

## **Board 406: The Rising Doctoral Institute: Helping Racial and Ethnic Minority Students Overcome the Transition into the Engineering Ph.D.**

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Abimelec Mercado Rivera is a Puerto Rican doctoral student and graduate research assistant in the Engineering Education Systems and Design program at Arizona State University. Abimelec received his Bachelor of Science in Mechanical Engineering at the University of Puerto Rico at Mayaguez (UPRM) in 2016. After working in the aerospace industry, he returned to the UPRM for his MS in Mechanical Engineering in 2017, where he pursued ways to tailor ideation methods to interdisciplinary teams as part of his thesis work, and had the opportunity to teach undergraduate ME courses. His previous efforts and experiences in engineering education, as well as his lived experiences as a father, helped shape his overall goal of fostering human-centered education systems, which led him to pursue his PhD at ASU.

## **The Rising Doctoral Institute: Helping minority students overcome the transition into the engineering Ph.D.**

Studies on graduate education have shown that underrepresented racial and ethnic minorities (URM) finish PhDs in engineering at lesser rates and longer timeframes than their majority counterparts [1], [2]. While multiple interventions have been designed for students considering their decision to apply for graduate school, few focus on the transition into those doctoral programs. Graduate student development frameworks argue that it is during this initial transition into doctoral education that graduate students suffer the largest dissonance with their environment [3]. Students typically enter the Ph.D. with misconceptions about what pursuing a doctoral degree entails. When students fail to correct these misconceptions as they progress through their programs, they are more likely to struggle and make decisions that are harmful towards their degree progress, and ultimately, they are less likely to finish their degree [4]. Our prior research has shown these findings to be present and latent in the experiences of URM students in engineering doctoral programs [5]–[7].

To prepare URM doctoral students for this transition into the Ph.D., we developed the Rising Doctoral Institute (RDI) [8]. The RDI is a workshop directed to incoming doctoral students who self-identify as racial or ethnic underrepresented students in engineering, and they participate in the workshop before joining their graduate programs in the Fall semester. This poster presentation aims to discuss the process of the design of the RDI, its implementation across five U.S. institutions, and our initial research findings regarding doctoral student development.

The RDI curriculum is informed by research into the experiences of advanced graduate students, who have identified topics and strategies that could have been helpful to their specific needs earlier in their degree [9]–[11]. The sessions include topics crucial to participants' success in graduate school, such as time management, advisor-advisee relationships, building the dissertation committee, and managing their funding, among others. As such, the RDI offers students tools, strategies, and a network that can help them successfully transition into their Ph.D. and maintain degree progress throughout their studies.

While the RDI serves as a primer to URM students beginning their engineering doctoral programs, every iteration of the RDI continues to increase our rich student dataset, which will aid to advance the understanding of URM students' transition to the Ph.D. process. As such, the workshop's pre- and post-surveys, longitudinal focus groups, and individual interviews are designed to provide insights into the transition students face when entering the engineering Ph.D. For example, the 2021 RDI included a set of pre-interviews that allowed us to explore the ideals that URM students held while choosing an institution to join, and the compromises they made during this process [12]. However, our data collection practices are not only designed to capture observations, but also to validate the students' lived experiences and support their success as they join their programs. In this line, participants of the 2021 workshop were invited to participate in focus groups that met approximately once a month throughout their first year, which allowed them a safe space to discuss their experiences as URM students in engineering doctoral programs. These meetings also allowed us to explore how the students were experiencing key elements to their socialization into their disciplines during their first year.

To further our mission and strengthen the sustainability of our project, in 2022 our team expanded the reach of the RDI by training leaders from five institutions across the US, namely Penn State, UC Irvine, University of Florida, Iowa State and North Carolina A&T, who piloted the RDI in their institutions as part of their rounds of incoming student orientations. With the help of our team, each one of the collaborating institutions committed two leaders who oversaw the adaption and implementation of the RDI model to better meet their students' needs, while aiding their institutions' efforts to support diversity, equity, and inclusion. When adjusting the model, some leaders followed the 2-3 day-long workshop model of the original RDI, while others implemented it throughout the semester to suit their student's needs and availability. Here we implemented monthly individual interviews with students from these institutions, which will allow us to parse out their experiences during their first year, understand the effect of the RDI in their long-term success, and provide valuable feedback to the institutions.

Future work will include a showcase of the collaborating institutions who piloted their RDI in 2022, where they will recount their experience in creating their models of the workshop to an audience of future partner institutions [8]. The showcase will serve as part of a planned recruitment effort to continue to expand the RDI and make it available to more students across the Nation. Targeted partner institutions include a variety of land grant institutions, minority serving institutions, and major private institutions from across the Nation. This effort will increase the number of institutions running an RDI workshop with their incoming students, and will provide more diverse student perspectives that will continue to improve future iterations of the workshop, while continuing to promote and sustain the success of URM students in engineering doctoral programs.

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