Dr. Gerd Duscher
Introduces the Powerful New Zeiss Electron Microscopes

Dr. Claudia Rawn
Establishes Unique RISER Program

Materials Science and Engineering Graduating Seniors
Department Head's Message
Dr. Kurt Sickafus

It is my pleasure to introduce this inaugural issue of materialsUT. We are excited to share with you news about our many achievements in the Department of Materials Science and Technology (MSE) this past year and to tell you about some of the changes that have occurred in recent months. One not so recent change was when I joined MSE in the fall of 2011 and took over for Professor George Pharr as department head. George is now occupied fully as Director of the Joint Institute for Advanced Materials (JIAM). George has overseen a recent groundbreaking for JIAM, which is due to be occupied in 2015. JIAM is located on the new Cherokee campus on the south side of the Tennessee River. MSE faculty and students are poised to play major roles in this exciting new materials research center.

Another significant development in MSE this past year involved our relocation from Dougherty to the Ferris Engineering Building. We completed our move in the fall semester of 2012. Ferris has many new features for which we are proud, including new seminar rooms, a new undergraduate lounge, and a large graduate student office commons on the second floor. Most of our MSE faculty have relocated their offices to Ferris and many of our research and support staff are now located in Ferris as well.

We currently enjoy healthy student enrollment in MSE. We have eight-six undergraduate students enrolled in MSE this spring, twelve of whom are due to graduate with their BS degrees in May. We also have eighty-one graduate students enrolled this semester, ten MS and seventy-one PhD candidates. This academic year, we will graduate four MS and nine PhD students.

Once again, I welcome you to materialsUT and I encourage you to peruse our newsletter and learn the latest on our department, our college and our university. I am proud of our many achievements this past year and I know you will share both our pride and our enthusiasm for the future.

Sincerely,

Kurt Sickafus
Alvin & Sally Beaman Professor and Head
Department of Materials Science & Engineering
Support staff helps conduct research at the IBML. From left are materials science graduate students Haizhou Xue and Curtis Chen and nuclear-engineering undergraduate Daniel Wentz.

From left, IBML director Dr. William Weber, materials science graduate student Curtis Chen, and IBML deputy director Dr. Yanwen Zhang monitor experiments in the IBML control room.

The University of Tennessee Department of Materials Science & Engineering (MSE) in Senter Hall is a newly acquired core technology at UT. The facility is equipped with two ion sources, a 3MV tandem electrostatic accelerator, three beamlines and three endstations. The two ion sources are capable of producing most ions from H up to Au. One beamline and endstation is devoted to rapid routine ion beam analysis, which can provide elemental and isotopic characterization. Two other beamlines with temperature-controlled endstations are each equipped with a beam raster scanner to produce uniform irradiations over large areas for controlled irradiation.

The facility enables fundamental and applied research of irradiation effects in materials, ion-beam modification of materials, defect-property relationships in ceramics and alloys, long-term performance of materials under extreme environments, interface phenomena, and nanostructures in materials. Energetic ions are used to study irradiation effects in advanced materials, perform ion implantation doping of electronic, optical and biomaterials, synthesize materials with non-equilibrium defects and nanoscale structures, modify the surfaces and structures of materials, and perform accelerated testing of materials for extreme reactor environments. These capabilities support research on advanced energy systems, nanoscience, and national security.

Since partial operation began in summer 2012, the facility supports multi-million dollar research efforts at the university under awards from the Department of Energy and Department of Defense. The facility also provides unique tools for both research and education, supporting projects for the university and for Oak Ridge National Laboratory (ORNL). “The recently commissioned Ion Beam Materials Laboratory is one of the latest examples of collaborative forefront science facilities between UT and ORNL,” said Dr. Steven J. Zinkle, a corporate Fellow at ORNL and a member of the National Academy of Engineering. “One of the important features is that this collaborative UT/ORNL facility is housed on the UT campus (as will be the case for the Joint Institute for Advanced Materials at ORNL) in Senter Hall, which was named after my father, Dr. William Senter, who was an Andrew Carnegie Chair at UT and a member of the National Academy of Engineering.”

