Assessing the Impact of Undergraduate-Research Experiences on Students: An Overview of Current Literature

Mary Crowe, University of North Carolina Greensboro
David Brakke, James Madison University

Institutions of higher education have entered the 21st century under increased scrutiny. Students, their parents, taxpayers, and legislators demand greater accountability and demonstration of the benefits derived from undergraduate education. Because undergraduate research seems to hold potential in increasing students' learning, retention, graduation rates and entrance into graduate programs, campuses across the country are providing more undergraduate-research experiences (URE) for students. The faculty members who mentor undergraduate researchers are increasingly assessing the impact of these experiences on students, faculty members, and their institutions, but the number of comprehensive analyses of the impact of undergraduate-research experiences is small.

While it is not realistic to conduct assessments of all the possible benefits or outcomes of such experiences on students, faculty members, and institutions all at once or even in one program, we encourage readers to select a few issues pertinent to the primary goals for their programs and design effective assessment instruments to gauge their impact. Even though assessment of undergraduate-research experience is in its early stages, faculty members and administrators would benefit from knowing what assessment literature is available and whether it relates to their assessment needs. Following are summaries and an overview of the results in the current assessment literature on undergraduate-research experiences.

This article is not a primer on designing an effective assessment protocol for such experiences, but it is essential to establish clear objectives and to select or design the appropriate assessment instruments in order to derive meaningful information. As information is collected and analyzed, it can be used to improve programs. We encourage individuals to share their results so that others can improve the research experiences they offer undergraduates on their campuses. Ultimately, the public sharing of these studies will help enable a comprehensive analysis of the assessment of URE.

Examples of the Assessment of Institutional/Programmatic Undergraduate Research Programs

Alexander B, Foertsch J, Daffinrud S, Tapia R. The "Spend a Summer with a Scientist" (SaS) program at Rice University: A study of program outcomes and essential elements 1991-1997. *Council on Undergraduate Research Quarterly.* 2000;20(3):127-133.

This article describes a summer program in Computer Science at Rice where 62 minority students worked with faculty role models on research projects. Of participants, 67 percent went on to graduate school, while another 33 percent obtained their undergraduate degrees and found employment in a STEM-related field. The authors suggest that the essential features of a successful summer program include a meaningful research experience, plus the opportunity to interact with role models and other undergraduate students, forming a "community".

Bauer KW, Bennett JS. Alumni perceptions used to assess undergraduate research experience. *Journal of Higher Education,* 2003;74:210-230.

The article begins with a brief introduction to the history of the conflict between teaching and research and then mentions the Boyer Commission's recommendation to introduce research-based learning standards into the curriculum. The authors point out the need for empirical evidence to demonstrate that the costs of undergraduate research are justified in terms of the value added. They then discuss the assessment instruments available at the time of the study. They surveyed alumni of a research institution and divided respondents into one of three groups: those who participated in research experience as part of a "university organized" program; those who participated in research on their own with a faculty member; or those who did not do research as part of their undergraduate experience. Students within the three groups were matched for major, GPA, and year of graduation. The results were based on 986 returned surveys: 418 respondents participated in the institution's research program; 213 worked on their own with faculty members; and 355 had no research experience. Alumni in the first two groups were more likely to go on to graduate school (80 percent and 71 percent versus 59 percent, respectively). They also reported a greater satisfaction with their undergraduate experience and reported increases in intellectual curiosity, research skills, and communication skills. The students in the first two groups also reported that being involved in research with a faculty member did not prevent them from doing other things. They reported they had better time-management skills, but we could not determine if this was a direct result of the undergraduate-research experience.

Campbell A, Skoog G. Preparing undergraduate women for science careers. *Journal of College Science Teaching*, 2004;33(5):24-26.

Women may be underrepresented in the sciences because they have fewer opportunities or because they encounter obstacles. Texas Tech's HHMI program began in 1992 and its purpose was to increase the number of women and minorities who had research experiences. The authors sent surveys to the 57 participants and interviewed seven past participants who were currently enrolled in STEM-related Ph.D. programs. Seventy-five percent of the participants responded to their survey. Their responses indicated that an increase in skills, confidence, and motivation were a result of the research experiences, mentors, external presentations, and the student's interactions with others in the program. The article also quotes some of the women about what they gained from the experience and from their mentors. The study involved no control group.

Chandra U, Stoecklin S, Harmon M. A successful model for introducing research in an undergraduate program. *Journal of College Science Teaching*, 1998;28(2):116-118.

