

> Evan Eskew '11 is working in Associate Professor of Biology Mike Dorcas's herpetology lab on "The effects of urbanization on population dynamics in five semi-aquatic turtle populations." Much of Dorcas's students' work is nationally recognized and provides useful data for regional developers and municipal planners.



Bill Giduz

# *The New Face of* Summer Research

A T D A V I D S O N

*Spending summer on campus for research is nothing new for Davidson students and professors. But there is something new under the Davidson sun that's making the college's strong tradition of close, collaborative research grow even stronger.*

BY JOHN SYME '85

> *Kate Wiseman '09 and Associate Professor of English Annie Ingram defined their work as "in-depth study," as they researched representations of flower art as a reflection of social attitudes toward female sexuality in 19th-century periodical literature, such as this image, reprinted with permission from The Huntington Library in San Marino, Calif.*

The fledgling Davidson Research Initiative (DRI), funded by a \$750,000 grant from The Duke Endowment, is in its second season this summer. This innovative program is deepening the possibilities of study, not only in the test tubes and Petri dishes of the life sciences, but in the social sciences and humanities as well.

That breadth of academic perspective is at the heart of what is perhaps most notably unique about DRI: the collaborative spirit of the summer research community that it creates, across disciplines and across campus.

## And They're Off

"The DRI definitely prepared me for graduate study at Duke, and provided me with many opportunities that made me a stronger applicant when applying to graduate schools," said biology major Nick DiLuzio '08, who is heading to Duke's Nicholas School of the Environment and Earth Sciences in the fall.

Last summer, DiLuzio worked with Associate Professor of Biology Mark Stanback '84 as one of the first DRI Summer Research Fellows, investigating the effect of predators on nesting in eastern bluebirds. "This was a nice, compact study, for which Nick could help design the experimental protocol, collect and analyze



data, and come out with solid results," said Stanback.

DiLuzio will soon be submitting his results for publication in an academic journal. Last August, he was one of the few undergraduates to speak at the American Ornithologists' Union in Laramie, Wyo. "Giving a talk to a packed lecture hall with some of the greatest ornithologists in the

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**—Nick DiLuzio '08**

country present was a great experience," he said.

DiLuzio is quick to point out that what he took away from last summer was not just about his work. "DRI also exposed me to research conducted by my peers in areas of physical sciences and social sciences that I would not normally have been exposed to." *(continued)*



> *Halley Brantley '09 and College of Wooster student Brittany Rancour '09, augured for sediment samples at Professor of Classics Michael Toumazou's Athenou Archeological Project in Cyprus, then returned to campus to analyze them with Professor and Chair of Chemistry Ruth Beeston.*

“What can be done, and what cannot be done, and how do we do it?” —Max Win '10

One of those peers was Kealy Devoy '08, an environmental studies major through the Center for Interdisciplinary Studies (CIS) who was also an inaugural DRI Summer Fellow last year.

“We were an experiment,” Devoy said, looking back, “an experiment that worked really well.”

But that was part of the whole point: students and faculty enjoyed charting new territory as a group of like-minded scholars, through project presentations, interdisciplinary lectures, and especially the weekly DRI lunches catering to their scholarly hunger for sharing information—not only about their own specific projects but about the DRI program and the nature of research itself.

Associate Professor of Biology Karen Bernd had a professor's-eye view during the first year. Two of the interdisciplinary discussion topics that remain salient examples for her were ethics and time management. As any Davidson scholar can tell you, those issues are germane to every subject in the college's curriculum—and then some.

“By coming together as a group, these students get to experience the commonality of methods and language across disciplines,” Bernd said. “Because of the academic backgrounds they have from all their courses at Davidson, there is a really interesting cross-fertilization.”

Summertime can provide especially rich opportunities for cross-disciplinary conversation. There is a certain sense of mental serendipity not always available against the full-tilt whirl of the academic year's demanding schedules—not to mention cocurriculars and extracurriculars like tutoring at Ada Jenkins Center, crew practice at dawn, Patterson Court social distractions, lectures and concerts, or even impromptu Wildcat road trips to Detroit, just to name a few....

