

1 Completely Different! The Twists and Turns of Changing Scientific Disciplines

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7 As researchers, constant evolution and learning are common practices. Most scientists
8 can relate to investing a great deal in becoming experts in a specific field we are passionate
9 about. While being a scientist means staying curious and excited about learning and discovering
10 new things, I never imagined these traits would lead me to change scientific fields immediately
11 after obtaining my Ph.D. Yet this is precisely what I did. Before my graduation ceremony, I had
12 already met with my new supervisor regarding a postdoctoral appointment in an area I had never
13 studied. It takes a lot of courage to pursue a professional career in science, particularly for
14 women, and even more to switch scientific avenues. A disciplinary change between Ph.D. and
15 postdoctoral appointments requires thoughtful analysis, research, and due diligence.

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17 As an early-career underrepresented female scientist who migrated from the Middle East
18 to the U.S. in 2000, I am familiar with professional and life challenges. Challenges are rarely put
19 under the spotlight; however, recent publications are beginning to shed light on the value of
20 sharing them (Rose et al., [2018](#); Bertolet et al., [2022](#); D'Andrilli et al., [2021](#)). My career's twists
21 and turns may be more relatable to diverse researchers than previously thought. Challenges come
22 in different varieties across relationships, life changes, and project troubleshooting; they are not
23 solely limited to data processing or scientific advances. When we remember that challenges are
24 essential to our education and accomplishments, we become better people *and* scientists. For this
25 reason, I will share my own experiences changing fields in my professional career; this article
26 will highlight the twists and turns of stepping into unknown scientific territories.

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28 *Switching disciplines after my Ph.D. - why make the change?*

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30 There are important questions to ask and consider in moments of professional change: Is
31 switching scientific disciplines an intelligent choice? Will we enjoy the research even more? I
32 thoroughly enjoyed my Ph.D. research in organic chemistry and catalysis. I enjoyed the main
33 idea, laboratory techniques, and discipline needed to achieve success, crucial components as we
34 invest so much time and effort in our work. My switch in fields to an Arctic environmental
35 scientist came very unexpectedly. My passion for one type of chemistry took me into a new field
36 I had never thought of pursuing. Life is full of surprises and serendipity.

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38 As many postdoctoral and graduate students know, building a career and conducting
39 similar research as your advisor does can be very difficult. The advice I received from close
40 professors and mentors was that "You can either use your specialized expertise in another field
41 or stay in the same field and learn new techniques." I chose to use my specialized chemistry
42 expertise in another field. Branching out seemed challenging, but I thrived in those moments.

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44 *My change from graduate school to postdoctoral fellow researcher*

In graduate school, my project was focused on developing new heterogeneous “environmentally friendly” catalytic systems and their applications in various metal-mediated organic transformations. I applied green chemistry techniques to optimize reaction conditions to avoid the use of harsh organic solvents, high temperatures, difficult product isolation, and the use of high pressure. (Hamdi et al., [2019](#)). These novel environmental catalytic systems will allow me to run organic reactions under ambient conditions (water as the solvent, room temperature, atmospheric pressure, easy product separation, and catalyst recoverability/recyclability). Green chemistry practices and environmental issues became a significant part of my professional career, and I planned to pursue an industry job to engage in other green catalytic processes. However, life is full of twists and turns.

My work with green chemistry methods led me to an exciting postdoctoral position as an Arctic environmental scientist. This postdoc position found me. I wasn’t looking to make a major switch in fields. My focus was to get my Ph.D. and find a job doing the same work I was already doing in graduate school. However, a mentor of mine recommended me for this postdoctoral position, and her advice to me was to go for it. She thought that my ideas to take specific processes and find ways to make them cleaner and safer would be a great addition to the polar community. She said I could bring a new perspective. I thought a lot about what that would mean and decided to take this chance and go for it!

This work is entirely different from what I did for my Ph.D., which, at the outset, was terrifying. My new position involved writing and submitting a National Science Foundation (NSF) proposal, which I knew nothing about. Writing the proposal required a lot of work, and I was lucky to have a great support system. This proposal aimed to evaluate the impact of diverse Arctic dissolved organic matter (DOM) sources flowing through the Fram Strait that affects marine carbon cycling processes. In August 2021, I received one of 13 NSF Postdoctoral Research Fellowships designed for researchers like me, who apply their expertise to new scientific adventures, ensuring vital first steps toward success. My new focus is evaluating the impact of Arctic DOM on marine carbon cycling processes in the Fram Strait. This event marked a sharp turn in my career in which focusing on environmental changes and impact has begun to shape my developing research program.

Challenges I had to face after making the change

During my transition to polar research, biogeochemistry, and oceanography, I faced significant challenges. I knew it would take time to learn new techniques, yet I did not realize transitions are like marathons, not sprints. After several months, I started doubting myself; maybe I was not ready for this challenge. Modifying my training and understanding demanded great effort, and engaging in a new field provoked considerable stress. These new techniques include preparing samples for analysis, learning how to use a variety of analytical instruments, data analysis, and even as simple as cleaning glassware the analytical way. However, perseverance opened the door to great creative thinking, especially for green chemistry method development and reducing wastes in ecosystems experiencing rapid changes with climate warming. Recognize your areas of weakness and find resources to help you strengthen them. Ensure you are prepared before and while starting a new position. Make sure your leadership is on the same path as you; their guidance is monumental to stay on track when challenges arise.

New problem-solving perspectives can help make cognitive leaps to new solutions and broaden collaborative team building (D'Andrilli et al., [2021](#)). I learned to demonstrate that expertise can be a potential boon for colleagues across different research groups and with cultural and language understanding. Every expertise is welcome in research, even on vastly different topics than what you are used to. So, remember to give yourself credit and value. In the end, no one can bridge between those fields but you! In the era of collaborative research and interdisciplinary projects, you will be an invaluable asset in knowing about different areas.

Tips for switching fields: Ask for advice and be kind to yourself

If you're thinking of switching fields, I suggest that you ask for advice to help you plan the transition and be patient. Based on my past experiences, asking for help was paramount, and solid mentoring and supervision were required. This lesson was hard for me; I am an independent person who is not comfortable asking for help. This experience humbled and taught me that leaning on other experts in a new field strengthens me as a person, the team, and the research itself. It is worth reiterating how important it is to be kind to yourself. Don't be so hard on yourself at times of transition or new beginnings, and be patient with your project progress. Switching scientific disciplines can feel like completing another Ph.D. at a rapid pace.

Once I was kinder to myself and asked for help, everything fell into place. I worked diligently and had a great mentor to guide me along the way. I can now confidently call myself an environmental chemist. I have seen how much I have improved a year into my postdoctoral appointment and how much room for growth I still have. This, in my opinion, is the soul of research, working together and growing together as a team. It's all I hoped it would be.

So, how has the change in career path worked out for me?

For researchers like myself, who have the fortitude to start over in a new discipline and can effectively market their abilities, changing fields can lead to a career homerun. After only one year in this new field, I am proud to say that I made the right choice, and although the change wasn't easy, I am happy and grateful I considered more professional paths to ignite my passions. It was not easy, and yes, it was scary. However, it is an essential part of your life, and as Jimmy Dugan (played by Tom Hanks) says in the movie *A League of Their Own*, "If it wasn't hard, everyone would do it. It's the hard that makes it great." So, I encourage researchers to consider every possible option, even the impossible ones. We all learn and thrive in different ways, and somewhere out there is the perfect path and team for you. So don't be afraid to make the switch!

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