

## **Education Report 7/21/18**

Allison Miller, Education Director-At-Large

Catrina Adams, Education Director

### **Education Director-At-Large/Education Committee Chair Background and 2018 Changes**

Education Director At-Large and the Education Committee chair have historically been different positions, but as per a board decision to streamline, they will be merged starting in 2018. Chris Martine will be taking over in both positions as Allison Miller (current Ed Director at Large) and Phil Gibson (current Education Committee Chair) step down.

### **Education Staff Background**

Education staff is mostly supported by NSF funding for the Digging Deeper/PlantingScience teacher/scientist professional development and online mentoring project (through 2019/2020). Jodi Creasap Gee (Educational Technology Coordinator) is supported 100% and Catrina Adams (Education Director, grant PI) is supported 70%. Supporting and growing this mission-driven, extensive, and long-standing partnership between BSA, BSCS and 18 scientific societies is a strong focus of education staff.

Besides PlantingScience, the Education Director supports the Education Director-At-Large and Education Committee Chair toward sustaining existing partnerships and initiatives (e.g. the Life Discovery Conference and PlantED Digital Library) as well as helping to secure and support new partnerships and initiatives (e.g. the QUBES/BSA Faculty Mentoring Network, BRIT-BSA collaboration and education travel sponsorships for Botany 2017 conference in Fort Worth).

The Education Director also works closely with BSA education stakeholders to set a strategic agenda for BSA education and to coordinate and promote member efforts in alignment with strategic goals towards fulfilling the society's educational mission.

### **Education Activities 2017-2018**

*Existing Grants:*

#### **Digging Deeper NSF Grant (1502892, \$2,884,857, 2015-2019) (DD)**

- Fall 2017 largest PlantingScience session EVER: 69 teachers, 815 projects, 2500 students
- wildly successful scientist mentor recruitment drive: asked for 100 mentors, got 300+ for a total mentor pool of 650+
- Spring 2018 significantly smaller, 23 teachers, 233 projects, ~1000 students. Welcome relief and allowed for more development, but need to begin regular advertising to increase numbers and give mentor pool more to do.
- grant-funded PD and data collection for primary efficacy study has ended
- collaboration with Science Gateways Community Institute for free user experience consulting on PlantingScience.org led to major interface improvements for teachers

- website improvements ongoing: new assisted mentor match, mentor training resources, and online poster session under development
- DD data in draft paper for submission to Journal of Research in Educational Effectiveness (JREE) indicate statistically significant effect on student achievement and attitudes about scientists, in prep publication meets requirements of What Works Clearinghouse “recommended without reservations.” Also found the sample to be generalizable to general US school sample (95%+), and that gains on both measures were more equitable based on prior achievement (pretest score) (slope of improvement closer to one).
- 2017 STEM for ALL Video Showcase video wins Facilitator’s Choice Award, participate again in 2018 with over 800 views from all over the world.
- Video resource production continues with focus on training materials and module resources, with help from undergraduate video production volunteer Alex McPherson.
- have ~40K of participant costs funds left for widespread participant-led dissemination.
- NABT will help promote: signed Inquiring About Plants books to award-winning teachers and some free/discounted advertising at NABT 2018 San Diego

**American Society for Agronomy: ASA Reinvests (\$30,220, Jamie Foster PI, 2015-2017)**

- successful launch of Agronomy Feeds the World module. Live on the website with participating teachers this Spring
- TriAg societies have agreed to support 5 MPST for 2018/2019 (but without meeting registration discount)
- ASA will promote PlantingScience alongside other educational outreach opportunities at educator and scientific conferences where they exhibit including NSTA.

*Pending Grant Proposals:*

**PlantingScience participation in NSF CAREER grant proposal by Digging Deeper early career scientist participant**

- Idea is to develop a UCLA course in scientific communication, and use undergraduates to help put together new module or “Wonder of Seeds” extension for PlantingScience around PI’s research interests (plant growth). PS will provide some coordination with high school classroom “resource reviewers” and an eventual home for the new module. Grant will supply some funds for evaluation and dissemination of the new module and staff time for development and website placement of new module materials (~\$10,000/yr in years 3 and 4 of the grant).

*Unsuccessful Grant Proposals:*

**PlantingScience F2 Grant (\$4,448,163, Catrina Adams PI, 2018-2023)**

- Reviews were mixed and odd, the lowest rated review (Fair) was very sparse
- The project did not provide a compelling case that the plant examples would be interesting and engaging to the target audience. Engagement is essential to effective educational practice, and students and teachers unfortunately tend to be bored by plants. How does the project address this major issue?

- Comments indicate that reorganization of the grant for clarity and to better balance big picture and details may improve the reviews without major substantive changes. Much can be done to simplify the storyline and comments/grant consultant will help with this.
- Having a research paper further along will also help...trying to get JREE paper in by end of July.
- Conversation with current PO sounds like resubmission would be welcome, so plan to revise and resubmit.

