

Demystifying the Path to Academia: Launching an Interactive Platform for Graduate Students

Dr. Agnieszka Miguel, Seattle University

Dr. Agnieszka Miguel is Professor and Chair of the Electrical and Computer Engineering Department at Seattle University. She earned her B.S. and M.S. degrees in Electrical Engineering from Florida Atlantic University and her Ph.D. in Electrical Engineering from the University of Washington. Her research interests include engineering education, broadening participation in ECE, and image processing. Dr. Miguel served as President of the Electrical and Computer Engineering Department Heads Association (ECEDHA) in 2022–2023. An ASEE Fellow, she has held numerous leadership roles within ASEE, including Chair of PIC I, Vice President of PICs, and First Vice President. She currently serves as ASEE President-Elect.

Dr. Barbara E. Marino, Loyola Marymount University

Dr. Barbara E. Marino is an Associate Professor in the Department of Electrical and Computer Engineering at Loyola Marymount University. Dr. Marino received the B.S.E.E. degree from Marquette University and the M.S. and Ph.D. degrees in electrical engineering from the University of Notre Dame. Dr. Marino has many years of industry experience, including work at the Naval Research Laboratory in Washington, D.C. on projects related to military ID systems, and at the Jet Propulsion Laboratory in Pasadena, where she researched image processing techniques for deep space optical communication systems. In recent years, she has focused on engineering education research, with an emphasis on broadening participation in engineering and strengthening pathways for students and faculty pursuing academic careers.

Demystifying the Path to Academia: Launching an Interactive Platform for Graduate Students

1 Abstract

This work-in-progress paper describes the design and initial launch of an online platform developed to support graduate students in exploring academic career pathways. The website targets early-stage graduate students and focuses on making implicit knowledge about academic careers more explicit, including faculty roles, the range of institutional types and missions, and common barriers that may discourage students from considering academic careers. Content is delivered asynchronously through a curated set of mixed-media resources, including faculty perspective videos, structured explanatory materials, and guided reflection activities that prompt participants to articulate their career goals, values, and alignment with different academic pathways. These materials are designed to support exploration and sense-making rather than immediate job search preparation, helping users build a foundational understanding of academic careers while reflecting on how these pathways align with their interests and experiences.

This work represents the first module of the i²mHubs initiative, a three-module sequence designed to motivate, prepare, and support individuals from graduate school through the early years of an academic appointment. Module 1 provides foundational knowledge about faculty roles and institutional types. Module 2 is an in-person workshop focused on practical strategies for navigating the academic job search process. Module 3 connects participants to mentoring hubs that provide support through the first years of an academic appointment. This paper focuses on the design rationale, structure, and implementation of Module 1 and outlines planned evaluation efforts within the broader i²mHubs mentoring framework.

2 Introduction

Perceptions of academic careers are often formed early in graduate school¹, frequently before students have sufficient exposure to the breadth of academic pathways or the realities of faculty work. Without this context, academic careers may be perceived as narrowly defined, inaccessible, or incompatible with personal values and life circumstances, particularly when students lack awareness of the diversity of institutional types, faculty roles, and career trajectories^{2,3,4,5}. As a result, many graduate students make decisions about whether to pursue academia based on incomplete or inaccurate information^{6,7}.

This challenge is compounded by the fact that preparation for academic careers is often uneven across graduate programs, with limited structured guidance on academic career pathways and the faculty job search process^{8,9}. In practice, much of this preparation occurs through informal mentoring relationships, the availability and quality of which vary significantly across institutions, research groups, and advisors^{10,11,12}. As a result, many students lack timely opportunities to engage with mentors who can contextualize academic work, demystify

expectations, and address challenges such as impostor syndrome and bias^{8,9,11,12}.

