Annual report of the BSA Committee on Human Diversity. July 2013.

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Elizabeth Kellogg (2014), President, ex officio
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Heather Cacanindin (BSA PLANTS coordinator)

1. Committee meetings. In 2012, the BSA Committee on Human Diversity met at the BOTANY meetings in Columbus, Ohio. In 2013, the Committee will meet Sunday morning at BOTANY 2013. Reminders have been sent to the Committee.

2. Broadening Participation symposium at BOTANY 2013. During the 2012 Diversity committee meeting, Anna Monfils suggested a symposium on the topic of broadening participation for the 2013 meetings. Following this suggestion, Anna Monfils and Ann Sakai worked on the symposium ‘Broadening Participation: Recruiting and Retaining Outstanding Scientists in the Botanical Sciences’. This symposium is co-sponsored by the BSA Ecology section, BSA Teaching section, BSA Systematics/ASPT, and with the support of iDigBio. The abstracts of the symposia are given below (see also http://www.botanyconference.org/engine/search/?func=program&program=382#results for further details).

3. PLANTS program. The Botanical Society of America was awarded a five-year NSF-funded PLANTS grant (Preparing Leaders and Nurturing Tomorrow’s Scientists): Increasing the diversity of plant scientists) directed by Ann Sakai (UC-Irvine), Ann Hirsch (UCLA), and Heather Cacanindin (BSA) in 2011. The goal of this program is to increase the number of undergraduates from underrepresented groups who attend the annual BOTANY meetings, and to increase their level of academic excellence and motivation to pursue advanced degrees in the plant sciences. The program for the PLANTS students is based on extensive mentoring by BSA volunteers (faculty, postdocs, PLANTS alumni) at the meeting. In addition, the program includes a workshop on how to apply to graduate school and in 2013 it will also include a new Student Writing Workshop. The continued involvement of the Diversity Committee in publicizing this program and selection of students, and the enthusiastic support of the BSA membership as writing mentors, PLANTS mentors, and as panelists for workshops is greatly appreciated. The support and expertise of Heather Cacanindin is been invaluable.

Nine students were selected for the PLANTS program in 2011, 13 PLANTS students attended in 2012 and 15 students will attend in 2013. Eight of the nine 2011 PLANTS students are now in graduate school, and four of these students have earned prestigious awards for their graduate studies (Jon Richey, Clayton Visger, and James McDaniel: NSF Graduate Research Fellowships; Irma Ortiz: Ford Foundation Fellowship). The Plant Science Bulletin (2013, vol 59: 45-46) highlighted the PLANTS program in an article by Heather Cacanindin.
4. Enhancing Scientist Diversity in Plant Biology Luncheon. In 2011, Dr. Mary Clutter gave the talk at this well attended event. In 2012, Dr. Maria Elena Zavala, gave a talk entitled “Planting the seeds of diversity to reap a harvest of scientists”. In 2013, Dr. Muriel Poston will give a talk entitled “Cultivation of the next generation of plant biologists”. We welcome ideas for future luncheon topics, formats, and speakers from the Diversity Committee as well as other BOTANY participants.

5. AWIS. In May 2012, Ann Sakai (Diversity Committee Chair), Heather Cacanindin (BSA), and Amy Litt (BSA Secretary) as representatives of BSA attended an American Women in Science (AWIS) meeting funded by NSF on the topic of implicit bias in society awards. Some of the AWIS findings were presented to the BSA Board during the past year. Based on the recommendation of the ad hoc Awards Committee (J. Skog, chair) to the Board, the following statement is now included on the BSA webpage used by those judging awards:

Understanding and Overcoming Implicit Bias

The Society asks that all members, and in particular those creating awards and/or working on award committees be aware of implicit bias. The following videos explore the complicated process of granting awards and prizes in disciplinary societies, and provide solutions for problems that may arise as a result of unconscious bias.

