

Biology & Environmental Sciences

The following is a list of resources compiled by UROP that relate to biology/environmental science undergraduate research or mentoring topics. While this is not an exhaustive list of resources available regarding biological research, they give a variety of different perspectives in biological undergraduate research, especially field research. They are available from the UROP library, GT Library, or on-line. UROP library materials can be checked out by coming to the UROP office. Please contact [UROP](#) for availability.

* Ahern-Rindell, Ami, and Stith, Brad. **Grant Writing Workshop: Biology.**

This presentation is a good summary on grant writing especially for the sciences with notes on how to include undergraduate research assistants.

Available From: UROP Office

* Best, Aaron A., et al. "**Models of Interdisciplinary Research and Service Learning at Hope College.**" Council on Undergraduate Research Quarterly Vol. 28 Iss. 2 (2007): pp. 18-23.

At Hope College, we are supporting interdisciplinary research and teaching. To give a better sense of these accomplishments and the challenges that interdisciplinary research presents, we present two specific examples of Howard Hughes Medical Institute (HHMI) supported interdisciplinary research teams at Hope College: the Interdisciplinary Research Program in Bioinformatics and Microbial Genomics team and Nursing and Engineering in International Development team.

<http://www.cur.org/Quarterly/dec07/Winter07Hope.pdf>

* Blauth, James R., and Schrum, David P. "**Service Learning and Field Research at the University of Redlands: Desert Restoration in Joshua Tree National Park.**" Council on Undergraduate Research Quarterly Vol. 26 Iss. 2 (2005): pp. 63-65.

The University of Redlands launched a research project that involves both biological and chemical analyses and that seeks to get students started in research earlier in their college careers. The project has an applied research or service emphasis in that they want to initiate ecological restoration of a disturbed desert wash in Joshua Tree National Park to reverse and limit the effects of ongoing foot traffic. This is a long-term project that offers a number of different ways for students to make contributions to the project while exposing students to field research.

Available From: UROP Office

* Davis, Larry E., and Eves, Robert L. "**The Natural History of a Modern Carbonate Ecosystem: Field Studies That Integrate Undergraduate Research.**" Council on Undergraduate Research Quarterly Vol. 25 Iss. 4 (2005): pp. 175-179.

The author describes a field research semester consisting of an 8 week content development and a 10 day research based field experience at the Gerace Research Center, San Salvador Island, Bahamas.

Available From: UROP Office

* Keller, Harold W. "**Undergraduate Research Field Experiences: Tree Canopy Biodiversity in Great Smoky Mountains National Park and Pertle Springs, Warrensburg, Missouri.**" Council on Undergraduate Research Quarterly Vol. 25 Iss. 4 (2005): pp. 162-167.

The author describes a field research project that involved three phases: the Adventure phase (learning rope climbing and sampling techniques), the Laboratory Phase (analysis of tree canopy biota), and Publication phase. The author takes the reader through the complete process, from grant writing, to the actual field research, and to the final summary of results.

Available From: UROP Office

* Knowles, Richard, and Cochran, Phil. "**Mandatory Undergraduate Research in a Biology Curriculum since 1936.**" Council on Undergraduate Research Quarterly Vol. 26 Iss. 1 (2005): pp. 40-43.

This article discusses the requirement for biology majors to complete an undergraduate research project. It reviews a program by Saint Mary's University of Minnesota in hopes that it can serve as a model to those wishing to include such a requirement to their programs.

Available From: UROP Office

* Lopatto, David. "**Survey of Undergraduate Research Experiences (SURE): First Findings.**" Cell Biology Education Vol. 3 Iss. 4 (winter) (2004): pp. 270 - 277.

In this study, I examined the hypothesis that undergraduate research enhances the educational experience of science undergraduates, attracts and retains talented students to careers in science, and acts as a pathway for minority students into science careers. Undergraduates from 41 institutions participated in an online survey on the benefits of undergraduate research experiences. Participants indicated gains on 20 potential benefits and reported on career plans. Over 83% of 1,135 participants began or continued to plan for postgraduate education in the sciences. A group of 51 students who discontinued their plans for postgraduate science education reported significantly lower gains than continuing students. Women and men reported similar levels of benefits and similar patterns of career plans. Ethnic groups did not significantly differ in reported levels of benefits or plans to continue with postgraduate education.

<http://www.pubmedcentral.nih.gov.www.library.gatech.edu:2048/articlerender.fcgi?artid=533131>

* Mabrouk, Patricia Ann, and Peters, Kristen. "**Student Perspectives on Undergraduate Research Experiences in Chemistry and Biology.**" Council on Undergraduate Research Quarterly Vol. 21 Iss. 1 (2000): pp. 25-33.

The authors focus on chemistry and biology students and assess attitudes of students from a variety of colleges and universities across the United States.

Available From: UROP Office

* Millsbaugh, Joshua J, and Millenbah, Kelly F. "**Value and Structure of Research Experiences for Undergraduate Wildlife Students.**" Wildlife Society Bulletin Vol. 32 Iss. 4 (2004): pp. 1185-1194.

