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Editors: Allison Pritchard/Tori Velasquez | Designer: Lisa Baehr

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So…you earned your Ph.D., now what?

By Jennifer F. Nemeth-Seay, PhD, SCPM, Janssen Research & Development
December 3, 2019

"You're graduating with your Ph.D., now what?" is a common question that all doctoral candidates ponder as they approach their dissertation defense date. Options abound for new graduates from a postdoctoral position in academics or industry, a range of full-time positions across different industrial sectors, and the choice to remain in academia in a salaried role. For many students, non-academic choices may not be clear, as most of their career has been within academic institutions. The thought of going beyond the walls of academia can be both daunting and exciting.

Discovering research careers in industry or in government can be challenging and does take effort on the part of students. Many resources are available to students that can facilitate the process. For example, at Janssen Research & Development, which is the R&D engine for the Janssen Pharmaceutical Companies of Johnson & Johnson, we will partner with graduate and postdoctoral fellow organizations to arrange for research facility site visits and other in-person exploratory experiences. Other options available for fourth- and fifth-year graduate students are co-op positions, which provide relevant work experience and valuable networking opportunities. Finally, applying for a range of roles (I recommend starting applications 4-6 months ahead of graduation), and going on as many interviews as possible, will allow a student to get an inside look at different organizations and their workplace cultures, as well as the caliber of scientific research and potential opportunities for scientific and career growth within the company.

"Why do I need to do a postdoc? I just finished XX years as a graduate student."

Regardless if a student is leaning strongly in a specific career direction (academic, government or industry), an alternative is to pursue a postdoctoral position. A common question I get from prospective candidates is "Why do I need to do a postdoc? I just finished XX years as a graduate student." As I often tell students, a Ph.D. program is designed to teach a student how to CONDUCT RESEARCH. A postdoctoral fellowship is designed to teach a graduate how to INDEPENDENTLY LEAD research. These opportunities also provide students with additional training in their area of expertise, together with the opportunity to learn new skills and technologies and obtain experience in another organization. In industry, the culture, speed of research, and how things work is far different than academia. A non-academic postdoctoral position provides a student with exposure to this environment, as well as obtain team and interdisciplinary experiences before they take that next big step as a full-time employee. In academia, a postdoctoral role is usually a critical next step to a tenure-track professorship position.

From the perspective of a hiring manager, an applicant with a postdoctoral fellowship is often seen as a more attractive, qualified candidate. Often, hiring managers tasked with identifying early career scientific talent will see applicants with postdoctoral experience as having inherently more scientific experience, who have learned critical skills for leading research, and potentially have a broader skill-set than their graduate student-only counterparts. Additionally, if the candidate has completed a Fellowship at an industrial institution, the hiring manager could see this candidate as better prepared to enter the industrial workforce.

Janssen R&D offers postdoctoral experiences to students that are grounded in novel, scientific exploration. We position our Fellows to publish their research in high-quality, peer-reviewed journals, present their findings at conferences, and participate in internal symposia and career development activities. All of these elements are designed to prepare our Fellows to take a strong "first step" into an industrial career.

Deciding your next step after your Ph.D. can seem daunting, but with a little preparation and forward thinking, any student can take that "next step" in their career with confidence.

Three research-based lessons to improve your mentoring

By Jay J. Van Bavel , June Gruber, Leah H. Somerville, Neil A. Lewis, Jr.
March 13, 2019

Some scientists are truly extraordinary mentors. Take, for example, professor Charlotta Turner, a chemist at Lund University in Sweden, who in 2014 received a text from her Ph.D. student telling her that he might not finish his thesis in time. When she learned that her student, Firas Jumaah, was in fact hiding with his family in an Iraqi factory as armed members of the Islamic State group roamed the streets outside, she leapt into action and worked with the university's security chair to arrange a daring rescue operation.

But for every heroic mentor, there are just as many horror stories about bad ones. Unfortunately, most mentors don't always have the tools or training to provide the proper support to their mentees (and, unfortunately, some just don't care).

One way to address this issue is by learning the science behind great mentoring, as Jay and colleagues discussed on a panel recently. Instead of relying solely on personal anecdotes or their own gut intuitions, the panelists described theories and research on how to manage the most important relationship in science: the one between a mentor and mentee. Here, we share three lessons from that event.

Becoming a better mentor should be a central concern for new faculty members starting their own labs, but also for graduate students and postdocs mentoring research assistants—and even for more senior faculty members who are continually striving to improve their mentoring. Our capacity for growth as mentors is a lifelong journey.

Informal chats about work or other common interests can help build rapport, and the more comfortable you and your supervisor are with each other, the better.

Lesson No. 1: Take cues from research on parent-child relationships

A career in science is often stressful. A 2018 study found "strikingly high rates of anxiety and depression" among graduate students. Yet, the authors write, the "data indicate that strong, supportive and positive mentoring relationships between graduate students and their [principal investigator]/advisors correlate significantly with less anxiety and depression."

So, how can students and mentors build a relationship that will buffer rather than contribute to those stresses? According to Geoff MacDonald, a professor at the University of Toronto in Canada, research on attachment and parent-child relationships can offer some important clues. This research points to three related but distinct approaches: authoritativeness, which is defined by both high expectations and high attentiveness; offering a safe haven in times of distress; and fostering a secure base to promote exploration.

Authoritative parenting—which tends to produce positive outcomes for children—is both firm and supportive, with parents maintaining boundaries while being reliably available to the child when needed. Scientists can cultivate similar relationships with mentees by being engaged and maintaining high standards while providing consistent support and encouragement. By setting challenging yet achievable goals, mentors signal their confidence in their students' potential. Great mentors go a step further by providing the necessary guidance and support to help their mentees succeed.

Students also need someone they can turn to when they are struggling with the challenges and setbacks that are an inevitable aspect of science. This may be especially true for underrepresented minorities, first-generation students, and women. Mentors should ask themselves whether they provide a safe haven for their students. Are they comfortable coming to you when they have a problem or encounter an obstacle? Do you listen and provide support?

Finally, research suggests that providing a secure base is critical for promoting exploration, risk-taking, and discovery—all critical elements of successful science. Mentors need to take an interest in their students' goals and encourage them to accept challenges and take risks, as well as provide guidance on how to overcome obstacles. But, much like parenting, it is also critical that mentors accept and encourage students' sense of independence by, for example, letting them take the lead on projects or sending them to a conference on their own when the time is right. Mentors should be constantly creating opportunities that allow trainees to become more independent—not micromanaging them or refusing to let them go.

Lesson No. 2: Convey belief in students' abilities and potential

Students watch mentors very carefully—not only because they are looking for scientific role models, but also because they are trying to understand what their mentors think about them and others. If students think their professors believe that only a few special people have intellectual potential, it can harm their sense of belonging and their performance, as London Business School professor Aneeta Rattan discussed.

Women and underrepresented minority scientists are particularly impacted. For instance, one recent study found that science, technology, engineering, and math professors who believe that ability and talent are malleable have smaller racial achievement gaps in their classes than professors who believe that ability and talent are fixed. Another study found that Ph.D. students are more attracted to scientific and technology careers when their professors believe that everyone has the potential for success, and women and minorities may benefit the most from this belief.

Mentors and institutions who want to promote a sense of diversity and inclusion on campus should think hard about the types of values and beliefs they communicate to students, both verbally and nonverbally. To make their beliefs explicit, mentors should share them openly—particularly if it is the belief that everyone has the potential for success. They should also act on that belief: If everyone in their lab has potential, that could mean equalizing the level of time and effort that students receive, rather than pitting them against one another in an academic version of The Hunger Games. It could also mean planning out student goals, explaining what they need to do to get there, and providing these guidelines and support early. Throughout this process, it will help if the mentor expresses confidence that their student has the potential to achieve these high standards.