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Dr. Gerd Duscher

Transmission Electron Microscopy

The Joint Institute for Advanced Material (JIAM) hosted an open house on Wednesday, February 6, 2013, to formally open the new JIAM Electron Microscopy Center. Two new powerful Zeiss electron microscopes are among the most advanced in the world, and will open up exciting new research and teaching options for faculty and students.

The Zeiss Auriga is a dual beam focused ion beam (FIB) with a field emission electron column for high resolution electron imaging and a Canion Ga+ column for precision ion beam milling.

Dr. Gerhard Duscher, an associate professor in the Department of Materials Science and Engineering, was instrumental in establishing the center.

“Dr. David Millhorn recruited me to strengthen the electron instrumental in establishing the center. The TEM also serves the materials biology, food science, human and veterinary medicine communities extremely well, and is also uniquely positioned to serve the polymer sciences and organic solar cells. We have biological colleagues interested in imaging proteins (Dr. Frederico Harte’s group at the agricultural campus is investigating milk proteins for drug delivery), cell components, and viruses,” Duscher said.

The Zeiss Libra 200FE which allows for tomography under cryogenic conditions, and with a monochromator that allows high-energy resolution spectroscopy to detect chemical compositions and atomic bonding. The TEM also serves the materials biology, food science, human and veterinary medicine communities extremely well, and is also uniquely positioned to serve the polymer sciences at UT. None of these researchers formerly had adequate access to a TEM. To support the Zeiss instruments system, state of the art sample preparation equipment was also purchased. To my surprise, the dual beam FIB instrument with its ion beam structuring capabilities is a big hit with these communities too, due to the 3D slicing and imaging capabilities at a larger length scale than the TEM would make possible.”

Currently housed in Room 101 in the Science and Engineering Research Facility (SERF), the microscopes will eventually be moved to the new JIAM building on the university’s Cherokee Farm Campus when it opens in 2015.

“The price for the relocation of the electron microscopes had been included in the purchasing contract,” Duscher said. “The new JIAM building has special environmental cells for TEMs and are ideally suited for these microscopes. We will be very happy to benefit from this new environment. While the instruments already meet and exceed the specifications, we hope to benefit from long time scale stability to improve more involved experiments.”

“Dr. Millhorn recruited me to strengthen the electron microscope program at UT,” Duscher added. “In fact, we are getting ready to offer remote access to the microscopes to enlarge the user base. This remote access, however, needs an additional amount of training and we do not expect to take off fast, instead, this will be a long-term process. At this time anybody who needs access will be trained for free and the roads are attractive enough for interested students to become experts in the techniques necessary for their research. Currently, we have two undergraduate students, around forty graduate students, and ten postdocs certified to use the instruments.”

Duscher sees the TEM as an instrument to promote new and emerging fields of materials science.

“In materials science, we use the TEM to study the influence of atomic defects and structures on the macroscopic properties of materials. The scale reaches from novel 2D materials like graphene to new neutron detector materials like boron phosphide. With the help of the monochromator on the new Zeiss TEM, the collaboration of research groups such as those working with Dr. Ramki Kalyanaraman and myself were able to discover new phenomena termed ferroplasmon that ties magnetism and optical responses of a composite nanoparticle. We are also able to use TEM to image soft matter. For instance, we are studying simple polymers like Teflon, polypropylene and their mixtures, ionomers for fuel cells, and organic solar cells. We have biological colleagues interested in imaging proteins (Dr. Frederico Harte’s group at the agricultural campus is investigating milk proteins for drug delivery), cell components, and viruses,” Duscher said.

Duscher also looks forward to seeing the microscopes relocated to their permanent home in the JIAM building.
New Faculty Members

Dr. Kurt Sickafus Named Head of MSE

Kurt Sickafus took the helm of the Department of Materials Science and Engineering (MSE) on August 1, 2011, as the Alvin and Sally Beaman Professor and department head. Sickafus previously worked as project leader at Los Alamos National Laboratory in New Mexico, and was an adjunct professor at New Mexico Institute of Mining & Technology and part-time faculty member at the University of New Mexico Extended University-Los Alamos Center. He is a Fellow of the Los Alamos National Laboratory and the American Ceramic Society.

He has authored or co-authored more than 200 publications and is the recipient of numerous awards, including the Los Alamos National Laboratory Distinguished Mentor Performance Award and the Los Alamos National Laboratory 2001 Fellows Prize.

