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THE ASSISTANT PROFESSOR'S GUIDE

TO THE GALAXY

or

How to Survive and Succeed in Academia

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1. Introduction

Welcome. You are now an Assistant Professor. You have moved from being a graduate student to having your own office and your own telephone. You are now responsible for classes, and students address you as "Dr." But, along with the new privileges and responsibilities of your position come unstated expectations. In some mysterious way you are expected to become a famous researcher who will easily qualify for tenure and promotion in 5 or 6 years.

The purpose of these notes is to help clear away some of the mystery of this process, so that you can understand what is expected of junior faculty, plan your professional activities and set your priorities in such a way as to achieve success in your academic career.

Teaching and research at a University are probably among the most satisfying of careers. We have the opportunity to participate in the search for new knowledge, to write up our results and share them with the community of scholars in our field and to transmit to students what we have learned. Doing these things on a University campus is exciting and fun. There is more freedom and more excitement in an academic career than in most other types of work. These notes are intended to assist you with meeting some of the expectations of your colleagues and your institution as you embark on these activities.

2. The review process

A new faculty member is expected to be active in research, to be a good teacher, to help the department, to be visible in the profession and to achieve professional recognition. Usually during the sixth year of service the senior faculty in the department will examine your record. If it is sufficiently strong, letters of reference will be solicited from outstanding people in your specific area of research. Based on these letters and the faculty's evaluation of your overall academic record, they will vote on whether to recommend you for promotion and tenure. If the vote is positive, a dossier will be prepared by the Chairman's office, including your resume, a list of your publications, talks, professional activities, teaching record, service record and copies of the letters of reference. The dossier, along with letters from a faculty committee and Chairman's recommendation is then forwarded to the appropriate committee in the School or College where your department resides. In most Universities, the recommendations the committee are transmitted to the Dean. Assuming that the recommendation is strongly positive, the Dean adds his letter of endorsement and passes the dossier to the next administrative level, often a Provost's Committee or a Presidential Committee on Promotions. The President of the University, acting on the advice of this committee, then signs a letter advising the faculty member of his promotion. The entire process takes several months.

The above description summarizes the process. More details can be found in your copy of the Faculty Handbook. Unfortunately, this rather cold summary does not really tell you what is expected of you, what the criteria are, and how to allocate your time and energy in order to succeed.

3. The major criterion

Achievement of tenure at most research-oriented universities requires that the candidate be viewed by senior researchers in his or her field as: (1) having made significant research contributions and (2) showing promise of continued productivity. While quality teaching and service to the University and the profession contribute to the overall academic profile of the candidate, they do not take the place of research contributions. These notes have been prepared to provide some guidance to Assistant Professors during their early years, so that they can plan their professional activities in such a way that their chances of recognition and promotion are maximized.

4. Research

We assume that your academic career begins with a fundamental commitment to research. For many new faculty members, this means continuation or extension of work they did on their dissertation. For others, it means a start or exploration of ideas which they may have considered in graduate school, but never had a chance to pursue before. For still others, it means an opportunity for cooperative research projects with colleagues. Whichever option fits you, it is essential that a major time commitment to research be made immediately. One cannot wait for a year or two to start research. The discipline required for achievement must be present from the beginning, as research is balanced against other demands on one's time, like teaching, counseling students, service to the department, professional society activities or consulting, and one's personal life. From a purely pragmatic point of view, many journals have a 2 year publication delay. Hence, waiting 3 years to submit the first journal paper may mean 5 years before it is published. But more importantly, there is a discipline and commitment associated with productive research, which must be achieved early. It becomes more and more difficult as time passes.