Lesson No. 3: Help your mentees embrace failure as growth

From rejected papers to unfunded grants to unsuccessful job applications, failure is a natural part of life for seasoned academics. But mentors often forget what this feels like for people who are new to the field, many of whom have excelled consistently at previous stages of their education. To make matters worse, these days it is easier than ever to see success stories in science—people are posting publications, announcing awards, and celebrating new grants and positions on social media. But just like celebrities who post airbrushed selfies on Instagram, it masks the true pathway people take in science. That's why mentors need to remind students that critical feedback and failure are a normal part of the process.

One way to do this is to cultivate a growth mindset among your trainees, as both Jay and Anne Wilson, a professor at Wilfrid Laurier University in Ontario, Canada, proposed. Praise hard work, effort, and improvement, and reward things mentees can control rather than outcomes that hinge more on outside forces and chance. For example, mentors can praise improvements in the scientific method even if the results are not promising, or reward the submission of papers to journals even if they are ultimately

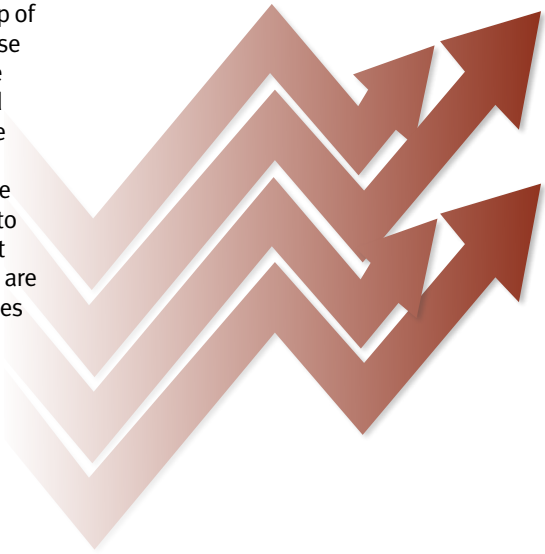
rejected. By focusing on growth—and the inevitable process of failure—we can normalize how science works, which can make the entire field seem far less daunting. It is also critical to talk about failure if we ever hope to learn from our mistakes.

Another great example of how scientists can openly acknowledge and discuss failures and setbacks is New York University's weekly discussion series "Growing up in Science," hosted by professors Wei Ji Ma and Cristina Alberini. Guests—including Jay—send around their official bio along with an unofficial bio that unveils their honest, winding path, illustrating the challenges and struggles that each of us face. It is incredibly refreshing to learn that eminent colleagues faced the same series of setbacks and failures that trainees are grappling with for the first time.

This thirst for honesty may be why failure CVs—in which people list all the rejections and setbacks they have experienced—have gone viral. As Princeton University professor Johannes Haushofer wrote at the top of his, "Most of what I try fails, but these failures are often invisible, while the successes are visible. I have noticed that this sometimes gives others the impression that most things work out for me. As a result, they are more likely to attribute their own failures to themselves, rather than the fact that the world is stochastic, applications are crapshoots, and selection committees and referees have bad days."

Stories of failure are often written by people who have already had success and feel safe to share their setbacks, but this doesn't need to be the case. By making this process transparent, we can help mentees understand that failure is a natural part of science.

There are no simple answers or formulas to address the countless challenges of mentoring. Any model requires constant evolution and tailored feedback to support the specific needs and background of each trainee—even if that requires sending armed mercenaries to extract them from a war zone. But it's well worth the investment. When mentors help their trainees flourish, it not only manifests in a more productive scientific environment; it is also the most rewarding aspect of the job.



What matters in a Ph.D. adviser? Here's what the research says

By Katie Langin
April 5, 2019

Earning a Ph.D. takes years and poses many challenges, so it's important to choose the person who will shepherd you through the process—your Ph.D. adviser—wisely. There's no single formula for choosing the right Ph.D. adviser; the factors will vary for each student. But the latest research on the topic points to things to look for when making a decision, as well as pitfalls to avoid.

Supportiveness

When it comes to student satisfaction, the single most important element is adviser supportiveness, according to a study published this week in Assessment & Evaluation in Higher Education. Getting a Ph.D. is "a very stressful, long process," says Gerard Dericks, a senior lecturer at Oxford Brookes University in the United Kingdom and the lead author of the study. "You'll have setbacks. You'll get discouraged. You'll have doubts about yourself—about your research ideas, about many things." So, it's important to have an adviser who "believes in you and is willing to give you that extra support that you need in those trying times," he says.

Dericks and his colleagues homed in on the importance of adviser supportiveness by surveying 409 Ph.D. students—85% of whom were in the sciences and engineering—at 63 universities in 20 countries. The United States, Australia, and countries in Europe yielded the most survey responses. The team measured student satisfaction by asking the survey participants to rate the degree to which words such as "good," "happy," "terrible," and "disappointing" described their overall Ph.D. experience. Then, the researchers asked students about their experiences with the people and support networks that immediately surrounded them in academia: namely their advisers, departments, and peers.

Adviser supportiveness—whether an adviser was caring, considerate, encouraging, and sympathetic—was the most important factor for student satisfaction. According to the researchers' findings, switching from an adviser who was strongly unsupportive to one that was highly supportive would be expected to increase the Ph.D. satisfaction score—on a scale of one to six—by nearly two points. None of the other factors considered—including age, gender, years of study, country, and department and peer qualities—had such a strong effect.

Working style

It's also important to figure out whether your working style is compatible with your prospective adviser's style, says Anna Sverdlik, a psychology postdoc at the University of Quebec in Montreal, Canada, who studies conditions that promote the success and well-being of Ph.D. students, and co-authored a review article on the topic published in September 2018. What works for individuals varies: Many students don't want someone constantly looking over their shoulder, but for some it can be helpful to have an adviser who keeps tabs on them more regularly to set deadlines and ensure that they're making progress, she says.

Either way, it's best not to have an overly hands-on adviser because that can handicap your future career, says Sotaro Shibayama, an economist and senior lecturer at Lund University in Sweden and the author of a new study of how advising style influences Ph.D. students' long-term success, published in this month's issue of Research Policy. Shibayama tracked 791 life scientists who earned a Ph.D. in Japan between 2000 and 2010, counting the papers they published in graduate school and up to 9 years after graduation. He found that when advisers were largely responsible for dictating the design of their students' research projects, students initially benefited because they published more papers during graduate school than peers who were given more autonomy. But after graduation, researchers who were advised by professors who weren't so hands-on went on to be more productive.

The study underscores a fundamental disconnect between the interests of advisers and advisees, Shibayama says. Advisers may want to publish as many papers as possible so that they can win more grants and move their research programs forward. But advisees are best served if they are given the space to make mistakes and develop into capable, independent scientists—a process that can take time, and that is more likely to pay off after a student has left an adviser's lab.

In some labs, graduate students are "treated like labor—like robots in a factory—rather than independent scientists," he says. "They are just told to do some experiment and they have to stay in the lab day and night, 24/7." That's not fun, he says, and the lack of autonomy doesn't help them learn what it takes to be a successful scientist. Shibayama recommends that prospective Ph.D. students look for advisers who let their students play a role in study design. "Students have to find someone who goes beyond their own interest," he says. "Some professors are interested in producing good students, so choose those supervisors."

Sverdlik adds that it's best to find an adviser who is willing to devote time to nurturing your development during critical phases of graduate school—during the transition from coursework to research, for instance—and who otherwise will give you room to grow on your own. "What we found in the literature is that when your supervisor just monitors your progress, and is willing to make time for you when you really need help, that is really all that is needed for students to succeed."

To figure out what a professor's approach to advising is, Sverdlik encourages students to ask a lot of questions of prospective advisers and their advisees when they're interviewing. For example: "How do they work? Do they check up on you a couple times a week, or do they give you a task and they're OK not hearing from you until you complete it?" Prospective students will differ in their specific preferences, but overall, it's probably best to find a balance and avoid overly hands-on and overly hands-off advisers.

