



M E E T I N G S

Meeting Calendar



Ninth Clonal Plant Workshop, Leuven, Belgium

The Ninth Clonal Plant Workshop, “Clonal plants: beyond the patterns—ecological and evolutionary dynamics of asexual reproduction,” will be held at the University of Leuven, Belgium, 1–4 July 2009.



The workshop aims to bring together ecologists and evolutionary biologists from around the world who have specifically studied the ecological and evolutionary dynamics of clonal plant species. These workshops have a long tradition going back to 1982, when the first Clonal Plant Workshop was organized at Yale University, and will provide a unique opportunity to discuss the dynamic nature of clonal plants in a pleasant environment.

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Meeting Reviews

Coordinating a Northeast Regional Phenology Network

The inaugural workshop of the Northeast Regional Phenology Network was organized by Ellen Denny and Brenden McNeil, and held in Durham, New Hampshire, 8–9 November 2007. The workshop was made possible with primary funding support from the Northeastern States Research Cooperative and additional support from an NSF-RCN grant to the Northeastern Ecosystem Research Cooperative.

Phenology, defined as the study of the timing of seasonally recurring biological events, is increasingly recognized as a vital aspect of understanding how organisms and their associated ecosystems respond to climatic variability. Similar to studies conducted elsewhere, recent studies in forests of the northeastern United States and adjacent Canada (i.e., “the Northeast region”) indicate that recent warming trends have resulted in an extension of the growing season (earlier springs and later autumns), a phenological impact with important ecological, hydrological, and biophysical ramifications. However, related studies from the Northeast region highlight that there is considerable, and still poorly understood, spatial variability in the phenology indicated by ground observations and remote sensing, and further questions remain about the correspondence between the spring phenology observed on the ground and the green-up signal seen from space. Thus, identifying the patterns and drivers of spatial and temporal variability in phenology is a prerequisite to understanding the consequences of climatic change in the Northeast region. Following the models of cooperative phenology observation networks formed elsewhere (e.g., in Europe, as well as the newly established USA National Phenology Network, USA-NPN), the Northeast Regional Phenology Network (NE-RPN) was recently formed to develop a cooperative effort that would (1) coordinate phenological monitoring by researchers and citizen scientists across the Northeast, (2) develop and evaluate common protocols specific to the flora (and eventually the fauna) of the region, (3) facilitate data sharing and regional phenological syntheses, and (4) contribute to the efforts of USA-NPN.

In addition to attendance by key representatives of the USA-NPN, the workshop had a capacity attendance (34 participants) from a very diverse cross-section of citizen science and research groups drawn from across the Northeast. The enthusiastic participation of all the attendees provided a valuable contribution toward the broader goal, shared by the USA-NPN, of working together to develop a spatially extensive, multitaxa, and multiscale phenological observation data resource that will support research, management, and policy objectives.

A series of introductory presentations at the workshop highlighted the observation that phenology is more than an indicator of climatic variation; it affects biophysical phenomena, such as ecosystem–atmosphere exchanges (e.g., surface energy balance, transpiration and photosynthesis, all of which have feedbacks to the climate system), as well as ecological phenomena (e.g., nutrient cycling,

species distributions, and trophic interactions such as herbivore–host synchrony). The remainder of the presentations provided details of some existing phenology monitoring protocols used in the region, with an emphasis on the phenology of herbaceous and woody species characteristic of the region’s deciduous forests. Four distinct approaches were described: (1) long-term field observations at well-studied research sites (e.g., Hubbard Brook and Harvard Forest LTERs), (2) citizen-science-based protocols (e.g., volunteer programs coordinated by the Appalachian Mountain Club and Cornell’s Project BudBreak), (3) “near” remote sensing, including upward-looking digital photography, tower-mounted webcams, and radiometric instruments, and (4) various algorithms for extracting phenology signals from satellite remote sensing platforms (e.g., MODIS, Landsat).

