

Redefining Electrical and Computer Engineering Faculty with Longitudinal Support for Women and Underrepresented Minorities

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1 Introduction

Despite numerous efforts to diversify electrical and computer engineering (ECE) faculty, the representation of women and underrepresented minority (W/URM) faculty remains critically low. Over the past eight years, the NSF-sponsored iREDEFINE program has hosted 207 underrepresented ECE postdoctoral scholars and PhD students in a two-day workshop aimed at motivating and preparing them to pursue faculty careers. This initiative has proven highly effective, with many iREDEFINE Fellows now contributing to academia. To expand its impact, efforts are underway to broaden and deepen the program by aligning its activities with key stages of participants' career development. The enhanced structure seeks to engage students earlier in their academic journey, increase mentorship touchpoints throughout graduate school, and extend support into the initial years of faculty appointments. This expanded initiative, known as the iREDEFINE Inclusive Mentoring Hubs (i²mHubs), is structured around three core modules.

Module 1 invites early-stage graduate students to explore academic career pathways by providing insights into the diverse types of faculty appointments, institutional settings, and the flexibility and autonomy associated with faculty roles. It also highlights the rewarding experience of mentoring and collaborating with students. The module will help participants identify actionable next steps to strengthen their preparation for academic careers. Content will be delivered online in a mixed-media format, combining informative resources with interactive opportunities for reflection and practical application of key concepts.

Students who successfully complete Module 1 will be invited to participate as iREDEFINE Fellows in Module 2, an in-person workshop held alongside the Electrical and Computer Engineering Department Heads Association (ECEDHA) Annual Conference & ECE*xpo*. This phase will focus on practical strategies for navigating the academic job search process. iREDEFINE Fellows will gain insights into ongoing tenure-track faculty searches, present their research to department chairs, and engage in mock interviews to refine their presentation and interview skills.

Module 3 will extend the mentoring experience by connecting iREDEFINE Fellows to a supportive network of peers and professionals through assignment to an i²mHub. Each i²mHub will consist of two to three iREDEFINE Fellows, one to two junior ECE faculty (iREDEFINE alumni), and one to two ECE academic leaders, such as current or former department chairs.

Through structured virtual activities, Fellows actively applying for academic positions will receive guidance from both junior and senior faculty within their Hub. This unique mentoring structure also fosters a multi-level support system, where senior members provide mentorship to junior faculty while encouraging peer mentoring among the iREDEFINE Fellows.

2 Background

According to the latest U.S. Census, 50.5% of the U.S. population identifies as female¹, and underrepresented minorities make up over 30% of the population^{2,3}. However, a significant gap persists between the diversity of the U.S. population and the representation of historically excluded groups among ECE degree recipients. Notably, ECE awards considerably fewer undergraduate degrees to women compared to the other 23 engineering and computer science (CS) degree programs examined in the most recent study conducted by the American Society for Engineering Education (ASEE)⁴.

In the 2021-22 academic year, women earned only 15.6% of all undergraduate Electrical Engineering (EE) degrees and 15.8% of all undergraduate Computer Engineering (CE) degrees. Joint ECE degrees showed a slightly higher representation, with women receiving 20.4% of those degrees. Similarly, underrepresented minority students were awarded just 19.8% of all EE degrees and 18.5% of all CE degrees, with joint ECE degrees awarded to URM students at an even lower rate of 14.3%.

Women have a slightly higher representation among graduate ECE degrees compared to undergraduate levels. In the 2021-22 academic year, they earned 20.6% of EE, 23.6% of CE, and 22.7% of joint ECE master's degrees. At the doctoral level, women were awarded 18.3% of EE, 21.2% of CE, and 16.7% of joint ECE PhD degrees. However, the representation of URM students in graduate ECE degrees remains critically low. URM students received only 7.8% of EE, 6.1% of CE, and 6.0% of joint ECE master's degrees in 2021-22. Their representation in PhD programs is even lower, with just 3.4% of EE, 3.6% of CE, and 3.2% of joint ECE doctoral degrees awarded to URM students.

