How APS is Bridging the Gap in Physics: The APS Bridge Program

Physics, like all disciplines in science and engineering, loses talented underrepresented ethnic and racial minority students in the transition between undergraduate and doctoral degrees, with the percentage falling from about 11% to about 6%. Bridge programs can plug this leak in the physics pipeline, by helping motivated and talented students find programs that allow them to shore up foundational coursework, and receive guidance to complete advanced degrees.

The APS Bridge Program, now in its fourth year, and continuing its substantial growth in placing students into graduate programs – none of whom would have been admitted without this program. This year we had 90 applicants, and were able to place 40 of these into 19 different programs. Students receive mentoring, and are monitored closely to ensure obstacles to their success are circumvented, and APS monitors every student to learn more about how students succeed, and why they sometimes fail.

Currently, 86% of our students remain in the program and this year we admitted more than enough students to equalize graduation rates of underrepresented students between baccalaureate and doctoral degrees – essentially plugging the leak. The significant culprit in all of this remains graduate admissions and retention strategies. We are now looking at approaches to take lessons we have learned to a broader audience and help shape graduate education throughout the discipline – and beyond. Stay tuned!

Bridge Site Highlight: Indiana University

2nd-year IU Bridge Fellow Joseph (JB) Holmes in the lab of Prof. Bogdan Dragnea (IU Chemistry and Physics), operating the femtosecond laser to excite nanoparticles incorporated into a virus-like structure, aimed at improved single biomolecule imaging and tracking.

At Indiana University, we are currently in our second year of operation as an APS Bridge Program site. With a roster of 34 full-time teaching faculty, 10 research faculty, and roughly 120 postdocs and graduate students, IU Physics has vigorous research programs in accelerator, AMO, astrophysics, biophysics, condensed matter, nuclear, and particle physics, and offers an extensive curriculum, including a broad array of laboratory-based courses.

Our Bridge Program benefits from an environment that promotes interactions among faculty, staff and students, enabling us to provide effective mentoring of Bridge Fellows. It also benefits from a vibrant and talented cohort, all of whom began to work with research groups from early on while taking a full complement of graduate and/or advanced undergraduate courses. One Fellow who entered in Fall 2015 has transitioned into our Ph.D. program following successful completion of core graduate courses, while two others are completing these courses this year. With three newly (Fall 2016) matriculated Fellows, we have reached our envisioned steady state size. The Fellows are contributing as strongly to the character and success of our department as we hope our program is to their professional and personal development.

— Jon Urheim, PhD, IU BRIDGE SITE LEADER

Partnership Site Highlight: UT Arlington

An APS-BP Partnership Institution, the University of Texas at Arlington is a Hispanic-Serving Institution, and also a Carnegie Research One university. We want to foster research excellence while also providing opportunities to underserved communities, which is why participation in the APS-BP was such a no-brainer for us. It has become part of our general strategy to recruit excellent US students. Our Bridge Student, Marialis Rosario-Franco, completed her undergraduate work at the University of Puerto Rico at Humacao, and has become a real star in the department. Our Dean has made additional Teaching Assistant slots available to us for students that we recruit through the Bridge Program, so we look forward to recruiting more students in the future. We have also received excellent ideas and feedback from the APS staff, including discussions that led to the founding of the PGSA, which we see as really benefiting the students and the department as a whole. Thus the whole department is very supportive of our involvement with the APS Bridge Program.

— Ramon Lopez, PhD, UTA BRIDGE SITE LEADER

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Zack Hall

Towards the end of his undergraduate career, Zack Hall, III discovered that he wanted to further his education by earning a Ph.D. in physics. However, a lack of knowledge of what was necessary to be successful in graduate admissions left him seeking direction. Under the keen advice of his advisor, Zack was encouraged to apply to the APS Bridge Program, in the hopes of becoming more competitive for admission to PhD programs, and to fill any gaps in his physics knowledge.

In 2014, Zack accepted a position in the California State University, Long Beach (CSULB)'s Bridge program, where he has thrived. His Master's thesis work at CSULB focuses on using computational and analytic techniques to study fluid oscillations of compact stars through linear perturbation theory in the framework of general relativity. “I'm grateful that an opportunity like [The Bridge Program] exists,” says Zack. “The faculty in the department at CSULB are very supportive and want to see you succeed at everything you do.”

Aidan Zabalo

Aidan Zabalo entered Florida State University (FSU)'s Bridge Program in 2014 to prepare to apply to a PhD program in physics. Recently, he successfully completed his master’s thesis in experimental condensed matter physics at FSU and joined the PhD program at Rutgers University. He plans to do his PhD in theoretical condensed matter physics studying strongly correlated electron systems.

Like many Bridge Fellows, Aidan applied to the APS Bridge Program because he was looking for a way to make himself a more competitive candidate for graduate school. He had not taken the Physics GRE and planned to take a gap year, continue his research, and study on his own for the GRE. Taking graduate classes, performing research, and writing a master’s thesis seemed like a more structured version of his initial plan and he decided to apply.

Aidan hopes to combine his love of teaching with his passion for research as a university professor. "The APS Bridge Program has done an excellent job preparing me for a PhD in physics. The ability to take graduate courses will certainly give me a head start in both the coursework and research required for the PhD. I have also improved my ability to conduct independent research and write scientific papers. I have no doubt that these skills will carry over and I can not think of any other way to have prepared myself more effectively for a PhD program.”

“My experience in the Bridge Program has been nothing but positive,” Aidan says. “The dedication of everyone involved to help see this program succeed has made me truly grateful for this opportunity.”

The APS Bridge Program now includes over a hundred member institutions (black dots), and is building a strong cohort of bridge sites (red) and partnership institutions (blue). “Affiliated” (green) sites have also accepted students. As students often consider geography in making graduate school choices, we will continue to expand our network of partner institutions nationwide.

For More Information:

Please visit our website at www.apsbridgeprogram.org, for more about opportunities to apply for membership or partnership affiliation, and/or to become a Bridge student. Information about upcoming APS Bridge Program conferences can be found at www.apsbridgeprogram.org/conferences.