

Hunting for jobs at liberal arts colleges

Suzanne Amador Kane and Kenneth Laws

Four-year colleges offer special challenges and rewards for physics faculty. Two veterans offer advice to physicists seeking to join their ranks.

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As of about a year ago, 764 distinct college-level physics departments existed in the US. Of those, a whopping 513 are at institutions whose highest degree offered is a bachelor's.¹ The vast majority of the schools are liberal arts colleges—by which we mean institutions that focus primarily on undergraduate education, rather than on graduate education and research; this category includes some of the smaller state universities and a few colleges with small graduate programs. Liberal arts colleges represent a significant job market, one that many PhD-level physicists aspire to join.

But how does one go about getting a job in physics in a liberal arts college? Whether you are a graduate student, a postdoc, or a working physicist looking for a change, your options for getting advice on this topic are probably limited. However good your PhD or postdoctoral mentor may be at research, the odds are that he or she knows relatively little about the small-college environment. Faculty positions at liberal arts institutions include a much more significant component of teaching and working with students than do similar jobs in research universities. Even so, increasing numbers of liberal arts colleges expect the physics faculty to

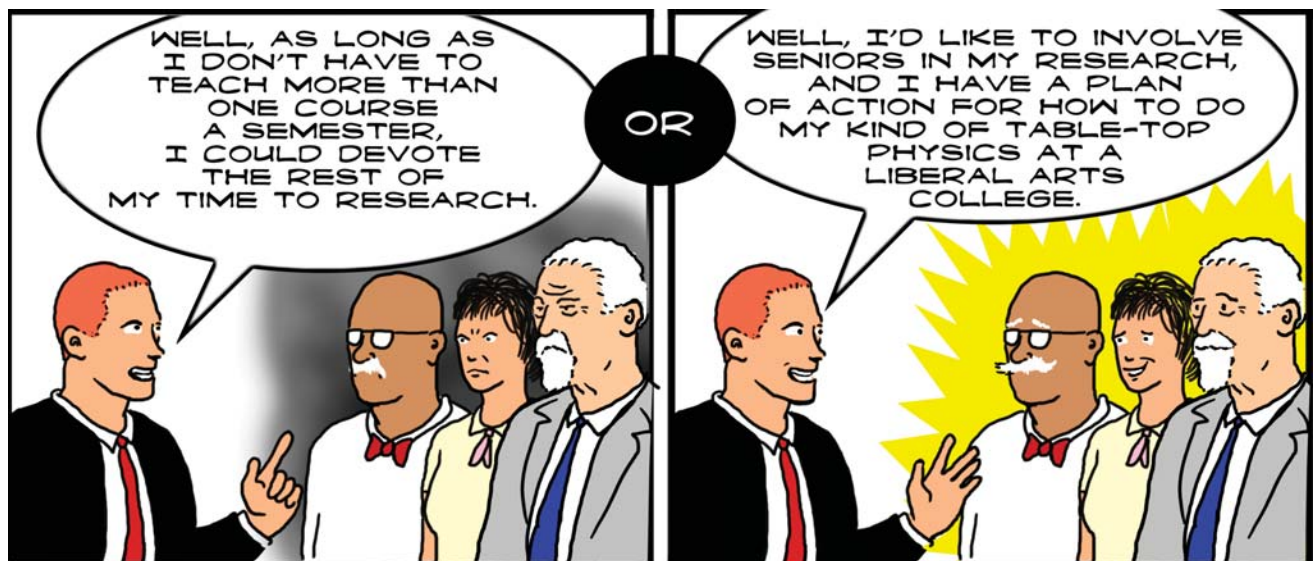
conduct serious research, which usually includes substantial involvement of undergraduates. Thus, those positions offer different rewards and challenges from faculty jobs at research universities. Your approach to applying for such positions should reflect those differences.

We are college professors with many years of experience in evaluating job applications and conducting interviews. We are dismayed by the number of candidates whose excellence gets masked by inappropriate application materials and poor preparation for interviews. This article provides our guidelines for effective job-hunting techniques. Following this advice will not ensure that you will land the ideal job, but it might make your qualities and unique attributes more evident to those doing the hiring.

