Tips for Promoting your Research

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TIPS FOR SECURING A SUSTAINABLE AND PRODUCTIVE RESEARCH PROGRAM WITHIN THE FOLLOWING KEY AREAS:

1. BUILDING YOUR OWN RESEARCH LAB AND MENTORING GRADUATE STUDENTS

I **currently have** 6 **Ph.D** and 2 **MS** students conducting research in my lab under my supervision, and I have already **graduated** 4 **Ph.D** students, 7 **MS thesis** students, and 1 **MS practicum** student so far.

Tip 1.1. Set a clear plan for student graduation

- Have a topic of research in mind when you meet your graduate student for the first time.
- Make an index of what their theses/dissertations will be about, as early as your graduate students begin their research work, and discuss them with them.

Tip 1.2. Develop a mentorship program within your group

- Name one senior graduate student from your group, who is already conducting research similar to what the new student will be assigned, the lab mentor for the new student.
- Even when the new student will meet with you for specific tasks assignment, having a fellow group member mentoring him/her helps both, the senior and the new students. The new student can comfortably ask questions without feeling embarrassed because there is just another student in front of him/her. The more senior student will not only reinforce his/her knowledge because of the opportunity of teaching others, but also this experience will help increase his/her self-confidence.

Tip 1.3. Conduct regular (weekly) group meetings

- Time is limited, so budget a couple of hours of your time every week to meet with your group altogether. Have them prepare a short PowerPoint to present what results they have obtained since the previous week. If they could not get results due to problems in the lab, then they should talk about those problems.
- Having the entire group in front of them when they report is twofold. On one hand, they feel the peer pressure for preparing and present properly. On the other hand, having the other students in the room help the presenter understand why something went wrong, as somebody from the audience can share troubleshooting tips. And, if results were successful, other students can learn and implement the same tactics in their own research projects.

Tip 1.4. Require your students to attend and present at national conferences

- As early as 6 months after starting with his/her graduate studies, make the new student to prepare and submit an abstract to a conference with his/her name as the presenter.
- This may feel rushed to you, but the fact that the research advisor is telling them, “go ahead and do that”, helps building self-confidence and trust on the work they are doing. Even when the student is not doing very well, or is taking long to produce results, once they know they have a deadline helps keep them focused, and they usually perform better. If by the time of the conference the student is really not ready to present, you can always give the talk instead. I have done this with probably 90% of my students, and I did not have to present for any single one of them.

Tip 1.5. Criticize, Encourage, and praise them whenever needed

- As a research advisor you are not only teaching your graduate students how to conduct research in the lab, you are also educating them in all aspects of their lives. It is important to know your student and learn what works best for her/him.
- If new students did something that does not make sense, meet with them, let them realize about that first, and educate them on the consequences. It is important to remind them that everyone makes mistakes and that people need to learn from those experiences. Do not get so hard on them the first time. If they continue messing up as they advance in their graduate careers, then the situation becomes unacceptable. They need to understand that responsibility and carefulness at work are part of their graduate education, and cannot graduate if they cannot accomplish that. Schedule meetings to discuss these types of issues as soon as they appear.
- Praise them as they get papers published or win awards, etc. Plan on doing it during a group meeting and/or e-mail the entire group to join you congratulate those students for their accomplishments.

2. PUBLISHING AND PRESENTATIONS

I have **published** 17 **peer-reviewed** articles and 6 **book chapters;** I have **given** 14 **keynote/invited talks**, so here are my tips for this category:

Tip 2.1. Set a realistic target on the number of yearly publications

- Peer-reviewed publications are a very much needed component to ensure a sustainable research program. A realistic target needs to be set on the number of publications you are going to publish per year. Evaluate your other responsibilities and set a number you can really meet. If the number of yearly publications is too high and you do not meet that target, frustration takes over. If the number of publications is too low, they you will easily meet the target and will not reach your full potential.
- Explore the top journals in your field when preparing a manuscript and target the one with the highest possible impact factor according to the topic and quality of the results you are trying to get published. Too specific journals in your field will most probably offer a larger number of citations for your published work in the near future, but the quality of the journal in which your paper gets published may be low.