There are two fundamental aspects to academic research: (1) obtaining research results and (2) communicating them to the academic community. The second issue is discussed below in Sections 5 and 6. Here I would like to offer a few suggestions with respect to the research process:

a. Some new faculty members have a tendency to read the work of others too long before starting their own work. Clearly, one must be aware of the previous and current work in one's field, but there is always more to read. A good strategy is to divide your time between developing your own results and continuing to read the literature.

b. In the choice of a research direction, it is desirable to pick one or two general areas and go into them deeply, rather than having a shotgun approach and jumping from

one problem to another.

c. It is stimulating and useful to work with collaborators. Collaborative work may produce new ideas and fresh approaches to old problems; discussion with colleagues may help you to find a way out when problems seemed intractable. However, it is important that you maintain your own identitity in collaborative projects. More on this later.

Let us now consider the communication of our results to others.

5. <u>Publication</u>

Assume that you have research results. Clearly, they must be published to become part of the accessible accumulative body of human knowledge. Without publication and presentation at professional meetings one cannot hope to achieve professional visibility. However, we don't publish only for our own advancement, but because we want to share our work with the profession, because we want to engage in dialogue with colleagues doing related work and to allow these interactions to stimulate our own research.

Ideally, good results should be published in major refereed journals. This is essential for science, since journals are archival publications and represent the accumulation of knowledge. Publication in journals takes a long time, partly because the papers are subjected to careful reviews by our peers. All of us who review papers realize how important it is that this process be done with care. As a result, we benefit greatly from using thoughtful reviews of our manuscripts. These anonymous critiques of our work may be hard on our egos sometimes, but they help to produce improved papers and to mature through the process. The process of polishing and improving our papers, if done with the proper spirit, can be an exhilarating experience, since it helps us become treu craftsmen in our field. Our papers need not just present the facts; they should do it with clarity and style. If we look at the delays in the publication of papers in this light, we realize the importance of journal publication. You too will be refereeing papers in your area of research (if you have not already done so). I trust that your own reviews will also be thoughtful and careful, so that others can benefit from your experience.

Presentation at conferences is often a good preliminary step to the longer and more arduous process of journal publication. Bear in mind that technical program committees, even at good conferences, may select papers without written referee reports. Members of such committees may be asked to review 50 papers in a period of a few weeks and to make recommendations for acceptance on the basis of these reviews. You can see that the clarity and conciseness of your abstracts is crucial to enable the program committees to evaluate the nature of your contribution. It is critical that you communicate the goal of your work, the assumptions and limitations of the work, the essential aspects of the methodology and the major results.

For most junior faculty I recommend a two-step process:

a. Present your results at a conference, preferably a reviewed meeting. Use the discussion and comments of your peers to review and strengthen the paper, and then,

b. Submit it to a refereed journal. In some areas, submission to the premier conferences in your field may be an intermediate step.

It is not possible to state exactly how many papers are needed to achieve tenure. Clearly one outstanding paper which wins a prize and is viewed as a seminal contribution, is more valuable then 10 mediocre papers. In some universities, one or two conference papers and one journal publication per year are expected. While there is considerable variation, this number is still useful as a guideline. Nevertheless, it should always be remembered that the impact on the research community is what matters, not numbers. It is simply a fact that some minimum publication frequency is needed by most people to become visible. I urge you to keep the next deadlines for important conferences posted near your desk as a reminder that there should be a continual flow of manuscripts from your office. In view of the pressures of teaching during the semester it is difficult to get much research completed during the academic year. Nevertheless, I recommend aiming at submission of a paper per semester, followed by one or two during the summer.

Papers reporting collaborative work will have co-authors. It is sometimes possible for collaborators to be significantly more productive than either investigator working alone, and I strongly encourage such collaborative research. However, bear in mind the fact your own contribution must be identifiable. Review committees must decide whether a candidate was a major or minor contributor to co-authored work. It may be desirable for you to publish some of your research results alone.

A comment needs to be made about publication in magazines and other non-scientific media. In short, they should probably be avoided, unless done for recreation and with very little effort. They do not convey the image of serious research commitment.

