

# 020.601 Current Research in Bioscience

as of 11/4/2016

MEETS: MTThF 10:30 am to 11:30am in Mudd 23.

ATTENDANCE: Mandatory 1<sup>st</sup> year CMDDB PhD students

GRADING: attendance only

PURPOSE:

- To introduce you to the training faculty, their research interests, and their scientific philosophies
- To directly answer your questions on science, graduate training, career options, academia, success in life.

DISCLAIMER:

This course is experimental and still under development. The existing faculty and students in the department feel that direct access of the incoming students to all of the training faculty (and vice versa) will benefit everyone. Its success depends on the ability of everyone to communicate frankly. All the existing graduate students in the department were asked to provide lists of questions they would want answered by each of the training faculty. Their unedited questions are listed below. Having the benefit of hindsight, each of the training faculty was also asked to provide a description of the most important factors in graduate school that contributed to their success. Some of their comments are listed below and some of their messages will be delivered personally. They also provided some additional questions and considerations to augment the list from the graduate students. Every student and PI has different experiences and values, placing different weight on the various factors. THE FOLLOWING LISTS HAVE NOT BEEN EDITED AND DO NOT REFLECT THE GENERAL OPINIONS OF THE FACULTY, STAFF, STUDENTS, OR ADMINISTRATION. They reflect the opinions of individuals and are purely meant to stimulate discussion. They should not be used as a checklist or blueprint. Most importantly, they should not be used in lieu of your own questions and comments.

SOME FACULTY PERSPECTIVES ON SUCCESS IN SCIENCE:

1. Graduate school is about acquiring the training and credentials you need to be launched into a field of choice. Generally, the most successful and most highly sought academic scientists are the ones who do something very different in their postdocs from what they did as graduate students. If a trainee masters two different fields, she/he is better equipped to answer biological questions and to deal with rapid changes in scientific fields.

9/6/2016	Garcia-Moreno
9/8/2016	Fleming
9/9/2016	J. Kim
9/12/2016	Halpern
9/13/2016	Gordus
9/15/2016	Kaiser
9/16/2016	YS. Lee
9/19/2016	R. Johnston
9/20/2016	Y. Kim
9/22/2016	Taylor
9/23/2016	Zheng
9/26/2016	Myong
9/29/2016	Schatz
9/30/2016	HK. Lee
10/3/2016	Schroer
10/4/2016	DiRuggiero
10/6/2016	Farber
10/7/2016	Ha
10/10/2016	Roberts
10/11/2016	Barrick
10/13/2016	Chen
10/14/2016	cancelled
10/17/2016	M. Johnson
10/20/2016	Schildbach
10/24/2016	Zhao
10/25/2016	Van Doren
10/27/2016	Lecomte
10/28/2016	Fan
10/31/2016	Kuruvilla
11/1/2016	Cunningham
11/3/2016	Bortvin
11/4/2016	cancelled
11/7/2016	Woodson
11/8/2016	Kirkwood
11/10/2016	Bowman
11/11/2016	cancelled
11/14/2016	Hilser
11/15/2016	Hattar
11/17/2016	Wu
11/28/2016	Wendland
11/29/2016	Beemon

2. Grad school is in large part learning how to learn - figuring out how to formulate questions, how to test models, how to figure out how to do something new and/or adapt other people's techniques to your own particular purposes, etc.... Self-motivation is key because no one can make you learn.
3. Your research publications and presentations are the first and second criteria used to evaluate you as a scientist. Recommendations are important too, especially if you need help in the first two areas.
4. Every scientist writes her/his own ticket to success. They should not rely on their advisors to gather all the information and make the important decisions. No one has all the right answers or advice. To succeed you have to work hard, be efficient, have good ideas, disregard the bad advice, remember the good advice, make the right choices and quickly fix the bad ones.
5. The most respected scientists have developed a finely honed critical edge that allows them to discriminate between truth and fantasy. This is really tough, especially when information is insufficient or clouded by dis-information, over-interpretations, or pre-existing opinions.
6. You have to love your science in order to muster the energy and creativity necessary to drive it forward. If you don't love it, do another project or find another place to work because you can't be successful in science if you are miserable. You'll just make everyone around you miserable too. If you can't or shouldn't move, try to find other ways to be content and avoid bringing down everyone else.
7. Learn from your mistakes and those of others. Pain is gain. This is the most important way to develop your independence as a scientist.
8. Lab environments change quickly with the continual comings and goings of personnel. If it's not what you want, be proactive and make it right. Try to get along with everyone and maintain professionalism because it's a small world (what comes around...)
9. Many of us got interested in science when we found we could do it better than our classmates. Some prominent scientists still seem to have retained these childish competitive urges, but a model that seems healthier is one where the joy of having ideas and testing them and of learning a bit about the way nature works and possibly of contributing something to the welfare of mankind attracts us to the work.
10. Doing science well, like doing anything else well, requires enormous commitment. Despite this, one must have broad scientific interests in order to have creative, fresh ideas that advance the field.
11. Minimize the following of trends and fads, for if you do, you are unlikely to be doing intrinsically good science, and when the fad dies, you will be dead.

