



Aquatic and Wetland Plants: Wet & Wild

July 26-31, 2003 ♦ Mobile, Alabama

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FORUM SESSION ABSTRACTS

EMPHASIZING BOTANY ACROSS THE CURRICULUM

1 Teaching the 'Tree of Life' for plants

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The green plants represent one of the biggest branches of the tree of life -- more than 1/2 million species -- a clade at least 1 billion years old. Their morphological and chemical diversity, ecological dominance, and importance in human affairs (for food, shelter, and medicines) are paramount among life's lineages. Recent research results have radically restructured the tree of life as we know it.

This session will discuss the tree of life for plants, specifically evolution, phylogenetics, and genomics (and their interrelationships). The panel will focus on two main goals: (1) summarizing recent research progress, and (2) discussing which facts and conceptual themes are best included across the curriculum, and how.

The session is designed for all science teachers interested in incorporating plant evolution into their classrooms. Discussion will focus on the lines of evidence used to understand plant relationships (morphology, genomic characteristics, DNA sequences) and using phylogenetic research as a model of scientific inquiry. Plant evolution provides an interesting, and less contentious, alternative to teaching evolution through mammalian examples.

Note that there will be also a hands-on workshop presented Sunday (W-3 -- "Getting to the Roots of Plant Evolution: Genomics and the Reconstruction Tree of Life") that will extend this discussion into laboratory practice.

This session is sponsored by two National Science Foundation supported projects:

The Green Tree of Life (<http://ucjeps.berkeley.edu/TreeofLife/>)

Deep Gene (<http://ucjeps.herb.berkeley.edu/bryolab/deepgene/index.html>)

Informational Session (Session 2-1)

2 What are the essential topics about evolution that undergraduates need to understand? A focus on plant biology

Organizer: STANLEY A. RICE, Department of Biological Sciences, Southeastern Oklahoma State University, Durant OK 74701-0609. Tele: (580) 745-2688, Fax: (580) 745-7459, E-mail: srice@sosu.edu.

Almost all plant biology educators consider evolution to be an essential topic, particularly in response to efforts by anti-evolutionists to block, or affix disclaimers to, evolution education.

Evolutionary science is a big subject, however, and educators need to prioritize the topics within evolutionary science that we want non-majors, biology or conservation majors, and future botanists to understand. In this discussion, the participants will produce a prioritized list of such topics, and discuss the reasons for them. Topics would be likely to include evolution of herbicide resistance, and bioinformatics. By discussing the participants, classroom and other experiences related to these topics, we will also generate a list of suggestions on how to approach these topics most effectively. These lists will be made available electronically to participants who wish them. The discussion leader is particularly interested in broad input on this subject. He is helping to lead efforts in Oklahoma to oppose anti-evolution activism, and is writing a brief, freshman-level encyclopedia of evolution for a major publisher.

Roundtable Session (Session 5-1)

3 Promoting botany beyond undergraduate curriculum requirements

Organizer: RANESSA L. COOPER, Hillsdale College, 33 E. College St., Hillsdale, MI 49242. Tele: (517) 607-2224, Fax: (517) 607-2252, E: mail: Ranessa.Cooper@hillsdale.edu.

The Slayton Arboretum of Hillsdale College has been a valuable resource for teaching botany at the undergraduate level. From course requirements to volunteer opportunities, students have been involved in botany outside of the classroom and laboratory settings. Examples of student involvement in Slayton Arboretum and the biology greenhouse will be presented. Mainly, I will focus on the participation of the Fall 2002 Michigan Flora class with these ‘extracurricular’ endeavors. I will give my perspectives on implementing botany beyond the curriculum, as well as share some student responses based on their personal experiences. Audience participation is encouraged. The primary goal of this session is to create an open forum for the discussion of ways to promote undergraduate interests in botany.

Informational Session (Session 4-1)

DESIGNING INVESTIGATIVE LABORATORIES

4 Enhancing botany experiences in ecology and evolution laboratories

Organizer: JENNIFER A. CLEVINGER, Department of Biology, MSC 7801, James Madison University, Harrisonburg VA 22801. Tele: (540) 568-7816, Fax: (540) 568-3333, E-mail: clevinja@jmu.edu.

