



Postdocs need to prepare for many things during their job search, including a panel interview.

Daunting but doable: Job searching after a postdoc

How postdocs can compete in a historically tight academic job market

By Kendall Powell

When neuroscientist **Nafisa Jadavji** entered the job market to search for an academic position in North America, she had already completed two successful postdoctoral stints in Berlin, Germany, and Ottawa, Canada; secured funding; and had 30 publications to her name. She applied to hundreds of positions, was invited for 10 onsite interviews, and eventually received one offer, for the assistant professor position she started in July 2019 at Midwestern University in Glendale, Arizona.

For better or worse, Jadavji's experiences are typical for academic job candidates. A survey of more than 300 applicants during the 2018–2019 academic job search season showed that the median number of onsite interviews was two and the median number of job offers was just one (1).

Recalling her own grueling, all-consuming search, Jadavji says postdocs need to develop a thick skin and persist in the process, especially women of color in science, technology, engineering, and mathematics (STEM) fields. Like many other candidates, she found the exercise hugely frustrating for its lack of transparency. When she asked for feedback from places that turned her down, she often got inactionable answers: "You don't smile enough. There were better candidates. You don't act like a PI [principal investigator]."

Searching for a permanent academic position after the postdoctoral term is not for the faint of heart. In some ways, postdocs have made a lot of progress—U.S.-based postdocs broke the USD 50,000 starting salary milestone this year as set by the U.S. National Institutes of Health (NIH) National Research Service Award pay scale (2). And nearly every university or institution that hires postdocs now has an office or program dedicated to their professional development.

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Yet, those who want to continue on the academic track face steep hurdles. Only 14%–20% of U.S. biomedical Ph.D. holders will eventually move on to an assistant professor, group leader, or equivalent permanent position (3,4). Only one-quarter of postdocs graduating from prestigious posts at the University of California, San Francisco (UCSF) and the Massachusetts Institute of Technology advance to professorships (5).

For those who see this as their career path, however, it's possible to shed some light on this murky process. *Science* has interviewed postdocs who've recently succeeded with their job search. In addition, two recent studies collected data to characterize what makes a successful candidate and what criteria search committees are looking for (1, 6).

Core characteristics

Pearl Ryder, a postdoc at Emory University and founder of the @FuturePI_Slack group and Twitter account, says that candidates who stand out show they have a vision for the future lab they want to create.

That largely aligns with the most highly prioritized hiring characteristics revealed by in-depth interviews with faculty members on search committees from 20 life science departments (6). Researchers at UCSF and Northwestern University in Chicago developed a rubric broken down by type of university (teaching only, research and teaching, and research intensive). For research-intensive campuses, the highest priorities were candidates demonstrating the capability for feasible and independent research, the ability to communicate that research, a strong publication record, strong research vision and strategy, and a funding plan. All types of institutions also highly valued collegiality and fit, defined as research and teaching **cont.** >

postdocs

experience that matches the institution's mission, meets departmental needs, and brings the potential to collaborate. The research group has published a series of videos on how applicants can best use the rubric (<https://career.ucsf.edu/phds/academic/acra>).

Another study, led by cell

biologist **Amanda Haage**

at the University of North Dakota in Grand Forks and colleagues, surveyed a cohort of 317 job candidates who largely applied to academic positions in North America during the 2018–2019 cycle (1). These applicants submitted a median of 15 applications and spent a median of 4 years in their postdoctoral positions. The applicants had a median six first-author publications, with a median of 245 citations.

Fifty-eight percent of those surveyed got at least one offer at the end of their job search. Haage's group is also surveying candidates during the 2019–2020 academic job search season, and encourages postdoctoral researchers who applied for academic group leader positions in North America to participate (https://und.qualtrics.com/jfe/form/SV_9nlisllMqqrYITL).

Because research track records were similar among candidates who got interviews, many candidates feel their offers came down to their ability to showcase key soft skills, such as communication skills and problem-solving, on their applications and during interviews. Luckily, even a postdoc who finds herself in a less-than-ideal situation can find ways to hone those transferable skills that search committees crave.