Tip 2.2. Attend with your group national/international conferences

- Plan to attend at list two conferences every year and have multiple (2-4) papers presented from your group. Give one talk, and let your graduate students present the rest.
- Participate in social gatherings at the conferences and take your students to networking with you.

3. SECURING AND MANAGING GRANTS

I have **received** 13 **research grants** (10 of which from major Federal sources such as NSF, DoE, and NASA; with my name listed as either the PI or Co-PI in 9 out of these 10 grants).

I have **received** 9 **education/enhancement grants** (5 of which from either Federal sources such as NSF and NASA or Industrial, such as Shell Chemical; with my name listed as either the PI or Co-PI in all these 5 grants)

Tip 3.1. Set a realistic target on the number of proposals as PI you will send yearly

- Evaluate your other responsibilities at work and set a number you can meet. If the number of proposals as PI per year is too high and you do not meet that target, frustration takes over. If the number of proposals is too low, they you will easily meet the target and will not reach your full potential.
- Do not wait for other researchers to invite you to contribute to a proposal, but take the lead on as many as you can. Proposals sent to State or Industry sectors are fine, but you need to focus

on Federal funding, such as NSF, DoE, etc. Make sure your proposals include experimental and modeling components to be competitive. Collaborative proposals involving multiple departments are always preferred.

Tip 3.2. Manage your Grants Properly

- Maintain a yearly plan and budget for a given proposal up to date. Prepare a timeline for the current year to make sure short-term yearly tasks are properly met. Make sure that budget is spent as planned. Future funding may depend on your management skills.
- Keep regular meetings with students involved in a given grant. These could be different from the group meetings if needed. Set particular targets that need to be met by them in order to accomplished specific goals. Ask them to give you written reports periodically, following a template containing clear accomplishments and deliverables. This will help you organize better for when the reporting period of the grant arrives.

4. NATIONAL RECOGNITION AND SERVICE

Tip 4.1. Advertise yourself

- Keep an eye-catching website on your research program. People who do not know you can learn about you through your website. This is particularly important for recruiting graduate students to your research group.
- Apply or get nominated to nationally/internationally recognized Awards. Never put limits to yourself if you have the qualifications to apply for an award. Let the people who give the award decide if you will win it or not. That is what I did the first time I tried a **National Science Foundation**-**CAREER Award**; which I won in **Aug 2005** despite discouragement to apply by a colleague.

Tip 4.2. Become an active member of a scientific organization

- Being just a member of scientific organizations is not enough. Pick one or more (if your time allows) scientific organization you belong to and take a leadership role. You will have the chance to networking with others in your field, meet new people, and also get them to know you and your research group.
- For example, I have been a member of the American Institute of Chemical Engineers (AIChE) since 1999. In **2010,** I became a **Senior Member** of the AIChE. During the **2009-2011** period, I was a member of the AIChE Transport and Energy Processes (TEP) Division **Board of Directors**. Finally, in January **2012,** I was **elected Chair of the AIChE-TEP division**, and I have also become a member of the **AIChE Council of Division and Forum Officers** at that time as well.

Tip 4.3. Participate as organizing committee member of international workshop/conferences

Just to give you a couple of examples. In my case,

- I have received an NSF proposal funded for organizing a workshop in India, together with a colleague from the University of New Hampshire. I was an **organizing Committee Member** for the "**Indo-US Workshop: Emerging Issues in Energy and Environment Security: Challenges and Research Opportunities"**, on Dec 12-15, **2010,** The Claridges SurajKund, Delhi NCR, India sponsored by the US National Science Foundation**,** the Indo-US Science Technology Forum, the Department of Science & Technology - Govt. of India, the Indian Institute of Technology – Delhi India, and the Ministry of New and Renewable Energy - Govt. of India.
- **I am now an organizing Committee Member** for the "**World Congress on Petrochemistry and Chemical Engineering**", that will take place on Nov 18-20, 2013 in San Antonio, TX hosted by OMICS Group, the World Class Open Access Publishing Group and Scientific Event organizer.