The presentations of existing protocols in the region laid an excellent foundation for two breakout group discussions that concluded the first day of the workshop. One breakout group identified and discussed four postulates for successful integration of citizen science efforts in a regional phenological monitoring program: (1) ensuring scientific utility of the collected data through quality control and self-evaluation of the accuracy of species identification, (2) focusing on engaging amateur botanists (e.g., master gardeners) but also encouraging participation from the broadest possible audience (e.g., K–12 students, humorously referred to as “kinder-gardeners”), (3) providing guidance and support (e.g., defining protocols and species lists, supporting web site and database development, and offering training materials such as an online library of photographs illustrating different phenophases), and (4) providing resources that keep citizen-scientists involved year after year (e.g., newsletters or annual reports with observation summaries, online discussion groups, e-mail lists, and annual meetings). The group also outlined recommendations for the specific responsibilities of local citizen science groups, and of the regional and national networks, in meeting these objectives. These discussions, which effectively defined the scope of citizen science efforts for this cooperative network, were viewed by many as a highlight of the workshop because of the excellent opportunities to educate the public about phenology, climate change, and ecology, and the huge amount of data and support a citizen science effort can offer.

The second breakout group focused on approaches for integrating ground observations with remote sensing. The group concluded that the development of empirical “transfer-functions” between ground-based and satellite-based phenology measurements could be facilitated if ground-based protocols met several criteria: (1) they provide a temporally continuous (rather than event-based) measure of leaf expansion and senescence, (2) they are representative of the species composition (which needs to be reported) of the canopy at the pixel scale, and (3) they report ancillary data, particularly regarding snow cover, which will be valuable for improving algorithms.

The workshop continued on day two with a second set of breakout groups. The first of these compiled a list of target plant species for the region, and discussed a tiered (by observer skill level) protocol system for ground observations that would capture the overall state of the development of the deciduous forest canopy (to be linked to remote sensing data), and would be compatible with existing long-term phenological data sets in the region and other national and international protocols. The regional protocols are currently being developed in conjunction with those of the USA-NPN with the goal of having a prototype version to be tested across the region in the spring of 2008. The second breakout group discussed a range of topics, including: (1) a data-sharing and “fair use” policy (to be modeled after

AmeriFlux), (2) an outline of content for the NE-RPN web page <www.nerpn.org>, and (3) plans for a regional synthesis (coordinated by Brenden McNeil) that could draw on existing long-term data sets to explore cross-taxa synchronies and patterns of spatial variability.

Several challenges and opportunities lie ahead for the NE-RPN. These include: (1) reconciling existing ground protocols, (2) ensuring and testing interoperability among ground, citizen-science, “near” remote sensing, and satellite remote sensing observations, (3) meeting the four postulates for successful citizen science participation, (4) attracting new participants and ensuring continued participation of all existing participants, (5) working with USA-NPN to design a cyberinfrastructure that meets the specific needs for data submission by both researchers and citizen scientists, and also supports data distribution and flow to analysis and synthesis efforts at regional and national scales, and (6) obtaining additional funding to support a network coordinator as well as future meetings and synthesis activities. As the NE-RPN moves forward toward its objectives, anyone who is interested in participating is urged to contact the group organizers, Ellen Denny and Brenden McNeil. (Brenden E. McNeil is the corresponding author.)

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Global Soil Change Motivates Workshop on Earth's Critical Zone

This Global Soil Change Workshop, organized by Daniel deB. Richter, was held in December, 2007, at the Nicholas School of the Environment, Duke University, Durham, and the North Carolina Center for Environmental Farming Systems, North Carolina State University, near Goldsboro, North Carolina. The workshop was sponsored by the National Science Foundation, U.S. Department of Agriculture, and Duke University.

Some of society's most important scientific questions have little to do with space travel, human disease, theoretical physics, or new math. Some of the most important scientific questions today are about the future of Earth's soil.

This workshop formally established a global network of long-term soil-research studies, several of which have been in continuous operation since the 19th century. Workshop participants studied soil and ecosystem change in Africa, Asia, Australia, Europe, and the Americas.

The workshop featured the proposition that soil studies spanning decades are key to answering some of the most significant questions faced by humanity today:

- 1) Can soils more than double food production in the next few decades?
- 2) How are different soils interacting with the global carbon cycle and climate?
- 3) How can land management minimize its adverse effects on the environment, and improve soil's processing of carbon, nutrients, wastes, toxics, and water?

Comprehensive research from long-term experiments provides direct observations of soil processes and change that are evident only after years and decades. The data from these decadal experiments are invaluable for improving the quality of human life and that of the environment.

An advanced-format web site supports the newly established network of long-term soils research and connects more than 150 long-term studies with researchers, teachers, and students from around the world. The web site originated in a graduate class at Duke University, and it encourages scientists to work together more closely (<http://ltse.env.duke.edu>) Workshop participants are enthusiastic about the future of cross-site research promised by this new networking. The organizers encourage anyone interested in joining this network to visit the web site and register themselves and their long-term studies with the network.

