



# Reflections on an ACADEMIC JOB SEARCH

Omar S. Magaña-Loaiza

**The road from reading a job posting to signing a contract is long and involved. Advice from a recently hired professor may smooth the path.**

I have always favored learning through experience, which might be why I am an experimental physicist. I used that approach when I decided to apply for jobs in academia. But my plan wasn't always to become a professor: In 2016, after I completed my PhD in quantum optics at the University of Rochester in New York, I became a research associate at NIST in Boulder, Colorado. I chose that path because I loved doing research, and at NIST, I could devote all my time to being a scientist.

Despite the amazing facilities and opportunities there, I missed the freedom I had in academia to explore new research trajectories. National research facilities support specific missions, so it's difficult for their scientists to change direction after making unexpected discoveries. As an assistant professor of physics at Louisiana State University (LSU; see figure 1), I lead the quantum photonics group. Our work ranges from basic "blue-sky" research to the development of photonic devices.

When I decided to move back to academia only a year after obtaining my PhD, I was aware of the challenges an academic job hunt presents and how long it might take. The probability of my finding a position was low; newly hired tenure-track faculty members are most likely to come from postdoc positions (see figure 2), and those typically last two or more years. But I thought that I had the requisite experience to join the academic ranks: I had trained and advised younger investigators, I had



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always enjoyed teaching in academic environments, and I was ready to establish and run an independent research program.

It can take months or even years to find a suitable academic job, even for experienced applicants. I familiarized myself with the job-hunting process by giving invited talks and having discussions with faculty members who attended the events. I also learned from experience: Interviews for other faculty positions earlier in my job search prepared me for my interview at LSU. As a new professor, I'd like to share my experiences with the hiring process and provide advice for young scientists considering an academic career.

The job-hunting process can be grouped into four parts: the application package, the online interview, the on-campus interview, and the negotiation of job terms. Below, I discuss relevant and sometimes unintuitive aspects of each of them.

In the past, an academic job search might have started by combing periodicals for job postings (see the article by Matt Anderson, *PHYSICS TODAY*, April 2001, page 50); now it starts online. I began exploring academic positions using *PHYSICS TODAY* Jobs, a valuable website with an extensive listing of positions for physicists and engineers; it's also where I found the advertisement for my current position at LSU (see figure 3). Additional websites with academic job postings can be found in the online resources box on page 35. Some sites will send users daily or weekly newsletters with alerts about new postings. The guidance provided by such sites is usually general rather than tailored to physics positions, but it can still help candidates identify and understand the necessary materials for preparing an application package.

From start to finish, my hiring process took approximately six months: two months to prepare the application package and four months to have the interviews and negotiate the terms of employment. Each institution's application package will be different, especially if you're considering both large research universities and primarily undergraduate institutions (PUIs), so you should tailor your submission to each one.

### Application assembly

Search committees will almost certainly request the following documents: a cover letter, a curriculum vitae (CV), teaching and research statements, and references. The first four documents should convey a general idea of your background, credentials, achievements, and research plans. Institutions usually request three recommendations, so you should include contact information for three references or arrange for the letters to be sent on your behalf. It's appropriate to ask your PhD adviser and postdoc supervisor to be references, and the third should be a senior colleague, such as another supervisor, a collaborator, or a member of your PhD thesis committee.

The search committee may also ask for a writing sample. Most applicants submit one or two of their best publications, but you could also pair a research paper with a less technical article if you've written one. Institutions are becoming increasingly likely to request a diversity statement, which describes your experiences working with people from different backgrounds, and you may be asked for a teaching portfolio, especially by PUIs. All application documents should use clear, accessible language for nonexpert scientists.