**AWIS Links:** [http://www.awis.org/displaycommon.cfm?an=1&subarticlenbr=415](http://www.awis.org/displaycommon.cfm?an=1&subarticlenbr=415)

Being concerned with the emphasis on gender, we add a note that implicit bias can be much broader in scope. To emphasize that point, we suggest reviewing not only the AWIS site as a source of guidance, but two others which cautions against implicit bias for minorities of any type and emphasize the pervasive nature of implicit bias.

**Rutgers University** program for implicit bias - [http:// philosophy.rutgers.edu/graduate-program/climate/133-graduate/climate/529-climate-of-women-implicit-bias](http://philosophy.rutgers.edu/graduate-program/climate/133-graduate/climate/529-climate-of-women-implicit-bias)

**National Center for State Courts** - [http://www.ncsc.org/~/media/Files/PDF/Topics/Gender%20and%20Racial%20Fairness/IB_Strategies_03_3012.ashx](http://www.ncsc.org/~/media/Files/PDF/Topics/Gender%20and%20Racial%20Fairness/IB_Strategies_03_3012.ashx)

6. SACNAS. The BSA currently sponsors two undergraduate poster awards ($500 each) at the annual SACNAS meetings. SACNAS is an organization devoted to advancing Hispanics, Chicanos & Native Americans in Science. In 2011 and 2012, Ann Sakai attended the SACNAS meetings (funded by her home institution, UC-Irvine), helped to organize judging for the two BSA and two ASPB (American Society of Plant Biology) awards, and talked to students with botany posters about the PLANTS program. One SACNAS student from 2011 (Caprice Lee) and one undergraduate from the 2012 SACNAS meetings (Dayvis Blasini) participated in the PLANTS program the following year. The SACNAS meetings in 2013 will be in San Antonio, Texas, Aug 3-6, 2013. The BSA had agreed to co-sponsor with the American Society of Plant Biologists (John Harada, Diversity committee chair) in 2013 up to half of the cost of a booth and a symposium (Living With the Neighbors - How Plants Cope With Other Organisms), with speakers Dr. Linda Walling [linda.walling@ucr.edu](mailto:linda.walling@ucr.edu), Dr. Brenda Molano-Flores [molano1@illinois.edu](mailto:molano1@illinois.edu), Dr. Monica Medina [mmedina@ucmerced.edu](mailto:mmedina@ucmerced.edu), and Dr. Gustavo MacIntosh [gustavo@iastate.edu](mailto:gustavo@iastate.edu). Brenda Molano-Flores and Ann Sakai will report back to BSA about the level of interest of SACNAS participants in the booth and symposium.

Prepared by Ann Sakai, Diversity Committee Chair
Broadening Participation - Recruiting and Retaining Outstanding Scientists in the Botanical Science

Monfils, Anna [1], Sakai, Ann [2].

Broadening Participation - Recruiting and Retaining Outstanding Scientists in the Botanical Sciences.

Many of the upcoming crises facing the U.S. and the planet, such as climate change, loss of biological diversity, invasive species, and sustainable agriculture, will affect future generations. Addressing these issues will require innovative training of young scientists and expertise that crosses traditional discipline boundaries and utilizes new technology, forms of communication and research techniques. These issues also will require the creativity, originality, and participation of a diverse community of scientists. The vitality of the sciences depends upon inclusion of people from the broadest possible base. The purpose of this symposium is to share some of the best practices to encourage recruitment and retention of all students, and particularly URM (underrepresented minority) students. What are the best practices to recruit and retain a diverse community of young scientists who will help maintain the creativity and vitality within the botanical sciences? Are there particular pedagogical methods, curricula, or types of institutional support that are good for all students and especially effective for students from underrepresented groups? How can some of these methods be implemented by instructors at institutions ranging from small teaching institutions to large research universities, and across botanical disciplines? Speakers will discuss successful teaching approaches in the introductory core biology courses, mentoring strategies for students and academics, recruitment of a diverse community of scientists, overcoming the dual hurdles of science and technology as it relates to current digitization initiatives, and curricular and institutional programs to promote diversity in the sciences. We will encourage audience participation on how to apply these ideas to specific botanical disciplines and research initiatives. With a Botany 2013 conference-wide theme of Celebrating Diversity, this symposium seems timely, relevant and of broad appeal to graduate students, postdocs, and faculty.

