

# Phys 7857 Graduate Seminar

## “How to get a job in physics”

Today: Preparing application materials

## **Academic jobs:**

Either for postdoctoral or faculty jobs the application package is more or less the same: a cover letter, a statement of research (for faculty positions also a statement on teaching) and a c.v.

In the case of postdoctoral positions you also need to arrange to have three letters of recommendation sent on your behalf. For faculty positions you usually provide the name of 3-5 people who will write.

Obviously, you'd better tell the people you list you are doing so...

It might be wise to discuss with your advisor(s) about the people you plan to ask letters from.

As we mentioned before, people tend to be more forgiving with the quality of the application package for a postdoctoral position. But having the best possible package is always a good idea.

The package has two broad goals:

To get your application noted.

To convey information about you.

## The cover letter:

Some people claim that the cover letter is the most important element of an application. From my experience, this is not necessarily so. For postdoctoral positions people do not pay great attention to the cover letter. For faculty jobs it can be more important. For non-academic jobs it is crucial (more on this later). In any event, it does not hurt to have the best possible cover letter and in some cases it can be crucial, for instance if the people looking at your application have never heard of you before.

It helps to use good stock paper (assuming the application is not online), and to sign the letter in blue (it makes it look less mass-marketed, this is a common trick one sees used by junk mailers, for instance). It is ok to mass-produce envelopes, they are usually opened by office staff who collect your file into a folder.

In some institutions it is ok to use official letterhead and envelopes for job applications. If in doubt, ask.

Many of these tricks will disappear as application processes move online...

**NO TYPOES!** Spell check everything.

Especially stuff spell-checkers don't catch, i.e. the department chairperson's name.

## Cover letter contents:

Why are you sending an application.  
Where did you hear about the position  
(ok to say someone recommended you apply) →  
Which position are you applying to  
(there could be several)

Call attention to elements in your background  
in research and teaching. Convince the reader →  
to take further look at the rest of your materials.

Provide any information that was requested →  
in the ad.

Make your contact info very clear.  
Phone number should be one with  
ability for people to leave messages  
if you are not there. ↘

Dr. Samuel Watson  
Physics Department Chairman  
Claremont College  
Claremont, CA 91711

Dear Dr. Watson:

I am happy to have the chance to apply for a faculty position at Claremont College. Enclosed is a copy of my current *curriculum vitae*, which includes a list of my publications and my teaching and research proposals.

My teaching philosophy has developed through my experience as a high school chemistry teacher, as a teaching assistant at Harvard University, and as a research supervisor at M.I.T. In my experience, the most successful classes are those in which there is a high level of student participation. I will try to encourage classroom participation by carefully organizing each lecture. With clear organization, students are more likely to believe they understand the framework of the class and will therefore be willing to ask questions about sections they do not understand. A second technique that I think will be useful is asking questions of individual students in order to create a more participatory classroom environment. I would also be interested in developing new courses, particularly courses for non-physicists that might focus on a single topic of current interest.

The research project I would like to pursue at Claremont involves coherent time-domain terahertz spectroscopy of condensed matter systems. I think this is an excellent project for an undergraduate school because it explores exciting physics, it involves many useful technologies, and it is unusual enough that there will be very little competition with larger research groups.

I have asked that four letters of recommendation be sent to you on my behalf. The writers are James Smith, my thesis advisor; Marvin Gardner, my post-doctoral advisor; and Randall Miller and Daniel Golden, in whose courses I was a teaching assistant at Harvard University. Their addresses appear on the last page of my *curriculum vitae*.

I appreciate being considered for your faculty position. Please let me know if I can provide you with any additional information to support my application.

Sincerely,

Jane Doe [doe@mit.edu](mailto:doe@mit.edu), (617)444-2222

## Curriculum vitae:

It is a good strategy as in this example to concentrate the most relevant information on the first page.

The second page could be a list of courses taught and a list of publications.

“Padding” publication lists with manuscripts in preparation or un-refereed papers is not a good idea. List them separately if you wish.

Memberships in societies are sometimes listed, particularly if you played leadership roles.

Sometimes people list other info like hobbies, foreign languages, or special skills relevant to the position.

