

## **Postdoc Academic Chat #3**

### **Teaching as a Postdoc – Why it Really Matter**

**5 March 2010**

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#### **1. Postdoctoral Teaching: Savvy Career Move or Distraction From Research? By Meghan Guinnee, Science, May 12, 2006\***

*"Research potential is the dominant factor in the Biology Department when we are recruiting new faculty." --Daniel Bush, chair of the Biology Department at Colorado State University*

Sigma Xi's recent [postdoc survey](#) showed that more than 40% of science postdocs have an interest in learning how to teach. Yet 64% of science postdocs report receiving no training on how to teach, and a mere 5% have attended workshops or done formal coursework on teaching skills. A number of organizations and universities are addressing this discrepancy through programs that support teaching and mentoring skills at the postdoctoral level. But is it a good idea for postdocs to take advantage of these opportunities? On its face, it seems like a no-brainer; this kind of training provides critical skills that faculty members will need to do their jobs well. But it's not that simple. Not every hiring committee is likely to value such training; when it comes to hiring, even some teaching-focused colleges put research first.

#### **Learning to Teach**

Traditional research-only postdocs may receive teaching training or locate part-time teaching positions with the assistance of a number of organizations aimed at science faculty-in-training. In the New York area, Future Science Educators (FSE), founded in 2003 by postdocs and graduate students at New York University School of Medicine, holds workshops and seminars on college teaching and provides resources for people

interested in part- or full-time teaching positions.

Through the Wisconsin Program for Scientific Teaching (WPST), postdocs can take classes on teaching, gain experience in the classroom, and mentor undergraduate researchers. The program was founded in 2002 when Jo Handelsman of the University of Wisconsin, Madison, received a Howard Hughes Medical Institute Professor award, an award given to a select few professors who are both top-notch researchers and world-class educators; the award is intended to support innovative undergraduate science teaching. Organizations such as FSE and WPST address a perceived need for teacher training at the college level. "Postdocs are generally not trained for the myriad responsibilities that characterize a faculty position—especially in teaching and mentoring," the directors of WPST wrote in a joint statement.

### **Teaching Postdocs**

The most intensive teacher training postdocs can experience is probably the "teaching postdoc," a relatively recent phenomenon in which postdocs are trained in both the laboratory and the classroom, often in approximately equal measure. The National Institutes of Health-funded Institutional Research and Academic Career Development Award (IRACDA), launched in 1998, supports postdoctoral teaching programs at a number of institutions, such as the Fellowships in Research and Science Teaching (FIRST) program at five Georgia institutions, including Emory University. Programs like FIRST offer obvious advantages for academia-bound scientists. FIRST fellows carry out research while learning to teach by means of formal courses, mentorship, and classroom experience. Postdocs like these "more closely resemble the realities of science careers, where you are expected to give up time at the bench to become supervisors, teachers, committee members, grant writers, and advisers, along with being productive scientists," says Andrea Morris, a past FIRST fellow and now a faculty member at Haverford College in Pennsylvania.

### **But Do They Work?**

Most people would assume that teacher training would be an advantage in the job search for people who are seeking jobs that involve teaching--and almost all faculty positions involve teaching. Yet postdocs who aspire to faculty jobs at top universities are often advised to focus exclusively on research. Which approach makes the most sense?

The Camille and Henry Dreyfus Foundation recently ended its Scholar/Fellow Program for Undergraduate Institutions, a mentored teaching-postdoc program, because postdocs taking part in the program were not doing as much research in the faculty positions they landed in as the foundation had expected. As Mark Cardillo, executive director of the Dreyfus Foundation, says, "The primary purpose of the Scholar/Fellow program was to prepare new faculty for a teaching and research career at ... PUIs [primarily undergraduate institutions], where significant research with undergraduates could be carried out." "Although the program did have some stars, it was eventually discontinued,

as we found an insufficient number of fellows attained positions at PUIs where they continued to do significant research with undergraduates." Many of the Dreyfus Fellows ended up in teaching-only positions, and about a third dropped out of academia altogether.

The FIRST program has fared better. By the traditional measure of postdoctoral achievement--first-author publications in high-impact journals--postdocs in the FIRST program perform as well as research-only postdocs, despite spending 25% of their time outside the lab. Of the 17 scientists who had completed the FIRST program as of 2005, all continued on as scientists and educators, finding jobs on college faculties (10 people), in further postdoc training (6), or in industry (1). But most of the ones who took faculty positions chose--or were chosen by--small, teaching-oriented colleges, not top research institutions.