2.1 Prior Work: iREDEFINE

In response to these challenges, the iREDEFINE Workshop was developed to inform and prepare electrical and computer engineering graduate students and postdoctoral researchers for academic careers¹³. The intensive two-day workshop provides structured opportunities for participants to learn about academic career paths, faculty appointment types, and the faculty search process, while also engaging directly with department chairs and senior faculty in attendance at the co-located Electrical and Computer Engineering Department Heads Association (ECEDHA) Annual Conference & ECExpo. To date, over 200 participants have attended iREDEFINE. Participant feedback and sustained engagement with academic leaders have demonstrated the value of this workshop in helping early-career scholars gain clarity, confidence, and community as they consider academic careers¹⁴.

In 2023 and 2024, focus groups were conducted with iREDEFINE participants and academic leaders to assess the program's impact and identify opportunities for growth. Both populations affirmed the strong value of the workshop and its connection to ECEDHA, while recommending that selected content, particularly foundational exploration of academic career pathways, be moved to an online format. This shift would allow greater emphasis during the in-person workshop on the faculty job search and create more intentional time for the workshop participants to engage with department chairs, refine application materials, participate in mock interviews, and discuss startup needs and position expectations. Across all focus groups, participants also expressed strong support for sustained mentoring beyond the two-day event. In response, the program evolved into the iREDEFINE Inclusive Mentoring Hubs, or i²mHubs Program, a three-module approach in which the iREDEFINE Workshop now serves as Module 2, embedded within a broader structure that includes pre-workshop preparation (Module 1) and post-workshop mentoring (Module 3) to support Fellows into the early years of their academic careers. This framework is illustrated in Figure 1. To guide this expansion and ensure continued alignment with community needs, an Advisory Council was formed in 2024. Composed of academic leaders and iREDEFINE alumni, the Council provides ongoing guidance and feedback as new program materials are developed.

2.2 Current Work: Interactive Online Platform

This work-in-progress paper describes the design and initial implementation of Module 1: Introduction to Academic Careers, an online platform intended for graduate students in the early years of their doctoral programs. The module is designed for doctoral students across engineering disciplines and focuses on faculty career pathways across a range of institutional types, including research-intensive, teaching-focused, and practice-oriented roles. While many examples and faculty perspectives are drawn from electrical and computer engineering, the core concepts are broadly applicable to academic careers in other engineering disciplines. The goal of Module 1 is to make implicit knowledge about academic careers explicit, accessible, and reflective, thereby enabling students to explore academic pathways earlier and with greater intentionality. As iREDEFINE has grown increasingly competitive, with a recent acceptance rate of 17%, requiring applicants to complete Module 1 prior to applying to the in-person workshop provides greater