The cover letter's purpose is to provide a broad description of your research and other professional achievements. It should

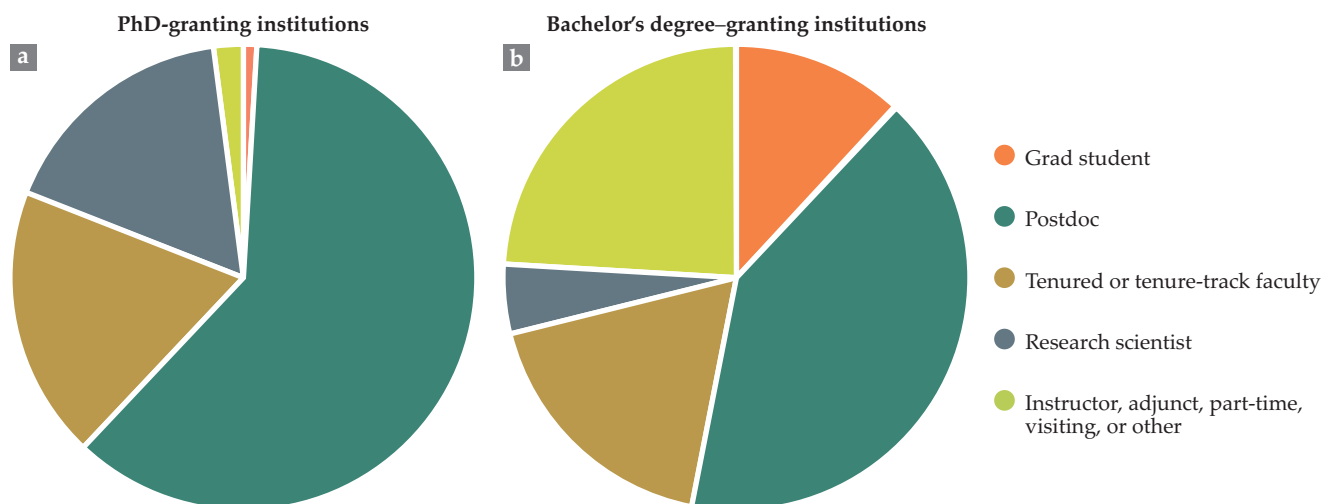


**FIGURE 1. THE AUTHOR**, in his interview clothes, stands outside Louisiana State University's quantum photonics laboratory. He now leads the lab as a faculty member in the physics department.

briefly outline your current and past positions. Cover letters usually run less than one page, although keeping it to that length can be a challenge given the breadth of information you may want to include. A good way to tell your story concisely is by featuring one or two high-profile research projects. Trying to squeeze in more could distract and overwhelm the hiring committee. The letter should also note your main research results and discuss how your previous research will influence future work.

Every application should be tailored to a particular job, and the cover letter should describe how you meet the job requirements in the posting (see figure 3). It should also discuss the aspects of the hiring institution that motivated you to apply. I recommend highlighting how your expertise will be a good fit for the department advertising the position. That effort requires learning about the department and understanding its ongoing research and teaching efforts, which will also help to clarify which of your own potential contributions should be highlighted.

While learning about each department, it's a good idea to identify similarities and differences between yourself and current faculty members. That comparison may help you suggest possible paths for future synergistic collaborations. However, because you won't know who might be leaving or retiring, it



**FIGURE 2. NEW TENURED OR TENURE-TRACK PHYSICS FACULTY** at PhD-granting institutions **(a)** in the 2017–18 academic year were most likely to come directly from a postdoc position. Career trajectories are more varied for faculty at bachelor's degree-granting institutions **(b)**, but postdoc was still the most common previous position for new hires. (Adapted from ref. 3.)

might be safer to focus on broad research directions rather than mentioning specific faculty members.

In my case, I knew that the physics department at LSU had a strong theory group that was developing quantum optical technologies. Multiple senior faculty members had also conducted seminal research in the foundations of quantum theory. Thus I saw a role for myself in supplementing their expertise with my experimental skills. I tried to convey that vision in my cover letter. I also described how my joining the department could be mutually beneficial—I could contribute to the development of the department, and the department could help my academic career grow.

Next in the application package is the CV. Although it can be long and dense, the CV should be organized and provide additional details and references related to claims made in the cover letter and in the teaching and research statements. It should list research interests, academic positions, other relevant work experience, education, and teaching experience. You should also include peer-reviewed publications, conference papers, invited talks, media coverage, honors and awards, collaboration with industry, skills, and service. The order in which the information is presented and what is highlighted should be informed by the institution's focus and the position of interest—for example, teaching experience should likely be emphasized for PUIs, whereas research is often more relevant at larger universities.

Although it may feel superfluous, don't neglect the service section: Activities such as mentoring, engaging in educational outreach, and peer-reviewing journal articles are valuable experiences that can help a candidate stand out.