The number of W/URM ECE faculty is also alarmingly low⁴. Only 15.3% of EE faculty, 20.3% of CE faculty, and 15.2% of ECE faculty are female-identifying. Only 2.7% of EE faculty, 4.4% of CE faculty, and 2.3% of ECE faculty are African American. Similarly, 2.8% of EE faculty, 5.1% of CE faculty, and 3.4% of ECE faculty are Hispanic. Research suggests that role models are extremely important in attracting W/URM students to engineering⁵. The lack of faculty role models is one of the major contributing factors to low persistence of W/URM students in ECE programs, thus perpetuating the cycle of underrepresentation⁶.

A limited number of national programs prepare graduate students for academic careers, with two of the most prominent being Preparing Future Faculty (PPF)⁷ and Rising Stars in EECS⁸. Established in 1993, PPF originated from a collaboration among multiple institutions aimed at equipping doctoral students with experience in research, teaching, and service responsibilities across diverse types of academic institutions. The program has been highly impactful, benefiting a significant number of graduate students. While some PPF initiatives focus on specific disciplines, none are dedicated exclusively to ECE graduate students. More critically, there is no

formal mentoring structure to guide students through the challenging transition into faculty positions.

Rising Stars in EECS is designed for URM doctoral and postdoctoral students ECE and CS who aspire to academic careers. This two-day workshop provides practical guidance on applying for academic positions, preparing for interviews, and navigating the challenges of the early years as a faculty member. However, like PPF, Rising Stars does not offer a formal mentoring program to support participants during their transition into academic roles.

There are also institution-specific initiatives aimed at preparing women and underrepresented minority (W/URM) doctoral students from various disciplines for faculty careers. One notable example is the Building Future Faculty Program at NC State University⁹. While these programs provide valuable support to participants at their respective institutions, they typically lack discipline-specific guidance and do not offer structured mentoring beyond the duration of the program.

3 iREDEFINE

Over the past eight years, iREDEFINE has hosted 207 underrepresented ECE postdoctoral scholars and PhD students in a two-day workshop aimed at inspiring and equipping them to pursue academic faculty careers. Supported by NSF grants #1663249, #1916976, #2016183, #2321316, and #2408861, the following seven in-person iREDEFINE workshops have been held alongside the annual ECEDHA conferences. (In response to the COVID-19 pandemic, virtual sessions were conducted in 2020 and 2021 to ensure continued access to the program's resources.)

- 2017 ECEDHA Annual Conference & ECExpo in Miramar Beach, FL
- 2018 ECEDHA Annual Conference & ECExpo in Monterey, CA
- 2019 ECEDHA Annual Conference & ECExpo in Tucson, AZ
- 2022 ECEDHA Annual Conference & ECExpo in New Orleans, LA
- 2023 ECEDHA Annual Conference & ECExpo in Santa Ana Pueblo, NM
- 2024 ECEDHA Annual Conference & ECExpo in Tucson, AZ
- 2025 ECEDHA Annual Conference & ECExpo in Norfolk, VA

3.1 ECEDHA

The strength of iREDEFINE lies in its strong partnership with ECEDHA. Founded in 1963, ECEDHA comprises nearly 250 chairs from departments offering accredited programs in electrical and/or computer engineering. The organization supports the ECE community by providing professional development opportunities, promoting best practices among educators, and fostering connections with corporations and government agencies involved in ECE fields.

The ECEDHA Annual Conference & ECExpo is the premier annual gathering of ECE department chairs from across the U.S. and Canada. The event features keynote addresses, industry spotlights, panel discussions, and focus groups, providing a dynamic platform for knowledge exchange and collaboration. A key highlight is the ECExpo, a large technology exhibition sponsored by industry partners, showcasing cutting-edge laboratory equipment and research tools.

The conference also offers extensive networking and social opportunities, with sessions and activities tailored to the location and theme of each year's event.

Over a decade ago, ECEDHA committed to enhancing the diversity of its programming and providing resources to help ECE departments do the same. Demonstrating this commitment, the ECEDHA Diversity Award was established in 2012 to recognize outstanding efforts in advancing cultural, ethnic, and gender diversity among ECE students and faculty. Since its inception, nine members of the ECEDHA community have been honored, including one of the co-authors, Agnieszka Miguel in 2020.