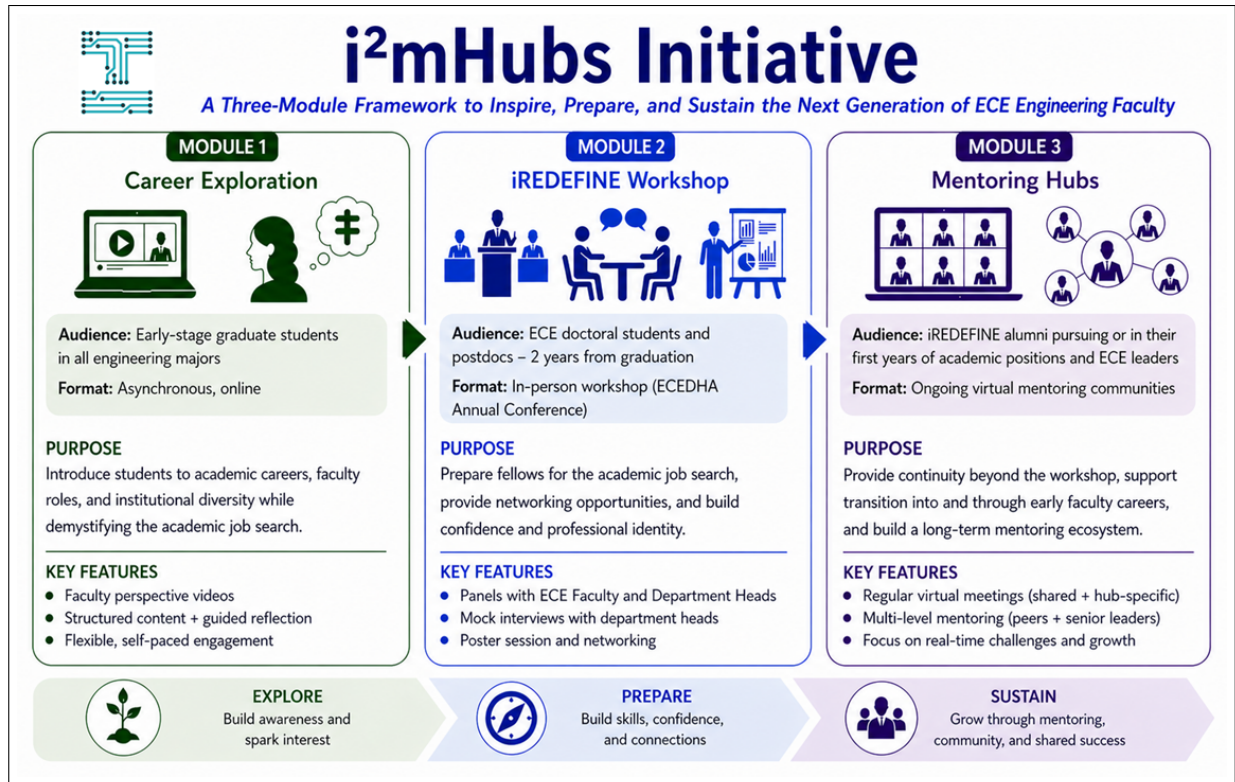


Figure 1: i²mHubs Overview

confidence that those selected for Module 2 are both highly engaged and thoughtfully prepared. By establishing a shared baseline of understanding before the workshop, Module 1 is designed to both broaden participation and deepen the effectiveness of subsequent program components. This paper focuses on the design rationale, structure, and early launch of Module 1 and presents formative observations to inform ongoing refinement.

This work is grounded in research on doctoral socialization and professional identity formation, which emphasizes that early exposure to career pathways, mentoring, and structured reflection play a critical role in shaping career intentions during graduate training¹. Within engineering education, limited access to mentoring and uneven transparency around academic career pathways have been shown to disproportionately affect students' preparedness for faculty roles, particularly for those from historically underrepresented groups¹⁵.

This work also draws on literature in online and self-directed learning, where structured, multimodal environments have been shown to support engagement, self-regulated learning, and meaning-making in asynchronous contexts^{16,17}. While graduate students increasingly turn to on-demand digital resources (including AI-assisted tools and search platforms) for career information, recent studies suggest that these sources are most effective when complemented by curated learning experiences that provide context, credibility, and opportunities for reflection^{18,19}. In particular, multimodal resources such as video narratives, interactive activities, and guided reflection prompts can support deeper processing and help learners connect information to their own evolving professional identities.

3 Design Goals and Principles

The design of Module 1 was guided by a set of intentional goals aimed at addressing structural gaps in access to mentoring and information about academic careers^{2,3}. Rather than serving as a static repository of resources, the module was conceived as an early-stage intervention that supports exploration, reflection, and informed decision making.

First, Module 1 is designed to make implicit academic norms and expectations explicit. Many aspects of academic careers, such as differences among institution types, faculty appointment models, and expectations around teaching, research, and service, are rarely articulated systematically in graduate training. By naming and explaining these elements directly, the module seeks to reduce ambiguity and lower barriers to entry for students who may not have access to this information.

Second, the module emphasizes institutional diversity and career plurality. Academic careers are often framed narrowly through the lens of research-intensive institutions, despite the wide range of faculty roles across higher education³. Module 1 deliberately highlights multiple institutional contexts using frameworks such as the Carnegie Classification, as well as faculty narratives drawn from a range of institutions. This approach is intended to help students recognize that fulfilling academic careers exist across many types of colleges and universities.

