

When Science Is a Family Tradition

A Shared Passion for Neuroscience



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Family efforts are commonplace in many professions. Dedication to suits united the Brooks Brothers, and enthusiasm for books brought Wiley & Sons together. In our family, it's a passion for understanding the brain. Our parents were drawn to the subject when they realized that their own field, philosophy of mind, was uninformed by developments in neuroscience. To discover what philosophy might gain from neuroscience, they trekked to labs at the University of Manitoba medical school, once even bringing back Tupperware-encased brains to dissect in our kitchen. The brain dissection fascinated us as kids, and even more critical was the accompanying conversation, conveying a conviction that understanding the brain was the great scientific challenge of our time.

This inspired us to choose neuroscience for our own careers. Though our professional interests have diverged somewhat, there remain many points of intersection. Our shared passion means that we have a common language for discussing subjects of mutual interest. This common language is the best part of having a sibling who is also a close colleague. We don't always agree. At family dinners, strong words are exchanged over topics both large—what will be the limits of the human brain in understanding itself—and small—what approach should be used to analyze neural variability. But a colleague who understands your ideas makes possible a dialogue that can help those ideas develop. Our discussions today don't usually center around the same topics as our parents' did, but our belief in the importance of neuroscience is the same, as we help each other contribute to that shared enterprise.

Scientific Imprinting



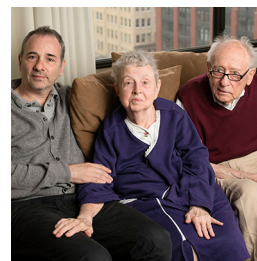
Robert B. Darnell
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My apprenticeship from my father (pictured above, center), James Darnell, happened at the dinner table. There I first learned the vocabulary of science. By the time I was 12, I was pretty convinced that “polyadenylation precedes splice site selection.” Growing up with the second language of science facilitated the transition from fluency in terminology to fluency in scientific thought. There was no confusing transcription and translation in my family! Fast-forwarding, my father and I now think critically together about transcriptional dynamics and RNA regulation versus the bland information present in steady-state RNA analyses.

At our dinner table, once a month my mother—an intellectual, but not a scientist—would ask my father what was new in the lab. Her question and her interest itself I always found wonderful. Explanations using jargon underscored the difficulty of putting the complex into understandable words. The importance of simple communication is a lesson I carry with me to this day.

Our dinner table and house was also full of people I knew were scientists, but who I thought of first as people. Experiences like waking up in the morning and jumping on a sleeping Lennart Philipson, bringing out his warmth and mirth, allowed me to experience scientists' humanity first-hand. The privilege of seeing the warm people underneath towering scientific personas, whether it was Lennart, Harry Eagle, David Baltimore, Aaron Shatkin, Jim Watson, or Bob Roeder, even as I overheard the intensity of their science discussions, led me to see intellectual intensity as a natural part of life. I knew their shared secrets—humanity underlying shared scientific passion. And this has been the biggest privilege for me—aiming to emulate their idealism rather than aiming to become a persona.

Getting Signal out of Noise



Andre Nussenzweig
National Cancer Institute, NIH

Even though I grew up in a family full of scientists, I can tell you that I didn't have a particular interest in being a scientist. Nothing against it, but dinner conversations about “complementary determining regions” (CD this and CD that) sounded pretty boring. Despite the background noise, one thing that came through loud and clear was the four P's: the *patience*, *passion*, and *persistence* to which my parents approached science, obviously leading to great *pleasure*—perhaps even to a fault. Every single day (including weekends), they would go to work. When they were on vacation at our country house, there were plenty of articles lying around from *Science* and *Nature*. Of course I flipped through them, but these were no *Time* magazines—a few pictures but with that same unintelligible fine print that my parents seemed so passionate about.

In addition to science journals, there were bookshelves and coffee tables full of photography, art, poetry, biographies, mysteries, and thrillers. This pre-selected library has always been an excellent source of fascinating reads on a range of topics. With all of these stimuli, it took me a long time to figure out what I wanted to do. I tried my best to avoid science with music, basketball, philosophy, psychology, computers, and art history. But I realized that only science seemed to satisfy my four P's. I first trained in physics (perhaps influenced by my uncle, who is a theoretical physicist) but eventually made a transition to biology. That's another story in itself, but I can tell you that CD this and CD that doesn't sound so bad anymore.

