

Session Information: T121. Educating the Next Generation of Geoscientists: Effective Strategies That Engage Students, Invest in the Future Geoscience Workforce, and Increase Participation of Members of Historically Underrepresented Communities in the Geosciences
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Title: MS PHD'S: Diversifying the Earth System Science Community Through a Synergy of Mentoring, Community Building, and Professional Development Activities

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INSTITUTIONS (ALL):

1. Institute for Broadening Participation
2. University of Texas at Arlington
3. Ohio Aerospace Institute
4. Universidad de Puerto Rico, Rios Pedros

The *Minorities Striving and Pursuing Higher Degrees of Success (MS PHD'S) in Earth System Science Professional Development Program* was established by and for underrepresented minorities to facilitate increased and sustained participation within the Earth system science community. Modeled after Aristotle's philosophy that the "whole is greater than the sum of its parts", *MS PHD'S* practices a synergistic model of tiered mentoring practices, successful minority scientist role models, peer-to-peer community building activities, professional development training techniques, networking opportunities, and virtual communication tools to broaden the participation of underrepresented minorities (URM) within the ESS workforce. Through a three-phase structure of activities, URM students establish mentoring relationships with successful scientists, build meaningful ties with URM peers and future colleagues, strengthen oral and written communication skills, engage in networking opportunities within premier scientific venues, and maintain continuity of networks formed through program participation. Established in 2003, *MS PHD'S* is now in its ninth cohort. From the original cohort of 25 participants, the program has grown to support 213 participants. Of these 213 participants, 47 have obtained the doctorate and are employed within the ESS workforce. Another 67 are enrolled in doctoral programs. *MS PHD'S* maintains close ties with program alumni to further support retention, inclusivity, and broadening participation of URM students and graduates in STEM activities. The program reengages alumni to become mentors and leaders for each new cohort as well as facilitating valuable opportunities for alumni to advance in their ESS related academic and professional career pathways.

PRESENTATION NOTES

Slides 1 & 2 - What is MS PHD'S?: MS PHD'S is a professional development program designed to facilitate the recruitment and retention of underrepresented minorities in STEM. We do this through a 3 phase structure that includes Tiered Mentoring, Successful URM Scientist Role Models, Community Building Activities, Professional Development Training, Networking Opportunities, and a Virtual Community.

Our Goals are to increase exposure to and engagement in the Earth system science community for underrepresented minorities, enhance professional skills, grantsmanship, oral and written communication, provide resources regarding future funding, education and career opportunities, facilitate networking opportunities with established researchers and educators, and sustain on-going interaction, communication and support through our virtual community

Slide 3 - Background: The pilot program was the 2003 MS PHD'S in Ocean Sciences. It engaged 25 highly talented URM students during the Final Joint Global Ocean Flux Study Program Open Science Meeting. The idea for the program was based upon research demonstrating that in 1998, minorities received < 10 % of the 30,000 plus doctoral degrees awarded by U.S. institutions and that the number of ESS doctoral degrees awarded to minorities was even smaller.

Slides 4 & 5 - MS PHD'S Today: In response to evaluation findings, the program is expanded to include Earth system science disciplines beyond Ocean Sciences. It is set up as a 3-phase structure to increase the benefits for students. A virtual community is added to further support participant interaction and inclusivity. The program supports 213 participants from 33 states, D.C., Puerto Rico, and an American citizen who graduated from University of British Columbia in Vancouver, Canada. We currently have 47 alumni with doctoral degrees and another 67 participants are enrolled in doctoral programs.

Slide 6 - Benefits for Students: As you can see, the program has many components that contribute to its success, and they are all focused on providing support for student needs. Overall, the program focuses on five major areas: exposing students to earth system science through meetings and field trips, mentoring relationships, professional development opportunities such as goal setting and strategic planning, networking opportunities with researchers, educators, and peers, and ongoing virtual support

Slide 7 - Benefits for Mentors: The program also benefits our mentors by facilitating mentoring and development of new talent and provides opportunities to engage new talent in their programs, labs and research initiatives.

Slide 8 – MS PHD'S Phases: This is an overview of the 3-phase structure:

- Phase I provides exposure to a large and diverse conference. Mentees are introduced to mentors and participate in sessions on developing and maintaining effective mentor/mentee relationships. They enjoy community building and gain additional exposure to science and research with field trips to CAS and Aquarium of the Bay. In-house professional development activities include CV/resume development, poster and oral presentations, and learning to set career and academic goals.
- Phase II provides further networking and professional development by matching mentees to conferences and workshops that align with their academic and research goals. Our organizational partners support small groups of mentees through travel grants, scholarships and other types of funding support to attend their events. Discipline-specific mentors are recruited to provide one-on-one or small group interaction with students during these meetings. In most cases, at least 2 students attend each conference to sustain peer-to-peer collegiality and support.