Third, Module 1 prioritizes early engagement and self-reflection. The content is targeted at students in the early years of graduate school, when career identities and aspirations are still forming. Guided reflection prompts are integrated throughout the module to encourage students to consider how their interests, values, and experiences align with different academic pathways, rather than positioning the faculty job search as a late-stage or one-size-fits-all process.

Fourth, the module was designed for scalability and accessibility. Delivered asynchronously through an online platform, Module 1 can be accessed independently of geographic location, local mentoring capacity, or conference attendance. Mixed-media content, including videos, interactive exercises, and written resources, supports multiple learning preferences and allows students to engage with the material at their own pace.

Finally, Module 1 is intentionally structured to prepare participants for deeper engagement in subsequent modules. Rather than duplicate the content of the in-person workshop, the module establishes a shared foundation that allows Module 2 to focus more fully on advanced topics such as application preparation, interviewing, and professional networking. In this way, Module 1 functions as both an access point and a scaffold within the broader i²mHubs mentoring ecosystem.

4 Website Design

This section describes how the design goals outlined in the previous section are realized through the structure, organization, and presentation of the website. The emphasis here is on how content is arranged and accessed to support exploratory, self-directed engagement by early-stage graduate students.

4.1 Website Organization

The website is organized around a simple main menu with four sections: Home, About, Explore, and Contact. Together, these pages guide users from initial interest to deeper engagement with the content.

The **Home** (landing) page is designed to draw in graduate students who are curious about academic careers. It introduces the purpose of the site and invites visitors to explore the opportunities, pathways, and realities of pursuing a faculty position.

The **About** page provides context for the initiative. It describes the history of iREDEFINE, highlights the people involved in its development and leadership, and features testimonials from past participants that reflect the program's impact.

The **Explore** page serves as the central hub for Module 1, where the core content of the site is organized into three thematic areas. Each area integrates mixed-media resources, such as videos and interactive activities, with guided reflection prompts to help graduate students critically consider academic career pathways and their own professional goals.

The **Contact** page provides visitors with a way to initiate connections with the iREDEFINE organizers. It offers information for inquiries and feedback and serves as a gateway to learning more about opportunities for deeper engagement, including participation in the in-person Module 2 workshop and the longer-term Module 3 mentoring hubs.

4.2 Website Materials

The first thematic area of the **Explore** page, **Discover the Diverse Paths Within Academia**, introduces users to the range of academic institutions and faculty appointment types. Materials include explanations of institutional classifications, video interviews with department chairs and academic leaders, and short profiles of faculty working in different institutional contexts. The use of the Carnegie Classification framework provides a structured way for users to understand institutional diversity and challenges the assumption that academic careers are limited to research-intensive universities. Reflection prompts encourage users to consider which institutional environments align with their goals and values.

The second thematic area, **Learn About the Application Process**, focuses on familiarizing users with the components of the faculty job search. Resources provide overviews of application materials such as cover letters, curricula vitae, teaching statements, and research statements, as well as description of the academic interview process. This content is intended to introduce terminology and expectations early, rather than to serve as comprehensive job search preparation.

The third thematic area, **Overcome Challenges**, addresses factors that shape how graduate students evaluate academic careers. These include impostor syndrome, stereotype threat, bias, and microaggressions. Materials in this section draw on videos, presentations, and written resources to help users recognize these phenomena and understand their potential effects. A culminating reflective activity invites users to identify challenges they have encountered and to consider strategies for responding to them.