We make suggestions about how to develop your application materials, prepare for an interview, and make a wise decision if you are offered a job. If you're not yet in the job market, we give some tips on how to prepare for a future job search (see box 1).

Before all that, though, let's take a quick look at who is doing the hiring. Understanding the audience for your ap-

The liberal arts college offers special rewards and challenges.



plication materials is an essential aspect of a good search. Because liberal arts colleges have relatively small physics departments, don't assume that your best chances are at an institution with an existing researcher in your field. The fields of research found in a given liberal arts college physics department are generally broad and varied because of the small number of faculty. The hiring process is generally conducted by a search committee whose members will review your application. It is reasonable to expect that the committee will contain not only physicists outside of your specialty, but also faculty from other fields and possibly even student representatives. As a result, you must not tailor your job application to a specialized audience in your own subfield. Also, everyone involved has limited time to devote to the hiring process, so avoid overly verbose essays and letters.

Make the application count

The first item search committee members will see is your cover letter. One of the strongest messages we wish to share is that a generalized form letter leaves a poor impression. Even worse is having your application submitted blindly through an online service, a procedure that reinforces the sense that you are oblivious to the unique character of the institution to which you are applying. Anticipate that such a lack of effort on your part might stimulate a similar lack of effort from the search committee.

Pay careful attention to whether the hiring institution prefers paper or electronic applications, and submit your materials accordingly. Committee members want to see an application from a person who is sufficiently in tune with the hiring institution to show a familiarity with its character. They want to see proof that the applicant is the appropriate person for that particular position. A search committee may receive perhaps 100 applications, which all begin to look alike except for those that speak specifically to the particular position to be filled.

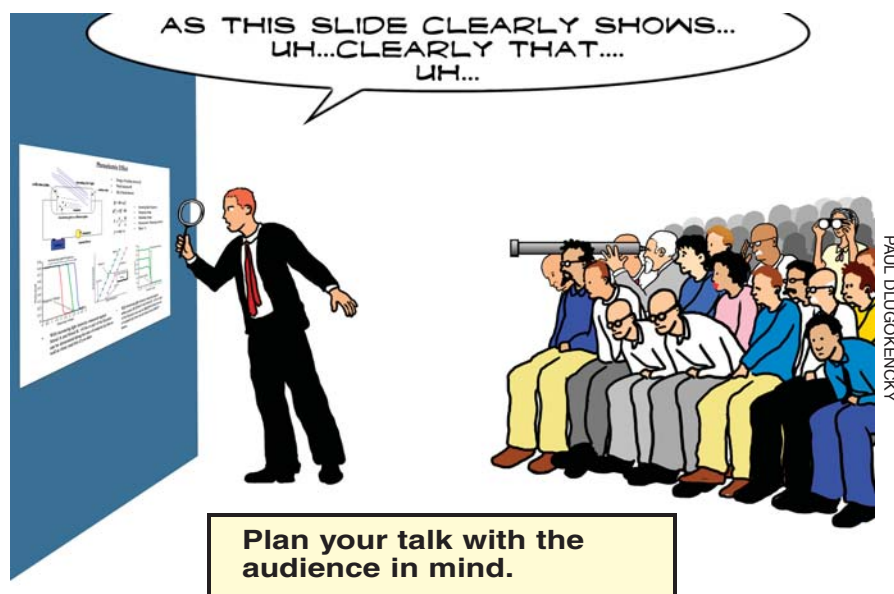
Suppose a person is applying for a position teaching physics at Dickinson College. Much of the department's character is related to its identification with the Workshop Physics approach to teaching introductory physics. If the applicant fails to note that association, he or she will probably not be considered seriously. Say another person is interested in Haverford College. Undergraduate research involvement is an integral part of its science programs, so the applicant would do well to reflect on that research tradition in an application. More generally, failing to at least discuss an interest in teaching when applying for a faculty position at any college can raise a red flag in the minds of search committee members. Similarly, your discussion of research should be specific to the institution, rather than being a specialized exposition of your PhD or postdoctoral work.