At the workshop, new results were presented from long-term studies of soil fertility, chemical contamination, crop production increases and declines, greenhouse gas emissions, and water quality, all demonstrating and quantifying soils' susceptibility to change.

Dr. David Powlson of Rothamsted Research, England, and a pioneer in research that uses data from multiple long-term soil experiments, challenged participants by saying that there is great short-term

potential for cross-site studies to advance the science of sustainability. Dr. Henry Janzen of the long-running Lethbridge field studies in southern Alberta, Canada, vigorously argued that new long-term studies are needed to meet the growing economic and environmental demands being placed on soils now and in the next few decades.

Participants are particularly concerned about crop declines observed in several long-term experiments. Research on intensively managed rice (an agro-ecosystem that currently feeds more than two billion people) indicates yield declines in several locations, declines attributed to a variety of causes, some of which involve unexpected changes in the soil. More recent studies suggest that adverse climatic changes such as an increase in night temperature could be responsible for declining rice and wheat yields.

Participants also have grave concerns about the poor funding support for long-term soil studies. Not a few long-term studies operate without stable institutional support, and remain productive only through the persistence of individual scientists. Several highly productive long-term experiments have even been abandoned in recent years, including important studies in Africa and South America.

Coincident with the Duke workshop on long-term soil studies, the 6 December issue of the journal *Nature* featured papers emphasizing the importance of long-running measurements of the Earth's environment. In a statement quoted several times during the Soil Change Workshop, the *Nature* editorial proclaimed, "Data sets encapsulating the behavior of the Earth system are one of the greatest technological achievements of our age—and one of the most deserving of future investment."

According to workshop organizer Dr. Daniel Richter, a professor of soils and ecology at Duke University, "Long-term records are key to predicting the weather, air pollution, river floods, and wildlife populations. Similarly, long-term soil observatories need explicit and much greater support not only to improve our rapidly intensifying management of land and water, but also to better manage environmental change."

The workshop concluded that in the short term, researchers and students should make the most of results from on-going long-term experiments. In the words of Dr. Ishaku Amapu, a professor of soil fertility from northern Nigeria who studies a continuous cropping experiment that began in 1950, "We need to make our long-term experiments work harder."

Such long-term research requires long-range planning, and workshop organizers invite interested scientists, students, and the public to join this international effort. Organizers have funding support from the National Science Foundation's (USA) Research Coordination Network Program and Critical Zone Exploratory Network, the United States Department of Agriculture, and Duke University, for five yearly meetings.

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A Young Scientist's Guide To Gainful Employment: Recent Graduates' Experiences And Successful Strategies

This paper is based on a workshop, "Job Hunting Experiences Of Recent Graduates," held at the 2007 meeting of the U.S. Chapter of the International Association for Landscape Ecology, Tucson, Arizona.

Securing a job after completing a graduate degree is among a graduate student's most rewarding (and most stressful) experiences. The job hunting process, from submitting an application to signing a contract, varies greatly among individuals. It is difficult for any applicant to anticipate what will be sought and expected from him or her during the process. A panel of seven newly minted ecologists and environmental scientists was assembled for a half-day workshop titled, "Job Hunting Experiences Of Recent Graduates," at the 2007 U.S. Chapter of the International Association for Landscape Ecology meeting in Tucson, Arizona. All panel members (i.e., authors of this paper) have completed their graduate education since 2002, and occupy a variety of positions as scientists. Panelists prepared responses to questions focusing on their job hunting experiences, comparisons between perceived and actual job responsibilities, and advice for graduate students entering the job market. The topics that emerged from the workshop discussion are broadly applicable across ecological disciplines.

Although other publications have provided advice to young scientists, many focus on engineering, medicine, or biotechnical aspects of biology, provide advice for succeeding in a new position, or are written by senior-level researchers or by professional journalists (e.g., Holden 1999, Wickware 2000, Gwynne 2005). These publications have broad appeal and valuable insight from senior scientists supervising the hiring process. Likewise, workshop panels offering career advice are common at scientific meetings (e.g., the Ecological Society of America Annual Meeting). However, the insight and perspective of recent graduates who currently are or have recently been through the process rarely reach a broad audience of their peers. Our goal was to highlight and summarize actual job search and hiring experiences of recent graduates and to provide personal and easily accessible advice. We believe that this advice is directly applicable to emerging graduate-level scientists within the ecological sciences, as well as to students early in their graduate careers who are developing long-term career plans. In this paper, we reflect on topics of interest raised by the workshop participants, and address items that we experienced as important. We have organized this paper into four areas:

- 1) Self promotion. *What can I do prior to and during the job hunt?*
- 2) Personal considerations. *How will both my professional and personal lives affect which jobs I should apply for?*
- 3) The application process. *What should I expect when applying?*
- 4) Keeping it all in perspective. *What if my application is rejected?*

Self-promotion

Advocating for students is an important mentor duty. However, self-promotion is a necessary and constant process that can begin early in your graduate career. Here we highlight: publications, activities beyond research, the “elevator speech,” getting your name out there, and connections.

