

College of Arts & Sciences

BACK TO THE FUTURE

I have just returned from Iowa City, where I attended the 5th annual FUTURE in Biomedicine Symposium at the University of Iowa Carver College of Medicine. The Fostering Undergraduate Talent Uniting Research and Education program brings faculty and their students from colleges and universities across Iowa to the University of Iowa for the summer, where they conduct research under the mentorship of College of Medicine faculty.

Drake has participated in this forum for four years—more than any other higher education institution in Iowa. This year I was privileged to see presentations by Adina Kilpatrick, assistant professor of physics, and her student, Amanda Marwitz, a senior double major in biology and BCMB (biochemistry, cell, and molecular biology). Yeah, I know. The frequency of participation in the FUTURES program by Drake faculty and students is evidence not only of their talent (of course) but also of the extent to which the experiential value of research is embedded in our approach to teaching science.

Undergraduate research offers students opportunities they may not find elsewhere. In fact, in each one of our Bachelor of Science degree programs in biology, BCMB, chemistry, computer science, environmental science, mathematics, neuroscience, physics, and psychology, students are required to complete (at least) a research-based capstone project and, as is more often the case, devote research hours during their junior and senior years. Because the college does not have full-time graduate students working in the labs, undergraduates have the opportunity to do *actual* research work themselves or in collaboration with faculty. In fact, it is fairly common for faculty to list students as co-authors on their published articles and presentations, and for students to publish their research findings in journals and present their work at local, regional, and national conferences—with the assistance of the alumni-supported STAR (Student Travel And Research) fund.

THE BIG BANG

The opportunities for student research extend beyond the courses and labs required by our various programs. Students also participate in the Drake University Science Collaborative Institute (DUSCI). Established in 2005, DUSCI promotes a culture of scholarship among students and faculty in science and math, supporting collaborative student/faculty research experiences and providing opportunities to engage the larger community. (Learn more about the program from its current director, John Gitua, in “Commanding Performance” on page 64.)

DUSCI achieves all of this through three special programs:

- **Speakers Series:** The Colloquium Lecture Series brings invited speakers and Drake faculty to campus to share current research and discoveries in science and math. Since 2005, the Series has held 61 events, attended by 4,880 students. The Life After Drake speaker series lets students hear from and interact with alumni who have turned their Drake education into successful careers in science and math.
- **Hands-On Research and Collaboration:** Summer undergraduate research fellowships are the centerpiece of the DUSCI program, allowing students to immerse themselves in their field of study. At this time, six to ten fellowships (\$3,000 stipend each) are funded for students who conduct full-time research in June and July, with students presenting the results of their research at an all-day symposium at the end of each summer. Since 2006, 66 students have served as fellows.
- **Drake University Conference on Undergraduate Research in the Sciences (DUCURS):** Each April, the Conference brings DUSCI participants and other Drake students together to showcase their diverse research to the public. Student-faculty teams showcase their research in oral and poster presentations, and awards are given to top teams. Since 2004, more than 1,260 students have presented research to collaborators in industry, government, and business.



DUCURS brings diverse student research to the public each spring.



For alumni and friends of the Drake University College of Arts and Sciences

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THE NEXT GENERATION

The research environment at Drake supports our teaching-oriented mission, part of which includes engaging with the community and ensuring science literacy not just for our students but also for the college students of tomorrow. Initiatives in STEM (science, technology, engineering, and mathematics) are an important part of this. Drake University is the STEM hub for the south central region of Iowa, responsible for working with businesses, education institutions, nonprofit groups, and others in the region to create greater K-12 student achievement in STEM subjects and a stronger workforce. The programming is vast.

- Drake's Wide World of Science summer camp for middle school students is just one of many examples of how Drake faculty and students engage with area K-12 students and teachers, often in collaboration with local businesses. These camps, while designed and supervised by faculty, are often run by our students—who are sharing their knowledge and learning how to teach others.
- Under the direction of Associate Professor Keith Summerville, Drake University and Metro Waste Authority cosponsor a weeklong, immersive summer camp for high school students to learn how to do field research.
- For the past two summers, Associate Professor Tim Urness and Assistant Professor Eric Manley (computer science) have held the Summer App Camp, a weeklong summer camp on iPod/android app development designed for middle school students.
- Windsor Professor of Chemistry Mark Vitha received three years of funding from the American Chemical Society to support high school students who worked in his lab. Also, the Chemistry Club sponsors Kids in Chemistry activities on the Drake campus, and physics department faculty visit Des Moines area high schools, giving demonstrations and promoting interest in the study of physics.
- And there is that Des Moines landmark, the Drake Municipal Observatory, operated jointly by the City of Des Moines and Drake's Department of Physics and Astronomy under the direction of Charles Nelson, associate professor and chair of physics and astronomy. It is located on the grounds of the Waveland Golf Course and is open to the public during our public night series held each spring, summer, and fall on successive Friday nights.

THE FINAL FRONTIER

So here we are, back to the future, using experiential learning and research to train the next two generations of scientists, teachers, doctors, lab technicians, engineers, and researchers. Why do we place such emphasis on research and experiential learning? Because we know it works. All you need to do is look at the placement—or accomplishment rate—of our recent graduates. Within six months of graduation, 99 percent of the Arts & Sciences class of 2012 had jobs, were enrolled in graduate or professional schools, or were engaged in activities (Teach for America, Peace Corps, etc.) that they saw as pertinent to their career objectives.

Our students' achievement is certainly a consequence of their intelligence and hard work, but I also have to think that the dedication of our faculty and their pedagogy has something to do with it as well. In fact, the evolution in science pedagogy over the years, from lecture-based to active learning, is one of many reasons why we are engaged in renovating and upgrading our science facilities as part of the *distinctlyDrake* campaign. (Learn more about science at Drake in "The Drake Formula" on page 26.)

And here I cannot resist a plug. Drake University has taken a lead in developing innovative, inquiry-based classes and real undergraduate research opportunities. We intend to expand those efforts to provide a more science-literate population. However, as we educate scientists—and the general population—for the 21st century, we are constrained by facilities designed in the 1940s and 1960s. We need more flexible classrooms and labs that can move rapidly from lecture to group work to undergraduate research and that permit us to make the best use of current technology. Thanks to donors Cathy, GR'86, and Steve Lacy; Morgan E. Cline, PH'53; Bill Smith, AS'70; and others, we have renovated key introductory labs in Olin Hall and, more recently, Harvey Ingham 104 (see *distinctlyDrake* Update, page 37); the biochemistry, biophysics, and organic chemistry labs in Harvey Ingham; and added the Cline Atrium between Cline and Harvey Ingham. However, to realize our goal of a distinctive learning environment for science studies, we need a more comprehensive effort to modernize our science facilities.

If you are moved to help us achieve that goal, please feel welcome to contact me or Doug Lampe, the major gift officer for the college.