When to jump

Thinking about taking the plunge into the job market should start on day one of a postdoctoral position, says **Dara Wilson-Grant**, associate director of the Office of Postdoctoral Affairs at the University of North Carolina at Chapel Hill. "We push the idea at postdoc orientation that if you didn't come in with a career plan, you need to develop one now," she says.

In North America, the median time in all fields for a postdoc is 4 years before going on the market, and many universities have followed recommendations to limit the postdoc term to around 5 years (1). While the data are muddy as to whether postdocs are spending more total time as a postdoc (see sidebar), what is clear is that the minimum time needed is tightly tied to publishing successfully and developing a fundable research plan. Building such a portfolio usually takes a minimum of 3 years, applicants say.

POSTDOCTORAL TIME WARP

Is the time spent as a postdoctoral researcher stretching out longer?

Paula Stephan, who studies the economics of science and has served on eight National Academy committees devoted to science workforce issues, says the answer is a resounding "yes." Stephan cites data showing that from 1973 until 1993, the percentage of biomedical doctorate holders serving in postdoctoral positions at 3–4 years post-Ph.D. and 5–6 years post-Ph.D. marched steadily upward.

"This is a story I've been hearing for a really long time," says Stephan. Around 2017, several reports called for a 5-year term limit on postdoctoral positions, and many universities adopted it. But, Stephan points out, that doesn't prevent a significant majority of postdoctoral researchers from doing multiple stints, nor does it prevent institutions from giving postdocs several different titles that mask their identity.

The Coalition for Next Generation Life Science database (<http://nglsccoalition.org/coalition-data>) was set up for institutions to report their post-Ph.D. and post-postdoctoral track records.

From the few that have posted data, the picture is sobering. At both the University of California, San Francisco and Massachusetts Institute of Technology, the median time spent in a postdoctoral position there is roughly 2.5–3 years.

However, only slightly more than 25% of their graduating postdocs go on to an academic tenure-track position. What's more, between 20%–50% of those graduating postdocs are moving on to another postdoctoral position (5).

One thing is crystal clear. Those who succeed at the very stiff odds of the academic job search gamble are those who have made the most of their 3–5 postdoctoral years, starting on day one.

Alison Tebo, a chemical biologist at the Laboratory of Biomolecules in Paris, France, started her job search in both the United States and

Europe in her fourth postdoc year, before she felt quite ready. She

forced herself to begin writing drafts of her application materials and her first independent grant application, which gave her a slow-burn process to figure out her place in the research ecosystem.

"I just started throwing stuff onto paper, and that led me through the process of asking, 'What is my identity going to be as a scientist?'" Tebo will start as a group leader at the Howard Hughes Medical Institute's Janelia Research Campus in Ashburn, Virginia, in September.

Alexandra Rutz, a biomedical engineer postdoc at University of Cambridge, United Kingdom,

followed a similar approach, going on the market before publishing the bulk of her postdoctoral work—against the advice of some peers. But she says it didn't seem to hurt her prospects, and she

will start her assistant professor position at Washington University in St. Louis in March 2021. "Nobody on the faculty search side once mentioned it, so maybe this is a false pressure postdocs are putting on ourselves," she says.

Applicants say that postdocs should plan for the search process to be very time-intensive, at some points all-consuming, and not to expect to produce research results at the same time. In addition, the process can be expensive when candidates must pay for interview travel and expenses up front. These factors may exclude or severely limit postdocs with caregiving responsibilities and those who come from groups underrepresented in STEM.

Sharpening skills

Of course, most candidates say they planned well ahead to gain and hone the soft skills they would need to highlight in their applications.

Juan Pablo Ruiz Villalobos, postdoc at University of Wisconsin–Madison and president of the Future of Research advocacy group, recommends having a mentoring compact or formal agreement with your advisor. "Spend some time thinking about what your needs are" and how to get them met during your time as a postdoc, he advises.

In addition to advisors, postdocs can find other mentors within a department or institution or join the National Research Mentoring Network (<https://nrmnet.net>) or take online courses through the Postdoc Academy (www.postdocacademy.org).