Haverford's Morris entered the FIRST program because she wanted a career that emphasized both teaching and research. It was a good career move. "I found that my experience as a FIRST postdoc gave me a huge advantage during the job search and as a junior faculty member because I entered the position with research ideas, courses in place, and resources to turn to for continuous motivation and success," she says.

That postdocs who do a lot of teaching often end up working at teaching-oriented colleges is not surprising; they have, after all, demonstrated an interest in teaching by the choices they've made during training. Brinda Prasad, co-founder and vice-chair of FSE, says that "FSE members have received more job offers at both PUIs and smaller Ph.D.-granting institutes ... because of having teaching experience and being part of FSE, as it demonstrates a long-term interest in teaching. These members did not want jobs at high-end research institutes; their goal was to obtain a position that had a large teaching component."

What about postdocs who want careers at top research institutions; does teaching experience help them? Not much, probably. David Holtzclaw, a postdoc with NASA's Bioastronautics and Fundamental Space Biology Postdoctoral Research Program and a past FIRST fellow, warns that when it comes to top research institutions, "you see a lot of search advertisements saying that they want candidates with a commitment to teaching, but from my experience that is just lip service. The established science community seems to have accepted the model that you either teach or do research, but not both." On the other hand, his teaching postdoc has helped him land interviews at teaching-oriented colleges: "[PUIs] respond very positive[ly] to my FIRST experience. They love to see candidates who not only have teaching experience, publications, and pedagogical training, but also who genuinely enjoy and respect teaching."

Demonstrated research potential is what research institutions look for when they hire; teaching experience comes in second place at best. But this doesn't mean they ignore teaching entirely; some institutions look for research-related qualities that they believe demonstrate teaching potential. "Prior teaching experience is not something that makes or

breaks a hire," says Dan Rubenstein, chair of Princeton's Department of Ecology and Evolutionary Biology. Rubenstein suggests that postdocs seeking faculty positions at institutions like Princeton should "do some really exciting research and go to meetings and give plenty of talks. That is the best way to learn how to emphasize important points and organize the material to be presented clearly and succinctly."

"Research potential is the dominant factor in the Biology Department when we are recruiting new faculty," says Daniel Bush, chair of the Biology Department at Colorado State University in Fort Collins. "At the same time, the Biology Department places a high premium on teaching excellence. ... Those candidates that do an excellent job defining their research questions, results, and conclusions in a manner that all our faculty can appreciate are invariably very successful in the classroom as well." Bush cautions that scientists seeking faculty positions at top research institutions should consider teaching postdocs "only if the research productivity is competitive with those that do not include the teaching experience."

Even at teaching-focused colleges, research training is often emphasized over teaching. "Focus on research during the postdoc," suggests Paul Rablen, chair of the Department of Chemistry and Biochemistry at Swarthmore College in Pennsylvania. "In our hiring, we look for essentially the same credentials as a research university does, plus ... an indication of interest in and aptitude for teaching. If you can get some teaching experience without compromising research productivity, that is great. ... The most important thing we will look for in a postdoctoral stint, though, is a successful research experience."

But the Swarthmore model is not the only one out there; at some teaching-oriented colleges, teaching experience is almost a necessity. "Teaching experience is very important," says James Ebersole, co-chair of the Biology Department at Colorado College in Colorado Springs. "While we have no hard-and-fast rules, we tend to look for someone who has experience in planning and teaching their own courses."

Gregory Wadsworth of the Biology Department at Buffalo State College in New York concurs. "Typically, we get plenty of applications with good research experience. So it is the teaching experience that often distinguishes who gets invited for an interview." Wadsworth says that even some part-time teaching at a community college could strengthen an applicant's CV. Still, he warns candidates not to put too much time into teaching. "While teaching experience is valued," he says, "we would not hire a candidate that seems to have given up on being an active scholar."

### **Postdocs Should Be Deliberate in Their Career Choices**

Focusing on research during the postdoc is the safe choice, as all institutions, from the smallest teaching college to the largest research institution, expect beginning faculty to have a strong research background. But for those with an interest in teaching, working on teaching skills during the postdoc is probably not a bad idea, as long as it does not impact

research productivity. For many, teaching is a passion; for them, teaching during the postdoc makes sense, even if it is not the safest choice.

## **Resources**

You can learn more about the FIRST program, and other IRACDA programs, from the [FIRST Web site](#).

You can find out more about FSE from [its Web site](#) and WPST from [its Web site](#).

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## **2. Why Teach as a Graduate Student or Postdoc? By Richard Reis\***

Confirming that teaching is what you want to do.