In 2016, ECEDHA partnered with Dr. Athina Petropulu (Professor and former Chair at Rutgers University) and Dr. Susan Lord (Professor and Chair at the University of San Diego) to launch iREDEFINE^{10,11}. This two-day workshop, held in parallel with the ECEDHA Annual Conference & ECExpo, leverages the conference's unique programming and the high concentration of ECE department heads to maximize its impact. Agnieszka Miguel has been involved with iREDEFINE since its inception and has served as the organizational lead since 2020. Barbara Marino joined the initiative in 2021 and has served as co-organizer since 2022.

3.2 Representative iREDEFINE Sessions

Each iREDEFINE workshop offers an engaging blend of interactive sessions, insightful panel discussions, professional development activities, networking opportunities, and social events. Although the content and schedule evolve annually to reflect emerging trends and participant needs, a few representative sessions are described below.

- **Strategies for a Successful Job Search:** In this session, workshop organizers and invited experts will share effective strategies for applying to academic positions. The session provides guidance on crafting a strong application package, including the cover letter, CV, teaching statement, research statement, and diversity statement. Additionally, participants gain insights into the academic interview process and how to navigate it successfully.
- **Institutional Diversity Panel:** In this panel, iREDEFINE Fellows will engage with ECE department chairs from a diverse range of institutions—varying in size, research activity, teaching expectations, and student demographics—including Historically Black Colleges and Universities (HBCUs) and Hispanic-Serving Institutions (HSIs). Panelists will share insights into the unique expectations and experiences of faculty life in their respective departments, highlighting the diversity of academic environments.
- **Faculty Panel:** In this panel, iREDEFINE Fellows engage with ECE faculty from local institutions who are members of groups traditionally underrepresented in engineering academia. The panelists participate in an open and candid discussion about their experiences as faculty members, offering valuable advice on navigating the challenges of the early years in academia. They share strategies for overcoming obstacles and building a successful academic career.
- **Negotiation Skills:** This session focuses on research-backed strategies to enhance negotiation skills, covering key topics such as identifying negotiation issues, understanding the negotiation process, and participating in practical exercises. Guided by Dr. Jenna

Carpenter, Professor and Founding Dean of the School of Engineering at Campbell University, Fellows apply these strategies through role-playing scenarios. The workshop also offers guidance on continuing to develop negotiation skills beyond the session.

- **How to Navigate the National Science Foundation:** In this session, iREDEFINE Fellows gain valuable insights into navigating the NSF, guided by a current division director. The presenter outlines the structure of the agency, highlights its current strategic priorities, and explains the proposal review process. Fellows receive practical advice on how to effectively interact with program directors and interpret feedback from the merit review to strengthen their future proposals.
- **Student Poster Session:** Students present posters highlighting their educational background, research contributions, selected publications, teaching experience, and leadership/service achievements, including awards. During this session, Fellows engage in meaningful discussions with department heads and chairs, sharing their scholarly accomplishments and career aspirations.
- **Mock Interviews:** This session aims to demystify the academic interview process and build Fellows' confidence in answering interview questions effectively. ECE department heads conduct one-on-one mock interviews, posing typical questions from academic job searches. Fellows receive immediate, constructive feedback to help them refine their responses and strengthen their interview skills.
- **Networking Breaks:** The breaks between sessions are scheduled to coincide with the networking breaks of the main ECEDHA conference, providing ample opportunities for the iREDEFINE Fellows to engage with one another and connect with the department chairs attending ECEDHA.
- **Industry Expo:** The industry sponsors of the ECEDHA conference host a technology expo introducing their latest products. The iREDEFINE Fellows have several opportunities to visit the *ECExp*o to learning about products that can be used in ECE education and research. This also provides an additional opportunity to network with the department chairs.

3.3 iREDEFINE Assessment

The effectiveness of the iREDEFINE workshop can be partly assessed by tracking the career outcomes of its Fellows. While it may be too early to expect recent participants to have secured faculty positions, Table 1 shows that 46% of iREDEFINE Fellows have obtained such roles.