## Curriculum Vitae

### **Philip W. Adams**

Department of Physics and Astronomy  
Louisiana State University  
Baton Rouge, LA 70803  
225-578-6847  
[adams@phys.lsu.edu](mailto:adams@phys.lsu.edu)

### **Education:**

10/86 Ph.D., Physics, Rutgers University, New Brunswick, NJ  
12/80 B.S., Physics, Louisiana State University, Baton Rouge, LA

### **Professional Employment:**

Full Professor of Physics, LSU, Baton Rouge, LA, 1999 – present.  
Associate Professor of Physics, LSU, Baton Rouge, LA, 1993 - 1999.  
Assistant Professor of Physics, LSU, Baton Rouge, LA, 1988 -1993.  
Postdoc in Physical Research Laboratory, AT&T Bell Labs, Murray Hill, NJ, 1986 -1988.

### **Awards:**

Fellow of the American Physical Society, 2006  
Alumni Association Faculty Excellence Award, 2001  
Tiger Athletic Foundation Undergraduate Teaching Award, 2000  
College of Basic Sciences Research Award, LSU, 1993  
Phi Kappa Phi Non-Tenured Faculty Award, LSU, 1993  
NSF National Young Investigator Award, 1992.  
University Fellow, Rutgers University, 1981-1985

### **Recent and Current Research Funding:**

PI on “Quantum Transport in Thin Film Correlated Insulators”, DOE, Division of Materials Sciences and Engineering, \$170K/yr, 2007-2010  
PI on "Superconductivity, Correlations, and Nonequilibrium Phenomena in Novel Low Dimensional Systems", NSF, \$103K/yr, 2002-2005. (Funded by National Science Foundation since 1989).  
CoPI on "Carbon-Composite Reinforced Superconducting Microfibers for Flight-Weight, High-Field Magnets", US Army, \$191K, 2004-2005.

### **Advisors:**

Postdoc: Mikko Paalanen  
Graduate: William Glaberson

## Statement of research plans:

It should be 1-2 pages long. It should give some level of detail and convey that you are a worthy researcher. Avoid writing a long essay, brevity is important.

It should have an opening paragraph that states the broad problem domain of your research and emphasize why it is important. *How this is crafted depends in detail of who may be reading your application.* For large research universities, your audience should be physicists/astronomers not necessarily in your research area. For smaller schools it should also include people potentially from other areas. It may be good to include how financially healthy your field is, how it is growing nationally or worldwide, that there is excitement about it, etc.

The main body should be about three paragraphs long. Give an initial paragraph that states how your specific research is contributing to the problem domain of the opening paragraph and how it helps move the whole field forward. Second paragraph should summarize your research approach, what you have achieved to date. Refer to your papers appropriately. Final paragraph should emphasize the future.

If you have experience in proposal writing or if you know of specific funding opportunities you will apply to when you get the job, mention them.

If there are people at the institution you will potentially collaborate with or facilities you will use, highlight this in a closing paragraph.

## **Statement of teaching:**

Again 1-2 pages in length.

Opening paragraph: state how important excellence in education is to you and how important is teaching in the future of your profession. Emphasize your desire to be a good teacher. Try not to sound phony.

Main body: 2-3 paragraphs long. Describe your teaching experience, any novel techniques you may have used and any successes you may have had. If you developed courses or new aspects of courses, mention it. Follow with a paragraph on what you plan to do in teaching at the institution you are applying to. Mention any new courses you may want to develop or existing courses you may want to teach in a novel way. Try to find out what is going on in teaching at the institution so you can tailor your message accordingly, particularly if they have special teaching initiatives going on.

If you can, a final paragraph of how you can integrate research into teaching can end the statement on an exciting note. Some special grants for young faculty (e.g. NSF's Career grant) require a teaching component. You may want to specifically mention you intend to apply and describe your strategy.

[http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5262](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5262)

## List of references:

Contact all references before including them in a list. If possible, meet with them or speak with them on the phone and describe the positions you are applying to. It is wise to send them a copy of your c.v. and statements, it will help them in writing the letters.

Try to get people from other institutions than your own. If you can't try at least to get people from other areas of research or other subfields in physics to write for you.