A lengthy cover letter is likely to inspire a reaction of "Oh, good grief. I don't have time for this. My class starts in five minutes." Again, consider your audience and be concise. A page and a half should be the absolute maximum.

Consider asking the colleagues and mentors who are writing your letters of recommendation to mention your teaching abilities and motivation in addition to talking about your research skills. It also would be wise to follow up with them to see that all your reference letters ar-

rive on time. A missing letter can stall an application, sometimes permanently.

Your curriculum vitae (CV, or resumé) should include all the factual information that the search committee needs. Put it in list form: publications, degrees, positions held, awards, and so forth. Be especially careful to organize the material accurately and honestly. For example, it is helpful to list peer-reviewed articles separately from conference abstracts, popular science articles, and other non-peer-reviewed work. Also, be wary about listing manuscripts "in preparation," since that designation implies that an actual manuscript in an advanced stage of completion can be produced for immediate inspection. For liberal arts colleges, you would do well to list all your teaching involvement, including brief descriptions of what you did. For example, "Teaching assistant for Introductory Physics II" is uninformative compared with "Teaching assistant for second semester introductory electricity and magnetism; conducted two recitations, with 25 students per recitation, using exercises adapted from



Tutorials in Physics." If you have been a tutor, worked with high-school science students, or performed other work relevant to a career in college teaching, make sure you mention it.

The teaching and research statements

Many search committees welcome or even require a statement describing the applicant's approach to teaching. Does the applicant seek interaction with students in class or feel more comfortable lecturing? Should laboratories be an integral part of a course or add-ons that provide distinct learning experiences for students? If a theorist, does the applicant have enough hands-on experience to teach introductory labs? Your statement should be well thought out, avoiding platitudes while emphasizing strengths, achievements, or approaches that set you apart. The statement will be more effective if it reflects your actual teaching or teaching-related experiences and is as concrete and specific as possible. What courses in the college's physics curriculum are you comfortable teaching? Do you have novel ideas to propose for interesting courses? Many departments are interested in offering special-topics courses, such as solid-state physics, astronomy, or biophysics, at an advanced undergraduate level. Many are on the lookout for algebra-based courses for non-physics majors. Can you teach a course in the physics of music or offer

Box 1. Preparing for a job search

What if you are a year or more away from going on the job market? Here are some ideas about how you can prepare to be a better candidate for the type of search that liberal arts colleges conduct.

- ▶ Develop your teaching abilities. Make the most of teaching assistantship opportunities and other openings that arise. Keep a journal of your significant experiences and summaries of your teaching evaluations.
- ▶ Get experience giving scientific talks. Present papers at conferences; give talks at research group meetings, at student-led seminars, at other institutions, or at local high-school science clubs. You can develop your communication skills in numerous ways.
- ▶ Train yourself broadly and deeply as a scientist. Avoid an overly narrow focus on any one set of research skills; instead, gain general laboratory or theoretical skills. Attend colloquia on both physics- and non-physics-related topics, talk with other scientists, and read widely in broad-based journals.
- ▶ Make sure that you get letters of recommendation from professors or others who are familiar with your teaching abilities and not just with your research.
- ▶ Visit other institutions and conferences whenever possible and learn to network effectively. Talk with liberal arts college faculty to learn more about their programs.
- ▶ Get postdoctoral research experience if you eventually want a position with a serious research component at a liberal arts college. The school will expect you to generate your own research program, independent of your graduate or postdoctoral research, while still teaching and managing other commitments. Postdoctoral research will help you develop the necessary skills and maturity.
- ▶ Consider getting teaching experience during your postdoc. The teaching postdoc, which divides your responsibilities between research and carefully mentored teaching, is a new option offered by some institutions. When used properly, such positions offer the best of both worlds. By contrast, a temporary teaching-only position may not necessarily be helpful in further job searches.
- ▶ Talk with peers and alumni who have carried out successful job searches. For example, it is helpful to understand the timing of openings so you know when to go on the market. It is relatively easy to learn about job openings through ads in *PHYSICS TODAY* and other publications and through online services such as the one run by the American Institute of Physics.
- ▶ Attend job-hunting and professional skills workshops. If none are available at your institution, look into those offered at major conferences by professional societies.
- ▶ Become familiar with the job market by using the resources of the AIP statistics division (<http://www.aip.org/statistics>), where you can learn about trends in hiring, career paths, and salaries and gain other useful information.

one on environmental science? If you have interesting ideas, your teaching statement is a logical place to share them, even to the point of including an abbreviated syllabus for an unusual offering.