These results can be attributed to a constantly evolving program. Over the past eight years of iREDEFINE, valuable insights have been gained by collecting feedback from iREDEFINE Fellows, workshop presenters, panelists, ECEDHA partners, and participating department chairs. This feedback was used to make continuous improvements to all aspects of the workshop, including the Fellow selection criteria, schedule logistics, and session topics. The following paragraphs summarize representative feedback from the recent 2023 and 2024 workshops. The results from the 2025 workshop was not available at the time of this printing.

Prior to attending the workshop, iREDEFINE Fellows were surveyed about their career

Year	Number of iREDEFINE Fellows	Current Position			
		Faculty	Post-Doc	Industry	PhD Student/Unknown
2017	35	9	23	1	2
2018	22	12	1	9	0
2019	32	10	5	12	5
2020	39	6	4	19	8
2022	37	5	5	8	19
2023	14	4	3	0	7
2024	28	4	3	1	20
Total	207	50	46	50	61

Table 1: Career choices of iREDEFINE participants. Note that there was no unique cohort in 2021 due to the COVID-19 pandemic.

aspirations and the factors that influenced them, as well as any professional training or mentoring they received during graduate school to help navigate their academic journey and prepare for future careers. Unsurprisingly, most expressed interest in pursuing a career in academia. While all Fellows were open to exploring other career paths, such as teaching a course or interning in industry during graduate school, only half had the opportunity to do so. Most reported that their research advisor was a strong mentor, but noted limited access to mentors outside their immediate research group.

The Fellows were also surveyed after attending the workshop. They were asked to rate the value of each session on a 5-point Likert scale. Figure 1 shows the great value placed on each of the sessions by the iREDEFINE Fellows. In their responses to open-ended questions, the Fellows reported that they would like more time to process what they are learning and experiencing. They would also like more unscheduled time to socialize and bond with each other. In addition, they wrote that more time to prepare for the poster and mock interview sessions would be very helpful. This feedback was incorporated in the 2025 workshop.

In addition, Fellows were asked about their career plans in the next one to three years, using a five-point Likert scale to assess their responses. Notably, as a result of attending the iREDEFINE workshop, interest in applying for academic positions increased, as did interest in pursuing postdoctoral opportunities. Interest in industry careers remained relatively unchanged (see Figure 2).

During the 2023 iREDEFINE workshop, Fellows were invited to participate in a focus group intended to gather feedback on their graduate school experiences. However, the session quickly revealed a deeper need for peer mentoring among the Fellows. They openly discussed challenges related to fitting in, confronting implicit bias, stereotype threat, and imposter phenomenon, and finding meaningful ways to contribute to their research groups. As these personal stories unfolded, a wave of recognition and relief spread through the group. The Fellows realized they were not alone in their struggles, and, in that moment, shifted from focus group participants to peer mentors, offering one another support, encouragement, and practical advice.