People can have very widely varying styles for writing letters. It is wise to consult with your advisor and other senior people about whom to ask for letters. Sometimes you could get someone who knows you little (e.g. someone you interacted with at a conference) but is a very senior figure to write for you.

If for some reason you will not ask your advisor to write, it is better to explain somewhere why. It is an obvious red flag if the letter from the advisor is missing.



## Non academic jobs:

*“So what are you going to do with that {  }“*  
By S. Basalla and M. Debelius, Chicago (2007)

A completely different ballgame. Some of the aspects look superficially similar, but the differences are important.

The applicant pool is likely to be much more diverse than in academia. People with different levels of experience, degrees, etc.

You need to convince the employer why you are the person for that job, particularly if you lack experience in the area.

Tolerance for sloppiness usually is much tighter.

Usually one sends a cover letter and a resume. The latter is a one page summary of why your abilities match the *requirements of the specific job*. Some people view the resume as a pared down version of the c.v. But it is a much more different animal. Even entries that you keep from your c.v. usually will have to be rewritten to fit in a resume.

Suppose you apply to a job in a hedge fund or an actuarial company. Sure, you have a Ph.D. in physics, with publications, etc, showing you are a smart cookie, but why should the employer take the risk of hiring you without any experience?

You need to convince the employer that you have done at least parts of the job already in your previous life. What? Yes, indeed you have.

You need to look at *all your past experience* with new eyes: *how it relates to this job I'm applying to.*

Graduate school may have taught you to be unduly grumpy about yourself. (Have you ever seen a happy, confident, grad student?). But in reality you are part of an elite. 1 in 10,000 people in the US has a PhD in physics.

Basalla and Debelius recommend making a list of everything you've done in your life. Courses, volunteer activities, jobs, hobbies. Then write a description of what you actually did there, as if you were explaining it to your neighbor or a stranger in the street. Take the broadest view possible. Then pick what looks most interesting and noteworthy.

## Examples:

What you wrote in your c.v. as “TA for physics 2101” can be translated to “Gave multimedia presentations in front of 20 people. Strong ability to handle spontaneous Q&A and conduct short evaluations teaching university courses from beginning to advanced level”. You don’t list specific courses, just what you did.

Or “lab instructor” can be translated into “Hands on individualized instructorship in a laboratory setting, including evaluation of reports”.

Were you part of a campus newspaper or newsletter? “Worked with team of writers to produce campus publication on weekly deadline”

“Led groups of visitors of all ages to multimedia presentation at astronomical observatory and handled logistics and spontaneous Q&A sessions”

Computer skills. List computer languages/systems you have dealt with. As a Ph.D. student your computer skills are significantly above average with respect to the rest of the population.

Notice that the descriptions do not give enormous details of what you did. This does not mean you have to lie. But details are less relevant. And standards of proof are low.

All this info has to be tailored to the place you are applying to. That means you need to research the place. There are increasing number of online tools to do this. In addition to the company's website, use Google news and similar services to see what has the company recently done that is newsworthy. There are specialized sites as well, e.g. [www.wetfeet.com](http://www.wetfeet.com)

## **Resume formats:**

**Reverse chronological.** You list your experience from most recent to least recent. Great if your recent activity is a good match. Trickier if it isn't. In each entry you can highlight either the place you worked at, or the position you occupied, or the skills you used.

**Skill based:** You list the skills you have in the way we described before. This is better if your career path is unorthodox. The format gives you a lot of freedom. Requires you to focus...

## Career statement:

You've probably seen resumes that at the top have a phrase with a "skill overview" or "career statement". "A physicist team leader with ten years experience seeks a challenging position in the semiconductor industry".

This is inexact science. Should you add one? A good one will help. A bad one hurt. You'll have to experiment a bit, consulting with friends and contacts. The best ones are concise, specific, focused and keep in mind the employer's needs. As usual avoid vague, long-winded statements. (e.g. the mission statements generated automatically at [dilbert.com](http://dilbert.com))

*"Our mission is to enthusiastically provide access to emerging paradigms so that we may endeavor to efficiently create performance based sources because that is what the customer expects"*

Keep the resume to ONE PAGE.

Use **boldface** and underlying when appropriate.

Do not list: title of dissertation; titles or descriptions of courses you taught; awards you won, unless they are really meaningful; advisors' names.