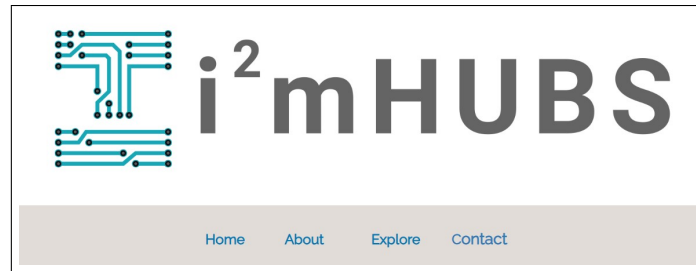


Figure 2: i²mHubs Navigation Bar

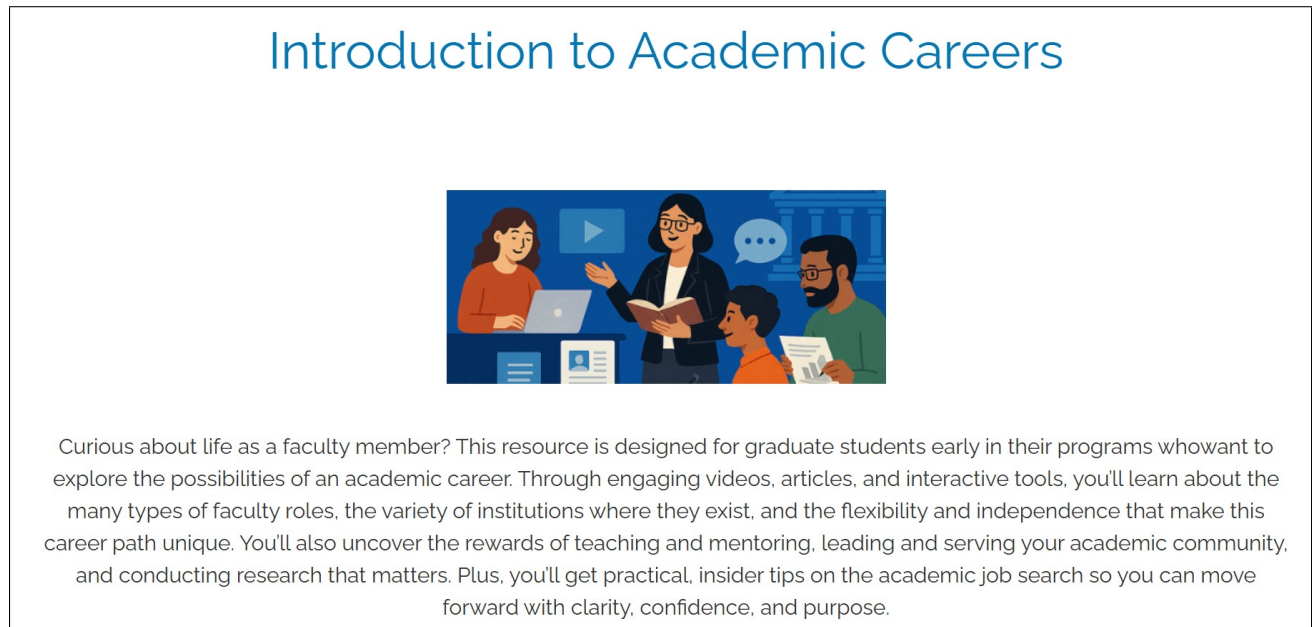


Figure 3: i²mHubs Website Landing Page

Across all three thematic areas, reflection prompts are embedded to support active engagement with the material. These prompts are designed to encourage sense-making rather than information consumption, helping users articulate questions, recognize patterns in their experiences, and begin forming a more intentional perspective on academic career pathways.

4.3 Example Pages from the Website

Selected pages from the Module 1 website are shown in Figures 2 through 5 to illustrate how the design principles are enacted in practice. These figures include the site navigation bar (Figure 2), the landing page (Figure 3), a page describing Carnegie classifications of higher education institutions (Figure 4), and an example faculty perspective video (Figure 5). Together, these examples demonstrate how the site combines informational content with lived experience and reflection to support early exploration of academic careers prior to participation in the in-person workshop.