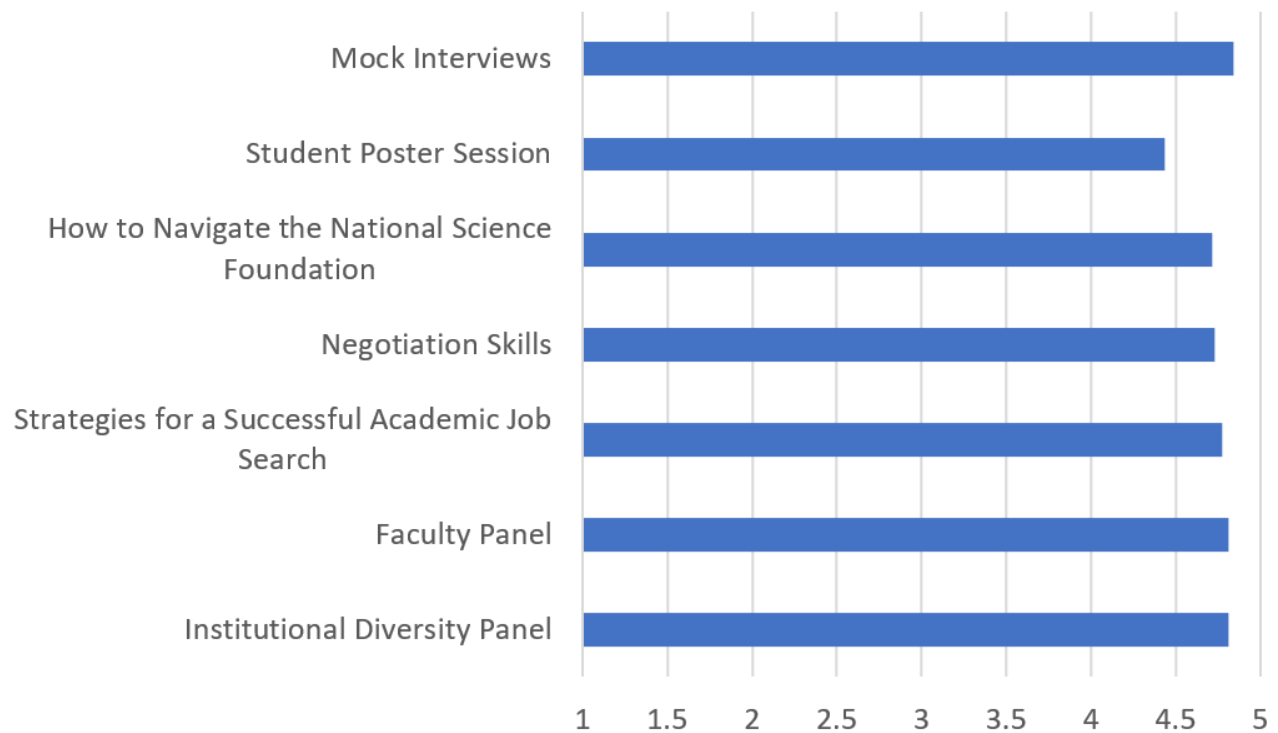


Figure 1: Feedback from the 2023 and 2024 Fellows on the Perceived Value of Each iREDEFINE Session (5-point Likert Scale: 1 = not valuable to 5 = very valuable)

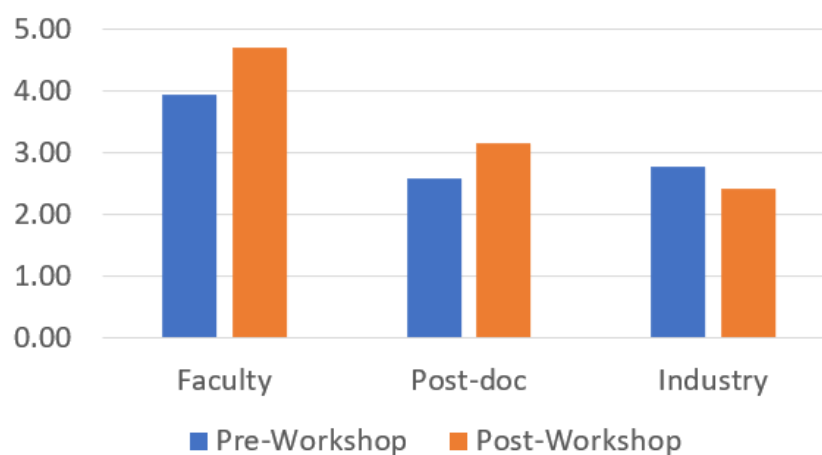


Figure 2: 2023 and 2024 Pre- and Post-Workshop iREDEFINE Fellow Career Interest (5-point Likert Scale: 1 = strongly disinterested to 5 = strongly interested)

Also in 2023, approximately 30 carefully selected department chairs, representing diverse races, identities, institutions, and geographic regions, were invited to participate in one of two focus groups held during the ECEDHA Annual Conference *ECExplo*. The chairs unanimously affirmed the value of the iREDEFINE program and pledged their continued support. As they work to diversify the faculty in their own departments, many expressed appreciation for the opportunity to engage with the Fellows and learn about their research and career aspirations.