Publications

Regardless of whether you are pursuing a M.S. or Ph.D, your advisor probably will encourage you to publish your research results. If you envision that publications will be important in your career path, start early, be patient, and be diligent, because building a publication record takes time. Publications are a quantitative measure of success, and beginning the publishing process early serves many functions. Having publications prior to completing your degree helps to secure interviews, illustrates your ability to communicate, displays continuous productivity to potential employers, and helps develop a professional reputation (and, as a side note, makes the defense go much easier). One strategy is to submit manuscripts for review prior to your defense or graduation, because once you depart from your graduate institution, infrequent contact with your advisor and committee will make it more difficult for you to capture their attention and receive timely feedback. Thus, prompt manuscript generation boosts your job prospects and keeps your graduate committee engaged with your research ideas.

Beyond research

Although your research is a top priority, take a holistic view toward your education. Panel members unanimously remarked about how seemingly tangential experiences benefited them during job searches. For example, a one-year outreach position related to watershed awareness created an opportunity for a fellowship and then a permanent position with the government for one panelist. Experience working on prescribed fire crews strengthened another panelist’s application for fire ecology academic positions. Throughout your graduate career, be cognizant of “desired experience” listed on job advertisements, seek to gain experience in such areas before you begin your job search, and become acquainted with individual responsibilities associated with a particular position [Box 1]. This strategy will improve your resume or curriculum vitae, provide you with personal contacts, teach you what you like or do not like about different job activities, and help to alleviate preconceived expectations about particular institutions or sectors. Regardless of how you expand your experience, it will allow you (and those who will write your recommendation letters) to gauge your ability to manage your time across multiple responsibilities. As long as you continue to progress in your degree program, extracurricular activities will broaden your qualifications and experiences for interview questions such as, “Describe a time when you demonstrated initiative?”

The “elevator speech”: “So what do you do?”

Although it is an innocuous question, this little tidbit of self-promotion can be quite nerve racking if it is not well prepared. An “elevator speech” is a memorized short description about “what you do” and is invaluable (see also Klaus 2003). With several versions of an elevator speech prepared, you always are ready to introduce yourself briefly and confidently to several potential audiences, such as guest seminar speakers, or someone you meet at a conference. One panelist recently used their elevator speech to make an unanticipated connection with a potential collaborator, while merely accompanying their

Box 1. Suggestions for career-related extramural activities (beyond research)

If you are interested in a career at an academic institution:

- Become familiar with research, teaching, and service components of academic positions, and determine whether you can balance all three simultaneously
- Besides publishing, apply for grants and fellowships to prepare for building an externally funded research program
- Attend a conference or workshop focused explicitly on collegiate teaching or pedagogy
- Develop a diverse teaching portfolio as an instructor, coinstructor, or teaching assistant for: courses, seminars, laboratories, tutoring programs, outreach exercises, local community colleges, and secondary school programs
- For service experience, volunteer with a departmental graduate student organization, local nonprofit groups, or government agencies. Another valuable service opportunity is to serve as a graduate representative on a faculty-level committee (e.g., faculty search committee)

If you are interested in a career with a government, nonprofit, or private institution:

- Apply for internship opportunities to gain an insider's perspective on elements such as the culture of the organization
- Inquire about job responsibilities and ability to advance within the institution
- Join a professional organization and become certified in your profession if your field of study has that option (e.g., The Wildlife Society's Certified Wildlife Biologist program)

partner, who was giving a last-minute seminar presentation. Be ready to discuss your skills and areas of expertise as they apply to the person or persons asking the question, and express your ability to work within both basic and applied contexts (described during the workshop as your “market niche”). Perhaps even more important, having a captivating elevator speech means that YOU know who you are, what you have to offer, and what makes you unique.

