

noblesse oblige (where in this context the term should not be burdened with any negative connotations!).

I would like to mention just one more of the many pieces of wisdom that I gleaned from Karen. I forget the precise circumstances—maybe it was in the aftermath of a seminar in which some piece of mathematics was not clearly explained—but Karen made an offhand remark about how, after years of constructing them herself, “I know what a proof is.” I remember my sense of puzzlement—surely anyone with a basic grasp of propositional logic would know a proof when they saw it—but the remark struck a chord. Only later did I figure it out: logical correctness is a necessary but not a sufficient component of an argument that needs to be engaging, understandable, and persuasive, i.e. of a proof.

The glass ceiling for women persists in mathematics, perhaps less overtly than in times past. But academic mathematics retains cultural practices, norms, and conventions that act to hinder women’s (and other groups’) advancement. As long as these barriers remain, those women who wish to persist will need role models, mentors, and useful advice. *Aspiring and Inspiring: Tenure and Leadership in Academic Mathematics*, a collection of essays from successful female mathematicians, provides some of those role models and some of that advice. The chapter authors were asked to reflect on their own experiences and help point younger colleagues toward success. Several themes emerge strongly from the collection: Networks of support are important; feeling a sense of belonging is critical; individual mentorship matters; one should formulate one’s own definition of success. Of course, the strongest theme is that academic mathematics has not achieved equality of opportunity. Until we do achieve it, we’ll need books like this.

The essays were gathered and edited by Rebecca Garcia, Pamela Harris, Dandrielle Lewis, and Shanise Walker. Below we reprint excerpts from the collection. The full volume will be available from AMS Books in Spring 2023.

## Excerpts from “Intersectionality as Impetus and Impediment”

Erica Graham

### Community

To successfully navigate the mathematical world, I needed to surround myself by people who collectively provided me

*Erica Graham is an associate professor of mathematics at Bryn Mawr College. Her email address is [ejgraham@brynmawr.edu](mailto:ejgraham@brynmawr.edu).*

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with connections, counsel, and confidence. At every stage of my career, beginning with choosing a graduate program, I have had to adjust who and what filled these roles for me.

The advice (or warning) I often given students looking to pursue graduate degrees is, “Grad school is going to suck, so you might as well surround yourself by people who don’t suck.” The same can be said of the road to tenure. Sure, some joy and passion makes it easier, but in order to deal with the externalities associated with pursuing tenure and establishing oneself in mathematics, it is helpful to have a community of people who make the process significantly less daunting. Here’s how I built my community of connectors, counselors, and confidence-builders.

... **As graduate student.** The summer prior to beginning my graduate program, I participated in the Enhancing Diversity in Graduate Education (EDGE) summer program. Remember that calculus 2 professor? It turns out, Rhonda Hughes was also the co-founder, along with Sylvia Bozeman from Spelman College, of this program for women in mathematics,<sup>1</sup> which was designed to provide an extensive and sturdy support network to facilitate the success of women in graduate programs in the mathematical sciences. At the time, EDGE was a way for me to get back into the swing of doing mathematics—I’d been working in the real world for two years—before undertaking the momentous task of getting a PhD. That summer, I experienced mathematics in a completely different way. There was nothing about the program’s coursework that was easy, but the network that EDGE gave me is something that has kept me going throughout all stages of my career. I’ll come back to this.

In the process of deciding where to go to grad school, I was self-aware enough to know that the environment in which I planned to immerse myself for the next several years was considerably more important to me than anything else. Recruitment visits provided an invaluable window into what life might be like in my prospective program. As a Black woman originally from Queens, no one could have predicted that I’d end up attending graduate school in Utah. But, the feeling I got from visiting the math biology group, a subset of the graduate mathematics program, at the University of Utah told me what I needed to know. At the time, the community dynamics I witnessed among the faculty and students within the program instantly felt familiar. And, thankfully, my gut was right.

As expected, grad school was difficult, to say the least. But, the community I created for myself made it doable. My personality and working style were more or less compatible with my advisor, who provided many examples of ‘how to be a research mentor’ that I am constantly working to emulate. I haven’t gotten there yet. I had a great collaborative group of fellow classmates, with whom I spent hours toiling on homework, studying for prelims, and later, practicing thesis defenses and job talks. We had older graduate

<sup>1</sup><https://www.edgeforwomen.org/>

students who served as ‘us, a year or four from now.’ The older students willingly showed us how to open Matlab on a Linux system (true story), shared their own experiences, and gave us samples of teaching statements and job interview questions. From beginning to end, the stress, frustration, commiseration, and tears were intermingled with the weekly *Lost* watch nights (when tv was still watched in real time), cabin parties in the mountains (where snowshoeing was the only way in or out), and football games (go Utes!<sup>2</sup>). Having heard grad school horror stories from BIPOC and white colleagues alike, I am grateful for the unicorn-esque experience that I had.