Academic credentials

When looking for an adviser, prospective students often seek out well-known researchers who are highly cited and respected in their fields. Dericks and his team didn't find any evidence that showed that's an effective strategy, though: After taking adviser supportiveness into consideration, students' satisfaction levels weren't correlated with their perceptions of their Ph.D. advisers' intelligence, knowledge, intellect, and scholarly abilities. It's critical to find "someone you can relate to, who is going to be supportive in a personal way," Dericks says. "That's more important than somebody who might have a famous name or someone who's particularly skilled."

That said, prestige can be a relevant consideration. The reality is that, in the long term, a reference letter from a well-known professor—and a degree from a top-notch university—can give Ph.D. holders a boost when they're searching for a job. According to a 2015 study, 25% of U.S. institutions produce roughly three-quarters of all tenure-track faculty members in the three disciplines the team examined: computer science, business, and history. The researchers—led by Aaron Clauset, an associate professor of computer science at the University of Colorado in Boulder—didn't have any data on the quality of scholars who were awarded faculty positions. But given how much faculty-member production differed between universities, they suspected that faculty positions weren't given out on merit alone. The reputation or some other characteristic of an institution, they concluded, probably played a role.

So, a prestigious academic pedigree may help you get where you want to go after graduation. But if that's the only thing you take into consideration, you could wind up having a terrible experience in graduate school. "A bad or even just mediocre adviser can make your time as a doctoral student miserable or simply not pleasant, which could undermine the excitement that got you interested in research to begin with," Clauset notes. When his students come to him looking for advice about who they should work with next, he tells them not to weigh prestige too heavily. "It's far more important … to have an adviser who supports your career goals and development, and who has your interests at heart, than it is to have a degree from an elite program."

Community science: Not just a hobby

By Chris Tachibana
August 30, 2019

Community science groups have an inclusive, open-door ethos that makes them a natural place to learn informally about scientific careers. Members explore, create, and problem-solve as they work together on do-it-yourself projects in conservation, synthetic biology, and more. If you join a community science lab, don't expect a straightforward path to a job. But do expect to meet potential mentors and advisors, make local connections, and gain skills to support your professional development.

Michal Galdzicki started doing community science nearly 10 years ago, while getting a Ph.D. in bioinformatics and bioengineering from the University of Washington (UW). The community science movement is still evolving, he says, so even members don't know if they should call it citizen science, DIY for "do it yourself," or something else. Participants may identify as artisans, hackers, or makers, but all celebrate hands-on, open, accessible science. Projects can be about engineering, environmental conservation, art, food, and more—often covering multiple topics at once. For example, Galdzicki originated a DIY-genotyping project for tracking the origin of salmon from markets and restaurants.

Galdzicki now has the title "Data Czar," in charge of integrating information at the Seattle protein-design company Arzeda. He says he constantly applies expertise from his community science work. Especially in a startup company, resourcefulness, low-cost creativity, and on-the-spot problem-solving are essential. Community science projects can develop those capabilities. For him, he says, "DIY actually means 'figure it out yourself.'"

Kevin Chen also benefited from cofounding the community science group Bricobio in 2013 in Montreal. In 2014, he launched the company Hyasynth, which uses engineered microbes to generate cannabis-derived medicines. Bricobio helped with connections, he says, bringing the right people with the right interests together to start the company.

Chen, Galdzicki, and others emphasize that community science is not about career advancement. Its primary goals, Chen says, are around democratization, "breaking down walls to increase access to science and get the public engaged with its tools." Still, being part of the community science world can provide professionally useful skills and connections.

A global mission—with networking opportunities

Community science projects cover a broad spectrum, ranging from collecting weather data with home sensors to culturing microbes to produce milk proteins. Synthetic biology is a common theme, Chen explains, because the history of community science includes sharing BioBricks, which are units of DNA sequences for engineering microbes. Teams for the International Genetically Engineered Machine (iGEM) Foundation Jamboree, held annually since 2003 at the Massachusetts Institute of Technology (MIT) in Cambridge, develop projects for the event using a standard BioBrick kit. Companies including Hyasynth, Ginko Bioworks, and SynBioBeta count "iGEMers" among their founders and employees.

The diversity of people and interests in community science is highlighted by the hundreds of participants at the Global Community Bio Summit at the MIT Media Lab. Activities, Chen says, include productive discussions, useful breakout sections, and global collaborations.

David Kong directs the MIT Community Biotechnology Initiative and founded the Global Community Bio Summit. He describes his work as "helping crystallize global networks around community science." The goal of the Bio Summit, he says, is to move science from individual labs to a collective intelligence that advances it in a coordinated, decentralized fashion.

Bio Summit attendees meet people who share this broader scientific objective. They can also connect with people in decision-making positions. In 2018, Bio Summit donors and sponsors included the global corporations Scientist.com, MilliporeSigma, and Takeda. Akiko Otani, Takeda's director of public–private partnerships, was one of several participants from the pharmaceutical company.

Otani stresses that Takeda's primary goal in sending representatives to the Bio Summit was not recruiting or scouting for employees. Instead, she says, "It was an opportunity to connect with and support people around the world who are doing science in their own communities." Projects such as teaching science to children in India using paper microscopes showed "young scientists doing impressive, innovative things with limited resources." Otani was impressed at the innovation and practical skills demonstrated by attendees that went beyond their academic achievements. She noted that the Bio Summit highlighted a diversity of thoughts, ideas, and people—a perspective that she brought back to Takeda by having Kong present to her team about the community bioscience philosophy.

> "[Community science is about] ... breaking down walls to increase access to science and get the public engaged with its tools."
>
> Kevin Chen

The spaces where it happens

Global summits are energizing, but the real work of DIY scientists happens in community labs. At first glance, these spaces can resemble traditional academic, government, and for-profit facilities. Seattle's SoundBio Lab, for instance, has incubators, centrifuges, and a pipetting robot. Lab members, however, range from high school students to retirees. Members may be artists incorporating science in their work, programmers contributing computer skills, parents introducing their kids to technology, or entrepreneurs piloting startup ideas.

Like most community labs, SoundBio is governed by a volunteer board. It's funded by donors and a low-cost membership fee. The SoundBio mission is educational, but some community labs are more like incubator spaces for startups, says cofounder Zach Mueller. SoundBio literally started "with people sitting around on lawn chairs in Zach's garage," cofounder Galdzicki says. Moving to lab space near UW meant that he, Mueller, cofounder Regina Wu, and early SoundBio members did all the work of creating their nonprofit organization, including paperwork, fundraising, and building lab benches.

Other learning experiences that can result from community science include mentoring, teaching, and collaborating with people with diverse backgrounds and interests. Networking is not a goal of SoundBio but can happen automatically. Many of those working at the lab have local connections: Wu works at Fred Hutchinson Cancer Research Center and Mueller at Amazon, while Yoshi Goto, director of operations and lab manager, has interned at Arzeda.

When Galdzicki started doing community science, his graduate school advisors were John Gennari, in UW's Biomedical Informatics and Medical Education department, and Herbert Sauro, in UW's Department of Bioengineering. Both supported this outside activity, even for an early-career researcher who had a thesis to complete. Gennari says that his department is interdisciplinary, with projects that include studying patient communications via social media and presenting science to laypeople. Community science aligns with that work and is a way to acquire and practice science communication skills. For that reason, some students and postdocs find that community science complements their research and grounds it in the real world. In addition, Gennari says, "research is intense" and any external activities help "clear your mind."

Community science is also a public-outreach opportunity. Sauro notes that some funding agencies, such as the U.S. National Science Foundation, require outreach activities. By working with the public on projects, scientists learn to explain and justify their research to laypeople. The activity also educates the general population about science, Sauro says. Many science outreach and communication programs are geared toward kids, so he appreciates that community labs include adults. "They vote and pay taxes that pay our salaries," he says, "so they should also be part of science outreach."