Getting your name out there

Meet and work with other scientists. Regularly present your research at professional conferences. A good oral or poster presentation can go a long way toward making you recognizable in the field. Introducing yourself to someone whom you might want to work with can benefit you regardless of your graduate or career aspirations. One panel member was offered a postdoc position as a result of a dialogue that began as an informal hallway conversation at a conference (a good use of that elevator

speech!). Professional societies seek volunteers to assist with organizational tasks and planning. For example, many professional societies have a graduate student representative who organizes student activities. Leading a workshop or symposium at a conference will result in interaction with conference organizers who are often well-established individuals within a discipline. Contribute to relevant blogs (e.g., the Ecological Society of America's "News and Views") or participate in online discussions (but do not overdo it—you do not want to be the person whose e-mails are deleted at the sight of his/her name). Additionally, remain thoughtful and professional in all communications (e.g., check spelling). The opportunity to form a professional network is often overlooked by graduate students.

Connections: it's not just what you know, but who you know

Anything you can do to earn positive name recognition for yourself is beneficial. Developing relationships with your advisor and committee begins at the very onset of graduate school. Good relationships with senior scientists other than your advisor are particularly important if you unfortunately have a strained relationship with your advisor. Connections alone will not get you a job, but might help keep you in the running. As a student, take advantage of the opportunity to form social relationships with students and faculty across many disciplines. For example, your research interest might be mammalogy, but your daily interactions may include fish physiologists and environmental sociologists. By taking casual interest in the research of others, you will become familiar with the names of their colleagues and associates. You never know whom you might meet during the job application process, and making a common connection can be a great conversation starter, and perhaps initiate the potential for future collaboration. Regardless of the position sought, many of the people you meet during an interview will have different disciplinary backgrounds; the situation will require you to have the ability to talk with them about their (and your) work.

Personal considerations

Career decisions often involve personal factors. We highlight topics with which the panel has had the most experience, including: whether or not to pursue a Ph.D or postdoc, geographic preference, balancing professional and personal life, and partner accommodations.

To do a Ph.D or not do a Ph.D

There is a multitude of choices for graduate students as they contemplate their career track. Some Master's students may enjoy research and want to pursue a Ph.D. Other students seek immediate entrance to the professional workforce. Additionally, some Master's students may contemplate pursuit of a Ph.D for reasons including prestige, pressure from professors or family members, comfort within the academic environment (as opposed to the unknown of the "outside world"), or job descriptions that include the phrase, "Master's degree required, Ph.D preferred." The Ph.D process is long and tedious, with inherent expectations of a successful research project, competency in focal areas (typically evaluated via grueling candidacy exams), and published research results. The decision to pursue a Ph.D requires careful consideration on both professional and personal levels, and should be based on personal desire to contribute to a scientific discipline, not as a substitute for dealing with a frustrating job search. If you are undecided about whether to pursue a Ph.D, keep in mind that you can always return to your studies.

Having some “outside world” knowledge can enhance your academic experience both mentally and intellectually. For example, one panelist spent 2 years working in the corporate sector before pursuing a M.S. and Ph.D, which provided a unique perspective for pursuing environmental research.

To do a postdoc or not do a postdoc

Job candidate lists may include individuals across a spectrum of experience ranging from current graduate students to associate professors. These individuals are your competitors, and likely are applying for many of the same jobs as you are. Similarly, job descriptions often include a phrase such as, “postdoctoral experience preferred.” Thus, a postdoc can offer an opportunity to enhance your competitive edge, and we highly recommend it. Advantages of pursuing a postdoc include providing time to acquire new skills, diversify your publication record, fill gaps in your curriculum vitae, and expand your collegial network. A postdoc also may allow for flexibility not available in a permanent position. However, disadvantages of a postdoc are that it may not include the full suite of responsibilities found in a permanent position, it is typically a short-term appointment that may require an additional relocation, may delay feelings of permanency in a community or institution, and is often subject to relationships with and expectations of supervising faculty. Regardless, do not let the lack of postdoc experience (or any perceived weakness of your application) keep you from applying for your “dream job.” If your background suits the job well, many employers will value your skills and expertise more than worrying about your nascent career. Nevertheless, an employee hired straight out of a Ph.D program likely has fewer publications and, especially for academic positions, may have to work much harder to achieve promotion. Furthermore, if you feel burned out after a Ph.D, going straight into a high-pressure job (e.g., tenure-track assistant professor) does not leave you much time to recover mentally and emotionally, get your life back in balance, and to catch up on things you may have neglected in order to graduate.

