Connections

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www.APSBridgeProgram.org

Bridge Program Makes Significant Headway in Closing Achievement Gap

Now in its fourth year, the APS Bridge Program (APS-BP) is on track to eliminating the achievement gap between undergraduate and graduate degrees earned by underrepresented minorities (URM) in the United States. Only about 30 additional URM PhDs per year will bring the current 5-6% PhD rate up to 10% – the current percentage of undergraduate degrees awarded to URM students in physics. In 2015, we placed 28 students into graduate programs, and our applicant pool has grown each year as students and their advisors become more aware of the program. These are 28 individuals who would not be studying physics today without the Bridge Program, and who will likely receive a PhD in a few years and begin to lend their energies to solving difficult problems and mentoring the next generation.

While too early to know the outcomes, 95% of our students are still on track to receive a PhD – comparing favorably with the discipline average of 60%. Additionally, the program is learning lessons that can help all graduate programs and students. One example is the formation of graduate student organizations in physics. These groups provide peer mentoring for students, break down isolation barriers, and provide student representation. Nearly all bridge program sites have developed or fostered such groups, and report significant advantages to their programs. The project is building on these achievements thanks to the strong support provided by APS members and the National Science Foundation.

Few Underrepresented Minorities Receive Degrees in Physics

About a third of all college age students in the United States identify as underrepresented minorities (URM: African, Hispanic, or Native American), but only about 10% of undergraduate physics degrees are earned by individuals from these groups. Role models are hard to come by, as the statistics worsen at the doctoral level: only 5-6% of domestic PhDs are URM. The reasons are varied: not enough money to apply to many schools, performed poorly on the GRE, poor math preparation in high school delayed performance as an undergraduate, received poor advice, or didn’t think they would measure up.

In physics, the addition of about 30 PhD degrees each year will bring the percentage of URM students receiving PhDs up to the same percentage of those students receiving bachelor's degrees. The Program has surpassed its expectations and is well on the way to achieving its goal.

Underrepresented minorities (URM) currently earn about 10% of all bachelor's degrees and 6% of all PhDs in physics. Trends in these degrees have not changed much in the past 15 years while the US population has continued to become more diverse. Elevating the rate at which URM students receive PhDs to match that of bachelor's degrees is the primary aim of the APS Bridge Program, and can be achieved with only about 30 more degrees each year.

University of Central Florida (UCF) and Indiana University are two of the newest APS Bridge Program selected sites. Members of the newest cohort of Bridge Students (left-right) Brian Zamarripa-Roman, Fernand Torres-Davila, Christopher Tiller, and Michael Sagapolutele have settled in well at UCF under the leadership of Department Chair Talat Rahman.

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Ethel Perez-Hoyos is in the PhD program at Ohio State University, starting out in OSU’s Bridge Program in 2014. Ethel completed her BS in Physics and Mathematics at West Virginia University (WVU).

What motivated you to apply to the Bridge Program?
I found that the Bridge program offers an excellent alternate admissions pathway that has allowed schools to tap into excellent physics PhD candidates, where the traditional admissions systems have failed. With most undergraduates starting the process 12 months before application due dates, applying to multiple universities, multiple required external tests, and for-profit companies advertising their “must have” test taking strategies, the admission process itself can become unnecessarily complicated and somewhat of a minefield for some.

What is your area of research interest?
Experimental condensed matter physics. My current project is on the synthesis of novel 2D Transition Metal Dichalcogenide (TMD) materials, specifically molybdenum disulfide (MoS₂) and vanadium disulfide (VS₂). These are exciting materials that, due to their reduced dimensionality and symmetry, present a new realm of phenomena that bulk 3D materials do not have. These materials have the potential to revolutionize electronic devices.

Do you feel like the Bridge Program has prepared you for a PhD program?
I was very excited to continue my studies at OSU after my undergraduate record was able to contribute and expand towards a complete physics core. The Bridge Program has helped me immensely. My mentors at OSU have helped me to choose a balanced load of courses that have further developed my conceptual understanding of physics. Working with the tutors, I have been able to develop strategies that help me work on my own learning techniques and problem solving strategies. At the same time, I was able to contribute and expand graduate education. One thing I like about the OSU Bridge program is its flexibility. The selection of classes are tailored to address the specific needs of the student in working towards a complete physics core. Moreover, the best thing about the program is the community of great people that are helping you succeed. I feel truly fortunate to belong in a community of so many people that care and want to see me become a better scientist.

