Initiatives Help Students Complete the Ph.D.

Attrition is as high as 50 percent in some doctoral programs according to findings of the Council of Graduate Schools (CGS). Women and minorities are less likely than white males and international students to complete their degree programs within ten years. To find out why and to develop effective ways to retain students, CGS established the Ph.D. Completion Project (http://www.phdcompletion.org) funded by Pfizer Inc. and the Ford Foundation. The Project gave funding to a total of 29 universities to address needs of students working toward doctoral degrees in the sciences, engineering, mathematics, humanities, and social sciences; develop interventions; and assess results.

MSU was one of eight new universities to receive grants in the second phase of the seven-year project. Karen Klomparens, Dean of the Graduate School, and Judith Stoddart, Assistant Dean in the Graduate School and Professor of English, are co-PIs, with Stoddart serving as the project director.

“Last year we collected baseline data from MSU’s doctoral programs,” Stoddart says. In September, CGS published Ph.D. Completion and Attrition: Analysis of Baseline Demographic Data from the Ph.D. Completion Project, a monograph examining the data from 24 institutions on seven- and ten-year completion rates by demographic characteristics and disciplinary areas.

Now in its final year, MSU’s Ph.D. Completion Project grant is beginning to support interventions. “We think we know what points in the doctoral education process are likely to be most open to interventions that will improve completion outcomes,” Klomparens says. “We also have ideas about what those interventions should be.”

“Doctoral education is a complex system with multiple inputs and outcomes and dynamic processes; it is impacted by systems delays that complicate our understanding between inputs + processes and desired outcomes,” Klomparens and Stoddart wrote in their proposal to CGS. The project they proposed addresses such questions as:

Graduate School Externally-Sponsored Projects

In the late 1990s, the Graduate School received funds from the U.S. Department of Education’s Fund for the Improvement of Post-Secondary Education (FIPSE) and the William and Flora Hewlett Foundation for the development of a program on conflict resolution in graduate education. Earlier this year, the Council of Graduate Schools published a monograph on Setting Expectations and Resolving Conflicts in Graduate Education, a summary of that funded project. We are currently conducting “train-the-trainer” programs for graduate deans in North America, so others can provide the workshops on their own campuses.

Current externally-sponsored and funded projects are:

Ph.D. Completion Project. Council of Graduate Schools, Pfizer, and the Ford Foundation. 2006-07 through 2009-10. $80,000. IRB# 07 667.

Responsible Conduct of Research and Scholarly Integrity. Council of Graduate Schools and PHS Office of Research Integrity (with Penn State and U Wisconsin, Madison). 2008-09 - 2009-10. $25,000. IRB pending.


Center for the Integration of Research, Teaching, and Learning (CIRTL). NSF (Univ. of Wisconsin, Madison is the lead). Initial grant: 2003-08; Continuation grant: 2008-2010. $222,500 (MSU’s share from NSF).

Each project has a goal to enhance graduate education, but does so in unique ways. There are many participating graduate programs (see the text boxes in each article) and several have “spin-off” projects that expand the reach to more graduate programs and students.
• Are interventions, like conflict resolution and career and professional development programs, more successful at the program or the university level?
• How do we know?
• What factors in which disciplines can predict which doctoral students will complete their programs?

“We’re working with eleven MSU departments that have been active in national discussions of doctoral education,” Stoddart notes (see below). Many have already implemented changes in program requirements, comprehensive exams, and professional development opportunities for their students, including teaching skills. Some have modified recruitment and admissions processes.

“These kinds of research projects can only be successful with the participation of the graduate programs,” she adds. “We appreciate the enthusiastic commitment of faculty and especially of graduate program directors and graduate secretaries to this project.”

A look at where problems might be and what to do about them led to dissertation writing as a prime area for interventions. “In some disciplines students write their dissertations with minimal interaction with their advisors until the dissertation is well along,” Stoddart notes. “In other disciplines, students and faculty interact frequently during the writing process. Is there a way to combine the strengths of both approaches?” she wonders.

