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feature article

Twenty-five and still going Strong: An inside look at the Hamel Center for Undergraduate Research

—Jacqueline Cordell, *Inquiry* student editor (Editor: Jennifer Lee)

It was an eye-opening experience...my undergraduate research made me feel like part of a larger community at UNH and someone more actively involved in my field as a music researcher. —Christopher Foss '13

Christopher Foss points to Italy, where he will pursue research in summer 2012 supported by an IROP grant.

In 2009 freshman Christopher Foss had little idea that he would participate in undergraduate research at the University of New Hampshire. Play the bassoon, yes. Get involved in musical tutoring, yes. Do independent research related to his instrument, no—not until Associate Professor Robert Haskins advised him to apply for one of the new Research Experience and Apprenticeship Program (REAP) grants from the Hamel Center for Undergraduate Research. Resident artist Janet Polk helped Foss write the successful application and supervised his research during the summer of 2010, when he studied sound changes produced by differently constructed bassoon reeds. Foss continued his research under Polk's guidance the following summer with the help of a Summer Undergraduate Research Fellowship (SURF). While engaged in his research, he met an Italian bassoon reed maker who employed a methodology unknown to him, prompting Foss to apply for (and be awarded) an International Research Opportunities Program (IROP) grant to continue his study of bassoon reeds in Italy during the summer of 2012. There he hopes not only to add to his knowledge of reed-making, but also to visit the fields in France and Italy where the cane used to make bassoon reeds is grown.

During 2012 the Hamel Center for Undergraduate Research celebrates its 25th anniversary of providing advice and funding for undergraduate students in all disciplines to pursue a period of research outside the classroom.

History and Development

The idea for a program at UNH devoted exclusively to undergraduate research surfaced in the mid-1980s, and in 1987 the university hired Dr. Donna Brown as the founding director of the Undergraduate Research Opportunities Program (UROP). Brown drew from a handful of already existing examples at MIT, Caltech, and the University of Delaware to help structure the fledgling program. Brown and the director of the University Honors Program, Robert Mennel, envisioned an open, multi-disciplinary program for students of all academic disciplines and research interests in a university-wide setting of intellectual inquiry. "We wanted to create a climate where we could encourage as many students as possible to get involved in undergraduate research," she said.

Over the years a variety of different awards have been created for students at different stages in their education wishing to pursue research at home or abroad. In spring of 1987 the first awards were given: five Undergraduate Research Awards (URAs) went to five students to conduct research during the academic year. The types of awards quickly expanded to include summer research: the Summer Undergraduate Research Fellowship (SURF) for projects in the U.S. was created in 1988, the SURF Abroad in 1994, the International Research Opportunities Program (IROP) award in 1997, and most recently the Research Experience and Apprenticeship Program (REAP), the first summer research grant available to freshmen, in 2007. The Hamel Center also offers smaller awards for specific purposes and sponsors credit-bearing research courses (INCO 590 and 790).

Adam Marquis gathering soil samples at one of his 32 sites in southern New Hampshire, 2005.

The variety of awards available is reflected in the variety and locations of the research. SURF awards funded on-campus research for Amy Ma ’12, an occupational therapy major, for a comparative analysis of different treatments of hand injuries; and for physics major Daniel Foley ’12 to find an improved method of producing tips for scanning tunneling microscopes. REAPs have been awarded for investigations on campus into the science of cheese-making and into bibliographic information for an atlas of Ancient Rome. North of campus, a REAP award funded Emily Spognardi’s ’14 participation in a White Mountains research project investigating the use of radio telemetry to locate bears and martens. SURF Abroad and IROP awards have taken UNH undergraduates as far away as Russia, Belize, Ghana and Australia for a wide variety of research subjects, such as sustainable practices of an eco-resort, the role of antioxidants in the aging process, Russian-American collaboration on railroads, and determining the health of fish populations.

The student researchers themselves bring a variety of experiences with them. Adam Marquis ’12, a wildlife and conservation biology major, spent two years in the U.S. Army before enrolling as a non-traditional student at UNH. He used this experience in his SURF-funded research into the effects of stream and landscape characteristics on salamander populations in southern New Hampshire. “I feel,” he said, “as though the discipline and skills I learned while in the Army, especially learning to do things systematically, helped prepare me for field research.”

