

FIELD [BY TRACEY L. KELLEY] of DREAMS

Students are thriving in the sciences thanks to a wide range of research projects and hands-on learning experiences available in Drake's College of Arts and Sciences

MANY OF DR. KEITH SUMMERVILLE'S STUDENTS are out standing in the field. Literally.

An assistant professor of environmental science and policy, Summerville has taken to heart the College of Arts and Sciences' dedication to undergraduate research. His students are as likely to find themselves knee-deep in prairie grass monitoring restoration efforts in the field as they are studying the results in a traditional classroom. This hands-on experience, explains Summerville, is a vital part of any education, and the resulting combination of practical research and classroom study offered by the College of Arts and Sciences is what sets Drake apart from its peers.

"Here, undergrads have the choice to invest in practical research for a semester, a year or whatever, and be primed with critical thinking skills that assist with any graduate program or field of work," says Sumerville.

These skills, Summerville says, help instill a sense of independence in students that will





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serve them well — not just during their undergraduate years, but also throughout their lives.

“They can’t be in the middle of a tall grass prairie restoration calling me every five minutes,” he says. “Achieving the independence to make decisions in the field, utilizing the right equipment, identification techniques, the writing; all these things build character.”

LAYERS OF LEARNING

The interactive contact between undergraduate students and full-time faculty is a hallmark of the Drake College of Arts and Sciences experience.

The traditional classroom, while an important tool for providing a base of knowledge, does not allow most students the opportunity to embrace independent thinking and experiential learning. Recognizing this, faculty members strive to flip the traditional classroom upside-down through broad uses of technology and integrative course and experiment design.

Courses like Nutrition and Wellness and The Iowa Environment are team-built. Many faculty-student collaborative experiments in chemistry, mathematics and environmental science and policy were recently selected as models by the American Association of Colleges and Universities for progressive use of bridging scientific knowledge to public policy. One First Year Seminar even has students sharing a residence hall as they examine rhetoric and politics.

And much of Drake’s research involves layers of students, faculty and outside experts in the field. One Drake astronomy project includes researchers from other universities and the National Observatory of Athens, Greece.

When a student’s natural curiosity is combined with this collaborative effort, explains Dean John Burney, it increases confidence, expands critical thinking skills and encourages professional development — all of which provide students with the tools they need to recognize their own interests and shape their futures.

CURIOSITY DRIVEN

Jared Bottcher entered Drake to study biology but not for the reason that many students choose the major.

“I didn’t want to go to med school,” he says. “I wanted to work with marine life and in conservation.”

Now, after a variety of self-directed experiments and a five-month study abroad program in Australia and along the Great Barrier Reef, Bottcher is a double major in biology and environmental science and actively researching fish habitats.

“Because of the experiences extended to me at Drake, I’m one up on many other students from other liberal arts colleges,” Bottcher says. “I’ve actually had time to work

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in my field, which prepares me for the workplace and involves more of my interests.”

Arts and Sciences faculty members encourage action-oriented inquisitiveness at any level. As a first-year student at Drake, Serge Kobsa, AS’03, wanted to know more than how fast to run across University Avenue or where the stairwell is to the dining hall in Olmstead’s basement — he wanted to know what makes us human.

He approached Dr. Brian Sanders, associate professor of psychology, about tackling an advanced upper level research-based course, Biological Basis of Behavior, to aid in his pursuit of the answer to this age-old question.

“Dr. Sanders and my advisor, Dr. Faux, believed in me and gave me a chance as a freshman — something that wouldn’t necessarily have happened at other institutions,” says Kobsa.

Over the next four years, Kobsa and Sanders studied neurobiological mechanisms and the behavior they determine. Kobsa spent a summer at Yale and the University of Connecticut learning new methods to further the joint research effort and presented results at international conferences.

Now in the combined MD/PhD program at

Yale, he credits Sanders and Drake with crafting not only his progressive research techniques, but also the inquisitive, interdisciplinary mind of a scientist.

So does he now know what it is that makes us tick?

“No,” laughs Sanders. “It’s a philosophical question. But results we’ve discovered in our experiments may, in time, explain human behavior.”