Sickafus received his BA in physics and mathematics from Ohio Wesleyan University in 1978. He received his MS and PhD degrees in materials science and engineering from Cornell University in 1981 and 1985, respectively.

In taking the position of department head for MSE, Sickafus succeeded Dr. George Pharr, a UT Chancellor’s Professor who served as both MSE department head and director of the Joint Institute for Advanced Materials (JIAM). Pharr stepped down as department head in August of 2011 to take on full-time duties at JIAM, a joint UT-ORNL institute for advanced materials multidisciplinary research. Construction on the new JIAM building is under way on the university’s Cherokee Farm Campus.

Dr. David Keffer Joins MSE Faculty

Professor David Keffer moved from the Department of Chemical and Biomolecular Engineering to the Department of Materials Science and Engineering (MSE) in October of 2012.

Keffer has taught undergraduate and graduate courses in applied mathematics, heat and mass transport, and molecular simulation since joining the College of Engineering faculty in 1998. He currently co-teaches Sustainable Energy Case Studies (CBE 652) with Paul Frymier, associate professor of chemical and biomolecular engineering. In the fall of 2013, he will begin teaching MSE courses including an undergraduate applied statistical and numerical methods course and a graduate advanced engineering mathematics course.

Keffer is the director of the Sustainable Technology through Advanced Interdisciplinary Research (STAIR) program. STAIR is an interdisciplinary PhD program linking researchers in the departments of chemical and biomolecular engineering; materials science and engineering; biochemical, cellular, and molecular biology; chemistry, and civil and environmental engineering.

Keffer established and co-leads the UT Computational Materials Research Group (CMRG). His team’s research focus is on multiscale materials modeling with energy applications. The group examines proton transport in fuel cell membranes as well as ion storage and transport in novel carbon electrodes.

Keffer has authored or co-authored over ninety technical papers in archival, peer-reviewed journals and has contributed to over 140 technical presentations at national and international conferences.

Carl McHargue retired from the College of Engineering in December of 2012. He will remain with the Department of Materials Science and Engineering (MSE) as a research professor, continuing his studies on ion implantation and defects in non-metal crystals.

He also retired as director of the Center for Materials Processing (CMP) in 2012, but will continue as a consultant for the center.

McHargue earned his PhD in 1953 at the University of Kentucky and began working in the metallurgy division at Oak Ridge National Laboratory (ORNL). He assumed responsibility for the metallurgy program at the UT Graduate School at Oak Ridge in 1954, and was appointed as a professor in a joint UT-ORNL position in 1962.

McHargue retired from ORNL in 1990 and became the director for the CMP and a professor in MSE. From 1989 to 1995, McHargue also held an appointment as Adjunct Professor at Vanderbilt University. He was a Visiting Professor at the University of Newcastle upon Tyne, United Kingdom, in 1987.

McHargue has authored or co-authored more than 300 technical papers and edited seven books. He received the Charles E. Ferris Faculty Award in 2010 and holds two US Patents on ion implantation of ceramics.

MSE Professor and CMP Director Dr. Carl McHargue Retires
The University of Tennessee Department of Materials Science & Engineering

Faculty Team Headed by MSE Professor Receives NEUP Award

A proposal submitted by a research group led by Dr. Kurt Sickafus, Alvin and Sally Beaman Professor and head of the Department of Materials Science and Engineering, to the 2012 Nuclear Energy University Programs (NEUP) Integrated Research Programs (IRP) Awards was selected for a $3.5 million award for a nuclear innovation project. The US Department of Energy (DOE), which provided a total of $13 million in funding for the three IRP awards, recently announced the award.

Researchers on the UT-led project will develop a fuel concept based on an advanced ceramic coating for Zr-alloy cladding. Collaborating institutions on the UT-led research teams, recently announced the award.

For more information about the IRP awards, visit http://ef.engr.utk.edu/IRP/.

Featured Faculty

Dr. Mariya Zhuravleva

Mariya Zhuravleva joined the University of Tennessee in 2009 as a post-doctoral research associate at the Scintillation Materials Research Center. Since 2011, she has been a research assistant professor in the Materials Science and Engineering Department.