This year, four MSU doctoral programs is focusing on writing projects, using a variety of approaches and covering topics such as how to analyze professional articles and the norms for professional writing:

• The Department of English is offering a year-long series of workshops.
• The Department of History provided summer grants for specific research projects with writing and submitting an external grant proposal as one of the requirements.
• The Neuroscience Program is offering a new graduate level course on writing.
• The Department of Sociology, the Department of English, and the Neuroscience Program will collaborate with the MSU Writing Center to develop a project focused on comprehensive exams. Graduate students from each program learn to be writing facilitators, leading groups of students who are preparing for their exams to analyze norms of argumentation and practice literature review techniques in their fields.

Departments are also looking into services that the Writing Center (http://writing.msu.edu/) offers for doctoral students. The service trains students as facilitators to consult with writers at all stages of writing from organizing content to evaluating effectiveness of the language.

Other projects under way this year address:

• Annual graduate student evaluations. “Departments want the annual evaluation to be more meaningful;” Stoddart says. “It’s an opportunity to engage students more, to communicate about issues that may be causing problems, and to help students move toward completing degree requirements.”
• Lab rotations. “Departments like Plant Biology, Microbiology and Molecular Genetics, and Pharmacology and Toxicology draw students from other disciplines for short rotations,” Stoddart explains. Those departments are looking at their procedures for helping students find

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**Partner Departments/Programs**

Chemistry  
Electrical and Computer Engineering  
English  
Genetics  
History  
Microbiology and Molecular Genetics  
Neuroscience  
Pharmacology and Toxicology  
Philosophy  
Plant Biology  
Sociology  

Eight of these are also involved in National Science Foundation (NSF) Alliances for Graduate Education and the Professoriate (AGEP) programs (http://www.msu.edu/user/gradschl/agep.htm)  

Seven are part of the NSF-funded Center for the Integration of Research, Teaching, and Learning (CIRTL) (http://www.cirtl.net)  

Four were in the now-completed Carnegie Initiative on the Doctorate program (http://www.carnegiefoundation.org/programs/index.asp?key=29)  

One (Electrical and Computer Engineering) participates in the Sloan Engineering Scholars Program.
advisors for their rotations for better integration into the graduate program.

- Certification-in-college-teaching program. “We’re trying a different approach to this program this year,” Stoddart says. In the past, students moved through the process individually; this year a cohort of 38 students from a mix of disciplines is going through together. Last fall they focused on their mentored teaching project; this spring they are developing their teaching portfolios. http://grad.msu.edu/teaching.htm

- PREP workshops. “We planned to spin these professional development programs off in discipline-specific versions,” Stoddart says. But focus groups with students revealed that they like participating in the programs with peers from a variety of disciplines. The Graduate School will offer the programs as a two-day intensive experience in Summer 2009. http://grad.msu.edu/prep/

- Admissions procedures. “We’re looking at completion rates for students admitted from 1996 to 2001 and whether there are correlations with the admissions requirements and procedures in place at the time,” Stoddart says. To determine if admissions procedures should be modified, they are exploring what connection, if any, exists between completion outcomes and grade point averages, test scores, previous research and professional experiences, type of undergraduate institution, and recommendations.

Not all of the ideas are new. “What we haven’t done before,” Stoddart says, “is measure the success of particular interventions at various points and assess whether those interventions transfer between disciplines and demographic groups.” Assessments will be different for each intervention. “The assessment may be qualitative, at least at first,” she adds, “but we’ll do longer-term evaluations to follow students who have experienced these interventions.”

“Research on graduate education is part of the mission of the Graduate School,” Klomparens says. “This project will result in publications that will contribute to the national discussion of these issues as well as assist our faculty to help their doctoral students achieve their degrees.”

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**Grant Seeds Program for Postdocs**

MSU’s Graduate School, in partnership with the Vice President for Research and Graduate Studies and the Provost, opened an Office for Postdoctoral Training (http://grad.msu.edu/pda/index.htm) last January to formalize professional development and mentoring support for these researchers. Tony Nunez, Associate Dean of the Graduate School, and Estelle McGroarty, Assistant Vice President for Research and Graduate Studies, provide leadership.