During grad school, I found that getting a Ph.D. was about much more than being a good test taker, which is how I got through my preliminary exams. It was about pressing onward when I didn’t think I could. It was about believing that some part of me had what it took to succeed without having a concrete definition for success. It was about knowing that I could not compare myself to my peers because my story was different from the next person’s. It was about resolutely deciding that I would continue putting one foot in front of the other until the graduate powers that be kicked me out (it never happened). It was about being just foolish enough to not have made alternative plans. It was about faking it until I made it.

It’s clear that my blackness played a large role in this clear case of *imposter syndrome* that I had/have. But given the sense of camaraderie I felt from being able to have similar conversations with fellow women graduate students, I suspect that intersectionality was at play. The imposter syndrome impedes my ability to consider that anything that I do is different from what anyone else would do if given the opportunity. For a long time, I wondered whether the only reason I was accepted to grad school was because I was Black. About half of the students in the program identified as women, so that wasn’t it, and I was clearly there for some other reason that had nothing to do with my academic ability. Clearly.

Even once I passed prelims, it didn’t really sink in. Even when I started doing research, it could never be as good as the others’ around me. ‘It’ was never enough. Well, if that wasn’t imposter syndrome, then I don’t know what is. Layla Saad has described this so aptly: “I always felt like I was invisible, I felt like people didn’t really see me, and yet I was always in these leadership positions. I felt like I didn’t really earn it when I got it; especially if it came easy, I would question it” [9]. The reality of what I was experiencing is even more sobering. Saad also describes this as a feeling of internalized unworthiness, one that stems from the culture of white supremacy that governs many of our lives from the

moment we are born. “You have been receiving messages that Black people are nothing, and that when we are given anything, it’s either an exception, or it’s luck somehow, or you killed yourself to get there and you have to keep going at that same speed. You have to keep working yourself into the ground to maintain that same level” [9].

The telltale sign of imposter syndrome lies at the intersection of making something look easy and discounting its value. What’s more is the types of people who suffer from severe cases of imposter syndrome are often at the intersection of marginalized identities. I view my ability to navigate structural barriers to my success by being in the right place at the right time, in the vein that it may not be something that I necessarily deserve, because these are the messages that have been subliminally fed to me from the day I entered the world. What are those messages? That I do not deserve the success that I have, and that the hard work that I put into doing well in school was in an effort to maintain an invisibility that I did not know I sought. I constantly discount the amount of work that I do and the degree to which I excel because it feels the most ‘natural.’ And yet, I am all-too-aware, as emerged from a recent conversation I had, that mediocrity is a privilege that I as a Black woman simply do not have. If I write all the things I do as a mathematician and tell myself it’s the bare minimum, is it true? This is where the reality check is needed. My reality is so deeply ingrained in a culture of white supremacy and anti-Black racism, that I needed a community that could replace my distorted perception of reality with something slightly closer to the truth. I needed people who could both validate my experience and fact-check my insecurities. Here’s where being part of the EDGE network made the difference for me.

. . . **As EDGER.** After participating in the EDGE summer program, I returned as a graduate student mentor one summer, made new connections and renewed old ones. This was my second priming against the infectious environment of academic mathematics. I was given guidance I hadn’t realized I needed from the faculty teaching the courses, from local program coordinators, and from the program directors alike. In fact, my decision to remain in academia upon completing my degree stemmed from the connections, counsel, and confidence I received that summer.

As a result of my relationship to EDGE and its ever-expanding professional network, I received financial support to attend national conferences and presented at an international conference as a graduate student. As a postdoc, I’d been invited to speak and/or co-organize conference sessions, received job references and colloquium invitations, and gained research collaborators. Some of the professional service that I’ve done was also the result of EDGE connections. The multi-dimensional support from EDGE has always been available to me at all stages of my career, not the least of which still includes being able to text, call, or video chat, with my favorite people for advice,

<sup>2</sup>The Ute Indian Tribe has had a formal agreement with the University of Utah since 1972, which includes partnership in the areas of name and logo use, education and educational access, advisory representation, and outreach. The most recent Memorandum of Understanding can be found at <https://admin.utah.edu/ute-mou/>.

support, some laughs, or even a much needed meme. Through EDGE, I gained the type of community where a mentor drives from Washington state to Salt Lake City for my dissertation defense. Because, unlike the other cues that I receive on a daily basis, I am worth it.

