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Microbe Mentor

How Important Is a Postdoc for a Teaching Career?

Amy Cheng Vollmer, Virginia Balke, Carie Frantz, and Thomas E. Hanson

How critical is a postdoc if i want to teach at a primarily undergraduate or 2-year institution?

To bring a broad perspective to the issue, *Microbe Mentor* editor Thomas Hanson asked three microbiologists at different career stages and types of institutions for their thoughts. Dr. Amy Cheng Vollmer is a Professor of Biology at Swarthmore College, Dr. Virginia Balke is an Instructor and Project Director at Delaware Technical Community College (DTCC), and Dr. Carie Frantz is an Assistant Professor of Geochemistry and Biogeoscience at Weber State University.

Amy Cheng Vollmer's research focuses on the stress response in *Escherichia coli*, and is moving towards microbiome characterization. She is the sole microbiologist in a Biology Department, where she has served twice as Department Chair. Research experience for students is an important part of the curriculum at Swarthmore and Dr. Vollmer has hosted over 70 students in her lab to date. She has previously written about her job in the August 2000 *ASM News* (66:459–462).

She began by elaborating on what primarily undergraduate institutions (PUIs) are and are not relative to research-intensive large universities (Carnegie R1 institutions). “The metaphor I use is this: if an R1 is the winter Olympics, a PUI is the summer Olympics—you still have to be at the top of your game, it’s just a very different game.” PUIs are much more diverse in their missions, histories, their expectations of faculty members, and how effort is counted. “Some PUIs do not expect any research at all, just teaching—lots of it; other PUIs will have both teaching and research responsibilities; be wary of ones that expect research but do not support it with any funding or facilities. If you are interested in a job that has both teaching and research expectations at a top-tier PUI, then you absolutely MUST have postdoctoral experience.”

Preparation is key. “Knowing the history of

the school is part of the homework you need to do to prepare for your application and your interview.” She argues that postdoctoral experience is key for at least two reasons. First, “. . . because you will likely be the only microbiologist on your campus. Oh, there might be others who use *E. coli* as a production source for plasmids, but it is unlikely that you will be able to go down the hall and have an in-depth conversation about reducing potential or archaea or peptidoglycan!” Second, “At a top-tier PUI, you will be expected to write research proposals to fund your projects from extramural sources: NSF RUIs or NIH R15 AREA grants. You must have a very productive postdoctoral record, meaning numerous publications, with first authorship on several of them. This is an indication that you have momentum coming out of the postdoc and projects that are ‘ready to go’ in your soon-to-be-independent laboratory.” Selecting a postdoc for those that are interested in a career at a PUI is important: choosing the right lab and supervisor is a key factor. “There are some PIs who are not supportive of any career trajectory other than R1 university faculty positions. Besides being unrealistic, it shows a general lack of consideration for diversity, which—in my opinion—is a red flag about that laboratory environment.” At the close, she emphasized the importance of experience. “Teaching experience can be gained in different ways: actually teaching, filling in for a professor when they are away, organizing a colloquium series or conference (long-term planning, logistics, etc.), or attending teaching workshops. There is a vast literature on pedagogy and active learning in an area called ‘the Scholarship of Teaching and Learning (SoTL)’ that is extremely useful for someone who is considering a PUI.”

Virginia Balke has spearheaded efforts to incorporate research experiences in courses at 2-year institutions like DTCC supported in part by several NSF awards. Balke has been teaching in the DTCC Biology & Chemistry Department for over 20 years and has most recently been mentoring students on independent projects ranging from soil microbial com-

munities to the microbiome associated with white nose syndrome in bats to antibiotic production in *Streptomyces*.

She also began by emphasizing the diversity of institutions and requirements. “At some institutions, a Ph.D. in the course-related discipline is a requirement for gaining employment, where at other institutions a degree in a related field is sufficient. For example, teaching microbiology at some institutions requires a Ph.D. in microbiology and at other institutions, a Bachelor’s or Master’s degree in microbiology, biology, or biochemistry will suffice as well as for teaching a range of other courses such as anatomy and physiology.” She is in favor of postdoctoral experience and notes that the climate for research at 2-year institutions is changing.