You should learn in advance whether the institution expects its faculty to conduct research, either as a scholarly pursuit or primarily for the benefit of undergraduate researchers—or both. In any of these cases, you will probably be asked to submit a research statement or proposal as

part of your application. The statement should include not only several pages of narrative explaining your research, but also an estimated and realistic budget, possible sources of funding, a scenario of the time required to establish the research program, and an explanation of the research's appropriateness for involving undergraduates.

Once again, you will want to craft your research description carefully, keeping the audience in mind: You are writing for physicists possibly unfamiliar with your subfield. In particular, emphasize the significance of your research in the grand scheme of physics and beyond. If your research involves expensive equipment, extensive travel to off-site facilities, or other specialized elements, you need to pay particular attention to its feasibility at a liberal arts college. One way to investigate that is to look at existing research programs at similar institutions where faculty are doing similar work. Your results from such an investigation are not just for convincing a search committee about your viability as a candidate; you need to assess the situation carefully for yourself to see if you even want the position.

Theorists may need to focus especially hard on the question of the appropriateness of their research for undergraduates. Existence proofs are again an excellent way to demonstrate feasibility, so note any prior undergraduate research involvement either by you or by colleagues in your subfield. Take note that computational research is more readily incorporated into undergraduate projects than is most theoretical research. Theorists should also explain how they would stay in touch with a larger community—for example, through collaborations, research conferences, or summer schools.

The visit and job talk

If you are one of the top few applicants, you will get an invitation to interview on campus. The purpose of the interview is for both parties to gain a deeper understanding of the appropriateness of the candidate for the open position. You must plan carefully for that visit, both to create a desirable impression and to learn what you need to know.

The institution is trying to discover things about the candidate that are not evident from the written application. How does the candidate interact with students and potential colleagues? Are his or her explanations clear to both students and faculty? How appropriate is the candidate's research program for the institution? Can the candidate realistically involve undergraduates in meaningful research projects on a regular basis? Does the candidate make evident the reasons why he or she wants to be a part of the institution? Are there any warning signs that indicate potential difficulties in the future? Is the candidate in tune with the character of the institution? Does the candidate have the energy level required to fulfill the many demands faced by college faculty? An interviewee would do well to have the motivations of the institution's representatives in mind throughout the interview process.

While there, what should the candidate try to learn? Aspects of a job that are usually of concern to candidates include salary, teaching load, research expectations, standards for tenure, leave policies, lab space, computer support, and research start-up funding. But we've been told repeatedly that the most important consideration, although more difficult to ascertain, is the environment. That is, will the new hire enter a department that is congenial and supportive or one that is rife with discontent and discomfort? How well does the college administration support the department? What sort of rapport exists between faculty and students? What is the surrounding community like? Is it diverse? How does the cost of living compare with other locations? How are relations between the town and the college?



Learn from the students.

One valuable event to ask for—if it's not already arranged—is a meeting with students, with no faculty present. Another is a meeting with only junior faculty, as they may have perspectives closer to those of a candidate for a new position than those who have been immersed in their positions for a longer time.

A normal part of the interview process is a colloquium given by the candidate. Pay particular attention to the guidelines the search committee offers in advance about how to structure the talk. From hard experience, we suggest strongly that you aim this talk at the sophomore level. Many candidates take lots of convincing before they avoid the temptation to give a specialized technical seminar: They feel a need to impress the faculty with the depth of their knowledge, rather than with their ability to share with students insights about their research. When one is immersed in research, it is difficult to back off and take the perspective of a nonspecialist who has to have aspects of the research explained. However, your hard work and physical reasoning will come across better in a talk pitched at the sophomore level—as you can easily learn if you observe colloquium speakers carefully for a while and notice the level and construction of the most effective talks. You will communicate better with all of your audience, not just students. If they wish, faculty members can ask follow-up questions to probe your technical knowledge. What if the main conclusions of your research are highly technical? Make sure that at least the first three-quarters of your talk is accessible at a general level. If you have also been asked to give a sample class as part of your interview, do not use that as an excuse to make your research colloquium inaccessible. For more on the sample class, see box 2.

