



## Science Abroad

Everyone understands that the scientific world is global today. We read papers from around the world, and emailing follow up questions to authors is as easy as if this were the work of a colleague down the hall. We ship samples for analysis by collaborators in other countries, discuss science over Skype and FaceTime, and can also converse informally in real time, as I am personally discovering after recently joining Twitter.

But one of the truly amazing and transformative components of the worldwide scientific community is the opportunities it affords the individual scientist to interact with people from other cultures through travel and in some cases, by living abroad. My colleague Ben G. Davis has written already about the importance of [being present at conferences](#) (both literally and philosophically) around the world in order to maximize your interactions with other scientists. I agree with his sentiments and encourage conference travel wherever and whenever you can manage.

However, many of us end up spending much longer in countries that are not our own, among scientists with completely different backgrounds and experiences to our own. A typical path might be a PhD in your home country, doing a postdoc abroad, and coming home to pursue a career. In the United States alone, 60 percent of postdoctoral scholars were raised elsewhere with 12 other countries posting double digit percentages.

Others have written about the critical political importance of keeping our borders open for scientists from around the world (see particularly this moving editorial from [ACS Nano](#)), so I do not aim to reiterate the great economic and societal cost to restricting the international migration of scientists, but rather to tell a personal and uplifting narrative of how international positions have shaped me as a person and a scientist for the better and what I would tell young students contemplating studying and working internationally.

I was born and raised in Madrid. While there were no scientists in my family, my time at home was mostly spent among books. In college, I had an excellent teacher in physics and chemistry. I truly believe passion is contagious, and this is how I first became interested in science and started to read about the different atom theories and about

how everything around us can be explained and be boiled down to, in a way smaller, though rather complex, molecular pieces. Later, as a chemistry undergraduate student I was drawn to the power of organic synthesis and tried to read reports of total syntheses. At that point, the details were lost on me, but I instead dwelled on the elegance and beauty of the logic behind how the compounds were pieced together. One summer, I had the opportunity to attend a course at the International University Menéndez Pelayo in Santander where, for the first time, I had the opportunity to meet students from other countries and scientists pursuing their careers abroad. I remember projecting myself in those individuals and realizing that the world was so much bigger than what I had been exposed to during my studies in Madrid.

After graduating in chemistry at the Autónoma University of Madrid, I joined the lab of Antonio M. Echavarren first to do my master's and later, my PhD. This decision fostered a life-long love for late transition metal catalyzed reactions. I vividly remember the day Antonio returned from a conference he had attended in Japan and mentioned his encounter with Eiichi Nakamura. The two of them agreed on exchanging students between their labs as a wonderful opportunity to bring them closer. I certainly jumped at the opportunity and ended up spending three months in Tokyo working on organozinc addition reactions in Nakamura's lab. I have fond memories of my time there: beyond the insightful scientific experience, I treasure most the people I got to know during this time, some of whom are among my dearest friends and mentors still today.

I then came back to Madrid to complete my PhD and started to think about the steps ahead. I knew I wanted to finally dive into complex molecular synthesis and was eager to become fluent in a third language. This is how I got to work with one of my scientific heroes, Prof. Alois Fürstner at the Max-Planck-Institut für Kohlenforschung (Germany). Not only did I immerse there into the challenging NP synthesis arena, but also into the most welcoming international community of PhDs and postdocs from all over the world where scientific exchange, constant learning, and personal support and friendship were established.

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While I went to Germany thinking that my postdoc was for a limited time, and I assumed I would someday go home to Spain, I also started to see how different academic systems work and I could begin to imagine how I would navigate them. This is also where the idea of really living, perhaps permanently, in a country other than where I was raised began to peek out. When an Assistant Professor position opened at the University of Zurich, I decided to give it a try. I knew neither the country, nor anyone in the system, but after a successful selection process, the offer was just too tempting. I found myself turning down a prestigious fellowship in Spain to forge a new path with my own research group.

And so I ended up in Switzerland, the prototypical example of scientific diversity. Graduate students come from all over the world, and the vast majority of postdocs are foreign. Zurich as a city is a haven for those of us who come from elsewhere with [one-third of its residents](#) as ex pats. With those sorts of stats, you hear many different languages in the hallways—particularly, English, of course, in the scientific areas, and it does not feel like there is even one set tongue. From my time in Germany, I thought that I would have an advantage with the language on the street—though I must admit Swiss German is still work in progress!

My group comes from three continents and have collectively studied in 15 countries. Some of this is the uniquely international appeal of Switzerland, but I think it also arises from the fact that my students represent the next generation of scientists who have entirely grown up in a globalized society. Students these days have the opportunity to meet invited speakers visiting our campus during the semester, can attend special courses from world-recognized experts in their fields, and might be able to travel abroad to present their work in international conferences. Many of these opportunities were just not there a few generations ago, and it is clear in this regard that globalization has helped here for the better.

It's not just the science that translates to your new life. Something as simple as trying dishes cooked by different co-workers at group parties and celebrations becomes both a learning and a bonding experience. For me personally, one thing I take with me no matter where I go is my appreciation of art. If you have never been to Madrid, when you go be sure to give yourself at least a day—ideally more—to its breathtaking museums, particularly the Museo Nacional del Prado, the Reina Sofía, or the Thyssen Bornemisza Collection. Today, visiting art museums is the one treat I always grant myself in a new city.

Despite giving such a sunny view of this globalization, there are also not so bright sides. Many of us, myself

included, come from countries where to obtain academic success, for some students, migration is a must. Spain's industrial and academic institutions, for example, cannot support all the talented students who come out of its educational system. I personally have found a great life in Switzerland, but I can certainly empathize with those who want to return home and repay the system that trained them initially. For people who end up involuntarily separated from their families, this dilemma takes a heartbreaking turn. Large countries are also not immune to forcing scientific migrations. In 2013, during the U.S. budget sequestration, [20% of U.S.-based scientists](#) reported contemplating a move to another country for funding reasons. If we move to a more international view of funding and development, the pains here could be lessened, making international moves a possibility for as many as would like to try it, but not force those who would prefer to pursue opportunities in their home country.

Even with some limitations and problems, in the end I firmly believe I am the person and scientist I am today thanks to the amazing experiences and people I have encountered in Spain, Japan, Germany, and Switzerland and would not trade my life's trajectory for anyone else's. If you have the opportunity to study somewhere else, for even a short time, I recommend it, and make time for whatever aspects of the culture outside science that interest you. It is a rare privilege that we work in a field that so accommodates and encourages travel; we should make the most of these opportunities.

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## Notes

Views expressed in this editorial are those of the author and not necessarily the views of the ACS.