Skog, Judith [1], Skog, Jeremy [2].

Biodiversity, Bioinformatics, Bias, and Beyond.

The "Field of Bachelor's Degree in the United States: American Community Survey Reports" from the U.S. Census Bureau notes that out of 56 million people with bachelor's degrees, 20 million are in STEM fields. However, there are great differences within these 20 million people for field of study according to ethnicity or gender, and only about 1 million of them hold degrees in interdisciplinary areas. Additional data provide information on other science degrees and workforce. A new report from NSF on "Women, Minorities and Persons with Disabilities in Science and Engineering" shows mixed results for several areas of increasing participation in the sciences of underrepresented groups. More students from these groups are showing interest in a career in science areas, but not all fields of study are showing similar gains and interest is mixed across the various ethnic groups, along with differences in preferences by gender. Discrepancies
increase, according to both these reports, as the recipients enter and move through the workforce. Some of the examples and data from these reports will be presented and examined in this discussion in the light of increasing opportunities for integration of biology and informatics and the availability of big data for furthering research analysis. New opportunities will require examining old views, creating new ways of attracting those groups now underrepresented to take up challenges, improving mentoring and the mentors, and ameliorating implicit bias in training, hiring, promoting and rewarding in academia and beyond. Documented approaches and support for proven methods need to be more fully embraced and disseminated through societies and institutions to fully prepare a diverse student population capable of meeting the challenges of integrated research.

Bart, Hank [1].

Increasing the participation of African Americans in ecology and evolutionary biology: experts, attitudes and interventions.

The underrepresentation of African Americans in ecology and evolutionary Biology, especially field-oriented and museum-based professions such as taxonomy, is striking. What is particularly troubling about this is that decades of investment in programs designed to broaden the participation of African Americans and other underrepresented groups in STEM is having measureable impact on numbers and the representation of African Americans in biomedical fields is robust. Why are so few African Americans pursuing advanced study and careers in ecology and evolutionary biology? The fact of the matter is, no one really knows. A team of highly accomplished, African American ecologists and evolutionary biologists has recently assembled to study this issue and find solutions. The plan is to survey the attitudes of African Americans toward careers in ecology and evolutionary biology and develop interventions to designed remove the roadblocks. In this presentation, I will review the scant literature on this subject, describe our thinking in developing the attitudes survey, and provide very preliminary details on potential interventions.

Haak, David [1], Freeman, Scott [2].

Closing the Achievement Gap: Evidence-Informed Teaching and Learning in Biology.

If we bring the same level of rigor to our teaching as our research, then we should design our courses based on data. Together with my colleagues, we have been working to evaluate the impact of different course designs-- from “highly-structured”, where students are required to prepare for class sessions that focus on intensive active learning exercises, followed by weekly practice exams, to “low-structure”, much closer to a traditional lecture format--on student performance in an introductory biology course for majors. I will present results from our research and address questions about whether structured interventions can close the achievement gap between students from advantaged and disadvantaged backgrounds enrolled in STEM courses. In the process of this research we have addressed interventions that promote culturally aware teaching and therein have a disproportionate benefit for high-achieving students and for students from disadvantaged backgrounds. Finally, I will discuss work on metacognition and learning and how we have developed approaches for evaluating the equivalence of students and assessments when comparing measures of achievement.

Herrera, Jose [1].
Talking about leaving -- botany and related disciplines, an NSF perspective.