This paper discusses a program in computer-information systems at Florida A&M University, where the goal was to increase the number of African-Americans who pursue graduate degrees in computer-information systems. The program had four parts, the first of which provided re-assigned time for faculty to engage students in research during the academic year and summer. The second component helped faculty members develop new courses in their research areas. The third part of the program aided the department in purchasing needed hardware and software to support research and instructional activities. The last component of the program focused on students and included professional-development activities, enrollment in courses in special topics, and summer research. The department also added research elements and programming assignments to introductory courses. The results showed an increase in the number of student research abstracts, participation of students in research, and 23 students pursuing an advanced degree (versus two students the year before the program began). The program also led the faculty members to develop a MS program in computer-information systems.

Chaplin S, Manske J, Cruise J. Introducing freshmen to investigative research: A course for biology majors at Minnesota's University of St. Thomas. *Journal of College Science Teaching*, 1998;27(5):347-350.

The article describes a one-month (January) interim research-based course open to freshman and sophomore biology majors. Each year a different professor taught the course, so the topic changed as did the location of the research (laboratory, field). The overall schedule of the course, however, was consistent. In week one, the students were introduced to the content of the course, basic techniques, how to read primary literature, and statistics. During weeks two through four, they worked on research projects, which culminated in an oral or poster presentation. At the time of article, the course had been offered six times with 47 students (34 of whom were freshman). Fifty-four percent of the students then worked as research or teaching assistants, increasing their interaction with the major. Only two of the 47 students subsequently changed majors. Eight of the 47 continued research and presented their research at a national meeting.

DiBiasio D, Mello N. Multi-level assessment of program outcomes and assessing a nontraditional study abroad program in the engineering discipline. *Frontiers: the Interdisciplinary Journal of Study Abroad*, 2004;10:237-252.

The article begins by describing projects that interdisciplinary teams of students undertook at various international sites: erosion of the canals in Venice, farming practices in Thailand, fertilizer application in Costa Rica, and the communication of new air-quality regulations in London. The authors describe the history, philosophy, and pedagogy of the program, which began in the early 1970's. Student outcomes were centered in analysis, synthesis, and evaluation. Students were required to complete three projects before they graduated: one in the arts/humanities, one in their major, and one interdisciplinary technology/society project. Students applied to complete their project abroad; if they were not selected, they completed a project in the local community. Students received nine credit hours (one semester) for the projects. If they went overseas, they were on-site for eight weeks. Every week the students were evaluated by faculty mentors for both the process and the product of the project. Students submitted final reports, which usually

were more than 100 pages long. The authors described how the overall program was evaluated. Finally, the article considered a program-wide evaluation in which an independent team of faculty members read the final projects and rated them on a variety of scales, creating a rubric using a 1-5 Likert scale. Overall, students who completed their project overseas scored higher than those who worked on projects on-campus.

Foertsch J, Alexander B, Penberthy D. Summer research opportunity programs (SROPs) for minority undergraduates: A longitudinal study of program outcomes 1986-1996. *Council of Undergraduate Research Quarterly*, 2000;20(3):114-119.

This article reports on the Committee on Institutional Cooperation's (CIC) summer research program. The CIC involves 15 Midwest R1 institutions that run summer research programs for minority students. More than 5,400 students participated during the 10-year period, 63 percent of whom were African-American. The students, from a variety of majors, worked on a research project, gained experience writing reports and giving presentations, and attended GRE-preparation workshops. The article is a qualitative report of structured, open-ended questions posed to participants and alumni of the program, directors of Summer Research Opportunity Programs (SROP), and representatives from the minority-serving institutions the students attended. Fifty-two percent of SROP graduates went on to graduate school, with 35 percent of them completing their degrees. Another 23 percent elected to attend a professional school, whereas only 8 percent of minority students not involved in the program attended either graduate or professional school. Minority students from a given campus who were involved in SROP were more likely to attend graduate school there than were minority students from other campuses. Students felt the research experience was a necessary and important step in getting into graduate school, and the relationship with a mentor was critical to their success.

Nagda B, Gregerman S, Jonides J, von Hippel W, Lerner JS. Undergraduate student-faculty research partnerships affect student retention. *Review of Higher Education*, 1998;22:55-72.

This study examined a research program targeting freshman and sophomore students at a research university. Students

Mary Crowe talks with undergraduate research student Watanya about her research.

