Not sure about a PhD? Work on a “pre-PhD”

Pursuing a PhD is not something to be taken lightly – several years of low pay, hard work, and other untold sacrifices are required to earn a doctorate. While some students may have a firm notion that a PhD is in their future, others are not so certain. For those who have attained a Master’s degree and are hesitant about seeking a PhD in ecology, we suggest taking a “pre-PhD” position. Ideally, you can gain experience and ultimately determine whether a PhD is desirable. Pre-PhD positions provide undeniable benefits to students who later pursue a PhD, making the experience less intimidating and more productive.

Skills acquired in the pre-PhD position are often relevant to a PhD; rather than following established protocol, these positions offer greater responsibility and problem solving experience, further developing scientific proficiency. Pre-PhD positions typically support primary investigators, providing opportunities to get involved in project development, hypothesis creation, experimental design, and the search for funding – precisely the skills that PhD students need to develop.

Where to find a pre-PhD position. These positions are widely advertised on the internet. Several professional societies have e-mail listservs or online job boards; pre-PhD positions are often offered through universities, museums, private industry, and state and federal governments (WebPanel 1). Titles of pre-PhD positions vary greatly, as do their inherent responsibilities and opportunities, which are not always obvious from their description; thus, during your job search, it is imperative to ask insightful questions to determine whether a particular position provides the desired skills. As per the US Federal Government GS-level system, many pre-PhD jobs are listed at GS–7 to GS–9 for those holding a Master’s degree. These positions are often short in duration, providing a “break” between degrees, and come with a higher monthly paycheck and weekends off – benefits that can be hard to find in graduate school.

Knowledge gained and new fields explored. One of the most valuable assets gained from a pre-PhD experience is a broad knowledge base. New yet related fields of study may be learned or a completely different field can be added to your existing skill set. DRC, for example, began his pre-PhD as an entomologist, but left with a solid knowledge of tree physiology and nutrient cycling. Moreover, many universities require that students take coursework in areas outside of their sphere of interest, specifically to broaden their training. Previous experience in field research – which may be provided by such positions – is also beneficial to students entering PhD programs (Walker 2008).

Skills gained and/or enhanced. Pre-PhD opportunities may also offer training in new, cutting-edge techniques; for instance, CRH learned to isolate and optimize microsatellite loci while working in a genetics laboratory, and will apply this technique in his dissertation research. Many skills acquired through professional employment would be hard to gain while juggling the demands of graduate school, but are nevertheless critical if one wants to be a well-rounded research scientist. For example, many pre-PhD positions involve personnel management, which will help in laboratory management later on, yet such experience is not specifically a part of normal academic training. Some graduate students gain limited experience by supervising undergraduates in lab settings, but this is insufficient experience for running a large laboratory of students and scientists with various research and mentoring needs (budgets, supplies, permits, organizational activities, etc). There are also opportunities for formal training and workshops – ranging from pesticide application to software use – that may be unavailable to those in academia. For instance, during their respective pre-PhDs, DPA attended an intensive, week-long course on the use of SAS statistical software for mixed-model analysis, while CRH learned ecological measurement techniques and acquired plant identification skills while associated with a Long Term Ecological Research (LTER) program. Skills developed during a pre-PhD can enhance your curriculum vitae and demonstrate competency in research, so that you stand out among prospective PhD applicants. Some pre-PhD positions even provide opportunities for conducting independent projects, preparing grants, and publishing original research. Writing and publishing manuscripts before starting a PhD program will lead to a greater familiarity with the literature, as well as improving your ability to see contributions in the context of the “big picture” – a task many new doctoral students struggle with.

Networking. Networking is a crucial part of higher education and is vital for successful, collaborative research. Opportunities to attend meetings, field days, or site visits may be possible in many pre-PhD positions. Indeed, those
who have held such positions have the benefit of associating with a wide range of scientists – some of whom may become academic mentors, research collaborators, or funding contacts. For instance, as a result of attending meetings and presenting research, DRC and CRH met their future PhD advisors and DRC developed most of his research proposal before enrolling in a PhD program. CRH was able to forge relationships with many well-known ecologists during his pre-PhD position as an LTER Science Assistant.

We encourage those who are uncertain about pursuing a PhD to consider a pre-PhD position; after all, discovering that obtaining a doctorate is not the proper course of action for you is just as important as determining that it is the right thing to do. Working professionally before re-entering graduate school can also encourage scientific and personal growth. For example, an in-depth knowledge of your field, more focused ideas on what you want from a PhD program, enhanced communication skills, networking, and personnel management are widely recognized as being essential components of a successful PhD student (Fischer and Zigmond 1998; Golde 1998). Experience and training prepare scientists to practice their craft independently and to develop their own perspective – such “self-authorship” (Magolda 1998) is vital to the development of successful scientists. We urge both scientists-in-training and the institutions training them to consider the important role of a pre-PhD in the career development of scientists.

Faculty response

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Research positions in Federal agencies, such as the US Forest Service (USFS), can be quite different from those in academia. Federal agencies often conduct research with scientists and supporting technical staff rather than faculty and graduate students. Although permanent technical staff can be invaluable in the USFS programs, because of their knowledge and procedural experience, it can be difficult to hire permanent technicians for various reasons – and so temporary, or term, technicians have become more common.

Temporary technician positions are considered to be training opportunities, but unlike academic institutions, Federal agencies do not grant degrees or require a thesis. Consequently, it is difficult to provide temporary technicians with a certificate of accomplishment similar to a diploma, even though they may have put in equivalent effort. Skills needed to accomplish the work are taught by the scientist, and the technician gains at least the same level of expertise in the topic as do graduate students, yet there is no recognition of accomplishment other than time spent in the position.

Publishing may be a way to provide term technicians with a tangible accomplishment. In recent years, the graduate thesis has changed from a comprehensive narrative to one or more manuscripts submitted for publication. The changed thesis form is related to the faculty’s need to publish. Federal scientists have the same need, so it seems logical to have similar expectations for temporary agency technicians and thereby equate the accomplishments of technicians with those of graduate students.

That was the approach I took as a USFS researcher. I successively hired two term technicians (DRC and DPA). Both had strong research backgrounds, gained from Master’s programs, and they recognized a mutual interest to publish. Both quickly learned to cajole various bureaucrats, scientists, graduate students, and fellow technicians – inside and outside the USFS – to help us meet research objectives. Such skills are not often needed in academic environments, but are very much a requirement in agency programs. Among the three of us, we published over 20 peer-reviewed papers in 8 years, with these pre-PhDs as senior authors on two-thirds of them. When their respective terms were over, there was no mortarboard procession, but their publishing record is clear to see. So we might conclude from this example that the pre-PhD model can be effective at furthering scientific careers. Of course, the sample size is small, and I was lucky to find such accomplished and ambitious researchers, but they also had considerable freedom to carve out projects that matched their interests and skills.

Providing pre-PhD opportunities does not require large changes in programs or existing term positions. There is little risk involved, when it is clear that there is an expectation for manuscript preparation and submission. The rewards to the scientist’s program include more productive and motivated employees, and a more diverse research agenda.

Given the available talent and interest, including pre-PhD positions within Federal programs seems a logical addition to the research enterprise.

References
### Fresh Perspectives – Supplemental information

**WebPanel 1. Selection of websites offering pre-PhD jobs, organizations with listservs, and employers that offer pre-PhD positions**

These lists are not all-inclusive, but are provided as reference and starting points for those looking for their own pre-PhD opportunities.

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<th>Websites</th>
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<td>Ecological Society of America</td>
<td>US Department of Agriculture (ARS, Forest Service)</td>
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