Part of
Ertel, P. K., & Ridgley, R. (Eds.). (2025). Educator reflections: The power of our stories. MT Open Press, Middle Tennessee State University. https://doi.org/10.56638/mtopb00325

Chapter 2-1

The Community of Scholars

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Finally, I was done. Walking to the stage with my advisor, I felt relieved knowing that my academic journey was finally over. As we walked to the center of the stage, I heard a loud "Hurray!" from the audience. I slightly winced when I realized my mother was breaking the event's solemnity. After five years in graduate school, I was hooded and received my Ph.D. in Astrophysics at Iowa State University. My advisor, Curt Struck, was with me through all the steps. He helped me do my first observation runs at Mt. Palomar and sent me to do data analysis at the Infrared Processing and Analysis Center at Caltech. He guided me through readings and talked me through the development of simulation software which formed the core of my academic work. At the center of the stage, I faced the audience. When Curt threw the hood over my head, I was slightly startled. I might have known it was coming, but it surprised me. He shook my hand, and I hugged him. I would not have been there without his guidance. We walked together back to our seats and watched the other doctoral students walk. After the doctoral ceremony, the provost said, "Congratulations on your accomplishments, and welcome to the community of scholars." At the time, I thought that wording was strange. For undergraduate degrees, they would say, "We welcome our graduates into the fellowship of the alumni." There was a distinction between the degrees that was lost on me at the time.

I thought about everything that had brought me to that moment. I grew up in a small town in Northern Minnesota, perhaps as isolated from universities and science as a community could be. From the time I was a child, I wanted to be an astronomer. However, I did not know how to get there.

When I was in fifth grade, I became very ill. It took nearly a year and five doctors to sort out what was happening, but eventually, I was diagnosed with Crohn's disease. The treatment options at the time were limited. I was prescribed an antibiotic to get me out of my acute state, but I had flare-ups off and on for a decade. The

disease sapped my energy throughout the rest of my time in Hibbing, Minnesota. Even when flare-ups were not happening, I often felt exhausted.

In ninth grade, my father passed away from cancer. I watched him struggle with the disease for a year until he finally succumbed to the illness. His death was a blow to me and my mother. Since she had severe arthritis, she could not go back to work. The death benefits from my father's retirement were about one-fourth of his salary, so we were thrown into poverty overnight. Although we had a house and could afford food, my dream of attending an expensive college was dashed. Crohn's disease had hurt my grades, and poverty made it impossible for my mother to help me beyond the meager college savings I had built over my young life.

My father's death was devastating emotionally for my mother and me. She already had some issues with depression and anxiety from her younger life, but this loss is one she never fully recovered from. She also had severe rheumatoid arthritis and could barely walk. I was the last child at home, so caring for her and the house fell on me. It was a lot for a 15-year-old to handle, and there was no support for my emotional needs. Despite this, or perhaps because of it, my desire to become a scientist grew. I wanted to think of a world bigger than my problems and have a life surrounded by ideas.

When I was in Hibbing, I never fully fit in. My emotional and family life was a disaster, and I was still dealing with Crohn's disease. About that time, I learned about the high school astronomy class and club that Dale Gibbs organized. Mr. Gibbs was one of the many science instructors at my high school. He would schedule star parties with the club to let us look through the club telescope. More importantly, he encouraged us to learn more on our own.

A year before I graduated, he organized a club trip to see a total solar eclipse passing through Winnipeg, Manitoba, about 400 miles from my home. I remember driving up to the event. The night before the eclipse, there was snow. I was so relieved to see the clear skies the next day as we finished the long drive to the rest stop, where we were to view the event. The temperature dropped from a cold 10 degrees Fahrenheit to well below zero. The sun disappeared. The corona was beautiful. Although I understood what was happening intellectually, its spiritual impact was profound. The universe was not just intellectually engaging. It was also beautiful. Physics and math were no longer abstract ideas but a shining circle in the sky of million-degree plasma as predicted by complex calculations and then realized by an alignment of celestial bodies. I think this is the moment when my childhood dreams became a direction for my life.