Chen says that currently, about half the participants in Montreal's Bricobio are academic scientists. For them, Bricobio is an inspiring, friendly space to build their skills and share their knowledge, he explains. As someone who now hires for his company, Chen observes that community science experience on a CV is noteworthy and demonstrates an ability to think beyond academic science. Others in hiring positions at universities and companies also say they notice citizen science or maker projects, or participation in community science or iGEM, but do not prioritize applications with these activities.

Nonetheless, to some, community science experience demonstrates creativity, genuine interest in the field, and job-related competence, especially for participants who initiate projects or develop them from scratch. Gennari and Sauro said they would look favorably at community science membership that was mentioned in an application from a graduate student, postdoc, or even faculty member. Gennari said he would consider it an indication of organizational and communication skills. Both he and Sauro emphasize, however, that not everyone would agree.

Making and marketing

Somewhat related to community science are maker organizations. These groups often focus on creating tangible items, such as furniture or musical instruments, but the community science and maker movements aren't separated by a clear line. Take Laura Penman's work with Copenhagen Maker in Denmark. As part of completing her Master's degree in digital manufacturing at London Metropolitan University, Penman self-built a 3D printer based on open-source designs from ceramicist Jonathan Keep. The printer creates items using organic material, such as coffee grounds, inoculated with fungal spores. The fungi grow into a networked mycelium that can be treated to create a solid, biodegradable material.

When Penman moved to Denmark, she got involved in the maker community—not to find a job, but to meet people. "As a byproduct," she says, "I found people who helped my professional development by pushing me to try out ideas." For example, through the community, Penman met a professor at the IT University of Copenhagen Digital Design Department who provided her with informal advice and mentoring for her maker project and her career.

> "... the career benefits of community science or maker participation are hard to predict, but can be huge as long as you're not expecting a direct link to a job."
>
> Laura Penman

Penman now works for 3Shape, which makes 3D scanners and software. Getting the job did not involve maker connections, though. One day, Penman bicycled past the company's building, noticed the name, and then checked the company's employment page. Penman says the 3D printing project was an asset that helped her CV stand out, though. Reflecting on these experiences, she says the career benefits of community science or maker participation are "hard to predict, but can be huge as long as you're not expecting a direct link to a job."

Even now, as an engineer for a 3D company, Penman still participates in Copenhagen Maker. Her motivations align with those of Galdzicki and Chen, whose day jobs and community lab work use related competencies. The difference, the three say, is that community science allows for more creativity. The work is driven by member and community interests rather than company directives and has few constraints beyond the usual need for time and funding.

Copenhagen Maker has a professionalization side, though, says Stine Broen Christensen, leader of the Copenhagen Maker Festival. A goal of the nonprofit organization is making technology accessible to the public through education, urban development, and democracy initiatives. Another is showcasing small businesses that originated as community science or maker projects. As an example of a science-based small business that uses the Copenhagen Maker Festival to interact with the public and promote its product, Broen Christensen names PlatoScience. Started by a neuroscientist and a product designer, the company makes personal neurostimulation headsets to increase focus and productivity.

Copenhagen Maker also runs Underbroen, a space for startups and small- and medium-sized enterprises "to go from maker to market," Christensen says. The space brings entrepreneurs together and encourages them to share knowledge, resources such as 3D printing and milling equipment, and skills such as programming and graphic design.

Occasionally life- and career-changing

Participants in community science, maker spaces, and events like the Global Bio Summit or iGEM emphasize that these activities do not lead directly to a job. Sometimes, though, joining the community can be career changing. Japheth Kelly was a computer science student at Ashesi University in Accra, Ghana, when he saw a poster in the library about iGEM.

The iGEM Jamboree brings thousands of participants to MIT, including teams from community labs such as SoundBio, which sends a group of high school students. Kelly's team members were from his university. Not only were they the first iGEM team from the West African region, he says, "we were all engineers with no biology background." Recruited and led by faculty member Elena Rosca, the team quickly got trained in synthetic biology methods and developed their project to use engineered bacteria to reduce the toxicity of gold mining in Ghana. The team won a silver medal for their work and the Chairman's Award for iGEM spirit and values.

For Kelly, the project led to a job growing the scientific and synthetic biology community in his region. He is now an iGEM Ambassador and travels around Africa, raising awareness about iGEM with young scientists and industry and academic leaders who could support them. The job requires researching a country's education policies, pitching to funders, and aligning university and company interests with solutions that a synthetic biology team can provide.

Kelly's career plans are to work in industry, get more education, and return to Ghana to teach. He says his iGEM work, which was reported extensively in the media, has been recognized by employers. He adds that the challenges of the experience were actually opportunities. Lack of funding seemed like a disadvantage, "but I learned skills from presenting and giving pitches to investors," he says.

"I learned to tell a story that can get us help with our projects." His team dealt with equipment that had to go abroad to get repaired and customs agencies that didn't understand materials sent to them for synthetic biology. Overcoming these barriers gave his team problem-solving experience that they now present to employers as a valuable skill.

Now, when Kelly talks to students about getting involved with science at a grassroots level, he tells them, "You need heart and determination to get through the hard, long nights in the lab when you often get results you weren't expecting, but you'll get help from a network that will bring other opportunities to your door. If I, Japheth Kelly, a nonbiologist, can do it, I say you definitely can, too."

Learning to balance my strengths and vulnerabilities as a leader

By Lucka Bibic
September 13, 2018

About a year ago, I took on the best imaginary job out there: CEO of CryoThaw, the finest company that never existed. I had come across a tweet announcing the 2017 Young Entrepreneurs Scheme competition, sponsored by the University of Nottingham with partners from the U.K. government and industry, in which teams form hypothetical startups based on feasible scientific ideas. As a graduate student unsure of my career plans, I was excited to explore outside academia. I also saw it as a way to develop my leadership skills. So, with the support of my supervisors and funders, I decided to give it a go. I recruited three other students, and we chose to focus on improving organ transplantation. I thought I had everything under control. I couldn't have been more wrong.

They say successful teams are part art, part science. Initially, we were neither. We were just four students with remarkably different personalities struggling to work toward a shared goal. I had allocated tasks based on each team member's skills, but I confused delegation with leadership and failed to motivate the team to work together. Our initial meetings went in circles—repetitive conversation with no clarity and a lot of time wasted rehashing previous decisions—and frequently ended in turmoil. As a result, the project started with frustration and animosity. The tension between being perceived as my teammates' competent CEO and who I actually was—their grad school buddy with no prior leadership experience or training—became intolerable. I considered opting out of the whole thing.

After a few weeks, a teammate confessed to me that he found our meetings stressful, too. I finally grasped that this culture was unsettling for everyone, not just me. "Oh boy, I suck!" I thought. Something needed to change.

I turned to my go-to tool for working through my thoughts and seeking clarity: I wrote in my notebook. I reflected on our performance and how each team member was an asset. I articulated examples where everyone, myself included, could do better. I thanked them for pushing me. When I saw that what I had written actually made sense, I decided that there was nothing to do but email it to my team as what I called an "open letter from your CEO." Maybe it would help us find a way forward, because otherwise we were going nowhere.

For a day, I could hardly bear to check my email. Then I cut myself some slack and decided I could feel proud of this appreciative, frank, vulnerable email. It felt like progress. Soon, my teammates called and thanked me for what I had written. They were relieved to learn that they were not the only ones struggling. Ultimately, the email served as a bond. And it taught me that being a leader is all about authenticity.

From there, team chemistry took off as we spoke our minds, good and bad. I found my voice as a leader, fostering an environment where we acknowledged our individual strengths and weaknesses, and where I wasn't expected to have all the answers but could nevertheless provide guidance. We read and watched everything we could find about heart transplantation, learned from webinars about startups, networked with experienced entrepreneurs, contacted national health services for data, and arranged consultations with medical experts.

Then, one day, a teammate entered the meeting with his hands full of papers and his breath shallow with excitement. "This cryopreservation thing is wicked!" he exclaimed. Soon after, we came up with CryoThaw Heart, a gold nanoparticle and laser–based approach to rapidly freeze and thaw hearts. We put together our business plan, pitched it, got selected for the finals—and won our division as well as the people's choice award.