In 2002, the Department of Biology at James Madison University began offering its students a new core curriculum of four courses, each with an accompanying laboratory. The courses, in sequential order, are: Organisms, Ecology and Evolution, Cell and Molecular Biology, and Genetics and Development. With the aid of a NSF-CCLI grant, our faculty have worked to ensure that botany remains an integral part of each student's laboratory experience. In particular, the Ecology and Evolution faculty have developed plant laboratories on the topics of competition, population growth, classification, identification, and sampling. During the six-week competition laboratory, students investigate marigolds and zinnias for the effects of inter-specific and intra-specific competition. During the three-week population growth laboratory, students investigate the effects of pH, salt, and nutrients on the growth of *Lemna* (duckweed). Students learn the principles of keying and identification by keying algae and gymnosperms in the laboratory and then they apply this knowledge in an outdoor exercise on sampling. During the sampling laboratory, students compare tree diversity on different slopes and gain experience identifying local tree species. Throughout the semester students are assessed using laboratory reports, data analysis, tests, and oral presentations.

Informational Session (Session 1-1)

ENGAGING UNDERGRADUATES IN RESEARCH

5 NSF funding opportunities that support undergraduate research

Organizer: JUDITH E. SKOG, Acting Deputy Division Director, Division of Biological Infrastructure, Room 615, National Science Foundation, 4201 Wilson Boulevard, Arlington, VA 22230, Tele: (703) 292-8470, Fax: (703) 292-9063, E-mail: jskog@nsf.gov.

This informational session will feature a presentation about National Science Foundation (NSF) funding opportunities that support undergraduate research.. Programs such as Research Experiences for Undergraduates (REU), Undergraduate Mentoring in Environmental Biology (UMEB) Research at Undergraduate Institutions (RUI) and Collaborative Research at Undergraduate Institution (CRUI) will be presented and discussed. A number of other programs that provide supplements to currently funded NSF awards are also available such as Research Apprenticeship for Minority High School Students (RAMHSS) for high school students, Research Experience for Teachers (RET) for science teachers, Research Opportunity Awards (ROA) for faculty, International Science and Engineering programs (INT) for international activities, and the new Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences (UBM), and these will also be presented and discussed. This informational session should be useful to investigators seeking ways of obtaining support for their research and educational

activities. A short presentation on preparing a winning proposal will also be included, time permitting.

Informational Session (Session 4-2)

6 Running NSF Research Experience for Undergraduates (REU) Site Programs

Organizers: TOM BULTMAN, Department of Biology, Hope College, Holland, MI 49423, Tele: (616) 395-7372, Fax: (616) 395-7125, E-mail: bultmant@hope.edu; and MARSHALL SUNDBERG, Department of Biology, Emporia State University, Emporia, KS 66801, Tele: (620) 341-5605, Fax: (620) 341-5607, E-mail: sundberm@emporia.edu.

Hope College, a four-year institution, and Emporia State University, a semi-comprehensive institution, each run separate NSF Research Experience for Undergraduates (REU) site programs through funding from the National Science Foundation. The programs support summer research by students from the home institutions as well as by students from other campuses. Student recruitment is accomplished by announcements in biology classes, an informational seminar, advertising posters within the science building, and for off-campus students, mailing an advertising poster to schools across the nation. In addition, each institution erected a web page that fully described the program and the research available and allowed students to apply on-line. Student selection is made based primarily on student commitment and enthusiasm, based on an application letter, grade point average, match with faculty interests, and course work background, and letters of reference at one institution. The Hope program involves students in research in various areas of biology. Students addressed questions ranging from the molecular- to community-level of organization. The Emporia program, which also ranges from molecular to community-level, focuses on questions relating to the tallgrass prairie ecosystems. We will discuss the logistics of each of our programs, including research and workshop activities as well as housing/board and social activities that are formally structured into our programs to facilitate the conduct of research and foster a stronger sense of community and identity among the students as emerging scientists. There will be ample time for questions and discussion following the brief presentations.

Panel Session (Session 3-1)

7 Integrating research and teaching: Using the classroom to feed your scholarship

Organizer: JEFFREY M. OSBORN, Division of Science, Truman State University, 100 E. Normal Street, Kirksville, MO 63501-42121, Tele: (660) 785-4017, Fax: (660) 785-4045, E-mail: josborn@truman.edu.

Although research and teaching are not mutually exclusive academic enterprises, the historical 'teaching vs. research' dichotomy persists on many campuses. This is unfortunate, because there is significant pedagogical value in engaging undergraduates in original scholarly work. A range of academic models exists that provide opportunities to integrate research into the formal curriculum. Some curricula include separate courses such as 'Introduction to Research,' 'Research Techniques,' 'Research Seminar,' 'Research Capstone,' 'Independent Study,' and/or others of this ilk. These types of courses are valuable and can add significantly to the curriculum, but it is also

important to integrate scholarship directly into the core and elective courses. For these, however, true curricular integration does not mean that the research component is simply an 'add-on,' but rather that the scholarly question(s) either is transformed entirely into the course content, or becomes a considerable component of it.