David Brakke and undergraduate research student Jaimie pose by Jaime's poster.

involved in the program worked with faculty members to conduct bibliographic research, literature reviews, and lab experiments. The program involved monthly meetings, peer mentoring, and skills workshops. The authors, who used a control group, found that students involved in the program had a lower attrition rate than those not involved in the program, with African-American students with lower entry scores receiving the greatest benefit. The program had a greater impact on sophomore students than on freshman students, and it found that peer advising helped to bridge the gap between students' intellectual and social lives.

Nnadozie E, Ishimaya J, Chon N. Undergraduate research internships and graduate school success. *Journal of College Student Development*, 2001;42(2):145-156.

The article begins with an explanation of why and when the Ronald E. McNair Post-baccalaureate Program began. The components of a McNair Program include undergraduate research, workshops, counseling, help applying for financial aid, and graduate-school and GRE preparation. Success in this program is defined by completion of an advanced degree. The authors sought to ascertain which components of the McNair program were most important; specifically they examined the frequency of workshops, the rigor of the research experience, and GRE preparation. They hypothesized that the more rigorous the experience, the more successful the program. A 12-item Likert questionnaire was distributed to 157 program directors,

producing a response rate of 22 percent (35 of 157 surveys). Respondents supplied a variety of information, such as the number and types of workshops their program offered, the requirements of the research project, and the completion of advanced degrees by students supported by their program. The authors computed an overall rating of the program and developed a scale for the rigor of the research experience. Program directors reported that the most important components of the McNair program were seminars, faculty-mentored research projects, and visits to graduate schools. They reported that GRE-preparation workshops were the least effective. In addition, the directors thought the more rigorous the research project, the higher the success rate of their students in graduate school, and further that if students attended too many workshops, it was detrimental to student growth. The authors also interviewed McNair students at Truman State University, who agreed with the program directors about the importance of undergraduate research in getting into and securing funding for graduate school, as well as participants' higher success rate in graduate school.

Russell SH, Hancock MP, McCullough J. Benefits of undergraduate research experiences. *Science*, 2007;316:548-549.

This article summarizes a nation-wide assessment of undergraduate-research experiences (URE) in STEM fields. The study involved four groups: 4,500 undergraduate researchers funded by the National Science Foundation (NSF); the 3,600 research mentors of these students; 3,400 individuals who received STEM degrees but did not participate in an NSF-funded undergraduate-research experience; and 3,200 individuals who received degrees in social, behavioral, or economic sciences but did not participate in a NSF-funded URE. Each group answered a Web-based survey. In 2005, the authors re-surveyed the undergraduate-student researchers funded by the NSF. Undergraduate-student researchers said that the research experience clarified their career interests and increased their understanding and confidence in their major. Close to 70 percent of those surveyed said their interest in a STEM career increased due to their experience, and 29 percent of students who had never considered getting a Ph.D. now expected to. There appeared to be a positive effect of the duration of the research experience on how students viewed the experience. The surveys did not detect significant differences between students based on gender or racial/ethnic groups and found that all students benefited from having a diverse set of mentors (different genders, ethnicities). The authors concluded that earlier involvement (as freshmen and sophomores) in research would likely be beneficial for students in traditional STEM fields but not in behavioral and social sciences.

Shellito C, Shea K, Weissmann G, Mueller-Solger A, Davis W. Successful mentoring of undergraduate researchers: Tips for creating positive student research experiences. *Journal of College Science Teaching*, 2001;30:460-465.

In 1997 the authors of this study conducted a mail survey of the 250 STEM undergraduate researchers at the University of California-Davis. They also conducted oral interviews with the faculty mentors. The survey garnered responses from 107 students, 66 percent of whom were seniors, 61 percent were females, and two-thirds had previous research experiences. Among the respondents, the 57 percent who reported they were satisfied with their experience also said that their mentor was helpful. Sixty-four percent of respondents who were unsatisfied or somewhat satisfied were mentored by someone other than a faculty mentor (a graduate student or postdoctoral associate). Students said it was important for mentors to be approachable and encouraging. The amount of time a mentor and mentee were together was an important determinant of satisfaction. The most satisfied students spent 2.5 hours a week with their mentors, while those that were somewhat satisfied reported only spending 1.1 hours a week in contact with their mentors. Of the three models of mentors (project, career, and individual), 54 percent of the students felt the ideal mentor would emphasize project guidance, while 34 percent felt the ideal mentor would provide individual guidance. The 13 tips from the faculty interviews included develop well-defined projects, recognize student constraints outside of the laboratory, commit ample supplies and equipment, understand and communicate expectations, spend time with and become acquainted with students, give positive constructive feedback, be approachable, respect students, progress toward student independence, encourage presentations, offer career advice, and provide continued mentorship.