A teaching statement should outline your instructional goals and describe your philosophy. It should be approximately two pages and should describe your experience teaching at different levels, which should include your work as a teaching assistant during graduate school. The statement is also a place to discuss your teaching methodologies. It can be enriched by including pedagogical techniques such as active learning,<sup>1</sup> which has recently received a lot of attention.

Your teaching statement should also describe new courses you could design that would enhance the department's existing curriculum. In my case, I applied only to research universities,

so I created my teaching statement to complement my research statement. For example, I briefly discussed how the equipment in my research laboratory could be used to perform hands-on demos for various specialized courses. But teaching and research statements can be independent, especially if the institution of interest is primarily a teaching university.

A good research statement should be four to five pages of information on your past, current, and future scientific work. The discussion should be general, and it should highlight the potential relevance of your research for the department. From the search committee's perspective, the most important part of the document is your plan for future research, and it must be supported by your past achievements, publications, and experience. It should also address funding. I highly recommend discussing funding opportunities that could eventually support your research program. Including potential funding sources in your research statement will allow you to convey a clearer and more comprehensive plan to the search committee.

Some search committees may ask experimentalists to include a startup budget with their application. That information will help the committee understand the infrastructure and initial support that your research program might require. Your budget proposal should consider the institution's available infrastructure and research priorities, and it should identify both the basic equipment needed for the experimental research being proposed and any associated costs. The budget may also contain information regarding potential collaborations that could help reduce startup costs. A basic plan can be easily adapted for different institutions.

A diversity statement, typically one page, should describe your past experiences with diversity and how it has influenced your personal and professional growth. It should reflect your desire to be inclusive and your willingness to boost and stimulate academic collaborations among people of different cultural backgrounds, nationalities, and beliefs. The positive aspects of your past collaborations may help you establish a strategy to improve inclusiveness in academic environments. Furthermore, recognizing the challenging aspects of those collaborations can help you set goals and identify possible solutions.

Search committees won't always request a diversity statement,

but it's helpful to write one anyway. During your interview, the committee is likely to initiate a discussion related to diversity and inclusion efforts, so you should be well prepared from having written about your experiences and initiatives.

## Getting personal

The documents described above help search committees decide which candidates will move on to the next stage: interviewing. A first round of interviews typically takes place online as a teleconference with a subset of the committee. It may also include administrators, faculty members responsible for shared facilities and teaching, and faculty members from other research areas or even other departments. The meeting typically takes about an hour, but could take anywhere from 20 minutes to 2 hours.

First-round interviews require you to be focused. The faculty panel may ask questions on a wide range of topics, including teaching, research experience, research plans, teaching philosophy, contributions to diversity, and service. The questions can jump quickly from one topic to another, which I found challenging. In one interview, for example, a question about the estimated budget to build a laboratory was followed by one related to the qualities of a good teacher and another about how to explain quantum interference to undergraduate students. Often the committee members use a set list of questions that will be asked of all candidates. The process ensures fairness, but can make the interview feel stiff and formal.

Before each interview, think about possible teaching and research questions that the search committee might ask. One question you should always be prepared to answer is, Why are you interested in working with the faculty at the interviewing institution? (See the online resources box on page 35 for more information on interview questions.) You will also have an opportunity to ask questions during the interview; posing thoughtful questions is one way to show that you've put time into learning about the department, its research, and the institution. Good preparation of both questions and answers will also help avoid uncomfortable silence during the meeting.

Some candidates will be filtered out in the online interview stage, and typically only three to five candidates are invited for a subsequent on-campus interview. The interview is an opportunity to demonstrate your communication skills and teaching abilities. It's also a chance to learn more about the university, the city, the department's culture, and the people who may become your long-time colleagues! The multiple meetings with faculty members will be long, exhausting, and at some points maybe even boring. Regardless, you should exploit the opportunity to learn more about the university's expectations and to assess the positive and negative aspects of potentially relocating your life and career there.

It's a good idea to prepare questions for the faculty members and administrative staff you will be meeting. My campus visits each consisted of one long day, but some last for two days, and they can occasionally be as long as four. You should focus your energy on engaging in one-on-one interviews, delivering an ex-

citing talk, and learning as much as you can. Be prepared for the possibility that your interview will include breakfast, lunch, and dinner. That may make it feel endless and without respite, but it's a common practice used to get to know candidates in more informal settings and to optimize time.