The National Postdoctoral Association awarded MSU seed funding last fall to stimulate the initiation of new Responsible Conduct of Research (RCR) programs designed especially for postdocs. Terry May, Faculty Conflict of Interest Information Officer, proposed working with MSU’s new Office for Postdoctoral Training to recruit 30 postdocs from MSU’s life sciences departments to attend three of the RCR workshops (http://grad.msu.edu/all/respconduct.htm) offered by the Graduate School and the Office of the Vice President for Research and Graduate Studies:

- Maintaining a Productive and Responsive Environment for Conducting Research (October 15)
- Personal Responsibility in Conducting Research and Advancing Your Career (January 15)
- Objectivity and Conflicting Interests in Research (February 18)

Of the series, these are the sessions that were applicable to all researchers, May says.

Following each of the three sessions, May and Dean Klomparens met with the postdocs over dinner to continue discussions. “We want to learn what our postdocs understand about RCR issues and what they see as the most immediate challenges they face currently in their careers,” May says. “Our goal is to involve them in developing a strategy that will be responsive to their needs and fostering an environment where responsible research practices are discussed and highly valued.”

Postdocs interested in attending future RCR workshops and follow-up dinners should e-mail their interest to gradwrsp@msu.edu.
Polls of graduate students attending responsible conduct of research (RCR) workshops from 2006 to 2008 indicate that they understand the risks to their careers for reporting colleagues who may violate research integrity guidelines. While the majority express confidence in the integrity of their departments and graduate programs, concerns expressed by others cannot be ignored.

“Questionable research practices have consequences,” says Karen Klomparens, Dean of the Graduate School citing their potential impact on the quality of the students’ research and the longer-term implications of the values and habits they develop and carry into their future roles as faculty members.

Kломparens, along with Eva Pell, Senior Vice President for Research and Dean of the Graduate School at Pennsylvania State University (PSU) and members of the Graduate School at the University of Wisconsin-Madison (UW), proposed a cooperative effort to assess—and implement a plan for improving—the climate for scholarly integrity in graduate programs at their universities. This effort is funded by the Council of Graduate Schools’ (CGS) Project for Scholarly Integrity (http://www.cgsnet.org/portals/0/pdf/N_pr_PSIawards0109.pdf). The Office of Research Integrity in the U.S. Dept. of Health and Human Services funded the CGS program to develop exemplars for graduate schools everywhere.

“All three of our universities have programs focused on education, instruction, and training in responsible conduct of research,” Klomparens says (see Research Integrity Activities at MSU on the next page). “We submitted this proposal to look for ways to energize and enhance our local activities and broaden the understanding of scholarly integrity.”

The collaboration begins in Spring 2009 with each university conducting an inventory of RCR activities using an assessment form developed by CGS and modified by MSU’s Research Integrity Council (RIC). The inventory will begin in 22 disciplinary and interdisciplinary programs in the behavioral and biological sciences at the institutions—ten at MSU (right), eight at PSU, and four at UW. In year two of the project, they will repeat the inventory to document progress and change. “We greatly appreciate the willingness of our graduate program partners to participate,” Klomparens says. “Without them we couldn’t proceed. We hope to partner with the RIC and eventually include all MSU graduate programs.”

Kломparens and Pell—who co-lead the collaboration—will assist in adapting the Uniform Research Integrity Climate Assessment (U-RICA) for use in graduate programs broadly.1 Designed for use in academic health centers, U-RICA is based on research of Carol Thrush, Assistant Professor at the University of Arkansas for Medical Sciences, and is being refined with the cooperation of Brian Martinson, Senior Research Investigator at HealthPartners Research Foundation.1,2 Martinson and Thrush agreed to consult with Klomparens and Pell to adapt the survey for general use.

Because graduate education exists in an integrated scholarly environment, the investigators plan to survey faculty, postdoctoral trainees, technicians, and undergraduates, as well as graduate students, about their perceptions of the climate for research integrity in their department or graduate program. Klomparens and Pell are committed to sharing and discussing general survey results with program directors, department chairs, and academic deans in the surveyed areas. The data and the discussions with these stakeholders will guide their collective approach to RCR educational improvements. Surveys like these can

reveal some insights about the climate for scholarly integrity or divergent opinions about responsible conduct of research issues, Klomparens notes. “We want to have open and honest discussion about these issues and efforts for encouraging a broad understanding of scholarly integrity.”