- Phase III is the ‘capstone’ phase. It takes mentees on tours of federal agencies where they learn about career, funding, research and internship opportunities. Mentees hear presentations from and network with program directors and agency representatives. Mentees gain exposure to the legislative system and learn how it impacts funding for professional development programs for URMs in the STEM fields. Mentees fine-tune professional skills through in-house workshops focusing on CV/resume development, oral and poster presentations, career goals, and post-graduation planning. These workshops expand upon skills addressed during Phase I. Hosted by NSF, mentees prepare posters of their research and present to an invited group of representatives in STEM initiatives from the federal, state and private sector. At the conclusion of Phase III, each student receives a fellowship of up to \$1,000 and designation of “MS PHD’S Fellow.”

Slide 9 - MS PHD’S Mentoring: MS PHD’S uses a tiered mentoring structure. We have Program Mentors who are successful underrepresented scientists and serve as role models. They remain engaged with students through all phases and beyond. They participate in all activities during Phase I and III. Meeting mentors are both URM and non-URM scientists. They support students by volunteering their time to share meeting/conference activities – attend sessions and debrief together – offer additional career/goal advice, networking – introduce students to their colleagues - share information on program and research opportunities. The Dream Team are MS PHD’S alumni that are student or recent grads. They provide near peer mentoring, share experiences, develop leadership skills by working with mentees and helping facilitate program activities/logistics. The Staff coordinates program activities, identifies and facilitates outside opportunities for participants, helps students with applying to various opportunities by providing letters of recommendation, critiquing application materials, etc.

Slide 10 – MS PHD’S Community Building: Community building activities facilitate bonding and support between participants. They have an opportunity to have fun and bond with each other while also gaining science exposure and networking through field trips to places such as California Academy of Sciences, Aquarium of the Bay, Smithsonian museums, we even do a group photo at the Einstein statute. They have a multicultural food festival where each participant prepares a favorite dish representative of their cultural background. And lastly, we have two closed discussion groups – the men’s Our Voices: Affirming and Empowering Brothers and Women’s Talking Circle where they share their most private challenges, obstacles and fears and counsel each other on strategies to overcome.

Slide 11 – MS PHD’S Professional Development: In addition to professional development opportunities afforded by participation in major scientific conference and professional society events, participants engage in program facilitated professional development activities. Mentees work closely with the program’s Professional Development Consultant, Program Mentors and Program Staff to develop and expand skills through these exercises.

- They set up a public profile to showcase research, goals, select pubs and presentations – useful when applying to opportunities.

- They give 5 minute self-introduction of background and goals to cohort members which they

update at Phase 3

- They develop short, mid and long-term goals which are then refined through discussion with mentors
- They participate in brown bag discussions on creating a better CV/resume and strategies for better oral and written presentation skills
- At Phase 3 there is the NSF hosted poster session and individual meetings with congressional representatives

Slide 12 - MS PHD'S Virtual Community: The virtual community is used to share successes, disseminate opportunities, provide ongoing mentoring and support, and maintain continuity of networks formed through the program. We have various technologies and social media. We support the structure and moderation of the virtual community but it's the participants who collectively keep it interactive and productive.

Slide 13 - Impacts: Overall 96% of mentee survey data indicates agreement on need for program. Benefits cluster around three central themes of community engagement and support, networking, and professional development.

Slide 14 - Impacts: After entering the MSPHD'S program, the relationships students form and the supportive networks they build last throughout their career! We've even had one marriage! Jose and Maria met in Cohort II – today they are married and starting a family while completing their PhD's. Holly, a cohort 4 mentee, is now a professor at University of Colorado, Boulder and a Program Mentor. Al-Aakhir, a cohort 2 mentee, has served several times as a Dream Team mentor and is currently working as an engineer for a not-for-profit research and development laboratory.

Slide 15 - Outcomes: The program has facilitated the recruitment and retention of 213 URM students with 47 having obtained a doctorate and another 67 enrolled in doctoral programs. MS PHD'S fellows have opportunities to become "Dream Team" (peer) mentors, program mentors, and staff. They also have opportunities to engage in STEM community as speakers and presenters at conferences, meetings, workshops, panels and webinars. Our organizational partners play a major role in facilitating the success of our program goals through their support in providing opportunities to the students.

Slide 16 - Outcomes: Through MS PHD'S activities, participants have produced 399 products as of September 2013. Another 12 abstracts have been accepted for upcoming 2013-2014 activities.

Slide 17 - Outcomes: The program also facilitated a new initiative Beyond the PhD to provide continue support of early participants as they transition into the workforce. The pilot was a two-day workshop held at University of Texas, Arlington in November of 2011 and covered these topics. Pending funding opportunities, we hope to continue with future Beyond the PhD workshops.

Slides 18 & 19 – Questions, Acknowledgments: Questions? Thank you to NSF, NASA and our many organizational partners for their support!