Vying for a faculty job is a competition, so it's important to make yourself stand out. The on-campus interview is an opportunity to do that—particularly during the job talk, which is a seminar or colloquium based on your research. There's more than one way to design an interesting and engaging talk, but I suggest focusing on a single topic or paper. That way you can provide the audience with enough background information that they can understand the significance of your research. To make sure things go smoothly, rehearse your talk a few times for your colleagues and incorporate their feedback.<sup>2</sup> (See the article by Stephen Benka, PHYSICS TODAY, December 2008, page 49.)

It may be tempting to try to impress the search committee

LSU

Louisiana State University

**Assistant Professor of Experimental Quantum Optics or AMO Physics (Tenure-Track)**

The Department of Physics and Astronomy at Louisiana State University invites applications for a tenure-track Assistant Professor position in experimental quantum optics or atomic, molecular and optical (AMO) physics starting Fall 2018. The faculty in LSU's Quantum Science and Technology (QST) group include Thomas Corbitt, Jonathan Dowling, Hwang Lee, Ravi Rau, Georgios Veronis and Mark M. Wilde. The group carries out an active research program in quantum optics theory, as well as the quantum optics experimental activity of Corbitt. The QST group forms half of the Hearne Institute for Theoretical Physics, with the other half comprising the experimental and theoretical general relativity group, whose faculty members consist of Ivan Agullo, Thomas Corbitt, Peter Diener, Joseph Giaime, Gabriela Gonzalez, Warren Johnson, Robert O'Connell, Jorge Pullin, and Parampreet Singh. The experimental component is largely part of the LIGO Scientific Collaboration, with an extensive presence at the LIGO Livingston Observatory situated 24 miles from campus. LSU also hosts a theoretical attosecond theory group including Mette Gaarde and Ken Schafer.

The Department of Physics and Astronomy at LSU has strong research efforts in particle physics, including nuclear and neutrino physics, space physics, condensed matter physics, medical physics, and astronomy and astrophysics.

**Details**

**Posted:**  
November 1, 2017

**Location:**  
Baton Rouge, Louisiana

**Salary:**  
Open

**Level:**  
Experienced

**Sector:**  
Academic

**Work Function:**  
Faculty 4-Year College/University

**Discipline:**  
Physics: Atomic and Molecular,  
Physics: Optics and Laser,  
Physics: Quantum

**Responsibilities**

Teach at the undergraduate and graduate levels; supervise graduate students' research and dissertations; establish a vigorous research program in experimental quantum optics or AMO physics; and service to the university.

**Minimum Qualification**

PhD degree in Physics or a related field (A.B.D. candidates considered but must have PhD by May 2018).

**Preferred Qualifications**

Preference will be given to candidates working on novel technologies for quantum communication, optical quantum information processing, and quantum optical metrology.

**Preferred Education**

Doctorate

**FIGURE 3. THE JOB POSTING FOR A FACULTY POSITION** should guide your application. The qualifications for my current position at Louisiana State University, highlighted in brown, were reflected in my background. My application referenced the job's responsibilities, highlighted in blue, and explained how I would be able to carry them out. Being aware of the department's focus on theoretical research, highlighted in green, helped me envision how my experimental background might complement the existing program. (Adapted from the PHYSICS TODAY Jobs posting.)

# ONLINE RESOURCES

► **Some websites that list job postings for physics faculty positions**

<https://jobs.physicstoday.org>  
<https://academicjobsonline.org>  
<https://higherredjobs.com>  
<https://sciences.academickeys.com>

► **Advice on writing an academic cover letter can be found at**

[https://owl.purdue.edu/owl/job\\_search\\_writing/job\\_search\\_letters/academic\\_cover\\_letters/index.html](https://owl.purdue.edu/owl/job_search_writing/job_search_letters/academic_cover_letters/index.html)

► **An outline for an academic CV can be found at**

<https://academicpositions.com/career-advice/how-to-write-a-professional-academic-cv>

► **A list of interview questions that you might be asked—and some you shouldn't be—can be found at**

<https://capd.mit.edu/sites/default/files/career/files/academic-interview-questions.pdf>