Summers M, Hrabowski F. Preparing minority scientists and engineers. *Science* 2006;311(5769):1870-1871.

This article describes a program at the University of Maryland Baltimore County to improve the number of under-represented students who graduate with a STEM degree. In 1989, five of the 18 African-Americans students who graduated with a science and/or engineering degree had a GPA higher than 3.0. That year, UMBC began offering four-year scholarships to African-American students intending to major in science and engineering fields and encouraged them to do research as part of their undergraduate experience. From 1989 until 2006, the program supported almost 800 students, with 86 percent of them graduating with a science or engineering degree. Students in the program were twice as likely to graduate and five times more likely to go on to graduate school than students in a control group (students who applied to the scholarship program but were not accepted). Tips for success discussed in the article included recruiting high-achieving students, giving merit-based financial aid, having a freshman-orientation program, recruiting research-active faculty members, involving students early in research, and having group activities (e.g., peer mentors in a support network, tutoring).

Ward C, Bauer K, Bennet J. Content analysis of undergraduate student research evaluations. http://www.udel.edu/RAIRE/Content.pdf Accessed January 14, 2005.

The authors examined free-form evaluations of 183 rising junior science majors who completed research projects during the 10-year period from 1985 to 1995. The authors coded existing evaluation forms collected at the end of a 10-week summer research experience. The research experience was rated as equal in value to course work, less valuable than course work, or more valuable than course work. Seventy-three percent of the students felt they experienced greater learning from research than coursework, and 25 percent of the students felt they experienced equal learning to completed course work. Thirty-nine percent of respondents felt that their learning was as valuable as course work but was of a different kind. Ninety-five percent of the students felt they had increased their technical skills due to the undergraduate-research experience, while 28 percent had increased self-confidence. More than 30 percent of the students thought they increased their ability to think creatively, while 57 percent cited an improved ability to act independently. About half of the students said that research provided insight into what graduate school would be like, while nearly a third reported an increased desire to learn.

Assessment of the Student Experience in Undergraduate Research

Cole F. 1995. Implementation and evaluation of undergraduate research practicum. *Journal of Professional Nursing*, 1995;11(3):154-160.

Since 1977, organizations accrediting nursing have required a research component for students earning baccalaureate degrees. For the most part, schools meet this requirement by didactic means in the form of a lecture. The author designed an eight-hour research practicum in which nursing students, working in groups, carried out an experiment. Students were involved in all aspects of the research process except deciding on the research question. One important aspect was learning about the IRB process and patient information. At the end of the experiment students were given two Likert surveys, one of which examined their attitudes, while the other asked what they learned. The students stated they gained a greater appreciation and understanding of what research was and were more positive about research.

Ferrari J, Jason L. Integrating research and community service: Incorporating research skills into service learning experiences. *College Student Journal*, 1996;30(4):444-451.

This article describes a class in which service learning was tied to research. Twenty-four undergraduates at DePaul University carried out a variety of research/service projects. Three teams of eight students carried out the projects, answered questions about how much they learned, and listed the pros and cons of the experience. Participants thought the experience resulted in personal growth, enriched their education, and influenced their career goals. They liked working in teams and collecting data with real-world implications. They found it difficult to schedule group meeting times and experienced personality conflicts between group members, but most said they would repeat the experience and would recommend it to others.

Gafney L. The role of the research mentor/teacher: student and faculty views. *Journal of College Science Teaching*, 2005;34(4):52-57.

The article results from examining the qualitative evaluations the author conducted of various UREs and also draws on more than 250 individual interviews with student participants and faculty mentors. Five themes emerged from the qualitative evaluations: image of scientists, classroom versus research experience, mentoring and teaching styles, varied expectations, and multiple mentoring. When students worked with faculty members on a research project, it was the first time that they realized that scientists are human and that many are passionate about their work. The biggest difference between the classroom and the research experience was that the classroom setting provided answers while the research experience focused on asking and answering questions. Students were surprised at how long it took to complete a project. Mentors and students recognized that there are times when students need quite a bit of supervision and other times when students' skills allow them to function more independently. Both students and faculty stressed that mentors need to be aware of the transition from the first to the second level and adjust their actions accordingly. Both students and faculty had varied expectations about how much personal and professional development might occur during the research project. Finally, it was noted that mentors played more than one role, often coaching students in the lab, in preparation for a career or graduate study, and on some personal matters.