Personal and Professional Benefits of Research

The whole process is a complete educational experience... right from the beginning.
—Founding director, Donna Brown

The benefits of conducting research are manifold and not just academic in nature. In the eyes of the Hamel Center, research is worthwhile even if the student does not intend to pursue the subject beyond the undergraduate level. The experience of performing research, Brown claims, gives students the opportunity to learn many crucial skills, such as independent thinking and critical judgment, clear and cogent communication, and effective problem solving. In addition, all students, no matter what their subject, learn that researchers have to be flexible and prepared for the unexpected. Brown tells the story of a student conducting oral history interviews with an African tribe who had to ask the Hamel Center to approve an unexpected cost: the price of a goat. According to local custom, the gift of the goat was expected when paying a visit to the tribal leader. (The researcher got the extra money.)

Many students, however, do choose to use undergraduate research as a stepping stone to graduate school and their careers—and often with great success. David Noblet ’05, a 2004 IROP recipient, conducted research on computer science in France and co-authored an article with his international faculty mentor that was published in a leading journal of the discipline. Upon graduation from UNH, Noblet received a prestigious fellowship to Caltech, given not only to just one student but to one student every three years. He feels that his undergraduate research definitely was a plus in his application for the fellowship.

Hamel Center award recipients Brian McConnell ’13 and Gina Chaput ’13 have also had their undergraduate research financially recognized. In the fall of 2011 they, in collaboration with their mentor Professor Ihab Farag, won a fellowship from the U.S. Environmental Protection Agency’s National Center for Environmental Research for their work on algae as a feedstock for the production of biodiesel. The award gave the pair nearly $50,000 in academic and internship-related support, aid that will allow McConnell and Chaput to continue their research.

Brown says that, for her, seeing the benefits research has for the students remains the most satisfying part of the entire program: “We like to motivate students to challenge themselves beyond their own expectations, to set them on a completely different trajectory, [and] to provide an opportunity for exceptional students to rise to their full potential.”

Staff, Faculty and Finances

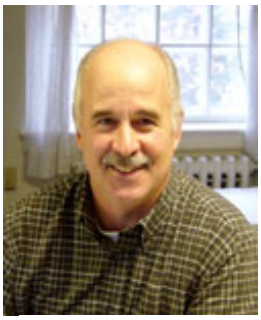
The Hamel Center staff provides many services to aspiring researchers: they help students find faculty mentors and write grant applications; they organize multi-disciplinary teams of faculty to evaluate the applications; and they support awardees during their grant periods both domestic and foreign.

When Brown retired in 2010 after 23 years, Dr. Paul Tsang became Hamel Center’s first faculty director. He is a professor in the Department of Molecular, Cellular, and Biomedical Sciences and specializes in reproductive physiology. An active researcher himself, he encourages students in his classes and lab to seek Hamel Center funding, and has mentored many students through their undergraduate careers. Having participated in undergraduate research as a student at Cornell, Tsang feels that his experiences had a significant impact on his life: “I enjoyed my research as an undergraduate, and later that spurred me to become a mentor for undergraduate students.” Tsang’s desire to perpetuate undergraduate research is part of a “generational” professional phenomenon occurring on college campuses everywhere: incoming faculty who did undergraduate research themselves in turn encourage their students to do the same.

Former director Donna Brown (left), administrative director Molly Doyle (center), and faculty director Paul Tsang (right) in the Hamel Center office.

Dr. Molly Doyle, the Hamel Center’s first administrative director, oversees daily operations and manages its operating budget and twenty different endowment funds. In addition, Doyle spends a large amount of time advising applicants individually and in grant-writing workshops. Her efforts are aided by Dr. Georgeann Murphy, international research coordinator and affiliate associate professor in the English department. Murphy depicts herself as a “happy matchmaker” between students and faculty mentors, and between students and donors. Under her supervision the IROP program, first of its kind in the nation, sends undergraduate researchers to sites around the world between their junior and senior years. She helps students develop proposals, stays in communication with the awardees over the summer in their different foreign countries, and organizes the IROP symposium in the fall.

Dr. Georgeann Murphy, coordinator of the IROP program.



Peter Akerman welcomes you to the Hamel Center for Undergraduate Research.

Peter Akerman, senior administrative assistant since 2004, is the one-man support system for the rest of the Hamel Center staff. He keeps track of students, their proposals and reports; and arranges for travel, the dispensation of money, meetings and anything else students or their faculty mentors might need.

Akerman and the entire staff are very aware of the important roles faculty play in the Hamel Center programs. Most students in the programs got involved as a direct result of faculty advertising in the classroom or encouragement during office hours. Each student applicant must have a faculty mentor, and Akerman emphasizes the importance of these mentors in the research process from application to final results: "The mentors play a huge role in the students' undergraduate research experience …They shape the research and guide the students through it. Without them, we wouldn't have research; it just wouldn't work." Brown agrees and notes that a research project fundamentally changes the dynamics between student and professor so that "they become collaborators; their relationship becomes more equal as they form a research team and learn from each other."