You have observed teaching for as long as you can remember and now it is something you think you would like to do. Yet, as you may already suspect, it is one thing to observe teaching and another thing to actually do it, and do it well. Teaching assistantships (TAs) expose you to certain aspects of teaching and they are a good place to start. However, nothing compares with giving lectures that are engaging and informative, dealing with student questions on the spot, and preparing examinations and homework assignments that connect with your lectures. As a geology graduate student who had just taught an introductory earth sciences course remarked, "The idea that I was the only one responsible for what my students were getting, that my course might determine who went on to major in the earth sciences, that I was the one who determined their final grade, and that the University counted what I did just like they did a 'real' professor, was quite sobering." For all of you, including those heading for Research I and II institutions, teaching will be an important, if not central activity, during your years as a professor. Now is the time to find out if this is what you really want to do.

Helping to prepare you for your first teaching assignment as a professor.

Wanting to teach is important, but of course wanting alone is not enough. As someone once said, "those who think all you have to do to be a good teacher is to love to teach, have to believe that all you have to do to be a good surgeon is to love to cut." Indeed, the medical model is quite instructive.

Your health maintenance organization has assigned you to a new physician who is just starting his practice. You make an appointment to see him, complaining of pain in your lower right side. He confirms it is appendicitis and says he wants to operate right away. In answer to your anxious questions, he informs you this will be his first operation and that he will probably be a bit nervous. But he also tells you not to worry. He has studied the appendix extensively, and he even did some research on it while a medical student. Furthermore, he has dreamed of being a surgeon for as long as he can remember. He has observed hundreds of operations, although it has been some time since he witnessed an appendectomy. However, before completing his degree he assisted a well-known surgeon by handing him the scalpels during a heart bypass operation. But no, he has not yet performed any surgery on his own.

I suspect that under such circumstances, you would say thank you very much, head for the door (as best you could) and start shopping around for another physician.

Of course nothing like the above is actually going to happen because it is not the way surgeons are trained. All future surgeons go through an extensive period in which they work side by side with experienced surgeons. At first they just observe. Then they assist the experienced surgeon, and only then, with an experienced surgeon at their side, and usually dozens of other physicians looking on from above, they perform their first operations. It is quite some time before they are actually performing operations in which they are the only physician on the scene.

I recognize that teaching doesn't involve life or death situations as is often the case with surgery. Yet, we insist that all future professors obtain training as researchers prior to entering the profession, even though half will do little or no subsequent research, but we don't do the same with respect to teaching. Is it because we think that compared to research, teaching is "easy" and doesn't require much preparation? Or is it because we think that the cost of poor teaching, at least in the beginning, is not that great? Or is it both?

Good teaching is not easy and the cost of doing it poorly is high. By actually teaching part, or in selected cases all, of a course as a graduate student or postdoc you will be better prepared and have greater confidence when you start teaching as a professor.

But doesn't such an approach create an obvious problem? If one of the arguments for obtaining teaching experience while a graduate student or postdoc is that the students you first teach as a professor will be better off because of it, then what about the students you teach before you become a professor? Aren't they being short-changed by being your

first students? Not necessarily. We just touched on the medical training model in which the resident surgeon does his or her work under the direct supervision of an experienced physician with many other physicians observing and with plenty of feedback from everyone after the operation. A similar process takes place in the training of high school and elementary school teachers. Here, "student teachers" teach one or two classes under the direct supervision of a master teacher. The student teacher often goes over the lesson in advance with the master teacher and there is considerable review of the teaching, homework assignments, and examinations, by the master teacher.

A similar system could be used in the preparation of professors. It might involve a multi-step approach beginning with teaching assistantships, followed by guest lectures and/or the teaching of class modules in courses in which the regular professor is present. These experiences might then be followed by team teaching with an experienced professor, and/or the teaching of a special course such as one taught through a university extension, in a field in which the graduate student or postdoc has clear subject-matter expertise. Finally, under certain circumstances, and still under the mentorship of an experienced professor, an advanced graduate student or post-doc could take full responsibility for teaching an entire course.