Daniel Silva joined Florida State University’s bridge program in 2014. As an undergraduate physics and math major at California State University Long Beach, Daniel attended an REU at UC Davis that sparked his interest in obtaining a PhD in physics. Having been informed of the APS-BP by his research advisor, Daniel felt encouraged to apply and pursue a graduate degree.

Less than a year after joining FSU’s Bridge program, Daniel successfully entered their PhD program. He believes the bridge program has prepared you for a PhD program and has a bright future as a physicist.

As an undergraduate, Douglas Tuckler always set his sights on attending graduate school, and now he is on track to earning a PhD in physics. Without remarkable grades and sufficient research experience however, securing entry into a PhD program through the typical path was not an option. Fortunately, his undergraduate advisor at Florida International University, Dr. Pete Markowitz, informed him of the APS Bridge Program. He applied in the program’s second year, one of 60 applicants. Although not offered admission into any of the four established bridge programs at the time, his application was passed onto a second round of graduate schools that agreed to look at bridge applications that year. The University of Cincinnati offered him admission in the summer of 2014, and Douglas accepted.

Though the material is challenging, Douglas is flourishing at UC, passing his PhD qualifier and acing his advanced coursework. Douglas’ research interests lie in high energy theoretical physics, and he aspires to work in the Perimeter Institute for Theoretical Physics in Canada. Douglas found a welcoming atmosphere and camaraderie among the graduate students at UC, a school he never considered when applying to graduate school initially. Impressed by the research occurring there, he is extremely happy with his choice. Douglas’ undergraduate record did not reflect traditional indicators of success in graduate school, but given the opportunity, he is excelling in a challenging field and has a bright future as a physicist. “I’m happy to be at UC...this is an amazing program that gives students great opportunities,” says Tuckler about the Bridge Program.

APS Profile: Bridge Program Manager
Dr. Geraldine L. Cochran has assumed the role of APS Bridge Program Manager as of January 2016. Cochran earned her bachelor’s degrees in physics and mathematics from Chicago State University. It is there that she became interested in physics teaching and physics education research. She earned a master’s degree in teaching with a specialization in secondary school physics, which afforded her the opportunity to gain more experience in teaching at the secondary level. She later earned an Ed.S. and her PhD in science education and curriculum and instruction, respectively, with a cognate in physics from Florida International University.

Cochran came to APS after serving as the Associate Director of the Multicultural Center for Academic Success (MCAS) and an Adjunct Professor at Rochester Institute of Technology (RIT). In her role at MCAS, Cochran supported STEM student initiatives by collaborating with the STEM colleagues at RIT, writing grants to support MCAS programs, and completing assessment and program evaluation for the center.

She also advised a caseload of STEM students, an aspect of her role she greatly enjoyed. As an adjunct professor at RIT and Nazareth College (through a collaboration with RIT) Cochran was able to continue teaching courses in mathematics, STEM education, and physics teacher preparation.

Cochran is very excited to join the American Physical Society and to manage the APS Bridge Program. She is passionate about increasing diversity in physics and supporting inclusive environments that encourage individuals to capitalize on the benefits that diversity offers. Having faced
played a significant role in helping to prepare him for a PhD in physics. He found the professors at FSU enthusiastic about helping him achieve his goals as well as very caring about students’ well-being.

Upon completion of his PhD, Daniel plans to work in the private sector in his chosen field of interest, Condensed Matter Research. He is currently working on spin systems, specifically long-range vs. short-range interactions. Daniel believes the Bridge Program is “a great opportunity for anyone interested in pursuing a graduate education in physics.”

What advice do you have for aspiring URM physics graduate students?

The Bridge Program is a very flexible program that will provide you with the tools and experiences to help you achieve your goals. Like any other graduate program, it requires a lot of hard work and will not be devoid of highly rewarding challenges, yet at the same time it is designed to give you the best support to succeed.