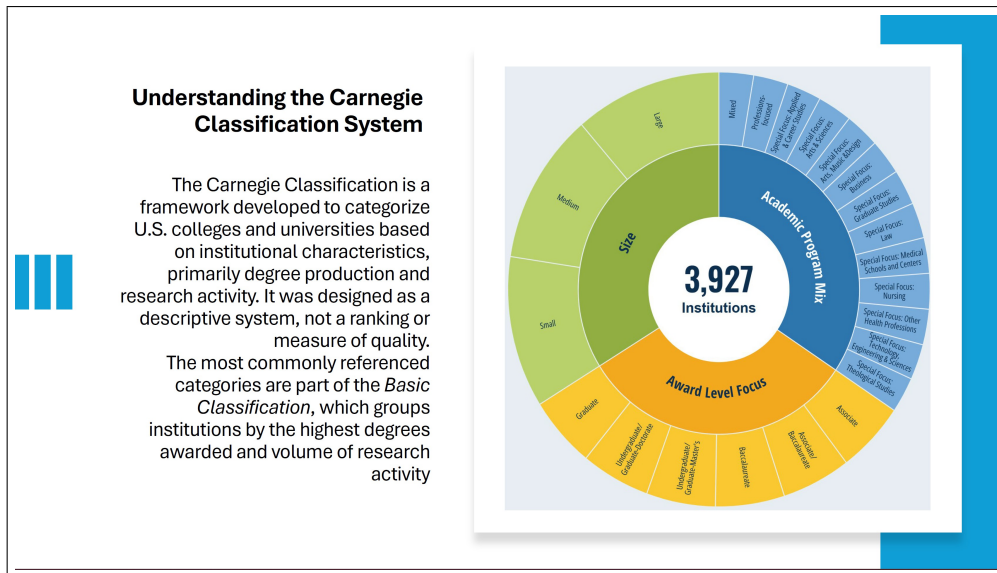


Figure 4: Description of the Carnegie Classification of Higher Education Institutions²⁰



Figure 5: Example Faculty Perspectives Video

5 Implementation Status and Planned Evaluation

Module 1 has completed its initial development and been soft launched as an online resource on the ECEDHA platform. At the time of writing, the website is available but has not yet been deployed at scale or systematically evaluated. This early release is intended to confirm technical readiness, ensure content completeness, and assess alignment with the broader i²mHubs mentoring framework prior to wider dissemination. Feedback from faculty and graduate students at the 2026 ASEE Annual Conference and Exposition will provide formative input, particularly regarding the clarity, relevance, and organization of the content and its effectiveness in supporting early-stage exploration of academic careers. These insights will guide iterative refinement before broader dissemination and formal evaluation.

Planned evaluation efforts will examine how graduate students engage with the module and how early exposure to information about academic careers influences later participation in the iREDEFINE Workshop and the broader i²mHubs initiative. Anticipated data sources include basic measures of site usage; structured user feedback; input from the i²mHubs Advisory Council; and reflective responses capturing changes in understanding, confidence, and preparedness for the Module 2 iREDEFINE Workshop.

6 Conclusion

This work-in-progress paper describes the design and early launch of an online platform intended to support early-stage graduate students as they explore academic career pathways. By making implicit knowledge about academic careers explicit and accessible, the website is designed to provide foundational exposure to faculty roles, institutional diversity, and common challenges in academia at a point when career interests and identities are still forming.

As an early-stage effort, the website is continuing to evolve. The authors seek feedback from faculty, graduate students, and engineering education researchers attending the ASEE Annual Conference on the clarity, relevance, and organization of the materials. This feedback will inform iterative refinement of the website and guide subsequent evaluation and expansion of the i²mHubs mentoring framework. Through this work-in-progress dissemination, the project aims to engage the broader engineering education community in shaping scalable, inclusive approaches to preparing future faculty.

7 Acknowledgment

This work is supported by the National Science Foundation under Grant #2408861.

References

- [1] A. E. Austin, "Preparing the next generation of faculty: Graduate school as socialization to the academic career," *The Journal of Higher Education*, vol. 73, no. 1, pp. 94–122, 2002.
- [2] D. K. Sherman, L. Ortosky, S. Leong, C. Kello, and M. Hegarty, "The changing landscape of doctoral education in science, technology, engineering, and mathematics: PhD students, faculty advisors, and preferences for varied career options," *Frontiers in Psychology*, vol. 12, 2021.