Some schools have begun to take steps in this direction. One example is a pilot program at North Carolina State University called, "Preparing the Professoriate." In focus-group discussions it was found that doctoral students wanted, "opportunities to prepare more fully for the academic life of a professor...to learn to teach in the same way that they learn to do research in a significant and extensive advising atmosphere." [2] According to North Carolina State:

The program uses 'mentoring pairs,' each of which teams a doctoral candidate with a current or emeritus professor. Throughout an academic year, the mentors work with their graduate students ('teaching associates') to develop individualized plans for substantive teaching experiences; these range from course preparation and planning to final course evaluation. [3]

Another example is a project sponsored jointly by the Association of American Colleges and Universities and the Council of Graduate Schools. Known as Preparing Future Faculty, it has awarded 17 doctoral institutions a total of \$1.8 million from the Pew Charitable Trusts to create special teaching programs for future academics. Says, Bianca L. Bernstein, dean of the graduate college of Arizona State University, one of the participating schools; "For too long, the only skills that doctoral programs have sought to impart involve research. Too many Ph.D.'s wind up learning teaching skills on their first faculty job." The Preparing Future Faculty program seeks to change this situation through mentoring programs, and seminars, and by providing opportunities for students to explore all aspects of teaching, including developing a course from scratch. [4]

Giving you a significant leg up on your competition in your search for an academic position.

You can bet your Ph.D. that evidence of teaching experience will be looked for in your application for an academic position. You can also be sure that you will be asked about such experiences, or lack thereof, during your job talk and campus interview. In fact, having such experiences can go a long way toward determining if you are one of the three or four, out of perhaps hundreds of applicants, who even gets a job interview. Remember also that getting a job offer from a school you are interested in is only the start. You want to be able to negotiate the best possible set of initial conditions in terms of teaching, research, type of position, and available resources. To do so you need to be the most competitive, and teaching experience is one thing that can help make you this way.

We will discuss this matter in greater detail in Part II, Finding and Getting the Best Possible Academic Position. The point to note here is that in spite of statements about research expectations you see in academic advertisements, the main reason for hiring new faculty is to have them teach classes. Positions usually become available because a professor has left the department and a replacement is needed to teach his or her classes. On more rare occasions, a position opens up because the department is expanding into new areas. In both cases, the primary need is to fill teaching slots and search committees will want to know how you can help to do so.

Over the last few years there has been a shift in the statements about teaching experience in academic job announcements for assistant professors in science and engineering. A few years ago most announcements sought, "outstanding *potential* for excellence in teaching and research." Today, many more announcements seek, "*demonstrated skills* in teaching and research", and a number clearly want, "*evidence* of teaching excellence," accompanied by a statement of teaching philosophy and the presentation of a teaching portfolio. Here is an example of an advertisement for a beginning assistant professor position that appeared recently in the Chronicle of Higher Education.

Industrial/Systems Engineering: The Industrial and Systems Engineering Department (ISE) at Virginia Polytechnic Institute and State University (Virginia Tech) seeks an entry-level tenure-track person to continue advancing the program in Systems Engineering with an emphasis on Systems Life-Cycle Engineering, the Systems Engineering Process, Economic Analysis, Design, Evaluation, and Logistics Engineering. This position will be available in the Fall, and requires teaching in ISE at both the graduate and undergraduate levels. Candidates must demonstrate a potential for creative research and the capacity for significant contributions with the Systems Engineering Design Laboratory. *Demonstrated teaching excellence is expected.* Preference will be given to applicants with the ability to lecture via distance learning media, to collaborate across disciplines, to interface with systems oriented agencies and firms, and to publish. At least one degree must be in Industrial and Systems Engineering (Ph.D. preferred), with a preference for all degrees in engineering. Salary is commensurate with qualifications and experience. Applicants should send a complete resume including personal data, education, publications, research, and professional experience, together with names of at least three references to ....(italics added).  
[5]



## References

[2] Committee on Science, Engineering, and Public Policy, Reshaping the Graduate Education of Scientists and Engineers, Washington, DC: National Academy Press, 1996, pp. 3-5.

[3] Ibid., pp. 3-5, © copyright 1996 by The National Academy of Sciences, courtesy of The National Academy Press, Washington, D.C., reprinted with permission.

[4] M.C. Cage, "Learning to teach," The Chronicle of Higher Education, vol. XLII, no. 22, February 9, 1996, p. A19.

[5] The Chronicle of Higher Education, vol. XLI, no. 28, p. B12, February 10, 1995

\* Reis, Richard, Chapter 6, Teaching Experiences Prior to Becoming a Professor, in *Tomorrow's Professor: Preparing for Academic Careers in Science and Engineering*, IEEE Press, 445 Hose Lane, PO Box 1331, Piscataway, NJ 0885-1331. ©1997 The Institute of Electrical and Electronics Engineers, Inc. All rights reserved. Reprinted with permission.

### **3. Vignette - Teaching as a Postdoc by Richard Reis\***

*Obtaining teaching experience while a postdoc can be critical to your future academic success. In the following vignette we see how such experiences are helping a chemistry researcher at a large Canadian university.*

I knew there were a number of things I needed to do to make myself more attractive to academia, and obtaining teaching experience was clearly one of them.