From physics to systems biology



Nikolaus Rajewsky
Max Delbrück Center, Berlin

Discussions at our lunch table in Cologne were rarely about my dad Klaus's immunology and genetics work but much more frequently about society and politics because my mom was a political scientist. But as a young boy, I loved visiting my dad in his lab, and the humming of the big machines sounded like music. Music was and is very important to me. However, a summer vacation changed my life. When I was 15, Janos Hajdu, a family friend, taught me calculus, differential equations, and Newtonian mechanics during the vacation. I fell in love with math and physics and eventually finished a Ph.D. in theoretical physics in 1998. However, a workshop about biology excited me when I was a postdoc with Joel Lebowitz in Rutgers University. Biology offers the most exciting scientific questions amenable to me! So I started a second postdoc with Eric Siggia at Rockefeller University, working computationally on transcriptional regulation. Meanwhile, Klaus moved to Harvard Medical School. Great! It was easy to visit and to discuss our science. He became interested in my computational approaches and my work on miRNAs that I had started at my own lab at NYU in 2003. This led to highly enjoyable interdisciplinary collaborations between Klaus and myself.

I moved to Max Delbrück Center (MDC) in 2006 and in 2008 started building an Institute for Systems Biology, where we synergize computation and experiments. Klaus later left Boston and joined the MDC. I think it is a real joy and very precious for us to be able to have a family life that includes science and music, which is now perhaps tighter than that in the early days.

No Other Choice



Bernardo L. Sabatini
Harvard/HHMI
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Each family has its peculiarities, and children usually assume that the oddities that surround them represent the norm. Thus, growing up in a microcosm of Argentinians transplanted to New York, populated exclusively by carnivorous physicians and scientists, never seemed odd to us. We must have appeared quite bizarre to the outsider, as we didn't understand American football but could explain protein trafficking through the Golgi apparatus.

Like many foreigners, our parents have classical educations that fostered, at gatherings of expats, heated conversations on arts, literature, history, politics, and, of course, science and medicine. With them, we travelled the world and had experiences—picking up hitchhiking armed soldiers in Israel, crossing Checkpoint Charlie into communist Berlin, and roaming the streets of Kyoto playing pachinko—that opened our young minds to the diversity of customs, beliefs, and tensions that fill the world. In each locale, with its own accents and foods, we encountered intellectuals and writers who were essentially family, both in their intense affection for our parents and in a shared pursuit of a stimulating life that was comfortable yet devoid of overt material pursuit. This childhood imbued in us a deep appreciation not directly for science but, rather, for the joy that arises from impactful pursuits driven by curiosity and free of intellectual constraints. It was the embrace of this lifestyle that inevitably led to us choose careers in science.

DNA Lit the Way



Alan Jian Zhu
Peking University

I grew up in an academic family in China in the 1980s. My father, Zuoyan Zhu, ran a laboratory in the Institute of Hydrobiology, studying fish biology. My decision to become a scientist came very naturally after gradual exposure to the research environment in my father's laboratory.

When I was a kid, I often went to my father's office to do homework after school. Homework was easy for me, and I got bored very quickly. To escape the boredom, I sometimes sneaked into the laboratory adjacent to his office. That was the beginning of my exposure to a research environment from a tender age. I remember vividly my first experiment: helping a graduate student load a DNA molecular weight marker onto an agarose gel. I was taught at school that DNA carries biological information but is too tiny to be seen with naked eye. So I was amazed to find out that I could actually see, behind a facial mask, the glowing red DNA ladder migrating through the gel before my eyes. I was immediately hooked. It was in that very room where I learned how to perform molecular cloning to put together different DNA pieces and later observed the hatch of a fish embryo injected with the transgene I helped construct. It was after that exciting period when I decided to follow my father's path to become a scientist.

The Center for Life Sciences at the Peking University, where I have my own laboratory, runs a program inviting local high school students into research laboratories. From my own experience, I believe this initiative will help kids become interested in science and, hopefully, will lead to future careers in science.