Looking back, it wasn't just a matter of how successful we turned out to be; it was also how far from successful we were at first. Our initial failures made me realize how being a leader starts with being your better self. Heartbreak doesn't have to be the end of the world. In many ways, it can be a beginning.

Team chemistry took off as we spoke our minds, good and bad.

How to talk to recruiters as an early-career researcher—and why you should

By Elisabeth Pain
July 30, 2018

In three morning sessions at the EuroScience Open Forum held earlier this month in Toulouse, France, early-career researchers had the opportunity to talk one-on-one with recruiters from industry and other employers. Science Careers dropped by and spoke with event organizer Clément Varenne, the administrative manager of L'École des Docteurs, which provides career training and development programs for doctoral candidates at the Federal University of Toulouse Midi-Pyrénées. This interview was translated from French and edited for brevity and clarity.

Q: What was the purpose of the event?

A: Each participant had a 30-minute chat with a human resources representative from companies in fields including engineering, aeronautics, aerospace, and cosmetics. It's almost like a mock interview in a neutral environment. There is very little at stake, so it's a good opportunity for participants to practice interviewing and see what works and what doesn't work.

Q: What mistakes do you typically see participants make when they talk to recruiters and other nonacademics?

A: Doctorate holders tend to focus too much on presenting their research and not at all on presenting themselves. Your successful thesis defense is enough to show that you are a specialist in your field and have been recognized by your peers. What a recruiter will be looking for in a candidate above all is a keen interest in the job, a profile that brings something different and valuable to the company, and a personality that fits its culture. Several times, I have heard recruiters say, "OK, that's enough, stop telling me about your research subject. Now let's talk about you. What are you passionate about?" Sometimes, doctorate holders are a bit bewildered by those questions and not really prepared to answer them. It is always more difficult to speak about yourself than to speak about your research, so you should practice that.

Q: What about transferable skills? Are Ph.D. holders aware of their skills, and do they know how to highlight them for potential employers?

A: Through research training, students develop an enormous amount of transferable skills that they usually aren't aware of. But as academic jobs have become more and more difficult to get, there has been increasing recognition that we need to help doctoral candidates identify their soft skills and sell them to recruiters. In L'École des Docteurs, we help students learn about the different terms used to describe soft skills and evaluate their own competences through role play interviews, quizzes, and questionnaires.

We also organize activities to give students further opportunities to develop their transferable skills. To help with communication, for example, we organize outreach events with the general public and schoolchildren, and in jails and psychiatric hospitals. And to help them improve their collaboration skills, which are very important for industry work, we run hackathon-style workshops where students have 24 hours to put together an innovative business plan.

Q: What advice do you have for Ph.D. candidates who may not have access to these types of programs and opportunities?

A: First, you must learn to translate what you've learned during your doctorate to make it relevant outside of academia. We have an academic language that is understandable only to our peer community. When you arrive at a company, you need new language to explain your scientific competencies and transferable skills. There are lots of articles about soft skills that can help you find this new language.

Second, don't hesitate to create your own opportunities. My doctorate was on the history of piracy in the Mediterranean, a topic that is often fascinating to the general public. So, I organized events to share my research with lay audiences, often in collaboration with public entities like the city of Toulouse. Doing this helped me realize that, although I liked research, I wanted to discover other things and diversify my work. It also helped me identify and further develop various skills, including event organizing and managing projects and teams. When the time came to look for a job, I was able to include these skills on my CV and explain them in a way that made them relevant to the post.

This paid off—I started my current job just 2 days after defending my thesis. This is another thing that I would like to convey to young researchers: the importance of anticipating their next career move. All too often, doctoral candidates wait until they have submitted their thesis to start looking for a job. I would encourage them to start looking a year in advance. You need time to research your options and develop your skills and networks.

Q: Do you have any further advice for doctoral candidates?

A: Academia can be stifling in some ways, and I would encourage students to raise their heads, open their eyes to what else may be available, and experience other activities and sectors. Do not hesitate to reach out to industry and other nonacademic employers. Challenge any preconceptions you may have by going and talking to them. For example, L'École des Docteurs helps students get exposure to industry by arranging 1-day visits and few-month placements. Through these experiences, students often realize that researchers in companies are just as passionate about their jobs as researchers in academia. Many students also discover that industry research is more tangible than basic research and that the pressure to perform is real, but it is no worse than it is in academia today. Gaining insight into industry and talking with company researchers about their jobs also helps doctorate holders better present their skills during job interviews.

Finally, do not be afraid of one-to-one meetings and other face-to-face opportunities to meet recruiters. Young researchers tend to forget that it is often much harder for the recruiter to find the right person than it is stressful for them to take part in the interview. So try to relax a little bit so that you can enjoy the experience and make a good impression while learning for the next time.

The best way to learn about issues on the career road ahead

By David G. Jensen
October 17, 2018

I'd love it if there were some kind of app for your career, like Google Maps or Waze, that you could use to hear about the issues on the road ahead of you. Wouldn't it be cool to get real-time information about what scientists in your field are discovering as part of their job searches, before you encounter those roadblocks personally?

Luckily, there's another way you can get similar information: your network. At least until that app comes out, there's no substitute for hearing about the hazards on the road to career success from people who have been there before you.

That's what I've done for years: network, in order to find the best career advice from those who've been there and done that. They've kept me up-to-date on the technical areas and skills that are hot in industry at the moment, which can change surprisingly quickly. More broadly, though, they have helped highlight the overarching elements of career success that are going to be relevant no matter your technical expertise. Your network can do the same for you. To get you started, here's my list of essential skills, built based on years of talking with clients and senior managers about the factors they consider most important for success with new hires.

The ability to convince: What employers look for—and what seems to be at the core of so much success—is communication that is personal, that touches people and their emotions. This goes far beyond PowerPoint and numbers or graphs on a projector. It's adding stories to your scientific presentations, choosing the right analogies, and ensuring that the audience feels something positive about you and your topic when you conclude.

Today, people sit in front of media all day long. To truly reach them, you need to communicate personally. This holds true whether you're talking to one or two colleagues or a room full of investors. Your audience needs to remember you and your message.

Technical competence combined with flexibility: Companies aren't hiring lots of generalists right now. They're looking to hire experts in some niche. But choosing your niche can be tricky—an area that's red-hot today could easily become a total bore in a few years. This means that, when you're embarking on a multiyear Ph.D. or postdoc, it's nearly impossible to know whether the

niche you've chosen to focus on will still be hot when you're ready to start your job search. The key is to master a niche—while also adding a fair amount of flexibility along the way.

Employers hire experts who work well with other experts, where each of those individuals has flexibility about what they can do with that expertise. These are people who can be placed anywhere in a project team and come out on top—because they are highly competent, and because they love a new challenge. As Bill Linton, the founder of Promega, once told me, "I hire lifelong learners exclusively."

Ask yourself whether you're ready for anything. Can you give up the finely tuned niche you've been developing in your academic research and move to some other area or role that you haven't really been planning on? That's what Linton and other CEOs like him expect of their best hires.

Efficiency and effectiveness: Quality of life is much more important for today's workforce than it has been in the past. Conflicting with that need, however, is the fact that employers have gone through great change, especially during the economic downturn a decade ago. Everyone seems to be doing a job and a half—or two. When you combine this with the need to spend quality time with friends and family, it means that effectiveness becomes job No. 1. You've got to be effective in the time you are on the job.

Being effective may not come naturally when you're coming out of an environment such as a Ph.D. program, where time can have a tendency to float by and you are not being graded on getting things done on a schedule. But in industry, every job counts on another one to be done—on time. Efficiency rules the day.

Leadership: The Ph.D. is not the "usual hire" for most organizations. When they bring Ph.D.s on board, they're looking for people who can take on leadership tasks. Even if you plan to stay on the scientific track at a company with dual-career ladders, where you can be either a scientist or a manager, both ladders require an ability to lead others effectively in order for you to succeed.

