NEW SUPPORT — NEW POSSIBILITIES
ENHANCING THE UNDERGRADUATE LAB EXPERIENCE

THE ENGINEERING COURSE FEE 2013–2014
The engineering course fee has provided the Engineering School with about $2.4 million. These funds were spent as follows: 18 percent for teaching support, 23 percent for materials, 42 percent for equipment, and 17 percent for lab and experiential learning space renovations.
LETTER FROM THE DEAN

Engineers learn by doing. That’s why the engineering course fee approved by the Board of Visitors has been so beneficial. In just two years since the fee was introduced, the Engineering School has made dramatic strides in enhancing the hands-on experiences of our students. Thanks to the fee, we have been able to purchase new equipment, renovate or build new laboratories and recruit additional teaching assistants. Equally important, it has enabled us to make more efficient use of existing facilities and leverage other sources of support.

Taken together, the opportunities created by the engineering course fee have further positioned the University as a leader in hands-on engineering education. Our electrical and computer engineering laboratories are a showcase for simulation tools that give students a systemswide understanding of circuit design. Our Rapid Prototyping Laboratory provides undergraduates with the rare opportunity to design complex objects and see them produced on a state-of-the-art 3-D printer. And our Nanomedicine Engineering Laboratory gives students studying nanomedicine experience analyzing materials with a scanning electron microscope.

By promoting high-impact educational experiences, the engineering course fee — and the differential tuition that is replacing it — is helping to ensure that our students leave the University much better prepared to take on the challenges of the 21st century.

Sincerely,

DEAN JAMES H. AYLOR
Louis T. Rader Professor of Electrical and Computer Engineering
Dean of the School of Engineering and Applied Science
Recognizing that nanotechnology will play a key role in advancing progress in virtually every area of medicine, from drug delivery to tissue engineering, the Engineering School created an undergraduate program in nanomedicine, the first in the nation. Thanks to the engineering course fee, our nanomedicine students have an opportunity to use technology that undergraduates at other institutions only read about. With funds generated by the fee, the School built a state-of-the-art Nanomedicine Engineering Laboratory — including two scanning electron microscopes — that gives students hands-on experience synthesizing, fabricating, characterizing and testing nanoparticles and nanotextured surfaces.
Understanding fundamental processes like distillation is critical to the education of a chemical engineer. When Wilsdorf Hall opened in 2006, space was allocated for a modern distillation column, but it was the introduction of the engineering course fee that allowed the department to make the purchase. Much larger than the previous column and equipped for computerized control and data acquisition, the new distillation column exposes students to the type of equipment that the chemical industry currently uses to prototype new processes. In doing so, it gives them a jump-start on their careers.
With funding from the engineering course fee, the Department of Civil and Environmental Engineering transformed a series of cramped basement rooms and hallways in Thornton Hall into two, attractive multipurpose undergraduate laboratories. The department then outfitted them with new and refurbished tables, stools, lab benches and cabinetry. Because the new labs are easily reconfigurable, they can be used for any of the five undergraduate labs the department teaches each year, increasing facilities utilization and freeing up space for research facilities for new faculty members.
Moving hands-on laboratory experiences to the center of the undergraduate experience is the driving force behind the new high-impact curriculum being implemented by the Department of Electrical and Computer Engineering. With funding from the engineering course fee, the department has purchased a unified suite of simulation tools for its undergraduate laboratories that enable students to readily see how the circuits they design function within a larger system. In addition, the laboratory fee funded the transformation of an outmoded computer lab into a well-equipped student projects lab designed for group work.
Scanning electron microscopes (SEMs) have become a fundamental tool in virtually every field of engineering. Accordingly, the Department of Materials Science and Engineering has devoted funding from the engineering course fee to renovating and expanding the Materials Science Investigation Laboratory, where students gain hands-on experience using SEMs. The department has also drawn on these funds to install a set of more-powerful SEMS in its Nanoscale Materials Characterization Facility. This will give undergraduates the opportunity to conduct more-advanced analyses, as part of their class work or in the course of independent research or senior thesis projects.
Three-dimensional printing has the potential to herald the next industrial revolution. By compressing the time from concept to prototype, it has already accelerated innovation, while setting the stage for dramatic advances in every field from aviation to medicine. Housed in the Department of Mechanical and Aerospace Engineering, the Rapid Prototyping Laboratory gives students firsthand exposure to this transformative process. With funding from the engineering course fee, the School has added a powerful new 3-D printer. Capable of printing an object composed of 14 different materials, the new printer will give students the opportunity to design vastly more-realistic prototypes.
Teaching assistants play a critical role in the education of our undergraduates. They serve as the eyes and ears of faculty members, helping them fine-tune their laboratory courses to ensure all students grasp fundamental concepts. They are equally important as mentors and models, providing undergraduates with guidance and encouragement as they work their way through design projects. By enabling the School to field additional trained teaching assistants, the engineering course fee helps students reap the full benefit of their hands-on experiences.