



ROAD NOT TAKEN
ANNA FREBEL

Anna Frebel is an astronomer and tenured professor of Physics at MIT. Originally from Germany, she received her PhD from the Australian National University's Mt. Stromlo Observatory in 2007. Following postdoctoral work at the University of Texas at Austin and the Harvard-Smithsonian Center for Astrophysics, Frebel joined MIT in 2012. She is a world-leading expert in the search for and analysis of 13-billion-year-old stars that she uses to study the origin of the chemical elements and the formation of our Milky Way galaxy. For her discoveries and her mentoring, she has received numerous honors and awards. In 2016, she was named one of ScienceNews Magazine's "Ten Scientists to Watch." Her research journey is detailed in her popular science book *Searching for the Oldest Stars* (Princeton University Press; also available in German as *Auf der Suche nach den ältesten Sternen*, S. Fischer). – Address: Department of Physics, Massachusetts Institute of Technology, 77 Massachusetts Ave., Bld. 37-664C, Cambridge, MA, 02139, USA. E-mail: afrebel@mit.edu.

[...]

I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I –
I took the one less traveled by,
And that has made all the difference.

Robert Frost

This past year at Wiko has been one full of unforeseen adjustments, changes, and untrod-den paths – for me, for Wiko, and for the world. Scientifically speaking, it was very

productive, though. Together with my students and collaborators from across the globe, we completed a dozen peer-reviewed papers with two of them published in *Nature Astronomy* (Chiti et al. 2021) and *Nature* (Yong et al. 2021). I enjoyed having the time and headspace to closely work with my students and more junior colleagues (entirely via Zoom, often daily and late at night due to time zone differences) to jointly produce results on a new search technique for the oldest stars in the Milky Way, on three ancient stellar streams in the outskirts of the Milky Way, on observational and theoretical results about the formation and evolution of the earliest galaxies that formed after the Big Bang, on the formation of the heaviest elements across the universe, and on the first characterization of a previously unexplored stellar population in the disk of our galaxy.

Due to travel restrictions, I was not able to invite any of my colleagues from across Europe or make any planned visits myself, but at least I was able to give several online talks and colloquia about our latest results. Luckily, from October on, I was able to do my telescope observing remotely instead of traveling to Chile in person. From my laptop in my apartment in the Villa Walther, I began to regularly operate one of the world's largest telescopes in Chile, the 6.5-meter Magellan telescope, to collect new spectroscopic data, some of which was immediately used in our work. The Chilean night would start around 2 a.m. German time and lasted until midday. Remote observing this way was a first for me, but it worked surprisingly well, including dropping the kids off to school and daycare during carefully timed 30-min. exposures as the night went on in Chile. Exhausting it was – but “coming home” with a bag full of good data at the end of each of those dozen observing nights spread between October and May made me briefly forget about being a single mom with young children without a developed support system, living through pandemic times.

Much of the research that I had actually planned on the origins of the very heaviest elements, however, did suffer from severe delays due to various telescope closures throughout 2020 and/or other associated reasons. But when one door closes, another one opens, and Wiko seemed destined to be a place with doors to step right through. I unexpectedly walked through such a door after a lunch meeting with Daniel Schönplflug early in fall 2020. As we talked, I realized I had the opportunity to use this year to start writing my second book and to take the time to collect all materials and background information I would need. The sudden and immense inspiration I gained from that meeting was something I had longed for even though I had not prepared to actually do any book writing at all while at Wiko.

Soon after, I added book writing and thinking to my regular calendar. At that time, I founded the “Different Kind of Book Club” – a Zoom group for Fellows interested in

writing their own books, with regular discussions guided by Daniel. I was interested in finding “accountability buddies” and in getting repeated feedback to make full use of the rich intellectual environment of Wiko. I imagined the uphill struggle of book writing might be more productive and enjoyable if shared in some way with like-minded fellow academics. Four of us ended up meeting weekly for most of the year with each of us working on outlines, exposes, and chapters. Thank you, Madeleine, Ben, Shamil, and Daniel for your time, wise commentary, laughs, and zoom faces when times were dreary otherwise!

My book will still take a while to finish. But I am so glad I was able to get started with telling a story of mentorship, career development, professional skills and leadership, and how to empower young and aspiring scientists to pursue a fulfilling science career. There still remains a lack of effective systemic and systematic advice and guidance for young scientists, especially women. This continues to keep academia a sink-or-swim environment rather than a collaborative and supportive space to jointly tackle exciting and challenging frontiers of humanity. The book concept broadly builds on the materials that I had developed for a new MIT graduate class on career development and professional strategies, paired with some of my own experiences. Daniel and the book club inspired me to find a way to include my own path through the academic maze, and I’m excited to have added this angle.

As I continue my writing, I gladly notice that I have taken a little piece of Wiko back home with me. I am immensely grateful for having had a chance to take this road that I had not planned on going down. It has made a difference already and it continues to inspire me as I keep marching on.

It was truly a privilege to join Wiko for a year, no matter how unusual it was, and I would like to express my warmest thanks to all the Wiko staff for their wonderful and most appreciated support, especially Andrea, Dunia, Maike, Daniela, Katharina, and Daniel for making it all happen, against all odds, again and again. My two young children were especially lucky, because they had a nearly normal year in large part thanks to the many children of the other Fellows living with us in Villa Walther and having that big garden to play in. I will probably never again experience so many children knocking on our door daily for all of them to come and go and play together like it’s the most normal thing in the world. Because it was. They made such good friends and we miss you all dearly!