Kломparens and Pell aim to enhance scholarly integrity on their campuses. “We recognize our pivotal responsibility in fostering and sustaining environments that promote integrity in research and scholarly pursuits across multiple levels, and for encouraging department and interdisciplinary graduate programs, as well as individual laboratories and graduate committees, to take local leadership of these initiatives,” the investigators wrote in their proposal.

In addition to their collaborative efforts, each institution will independently design, implement, and assess projects based on their own needs and strategic plans.

At MSU, Klomparens and co-investigators Terry May, Faculty Conflict of Interest Information Officer, and Stephanie Watts, Professor of Pharmacology and Toxicology and Chair of the MSU Research Integrity Council, will analyze graduate handbooks, focusing on the section, “Departmental Policies: Integrity and Safety in Research and Creative Activities.”

In addition, the Research Integrity Council (RIC) was asked to recommend a set of principles regarding integrity in research and academic scholarship and guidelines for RCR education, instruction, and training parallel to the guidelines developed in 2004 by the Research Mentoring Task Force. RIC also will be asked to develop a “Needs Statement” for affirmative education in responsible conduct of research and creative activities. The University Graduate Council will engage in these discussions as well. The CGS inventory and the U-RICA climate survey will serve as tools to assess the effectiveness of actions taken.

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### Research Integrity Activities at MSU

At MSU, training is already mandatory for anyone who works with human or animal subjects or for chemical, radiation, and biological safety. These education programs primarily address compliance with federal regulations. MSU has already taken a number of steps to go beyond “just compliance”.

In 1998 the Graduate School, with support of the Office of the Vice President for Research and Graduate Studies (OVPRGS), began an annual series of RCR workshops that stress responsibility of researchers and are intended to complement discipline-specific programs (http://grad.msu.edu/all/respconduct.htm).

In 2003, a task force of faculty and graduate students, chaired by the late Hans Kende, National Academy of Sciences member and MSU Distinguished Professor of Plant Biology, established a foundation for broader education on responsible conduct of research in their Guidelines for Graduate Student Advising and Mentoring Relationships and Guidelines for Integrity in Research and Creative Activities. The task force recommended that these guidelines become part of all handbooks for graduate students, and in early 2004 the University Graduate Council endorsed that recommendation. MSU’s Faculty and Academic Councils both approved the recommendations. Over the next year, the Graduate School reviewed all graduate handbooks to assure that the recommendations were met. Subsequent polls of graduate students indicate that they receive the handbooks but that faculty aren’t always explicit about the underlying scholarly integrity issues the guidelines address.

Last year, the Graduate School and the OVPRGS initiated the Hans Kende Memorial Lecture Series on Integrity and Mentoring in Research with presentations by nationally recognized experts on RCR. A Research Integrity Council was appointed by Vice President Gray and Provost Wilcox to “assess our status and continue our collective commitment to fostering an environment where responsible conduct in research is valued and protected.”
Program Helps Graduate and Undergraduate Students Learn Together

MSU’s new Residential College in the Arts and Humanities (RCAH) is designed as a place for undergraduates to learn. But graduate students are learning some things there, too. As part of the program originated by the Carnegie Academy for the Scholarship of Teaching and Learning (CASTL), the graduate students are developing projects that will help them advance their teaching skills and apply scholarship to their teaching methods. http://grad.msu.edu/castl/

RCAH provides a structure for an interdisciplinary arts and humanities curriculum, says Dean Stephen Esquith. “No single discipline can provide a full perspective on the complex, rapidly changing world our students will function in. And no one method of learning will be effective for all students and all subjects.” So, in addition to a structured interdisciplinary core curriculum, RCAH offers maximum student-faculty contact and informal learning opportunities in co-curricular activities, spontaneous events, and impromptu discussions. The college also requires creative experiences, civic engagement, and proficiency in a language other than the students’ native one.

CASTL Fellows help RCAH Reach Those Goals

MSU’s proposal to the CASTL Leadership Program in 2006 outlined a plan that included fellowships for doctoral students to become scholars of teaching, learning, and engagement and then to carry what they learned into the residential college environment to mentor the undergraduates there. Ten fellows began in the program in spring semester 2007. RCAH opened its doors the following fall. A second cohort of CASTL fellows (including some from the first year) was named for the 2007-08 academic year, and a third cohort is now working with RCAH students and faculty for 2008-09.