Her current research at UT focuses on scintillation materials from synthesis to characterization for application in medical imaging and homeland security. Zhuravleva is the leader of a research project with the aim of achieving large-volume bulk growth of new scintillators with excellent energy resolution, funded via a five-year grant from the Academic Research Initiative (ARI) program, sponsored by the National Science Foundation (NSF) and the Domestic Nuclear Detection Office (DNDO).

Zhuravleva’s research areas also include discovery and development of new scintillation materials for the next generation of gamma-ray, x-ray, and neutron detectors; solid state synthesis and melt crystal growth via the Bridgman methods; solid state chemistry and phase equilibria; and scintillation mechanisms and characterization techniques.

She has a PhD degree in materials science and engineering from Tohoku University, Japan. During her doctoral research, she used the micro-pulling-down and the Czochralski methods to grow inorganic scintillator crystals for radiation detection. She also holds an MS degree and a BS degree, both in materials science and engineering, from Moscow State Academy of Fine Chemical Technology, Russia.

Zhuravleva holds memberships in the American Association for Crystal Growth; the American Ceramic Society; the Materials Research Society; the Institute of Electrical and Electronics Engineers (IEEE) Nuclear and Plasma Sciences Society; and the IEEE Women in Engineering.

Dr. Wei He

Wei He received his PhD in chemistry from the University of Connecticut in 2003. His dissertation research included synthesis and patterning of biocompatible polymers to direct cell growth. From 2003 to 2006, he was a postdoctoral associate in the Neurological Biomaterials and Cancer Therapeutics Laboratory at Georgia Institute of Technology.

Following a brief stint at the University of Washington developing biomaterials for tissue engineering, He joined the faculty at the University of Tennessee (UT) in 2007, where she currently holds a joint assistant professorship in the Department of Materials Science and Engineering and Department of Mechanical, Aerospace, and Biomedical Engineering.

At UT, He has established a vibrant interdisciplinary biomaterials research program, striving toward materials-enabled interventions to tackle challenging medical problems. Her current research revolves around achieving seamless integration at the bio-abiotic interface for indwelling medical implants.

Specifically, her team is tailor-designing immunologically responsive therapeutic polymers to modulate wound healing around implanted neural sensors. She is also leading the efforts in developing new bioactive structural materials and surfaces for orthopedic applications.

Her research has garnered funding supports from the National Science Foundation (NSF), and her professional promise in research and education earned her the prestigious NSF CAREER Award in 2011.
Pelagie Favi, a third-year doctoral student in the Department of Materials Science and Engineering (MSE), comes to the College of Engineering from western Africa, via extended stays in Montana and Virginia. After earning her bachelor’s and master’s degrees, and working several years in industry, she now researches biomaterials for tissue engineering applications under the advisement of Dr. Roberto Benson.

“One of my favorite things about my experience in MSE is the opportunity to access in-depth exposure to leading-edge research and interaction with scientists in important and relevant biomedical research areas,” said Favi. “I have also enjoyed the excellent, yet challenging, classes such as x-ray diffraction, polymer lab methods, and polymer chemistry, which have enhanced my engineering skills and knowledge.”

Favi originally comes from the city of Cotonou, Benin, on the west coast of Africa. She earned her BS in chemical engineering from Montana State University in 2003, and her MS in biomedical engineering from Virginia Commonwealth University in 2008. She worked as a chemist in the product-assessment division at Phillip Morris USA between 2003 and 2005, and as an engineer at Altria Inc. between 2005 and 2010.

Favi’s research interests at UT include using mesenchymal stem cells for regenerative medicine, creating functional polymers and hydrogels to allow for cell functioning and surface modification of biomaterials for cartilage, bone, and soft tissue regeneration. Her current research is in developing and studying bone-marrow stem cells from horses, seeded on engineered cellulose scaffolding as potential biomaterials for bone and cartilage regeneration.

“I’ve been very fortunate to have Dr. Benson as my research advisor,” said Favi. “Our research interests in biomedical engineering have resulted in a great collaboration with research associate professor Madhu Dhar and research associate Nancy Neilson from the College of Veterinary Medicine.”

The enterprising graduate student has earned numerous awards in her time at UT. Most recently, Favi won the 2013-2014 National GEM Fellowship Award, sponsored by Oak Ridge National Laboratories (ORNL); and the 2013-2014 National Institute for Mathematical and Biological Synthesis (NIMBioS) Graduate Research Assistant Award.

