering from diseases.

Health checkups for the arteries of energy

The petroleum industry suffered a big problem to solve. Paraffin buildup in pipelines is a serious threat to the industry and deep-water oil fields.

A multiphase deposition problem is analogous to the problem of cholesterol clogging the arteries, resulting in heart disease. Research is needed to determine the causes of paraffin deposition in pipelines or wells.”

Don’t Know,” said Bryan Tapp, professor and chair of the geosciences department. “If you’ve got a question about what’s going on in your world, we’re your scientists.”

The geosciences department is developing an independent stream that provides the opportunity for research and discovery in modern geoscience. The primary objectives of this phase is to develop better models to reduce the uncertainty in predictions of human behavior. The $3.7 million project is supported by the National Institute of Mental Health.

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Construction begins on college’s expansion

The 1.5-acre Samson Plaza will connect Rayzor Hall, Kiplinger Hall, and the yet-to-be-built Stephenson Hall, which will house the petroleum and mechanical engineering departments. The outdoor space will welcome students and visitors in a pleasant atmosphere with oak and crape myrtle trees, seasonal flower beds, inviting outdoor seating furniture and arrangements, and a fountain. Samson Plaza is made possible through the generosity of the Schusterman family.

New NanoLab features $1 million microscope

The University of Tulsa is pleased to announce the installation of an FEI Helios NanoLab system, funded by a $1.2 million grant from the National Science Foundation’s Major Research Instrumentation Program.

The microscope uses two powerful beams, a scanning electron beam (SEM) and a focused ion beam (FIB), that will allow University of Tulsa researchers unshock scientific mysteries on a scale down to 1/1,000,000 of a human hair.

“The SEM accurately images what’s going on at the nanoscale level and the FIB slices into layers of material,” said Dale Foreman, professor and chair of the Chemistry and Biochemistry Department.

“Combined into one system, these two instruments make possible a variety of advanced techniques, including 3-D imaging, which will help us to probe our research chemistry, biology, mechanical engineering, physics and chemical engineering to the next level.”

In May, TU celebrated the opening of the new NanoLab with a special ribbon-cutting ceremony, where the focused ion beam cut a custom-made nanoribbon bearing the TU logo.

That same summer, the new campus transformed with the Oklahoma Microscopy Society’s annual meeting, students and visitors from around the country transferred to TU to see the new million-dollar microscope. Guest speakers explained a wide range of applications for an FIB/SEM microscope— from 3-D imaging of natural gas shale plays to the chemical makeup of ancient Greek ceramics.

“(TU) is one of only a few private universities in the U.S. to have an FIB/SEM microscope,” said Paige Jonhson, president of the Oklahoma Microscopy Society and manager of the Micro and Nano-Characterization and Fabrication Laboratory. "This technology significantly advances TU’s ability for nano-research and education." Some of the projects planned for study at TU using the NanoLab’s million-dollar microscope include advanced materials like self-healing plastics or fabrication of materials for advanced medicall production, which are both subjects of investigation at the university.

In April, the TU-Chem-E-Car team did just that. They traveled to the MEC Regional Competition in Des Moines, lowland second place at 11 cars and tied for third in the post-competition, With a score of 38, the TU team qualified for the national Chem-E-Car competition. Now, the teams have six weeks to build their robot from a kit of hundreds of parts. More than 30 teams competed in a seeded-gate that challenged their robot to climb obstacles and score goals against their opponents.

During the MEC Regional Oklahoma City Regional Championship, the Booker T. Washington team earned second place as part of an alliance in the first competition. In the robots competition, the leading cars going into the final cut were those that alliance of nilon and Booker T. Washington robot was down. In addition to the MEC Regional event, the Booker T. Washington team earned second place individually at the FIRST Robotics Greater Kansas City Regional Competition earlier in the season.

Building on their momentum, Booker T. Washington High School began a dedicated robotics class this fall, which Davis said he and his TU mentors hope to support. Jordie has many young star on their team, and Davis says exciting potential for their team this academic year, too.

Chemical engineering students will travel to Salt Lake City in November to represent TU in the American Institute of Chemical Engineers’ (AIChE) Chem-E-Car competition. The Chem-E-Car competition is one of the largest and most competitive national Chem-E-Car competitions and went on to win the international crown to Great Britain.

People started to forget what TU did five years ago," said Chris Dean (BS ’10), captain of the TU team his senior year at the FIRST Robotics Oklahoma City Regional Competition earlier in the season. “For my last year at TU, I was proud to be a part of something special.”

“We've gone to the semifinals many times, but this was the first time we made it to the final," said Jeff Duce, professor of computer science and a TU faculty sponsor for robotics teams. "We've developed dedicated high school student teams, and we look forward to what they'll accomplish next year.