The fellows come from a range of disciplines with interests in languages, aesthetics, music, drama, education, political science, and geography. The first group helped design the RCAH curriculum; last year and this year the fellows are part of it.

Graduate students want to learn to be good teachers, says Judith Stoddart, Assistant Dean in the Graduate School and Professor of English. They’re eager for the professional development programs she organizes as part of her appointment in the Graduate School. “We fill workshops and seminars with more than a hundred students and still have waiting lists for the programs,” she says.

Mark Sullivan, Associate Professor in RCAH and the College of Music, leads the CASTL program this year. The fellows and the faculty on the CASTL advisory committee meet every other week to talk about teaching and learning. They read and discuss scholarly articles on pedagogy theory, ethical issues surrounding classroom practice, and the ways undergraduates and adults learn, drawing from psychology and neuroscience. They explore models of best practices and ways to assess whether students are learning what teachers think they’re teaching.

CASTL Fellows focus on RCAH co-curricular activities, Sullivan says. They don’t have responsibility for classroom instruction. Working with RCAH faculty and students, they design projects to meet the out-of-classroom goals of the college. The CASTL Fellows then apply what they’ve learned about teaching and learning to assess the educational success of the project.

Projects under way in the first three years of the collaboration between RCAH and CASTL fellows include:

- The Building Stories Project, where people involved in developing RCAH record their experiences to document the story of the college itself. RCAH students interviewed workers who helped create the college and then worked with CASTL Fellows to organize existing material, add new material, and present their findings. The project involved about 40 undergraduates, four CASTL Fellows, and two faculty members.

- A 21st Century Chautauqua, cosponsored by the Association of American Colleges and Universities Core Commitments program, which engaged RCAH students and CASTL Fellows with students from James Madison and Lyman Briggs Colleges in dialogues about personal and social responsibility. Together they are honing skills for discussing difficult questions relating to the rights and responsibilities of campus values like freedom of inquiry. The process will include creating a structure for institutional dialogues and developing curricular and co-curricular projects reflecting ideas agreed on in the dialogues.

- The Center for Poetry, where student and faculty poets share their work with each other and also in the
Cross Institutional Alliances Help Develop Community of Future Faculty

On the first Thursday of each month, a group of graduate students gather to eat and talk to each other—and sometimes to faculty mentors and department chairs—about the research they’re conducting. Their presentations are brief and informal (no PowerPoint slides allowed!) and geared for people in all disciplines. The students are part of the NSF-funded Alliance for Graduate Education and the Professoriate (AGEP). Tony Nunez, Professor of Psychology and Associate Dean in the Graduate School, and Julius Jackson, Professor of Microbiology and Molecular Genetics and Assistant Dean in the Graduate School, lead the program at MSU. Marcus Coleman, a graduate student completing an M.S. degree in Agricultural, Food, and Resource Economics, is program manager.

The idea for the monthly presentations was Jackson’s. “The students get acquainted, and because they come from a range of disciplines, they learn to talk about their research to people in other fields,” he says. “This will be a valuable skill as they move into faculty positions.” And that’s the “Professoriate” part of the program: one of the AGEP goals is to encourage graduate students to go on to faculty careers.

At the end of spring 2007, the University Office of Outreach and Engagement, which had been selected to assess the program, informally interviewed members of the first cohort of CASTL Fellows. Since RCAH didn’t begin until the following fall, those fellows hadn’t been able to work with the faculty and students there. Some fellows felt they needed more guidance in developing and carrying out a project on the scholarship of teaching and learning. “The assessment team will ask the current cohort the same questions,” Sullivan says. “We’ll learn whether the changes we instituted this year have made a difference.”

NSF’s primary goals for AGEP are to increase the number of underrepresented U.S. minorities earning graduate degrees in the program’s disciplinary emphases and to enhance the students’ preparation for faculty positions.

MSU has two grants from the National Science Foundation (NSF) to fund the AGEP program. One is for recruiting and retaining domestic students in STEM disciplines: science, technology, engineering, and mathematics. The other covers social, behavioral, and economic sciences (SBE). Both grants are to alliances of universities. The STEM alliance includes MSU, the University of Michigan (UM), Wayne State University (WSU), and Western Michigan University; SBE alliance members are City University of New York, MSU, UM, and WSU.