In 2012, Favi won the first prize for Best Graduate Student Research Presentation at the Materials Information Society Poster Night, sponsored by the Oak Ridge Chapter of ASM International. She also earned the 2012 Phi Zeta Excellence in Animal Health Research Award at the Comparative & Experimental Medicine and Public Health Research Symposium; the 2011 Helen Jubin Fellowship Award, presented by the College of Engineering; and the 2010-2013 Program for Excellence & Equity in Research (PEER) Fellowship Award, a National Institute of Health (NIH) Graduate Training Grant.

“Many people have contributed to my success thus far at UT,” said Favi. “Dr. Cynthia Peterson’s generous PEER Fellowship, awarded to me for my first three years at the university, has been very enriching and has given me exposure to various professional-skills development workshops. Dr. Sekeenia Haynes, associate director of PEER, has also been very encouraging and has helped me identify various additional funding agencies for graduate school.”

Favi’s research activities have included several poster and oral presentations, publications, and workshops.

“The workshops I’ve attended include effective college teaching, negotiation, and writing for nonscientific readers,” said Favi. “The research story written by a fellow PEER scholar, Samantha Tracht, and I during the writing for nonscientific readers’ workshop directed by Dr. Mark Littmann, was published by LiveScience and the National Science Foundation.”

Favi looks forward to teaching and performing bioengineering research once she completes her doctorate.
Energy Frontier Research Center (EFRC) Summer School

Dr. James Morris, UT-ORNL joint associate professor in materials science, organized an Energy Frontier Research Center (EFRC) summer school titled “Defects, Deformation and Damage in Structural Materials,” June 11-15, 2012, in Knoxville. The Department of Energy and Oak Ridge National Lab (ORNL) primarily sponsored the school.

The school was designed for advanced undergraduate and graduate students and postdoctoral researchers in physics, materials science, and nuclear engineering, with a focus on key fundamental issues relevant to current research, and state-of-the-art techniques for studying defect properties.

Major themes included studies of individual defects, interactions of defects, radiation-induced defects and cascades, and small-scale plasticity; computational approaches (electronic structure methods, atomistic simulations, and continuum modeling of plasticity); and advanced in-situ experimental methods including in-situ techniques (x-ray and neutron diffraction methods, atom probe, and microscopy).

More than twenty speakers gave presentations. Approximately eighty students from around thirty different institutions attended. Speakers included materials science and engineering professors George Pharr, Easo George, Kurt Sickafus; and Governor’s Chair Professors Bill Weber and Brian Wirth. Morris represented the Center for Defect Physics at ORNL.

Other sponsors included the Center for Materials Science of Nuclear Fuels at Idaho National Laboratory; the Center for Materials at Irradiation and Mechanical Extremes at Los Alamos National Lab; and the Center for the Materials Science of Actinides at Notre Dame.

The school also featured a student poster session, a trip to the Smoky Mountains, and a tour of ORNL.

Morris is organizing a related symposium for the 2014 Spring Materials Research Society meeting, entitled “Materials Behavior Under Extreme Irradiation, Stress, or Temperature,” with co-organizers Jianguo Yu of Idaho National Lab; Andrew Horsfield of Imperial College in the United Kingdom; and Nan Li of Los Alamos National Lab.

ASM Materials Camp for Teachers

Members of the Department of Materials Science and Engineering (MSE), along with the American Society for Metals (ASM) Materials Education Foundation, hosted a Materials Camp for Teachers June 11-15, 2012, at the Oak Ridge High School.

Twenty science, technology, engineering, and math (STEM) teachers participated in hands-on lab experiences that showed them how to use applied engineering techniques in the classroom and introduced them to low-cost/no-cost everyday materials that could be integrated into their lesson plans. Participants also toured the Spallation Neutron Source in Oak Ridge.

Dr. Claudia Rawn, UT-ORNL assistant professor, director of the Center for Materials Processing, and program co-director of Sustainable Technology through Advanced Interdisciplinary Research (STAIR); and Michelle Everett, an MSE graduate assistant and Integrative Graduate Education and Research Traineeship (IGERT) researcher, represented MSE at the camp.