Leadership comes in two "flavors." For one, there's the classical "boss/subordinate" relationship. As a grad student or postdoc in academia, it's difficult to get experience as a real boss—this is one that you'll likely have to learn on the job. However, there is also "leadership via influence," which is critical to project management—and you can absolutely practice this while you're in academia. For example, be the one in your lab who trains younger students, attend workshops about leadership skills and project management, and get ready to discuss your experiences at upcoming interviews.

Growth potential: During the job search, you're actually being interviewed for two positions. One is, of course, the job you've applied for. The other is the "hidden agenda" job: the position you'd be in line for when you move up. No company wants to hire someone who is only good for a research scientist role (the entry level position in the company's Ph.D. ranks). Your employer wants to move you up, to maximize your value to the company by putting you in a leadership role, for example, or by having you run project teams. To get hired, you have to succeed in the interview for both the job for today and the job for tomorrow.

For career support, tap your network! It's deeper than you realize

By Karin Bodewits
August 28, 2019

"You're screwed!" Jane says over breakfast, pointing at the one-page letter Otto just brought in from the mailbox.

"I am not!" Otto responds. "They want to meet me!"

"May I correct you," Jane says, ironically emphasizing her posh Oxford accent. "They welcome you to give a lecture in an auditorium filled with professors and students about a topic you know nothing about, and you only have 2 weeks to prepare. If you ask me, that sounds like being invited for a confrontation with an armed gladiator in the Roman Empire."

She's right, Otto realizes, and his excitement turns to stress. He has a Ph.D. and a couple years of postdoc experience in organic chemistry, yet somehow he is supposed to give a 50-minute lecture about groundwater circulation and pollution—something he knows absolutely nothing about. But he knows he can't postpone or cancel. This is their test: making him lecture about a topic outside of his core field. And isn't that the job he really wants? He dreams about becoming a lecturer and covering a range of topics. The interview conditions are very tough, but what choice does he have?

In the past 2 years, he had only seen a handful of job openings in the area and with decent pay. He had applied for all of them, but this was the first time he made it to the interview.

"I'll be fine, Jane. I'll pick up some books at the library after work. And I'll phone Chris tonight. He'll help me," Otto says, casually taking a bite of his toast.

"Chris? Who's Chris?"

"Oh, he's an old friend. He studied something with groundwater, and the other day I saw on LinkedIn that he is still active in the field."

"Have I met Chris?" Jane asks, slightly stupefied. Jane and Otto have been together for 8 years, plenty of time to meet all family and friends. But Jane can't remember meeting anyone named Chris or hearing any stories with a Chris playing a leading part or even a supporting role.

Otto pauses chewing for a moment. "No, you haven't met him. He is living in Berlin."

"And when was the last time you saw Chris?" Jane asks.

"It's been a while. But 10 years, 10 days, or 10 hours ago ... why does it

matter, Jane? We were in high school together. We played in a band for a while and hung out in the same youth club. I know he would be happy to hear from me."

"You are not seriously going to ask for help from someone you haven't talked to in a decade, are you?"

"Why not? I will just ask him for advice—a few ideas and some feedback on my ideas. And best of all, it's a good reason to catch up!"

"That is just weird," Jane says, already feeling ashamed on Otto's behalf.

She would never contact a person she hasn't talked with for years. She is connected with many former colleagues on LinkedIn and ResearchGate, some of whom now work for organizations she could envision working for after finishing her Ph.D. in a few months. But contacting them would feel like taking advantage. They would instantly know why she was getting in touch after letting so much time pass!

Seek out strangers in scientific settings and practice. A little practice can make a tremendous difference on the type of impression you make and how lasting it is.

But she is not about to argue the point. After all, it's his life, his contact.

That evening, Otto flops onto the sofa next to Jane with a grin on his face, holding a book about groundwater.

"Chris instructed me better than an undercover agent would get briefed before infiltrating the Hells Angels," he says excited. "With his advice, together with this book, I will rock that lecture. Chris is even going to send me some maps for an interactive exercise."

Jane raises her eyebrows.

"And Chris didn't find it super strange you phoned?"

"Of course not! He was happy to catch up. He has a wife and a kid now, and he says that we are more than welcome to visit them whenever we are in Berlin. Wouldn't that be a great reason to go visit?"

"Berlin would be nice," Jane agrees hesitantly. She's still not sure what to think about it all, but she's happy that Chris did not hang up on her partner.

"And after talking about science for a bit, he asked me whether I could proofread a short manuscript he is about to submit. It's pretty heavy on my field, and he reckons my English is better than his. It's perfect timing! I told him that I'm happy to reciprocate."

"It sounds like it," Jane says smiling at Otto. She kisses him on his cheek and adds, "I really hope you get this job. And if you do, we'll go to Berlin to celebrate."

The moral of the story

Your network is much larger than you think.

Oftentimes, Ph.D. students and postdocs feel insecure about which people from their past are socially acceptable to contact for help. For example, can you contact someone you haven't seen or been in touch with during the last 24 months? Are they still part of your network?

Yes! It's completely natural for people to lose touch as their lives and careers develop. You stay in touch with some people but not with others. But as long as you and the other person separated on good terms and you did not burn any bridges, you can contact anyone who is likely to remember you.

Be frank about what you want from them. For example, you might write an email that looks something like this:

> *Hey Chris. I am reaching out because I am looking for groundwater expertise and LinkedIn tells me that you are the expert! I got invited to interview for a lecturer position and would love to chat for a few minutes to get your input if you're available. Maybe I could do something for you in return.*
>
> *And it would be great to catch up, too! I still have fond memories of when you played that prank on our high school math teacher.*

That's better than starting with a lot of filler, such as "I thought about you the other day and how we lost touch. It would be super nice to catch up with you. How is your mom doing? Is she still running that bakery in town? Blah, blah, blah … ." Taking too long to get to the real reason that you're contacting them makes people feel like you aren't being straight with them, and you will come across as dishonest. Play with open cards instead.

Do you still feel insecure about contacting certain people? Just ask yourself what you would think if that person contacted you. If you wouldn't mind, or would even enjoy it, they will feel the same way!

Building community as a career

By Maggie Kuo
February 13, 2018

What did one computational biologist say to the other? It sounds like the start of a bad joke. But for Aidan Budd, it gets to the crux of his work as a community builder.

When he was a scientist at the European Molecular Biology Laboratory (EMBL), Budd's main responsibilities were research and teaching. But he was also responsible for fostering community among his colleagues. He organized regular meetups where the denizens of his campus in Heidelberg, Germany, could chat informally about whatever was on their minds. During one of these events, a computational scientist mentioned that his bench colleagues regularly came to him for basic computer programming help. Another computational scientist affirmed that she frequently answered the same set of computer skills questions. And they realized that they could teach a workshop covering coding basics to help their colleagues fill this knowledge gap. But, they drew blanks over handling the administrative parts of organizing a workshop.

In another scenario, this could have been when the idea withered and died, leaving the bench scientists light on computing skills and the computational scientists donating their time piecemeal to help their colleagues. Instead, Budd stepped in and helped them book the room, order snacks and drinks, and take care of other logistics. In fact, Budd made it so easy that the scientists were eager to run the course again. It has since become a campus staple, running regularly for the last 7 years, with other scientists joining in to teach.

The evolution of the course captures Budd's joy in community organizing. Everyone benefited. Attendees learned new skills and made new acquaintances. The scientists leading the course discovered a new interest in teaching. The course supported the institutional leadership's goal to encourage collaborations and knowledge transfer between the diverse disciplines on campus, so the leadership was happy to fund the activity. The good feelings reached Budd, too. He had helped his colleagues form new relationships, find shared interests, and support their peers. And he made carrying out their ideas easy. "Making those things happen—that's a huge kick for me," he says.