The department chairs also offered thoughtful and generous suggestions for program improvement. They recommended that only students in the penultimate year of their PhD studies be invited to attend, noting that students earlier in their programs may not have a well-developed research plan, while those later may lack the time to fully benefit before entering the job market. To maximize the impact of the in-person experience, they also suggested shifting some content online to allow more time for mock interviews and to possibly include a CV review session. Many volunteered to help develop this online content, which could be shared with Fellows prior to the workshop. Suggested topics included the structure of a typical on-campus interview and commonly negotiated elements of a faculty start-up package.

4 Extending the Reach of iREDEFINE

Now mature, iREDEFINE is ready to grow beyond an annual workshop into mentoring hubs designed to support the iREDEFINE Fellows into the first few years of an academic appointment. The iREDEFINE Inclusive Mentoring Hubs (i²mHubs) will be populated by iREDEFINE Fellows, iREDEFINE Alumni in the first few years of a faculty appointment, and ECE academic leaders including current and former department chairs. The iREDEFINE workshop at the ECEDHA Annual Conference & *ECExplo* will still be the core of the i²mHubs but will be accompanied by a year-round program of virtual mentoring activities. Once part of the i²mHubs network, participants will always be able to count on the support and advice of other members of this network, even many years after they participated in the iREDEFINE workshop.

These new i²mHubs will undoubtedly have far reaching effects on the face of ECE that go beyond merely encouraging more W/URM PhD students to become faculty members. The result of this work has the potential to exponentially broaden participation in engineering. By forming structured connections between the iREDEFINE Fellows and ECE academic leaders, we intend to create pathways to academic administration for many iREDEFINE Fellows and Alumni. Furthermore, positioning role models in academia will increase the recruitment and retention of W/URM graduate and undergraduate students, widening the pipeline for the missing millions¹².

The mature program will consist of three modules described in the following subsections.

- Module 1: Introduction to Academic Careers
- Module 2: iREDEFINE
- Module 3: i²mHubs

4.1 Module 1: Introduction to Academic Careers

Module 1 will invite graduate students in their first few years of graduate school to explore the possibility of an academic career. Through mixed-media online materials, students can learn about the variety of faculty appointments, the diversity of institutions, the flexibility and autonomy of fulfilling faculty responsibilities, and the joy and gratification that comes from working with students, engaging in academic service and leadership, and conducting research. This module will also help these students prepare for an academic job search by demystifying the process.

Most graduate students attend R1 institutions and are advised by faculty heavily involved in research activities. To better understand the diversity of academic positions, faculty from a variety of institutions and in a variety of faculty appointments will be interviewed. They will be asked about their current responsibilities in the areas of scholarship, teaching, and service. Each faculty member will also be encouraged to talk about their unique career trajectory and how it was influenced by their personal and professional goals. These interviews will be edited for content and clarity and made available to the interested students. A series of prompts will be provided to encourage the students to reflect on the type of institution and position that most appeals to them and indicate how those contexts align with their own strengths and interests.

Many phenomena prevent W/URM students from pursuing careers in academia. Imposter syndrome, stereotype threat, bias and microaggressions are just a few. A combination of videos, presentations, and articles will be made available to help students understand the effects of these phenomena and present ways to overcome them. Since these are not unique to ECE, existing material will be sought out to supplement any newly created content. A culminating activity will help each student recognize their own challenging experiences and to develop appropriate responses (inward and outward) to mitigate the effects.

In the focus groups of ECE department chairs at the 2023 ECEDHA Annual Conference & ECExpo, department chairs indicated that, in their experience, many faculty candidates are not adequately prepared for the search process. To better prepare students through Module 1, a detailed description of typically-required application materials will be provided. In addition, department chairs from a variety of institutions will be interviewed about their expectations as they relate to candidates' application materials, preparation for the campus visit, and negotiations for salary and start-up funding. Students will be encouraged to draft these materials, as appropriate, based on the type of position and institution they are interested in.