Dr. Maria Clapham, professor of psychology, recently traveled with two students to the Midwest Academy of Management in St. Louis,

MO, to present a survey of creativity practices.

These students — undergraduates majoring in industrial and organizational psychology — participated in the presentation by highlighting innovative training techniques to executives.

“Members of that institution were asking our students what graduate program they were in,” Clapham recalls. “The faculty was stunned to discover undergrads doing this level of detailed research.”

OPPORTUNITY KNOCKS

For off-campus opportunities like these, the college often draws support from the Student Travel and Research (STAR) Fund. The Arts and Sciences National Advisory Board created STAR grants last year to provide partial funding for students to make presentations at academic conferences or to take advantage of significant research ventures.

How loud is opportunity knocking? Physics major Mallory Knodel analyzed a solenoid magnet while summering at Stanford. With the help of a STAR grant, she presented her research at a superconductivity conference in Florida. Of the 1,500 attendees, Knodel was one of only 10 undergraduates.

Drake students also realize vital academic publishing goals. Some of Clapham's undergrads are developing a formalized research paper on validity results of divergent thinking using the Runco Ideational Behavior Scale.

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These research opportunities also serve as an enticing recruitment tool. Student Elizabeth Corcoran Hill spent time abroad, studied for two years at Evergreen State College in Washington and authored an Iowa hiking guide.

But when she worked on a bird-binding project with Dr. Thomas Rosburg, associate professor of biology, she became interested in Drake's educational approach.

"I was impressed with his (Rosburg's) dedication to conservation and the incredible work he and Dr. Summerville are doing," she recalls.

As a result, Hill transferred to Drake this fall to work on an ecology degree and to focus on more Drake-led fieldwork in prairie restoration and conservation.

REVAMPING AND RENOVATING

Even if the entire world is a scientific playground, there is still a need for class to settle down indoors. Drake is embarking on an ambitious 10-year, multi-million dollar renovation project for the College of Arts and Sciences. New learning spaces, influenced by National Science Foundation designs, stimulate immediate experimentation. Versatile classroom formations allow for mini-lectures, group work or independent computer modules. A facilities overhaul begins in Olin Hall on biology and psychology laboratories in May 2006.

Upgraded facilities will greatly enhance a strong network of like minds that share in the wonder of the natural world, the humanities and a literal universe of unlimited possibilities.

"Even if some students choose not to pursue a career in the sciences," Burney says, "it is crucial that we help them participate in their development of knowledge through analytical thinking and engagement. These are abilities for life."



Butterflies, riboflavin and galaxies, oh my!

OUT OF THE CLASSROOM AND INTO THE WORLD

THE COLLABORATION OF STUDENTS AND FACULTY in Drake undergraduate research is a primary component of a successful Drake experience. Even more important is to broadcast that research. In the College of Arts and Sciences, both of these endeavors are strongly supported. Within the past couple of years:

- ▶ Approximately 300 mathematics and science students have participated in research with faculty.
- ▶ Faculty obtained 32 external grants to support this research.
- ▶ More than 32 students worked with faculty to publish 95 articles in peer-reviewed journals.
- ▶ An average of 100 students are involved in regional or national science conferences each year.

The college also conducts the Drake University Conference on Undergraduate Research in the Sciences (DUCURS) each April. During this full-day conference, students from biology, chemistry, environmental science, physics and astronomy, psychology and pharmacy collaborate on paper and poster presentations detailing their research.

Students hone their professional presentation skills and "realize they've become experts in their research area. It's a great confidence builder," says Dean John Burney. Featured research at the 2005 event included the efficiency of herbal therapy during cancer; luminosity profiles of galaxies; the human body's uptake and clearance of riboflavin (vitamin B2); variables and applications in fluid flow dynamics; movement behavior of grassland butterflies; ways to improve angiogenesis (the formation of blood vessels); and the effects of certain illicit drugs on rats' performance in mazes.

A university-wide showcase is an innovative concept not widely used for the sciences in the post secondary environment, especially for liberal arts institutions comparable to Drake. While currently a venue for the Drake community to view students' progress, the college hopes to encourage more members from science-related industries to attend DUCURS in the future.