## Apply Yourself

Great opportunities don't usually come easily, and the chance to spend a summer as a DRI Fellow is no exception. Students with a project in mind start the process by finding a faculty member who is willing and able to serve as a mentor for their summer research. In consultation with their mentor, the student then submits a research proposal and other application materials to program director Verna Case and a faculty committee for review.

Proposals are comprehensive. They must include a detailed research plan; a discussion of the unique and original nature of the research; a description of how the student and mentor will interact throughout the research experience; a budget; and a plan for how the results will be shared—a poster presentation, for example, or publication plans, or both.

Despite that steep hill to climb, the number of applicants for the 20 DRI summer fellowships available this summer increased 57 percent over those submitted for 2007.

“It seems like good news travels fast,” said Case, who, in addition to directing DRI, is Dana Professor and Chair of the



Bill Giduz

## Mimms Summer Research Scholars

When Larry Mimms '76 learned that Davidson professors Malcolm Campbell and Laurie Heyer had collaborated on a textbook, *Genomics, Proteomics, and Bioinformatics*, he ordered it right away. Then he read about Davidson in the *TIME Magazine* story “Who Needs Harvard?” and was inspired to find out more about undergraduate research at his alma mater—and how he might further the cause. After conferring with Campbell and DRI Program Director Verna Case, he decided to fund two Mimms Summer Research Scholars to work under the umbrella of the DRI in 2007.

After meeting the 2007 Mimms Scholars at the DRI poster sessions last September, Mimms decided to endow these summer opportunities, adding two more permanent research fellowships to the DRI.

Mimms, whose Ph.D. is in biochemistry, is president of VDX Corporation, a San Diego biotech firm working on HIV diagnostic products. His son Jared will be joining the Class of 2012.

“For Davidson, the ability to offer a summer research program on campus is a major step forward,” said Mimms. “Performing independent research is a critical part of the learning and maturing process and helps prepare students for tackling real-world problems.” ♦

> (l-r) Last summer, Associate Professor of Biology Chris Paradise and Kealy Devoy '08, now the inaugural Davidson Fellow for Sustainability, studied the effect of greenways on insect populations in adjacent streams.

> (l-r) Karen Hales, associate professor of biology, and Bevin English '08, used genetic analysis in the common fruit fly, *Drosophila melanogaster*, to explore the molecular mechanisms by which mitochondria are moved and shaped in cells.

Biology Department. Case and her departmental assistants worked relentlessly to build the DRI program, and now devote a great deal of time to its administration.

## Upping the Ante

DRI takes the best of Davidson's collaborative research concepts, powerful scholarship, and professorial mentorship and ups the ante with increased freedom and responsibility for the students themselves. Application is rigorous, the financial awards are generous, and the academic opportunities are essentially boundless.

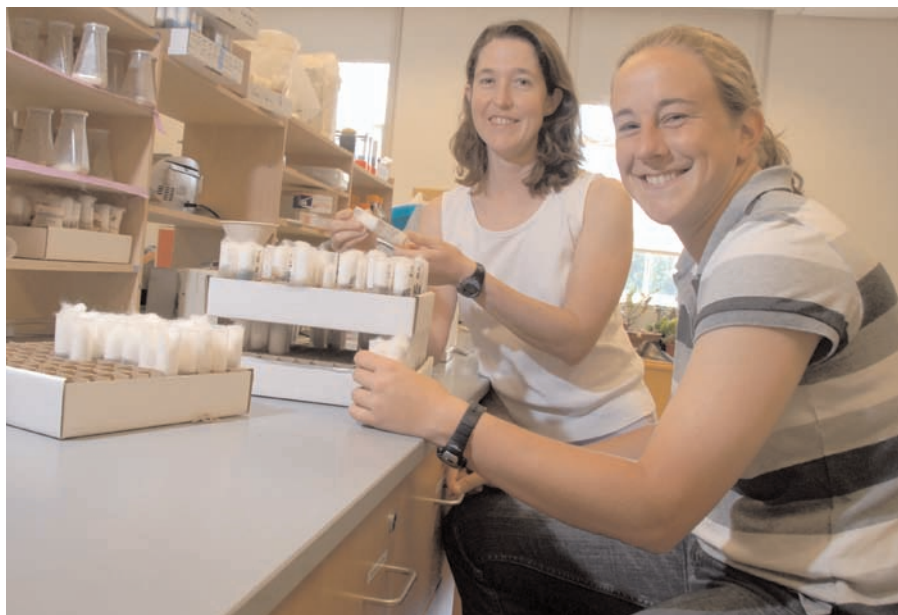
"I really believe this is one of the most generous summer research awards in the United States," said R. Stuart Dickson Professor of Psychology Julio Ramirez, who has two DRI students in neuroscience this summer.