► **For more guidance on job interviews, see PHYSICS TODAY's Q&A with career consultant Alaina Levine at**

<https://physicstoday.scitation.org/doi/10.1063/pt.5.9035/full> and <https://physicstoday.scitation.org/doi/10.1063/pt.5.9039/full>

► **Learn about what salary level to expect as a physics professor at**

<https://aip.org/statistics/salary-calculator>

members by presenting multiple papers, but that's not a good strategy. They have already analyzed your CV, and you were invited to the on-campus interview because they were impressed by your achievements. Remember that the purpose of the job talk is to demonstrate your ability to communicate and teach effectively. Picking a single paper or project—if possible, one that can appeal to a broad audience—will help you demonstrate those skills.

I recommend designing your job talk so that it's easy for the search committee to contrast your expertise and plans with those of other applicants. Although you may not know who the others are, most departments have public calendars that list talks by invited speakers. In any case, reviewing recent seminar topics will provide insight into department members' interests, which can help you plan your own talk.

Some universities, particularly PUIs, may request a teaching demonstration in addition to the job talk. In that case, the search committee will assign a topic and request that you teach a 30- to 90-minute lecture, followed by questions from students. The lecture is an opportunity to showcase the various methodologies and pedagogical techniques discussed in your teaching statement. An old-fashioned lecture without interactive components is unlikely to impress the hiring committee.

Going into your job search, you'll likely have experience conducting research seminars and teaching demonstrations. But another potential interview component—the chalk talk—is probably unfamiliar. In a chalk talk, the hiring committee can ask about your research proposal, implementation plan, budget, or anything else, and you have to defend your program. The whole thing takes about 60 minutes, and although it can be done at a chalkboard, it can also be presented with slides or as

a combination of the two, depending on what the committee requests.

## Nuts and bolts

Following the on-campus interview, you might be contacted by the department chair or the dean to discuss your potential appointment. Negotiating your initial teaching load and startup funds is a necessary part of the hiring process. At some institutions, your salary, the number of students and postdocs you can hire, their salaries, coverage of publishing fees, and travel funding are negotiable as well. Being able to offer generous postdoc salaries can help you attract talented researchers who will speed up the establishment of your research group.

Although you may have a long wish list, it's crucial to identify the bare-minimum resources that you will need to begin a successful research and education program in your area of expertise. Before you bring a budget proposal to a department chair, consider potential barriers to its implementation and formulate possible solutions. The budget should identify any necessary supplies or equipment that the facilities currently lack. Another important consideration is how long it would take to get your lab set up and for your group to start performing new, original research. A careful estimation will inform any negotiations and justify your requested teaching loads and summer salary. Most junior faculty positions cover nine months of salary with the expectation that you will eventually secure funding to cover the three summer months; until that point, you'll need additional support.

Behind every hiring process are departmental and institutional politics that may be invisible to the candidates—and are beyond their control. (See the article by Matt Anderson on page 52 of this issue.) I had a disappointing experience in which I had almost finished negotiating startup funding for a position when the university hired a new dean of science who instated a hiring freeze. Although I believe such setbacks are unusual, they are always possible and can be discouraging. That's why I suggest keeping some emotional distance throughout the stages of the job search and remembering that the hiring process is not finalized until the contract is signed.

In the end, I was fortunate to receive a generous offer only a year after finishing graduate school. But before I received that offer, I had to pass through a series of other interviews for faculty positions. The process presented unexpected challenges and uncovered weaknesses in my job-search approach. I hope that readers who are considering becoming professors can learn from my experience and enter the job market a little better prepared for the challenges ahead.

## REFERENCES

1. C. Meyers, T. B. Jones, *Promoting Active Learning: Strategies for the College Classroom*, Jossey-Bass (1993); for other instructional strategies, see National Research Council, *Discipline-Based Education Research: Understanding and Improving Learning in Undergraduate Science and Engineering*, National Academies Press (2012).
2. For help preparing a research seminar, see, for example, N. A. Lewis Jr et al., "Three tips for giving a great research talk," *Science* (17 April 2019).
3. A. M. Porter et al., *Faculty Job Market in Physics and Astronomy Departments: Results from the 2018 Academic Workforce Survey*, Statistical Research Center of the American Institute of Physics (June 2020).

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