Hakim T. 1998. Soft assessment of undergraduate research: Reactions and student perceptions. *Council of Undergraduate Research Quarterly*, 1998;18:189-1192.

The article begins with the author suggesting that undergraduate research has four components: mentorship, originality, acceptability and dissemination. The article then reports on the qualitative assessment of the experience of 25 undergraduate research students at Jacksonville University. The students reported on their relationship with mentors, the challenges and rewards of undergraduate research, their gains in their academic discipline, their feelings and personal changes. The foremost conclusion with respect to students was that their research started out as being directed but then proceeded to being self-driven. Students felt motivated and more connected to their discipline; they felt as though they contributed new information and that the experience allowed them to improve their problem-solving skills.

Hunter AB, Laursen SL, Seymour E. Becoming a scientist: The role of undergraduate research in students' cognitive, personal, and professional development. *Science Education*, 2006;91(1):36-74.

This article is a continuation of the work described in Seymour, *et al*. (2003). This ethnographic study summarizes the opinions of students and faculty members who engaged in an "apprenticeship model" undergraduate-research experience. The participants were from four prestigious liberal-arts colleges who participated in a short-term (summer) URE. The article begins by outlining how undergraduate research fits within the constructivist learning paradigm and then describes the characteristics of the apprenticeship model of undergraduate research. The authors found that both students and their faculty mentors agreed on what students gained from their research experiences (understanding of what it means to work like a scientist, enhanced preparation for graduate school). Students' and faculty mentors' opinions differed concerning gains in higher-order thinking skills and how each group "classified" their gains. The article includes a number of quotes from students and their faculty mentors with regard to thinking and working like a scientist, becoming a scientist, personal-professional gains, clarification of career/graduate school intentions, enhanced career/graduate-school preparation, and gains in skills.

Ishiyama J. Undergraduate research and the success of first generation, low income college students. *Council on Undergraduate Research Quarterly* 2001;22:36-41.

This article describes a program in which first-generation college and/or low income students were involved in a research program that began their sophomore year and continued through their senior year. The authors compared this group of students with a control group of students that had similar ACT scores and graduate-school ambitions. They found that the students involved in research were more likely to stay enrolled as an undergraduate student and that a greater percentage of these students went to graduate school than the control group. In a self-reported survey, 71 percent of the students felt

that the research experience was important, while 95 percent of them indicated that the mentoring that accompanied the research experience was important.

Ishiyama J. Does early participation in undergraduate students benefit social science and humanities students? *Journal of College Students*, 2002;36(3):380-386.

This study examined whether humanities and social-science students who engaged in undergraduate research as freshmen reported higher intellectual gains (i.e., thinking analytically, finding relationships, and independent learning) than freshmen who did not have an URE. The population consisted of 156 students attending a highly selective public university in the Midwest, 27 of whom completed a research project early in their college career. The author compared the self-reported score of freshmen with and without a research experience on the College Student Experiences Questions (CSEQ). The results showed that 47 percent of non-research students reported a score of 2.75 or higher versus 72 percent of those students who did research. Also, a higher proportion of first-generation low-income students (88.9 percent) reported a score of 2.75 or higher.

Kardash, CM. Evaluation of an undergraduate research experience: Perceptions of undergraduate interns and their faculty mentors. *Journal of Educational Psychology*, 2000;92(1):191-201.

Previous assessment of undergraduate-research experiences has concentrated on the number of students who graduate and how many of the students persist and pursue graduate or professional degrees. In this study, the author developed a list of quantifiable skills to assess whether/how the skills were met by a summer research experience. Student participants completed the survey before and after the summer program. Faculty mentors completed the survey after the program ended and identified which skills students gained experience in as part of their project. As a result of a summer research experience, students reported gains in their ability to orally communicate their project, make observations, collect data, and relate their study to the big picture. Skills that were least improved included the ability to ask a question, develop a workable hypothesis, and reformulate a hypothesis based on the results of their work. Students felt that the experience did not help them learn how to write a research paper, how to analyze data, or improve their statistical knowledge; faculty mentors indicated that they did not give students training in writing, statistical, or data analysis.