DRI summer research projects to date include work in political science, religion, history, neuroscience, synthetic biology, mathematics, economics, psychology, chemistry, biophysics, genomics, bioinformatics, and English.

English? So just what is the established research process for studying, say, representations of flower art as a reflection of social attitudes toward female sexuality in 19th-century periodical literature?

"There isn't one!" said English major Kate Wiseman '09, who worked with Associate Professor of English Annie Ingram last summer on just that topic.

Wiseman admits to a certain intimidation at first, bringing her literary research on flowers and femininity to a table filled mostly with laboratory scientists. But she wound up feeling quite comfortable contributing to the broader conversation about methods and perspectives. It was worth noting in discussion, for instance, that traditional ideas of scientific replicability aren't always useful in the arts and letters. Study of a single poem, after all, can yield



Bill Giduz

many interpretations.

"It's all about originality," Wiseman said. "Research in the humanities has to be undertaken with a completely different mindset. For one thing, our conclusions are qualitative, not quantitative—meaning that

usually we 'assert' certain claims rather than 'proving' them.... In a strict sense, the arts and humanities are not 'practical'—and that's why I love it so much. It's something that's given us meaning since time untold."

Almost like it's in our DNA.

(continued)

## A Sampling of 2007 and 2008 DRI Summer Research Projects

*Mathematical Modeling of Living Computers*

*Don't Throw Baby (Boomers) Out with the Bathwater: Redefining Older Adulthood in an Integrated Lifespan Concept*

*Is Local Protein Synthesis in Retinal Ganglion Cells Growth Cones Necessary for Axonal Extension?*

*Beyond the Big Stick? A Study of U.S. Policy in Latin America after the Cold War*

*Social and Environmental Enrichment Increases Sensitivity to Cocaine in Female Rats*

*The Study of Ancient Human Activity through Soil Chemistry: Mystery Structure at Malloura*

*Party and Principle: Analysis of Congress Members and the Decision to Go Public*

*The Free Verse Controversy in Little Magazines*

*Modeling Flagella Forces*

*Civil Religion and Presidential Politics*

> (l-r) Professor of Religion Emeritus Max Polley, Kelly Giles '09, and Associate Professor of Psychology Kristi Multhaup bring three generations of scholarship to bear on gerontology, assessing the "use it or lose it" hypothesis of cognitive aging. Polley and his wife Jacquelyn live at The Pines at Davidson retirement community.

## Success Breeds Success

In Davidson's nationally renowned genomics labs, math major Max Win '10 is bringing his expertise this summer to the burgeoning field of synthetic biology. Win's adviser, L.R. King Associate Professor of Mathematics Laurie Heyer, cowrote the first textbook for teaching undergraduate genomics with Malcolm Campbell, professor of biology and James G. Martin Program Director of Genomics. Win echoes their frontier scientific spirit in approaching his own DRI research.

"What can be done, and what cannot be done, and how do we do it?" he asks, launching into an explanation of his project to develop a graphical computer search tool for a registry of standard biological parts. As a DRI/Mimms Research Fellow (see sidebar on p. 6), Win is part of a nine-member international Genetically Engineered Machines (iGEM) team working in the labs at Davidson this summer, with funding from a variety of sources.

"All of this scholarship has produced a synergy with funding," Campbell said.

Indeed the \$1.5-million grant that Davidson received from the Howard Hughes Medical Institute (HHMI) in April is the most recent example of the scale of resources that are supporting Davidson's commitment to research.

In the last 10 years, the number of students working with faculty mentors in the summer has tripled, to more than 60 last summer. Grants came from a variety of sources, including HHMI, the Merck Foundation, the National Institutes of Health, the National Science Foundation, and the college's Kemp and Abernethy funds.

By far the largest recent increases in summer research students are due to DRI.