NSF’s primary goals for AGEP are to increase the number of underrepresented U.S. minorities earning graduate degrees in the program’s disciplinary emphases and to enhance the students’ preparation for faculty positions.
creating these alliances around the country, NSF aims to encourage universities to build communities that can work cooperatively toward those goals.

The Michigan AGEP alliance community gets together each semester. MSU hosts the fall meeting. “We call it ‘Pathways to the Professoriate’ and keep it to one early evening with dinner,” Nunez says. In the fall of 2007, Ruben Martinez, Director of the Julian Samora Research Institute, was the featured speaker. Then students went to one of four sessions designed to fit different stages of their experience, from transition into a graduate program to the job hunt at the end. “They were on their way back to their home campuses by about nine o’clock,” Nunez recalls. “And the program got rave reviews.”

“In Fall 2008 UM added a session for faculty and Kerry Ann Rockquemore, Associate Professor at University of Illinois, Chicago, delivered the keynote address,” Jackson says. Each university in the alliance takes responsibility for one or two of the tracks. For Fall 2009 through Fall 2011, the Michigan AGEP Alliance plans to hold its Fall meeting jointly with the State of Michigan King-Chavez-Parks Future Faculty Fellowship program.

In February 2008 the “Mega Midwest” AGEP Conference—three days of professional development and networking activities, including a recruiting fair—took place. Four alliances, with member universities from New York City to Iowa, plus the Dow Chemical Corporation and Shell Oil Company sponsored the event that drew more than 200 students and faculty to Chicago. Presentations covered topics such as responsible conduct of research, negotiating for academic jobs and writing papers and proposals.

“Now that we’ve gathered these students into a community, the next step is for them to become AGEP scholars,” Jackson says. Students are invited to submit proposals requesting up to $2,000 for activities related to their research.

“They can request funds for travel, membership fees for a professional society, tuition for a short course in a research technique, even a laptop,” Nunez says. To apply they must be members of the AGEP community and students in good standing and have the support of their advisor for the activity.

Requiring them to be part of the AGEP community draws them into the support system it offers, Jackson says. Sixteen students have received funding. “We provided feedback on proposals that weren’t successful,” Jackson adds. “We want those students to be successful the next time.”

The AGEP program has a recruitment component, too. “Expanding the pool of historically underrepresented talent in the STEM and SBE disciplinary areas is something we’ve been working on for decades,” Jackson says. “But we still have a long way to go.” He and Nunez are experimenting with new ways to expand diversity among domestic students.

They go to recruiting fairs and conferences where undergraduates make research presentations. However, their survey of first year graduate students told them that the recommendation of an undergraduate mentor was more important than what prospective students learned at events like recruitment fairs. So they also encourage MSU faculty to visit universities with significant populations of minorities, and they invite faculty from those universities to visit MSU and get acquainted with MSU’s graduate programs.

In October 2007 and 2008, faculty and undergraduates from a half dozen of those institutions spent two days at MSU, hosted by the College of Natural Science. They toured campus and met with MSU faculty and AGEP students as well as representatives of the Graduate School. “The visiting faculty ask us why they should encourage their students to come here for graduate school,” Jackson says. “They want to know how they’ll be accepted, who will look out for them. The AGEP community is reassuring to them.” The process is working, he adds. Students have applied and been admitted.

“We want AGEP to be a complete community,” Jackson adds. “Students learn their subject matter in their graduate programs, but they don’t have many places to learn to be professors.” He cites social and political issues that can affect their future jobs—pressures on student loans, for example. “What if loans dry up?” he challenges the students. “Who will go to college?” He wants them to be actively participating citizens of their institutions, their communities, the nation, and the world.

Although some students participating in the AGEP community have graduated, the four-year-old program is too new for students to have been part of it for their entire graduate school experience. Still, Nunez, Jackson, and their counterparts at the other universities are working on processes to evaluate the program. UM is leading that effort for the Michigan AGEP by focusing on what metrics are needed to be tracked and how to track them.