Award stipends have risen progressively in accordance with inflation rates and the increased cost of living, making the fellowships viable options rather than summer jobs for UNH students. However, maintaining a competitive level of funding leaves the undergraduate research program with a problem that plagues almost all academic programs: finances.

In the early years of UROP all program costs, both administrative and grants, were supported by Academic Affairs via the University Honors Program. In the early 1990s, in response to increased demand for research support from faculty and students, UROP began to work with the UNH Foundation to raise endowment monies. Currently, 100% of the funding for undergraduate research awards and fellowships comes from donor gifts. These contributions have sustained the program even through times of economic uncertainty, although program administrators are quick to point out that growth will require more funds: "The costs of research increase each year," notes Tsang, "and the number of applications from students still far exceeds the amount of funding available, so we hope to continue to grow our programs while also keeping them financially competitive."

In 2004, the Hamel family, led by Mr. Dana Hamel and his wife Kathryn, provided a generous endowment to what was then the Center for Undergraduate Research. In 2006 the Center was named the Hamel Center for Undergraduate Research in their honor. The Hamels are among the many donors who provide the much needed funds for the program to flourish and provide support for a greater number of student researchers. Today, an average of 250 students participates in Hamel Center programs each year. The Hamel endowment also provided for the support of *Inquiry*, the undergraduate research journal, whose first annual issue appeared in 2005.

Undergraduate Research Conference and Beyond

All SURF and IROP awardees are required to present their research results "in an appropriate forum," and many do so at the university-wide Undergraduate Research Conference (URC) held every April. Entering its thirteenth year in 2012, the URC allows students to present their research experiences and findings in an atmosphere of academic inquiry surrounded by supportive peers and faculty members. Adam Marquis, even though he expressed reservations about presenting his research for the first time in front of a large group, remained upbeat: "I'll admit I'm more nervous about [presenting] than I was about doing the actual research… it will be the first time I've presented results of my own research in a format like that, but I'm expecting it will go well."

Tyler Burks points to Holland where he did his IROP research in 2011 on antibody responses in poultry.

Senior Tyler Burks ’12, on the other hand, genuinely enjoys talking to people about his research, which combines science, engineering and fine art in such subjects as poultry immunology and woodworking. Leonardo da Vinci, not surprisingly, is his inspiration. When talking about his undergraduate research—at a conference or over coffee—Burks’ very being hums with enthusiasm for his work and passion for his ideas.

It is this passion for and dedication to academic inquiry that assures the future of UNH’s undergraduate research program. Tsang equals this passion with his own, voicing optimism in the continued growth and development of the program. “Undergraduate research is a pretty hot commodity these days,” he smiles, due in part to the number of opportunities available to students who come seeking experiences beyond the classroom. After pointing out the proximity of the Hamel Center for Undergraduate Research, the Honors Program, the Center for International Education, and the Fellowships office—all located on the second floor of Hood House—Tsang unveils the collective vision of the Hood II programs and of Lisa MacFarlane, senior vice provost for academic affairs: “One of the things we would like to do is to create even stronger ties between programs so that when a student lands on this floor, that student will hopefully see that a lot of us are interconnected and come back and apply for fellowships, research support, study abroad and for the other opportunities we offer.”

While supported by faculty and staff throughout the entire process, these undergraduate researchers conduct their work independently, in settings other than their familiar classrooms. Their research may take them to work just the other side of campus in a lab, to hiking through the woods of New Hampshire, or to interviewing residents of other New England states. Some will find themselves in faraway places such as Russia or Ghana, surrounded by different cultures and languages. They will learn much from these environments as well as from their research projects and gain knowledge about themselves they could not have found in a classroom.

For Chris Foss, who changed his major from music education to music performance as a result of his research, the learning process is everything: “Undergraduate research has been the most rewarding experience of my time at UNH. I’ve learned to uncover new information and be in charge of my own education—because once I leave these walls, that’s what’s going to matter.”

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Author Bio

*When **Jacqueline Cordell** is not slicing up the competition on the fencing strip or swinging on the dance floor, she may be found simply enjoying one of her beloved Victorian novels. A graduating senior from Bedford, New Hampshire, Jacqueline is an English literature and linguistics double major who intends to study Old English and British literature in graduate school with the hopes of becoming a university professor. Jacqueline came to the University of New Hampshire because of her familiarity with the students and campus, and she has taken full advantage of the opportunities she has discovered. A University Honors Program student, she has spent her summers doing undergraduate research in collaboration with faculty from the English Department. This year she joined Inquiry in order to see what the last steps of the research process, the editing and publishing components, are all about.*