“Having extensive research experience is a benefit, given the current national movement to incorporate undergraduate research experiences into courses at community colleges . . . The diversity of projects and experiences from graduate school and a postdoc provides more to draw from for designing research-related curriculum over a variety of courses.” One suggestion is, if your postdoc situation allows it, seek out adjunct instructor appointments to gain experience and contacts in the environment and to prepare for teaching. “Review the latest education research to be familiar with high-impact classroom practices and to write a knowledgeable philosophy of teaching statement. Also seek out advice from community college instructors about the differences in teaching at an institution where you may be completely responsible for the class including laboratory preparation and do not have TAs to assist with grading or recitation sessions.” As with Amy Vollmer’s suggestion, do your homework. “If you are applying for a job at a 2-year institution, do some investigation as to whether the college faculty and administration are heavily vested in the use of undergraduate research as a student engagement and retention tool.” She closed with a reflection on her experiences. “Teaching at a 2-year institution is rarely the primary goal one considers as a graduate student or postdoc, though for most of us, we could not imagine a more fulfilling job where we have incredible impact on nontraditional students.”

Carie Frantz is a newly minted (very newly minted—as of June 2016) Assistant Professor of Geochemistry and Biogeoscience in the Department of Geosciences at Weber State University. She is a geomicrobiologist interested in microbe-

mineral interactions and is plotting a full-scale scientific assault on the enigmatic microbialites of the Great Salt Lake.

Freshly out of her postdoc, she feels it was entirely worthwhile. “As a line item on your CV, a postdoc isn’t usually a requirement for working at a PUI or 2-year institution, but it’s time well invested. Doing a postdoc is a great way to develop new skills and expertise, expand your network, beef up your CV, and get a paycheck during the postgrad job hunt. It also demonstrates a commitment to research, which many PUIs and 2-year schools want.” Doing a postdoc also gave her a solid perspective on what she wants to do and why. “When I finished my Ph.D., I wasn’t sure what I ultimately wanted to do other than that I knew that I wanted to stay in science. After a year adventuring in the Andes where I missed science and the academic environment, I spent two years as a postdoc at the University of Washington’s Applied Physics Lab working on a really cool sea ice microbiology project. As a soft-money research institute, it is about as different an environment from a PUI as you can get. My postdoc experience made me realize that while I love research, my favorite part of my job was teaching and mentoring students.”

Her postdoc experience also allowed her to become fully independent, echoing a sentiment from Vollmer. “That independence is critical, perhaps even more so at a primarily undergraduate or 2-year institution, because chances are you won’t have peers at your institute who do anything remotely similar to what you do. It can feel awfully lonely unless you’re used to working in a vacuum (which a postdoc can seem like) and have learned to aggressively pursue collaborations and confidently sell what you do, and why it’s exciting, to everyone you meet.” In addition to getting teaching experience, she noted that getting mentoring experience as a postdoc and learning how to talk about your mentees’ research is valuable. “One thing that is easy to do during your postdoc is to mentor undergraduates. Come up with a few subprojects related to what you’re doing that a student could take on . . . Being able to talk about your students and their accomplishments in applications and interviews demonstrates that you know how to lead student-driven research.” Applicants with postdoc experience for these positions are now common and for her “. . . it was definitely (and explicitly) considered a plus in my application.”

In the end, the choice to postdoc or not should

be driven by your career goals. Therefore, defining your career destination and knowing the requirements for that position, i.e. doing your homework, is critical to determining whether a postdoc will be necessary to get there or not.

While a postdoc may not be required for every type of PUI or 2-year institution, our group, which represented the full spectrum of career stage and institution types, was unanimously positive about the benefits of doing one.

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