Fostering community

Community management is a relatively small but potentially growing area of opportunity for Ph.D. scientists looking to extend their impact beyond the bench. Positions with community management responsibilities can be found at universities, research institutes, and scientific associations, according to a 2016 survey. Some of these roles focus on in-person community building. But in this age, social connections form just as readily over the internet. Online community building is the focus of the yearlong Community Engagement Fellows Program (CEFP) sponsored by AAAS (the publisher of Science Careers), which aims to train scientists in online community management strategies.

The enrollment in the program reflects the diversity of this fledgling area. In last year's inaugural class of fellows, just seven of the 17 fellows had the word "community" in their titles, such as "community manager" and "community engagement director." Other fellows had titles including "project manager" or "program manager" or titles related to communications.

As the titles suggest, these roles can include responsibilities beyond community management. Lou Woodley, who runs the CEFP and is also director of community engagement and marketing for AAAS's online forum platform Trellis, sees that variety as a positive. The best part about the roles she has held over her 10 years in the field—her repertoire includes developing tools to help scientists work together more effectively, organizing virtual conferences, and helping scientific journal editors use Twitter and Facebook to build community with scientists—is that "no 2 days look the same," she says. "You're always moving on to some other thing." In her current role, Woodley's day might switch between training people to use Trellis, writing articles for members of the communities she oversees, and relaying user feedback to the platform's technical team. There's "no opportunity to be bored," she says.

Over the course of developing and running the CEFP, Woodley has noticed that scientists in these roles are often the ones who organized the holiday dinner or passed birthday cards around in lab. They were "typically that connecting-people person," she says. If that sounds like you, community management may be just what you've been looking for. But to make the transition happen, you may need some creativity in your job search and flexibility in the responsibilities you are willing to take on.

Paths to community

During his Ph.D., Budd realized he found personal interactions and establishing relationships more fulfilling than research. So, when his Ph.D. supervisor—who wanted to increase the sense of community among the hundreds of scientists at EMBL—had the resources to bring on a staff member who would spend part of the time building community, he approached Budd about the job. The same narrative helped Budd find his current position as senior community and business development manager at the Earlham Institute in Norwich, U.K., where he is working to expand the use of bioinformatics tools developed by his supervisor's lab. "I still see it as unusual and lucky that I was able to find that person" who valued community building and was willing

and able to commit resources to it, Budd says of both of his job moves.

Woodley got into the field through an internship with Nature Publishing Group during her biochemistry Ph.D. The organization was experimenting with a variety of online tools, including an online professional networking platform and a website bookmarking service, to help scientists do their work. Her job was to help identify the tools that the scientific community would embrace. She found that she enjoyed the work, and her career trajectory was set.

For biologist Marsha Lucas, on the other hand, it was an interest in writing that eventually led her to community management work. After finishing her Ph.D., she explored various science communication opportunities until, in 2012, she began her current position at the Society for Developmental Biology in Bethesda, Maryland, where she writes and edits for the society's newsletter and website and develops educational outreach activities. She hadn't expected community management to be part of the role when she started it. The organization's directors had talked for some time about helping students participating in its undergraduate summer research program, Choose Development!, connect with each other before meeting in person, but the program was not in her purview. However, when she learned of the CEFP in the fall of 2016, she decided to take the lead on the project. She felt that helping students develop a sense of community would improve their research experience, and she also saw an opportunity to learn new skills and further her own professional development.

Lucas had little experience in building an online community when she started the CEFP. But during the weeklong training session last January that kicked off the fellowship, she learned the basics of what she would need to do to successfully cultivate community among the undergraduate researchers. She started putting these skills to use on the Choose Development! online forum by proactively seeding discussions, posting questions such as "What are you working on?" and "What was a win this week?" She wrote a top 10 list of reasons to pursue a career in the field to stoke the students' enthusiasm about the discipline. In the beginning, she personally emailed students and professors to nudge them to write about their research experiences or to reply to a discussion question on the forum. But as the summer progressed, she saw students sharing their opinions and initiating discussions on their own. Conversations were happening without her prodding. That was a win for her, she says.

Community management is a relatively small but potentially growing area of opportunity for Ph.D. scientists looking to extend their impact beyond the bench.

Whether the work focuses on in-person meetings or building virtual relationships, the role provides scientists an opportunity to impact their disciplines. For Malvika Sharan, Budd's successor at EMBL, that meant promoting her passions for open science and diversity—interests she had developed during her Ph.D. through attending conference sessions and interacting with colleagues, including Budd, who were active community builders. As a community facilitator at EMBL for the past year and a half, she has been involved in several community projects, including events to spread awareness about open science, and a panel discussion about diversity in science is in the works. "I felt that this was the niche I belong to," she says.

Sharan finds her community management work fulfilling. However, the role has its challenges, too. Although some scientists see the importance of community organizers, the broader scientific community may not readily see the value, Sharan notes. One year into her role as a community manager, Sharan resumed her work on RNA-binding proteins. She found she missed her research, she admits. But, she also wanted scientists to perceive her as one of them. "I do not want to look like an outsider who is talking about things that do not concern me," she says. And although she is happy to be able to conduct research as part of her job, she would also like to see more scientists take the initiative to give back to their communities and "not think that it's someone else's task," she says. Ideally, she continues, everyone would do a bit of community management.

Want to connect with other graduate students? Check out this new online community

By Elisabeth Pain
June 18, 2018

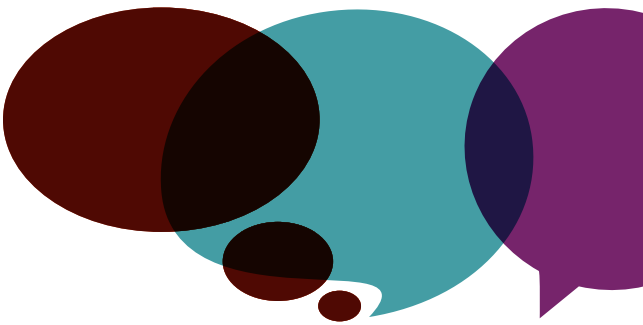
Brittany Jack has been using Slack, the electronic communication and collaboration tool, since she joined Prachee Avasthi's lab. Jack, who has just completed the first year of her Ph.D. at the University of Kansas Medical Center in Kansas City, uses it to keep Avasthi up to date on her results and ask for advice. She's also found it helpful for communicating with her labmates: a postdoctoral fellow, a research assistant, and three undergraduate researchers. But it wasn't until another graduate student, Brae Bigge, started a rotation in the lab this spring that Jack realized how much she could gain from daily communication with trainees at her same career stage. And she realized that Slack could be just the tool to help make that happen—in a big way. Last month, Jack, together with Bigge and fellow grad student and friend Rosalyn Henn, launched Grad Student Slack. It joins a growing list of Slack groups for scientists, including New PI Slack (which Avasthi founded in 2016), Future PI Slack, and Mid-Career PI Slack. "I just wanted to have a community and ... camaraderie with graduate students across the world," Jack says. "We are all going through the same thing, and we can give each other advice."

The only requirement to join Grad Student Slack is that you are a master's or Ph.D. student. It is still in its early days, but the group already has some 300 members. Most of the interest is coming from the United States, Canada, Europe, and India, but there is also some from Asia and Australia. So far, members have created more than 40 discussion channels. Some are dedicated to research topics as diverse as cell and molecular biology, ecology, computer science, and the humanities. Others are forums to discuss how to prepare for qualifying exams, write a paper or thesis, mentor undergraduate students, participate in journal clubs, and engage in science communication. There are channels dedicated to professional and personal growth, covering the relationship with your principal investigator (PI), career development, job hunting, and being a scientist parent. A few channels promote networking within specific geographical regions. Yet others will help you get through a bad day or cultivate your mental health.

"It is a space for open and honest discussions about graduate school, both the personal and the professional aspects of it," says Ankita Patil, who has just finished the third year of her neuroscience Ph.D. program at Drexel University in Philadelphia, Pennsylvania. Patil has already gotten tips on how to tackle graduate school's workload, contributed to answering questions about attending conferences, and discussed research. "It's also nice that there are plenty of students who actively engage in the conversations. It definitely allows you to voice your opinions or ideas without feeling like they may be singled out or dismissed."

