Higher rates of attrition of women and minorities from scientific paths at the doctoral level are an ongoing concern. Several factors contribute to this drain of talent: (i) socio-cognitive stress (e.g. feelings of isolation); (ii) limited access to career advice networks, particularly during academic transitions; and (iii) tension between personal values and perceived culture & expectations of academic research. Studies show that minority-serving institutions and undergraduate programs that offset the sense of isolation can increase persistence in science. Applying these interventions at later training stages and at research-intensive institutions presents obvious challenges. Through the NIH-supported Yale Ciencia Academy, we have leveraged a large and dynamic Hispanic science network, the Ciencia Puerto Rico community (www.cienciapr.org), to enhance the training and retention of minority graduate students in science. Specifically, we: 1) create online learning communities that close the geographic gap between graduate students and role models, mentors, and peers from similar cultural backgrounds; 2) provide training that addresses common gaps and provides skills for professional development; and 3) enable trainees to contribute to their community of origin through science outreach. Now in its second cohort, the Yale Ciencia Academy has recruited a total of 62 scientific role models, and 74 life and behavioral sciences graduate students from 36 universities in Puerto Rico and the U.S. to date. We are examining the impact of the program with respect to (a) enhanced feelings of competency in science and positive expectations for a scientific career; (b) larger and more focused individual professional networks; (c) competency in important academic and professional skills; and (d) awareness of social value as scientists. AT FOBGAPT 2017, we will be ready to share preliminary results with respect to baseline measures of students’ perceived graduate school environment; career interests and expectations; experience with mentors and networks; professional development experiences and attitudes; and scientific and social identity.