So says Ulrike (Uli) Salzner, a postdoc in the chemistry and physics departments at Memorial University of Newfoundland (MUN), a Doctorate I university of about 18,000 students in St. John's, Newfoundland. The approach taken by Salzner is illustrative of both the Breadth-On-Top-of-Depth and Next-Stage components of our professional preparation strategy.

Salzner's undergraduate and graduate studies took place in the Federal Republic of Germany, culminating in a Ph.D. in theoretical organic chemistry (1993) from the University of Erlangen-Nuremberg. After graduation, she accepted a two-year postdoc in the chemistry department at Northern Illinois University in DeKalb, Illinois. "This position gave me the opportunity to continue my work in theoretical chemistry and to be in an environment where I could improve my English," comments Salzner. As her

appointment came to a close she applied for a number of faculty positions in the U.S. and Canada. She was on the short list at a few schools but did not receive an offer.

According to Salzner:

My foreign status may have been part of it. The fact that I had concentrated in one area of chemistry also narrowed my chances. And then there was my lack of teaching experience. In German universities Ph.D. students almost never have the opportunity to teach classes. I was able to conduct small seminars and the experience showed me I could explain things well to others. I also came to feel teaching and research were things I would like to do.

Since Salzner didn't have a faculty position, she decided to apply to other universities for a second postdoc. Now, however, she had some new objectives in mind. "While I couldn't do anything about my visa status, I realized I could do something about my research and teaching. I wanted to broaden my research horizons and at the same time obtain real classroom teaching experience," she explained.

The position at MUN offered her the opportunity to do research in an entirely new area. As Salzner puts it:

When doing a postdoc you have to be careful. It is easy enough to get a position advancing the work of your supervisor, but what does this do for your career? You want to be sure to do what is good for you as well. I needed to try another area, one that had a broader appeal within the field as a whole. The MUN offer would have me doing research in a more applied materials science area involving the development of intrinsically conducting organic polymers. I would be part of a team consisting of myself, an electro-chemist, a theoretical chemist and a physicist, and this appealed to me as well.

However, Salzner had another problem which had nothing to do with research and teaching. She needed more money. She was a single mother with a small son and the standard postdoc salary simply wasn't enough. MUN really wanted her, yet, the only way they could provide her with a higher income was if she agreed to teach a chemistry class as part of her postdoc duties. This "requirement" of course fit perfectly into her plans, and she eagerly accepted the position.

Her teaching assignment took place during the first semester she was in St. John's. Comments Salzner, "I had a freshman chemistry class with 84 students. It met four hours a week for lectures and another three hours a week for laboratory. In addition, I supervised two other laboratory classes of another professor. This assignment was basically full-time so I put my research somewhat on hold during the first four months."

Salzner's course was taken by students who had not had chemistry before or who had done poorly in such a course. They included nurses, some future science majors, and those who taking it solely to fulfill a general education requirement. In Salzner's words:

It certainly made for a challenging experience. For the most part I had to assume my students didn't know anything, not even the basic structure of the atom. I had to figure out how to bring science to them in ways they could understand while also making it interesting. I also found I had to read the textbook carefully myself in order to organize the material in a didactically useful way.

For me the most enjoyable part was when some of my students really caught on, when they started sitting in the front of the class, and when they came to see me in my office to discuss things further. I really feel I reached some of them in a significant way.

At the same time I know there were others I couldn't reach. Some stopped coming to class and eventually dropped out. Around 20% of my students failed the class, which is about average for the course, yet I still felt bad about it.

Salzner had a lot of independence in terms of what, and how she taught. As she puts it:

To a certain extent I was surprised at how much they trusted me. On the other hand they were aware of my background and knew I could give well organized talks. Also, we went out for pizza every week and I asked a lot of questions, so they knew I was putting effort into my teaching.

Salzner is now fully engaged in her research at MUN but may teach again in the second, and final year of her postdoc. She is clearly delighted at having had the opportunity to do so in her first semester, summing up her feelings this way: "Not only has it closed an important gap in my background, it has convinced me that more than ever I want to become a professor."

\* Reis, Richard, Chapter 6, Teaching Experiences Prior to Becoming a Professor, in Tomorrow's Professor: Preparing for Academic Careers in Science and Engineering, IEEE Press, 445 Hose Lane, PO Box 1331, Piscataway, NJ 0885-1331. ©1997 The Institute of Electrical and Electronics Engineers, Inc. All rights reserved. Reprinted with permission.

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