Because my family had so little money, I spent my first year at Hibbing Community College (HCC) after high school graduation. The cost of tuition was low, and I could stay home instead of renting an apartment or dorm. While I was there, I found two new mentors. As a student at HCC, I worked with Don Penn, a physics and computer science professor. I learned calculus-based physics with him and learned how to apply mathematics to solve complex problems. The most memorable experiment was learning how weight, mass, and acceleration were related. Don was a flight instructor, so he brought the class of 12 to the airport. He took three of us up at a time

and shot zero-g parabolas in a Cessna 172. For a few seconds, we were weightless. The scale holding our sample weight read zero as the normal force that caused the weight to be removed. In Don, I caught a glimpse of how scientists thought. It is hard to pinpoint what this was, but his way of viewing the world differed from others I had met.

While attending college, I found a work-study job at the recently constructed planetarium. Both Don and Dale helped create this facility when I was finishing my time in high school. I worked for a fantastic astronomy educator, Bill Long (pseudonym). Bill immediately recognized me as a fellow nerd and gave me my weekly astronomy show at the planetarium. I also worked as a student assistant in his astronomy class. Bill helped me assemble the first few programs and then trusted me to create and present them independently. I learned how to teach and give public talks because of his mentorship.

After my year at community college, I transferred to Minnesota State University in Mankato. Though I had been accepted to the University of Minnesota, I did not attend as I was doubtful about how to afford the higher tuition. Once at Minnesota State University, and perhaps for the first time, I was surrounded by nerds like me. The students and the faculty helped me learn how to solve problems and shaped my thinking about how the natural world worked. Jim Pierce and Mark Klaus (pseudonym), the two astronomy professors, helped me daily over the next three years. Mark pushed me toward doing research, even though it was very preliminary. He got me involved in the Sigma Xi chapter and encouraged me to apply to grad school. Jim was also excellent. During the summer before my senior year, Jim invited me over every week to join his family for pizza night. His 10-year-old son would routinely trounce me in chess, and I had a feeling of family and connection that helped me through that summer. Jim also brought me to his alma mater–Iowa State–to meet some astronomy professors and see the campus that summer. Five years later, I found myself on a stage hooded by one of the people I met on that trip.

When I graduated, my first job was as a National Research Council Research Fellow at the Naval Research Laboratory. After three years, I moved to my first academic position at George Mason University. I spent 18 wonderful years there working between the Department of Physics and Astronomy and the Computational and Data Science program. All through those times, I was guided by colleagues and friends with help writing grants, publishing papers, and developing my teaching. Through mutual friends, I met my wonderful wife, Katharine. She has been by my side to guide me through the parts of life that are not academic. She balances my world and reminds me that it is larger than my office.

For the last 14 years, I have been a faculty member in the Department of Physics and Astronomy and the Director of the Computational and Data Sciences Ph.D. Program at Middle Tennessee State University (MTSU). My job is now to mentor doctoral students as their advisor and a guide to the profession. A total of 47 doctoral students have graduated from my program. I know that each of them found themselves thinking about how their academic journey was complete as they were hooded, just as I did when it happened to me.

Looking back at my life, I know I would not have succeeded if mentors had not guided me. That little kid in Hibbing would not have found his calling without the help of Dale. I would not have the confidence to teach without Bill, and I would not understand that scientists saw the world differently without Don. Jim and Mark helped me find a path beyond my undergraduate degree toward research and the academic world. Curt helped me develop the research and technical skills I now pass on to my students.

We do not become academics alone; we have mentors and colleagues who guide us. Our parents, friends, and family support us, even if they do not fully understand who we are and what we are becoming. We become who we are because of the community around us that nurtures us through our careers.

Just as we grew from others, we now encourage others to grow. We are part of a chain of academics that goes into the past to our mentors and their mentors before them. We build that chain through our students. The impact of our academic ancestors continues through our academic descendants. We do not do this alone, but with our peers repeating the same patterns that formed us and our students.

Tomorrow morning, I will hood my ninth Ph.D. student, Matthew Swindall. Working with him has been a joy. He has been focused, brilliant, and incredibly productive. I am proud of what he has done and so pleased I was there to help him. I know his academic journey is not over; it is just beginning. He will go on to do meaningful research and mentor others throughout his career, no matter where that career takes him. I know he will not understand the depth of this statement until later, but I am so pleased to welcome him to the community of scholars.