Many colleges and universities are encouraging faculty to provide more undergraduate research experiences (URE). Proponents of URE describe many benefits for students and faculty mentors. In addition to developing important research skills (e.g., problem solving, communication), students learn the process of science, and the recruitment and retention of highly qualified students are increased. Mentors often gain assistance in meeting their long-term research goals while helping shape careers of future scientists. The call for increasing URE requires a basic understanding of goals, responsibilities, and priorities from student and mentor perspectives. Our intent is to discuss merits of URE and offer advice for structuring and developing URE. We provide an overview of student and faculty perspectives of URE, outline various structures for URE with an emphasis on the student colleague model, and describe how to incorporate URE in mentor research programs. Also, we supply a list of internet resources for publishing and funding undergraduate research projects. We contend that URE might help overcome some of the shortcomings of undergraduate education recently identified by wildlife educators and employers, as students develop many key career skills and acquire relevant experience important to later success in the profession. However, students and faculty must carefully assess and consider whether URE help meet future goals, given other commitments.

[http://www.bioone.org/www.library.gatech.edu:2048/doi/abs/10.2193/0091-7648\(2004\)032%5B1185%3AVASORE%5D2.0.CO%3B2](http://www.bioone.org/www.library.gatech.edu:2048/doi/abs/10.2193/0091-7648(2004)032%5B1185%3AVASORE%5D2.0.CO%3B2)

* Ramón y Cajal, Santiago. **Advice for a Young Investigator.** Cambridge, Mass: MIT Press, 1999.

This book was written originally in 1897 by Ramon y Cajal, a noteworthy researcher in the biology/medicine field from Spain. In this, he offers advice, wisdom, and his thoughts on how a young investigator (i.e. a new researcher) can succeed in research. Despite being written a century ago, this text remains relevant today and offers practical suggestions for the new researcher (as well as more experienced ones).

Available From: UROP Office, GT Library

<http://www.library.gatech.edu:2048/login?url=http://www.netlibrary.com/urlapi.asp?action=summary&v=1&bookid=422>

* Sobotka, Kristin, and Elgin, Sarah C. R. "**Summer Scholars, A Pre-Freshman Undergraduate Research Experience.**" Council on Undergraduate Research Quarterly Vol. 25 Iss. 3 (2005): pp. 122-125.

Washington University (WU) in St. Louis supports a research experience for undergraduate students during the summer prior to the start of their freshman year. The participants are chosen on a selective basis and the program covers all of their expenses. The students spend six to seven weeks from the middle of June until the end of July on campus, engaged in a faculty-mentored research project, which they present in a one-day symposium. The Summer Scholars Program in Biology and Biomedical Research (SSBBR), one of a few programs of this type, benefits both the students and the institution. Students have an early opportunity to engage in research, to explore science as a possible career, to learn about the campus, and to form relationships with like-minded peers. Becoming part of a research group, and building a supportive peer group, can be especially important for women and minority students interested in science. The benefits to the university include increasing the visibility of undergraduate research opportunities on our campus, and a recruiting advantage in attracting able and interested students, particularly minority candidates. The program "seeds" the freshman class with a group of students who have experience working in WUs research labs, a peer group that encourages other students to participate in research during their college careers. In its recent publication "BIO 2010,"the National Research Council states such programs are "predicated on the notion that an active research experience is one of the most effective ways to attract talented undergraduates to science and to retain them in science and engineering careers" (National Research Council, 2003). The SSBBR has been supported through a grant from the Howard Hughes Medical Institute (HHMI) and by the Deans of Arts and Sciences and Engineering.

<http://www.cur.org/Quarterly/mar05/Summer.pdf>

* Zimmerman, Mel. "**The Clean Water Institute at Lycoming College.**" Council on Undergraduate Research Quarterly Vol. 26 Iss. 2 (2005): pp. 76-78.

The concept behind the Clean Water Institute is to create collaboration between Lycoming College faculty members and students and local watershed groups with the goal of addressing environmental problems related to the abundant water sources in the region. Through the Institute, Lycoming students have established 17 permanent monitoring sites along the West Branch of the Susquehanna and directly support projects with 12 local watershed groups. The Clean Water Institute at Lycoming College has afforded our Biology students and Environmental Science minors with concrete skills that have not only enhanced their individual educational experiences, but have contributed in meaningful ways to regional watershed groups and the State of Pennsylvania with research on Environmental Science. In November 2001, the Secretary of the Pennsylvania Department of Environmental Protection recognized the Clean Water Institute with an award and stated, "The real data we get from your work will be invaluable. This is exactly the kind of project partnerships that Growing Greener was created to support." The Clean Water Institute at Lycoming College reflects the unique opportunities available to undergraduate students at a liberal arts college through collaborations between faculty, students and the community.

<http://www.cur.org/Quarterly/Dec05/Dec05Zimmerman.pdf>