"Grad Student Slack is able to provide that broader sense of community that I haven't yet found on campus," says Joshua Landman, who completed a master's degree in computer science at Washington University in St. Louis in Missouri and will begin a Ph.D. in data science there in August. He didn't have a cohort during his master's degree, and as an incoming student it's not always easy to get to know people, says Landman, who was among the first people to join the Slack group after a friend sent him an invitation. Through Grad Student Slack, "I've met other students both within my discipline and from other branches of science, not to mention students at my university that I wouldn't have otherwise interacted with," he says. That is particularly important, because "grad school can, in some ways, be isolating."

As Bryn Sachdeo, a final-year Ph.D. candidate in nutritional biochemistry and physiology at Rutgers University in New Brunswick, New Jersey, puts it, "I see Grad Student Slack as a peer-support dream team." Connecting with others this way can help fill the gaps that many students experience—even those with supportive PIs, thesis committees, and broader communities. So far, Sachdeo has exchanged postdoc hunting tips with an astrophysicist and a neuropharmacologist and given feedback on a thesis abstract about Drosophila genetics. She also appreciates that she can interact with the group on her timeline. "If I have an insane schedule and don't have the energy for it, I can choose to not engage at all," she says. "At the end of the day, it's a voluntary social media platform, so you get out what you put in."



As the discussions have the potential to delve into sensitive topics, one issue is anonymity—or lack thereof. All members must register with their full names and state their year in graduate school to be verified as graduate students. The founders opted for this policy because they wanted members to feel comfortable being open about their experiences, without the risk of retaliation from more senior researchers or other negative consequences. But members still need to be careful not to reveal anything that they may come to regret later, the founders warn. The group's code of conduct, which emphasizes respect and courtesy, also invites students who feel too uncomfortable to participate to get in touch with the founders so that they can consider granting anonymity on a case-by-case basis. "We have not crossed that bridge yet," Jack says, but "we are aware of the fact that [some students] might need to discuss problems with their PI and other people from their lab could be in [the Slack group]."

The founders see Grad Student Slack not only as a service to their community, but also an investment in their own futures. During a Ph.D., "the later years are often the more difficult ones," says Henn, who is just about to start her second year. "Knowing that later on, we will be able to have this community that is going through the same experiences at the same time will be really beneficial."

> "We are all going through the same thing, and we can give each other advice."
>
> Brittany Jack

The keys to a powerful LinkedIn profile

By David G. Jensen
December 20, 2017

In last month's Tooling Up column, I explained why your LinkedIn profile is so important. This month, I'm going to give you some ideas about how to actually create a powerful one. There's no single recipe or "right" way to do it, and I wouldn't want to give the kind of formulaic advice that churns out cookie-cutter profiles. But there are a few crucial sections and a few common mistakes that I'll describe to help you get started. Then, it's all about letting your own creative juices flow to craft a profile that is as unique as you are.

Promote yourself and the value you bring

One of the first things anyone will notice about your LinkedIn profile is your photo, so make your choice carefully. It should be professional; don't use a selfie or something that shows you at some great distance waving from a boat or the top of a mountain. I use a plain vanilla headshot, which works for me because I'm a conservative older businessman. For you, an edgy, creative shot is fine if that's what you prefer. Let it say something about you. Just make sure that what it ultimately says is that you are employable.

Then comes the writing. The term "self-promotion" has earned a bad reputation in the scientific world, but in the case of the LinkedIn profile, a bit of ethical self-promotion is important (as long as you don't go over the top). Rather than writing in the reserved style of a scientific CV, your profile should highlight what you're good at and what you can bring to a possible employer. Laying it out for them is encouraged; bragging is not.

Your first opportunity to do a bit of that self-promotion is in the professional headline, which falls right beneath your name. The headline offers you 120 characters to say whatever you want about yourself, and it is a great place to reinforce your value to an employer. This headline is also often the first thing that search engines find. So, the goal is to be precise and to include the most significant keywords that recruiters use in their searches. Are you a plant scientist with experience and interest in software development? That's your headline right there: "Molecular Marker Corn Breeder known for Plant Sciences Software Development and Genomic Analysis."

Don't squander it, as so many people do, on nonwork hobbies or corny messages like, "Let's Connect!" For

example, "Dynamic Corn Breeder and Tuesday Night Bowler" sounds like a really dumb combination. Nonetheless, countless people have headlines just like this. But at this early stage, no hiring manager cares about your interests in bowling, skydiving, or choir, so why put it in the No. 1 most valuable space in your profile? You can talk about these interests in an interview.

Another place for some savvy self-promotion is in the summary section that falls just below the headline. Your summary is a potentially huge block of text—up to 2000 total characters—which is almost always read when people are skimming LinkedIn profiles. (That is, as long as it isn't boring writing!) The first 200 characters will be immediately visible, along with a "View More" button to display the rest.

The best way to think about your summary is that it should be real-world "I do this" stuff, not blue-sky "wanna be" stuff. When employers are sourcing prospects, they don't give a hoot about what you want to do. They care about what you are doing now or what you have done in the past. A bit of "wanna be" is good when you can draw a line between your experience and what you are capable of for an employer, but I recommend that you keep most of your summary to your history and major skills.

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The 2000-character block offers room for three to five short paragraphs of text plus a few bullet points. To me, that suggests that you should write about several of your key strengths, with a short paragraph discussing each. Remember, don't get caught up in the dry writing style of the CV. Write it in a style that is more promotional than you are probably comfortable with. But don't push it too far—always be truthful. And, as any advice that deals with search engine optimization will tell you, spread some of the important keywords of your profession around so that you'll catch as many recruiters as you possibly can.

If you're not sure exactly what those keywords should be, try this tip: Play around with a word cloud website, such as Wordle. Paste in job ads for positions that interest you and watch as the site turns them into beautiful "clouds" of keywords that you can use in your own summary. You can also scan LinkedIn for people in jobs that you're interested in or whose LinkedIn profiles you admire and do word clouds for their summaries. Try it singly, with one ad or profile at a time, or combine text from multiple sources and watch the cloud as it develops a great set of keywords.

My last comment about the summary section is a simple but important one. If you're looking for a job, include your email address at the end. Otherwise, recruiters will be forced to contact you through LinkedIn's InMail, which typically costs about $8 to $10. When there's cost involved, people are a lot choosier about who they contact. So, including your email address is an easy way to increase your chances of being contacted about your dream job.

Building the body of a great profile

In your headline and summary, you offer the high-level view of your value and interests. Where do you really get into the nitty-gritty details? Enter the work experience section. Here, you highlight the specific skills you developed and employed and describe some of your accomplishments from each of the jobs you've held in up to 2000 characters. I would never recommend that you use that full length—that's way too much for anyone to read—but take the time to write a solid one or two paragraphs for each entry.

One mistake that I frequently see scientific job seekers make in this section is not including their educational years. Yes, you are technically a student while you earn that advanced degree, but I recommend putting your grad school (and postdoc) years into your work history anyway. Many of the experiences during your training are relevant to employers, and including that time in your work history gives you the chance to highlight those. It was work, after all, to get that degree! (You'll also put the actual degrees in the education section.)

The final profile element I'll discuss this month is the skills section, which plays a role in the all-important search engine optimization. Each skill that you add will increase the chance that you'll show up in relevant searches, so make sure you have a good number of them. But, as with self-promotion, don't go overboard. Make sure that the skills you list are truly part of your expertise and that they can be endorsed by people who know you.

These tips will get you started as you establish your LinkedIn presence, but it's also important to remember that LinkedIn is far more than an online resume. It's a place to join groups of like-minded people, make connections, learn about new job prospects, and even publish articles. So, start with the profile, but don't forget to explore everything else the platform has to offer. Because when it comes to job searching and career development, there's always more you can do to improve your chances of success.


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