Hidden in many of the statistics about the lack of participation by Underrepresented Minority (URM) students is the worrisome detail that most URM students, who are successful in STEM, disproportionately choose careers in health-related fields. The reasons URM students opt not to pursue a career in field-related or botanically-focused professions are numerous, interrelated and complicated by sociological, economic and cultural considerations. Yet, solving many of the most pressing contemporary ecological problems will require ideas and the intellectual capital of the fastest growing demographic of our nation. Many STEM disciplines, including botany, lack a diversity of viewpoints that has limited our ability to manage important scientific challenges. This talk will remind the audience of several common misconceptions about URM students and describe a few of the widespread challenges that prevent or stifle URMs from considering STEM careers that ultimately undermine their needed contributions to such fields. Several federally-funded programs have shown promise to mitigate these challenges and the talk will focus on highlighting place-based strategies that engage URM students in STEM and encourage their entry into field-based and botanical careers. Moreover, since many of these strategies are place-based we will endeavor to enter into collective and interactive conversations with the audience to share some commonly-used strategies used in a diversity of institutions by a variety of professionals within biology. Finally, the talk will briefly describe programs within the National Science Foundation (NSF) that directly or indirectly fund innovative and evidence-based strategies to recruit and retain URM students within STEM and highlight several examples of NSF-funded projects that have successfully addressed the need to encourage URM students to pursue non-health related careers.

McKenna, Mary [1].


The national under-representation of African Americans and other minorities in graduate programs and professional careers in botany, ecology, and environmental science is an area of critical concern for the future of these fields. In 2004, faculty at Howard University established the Environmental Biology Scholars program with support from NSF, to develop a community of African-American undergraduate researchers prepared for graduate programs in botany, ecology, and environmental biology. Key aspects of this program are (1) early recruitment of talented and highly motivated students (2) early and sustained research experiences (3) close mentoring by Howard faculty (4) strong peer mentoring (5) community-building through regular meetings and activities for all participants (6) opportunities to present research at scientific meetings, and (7) effective partnerships with the scientific community. Our students benefit from participation in REU programs throughout the US and internationally (OTS, Ghana), and in particular, we formed a strong partnership with UVA’s Blandy REU program. Close partnerships with graduate programs at U Michigan, UC Davis, and UC San Diego provide further training for our students. Diversity outreach programs in scientific societies such as PLANTS (BSA) and SEEDS (ESA) are another important tool that provides a glimpse of the professional life of a scientist and empowers students to expand their scientific networks. So far, nineteen Environmental Biology Scholars graduated from the program and fourteen students are current participants. Ten of our graduates entered masters programs in botany, ecology or environmental science (half at Yale FES and U Michigan), and four are currently pursuing a doctorate (Duke, Berkeley, Texas Tech, and Columbia U). Although the biology students at Howard (and HBCU’s generally) have traditionally been more attracted to medical careers or research in biomedical areas of biology,
creating a community of inquiry and peer support along with sincere and sustained faculty mentoring can be transformative.

O’Neal, Christopher M. [1].

Increasing Retention of Underrepresented Groups in Biology: The Role of the Graduate Student Teaching Assistant.

Despite impressive improvements in the retention of some underrepresented minority (URM) groups in the biological sciences, other groups continue to lag behind in their proportional representation. Pushes from the National Science Foundation, academic institutions and other organizations have focused on faculty mentorship, bridge programs, and undergraduate research opportunities as mechanisms for addressing the retention gap. Little has been done, however, to empower graduate student teaching assistants to positively impact URM retention in the classroom, the teaching lab, and in office hours. This is a particularly unfortunate oversight in the biological sciences, where TAs at large institutions account for a majority of the contact time students have with instructors. This presentation will review some of the research on how instructor behaviors in and out of the classroom impact students’ decisions to stay in or leave the sciences. Participants will have the opportunity to explore qualitative data collected at the University of Michigan from students in gateway sciences courses, including biology. We’ll close with a discussion on preparing TAs to teach “for retention,” and look at some best practices that arise from our research.