Here are five tips for a research talk:

1. Have transparencies or slides that are clear and well organized; that's more important than completeness.
2. Avoid mind-numbing pages of data and equations.
3. Don't present too many slides for the time allotted. Plan to spend a few minutes on each slide.

4. Display data graphically, emphasizing physical intuition rather than mathematical derivations.

5. Include slides that give an overview and final summary. Ask yourself: Have I made the main point of my talk clear to the audience?

Practice your talk repeatedly, and time it to finish within the recommended time frame. If your colloquium fills a 1-hour slot, you should plan to talk for 45 minutes and leave 15 minutes for questions; you will need to demonstrate your ability to answer questions spontaneously. Don't give in to the urge to talk the entire hour. Finally, try to relax during the questioning. Remember, when audience members ask questions following a talk, it shows that they are engaged and interested, which is a good thing. Prickly responses to questions give the worst impression. And humor always adds to the appeal of a presentation. (For more tips, see "Further reading.")

Still more about interviews

Often, candidates meet with students separately and informally, often over a meal. Be sure to take full advantage

of such a meeting to learn about the institution and its students. Don't just talk; listen. Your interest and enthusiasm will be apparent, so remember students' goals in attending this meeting. They want to learn about you as a potential teacher, mentor, and person. This is not the time to become distant and distracted thinking about your talk, faculty interviews, or other events.

Your interviews with faculty will go more smoothly if you take the time to educate yourself in advance about the department and each member. This is easily done using the internet and selected publications. You will then know the structure of the department's curriculum and the background and interests of each person interviewing you. This information will help you immeasurably to explain your own work and abilities, and to ask intelligent questions. Faculty members will not have to waste valuable interviewing time giving you basic facts about the institution.

Where does one find out about issues like salary, start-up funding, and benefits? Those topics may be covered in a separate meeting with a member of the administration. Make sure you will get such a chance. Otherwise, find out with whom you should discuss those matters so they do not get forgotten in the rush of the interview.

One awkward circumstance that can arise involves unwelcome personal questions. Federal equal employment opportunity guidelines clearly forbid employers from inquiring about your marital status or other family matters, but many faculty on a search committee will still ask detailed questions about your personal life. Although some candidates do not care, others are greatly concerned by it. Will a dual-career couple be looked at as a hiring risk? Will your marital or family status make you a less desirable candidate? Possible responses to unwelcome questions of this sort can be found in the "Further reading," as can advice for dual-career couples.

Once again, appreciate the fact that committee members from other departments are likely to be voting members. Ignore their input at your peril. You will create a much stronger

Box 2. The sample class

Since most liberal arts colleges value teaching at least as much as research, many will ask candidates to prepare and deliver a sample class. Consider this opportunity just as important as your research talk. During a sample class, faculty members and students will evaluate your abilities to communicate at the appropriate level and interact with students.

Before preparing your sample class, take steps to find out important information:

- ▶ What subject, and at what level, are you expected to teach? What background, mathematical or otherwise, do the students in the course have?
- ▶ What textbook is the class currently using? Familiarize yourself with it to help you assess the students' level of knowledge.
- ▶ How long is the class period? Practice your sample class repeatedly, and make sure it fits in the allotted time.

Do some exploring to find out which pedagogical methods are favored by the department where you'll teach. For example, peer instruction is highly valued at many liberal arts colleges, where even introductory courses are often taught in small sections. (See "Further reading.") As you prepare your sample class, find ways to involve your students, perhaps with carefully prepared questions, demonstrations, or in-class exercises. In the end, you will want to use this opportunity to showcase your special talent in the classroom, which will undoubtedly leave an impression on your intended colleagues. Make that impression a favorable one.

impression if you show interest in, and consideration for, everyone you encounter on your interview, including support staff and students.