“AGEP is about making an impact on university culture, and that’s not easy to measure,” Jackson says. “Still, as we plan and carry out activities, we’re mindful that we want to measure results. We’re searching for answers to what works best to recruit and retain future faculty members,” he adds. “That’s what we do at universities.”
NSF-Funded Center Integrates Research, Teaching, and Learning

The next generation of faculty members in science, technology, engineering, and mathematics (STEM) disciplines is now in graduate school studying their chosen disciplines and researching their dissertation topics. Few of them are spending time learning to teach, though that will be part of the faculty careers many expect to have. Even fewer are learning how to evaluate their teaching for effectiveness.

CIRTL—the Center for Integration of Research, Teaching, and Learning (http://www.cirtl.net)—aims to change that. The program began in 2003 with a five-year grant from the National Science Foundation (NSF) to the University of Wisconsin-Madison (UW), Michigan State University, and Pennsylvania State University. NSF awarded a $5.1 million renewal grant in January 2008.

CIRTL is built on three key concepts, called pillars:

- **Teaching as research**—STEM instructors use research methods to develop and implement teaching practices that advance the learning experiences and outcomes of both students and teachers.

- **Learning communities**—groups are linked for shared learning, discovery, and generation of knowledge.

- **Learning through diversity**—the array of experiences, backgrounds, and skills among STEM students and instructors enhances the learning of all.

The three partner universities already had some professional development activities in place that fit the CIRTL goals. For example, MSU has offered a Certification in College Teaching Program (http://grad.msu.edu/teaching.htm) since 1998. That program is designed to help graduate students organize and develop their teaching experience in a systematic and thoughtful way. It requires faculty-mentored teaching experience in contexts appropriate to the discipline along with workshops, courses, and other programs covering five core areas:

- Adult Students as Learners/Creating Learning Environments
- Discipline-Related Teaching Strategies
- Assessment of Learning
- Technology in the Classroom
- Professional Development/Understanding the University

CIRTL at MSU is built largely on the Graduate School’s Career Development through the PREP program (http://grad.msu.edu/prep/): Planning for career and professional goals, from entry to exit; Resilience and tenacity through multiple career and life stages; Engagement in decision-making and skill development; and Professionalism in research and teaching.

PREP workshops are geared to the stages of a graduate student’s life, starting with topics like coursework, qualifying exams, and socialization and progressing to dissertation writing and job search. (http://grad.msu.edu/prep/)

UW led the effort to submit the first proposal to NSF. CIRTL director Robert Mathieu is a UW Astronomy professor. Ann Austin, MSU Professor of Educational Administration, is a co-principal investigator. Rique Campa, Assistant Dean in the Graduate School and Professor of Fisheries & Wildlife, is a member of the CIRTL management team and MSU’s campus leader. A management team of representatives from the partner universities meets annually, and a national advisory board meets annually at one of the CIRTL institutions to discuss successes, assess plans, and offer suggestions to help the program succeed.

MSU hosted the CIRTL Network and National Advisory Board meeting in October 2008.

In its first two years, the Center worked to develop, implement, and evaluate a prototype professional development program for STEM graduate students heading towards faculty careers. When NSF renewed funding for three more years, CIRTL had already grown into a network of universities. Although Penn State no longer participates, Howard University, the University of Colorado at Boulder (CU), Texas A&M University, and Vanderbilt University have joined the CIRTL network. Representatives of some
of the 100 or so universities that produce 80 percent of the nation’s Ph.D. graduates have attended annual CIRTL forums.

Indeed, from the beginning CIRTL’s goal was to create such a network of universities committed to integrating advanced skills in teaching and learning with the high-quality research training already available at major research universities. Network initiatives are both programmatic and research-related, says Campa. Two programs the partners developed began this past fall:

- **Distance education** courses taught in real time are available to graduate students at any of the network universities for credit or for professional development. CU and UW are offering the fall courses; Howard and UW will offer courses in the spring.

- An **exchange program** provides funds for Ph.D. students to visit other institutions and discuss their research, teaching, and learning. “The visits will simulate academic interviews,” Campa says.

Also, Texas A&M is taking the lead in developing a portal to improve communication among the institutions. The Web site will include discussion boards, news, course materials, teaching and learning resources, networking capabilities, blogs, and collaborative projects.