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Featured participants

Coalition for Next Generation Life Science Database

<http://nglscoalition.org/coalition-data>

Division of Biological Sciences Postdoctoral Association, University of Chicago

<https://bsdpostdoc.uchicago.edu/contact-us>

Future of Research

www.futureofresearch.org/about

Future PI Slack @FuturePI_Slack

<https://futurepislack.wordpress.com>

National Research Mentoring Network

<https://nrmnet.net>

Office of Postdoctoral Affairs, University of North Carolina at Chapel Hill

<https://research.unc.edu/postdoctoral-affairs/postdocs>

Postdoc Academy

www.postdocacademy.org

University of North Dakota

<https://und.edu>

Wilson-Grant, who spends much of her time doing one-on-one career counseling for postdocs, says they should decide on their target institutions and research recent hires at those places to see how many and what kinds of research publications they had. She also says that gaining the soft skills to be a good job candidate does not have to be extensive; she suggests taking a workshop to lay some groundwork in teaching, then teaching a summer or community college course to get hands-on experience.

To develop leadership skills, she recommends that postdocs join a committee of a professional association or scientific society to polish their communication, delegation, and conflict management skills. Some candidates joined departmental seminar-organizing committees, advisory councils of institutes or journals, and conference-organizing committees.

Nancy Schwartz, dean for postdoctoral affairs for the Division of Biological Sciences at the University of Chicago, advises postdocs to take advantage of all the resources on their campuses, including professional development seminars, alumni networks, and one-on-one sessions to practice for job interviews and negotiation.

“A lot of postdocs don’t realize that they are doing many PI-like activities in the lab” and should explicitly include them on their CVs and applications, says Schwartz. Examples include “writing up protocols, mentoring graduate students, or maybe their PI went on sabbatical and left the postdoc in charge [of lab management],” she says.

Adding sparkle to applications

When all candidates have similar research productivity, how do successful applicants outshine the crowd? Recent job searchers say they’ve demonstrated other key characteristics: commitment to diversity, managing and mentoring others, and being savvy in securing funding.

Of the 46 engineering departments where Rutz applied, half asked for a diversity statement on the candidate’s commitment to and experience with diversity, equity, and inclusion (DEI) efforts. Devang Mehta, a plant genomics researcher at the University of Alberta in Edmonton, Canada, highlighted an op-ed he’d published on racism in science, his participation in a DEI journal club, and his work on the *eLife* Early-Career Advisory Group that looks at DEI issues in publishing.

Even time that applicants spent working from home during the COVID-19 pandemic can be turned into a shining moment of management success. “If you were managing a team at home, with

school-aged coworkers at your side, you can talk about how you reworked schedules to come out of it successfully,” says Tracy Costello, owner of Coach4Postdocs.com, a Tampa-based consulting business.

Rutz highlighted her mentoring of 18 students during her Ph.D. work and postdoc, publishing with many of them. This showcased her talents as an effective teacher and advisor.

Search committees also want to see how familiar an applicant is with the funding landscape in their field and region or country. If a postdoc doesn’t already have their own funding from a career transition grant, such as the NIH Pathway to Independence Award (K99/R00), then they must find creative ways to show that their research is fundable and that they have grant-writing experience.

Mehta says he purposefully chose to join a relatively new group as a postdoc to learn from a mentor who was actively setting up his own group. “My PI was great about involving me in the grant-search and grant-writing process,” he says, adding that postdocs should cowrite grants with their advisors, being listed as Co-PIs when possible.

As a postdoc abroad in Europe, Rutz wasn’t eligible to apply for many U.S.-based career transition awards, so she listed all the grants she had cowritten or fully written in the past.

Jadavji went so far as to write out her first grant’s aims and devised a plan for which grant mechanisms she would apply for in her first year. “Have that trajectory of how you will fund your research mapped out,” she says.

Cast a wide net

Jadavji recommends that once a candidate has gotten an interview, they should “celebrate—and then get to work.” After all, getting offered an interview by phone or video call is a huge success in this market—with a median of just one per candidate during the 2018–2019 cycle. But next comes the serious work of researching departments and their faculty members, and preparing for tough interview questions.

“The number of applications people put in was the most robust predictor of how well they did in terms of interviews, which then lead to offers,” notes Haage (although that relationship tailed off sharply for respondents who filed more than 50 applications). Applicants should not be too rigid about the location, size, and focus of institutions they consider, and be willing to include undergraduate institutions, minority-serving institutions, and other settings. “Great science can happen outside of where you think it can.”

References

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