Advice on Choosing a Research Area and a Doctoral Advisor

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Congratulations on having been admitted into the Graduate Program in the Department of Mechanical Engineering at the University of California at Santa Barbara! Here are some suggestions on how to go about choosing a research area and a doctoral advisor. They are inspired by my experiences and by those of other ME department faculty, and they are adapted from various documents on this subject, including [1, 2, 3].

Here are some thoughts regarding a research area.

(i) Find a broad subject that inspires you and strongly motivates you. You are the best judge of what type of work you like, whether theoretical, numerical and simulation-based, experimental, etc. Find a subject which resonates with your strengths and interests. Also, as you choose a subject, you are choosing the scientific and engineering community that works on it. These are the people that will judge your work, that you will collaborate with, and that, possibly, you will interview for. Make sure your interests and values are aligned with those of the community you choose to work in.

(ii) Most research areas in Mechanical Engineering at UCSB combine scientific elegance with practical impact to greater or lesser degrees. You will want to strike a balance that fits your interests and inclinations.

Research areas are in a constant state of flux. New technologies and problems appear; yesterday's problems are solved and go out of fashion; old problems resurface in new clothes and lead to wonderful new discoveries. Choose a subject that will have relevance in future years.

Regarding doctoral advisors, before you make any decision, you should be well informed about your advisor's characteristics and you should develop expectations about your work life during graduate school and beyond. Here is an incomplete list.

Technical and personal skills Get to know your prospective advisor from a technical and a personal point of view.

From a technical perspective, your interests should be aligned with the advisor's technical background and research objectives. Be informed about the research quality and reputation of the prospective advisor; relevant information in this regard include citations, awards, peer recognition, and publication record of the faculty member.

From a personal perspective, you should be able to establish an effective work relationship and an open and straightforward communication channel with your advisor. Your advisor should be able to provide you with encouragement, motivation, criticism and moral support throughout a long work effort.

Supervision style Find out how much supervision and direction the prospective advisor will give you, including the frequency and duration of one-on-one meetings and group meetings.

Ask for documents describing the broad area and some of the projects you might be working on. Do not to be overly concerned about the specific problem you will begin your research work with, since that problem might change quickly and will certainly evolve over the duration of a PhD.

Publications and thesis Find out what the average publication record of former PhD students has been. Read one or two recent theses that have been supervised by this faculty member. This data and an open discussion will help you develop a broad general view for what the advisor's expectations are. Find out who are the current students working with the advisor and their PhD subjects. Find out when and what conferences current and former students have attended.

Duration and financial support Find out how long it took former graduate students to complete their PhD theses under the supervision of the prospective advisor. Discuss and develop expectations about what kind of financial support you will be provided with throughout your PhD years.

Career path You should have clear expectations about what likely career paths will be open for you after graduation. You should know the career paths of the former PhD students of the prospective advisor.

As with everything in life, enjoy graduate school while it lasts!

References

[1] John R. Abelson. Advice on finding a graduate thesis advisor. University of Illinois at Urbana-Champaign, July 2004.

[2] Howard G. Adams and Ashwin Ram. How to choose a graduate advisor. Georgia Tech. Available online at `http://www.cc.gatech.edu/faculty/ashwin/wisdom/how-to-choose-an-advisor.html`, August 2006.

[3] Marshall L. Dermer. An insider's guide to choosing a graduate adviser and research projects in laboratory sciences. *Journal of Chemical Education*, 70:303–306, 1993. Available online at `http://www.psywww.com/tipsheet/insider.htm`.