In addition to the pedagogical element, there is practical and administrative value in combining teaching and research efforts at the undergraduate level. At colleges and universities with relatively high teaching loads, particularly baccalaureate and comprehensive institutions, many faculty members find it difficult to maintain a research program during the academic year. By incorporating research into the core and elective courses, a faculty member has the opportunity to remain intellectually engaged in their area of interest, to keep current with the literature, to share budgets, to recruit new students into the lab, etc. This can be especially important for junior faculty.

Several best practice strategies for integrating research and teaching will be briefly presented and there will be ample time for participants to share other models, as well as time for the group to discuss related issues (e.g., grading criteria, how to get "resistant" colleagues or departments on board, etc.).

Breakout Session (Session 5-3)

DEVELOPING EFFECTIVE TEACHING AND MENTORING SKILLS

8 Best practices and biggest challenges in the botanical classroom/lab

Organizer: BEVERLY J. BROWN, Nazareth College of Rochester, 4245 East Avenue, Rochester, NY 14618, Tele: (585) 389-2555, Fax: (585) 586-2452, E-mail: bjbrown@naz.edu.

We probably all have days when we feel born to teach and other days when we wonder why we ever set foot in a classroom. This session will allow attendees to share best practices that they feel really help students understand botanical subject matter. Participants will also have the opportunity to present one of their greatest teaching challenges and draw on the strengths of the group to come up with possible solutions. Participants will be asked to bring at least 20 copies of a one-page handout listing one best practice and one challenge to share with the group.

Breakout Session (Session 5-2)

9 Making the Most of NSF Division of Undergraduate Education Funding Opportunities

Organizer: KATHERINE DENNISTON, National Science Foundation, Division of Undergraduate Education (DUE), 4201 Wilson Boulevard, Suite 840, Arlington, VA 22230, Tele: (703) 292-4620, Fax: (703) 292-9016, E-mail: kdennist@nsf.gov.

This session will highlight the NSF, Division of Undergraduate Education Course, Curriculum, and Laboratory Improvement (CCLI) program. The goal of the CCLI program is to improve the quality of science, technology, engineering, and mathematics (STEM) education for all students. Targeted activities include improvement of learning environments, course content, curricula, educational practices, and student assessment. In addition, the program seeks to contribute to the relevant research base.

The CCLI program has four tracks: Educational Materials Development (EMD), Adaptation and Implementation (A&I), National Dissemination (ND), and Assessment of Student Achievement (ASA). We will discuss the requirements and guidelines for each of the tracks, as well as the attributes of competitive proposals and the proposal review process.

Informational Session (Session 2-2)

10 Approaches to teaching botany to non-majors

Organizers: DAVID W. LEE and JENNIFER RICHARDS, Department of Biological Sciences, Florida International University, University Park, Miami, FL 33199, Tele: (305) 348-3111 (D. Lee) and (305) 348-3102 (J. Richards), Fax: (305) 348-1986, E-mail: leed@fiu.edu; and richards@fiu.edu.

We have drastically revised both the lectures and laboratories in our non-major introductory botany course, and we would like to share what has and hasn't worked. Our goal in this venue is to evoke responses and communicate ideas that will help participants. We have re-structured our lectures, which are delivered in two 75-minute periods per week. A major change has been to break the lecture into two parts, with various quizzes and activities provided during the middle. Some of these activities require interaction among students. We have modified the laboratory to alternate between inside and outside activities. The outside activities include students tending a vegetable garden and visiting the campus nature preserve. Inside the students grow fast plants, ferns and leaf explants in a growing area in the lab. We have two off-campus field trips, to Fairchild Tropical Garden and Everglades National Park, during the normal lab periods (six lab sections for this course). We have created our own lab manual, which has special relevance to our local environments. This course exposes a wide variety of students to plants and plant-related issues that have meaning in their lives.

Breakout Session (Session 1-2)

11 Attracting botany graduate students to smaller schools

Organizer: BRUCE K. KIRCHOFF, Department of Biology, P.O. Box 26174, University of North Carolina, Greensboro, NC 27402-6174, Tele: (336) 334-4953, Fax: (336) 334-5839, E-mail: kirchoff@uncg.edu.