TU mentors celebrate outstanding robotics performance

“‘Inspirting students with the same passion for science and technology I had in high school is a very rewarding feeling, and it’s a contribution that I knew I would make the future of the Tulsa community,’ said Professor Barber. "I am very excited to be able to support our students as they continue to diversify our student body and make significant contributions in the future of science."

In the heart-pumping high-energy celebration of science and technology, University of Tulsa student volunteers and faculty mentors worked as their high school robots teams, for the first time in 15 years, made it to the finals of the FIRST (For Inspiration and Recognition of Science and Technology) regional robotics competition.

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The instrument also will become a centerpiece in the development of the TU Microscopy Laboratory, which will allow educational opportunities for students at all elementary schools and small regional colleges across the state.

The microscope's reach goes well beyond the TU laboratory. Researchers hope the remote operation capabilities of the microscope will allow educational opportunities for students at all elementary schools and small regional colleges across the state.

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Tyler Johannes earns research recognition

This spring and summer has brought worldwide recognition for original research by Casey Davis, a senior mechanical engineering student from Dale, Oklahoma. In March, he won first place in the research competition at the 9th Annual Research Day at the Capitol in Oklahoma City. And this summer he traveled to Japan as an award-winning student at an industry conference.

"Undergraduate research has been a more challenging alternative to industrial internships," Davis said. "It has exposed me to new subjects and helped me to think in ways that pursue a graduate degree in mechanical engineering." Davis has put the time and effort into this project so that he can pursue a graduate degree in mechanical engineering.

Tyler Johannes, a biology graduate student, won third place for his research presentation at the TU biology biology research symposium (the National/Biomedical Conference held at Loyola College in Denver, Colorado). "This is the first time a student from the Phi Alpha chapter of the Sigma Tau (biological science) honors society for biology students in the state of Oklahoma attended the symposium," Voss said. "This must be an indication that students are interested in doing research and like the professional atmosphere of the symposium."

"The symposium also helped me to network with professionals in the field of biology and other biology students," Johannes added. "It was a great opportunity to present my research and learn about other research projects that are happening in the state."

TU engineering students earn research recognition

The TU mathematics team set records in national, regional, and local competitions. The TU math team gained the highest score ever for the university at the most recent nationwide Putnam Mathematical Competition. Build-up of off the momentum from that success, the Tulsa University mathematics team is leading the nation, the Oklahoma University mathematics team is leading the state, and the University of Tulsa mathematics team is leading the region. The TU team earned a total score of 154, which is the highest score ever for the university at the Putnam Competition. The TU team was led by Dr. Paul Hsu, a professor of mathematics at TU.

"Our students are doing an excellent job of applying the concepts they learned in class to solve complex mathematical problems," Hsu said. "This is a great achievement for them and for the university." The TU team was led by Dr. Paul Hsu, a professor of mathematics at TU.

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Igor Chudinovych

Professor Igor Chudinovych is the Department of Mathematics, Mechanical and Aerospace Engineering, and Natural Sciences, at the University of Guanajuato in Mexico, teaching a course in the Theory of Elasticity. He came to The University of Tulsa in 2007 as a full-time professor in the Department of Mathematics and Computer Science, where he taught Calculus II, Differential Equations and other logarithm mathematics courses.

In 1973, he was awarded his master’s degree in mathematics and mathematical education at Kharkov State University. Along with his fellow students, he became part of the great Kharkov mathematical school in world-known mathematicians, with names like Vladimir Markov, Alexander Sidorov, Ivan Matveev and many others who made great contributions to the field.

In 1978, he received the Candidate of Science (PhD) degree in theoretical and mathematical physics from the Institute for Theoretical Physics in Kiev, Ukraine. He began a lifetime teaching career as a professor at Kharkov State University, where he served from 1978 to 2002. Never one to stop learning, he earned his Doctor of Science (DrSC) in 1995 in mathematical physics from the Institute for Low Temperature Physics and Engineering in Kharkov, Ukraine.

In 2002, he switched gears and worked abroad at the University of Georgia in Munich, teaching a course in the Theory of Elasticity. He came to The University of Tulsa in 2007 as a full-time professor in the Department of Mathematics and Computer Science, where he taught Calculus II, Differential Equations and other logarithm mathematics courses.

Gloria Meadors

Meadors earned a bachelor’s degree in chemistry from Sam Houston State University in 1967 and then a master’s degree in inorganic chemistry from the University of North Texas in 1973 as an instructor in 1967–8, and until August 2010, is a heart attack. She spent time as a writer for the laboratory manual and now teaches general and organic chemistry.