### **NSERC PromoScience (\$200,800, Julia Nowak, CBA/ABC PI, 2018-2021)**

- third try, reduced budget. Includes support for growing the program in Canada and salary for a Canadian PS Director...

#### *Partnerships/Initiatives:*

#### **Lightning Talks: High Speed Botany for Everyone**

- one of 2 lightning talk options, held during PlantingScience reception. Idea is to make education talks more visible to the general BSA membership and to provide more content in the PlantingScience reception, including a venue to present on the research coming out of the grant.

#### **PlantED Digital Library/Life Discovery – Doing Education Conference**

- theme of 2017 conference Data: Discover, Investigate, Inform
- small NSF grant was obtained to support travel for increasing the diversity of participants at the LDC. Travel grant awardees participated in a LDC-QUBES FMN with BSA-sponsored participants were awarded title of “BSA Education Scholar” upon completion.
- Theme of 2018 conference: Microbiomes to Ecosystems: Evolution and Biodiversity across Scale, Space and Time. March 21-23, Gainesville, Florida

#### **“Plants by the Numbers” QUBES/BSA Faculty Mentoring Network**

- 13 faculty participated, lead by Ed committee members Phil Gibson and Paul Beardsley
- implementation of selected resources in the PlantED Digital Library, those with a strong data/quantitative literacy component
- participants awarded title of “BSA Education Scholar” upon submission of teaching notes appendix to PlantED Digital library submissions
- planning “travelling joint poster” for participants to disseminate experience at Botany and other plant biology meetings
- will be doing this again in the future, perhaps associated with LDC conference...great resource for our membership

#### *Publications:*

- Joe Taylor, Catrina Adams, Anne Westbrook (in prep) The effect of participation in a student-teacher-scientist partnership-based online plant science mentoring community on high school students’ science achievement and attitudes about scientists. For

submission to Journal of Research on Educational Effectiveness (JREE). This will be the main paper used to establish the efficacy of the program according to What Works Clearinghouse standards and will set the stage for other papers describing nuances of the PD program and results of studying the online conversations between students and scientists.

- Elisabeth A. Desy, Catrina T. Adams, Teresa Mourad, Scott Peterson (in press) "Effect of an Online, Inquiry- and Mentor-based Laboratory on Science Attitudes of Students in a Concurrent Enrollment Biology Course: the PlantingScience Experience. *American Biology Teacher*.

Claire Hemingway and Catrina Adams (in prep)

- paper tracking the 250 MPST program early-career participants 2006-2016: commonalities in who participates, subsequent career path, subsequent society membership/service, perceived PD benefit.
- publicly available data collection in full swing
- would like to interview selected current and previous MPST but need to secure IRB approval (likely will be ruled exempt)...Marsh Sundberg has agreed to assist.

## **Challenges to Address:**

*PlantingScience Partner Engagement:*

- increasing engagement of existing PlantingScience partner societies
- recruiting new partner societies to PlantingScience
- recruiting teachers to PlantingScience
- PlantingScience MPST Liaison sponsorship

*PlantED Digital Library*

- increasing contributions to/use of PlantED digital library
- now that upgrades to functionality have been made, desperately needs an upgrade to usability/look

*Botany.org Education and Outreach Webpages*

- needs an update to content. This is on the education committee agenda to discuss

## **Looking forward 2018-2021**

*Strategic Planning for Education:*

- explore current education priorities with our committees and membership establishing priorities, providing mechanisms for BSA support of member education proposals and avenues for engaging members in high-priority areas.
- areas of interest to our education committee, teaching section and members appear to be: quantitative literacy/data skills, PUI and other faculty networking opportunities,

getting high-quality education resources disseminated and used, providing mentoring opportunities.

- a structured conversation about strategic planning would be helpful in establishing priorities and strategies.

*PlantingScience:*

- **Engage fundraising/grant strategy support for PlantingScience.** Finding additional funding is critical as we move through year 3 of our 4 year NSF grant. Plan to use BSA education funds to contract with a grantwriting consultant to help refine our grant strategy, identify additional or alternative funders, and suggest revisions to grant application drafts. Grantwriting assistance was massively helpful in rewriting our successful Digging Deeper grant.
- **Prepare visually engaging PS materials to explain the program, success and promise** to partner societies and potential funders and define partnership responsibilities and outline suggested ways to contribute.
- **Host 2019 PlantingScience/Digging Deeper advisory panel meeting in Washington D.C.**, inviting partner society representatives to participate in a sustainability discussion
- **Widely disseminate positive results of Digging Deeper study** to the research community, partners and potential partners, potential participants (scientist mentors, teachers) and to the wider community. Leverage partner organizations and engaged participants in this effort.
- **Potential C-STEM grant** in partnership with other organizations to take advantage of NSF priorities: leverages mentor pool untapped expertise with big data and untapped abilities of the HUBzero platform