It can be particularly difficult to attract botany graduate students at smaller schools. The prestige of the institution is often lower, and many times the terminal degree is an MS not a Ph.D. Given these constraints, why do graduate students choose a particular school and professor? During Spring 2003 I surveyed the approximately 30 students enrolled in the Masters program at the University of North Carolina at Greensboro to determine why they selected both UNCG and their major professor. The answers ranged from “I was in Greensboro and wanted to pursue a higher degree” to “I knew their research and wanted to work on a specific project with them.” The session will begin with a brief presentation of the results of this survey, and a solicitation of experiences in attracting graduate students from the audience. The discussion that follows will allow participants to share strategies for attracting students, and will result in a summary that will be distributed to participants following the meeting. Faculty and graduate students from smaller institutions are invited to attend.

Breakout Session (Session 2-3)

12 Facilitating interaction in large lecture courses

Organizer: SUZANNE KOPTUR, Department of Biological Sciences, Florida International University, Miami, FL 33199, Tele: (305) 348-3103, Fax: (305) 348-1986, E-mail: kopturs@fiu.edu.

Small-group interactions and cooperative learning are great techniques for getting students more involved with their own learning in laboratories and lecture classes of modest size, but what about large lecture classes (of 100 students and more)? Years of teaching large, required courses for our major in Biology (most recently and repeatedly, Ecology) has led to an evolution in my own strategies for engaging students in course material and having them feel less like one in a great sea of faces remote from the course lecturer. Breaking up the lecture into several ‘chunks’, separated by some activity that compels each student to become actively involved with the material has been the major innovation, and has led to greater student attendance, attentiveness, and (by some measures) achievement. Materials available on the course web site promote greater contact with subject matter outside of class, and greater preparation for in class activities. Each student also does a project on different assigned topics, divided into phases, providing ongoing interaction with the instructor or TAs who provide feedback.

Informational Session (Session 3-2)

REACHING OUT BEYOND THE IVORY TOWERS

13 WHERE'S BOTANY IN THE NEWS? STRATEGIES FOR LINKING UP WITH THE PRESS

Organizer: SUSAN MILIUS, *Science News*, 1719 N St. NW, Washington, DC 20009, Tele: (202) 872-5124, Fax: (202) 659-0365, E-mail: smilius@sciserv.org.

If you don't mind talking to reporters--that is if you can't beg off and have a root canal or sit through a 5-hour faculty meeting instead--come meet the press and sound off about why. What don't scientists and journalists understand about each other? Could we work together better? Want to know what other life-science professions are doing to attract media relations? And is there anyway to fight the trend that science reporting so often comes to means medical-NASA-and-cute-animal reporting?

Roundtable Session (Session 3-3)

14 The SIU SYSTEM: A model program for supporting youth with disabilities in science

Organizers: KAREN S. RENZAGLIA, Plant Biology Department, Southern Illinois University, Carbondale, IL 62901-6509, Tele: (618) 453-3229, Fax: (618) 453-3441, E-mail: renzaglia@plant.siu.edu; and PAUL E. BATES, Special Education and Educational Psychology, Southern Illinois University, Carbondale, IL 62901-4610, Tele: (618) 453-1814, Fax: (618) 453-7110.

Other Participant: RENEE LOPEZ-SMITH, Plant Biology Department, Southern Illinois University, Carbondale, IL 62901-6509, Tele: (618) 453-3229, Fax: (618) 453-3441.

The SIU SY-STEM (Supporting Youth in Science, Technology, Engineering and Mathematics; www.siu.edu/~system/) is an NSF supported project that provides services, support and learning experiences needed by secondary students with disabilities to pursue careers in STEM disciplines. The project is focused around five highly integrated yet well-defined phases: 1) Talent search through a vast network of contacts and referrals from junior high and high schools in the southern Illinois region; 2) Person-Centered Transition Planning workshops conducted at regional community colleges; 3) Continued contact by role models and mentors with disabilities following the workshops; 4) A Summer Research Experience for select students and; 5) Follow-up studies and efforts to facilitate transition planning and provide continued enriching experiences for students into the post-secondary environment. The workshops are designed to identify the strengths and interests of the students and to determine a course of action for them to achieve their professional goals. Through these experiences, we emphasize self-determination, self-awareness, and transition planning for moving successfully from high school to university. The capstone of the SIU SY-STEM project is a summer research experience, sponsored by a faculty mentor who integrates the students into his/her research team. An overview of each component of this successful model will be provided.

Informational Session (Session 1-3)

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