Geographic preference

Most graduates have a mental list of both “ideal” and “unacceptable” geographic locations. Take time to think about how you define these extremes, and the importance of geographic location relative to other considerations. Any position likely will require trade-offs. Your first job may not be in an “ideal” location, but may pave the way for a future relocation. You may find that compromising on your “ideal” location leads you to a position that meets your desired standards of a welcoming community and professional opportunities. Remember that nothing has to be permanent. However, there is no guarantee that a position will materialize in an “ideal” location, but continual employment is important for both professional and personal reasons.

Balancing professional and personal life

Preserving a balance between professional and personal life can be tenuous and complex, often involving continuous emotional effort. The workshop panelists unanimously agree that many stresses encountered are unanticipated and can change over time. For example, one panelist did not anticipate that a cross-country move would result in a strained relationship with an immediate family member. Because of family considerations, a very limited geographic scope narrowed the opportunities and added additional stress for another panelist. However, the geographic limitation ultimately helped land a job,

because other applicants would relocate if a more preferred opportunity arose elsewhere. Even seemingly small differences between graduate school and a regular job may result in unforeseen complications, as schedule flexibility may decrease in a post-graduate position. Clear communication with your partner and/or family about potential job responsibilities and locations is critical. Likewise, be sure to gauge the expectations of your prospective employer and colleagues to determine if they match your own. As it will be up to you to manage your time, it is extremely important to evaluate honestly how you can be professionally productive while maximizing your own quality of life expectations AND meeting others' expectations of your time [Box 2] (see also Rosser 2004, Coughlin et al. 2005). While concentrating on the stressful "here and now," it is critical to keep a long-term view about what is, and will be, important to you over time.

Box 2. Potential areas of conflict between professional and personal life to consider:

- Differing expectations regarding timing and duration of vacations and holidays
- Differing expectations regarding reasonable cause for sick leave
- Institutional sensitivity and concerns surrounding requests for family leave
- Differing flexibility to telecommute, keep odd hours, or allow children in the workplace
- Pressure from colleagues or family to conform to incompatible schedule or values
- Change in financial circumstances may affect relationships
- Difference in experiences (e.g., lack of suitable and satisfying work for you or your partner)
- Geographic distance from family
- How professional responsibilities might affect relationships with a partner or family members
- If professional responsibilities might affect ability to raise children, if desired
- If professional responsibilities affect quality of life (e.g., amount of "free" time)

Partner accommodations

As dual-career couples become more common, some (but not all) employers have developed partner accommodation policies; panelists described a very broad range of institutional willingness to make such accommodations. It is important to note that there is no guarantee that an accommodation can or will be made; you or your partner may have to be creative in generating opportunities. Likewise, proactive communication with nonacademic partners about the trials and tribulations of the academic job search (i.e., relocation may be necessary) is crucial. When considering jobs, seek the situation that is best for both of you over the long term and realize that one person might have to settle for a nonoptimal position, at least temporarily. We suggest that, if appropriate, any discussion of partner accommodation is best left until after an offer is made to you or your partner. Once an offer is made, ask the hiring institution to assist you in finding an accommodation. Your new co-workers may have connections to other departments and/or employers in the area, and perhaps may recently have navigated a similar situation. For example, the hiring institution of one panelist circulated the partner's curriculum vitae to other local research institutions, which resulted in *two* job offers to the partner. Most institutions know that happy employees are less likely to leave, and thus they have a vested interest in trying to meet your request.

The application process

The application process can be extremely time-consuming, stressful, and exhausting. As a group, the authors have filled out a plethora of applications. Here are some of our tips for making the application process go more smoothly.

Learn about the process before applying

While still a student or postdoc, become familiar with typical application requirements. For example, most academic position applications require a moderately detailed cover letter, a curriculum vitae, and statements of research interests and teaching philosophy. These documents shape the recipient's first impression of you, and it is often difficult to determine precisely what will catch a search committee's attention. Before you begin the job hunt, take time to draft templates of anticipated documents, ask others to review and critique them, and then customize your responses carefully for each application. To gain insight into an actual application process, become involved in your academic department's search process by attending candidate seminars and scheduled meetings with graduate students, and express interest in serving as a student representative on a search committee (see also Darley et al. 2004, Vicker and Royer 2006). On the other hand, the application period for government jobs may be short. Be sure to use the appropriate formats for your resume or curriculum vitae, have copies of all supporting documentation ready, and familiarize yourself with the online application system beforehand (see also Troutman et al. 2002). Also recognize that sometimes (e.g., federal government) candidates may be selected by human resources staff using keyword identifiers, and prepare your application accordingly. With these preparations, much of the work will be completed already when the time comes to apply for a position.