## Case study:

Ph.D. in geology, looks for job in Silicon Valley.

Physicists are hotter than geologists in Silicon Valley.

Computer skills important

Highlights innovations in teaching

Highlights creativity

**Dina Y. Venezky, Ph.D.**

123 Lois Lane, Apt. C, Metropolis, ME 12345 555-555-5555

dyvz@gradstudent.edu <http://gradstudent.edu/dina>

### EDUCATION

**Brown University**, Providence, RI, Ph.D. Geology, concentration in geophysics, 19  
**Smith College**, Northampton, M.A., A.B. Geology, concentration in studio art, 19

### LEADERSHIP

**Project Manager, Solar System Exploration Pilot Student Workshop, Jet Propulsion Laboratory, 1996**

Oversaw all aspects of Venus Aerobot mission from choosing science objectives and instruments, to leading the group, to managing costs (\$150 M) and environmental constraints. Designed presentation for NASA review panel.

**Liaison for the Center for Advancement of College Teaching, 1995–1996**

Designed a workshop for all science teaching assistants to introduce them to practice at Brown.

**National Outdoor Leadership School, Semester in the Rocky Mountains, Fall 1990**

Led groups in wilderness backpacking, caving, desert backpacking, and winter telemarking.

### COMPUTING AND MULTIMEDIA

**Webmaster, Brown University Geology WWW Server, 1993**

Designed and developed first public United States Geology Department Web server. Experience in Perl, Fortran and C. Familiar with Unix, Mac OS, LaTeX, HTML, JAVA and applications.

### TEACHING

**President's Award for Excellence, Brown University, 1995**

**Instructor for the Brown Learning Community, 1995–1996**

Taught classes to students of all ages and their parents about volcanoes, rocks and minerals, mission design, and using the World Wide Web to learn more about science.

**Teaching Assistant, Brown University, 1992–1994**

Taught geochemistry and physical geology.

### EXTRACURRICULAR

**Volunteer at the X-Games.** Created and filled the role of FRUIT-A-BURST girl.

**Volunteer at Wind Cave National Park, South Dakota**

**On Eagles' Wings Scientist Presenter, Lindbergh Foundation**

## Case study:

Biologist, wants to work as technical consultant in the software industry.

Goal clear, consultants travel a lot

Software skills highlighted

General skills acquired through his narrow research (studied the brains of slugs)

He didn't do much here, but it is quite appropriate for the job he's seeking.

1 Summer St.  
Somerville, MA 02143

**Josh W. Fost, Ph.D.**

(555) 555-1313  
fost@grad.com

### OVERVIEW

- 9 years C/C++ development (Unix, Win95/NT, Mac OS)
- Ph.D. in computational neuroscience, strong quantitative modeling and statistical skills
- Seeking project management position, 30% travel

### EXPERIENCE

- 1996–1998 Postdoctoral fellow, Brandeis University**
- Translated nonquantitative biological problems into quantitative models.
  - Developed C++ applications and user interfaces to test models.
  - Designed computational models of active filters in neurons; measures of salience in time-series.
- 1996–1998 Computer consultant, freelance**
- Helped nontechnical home users with system purchases and troubleshooting.
  - Web design and development (DHTML, CSS, JavaScript).
  - Systems administration (Unix, Win95/NT): 20-machine campus LAN.
- 1991–1996 Graduate student, Princeton University**
- Computer modeling of biophysical mechanism of learning.
  - Analysis of feedback and gain control in biological neural network.
  - Research on stochastic resonance, role of noise in neural nets.
- 1991 Research fellow, Naval Ocean Systems Center**
- Developed models of mammalian visual system for use in undersea vehicle.
  - Researched flocking and swarming algorithms.

### EDUCATION

- 1996** Ph.D. Computational neuroscience (neurobiology), Princeton University
- 1991** A.B. Neuroscience, philosophy, Bowdoin College

### OTHER ACTIVITIES

- Cofounder and manager of college café, 1988–1991
- Interests: drawing, hiking, carpentry, poetry, juggling

# Summary:

- Application materials have to be prepared with care.
- Keep your audience in mind.
- Academia and business have their own rules.
- It is not an exact science.