The mixed-media materials will be hosted on the ECEDHA website, available to all who are considering a career in academia. The materials will demystify the process of applying for academic positions through a platform open to all, creating a more equitable process. W/URM participants will specifically benefit by understanding and learning to mitigate phenomena that might otherwise prevent their full consideration and participation.

The primary goal of Module 1 is to inform and excite W/URM participants about academic careers. The secondary goal, but intrinsically more important, is for Module 1 to serve as the opening to a funnel directing W/URM students to the second module of the proposal.

4.2 Module 2: iREDEFINE

Module 2 invites PhD students in the final two years of graduate school to take the next steps toward exploring and preparing for an academic career. Unlike Module 1, Module 2 will only be open to W/URM students in ECE who continue to express an interest in an academic career. Preference will be given to students who have fully participated in Module 1 in a timely and meaningful way. The selected students will earn the title of iREDEFINE Fellow and will be invited to participate in the Module 2 activities.

The pinnacle of Module 2 is a two-day in-person workshop held in parallel to the annual meeting of ECEDHA. Before the workshop, iREDEFINE Fellows will participate in several online group sessions to further refine their application materials. These group mentoring sessions will be led by the iREDEFINE facilitators who will provide guidance on preparing and presenting scholarship accomplishments and career aspirations in a poster format, assist the Fellows in preparing responses to typical interview questions, and help each Fellow identify areas in which they would like to further cultivate their experience to improve their chances of landing the type of position they desire.

The in-person iREDEFINE workshop will continue to include numerous sessions designed to build community among the iREDEFINE Fellows and with the ECE chairs attending the ECEDHA conference. The iREDEFINE schedule will include dedicated programming for the Fellows on team building, negotiation skills, and effective mentoring. The Fellows will have the opportunity to hear from junior ECE faculty (including iREDEFINE Alumni) about their experience from their own academic job search and the first years in academic positions. In addition, a panel of ECE department chairs will discuss what the search process looks like from their point of view.

The iREDEFINE schedule will include opportunities for the Fellows to interact with the attendees of the parallel ECEDHA conference. Select department chairs will be invited to review specific application materials (CV, cover letter, and teaching and research statements) of the iREDEFINE Fellows in order to provide constructive feedback. There will also be a mock interview session where each iREDEFINE Fellow will have the opportunity to engage in a mock interview with department chairs from various types of institutions and receive real-time feedback.

The iREDEFINE and ECEDHA schedules will merge for one common session, during which the iREDEFINE Fellows will have the opportunity to present their scholarship accomplishments and career goals in a poster session attended by the department chairs. This important session serves two goals. One goal is to give the Fellows the opportunity to apply the skills they have been honing throughout Module 1. A second goal is to provide the department chairs, many of whom will have faculty openings to fill, a sneak peek at the talent that will be on the job market in the coming years.

The iREDEFINE Fellows will also have numerous opportunities to participate in the ECEDHA activities. These will vary depending on the ECEDHA theme and schedule, but will often include the opening session, networking breaks, keynote sessions, and industry spotlights. The iREDEFINE Fellows will be invited to wander the notable exposition highlighting the latest educational products created by our industry partners.

Finally, iREDEFINE will serve as a starting point for Module 3 by establishing a mentoring community for the iREDEFINE Fellows. Each i²mHub will consist of two or three iREDEFINE Fellows, one or two iREDEFINE Alumni, and one or two ECE academic leaders, including current or former department chairs. The time together will be used for mentor/mentee training, networking activities and establishing group goals and agreements.

4.3 Module 3: i²mHubs

Module 1 provides resources specifically created and selected to help W/URM graduate students make informed decisions about pursuing a career in academia. In Module 2, guided by the iREDEFINE mentors, the Fellows refine this interest and begin to craft their application materials. Module 3 will provide more targeted mentoring for the graduates of the iREDEFINE workshop (still referred to as iREDEFINE Fellows) to offer individual guidance through the academic job search and into the first few years of an academic appointment.