#### SOME FACULTY PERSPECTIVES ON CHOOSING A THESIS LAB:

1. A good indicator of the value of a thesis advisor is his or her past successes and failures. The record tells a lot.
2. Does the advisor interact with a wide variety of other scientists? Does the advisor encourage thought, open communication with others, the testing of fresh ideas, interacting with other labs in the department?

3. Is your potential advisor sufficiently organized and responsible to write you a helpful letter of recommendation well after your graduation?
4. What sorts of presentations come from the lab. Has the advisor worked hard with the students on their presentations? Is feedback provided afterwards?
5. Do your thesis work with someone who is doing great science as opposed to picking a lab simply on its atmosphere.
6. Students should think about reputation of lab and the quality of training they might receive. What kind of journals does P.I. publish in? Are papers written clearly? Do experiments include controls and careful analysis? Is the PI a leader in her/his field? Is the field exciting?
7. Students should try to size up the mentoring style of the advisor, and ask whether this style will be good for them as an individual. A good match between student and advisor is very important and should not be overlooked.
8. How does the P.I. view external commitments of the students.....developing non-scientific interests (learning music or something like that), teaching a Dean's Fellowship course, taking non-scientific classes, training for alternative careers, and extended vacations?
9. I have often heard that all graduate students hit a wall at some point.... What do you do when that happens?
10. While HOW LONG it takes to graduate is an important question.... WHAT NEEDS TO BE DONE to graduate?
11. Ask this: What are the 3 best things your grad students would say about you? And the 3 worst traits? Why should a student come to work for you?
12. For a rotation period: Does the project sound interesting and do-able? Will you learn something new in a rotation (field or techniques)? Does the project tie in with things you already know about (i.e., can YOU bring something of your own to the project)?
13. For a dissertation project: Are you the student excited about the work going on in the lab? Does the field under study have a long future? Is the project you plan to start one you (the student) are well suited to temperamentally? Technically? Or will you be beating your head against the wall because you can't get things to work or are bored out of your mind doing the same thing over and over? Will you be just one cog in a big machine, or will your project allow you to create your own unique story?
14. Is the PI available to you and others to give advice (this can be hard to judge if you did a rotation during a busy period -- the other folks in the lab can tell you if the PI travels too much, or is generally unavailable)?
15. Is the PI a good mentor? Do they make the effort to keep track of what people are doing, and to give useful suggestions on how to get past hurdles and stumbling points?
16. Is the PI flexible and patient? If your project bogs down, will they be willing to allow you to move to a new project? If your project moves a bit too slowly, will they force you to change to a new project even if it is premature?

17. Did you enjoy working with others in the lab? Did folks seem to get along with each other? It is not necessary that the lab have parties every week, but you don't want to work in a place where everyone hates each other or the advisor.
18. The mentor should talk with students regularly about research results and directions.
19. The mentor should be aware of the level of difficulty of the project and as time passes makes appropriate adjustment of the direction, so the students will have publications and can graduate in 5-6 years.
20. The mentor should require students to regularly read the scientific literature.
21. The mentor should require/encourage students to ask critical questions in lab meetings and journal clubs.

#### FAQs BY PhD STUDENTS:

1. Are you willing to take a new grad student?
2. What's your field about and how did you get into it?
3. What's the most exciting discovery your lab made recently?
4. What project in your lab shows the most promise?
5. Why do you think your model system is so cool? What are its disadvantages?
6. What projects are underway and what are your future directions?
7. What short-term projects are you looking to have rotation students tackle right now?
8. What long-term projects are you looking to have permanent grad students take over soon?
9. How are the projects in the lab assigned? Are graduate students allowed to come with their own projects or do they work in projects that are very closely related to what others are doing?
10. What techniques will students be using?
11. How often do your students typically publish?
12. What are your expectations for a student to graduate?
13. How long do your students take to graduate? What have they gone on to do?
14. What is your mentoring philosophy and level of involvement?
15. What is the lab composition, how excited are they by their research, what is their attitude like, and what is the lab-dynamic like?
16. Who is the primary advisor and who is the go-to person in their absence?

17. How many classes does the professor teach, i.e. what kinds of other time commitments do they have?
18. How often is the professor out of town, ballpark figure?
19. Does the prof. like to hold weekly meetings? monthly? individually or only as a group lab meeting?
20. Does your lab have journal club meetings?
21. What are the opportunities for the students to give talks or present at meetings or go to courses? Is it pretty much up to the student or does the advisor encourage the students to do so?
22. Do grad students in your lab usually teach undergrad researchers? If so, how soon do you expect them to start, and what kind of preparation do you give them?
23. Do you train your students to be good speakers, teachers, and writers?
24. How does your relationship with students evolve during the course of grad school and afterwards?