Review articles are not as clear. They are not original research contributions, and they take a great deal of time. On the other hand, there may be a strong need for a comprehensive review in your field. Doing such a survey may also help you crystallize the major trends and focus your own work on critical problems. I believe that they should be undertaken only if their preparation will help you in your own research, and not just to obtain "another publication". A similar note of warning needs to be issued in connection with book chapters. These are also considered to be compilations of existing work, rather than original research contributions, and they tend to take an enormous amount of time. They should be undertaken with a great deal of caution. (I wrote some as an Assistant Professor).

Finally, we have books. As a general rule, I believe that books should be written by tenured faculty. But then, all rules have exceptions, and I know of cases where a book, even partially completed, was of such importance to the field, that its preparation became known in the computer science community and helped the faculty member attain tenure.

Let me emphasize again that we don't publish to get tenure. We publish because it is en exciting and essential part of our research. If we do it right, tenure will follow.

6. The research community

Early in your career you should begin to develop a list of the 10 or 15 most influential researchers in your field. These are the people whose fundamental contributions are often cited. They may be featured speakers at conferences, they may chair the technical program committees, be distinguished speakers at your own or other universities, etc. As you prepare your manuscript for publication, I suggest you also publish it as a Technical Report and distribute copies to the people on this list. If you see them at meetings, try to discuss your research results with them. Make it a point to visit other universities (preferably where the leaders are located) and give seminars on your work. These steps will assist in the dissemination of your research results, enable you to benefit from discussion and feedback and generally increase the awareness on your work in the community, so that when the Department writes for letters of reference your research will be known.

Clearly, none of these steps are needed if your work is genuinely superb. Then, a few published papers will be noticed and highly regarded, whether you ever attend a meeting or not. However, most research contributions are incremental rather than revolutionary, and must be discussed to become known and have an impact.

Do not neglect the community of your colleagues on the campus. You should also plan to give seminars in our department, discuss your research with fellow faculty members, participate in experimental seminar courses, and distribute copies of reports and papers to potentially interested colleagues. Seminars at neighboring institutions are also valuable; they provide additional feedback on your work and increase self-confidence.

7. Graduate students

You will encounter two points of view with respect to the question of working with graduate students. One opinion holds that assistant professors should do their own work and only direct the work of students later in their careers. The other side of this issue is that good students can multiply your effectiveness and increase your productivity. I believe that the latter is particularly true in connection with experimental research, where student help with implementation and software development can make the difference between success and frustration. Where theoretical research is concerned, the choice is more personal. Some people are quite content to work in isolation. Others prefer to have students work on related aspects of the same problem on which they are working. I have found work with graduate students very stimulating, with a couple of exceptions, when I (temporarily) tried to work with students of mediocre ability. In such cases, the experience was a largely unproductive expenditure of time.

In my personal work with students, I set goals for them and insist that they document their progress with draft manuscripts. My work with them on these drafts often leads to conference papers. My students always publish before they finish, sometimes jointly with me and sometimes on their own, depending on the degree of my own involvement.

One final observation on this matter: Guidance of doctoral students is central to the work

of a Professor in a research oriented University. In a research institute one's only function is to do research, at a university we also inspire and guide graduate students. Our former students then carry our vision of important research problems and methodology to other institutions. For this reason, review committees at all levels look for work with doctoral students in examining a candidate's dossier. For most of us, work with students is rewarding and stimulating and increases our productivity.

8. Research funding

Of course, it is difficult to have students if one cannot support them. Yet, student support is only one of the reasons to apply for research grants. The most important one is that grant applications are reviewed. Hence, a good proposal will reflect favorably on a faculty members reputation and enhance his or her visibility in the profession. I am continually amazed when I discuss junior faculty with colleagues elsewhere to hear phrases like: "Oh, yes, I know of this person. I reviewed a proposal of hers; it was a good one". The second major reason for obtaining your own research funding is that it gives you freedom to make your own decisions with respect to travel, equipment purchases, software purchases, and research assistantships.