The camp was sponsored by UT’s Joint Institute of Neutron Sciences, Oak Ridge National Laboratory (ORNL), Oak Ridge Associated Universities (ORAU), the ASM Educational Foundation, the Oak Ridge Chapter of ASM International, and the National Science Foundation (NSF) STAIR program at UT.

ASM Materials Camp for Students

The June 18-22 ASM Materials Camp for Students attracted twenty bright STEM high school students for hands-on experience in materials handling and research.

Dr. Claudia Rawn worked with Steve Dekanich, senior metallurgist at Y-12 National Security Complex, to plan a program that introduced the students to the world of failure analysis and materials characterization. IGERT members Rosemary Le and Shawn Buckley, along with other MSE graduate students, acted as camp mentors.

SpaceX supplied tubes for evaluation. Campers used a Hitachi TM 3000 tabletop scanning electron microscope to determine the chemistry and conditions of the tube and tube wells. They also used a Keyence optical microscope for studying surface morphology and creating 3-D images.

The week concluded with students presenting their findings before a panel of judges from UT, Y-12, and ORNL.

The camp was sponsored by the Oak Ridge Chapter of ASM International, UT students’ Materials Research Society (MRS) and Materials Advantage chapters, Y-12 National Security Complex, ORNL, SpaceX, Hitachi, Keyence, Mager Scientific, the UT MSE, and the NSF STAIR program.
Student Activities

ASM Poster Night

The annual Oak Ridge Chapter of ASM Student Night was held on Thursday, October 18, 2012, at Rothschilds Conference Center in Knoxville. This year, twenty-nine graduate students and thirteen undergraduate students competed for recognition and cash awards from the local ASM International Chapter. Judges from Oak Ridge National Laboratory (ORNL) included the Materials Science and Technology Division Director Gene Ige; the Chemical and Engineering Materials’ Division Director Mike Simonson; and Bill Peter, the Group Leader of the Materials Processing and Manufacturing Group within the Materials Science and Technology Division. Greg Reed, the University of Tennessee’s Associate Vice Chancellor for Research, rounded out the judging team.

First place honors went to Pelagie Favi for her poster “Engineering Bacterial Cellulose Scaffolds for the Proliferation, Osteogenic and Chondrogenic Differentiation of Bone Marrow Mesenchymal Stem Cells.” Favi works with Dr. Roberto Benson.

Second place went to Wei Wu for his poster “Study of Plastic Deformation of a Wrought AZ31B Magnesium Alloy by in situ Neutron and Synchrotron Microbeam X-ray Diffraction,” featuring his research at the VULCAN engineering materials diffractometer at ORNL’s Spallation Neutron Source (SNS). Wu works with MSE faculty members Dr. Yanfei Gao and Dr. Peter Liaw.

Third place went to Michelle Everett for her poster “Molecular Visualization of CH4–CO2 Solid Solution in Gas Hydrates by Neutron Powder Diffraction,” featuring her research at the POWGEN the SNS neutron powder diffractometer. Everett has since graduated and is now a staff member at the European Spallation Source. As a graduate student, she worked with Dr. Claudia Rawn and Dr. David Kefter.

Camera Foster, working with Dr. Shanfeng Wang, assistant professor, and Mr. Lei Cai, won the undergraduate award for her poster “Enhanced Bone Cell Functions on Poly(ε-caprolactone) Triacrylate Networks Toughened by Incorporating Photo-crosslinkable Polyhedral Oligomeric Silsesquioxane.”

MRS Student Chapter activities

The Materials Research Society (MRS) Student Chapter is in its second year of activity at UT and has been focused on outreach, volunteering, and service to younger students who are looking at materials science and engineering as their target area of research or career.

In spring of 2012, the MRS chapter at UT engaged in an outreach activity at West High School in Knoxville. The chapter sought to create an awareness and interest in materials science with students who, as they prepare to enter their college education, may be deciding upon study in science, technology, and related fields. MRS chapter president Carlos Gonzalez initiated the effort in collaboration with high school teacher Joe Foy. Foy enabled the UT MRS representatives to show off demonstrations and talk to approximately fifteen students who are engaged in AP physics, chemistry, and mathematics classes.