Last year MSU and UW offered a video conference that drew about 40 graduate students from each university to a panel discussion about preparing for and securing an academic position. In real time one evening, the students were able to participate in mock interviews and question faculty about academic life. “I’m very pleased with the video conference initiative,” says Karen Klomparens, Dean of the MSU Graduate School. “It provides a way to link studies across disciplines and universities and for them to have access to helpful programs and speakers.”

In a research-related component of the network, MSU, UW, and CU are leading an effort to evaluate the effectiveness of programs that give diverse groups of graduate students mentored teaching experiences and familiarity with materials on teaching and assessment techniques. “The partners developed individual programs to fit their own institutions,” Campa says, “but they have the same goals.” The evaluation of programs across the network will draw on data from the institutions’ programs in addition to assessing the network programs. Ann Austin co-leads the cross-institution evaluations with Mark Connolly from UW. Campa serves on the evaluation leadership team.

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**MSU CIRTL Steering Committee**

- **Rique Campa**, Professor, Fisheries & Wildlife
- **Diane Ebert-May**, Professor, Plant Biology
- **Mark Urban-Lurain**, Director, Instructional Technology Research and Development, Division of Science and Mathematics Education
- **Kevin Johnston**, Director, Teaching Assistant, Orientation, and Training Program
- **Julius Jackson**, Assistant Dean, Graduate School; Professor of Microbiology and Molecular Genetics
- **Stephanie Watts**, Professor, Pharmacology and Toxicology
- **Tammy Long**, Assistant Professor, Biological Science Program
- **Cori Fata-Hartley**, Assistant Professor, Lyman Briggs College

**CIRTL Grant Management Team**

- **Robert Mathieu**, Director, PI, University of Wisconsin Madison, Astronomy
- **Ann Austin**, Co-PI, Michigan State University, Higher, Adult, and Lifelong Education
- **Kitch Barnicle**, Project Manager, University of Wisconsin Madison, Wisconsin Center for Education Research
- **Rique Campa**, Professor, Michigan State University, Fisheries & Wildlife
- **William Eckberg**, Co-PI, Howard University, Biology
- **Bruce Herbert**, Co-PI, Texas A&M University, Biogeochemistry
- **Patricia Rankin**, Co-PI, University of Colorado at Boulder, Physics
Campa says one of the CIRTL-related activities developed at MSU is the FAST Program—for Future Academic Scholars in Teaching (http://grad.msu.edu/fast). This fall FAST named its third cohort of ten fellows: doctoral students interested in becoming scholars of teaching and learning as well as disciplinary research scholars.

Monthly meetings and workshops for the FAST fellows with MSU faculty and staff create a learning community dedicated to the scholarship of teaching and learning. Meeting topics include information on how to assess student learning, where to find research articles on teaching, and where to find organizations—like special interest groups in professional associations—of people who talk about teaching. The FAST steering committee also invites guest speakers, usually other MSU faculty, to share their teaching experiences and their research on teaching and learning.

Each fellow plans a research project that will provide them with an opportunity to assess the effectiveness of a method they develop to help their students learn. For many of the fellows, the first step is to learn how to evaluate teaching and learning, Campa says. The students find that “scholarship on teaching and learning” has new terminology and may require different study designs from their dissertation research.

“The MSU CIRTL Steering committee surveyed the students before and after participation to learn how their views and approaches to teaching changed,” Campa notes. The preliminary evaluation results from FAST will be part of the overall CIRTL evaluation process.

A survey from the National Association of Graduate-Professional Students in 2000 reported that 90 percent of students said they felt prepared for an academic career but no more than 60 percent felt prepared to teach. Soon, students who have had the advantages of CIRTL programs will be in their first academic jobs. Campa says the evaluation process will follow them to see if they report being better prepared for teaching.

“If the evaluation shows that CIRTL programs are changing attitudes and behavior, we can look at methods to expand the network,” Campa says. The management team is beginning to think about a proposal to renew the grant when it ends in 2010.

“We expect CIRTL to be a change agent,” Campa says. “We want to see new STEM faculty who are effective as both researchers and teachers.”

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To serve as an advocate for graduate education to the University and beyond and to enhance the quality of graduate education at MSU in all its diverse dimensions.