For these reasons I strongly believe that new faculty members should begin to apply for research funding very soon. There may be Faculty Research Initiation grants available at your own institution. NSF has Engineering Research Initiation Grants, which are somewhat easier to obtain than regular grants since the competition consists only of junior faculty. In some cases it is highly desirable to apply for the first grant jointly with a senior member of the faculty, establish one's reputation, and then apply separately. Whatever the model you choose, I urge you to think of research ideas in terms of both publication and proposals.

9. Teaching

I believe that it is essential to be a good teacher, to prepare for classes, to go beyond the textbook, and to spend time with students. Teaching can be an extension of our research, since it forces us to understand the fundamental ideas in our fields and explain them to others, thus improving our own understanding. This often leads to papers which are more clearly written and more easily understood. Obviously, every seminar and every presentation at a scientific meeting is another teaching experience.

However, having said that, let me add that your evaluation in the University is based on research, teaching and service. In a research-oriented ("publish-or-perish") University, research must be the primary evaluation criterion. Hence, I advise you to be a good teacher, but not to the point where devotion to teaching will seriously interfere with your research. This is a hard choice, but it must be made by all of us. Furthermore, Special Topics courses and graduate seminar courses can become an integral part of your research program. It needs to be emphasized that good teaching can go hand-in-hand with good research. To encourage and reward good teaching, many universities provide annual awards to the best teachers.

10. Professional societies

My advice is to participate, be visible at the major conferences in your field, but don't get so involved in professional activities that it takes a significant amount of time away from research. Participation on Program Committees of important conferences is a different question; this is clearly important and useful in terms of professional contacts and it gives one the opportunity to learn quickly of related work going on in other places. Reviewing papers for professional journals falls into the same category; it is a lot of work, but useful and important. On the other hand, serving on a local arrangement committee for a conference may not be professionally useful, depending on the circumstances.

11. Service to the Department

This also falls into the category of things that must be done, even if they do not contribute directly to one's research. We try to keep the number of committees and related responsibilities as low as possible for junior faculty. It is impossible to eliminate them altogether, or the department could not function. Furthermore, even if we had paid staff to do all the committee work for us, I am not sure it would be good, since we would have no sense of participation in our own growth as a department.

12. Is there no time for fun?

Of course there is time for relaxation, for sports, and for socializing. In fact, the old adage that "all work and no play makes one a dull person" is certainly true. Furthermore, recreation is essential for continued creativity. But having said that, let me add that, with the exception of a few brilliant souls, you will need more than 40 hours per week to accomplish the goals outlined here. Nearly all Assistant Professors either work late part of the time, or take work home with them or work part of the weekend or some combination of the above.

13. Consulting

University professors are frequently asked to accept consulting assignments in their area of expertise. It is tempting to accept such jobs, not only for the financial rewards, but because it is flattering to be considered an "expert" in one's field. In view of the pressures on time which are discussed in the preceding paragraphs, it is clear that consulting activities may interfere with research, other professional activities or leisure time. On the other hand, consulting can be very rewarding professionally, since it may provide an opportunity to apply academic concepts in an industrial setting. I suggest that consulting activities be accepted only when the professional rewards are apparent, and even then, they should be quite limited. First year Assistant Professors should not accept consulting assignments while they are trying to get their own research program organized. I have tried to accept only those consulting jobs where I could see the possibility of publication or professional growth or both.

14. Is it worth it?

This is a question which only you can answer. From my own experience, having been in industry as well as in academia, I believe that the academic career is the best of all possible careers. It provides the highest ratio of satisfaction to frustration of all careers I know. It provides a life-long opportunity for learning and creativity, and for contact with stimulating colleagues and students. Each new semester is a fresh start, which renews hope and opportunity. But most of all, a University career is a continuing learning experience, always on the growing edge of new knowledge. However, it has initiation rites, and it involves hard work and a level of commitment not required in many other jobs. But the rewards are worth the effort, and I hope that you will accept the challenge and make this a long term career. I wish you great success.