- [3] N. T. Buswell, "The purpose of a PhD in engineering: Where does teaching fit in?" *Studies in Engineering Education*, vol. 1, no. 1, pp. 83–96, 2021.
- [4] M. Roach and H. Sauermann, "The declining interest in an academic career," *PLOS ONE*, vol. 12, no. 9, 2017.
- [5] D. Wilson and A. Donnelly, "Assessing the factors that influence the career choices of minority PhD graduates in SEM fields," in *WEPAN 2010 National Conference: Gateway to Diversity: Getting Results Through Strategic Communications*, 2010.
- [6] G. Seo, J. Ahn, W.-H. Huang, J. Makela, and H. Yeo, "Pursuing careers inside or outside academia? Factors associated with doctoral students' career decision making," *Journal of Career Development*, vol. 48, no. 6, pp. 957–972, 2021.
- [7] N. H. Choe and M. Borrego, "Master's and doctoral engineering students' interest in industry, academia, and government careers," *Journal of Engineering Education*, vol. 109, no. 2, pp. 325–346, 2020.
- [8] National Academies of Sciences, Engineering, and Medicine, "The science of effective mentorship in STEMM," <https://doi.org/10.17226/25568>, 2019.
- [9] —, "Effective mentoring in STEMM: Practice, research, and future directions: Proceedings of a workshop in brief," <https://doi.org/10.17226/24815>, 2017.
- [10] A. Donnelly, "Factors influencing career choices of under-represented STEM PhD graduates," in *Proceedings of the 2011 Annual ASEE Conference and Exposition*, Vancouver, BC, June 2011.
- [11] M. E. Howe, M. M. Kim, and S. Pazicnia, "Graduate student womens perceptions of faculty careers: The critical role of departmental values and support in career choice," *Journal of the Amercian Chemical Society Au*, vol. 2, no. 6, pp. 1443–1456, 2022. [Online]. Available: <https://doi.org/10.1021/jacsau.2c00175>
- [12] J. B. Main, "Family formation and the career trajectories of women engineering PhDs," *Studies in Graduate and Postdoctoral Education*, vol. 14, no. 1, pp. 26–46, 2023.
- [13] S. M. Lord and A. Petropolu, "Professional development program for improving the diversity of faculty in electrical and computer engineering (iREDEFINE ECE)," in *Proceedings of the 2018 American Society for Engineering Education (ASEE) Conference & Exposition*, April 2018.
- [14] B. Marino and A. Miguel, "Redefining electrical and computer engineering faculty with longitudinal support for women and underrepresented minorities," in *Proceedings of the 2025 American Society for Engineering Education (ASEE) Conference & Exposition*, June 2025.
- [15] G. C. Fleming, A. Patrick, D. Grote, M. Denton, D. B. Knight, W. Lee, M. Borrego, and H. Murzi, "The fallacy of "there are no candidates": Institutional pathways of Black/African American and Hispanic/Latino doctorate earners," *Journal of Engineering Education*, vol. 112, pp. 1–243, 2022.
- [16] J. Broadbent and W. Poon, "Self-regulated learning strategies academic achievement in online higher education learning environments: A systematic review," *The Internet and Higher Education*, vol. 27, pp. 1–13, 2015.
- [17] N. D. Vaughan, M. Cleveland-Innes, and D. R. Garrison, *Teaching in Blended Learning Environments: Creating and Sustaining Communities of Inquiry (Issues in Distance Education)*. Athabasca University Press, December 2013.
- [18] W. Yang, Y. Xie, and X. Wu, "Can ai be a good counselor? comparing the effectiveness of ai and human career counseling," *Technology in Society*, vol. 86, p. 103301, 2026. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S0160791X26000904>
- [19] E. Kasneci *et al.*, "ChatGPT for good? On opportunities and challenges of large language models for education," *Learning and Individual Differences*, vol. 103, p. 102274, 2023.
- [20] "Carnegie classification," <https://www.carnegiefoundation.org/carnegie-classifications/>, urldate = 2026-01-21.