The phone interview

Although relatively short, phone interviews are common and can determine whether a candidate receives an on-site interview. During a phone interview, you may not get to say everything that you want to say, cannot use facial or body language to convey a message, and it is difficult to gauge whether you are making a positive impression or determine if the interview went well. However, there are ways to prepare for phone interviews. Anticipate what questions you might be asked (some are easy to predict; see also Box 4) and prepare brief answers that include anecdotes demonstrating the qualities you wish to convey to the interviewers. To help you prepare answers, you might ask your advisor to give you a mock interview. Have the interviewers call you at a location where disturbances will be minimal. For example, if you work in a cubicle or lab setting, arrange to be called at home. Be aware of time zone differences. Before the interview, ask for a list of the people whom you will be talking to, so that you may write down their names. At a minimum, familiarize yourself with the research interests of your interviewers and consider how your own research and skills fit within the institution or department that you hope to join. Make notes of who asked you what questions. Keep a copy of your application in front of you, as you may be asked to expand on something that you wrote in it. Prepare a few questions of your own for the interviewers to show interest in the position, and keep that "elevator speech" handy! Do not hesitate to ask the interviewers if you have completely addressed one question before moving on to the next in order to avoid potential misunderstandings. On the bright side, there is no need to fret over what to wear, and you can keep several "cheat sheets" handy if your memory tends to slip under pressure.

On-site interviews

The hardest part about on-site interviews is being “on” the whole time. For example, an academic job interview can last up to 3 days. Similarly, the selection and interview process for government positions can last from a few consecutive days to multiple one-day sessions over several months (e.g., see the U.S. Environmental Protection Agency Intern Program <<http://www.epa.gov/ohr/eip.html>> or Presidential Management Fellow Program <<https://www.pmf.opm.gov/>>). During an interview, it is difficult to know what to say, when to say it, and to whom to say it. You can only talk so much about your research interests, career plans, and teaching philosophy, so don’t hesitate to pursue discussion of less formal topics, such as about the local community or area. Because being “on” for so long can be a challenge, there are several things that you can do to prepare for your interview [Box 3]. First, familiarize yourself with the institution and the people within it. This will convey that you have some knowledge about the interviewers and the institution and demonstrate your enthusiasm for the position. From the information that you collect, prepare a list of questions to ask interviewers. Likewise, anticipate questions that you might be asked, and prepare responses. Second, thoroughly rehearse your seminar(s) (i.e., “job talk” and perhaps teaching demonstration if applicable), as the purpose of the presentation(s) is to demonstrate your ability to communicate and conduct research, how you “fit” into the research program of the department, and where your research program is headed. Third, have a plan. Think of yourself as a potential long-term asset to and investment by an institution. Have a general idea about where your career is heading, and prepare responses to questions such as, “Who would you like to collaborate with?” [Box 4].

Keeping it all in perspective

Applying for jobs is mentally and emotionally draining. There are obviously factors such as publications and teaching experience that affect an individual’s competitiveness. Despite these factors, your success as an applicant also depends on who else applies for the same position, the search committee itself, and perhaps who knows you or your advisor. Here we provide some advice for extraneous situations that are completely beyond an applicant’s control.

The “Superstar” factor

We all know them: graduate students who leave a Ph.D program with 10 completed publications, including a paper in *Science* that resulted from a seemingly small side project. It’s OK to admit that 99.9% of us are not “Superstars,” but we all will compete against them for jobs. A productive tactful approach is to cheer heartily for them to get a job as quickly as possible, for their quick employment leaves you with an unencumbered shot at the next job. As the landscape shifts, you may be viewed as the next “Superstar”! Regardless, we all have individual qualities that make us good at what we do, or we would not be completing an advanced degree. Think about what makes your research unique compared to your peers, and what qualities will make you a good colleague. Then, use those traits to your advantage.