The annual Bridge Program Conference and inaugural National Mentoring Community (NMC) Conference was a resounding success. Over 175 faculty, bridge students, mentors, and mentees attended the conference at Florida International University in Miami on October 9-11th, 2015. The next Bridge Program conference will be held in February 2017.
Manuel Bonilla and Joshua Robles-Garcia are both APS-BP students at the University of South Florida (USF) in Tampa. Manuel is in his third year in the program, while Joshua is in his first. Both students have bonded over the usual rigors of graduate school, but they also shared a unique transition: both completed their undergraduate studies at the University of Puerto Rico at Humacao (UPRH) and came to the US mainland for graduate school. Here’s what they had to say about their experiences so far:

**How was your experience so far in the bridge program?**

**Joshua:** My first semester at USF was excellent. Having previous Bridge and Spanish-speaking students at USF helped me understand the graduate courses I was taking a lot better. I found the courses challenging but not impossible. The Bridge Program is helping me overcome my limitations in order to obtain a PhD in Physics. **Manuel:** If it were not for the BP I would not be pursuing a graduate degree in physics. The BP gave me the chance to pursue my goal. Through the program, I’ve had the opportunity to attend conferences where I met inspiring people and saw firsthand how vital it is to get students like me accepted into graduate school. The BP gave me the confidence to believe I belong in graduate school. I now believe anyone who is willing to strive in graduate physics should have the opportunity to do so, regardless of if their profile matches statistical standards that do not account for underrepresented minorities.

**How would you describe your relationship with your fellow Bridge student?**

**Manuel:** Joshua and I were good friends at UPRH since our research advisors shared a laboratory. We spent a lot of time doing research in the same lab. We’ve become really good friends and help each other, mutually, as much as we can. **Joshua:** I would consider us to be friends. Every time I have concerns about courses or any problems at USF, I contact Manuel for advice. As a veteran bridge student, **how do you work with Joshua?**

**Manuel:** Rather than a mentor, I feel like a friend. I remember when I arrived at USF I did not know anybody and it took time to find people to talk with. I talk to Joshua about the courses I’ve taken and my ongoing research projects. Even though I am a PhD student now, I still identify with Bridge students because of the good experience I had as part of the program.

**How was the transition from Puerto Rico to USF? What is the best piece of advice Manuel gave you, as an experienced Bridge student?**

**Joshua:** My transition from UPRH was easy since I already had family and friends in Tampa and Orlando. Manuel also helped me a lot in my transition. Having a friend and staff who speak Spanish at USF made it easier. The best advice Manuel gave me was last semester when he suggested that I not take a very heavy course load. **How do you like Tampa and USF?**

**Manuel:** Tampa is a good-sized city with a diverse community in which I feel I can fit in comfortably especially compared to other places in the States. It is very diverse and the weather is similar to Puerto Rico, where I was raised. **Joshua:** The faculty at USF are pleasant and helpful. I like my research and my research group…as well as the weather. **Can you describe your research?**

**Manuel:** I am currently working at the Surface Science Laboratory under Dr. Matthias Batzill and will soon finish coursework requirements for the PhD program. **Joshua:** Last semester I joined the Functional Materials Lab. I’m working on the synthesis of magnetic nanostuctures. I’m currently getting ready to apply to PhD programs.

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**Fellow Puerto Rico Graduates Succeed in USF Bridge Program**

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**Join as a Member or Partnership Institution**

**Member Institution**

The APS-BP is developing a coalition of academic institutions that share a commitment to increasing educational opportunities for underrepresented minority (URM) physics students.

**Partnership Institution**

The APS-BP is developing a national network of graduate institutions where bridge and other students, if admitted, will receive mentoring and assistance in making the transition into a doctoral program. Among the benefits of becoming a Partnership Institution are:

- Eligibility to apply for a Partnership Grant for up to $10,000 to improve access to graduate education, especially for URM students.
- Early access to APS-BP bachelor’s and master’s student applicant database.

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**Students: Apply for the Bridge Program**

The APS Bridge Program aims to increase the number of underrepresented minorities who earn a PhD in physics by helping students gain admission to graduate programs. **Eligibility Requirements**

Underrepresented minorities who will complete or have already completed a bachelor’s degree in physics or a closely related field and plan to pursue a physics doctoral degree.

**Deadline:**

March 21, 2016

**More Information:**

Email: bridgeprogram@aps.org or www.apsbridgeprogram.org/

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