It should be a given, but don't undermine an otherwise good interview with thoughtless remarks or behavior. When asked about research that students might do in your lab, have a carefully worked-out plan for senior projects. You should not be surprised and suggest, "Well, they can help solder circuit boards or clean glassware." Don't ignore researching the institution, then startle the committee with a sudden epiphany: "Wait—you have to teach your own labs without graduate teaching assistants?" We relate these remarks because, ironically, they were made by otherwise talented candidates talking to our dismayed colleagues at other institutions.

It's a good idea to follow up the interview by sending a letter to the search-committee chair expressing your appreciation. This also gives you a chance to briefly reflect on your visit, reply to questions you may have left unanswered, send new publications or preprints, and otherwise bolster your application.

If you have not heard back from the search committee within a time equal to about $\frac{1}{4}$ of the time remaining until the job actually begins, then a polite inquiry is probably in order. Try to be patient. The committee may have you on a list of possible hires, but it could be waiting to hear from a first- or second-choice candidate who has it on hold. Frustrating for all parties, the decision-making process can take weeks, and you do not want to hurt your chances by appearing impatient and demanding. The exception is when you have a competing offer firmly in hand. In that case, the search committee should be politely notified by phone that you are now working under a deadline imposed by the competing institution.

Remember that the members of the search committee, in addition to their teaching and research responsibilities, may be advising and supervising students, serving on college committees, and trying to find time to finish a grant proposal due in three days. They will appreciate a concise application, directed toward their institution's needs. Be honest and don't oversell your accomplishments. In any case, a matter-of-fact approach does a better job of displaying your talents than does an overbearing one.

We hope these suggestions will help applicants for college faculty positions present themselves as effectively as possible, avoid potential pitfalls, and optimize their potential for landing that desired job.

We thank Catrina Hamilton-Drager for fruitful suggestions. This article is adapted from our online essay, available at <http://www.physicstoday.org/jobs/jsresources.html>.

Reference

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Further reading

- ▶ M. Anderson, "So You Want to Be a Professor!" *PHYSICS TODAY*, April 2001, p. 50.
- ▶ J. S. Rigden, *Landing Your First Job: A Guide for Physics Students*, AIP, College Park, MD (2002).
- ▶ Committee on Science, Engineering, and Public Policy, *Careers in Science and Engineering: A Student Planning Guide to Grad School and Beyond*, National Academy Press, Washington, DC (1996), available at <http://newton.nap.edu/catalog/5129.html>.
- ▶ J. C. Garland, "Advice to Beginning Physics Speakers," *PHYSICS TODAY*, July 1991, p. 42. Also note the response: N. D. Mermin, "What's Wrong with Those Talks?" *PHYSICS TODAY*, November 1992, p. 9. See also H. Newberg, "The Woman Physicist's Guide to Speaking," *PHYSICS TODAY*, February 2005, p. 54.
- ▶ L. McNeil, M. Sher, "The Dual-Career-Couple Problem," *PHYSICS TODAY*, July 1999, p. 32; "Report on the Dual-Career-Couple Survey," available at <http://www.physics.wm.edu/dualcareer.html>. See also M. Sher, "Dual Career Couples—Problem or Opportunity?" *CSWP Gazette*, Fall 2006, p. 1.
- ▶ The Council on Undergraduate Research website at <http://www.cur.org/> contains information about various aspects of undergraduate research. CUR members also can access information regarding funding resources. Other funding opportunities are available through NSF's Research in Undergraduate Institutions program (<http://www.nsf.gov>), the Research Corporation (<http://www.rescorp.org>), and the American Chemical Society's Petroleum Research Fund (<http://www.chemistry.org>). The KITP Scholars program at the Kavli Institute for Theoretical Physics (<http://www.kitp.ucsb.edu>) is another relevant resource.
- ▶ The American Association of Physics Teachers (<http://www.aapt.org>) has several resources of interest to professors at primarily undergraduate institutions. The American Physical Society also has some pertinent material at <http://www.aps.org/jobs/index.cfm>.
- ▶ The American Institute of Physics maintains the Career Network website at <http://www.physicstoday.org/jobs>. ■