In the EDGE summer program lineage, I've gone from student to graduate mentor to faculty. In doing so, I've learned to appreciate my mathematical journey through someone else's lens. My own insecurities aside, I've been able to reflect on the ways in which my positioning provides opportunity to the next generation of mathematicians. When I can't find a reason to push through for myself, I look for ways to support others because I know what lies ahead. When I connect with EDGers at conferences, I am often reinvigorated, if not for myself, then for them.

...**As postdoc.** I began my postdoc at North Carolina State University not knowing whether I would remain in academia or go into industry. It was a three-year postdoc, which was the ideal length for me. Here's why. In year one, I spent most of my time adjusting to a new living and working environment. I had to confront the reality of life as a queer Black woman in an interracial relationship in a new place: Moving from Utah to North Carolina was a big shift, and I had to adapt to how the new forms in which racism and bias played themselves out beyond my graduate school bubble. With the massive change, it was very difficult for me to hit the ground running with research. Whether it was pushing past the invisibility (invis-ability = invisible disability), trying to publish work from my doctoral thesis, or doing background reading for work with my postdoc mentor, I struggled in year one. I was forced to create my own gauge of productivity. By year two, I managed to focus entirely on my new project (even making some headway!), without the headache and stress of having to apply for a new position. By year three, I didn't have a choice but to apply for a job, even if every other part of me didn't feel as though I was ready. Sometimes it's best simply to rip the bandaid off.

It's a challenge to balance a description of what I did during my postdoc versus how I felt. My invisibility made everything a thousand times harder. But prioritizing self-care<sup>3</sup> helped a bit. At the end of the day, no one could know me better than I knew myself, and I was adamant about using my flexible position to take care of myself before I even attempted to do good research. This doesn't work for everyone, but I personally had no other option.

I did take advantage of the low teaching load and travel funding that came with my postdoc, and ...well, I traveled. A lot. I attended conferences, workshops, and organized sessions. I met people. A lot of people. Then I was invited to give colloquia and organized more sessions. It was exhausting, but it was also a way for me to expand my professional network. I knew that I'd have to apply for jobs down the

<sup>3</sup>I fully participated in this revolutionary act, as described by Audre Lorde.

line and was very intentional about talking to people about their experiences and various career paths. This included folks who were in industry, academia, or government. It was such a busy and also meaningful time in trying to figure out who I wanted to be as a mathematician.

## Excerpts from "I Am Not Your Typical Role Model (or Do Not Follow My Steps)"

*Ivelisse M. Rubio*

### The road to tenure

**Norms, expectations and goals.** Even if you find the place where you can fulfill your goals, the department might have other expectations for you. When a department recruits for a position, there are some areas they need to strengthen and are looking for people with certain qualifications and interests. The norms and criteria for obtaining tenure and promotion vary from place to place, and they might not be clear. It is important to know them.

When I started at the UPR-H, the rules and expectations for obtaining tenure were made clear. Among other things, the mathematics department was looking to strengthen their research. Hence, in addition to teaching, I was expected to have a research agenda, publish in peer-reviewed journals, and obtain external funding. Some of the colleagues in the department thought that starting an REU during my first year was a mistake, that this was something that should be done by people with more seniority and who are already established researchers. They were probably right but the timing and conditions were perfect to start the summer program and this could not wait five or six years. For this reason, I ignored the advice and decided to take advantage of the good conditions to start the summer program.<sup>4</sup>

During my first year at the UPR-H, I worked on a paper related to my thesis research, submitted the paper to one of the best journals in the area, and it was rejected. I did not know that this was part of the process: that one learns from the reviews, revises the paper, and submits it to some other journal. Between the work dealing with the bureaucratic processes to run SIMU, mentoring undergraduate research students during the academic year, writing and administrating grants, serving on committees, and teaching

*Ivelisse M. Rubio is a professor at the University of Puerto Rico, Río Piedras. Her email address is [ivelisse.rubio@upr.edu](mailto:ivelisse.rubio@upr.edu).*

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<sup>4</sup>*I was one of the two Co-Directors for the Summer Institute of Mathematics for Undergraduates (SIMU), where the two research components were led by two other Research Advisors. The research topics differed each year.*