In addition to being a writer, Meadors has taught high school mathematics, science and engineering, and even began TU’s chapter of the Society of Women Engineers. She was awarded the Distinguished Teacher Award from Sigma Xi, the physics honor society.

Meadors earned a bachelor’s degree in chemistry from Hunter College and her master’s degree in education from the University of North Texas before receiving her doctorate in 1973.

She remembers when Gloria approached me about starting a student chapter of SWE,” said Donna Farrior, retired professor of mathematics. “This was when the Engineering College was near the North Campus, and there were only a few women and very few amenities. Starting SWE was a great experience, and the students were very active.

A dedicated “rock bound,” Meadors and her husband spent time teaching each and every student on her own collections and as a collector. She is remembered deeply in her role of service at TU and her leadership in women’s issues that continue to benefit students and faculty today.

CESE

Research as engineers and technical professionals are key to managing and leadership positions, they require knowledge and skills that are often not been trained. Classes at TU’s Continuing Engineering and Science Education (CESE) have been designed to help engineering professionals advance their managerial skills with programs like the Executive Leadership Institute, ELITE.

Graduates of the ELITE program have the opportunity to have first-hand leadership roles. In fact, the majority of ELITE graduates have received accelerated promotions within their respective organizations. Financial, managerial, development, communication, negotiation skills, that we have learned through ELITE training.

For more information, contact CESE at (918) 631-3088, or visit www.cese.utulsa.edu for more information about education classes and professional development credits for you and your professional association.

IPEC mock trial puts energy experts in the hot seat

Testifying as an expert witness in the legal proceedings of an exploration and production trial isn’t easy, which is why a special presentation was added to the “Legal and Regulatory Issues in E&P” session at the 17th International Petroleum & BioFuels Environmental Proceedings.

In addition to the mock trial, IPEC addressed the environmental issues of today and tomorrow. The conference was sponsored by Continuing Engineering and Science Education (CESE).

Students from Indian petroleum university enjoy CESE/PE summer program

Students from Pandit Deendayal Petroleum University in Gujarat, India, were able to accomplish so much in three weeks. In June, 23 students arrived in Tulsa for the Tuohi Undergraduate Petroleum Engineering Program, where they conducted field research, visited local oil and gas, petroleum economics, basic petroleum exploration and production, and a range of professional organizations including the West Virginia Society of Certified Public Accountants.

AEE leadership looks to TU continuing engineering education tax

Pat Hall, associate dean for CESE, has been asked to serve on the American Society of Engineering Education (ASEE) search committee for the executive director position. Hall has long record of service to ASEE and just finished term on ASEE’s Board of Directors.

Phishing for professional associations

An exciting new security information partnership began this year with an unconventional twist: All participants in the Information Security track – Assurance & Risk Assessments class were exposed to a phishing scam.

“The course was a perfect blend of classroom lectures and field trips along with fun trips within the environmental issues of today and tomorrow,” said Neal Meadors, the program’s new executive director. "I found myself longing for the challenge of learning more and becoming a more well-rounded manager." Meadors said. "I could not think of a better place to return the education process.”

For Madden, the great thing about the ELITE program is that he didn’t have to wait years to see the fruits of his labor. "I have experienced immediate returns in many different aspects of my personal and professional make-up," said Madden. "Not only have we learned how to deal with small groups and one-on-one conflict, we have learned how leadership and management are worlds apart. However, the ones that can find a balance with the two have a great opportunity.”

The next ELITE program for engineering professionals begins in March 2011. Visit www.cese.utulsa.edu to sign up today!
TU professional development classes coming to a city—or country—near you

The University of Tulsa offers more than 80 continuing education classes a year in dozens of states and countries—classes that are customized for engineering and science professionals.

 Tara Abu-Haddad to Almaty, TU Continuing Engineering and Science Education (CESE) classes have large industry professionals desperate for the newest technology and tactics in prosthetics engineering, biomedical engineering, computer security, environmental science and engineering, and more.

“TU has grown in reputation for providing continuing education courses all over the world with proven applicability and quality that meet professional development requirements,” said Pam Hall, associate dean of CESE. “It is because of the worldwide reputation of TU and its graduates that we can offer our programs across the U.S. and globally.”

CESE presented “Fundamentals of Petroleum Exploration, Drilling and Production” in Guanajuato, Mexico from August 31 to September 1, 2010. More than two dozen people attended the course.

A new kind of networking

After a devastating forest fire rages through a remote mountainous area, scientists are unable to reach the location to assess the damage. Instead, they fly overhead and drop hundreds of sensors over miles of uninhabited terrain—sensors that are mobile, have a small amount of money and processing capability, but most importantly, network with each other. With this network of wireless computing devices transmitting information back, scientists can piece together a clear picture of what has happened in the inaccessible area.