Sometimes grant writing—which is, after all, a vital part of the research business



Bill Giduz

students are learning—shows up as a grassroots initiative at the student level of a DRI project.

This year, for instance, psychology student Kelly Giles '09 will help inaugurate a long-term study assessing the "use it or lose it" hypothesis of cognitive aging. By spring, Giles had already secured a highly competitive \$500 Sigma Xi grant for software. Giles, Multhaup, and Multhaup's husband, UNC Charlotte Associate Professor of Psychology Mark E. Faust, are collecting data for the study with Michelle Ong, a Mooresville physician.

## Publish and Flourish

Professor of History John Wertheimer's students have been publishing collaborative research on a regular basis as part of a seminar style that has enjoyed popularity and renown since he introduced it in the late '90s.

"DRI opens up new possibilities to that," Wertheimer said. The program's formal structure and attendant rigorous expectations bolster the group study approach by honing individual summer research based on seminar work. Wertheimer also notes that the professor's stipend component is a welcome validation of faculty commitment

to summer collaboration with students.

"That's what I like about Davidson—you can teach the way you want to teach, and I've wanted to teach this way since I got here," he said. "It works for me."

This summer, it will work for two of Wertheimer's students, too, as they venture into South Carolina county courthouses armed with spreadsheets of data dating to 1896 and legal documents from 1914's *Tucker v. Blease* state Supreme Court case. Joe Harvey '09 is looking for documentation of the exemplary damages won in court by black families for lynchings. "No one's covered African American legal actions to show that they were not just passive victims in this play," he said.

Jess Bradshaw '09 is centering her research on a case in which three students were expelled from school in Dalcho, S.C., for having "mixed blood," despite lack of evidence. The S.C. Supreme Court decision had the ironic effect of the founding of a Negro school in the community.

It is a fitting irony a century later that students from historically black colleges and universities are now being invited to apply for DRI Fellowships at Davidson, which holds a commitment to making several slots per year available for such collaboration. Allyson Cobb, a student at North Carolina A&T State University, is

*“My research students are my productivity—and then they go on to win awards.”*

—Michael Dorcas, associate professor of biology

working with Bradshaw this summer, and Gabrielle Jones, from N.C. Central University, is working with Harvey. A total of five students from historically black institutions are DRI Fellows this summer.

## Streams of Consciousness

Associate Professor of Biology Michael Dorcas is proud that his students have successfully competed with graduate students from other institutions to bring home awards for presentations at the Association of Southeastern Biologists.

At one recent symposium, Dorcas said a colleague was complaining that he didn't have time for productive research because of the hindrance of dealing with undergraduate students. Dorcas responded, “My research students *are* my research produc-

tivity,” then thought to himself, “and then they go on to win awards....”

Many research projects contain a community service component that's indicative of the college's commitment to leadership and service. Herpetology students' Reptile Day is perennially popular throughout the region, and developers and town planners make frequent use of Davidson College students' environmental field and stream studies, as well as citizen surveys.

Last summer, Devoy sampled both local stream waters and local public opinion on the environment, working with Associate Professor of Biology Chris Paradise and MacArthur Assistant Professor of Psychology Scott Tonidandel '96. Devoy says her DRI Summer Research Fellowship was one of her best experiences at Davidson.

It is indeed an experiment that has

worked—and one that is both replicable and unique from one summer to the next.

## Digging Deeper

Every Davidson student enjoys the freedom to investigate or explore a topic of special interest, but DRI Summer Fellows also come to understand the power of collaboration, cross-fertilization, and synergy. And the Davidson Research Initiative has taken the college's longstanding emphasis on depth of learning even deeper. When students tell their parents, friends, or high school teachers about the research they are doing over the summer, the most common response is, “Wow!”

“And for the most part,” said Mike Dorcas, “the research we do is comparable to Ph.D.-level research.”

Wow. ♦



Malcolm Campbell

DRI and HHMI summer fellows physically model the graph they were building in DNA to explore the Hamiltonian Path Problem. (clockwise from the top) Andrew Martens '08, Amber Shoecraft from Johnson C. Smith University, Oyinade Adefuye from North Carolina Central University, Associate Professor Laurie Heyer (ducking to represent a stop node), Will DeLoache '09, Mike Waters '10, and Jim Dickson '09.