Fit

An applicant’s “fit” for a particular position or situation is a very ambiguous concept. However, all workshop panelists identified it as a key component to successfully landing a job. The definition of “fit”

Box 3. Suggestions for on-site interviews:

- Ask others with interviewing experience for advice about what to expect
- Do a mock interview with videotaping to allow you to review your performance
- Learn about the interviewers or institution (e.g., faculty research, academic curriculum, institutional culture, institutional mission and/or vision)
- Ask for an agenda prior to the interview to identify those whom you will meet
- Create a “cheat sheet” to refresh your memory during breaks; use headshots from the Institution’s web site (if available) to keep track of names and faces
- Rehearse your seminar(s) and seek input from others
- Prepare your seminar specifically for the job and department at hand
- Be prepared to discuss short- and long-term goals (e.g., desired laboratory size, grants to pursue, interest in the administrative arena, or becoming a technical or team leader)
- Though a cliché, dress appropriately. No matter how enlightened we are, appearances elicit a reaction, so make it positive
- Be yourself, so interviewers can get to know you as a person. Remember, you have an equal interest in determining whether interactions with these potential colleagues would be comfortable and productive
- Keep your energy up and remain positive. Don’t talk negatively or complain about anything (e.g., your current position, advisor, other people). Take breaks and carry a snack and drink. Smile. This will demonstrate confidence and enthusiasm. Convince yourself that you are happy to be there and having a great time. The hiring institution has brought you there and hopes to like you
- If you are not able to take a break, excuse yourself to use the bathroom (some departments allow requests for your itinerary ahead of time)

Box 4. Interview questions that surprised or stumped panel members:

- What start-up equipment will you need, and how much will it cost?
- What is your ideal laboratory size (e.g., number of people)?
- What teaching techniques would you use to make the human anatomy and physiology class interesting to and fun for nursing students?
- How would you engage a community to develop and implement a voluntary source water protection strategy?
- What textbook would you use for teaching the [fill in the blank] course?
- Can you describe what you just said in terms of [fill in the blank] type of modeling?
- If we tell you that the job location has changed, how will this affect your interest?
- How are your research interests not redundant with [fill in name here]?
- What will be the first grant you write and what will be the funding source?

changes, based on circumstance and persons involved, and can be defined on both a professional and personal level. In other words, you might “fit” a job description perfectly, but personal “fit” is determined by your rapport with a potential employer and colleagues during the interview. Employers often weight the two components of “fit” inconsistently. In some instances, employers may seek a specific skill set and interview only those candidates that match exactly. Conversely, other employers may have a rough idea of what they want, but the ultimate decision will depend on an applicant’s “fit” with the personalities of current employees. For example, one panelist was specifically hired based not only on experience, but also because of extracurricular activities and a personality that meshed well with the institution’s current employees. As a job candidate, you have little control or knowledge about what role the “fit” factor will play for any potential position and, as such, you are left with the somewhat unsatisfying knowledge that it indeed plays a role (see also Barden 2007).

Perseverance

All ecologists have received a rejection letter at some point in their career. The same perseverance that got you through graduate school will be important as you enter the job market. Applying for jobs is part of professional development, and should be viewed as a learning experience. If you get rejected from your “dream job,” which you thought offered a “perfect fit,” it is acceptable to inquire politely about any weaknesses in your resume, curriculum vitae, or interview performance. Not all employers will respond, but you may receive some valuable advice. Such an inquiry demonstrates your commitment to professional development and your ability to accept and learn from constructive criticism. Keep in mind that it takes many scientists several years, and possibly multiple positions, to get the exact job they want. Not getting a particular job is not a reflection on how good a scientist you are, or your self-worth.

Conclusion

Since we all are responsible for taking the initiative to forge our career path, our goal was to share our perspectives on and experiences with several broad themes involved in a job search. Do not hesitate to start thinking about the job hunt early in your career as a graduate student. Each position that you consider will offer unique opportunities to build your resume or curriculum vitae, and will present personal and professional trade-offs. Take time to think about and proactively discuss both professional and personal factors, but also keep in mind that you control only so much of the process. Good luck!

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The following advisory items are provided to help focus your review.

a) Meeting title, organizer, location, sponsoring organizations?

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c) How well did the meeting meet the objectives? Were there specific papers delivered or roundtables/discussion groups that were exemplary in reaching the objectives? You may concentrate the review on only the outstanding papers to the exclusion of all others, or give a comprehensive view of all presentations/meeting activities, or examine a selection of papers that neither describes all, nor focuses on a very few.

d) What new was discussed? What previously weak hypotheses were strengthened, confirmed or supported? Were any breakthroughs, or new or innovative hypotheses presented, that forced participants to rethink current concepts?

e) Was there anything else important that the meeting accomplished that may not have been part of its explicit objectives?

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