Jamie Payton (BSCS ’01) makes research scenarios like the forest fire a very real possibility. In 2007, her award-winning work in setting software for these emerging, networking systems won a best paper award at the International Symposium on the Foundations of Software Engineering, one of the top conferences in her field.

There’s a military application too. Soldiers can carry these devices to help them navigate dangerous terrain or direct improvised explosive devices. She is defining the technical specifications for extracting information from the network built by these small devices that can be applied to emergency services, military operations or scientific exploration.

Payton traces her passion for networking back to Tulsa, and she has never forgotten the mentorship and support for her research that she received at TU. Now an assistant professor in the Department of Computer Science at the University of North Carolina at Charlotte, she mentors students of her own. And, she tries to emulate her TU mentor, Computer Science Professor Rose Gamble.

“My doctoral week was in the winter; area of what I did with Rose (both in software engineering), but I expanded into software programming for mobile devices,” she said. “The same basic principles applied and gave me a good foundation of knowledge. I was able to build off of it and go in a new direction.”

During her doctoral program, she met a like-minded computer-scientist, Richard Souvenir, whom she married in 2006. Together they moved to the University of North Carolina in 2004, where they both serve as faculty members in the computer science department. This year, Payton and Souvenir became new parents, and are now raising 16-month-old twins, who could quite possibly be the first computer science siblings in their homes.

Alumni Spotlights

The following stories highlight the unique ways that alumni have made use of what they learned at the College of Engineering and Natural Sciences. Although their journeys differ, the theme is the same:

Their time at TU changed their lives. In return, they continue to inspire others as proud graduates of The University of Tulsa.

Todd Adellmann (BSEE ‘89) completed a JD at the University of Colorado at Boulder and will begin working as a patent attorney at Setter Roche LLP after completing the Colorado bar exam.

Daniel Wilson (BSCS ’00) traveled the world and became a computer science wiz in their home.

“Every now and then I call or e-mail Rose to ask advice when I need it,” Payton said. “Especially now that I hired myself as an advisor, it’s nice to ask someone how to encourage students and help them get the most out of their research.”

Gamble recruited Payton out of high school, saying her potential right away.

It was clear that Jamie’s prior work, her writing, and her dedication that she possessed the “spark” that said she could be a researcher, that she could solve hard problems,” Gamble said. “She doesn’t become frustrated with the ambiguity and experimentation that research involves and can often benefit from great mentors to achieve success.”

Payton also participated in the Tulsa Undergraduate Research Challenge (TURC) all four years she was at TU. TURC provides undergraduate students as early as the freshman year with a faculty mentor, research funding, and community opportunities to build a career in scholarship and community involvement. Many of TU’s most successful students have taken advantage of the TURC programs.

“TURC is a great way to get prepared for advanced research, and I would recommend it to anyone who is interested in doing research,” Payton said. “TURC and Rose’s mentorship really shaped the direction of my career.”

Now graduated from TU, Payton continued directly into a PhD computer science program at Washington University in St. Louis.

Class Notes

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“I have taught myself a lot of what I did with Rose (both in software engineering), but I expanded into software programming for mobile devices,” she said. “The same basic principles applied and gave me a good foundation of knowledge. I was able to build off of it and go in a new direction.”

During her doctoral program, she met a like-minded computer-scientist, Richard Souvenir, whom she married in 2006. Together they moved to the University of North Carolina in 2004, where they both serve as faculty members in the computer science department. This year, Payton and Souvenir became new parents, and are now raising 16-month-old twins, who could quite possibly be the first computer science siblings in their homes.

“Every now and then I call or e-mail Rose to ask advice when I need it,” Payton said. “Especially now that I hired myself as an advisor, it’s nice to ask someone how to encourage students and help them get the most out of their research.”

Gamble recruited Payton out of high school, saying her potential right away.

It was clear that Jamie’s prior work, her writing, and her dedication that she possessed the “spark” that said she could be a researcher, that she could solve hard problems,” Gamble said. “She doesn’t become frustrated with the ambiguity and experimentation that research involves and can often benefit from great mentors to achieve success.”

Payton also participated in the Tulsa Undergraduate Research Challenge (TURC) all four years she was at TU. TURC provides undergraduate students as early as the freshman year with a faculty mentor, research funding, and community opportunities to build a career in scholarship and community involvement. Many of TU’s most successful students have taken advantage of the TURC programs.

“TURC is a great way to get prepared for advanced research, and I would recommend it to anyone who is interested in doing research,” Payton said. “TURC and Rose’s mentorship really shaped the direction of my career.”

Now graduated from TU, Payton continued directly into a PhD computer science program at Washington University in St. Louis.
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