Lopatto D. Survey of undergraduate research experiences (SURE): First findings. *Cell Biology Education*, 2004;3:270-277.

This article is a preliminary report of a long-term study of 10-week research programs sponsored by HHMI. More than a thousand (1,135) undergraduate students who participated in a summer undergraduate research from a variety of campuses completed an on-line Likert survey. Students reported their attitudes and opinions at the conclusion of the experience. The topics in the survey were centered on interest in graduate/professional study, the research process and skills associated with doing research, expectations of the experience, and the overall research experience. There were some differences in the responses of female versus male students with respect to field of study (more males were in physical sciences), and women reported higher learning gains than men. Students reported the highest gains in understanding the research process, laboratory techniques, and in scientific problems. There were no differences between ethnic groups.

Seymour E, Hunter A, Laursen S, DeAntoni T. Establishing the benefits of research experiences for undergraduates: First findings from a three-year study. *Science Education*, 2003;88:493-534.

The authors of this study examined the current literature regarding the benefits of undergraduate research by dividing published manuscripts on evaluating undergraduate research into groups: those in which the hypothesized benefits are both claimed and well-supported; those in which the hypothesized benefits are stated but not adequately demonstrated (the majority of studies to date); and descriptive pieces. The authors then described the focus of their research, which dealt with students from four small liberal-arts colleges who participated in a summer research experience. Each of these campuses had a strong history of undergraduate research and had 10-week summer research programs. Researchers conducted focus-group interviews with the 76 students before they began

the program and at predetermined times after the program. Their 63-student comparison group consisted of students who applied but were not accepted to programs; students who did not apply to any research program; and students who participated in a different type of experience (clinical or industrial research). The researchers also interviewed 14 faculty members. The two major categories in which students reported learning gains were their confidence in their ability to do research and working like a scientist. Gains were also reported in other skills (i.e., communication, computer), clarification of career goals, enhanced career/graduate-school preparation, and changes in attitudes.

Summary

The assessment of undergraduate-research experience is in the early stages. Some studies have focused on programmatic goals, while others have tried to understand outcomes for students or faculty resulting from these experiences. The studies have ranged widely in methodology, size and type of student population, and institutional type. As a result, relatively few provide the basis for comparative analysis of the value of undergraduate research. We encourage much more attention to assessment of outcomes tied clearly to programmatic goals. In addition, we emphasize the several dimensions that require assessment: impact on career choices and continuance in programs, changes in attitudes, and the complex domain of cognitive development. We note the need for meaningful data collection in all cases. We also encourage broader sharing of results from a range of programs on individual campuses and comparisons among programs in different settings. We see evidence of positive gains from undergraduate-research experiences; however the data are not comprehensive, and the reports in many cases are anecdotal. While we see much activity surrounding URE, there is less tangible evidence and research addressing the value provided in ways that can be effectively shared. There is also a problem in the lack of adequate control groups. Many of the studies described suffer from a self-selection bias so that we do not know if the benefits are due to URE or because of the type of student likely to be selected for inclusion or likely to enroll in URE.

Mary Crowe
Director, Office of Undergraduate Research
University of North Carolina Greensboro
1000 Spring Garden Street
Greensboro, NC 27455
336-334-4622
EM: mlcrowe@uncg.edu

Mary Crowe is Director of the Office of Undergraduate Research at the University of North Carolina at Greensboro. She is a member of the Board of Governors of the National Conference of Undergraduate Research (NCUR) and an F21 member of Project Kaleidoscope. She is a Councilor of the Council on Undergraduate Research (CUR) and was named its 2005 and 2006 volunteer of the year. She is a member of CUR's assessment team for the Carnegie Foundation's CASTL project and was instrumental in developing CUR's Initiating and Sustaining Undergraduate Research Programs Institute.

David Brakke
Dean, College of Science and Mathematics
James Madison University
Harrisonburg, VA 22807
540-568-3508
EM: brakkedf@jmu.edu

David Brakke is a limnologist/ecologist and has served as Dean of the College of Science and Mathematics at James Madison University since 1999. He previously was Dean of Science and Mathematics at Towson University and Assistant Dean of Arts and Sciences at the University of Wisconsin-Eau Claire. He is a CUR Councilor and co-chair of the CUR Assessment Task Force for the Carnegie Foundation for the Advancement of Teaching's CASTL project. He has served on the National Steering Committee for Project Kaleidoscope and writes a quarterly column on science and society for the Association of Women in Science Magazine.