Presenters included Sagar Prasad from chemical engineering; and Vanessa Ramos, Nozomi Shirato, Seth Lawson, Carlos Gonzalez, and Adam Lindsey from materials science and engineering. Topics included areas of research at UT MSE, such as thin film applications, thermoelectric materials, scintillation materials, and metallurgy. Each presenter was allotted fifteen to twenty minutes and engaged the students with demonstrations such as atomic force microscopy, phase transformations in iron alloys, photo voltaic and thermoelectric cells, and oxide growth and scintillator applications and production techniques.

A few members of the MRS student chapter also visited the L&N STEM academy, via coordination with Stephanie Ogden, in order to showcase these same demonstrations illustrating the fundamentals of material science and engineering and how they impact our society. Later on, those same students were able to come visit some of the laboratory spaces in SERR for an INREACH activity. They toured facilities such as the electron microscope and the Scintillation Materials Research Center.

MRS has engaged in campus beautification in front of the Dougherty Building last year and has plans to focus efforts in front of the MSE department’s new home in Ferris Hall this year.

During the 100th engineers day, members of MRS conducted and judged the annual egg-drop competition held in the Min Kao Building, as well as the second consecutive MRS-sponsored food-battery competition.

At the Tomorrow’s Engineers Today event in November 2012, MRS members mentored over twenty high school girls in interactive demonstrations/group activities centered on STEM applications such as structural engineering and alternative energy production and utilization in collaboration with the TN-SCORE.

Carlos Gonzalez and Seth Lawson assisted four students from the L&N STEM academy, via coordination with Stephanie Ogden, in order to showcase these same demonstrations illustrating the fundamentals of material science and engineering and how they impact our society. Later on, those same students were able to come visit some of the laboratory spaces in SERR for an INREACH activity. They toured facilities such as the electron microscope and the Scintillation Materials Research Center.

MRS members organized egg-drop competition for Engineers Day.

Area high-school students participated in the second annual MRS-sponsored food-battery competition during the 100th Engineers Day.

In addition to outreach and volunteer efforts, MRS invited speakers from industry to provide insight into career opportunities. They also set up question-and-answer sessions from organizations such as TVA, the Office of Solid Waste for the City of Knoxville, and Alcoa.
The opening of the Min H. Kao Electrical Engineering and Computer Building in January 2012 and the subsequent relocation of the Department of Electrical Engineering and Computer Science to the new facility was the beginning of a series of moves for several departments that will take place in the coming years.

One of the first relocations was the move of the Department of Materials Science and Engineering from its longtime space in the Dougherty Engineering Building to Ferris Hall in the fall of 2012. The building offers significantly more space to the MSE department.

MSE now has new seminar rooms, an undergraduate lounge, and a large graduate student office commons on the second floor.

“The move to Ferris created a home for all of the personnel in MSE while also providing needed lab space for nuclear engineering,” said Dr. Bill Dunne, associate dean for research and technology. “The MSE undergraduates now have a large work area on the first floor, while the faculty, staff, graduate students, and postdocs share space on the second thru fourth floors. We were able to get the building mostly repainted, change flooring where it was needed, and should even have new windows on the building before the end of 2013. At the same time, in the Dougherty Engineering Building, we have been able to provide more space for MABE and CBE from the office spaces vacated by MSE, so those two departments are now the ones based in that building.”

Additional relocations are planned for the future by the engineering college after the opening of the John D. Tickle Building in 2013. The Department of Civil and Environmental Engineering will move from Perkins Hall to occupy the first four floors of the Tickle building. The Department of Industrial and Systems Engineering will relocate from its space in East Stadium Hall to the fifth floor of the Tickle facility.

Initial planning is also ongoing for a possible third new engineering building to house the Department of Nuclear Engineering and the Jerry E. Stoneking Engage Freshman Engineering Program.

The MSE department faculty, staff, and students are happy to be settled at last.

“There is a common sense of pride among MSE staff and students from having our department name displayed prominently outside our new building,” Sickafus said.
Materials Science and Engineering Graduating Seniors

MSE graduating seniors for 2013. From left: Trevor Pate, Alex Paradies, Nikki Hanold, Michael Stanford, Brett Lewis, Charlie Borenstein, Elijah Barlow, and Brandon Shaver (not pictured: Guoya Jia, Alexandra Rajic, Jeremy Tisdale, Eric White, and Benjamin Wing).