

To Ph.D. or Not to Ph.D.?

SUMMER PROGRAM TRIES TO HOOK DISADVANTAGED STUDENTS, AND LARGELY SUCCEEDS, ON THE PLEASURES AND REWARDS OF BIOMEDICAL RESEARCH.

WITH EASELS LINING THE HALLWAY ON EITHER SIDE OF HIM, 22-year-old Miguel Edwards demonstrated to several eager young researchers how he spent the previous summer tugging on RNA held in place by a laser beam. Fingers pinched together, he mimicked how micropipettes gently yanked on the RNA molecules, allowing him to calculate the kinetics and thermodynamics involved in RNA binding.

The scientists participating in this exchange at HHMI headquarters in May were current and former students in the Institute's Exceptional Research Opportunities Program (EXROP), which provides a summer of research experience to talented disadvantaged undergraduates by pairing them with HHMI investigators and professors.

Edwards, a native of Dominica and a 2007 graduate of CUNY–Hunter College, did his RNA work in HHMI investigator Carlos Bustamante's lab at University of California, Berkeley. He says his time there solidified his career plan. "The EXROP experience helped me decide I want to continue with research."

As EXROP enters its fifth year, some 95 percent of the 128 students who have completed the program and graduated have chosen to stay in science and medicine. Moreover, most of the students are pursuing post-baccalaureate work, with the largest number planning on research careers. Fifty percent have entered graduate programs—to earn master's, Ph.D., or M.D./Ph.D. degrees—and 25 percent have chosen medical school. Another 20 percent of the students have opted to pursue research-related activities, such as becoming a laboratory research technician, while 2 percent are teaching and 3 percent are planning non-science-related activities.

The biggest career "problem" facing most of these students has not been whether biomedical professions are attainable but whether the best path is research, clinical medicine, or both.

At the event, HHMI President Thomas R. Cech spoke directly to the students' struggles, noting he had heard some of them say they "would prefer to get an M.D. because it's a simpler career track." With four years of medical school, followed by residency, becoming a physician offers some certainties in the way of training. By contrast, the time it takes to earn a Ph.D. depends on the program, the project, and research outcomes, leaving a student to count on anywhere from four to eight years for degree completion, followed by an open-ended postdoctoral fellowship. A combined M.D./Ph.D. path is even more complicated, as it involves interrupting medical school with a doctorate program.

Clearly hoping to motivate the students toward a Ph.D., Cech noted that "this country needs people like you standing in front of the classroom, and teaching is largely the activity of Ph.D.s." He

acknowledged that many M.D.s do outstanding research, but Cech stressed that "Ph.D.s get highly rigorous research training."

That kind of encouragement, combined with strong mentoring, is what Naira Rezende says helped her decide to pursue a Ph.D. While an undergraduate at CUNY–Hunter College, the Brazil native conducted summer research in the Massachusetts Institute of Technology lab of HHMI investigator Tania Baker, where she heard about EXROP. The following year, Rezende participated in the program, working in the laboratory of HHMI investigator David Schatz at Yale University. The year after that, she received a 2005 Gilliam fellowship (named after charter HHMI Trustee James H. Gilliam Jr.), which provides up to five years of financial support for graduate study; it is available only to the most competitive EXROP students.

Rezende credits all her mentors with demonstrating that science was a promising career path for her, but she found the example set by Baker as a successful woman in science particularly reassuring. Currently in a Ph.D. program at Weill Medical College of Cornell University, Rezende hopes one day to run her own academic research lab.



Keynote speaker Shirley A. Malcom (right), head of education and human resources at the American Association for the Advancement of Science, focused on increasing diversity and opportunities in the sciences.

Research experience gained through EXROP can sometimes tip the balance one way or the other for a student who is deliberating about the future.

For example, Jasmine Ellis spent this summer working in HHMI investigator Morris Birnbaum's lab at the University of Pennsylvania. A Princeton University sophomore, Ellis has her sights set on medical school but sees her EXROP summer as a terrific opportunity to test the research waters. Ethan Sanford, on the other hand, spent his summer working in David Ginsburg's University of Michigan laboratory. Surrounded by M.D.s and Ph.D.s in Ginsburg's lab, Sanford observed that M.D.s who truly wanted to conduct research could do so. That gave this University of Colorado, Boulder, graduate, who is eager to choose a path with plenty of patient interaction, the confidence to apply to medical schools. ■ – LISA SEACHRIST CHIU

FOR MORE INFORMATION on the work of Carlos Bustamante's lab, see "A Different Mindset," page 14.