These activities are a direct response to the feedback from the department chairs focus groups in 2023. The attendees lamented the lack of preparation of some recent candidates interviewing for faculty positions. They spoke of candidates who did not fully understand the diversity of faculty appointments, candidates who were not prepared to negotiate their start-up package, and candidates applying for teaching positions without any teaching experience. And, most importantly, the department chairs unanimously and enthusiastically expressed support for the work of this proposal.

The composition of the proposed inclusive mentoring Hubs is based on the latest research on best practices in mentoring¹³ and on feedback from previous iREDEFINE cohorts. Research shows that the most successful mentoring pairs are between two of the same race and gender so that the guidance provided affirms the mentee's gender, social, and cultural identities. Research also demonstrates the value of working with several mentors that represent different aspects of the protege's interests. Feedback from the focus groups of the 2023 iREDEFINE cohort confirm the enormous benefit of the support gained by peers. Sharing experiences does a great deal to diminish the effects of stereotype threat and imposter syndrome as the Fellows learn they are not alone in their struggles. The strength of the community was evident as the Fellows, not only shared their struggles, but also helped brainstorm solutions together.

In light of these important findings and to respond to the need for an inclusive, community-based mentoring network for W/URM ECE PhD students and junior faculty, the mentoring provided in Module 3 consists of inclusive mentoring Hubs. Each i²mHub will consist of two or three iREDEFINE Fellows, one or two junior ECE faculty (iREDEFINE Alumni), and one or two ECE academic leaders including current or former department chairs. Having multiple iREDEFINE Fellows ensures that they have peer support and the relationships developed during the iREDEFINE workshop will be maintained and even strengthened. The iREDEFINE Fellows will be mentored by both the junior faculty and the academic leaders. Junior faculty will also engage in peer mentoring and will be mentored by the academic leaders.

The i²mHubs will meet virtually twice a month alternating between meetings of the entire mentoring cohort and the individual i²mHubs. Gatherings of the entire mentoring cohort will be used for professional development with topics that include further mentor/mentee training, goal

setting, best practices for an academic search, negotiating a start-up package, navigating the challenges of the first years of an academic appointment, and creating a healthy work/life balance. These sessions will begin with a presentation from a guest speakers or an invited panel and include time for the Fellows and Alumni to ask questions and the mentors to share their wisdom. After each of these mentoring activities there will be an opportunity for each individual i²mHub to connect.

Gatherings of the individual i²mHubs will be used to provide situational advice and targeted feedback to the Fellows at each stage of their search process as well as advice to the Alumni members as they are progressing through their first months and years in an academic position.

Fellows will receive feedback and advice on written application materials. They will have an opportunity to practice their research presentation and answers to interview questions. They will be able to debrief with their Hub after phone and in-person interviews. iREDEFINE Alumni will receive advice tailored to the academic positions they are in. As appropriate, they will receive feedback on their progress toward promotion. They will be able to discuss their strategy for staying engaged in research, in proposal writing, and in selecting collaborations. Alumni will be mentored on effective teaching pedagogy and use of innovative teaching techniques. In addition, the mentors will be encouraged to connect their Fellows and Alumni to a wider network. Introduction to colleagues in a similar research field, and connection with associates attending the same conference are just two of the many ways the mentors can facilitate expanded networking.

5 Conclusion

Over the past eight years, the iREDEFINE workshop has laid a strong foundation for fostering diversity and inclusion in ECE academia, helping to enrich the discipline with a broader range of perspectives, experiences, and contributions. Through intentional programming, iREDEFINE has supported historically underrepresented groups, empowering them to thrive in academia and contribute to shaping the future of the field. Building on this success, i²mHubs is poised to extend and deepen the impact of iREDEFINE's work. Specifically, Modules 1 and 2 enhance the knowledge, skills, and preparedness of W/URM postdoctoral and PhD students, equipping them with the tools they need to navigate the academic job market with greater confidence and competitiveness. The mentoring hubs in Module 3 provide the iREDEFINE Fellows with a professional network of peers and mentors to help them succeed in their academic job search and in their first years as faculty. The result of this effort has the potential to exponentially broaden participation in engineering. Positioning role models in academia will increase the recruitment and retention of W/URM students, widening the pipeline for the missing millions.

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