UC San Diego
JACOBS SCHOOL OF ENGINEERING

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MENTORING

The goal of successful mentoring relationships in the Jacobs School of Engineering is to empower individual researchers and the research community to lead, innovate, and improve our future with integrity. Deficient mentoring can be a contributing factor to research misconduct (Wright et al., 2008).

Mentoring Relationship

- ***Mentors provide mentees with guidance*** both by what is said and what is demonstrated in practice
- Mentoring is important for learning ***knowledge and skills needed to perform research***, ***career development***, and ***solving personal problems*** encountered in academic life
- Success depends on a ***trusting and professional relationship*** between mentor and mentee
- Such a relationship is a prerequisite for mentor and mentee to feel open to ***raise and discuss ethical issues*** that may arise

Domains of Mentoring

- ***Scientific Mentoring***: teaching and facilitating knowledge and skills necessary for mentee to be a successful researcher
- ***Professional Mentoring***: facilitating development as a leader with the interpersonal skills and credentials needed for mentee to pursue a career in science, including understanding the political, ethical, economic, and social dynamics in a specific research community
- ***Personal Mentoring***: facilitating self-reflection for mentee to understand who they are, their personal and career goals, and to embrace diversity in the context of pursuing a research career (e.g., a disability, entering a field in which gender representation is unbalanced, or life decisions such as marriage or having children).

Responsibilities for Mentors and Mentees

- ***clearly define mutual responsibilities and expectations*** from the beginning
- ***share regularly their respective goals and clarify constraints*** for research success
  - ***Constraints for PI mentors*** might include, for example: choice of which specific research problems are to be addressed, responsibilities to funding agencies, publishing high quality papers in specific venues, or managing budgets
  - ***Constraints for mentees*** might include, for example, an interest in working on particular problems or a need to better understand what is needed to advance in their career
- ***foster a community that welcomes diversity and inclusion***
- ***adhere to campus policies and guidelines*** for academic and research integrity
- ***continually review and refine the mentoring relationship***

MENTORS

The purpose of this section is to briefly summarize roles and responsibilities for mentors in the Jacobs School of Engineering. To be clear, the head of a research group or principal investigator (PI) can have important mentoring roles, but a mentor is not necessarily a PI. In fact, much of the benefits of mentoring requires that a mentor be someone other than the PI thereby removing possible conflicts of interest between the success of the project vs. that of the mentee. Mentors in academia might often be PIs or faculty, but the role of mentor can also be held by a postdoctoral scholar, senior graduate student, technical staff, or others. The key is only that they embody the roles and responsibilities outlined below.

Mentor Roles & Responsibilities

A mentor:

- ***has experience and expertise*** in addressing challenges that will be faced by a mentee
- ***is able and willing to communicate*** their experience to the mentee
- ***is able and willing to listen to*** the mentee
- ***is able and willing to refer the mentee to appropriate resources*** (e.g., for mental health, career development, or for financial support)

A mentor should:

- ***advise and encourage***, rather than direct or command
- ***model and teach*** exemplary leadership skills and independence
- ***assist the mentee in understanding and adhering to professional standards of conduct***
- ***teach responsible conduct*** explicitly and by example
- ***recognize and help mentee navigate*** competing responsibilities

A PI in a mentoring role should:

- be explicit about ***sometimes conflicting goals*** (success of project vs. mentee)
- set clear ***guidelines, expectations, and timelines***
- provide ***vision and scope*** for the mentee's research project(s)
- provide and/or advocate for necessary ***scientific and personal resources***
- set reasonable expectations and ***challenge the mentee to excel and succeed***
- ***recognize and balance competing interests*** and goals of members of research group
- ***be accountable*** to the department and institution for supporting the success of mentees

Mentors, PIs, thesis advisors, and other leaders in the research community should continually ask themselves:

*"**Am I adequately preparing my mentees** in all relevant domains,*
or at least directing them to useful resources?"

MENTEES

The purpose of this section is to briefly summarize roles and responsibilities for mentees in their relationships to mentors in the Jacobs School of Engineering.

Mentee Roles & Responsibilities

A mentee:

- ***is able and willing to listen to*** a mentor
- ***is open to and ready to act*** on new suggestions and challenges

A mentee should:

- ***recognize potential conflicting goals*** for a PI who is also a mentor
- ***ask for help*** when stuck
- be prepared to ***share results that differ from what was hoped***
- be ***collegial and share*** with other members of the team
- ***seek out new scientific and personal connections*** through professional meetings
- ***seek multiple mentors*** to address issues in scientific, professional, and personal domains.*
- ***be accountable*** to PIs, peers, the department and institution for responsible practices of research

Mentees should continually ask themselves:

*"Do I have **adequate mentoring resources** to support me in all necessary areas of my academic career path?"*
If not, then seek out new or additional mentors.

* A faculty advisor is typically the primary mentor for a research mentee, but over the course of a career an individual will be best served by seeking out multiple mentors. Mentors might be found in many places, such as members of a thesis committee, connections made at professional meetings, or recommendations of peers, collaborators, and colleagues.

UC San Diego Resources

Research Mentoring

For disputes or questions related to research mentoring at UC San Diego, contact:

- Research Ethics Program | 858-822-2647 | ethics@ucsd.edu
- Ombuds Office | 858-534-0777

Starting points for health, financial support, and career development

Counseling and Psychological Services: https://wellness.ucsd.edu/CAPS/Pages/default.aspx

- Services for Graduate & Professional School Students

Graduate Division: https://grad.ucsd.edu

- Financial Support

Grad Life: https://gradlife.ucsd.edu/about

- Employment and Funding
- Health & Wellbeing

Office of Postdoctoral & Research Scholar Affairs: https://postdoc.ucsd.edu

- Benefits and Services
- Finding Funding Opportunities
- Professional and Career Development

Postdoctoral Association: https://pda.ucsd.edu

- Career Development Resources

Career Center: https://career.ucsd.edu

- Career Development
- Graduate Student Resources

Resources

On Mentoring

1. Anderson MS, Horn AS, Risbey KR, Ronning EA, De Vries R, Martinson BC (2007): What Do Mentoring and Training in the Responsible Conduct of Research Have To Do with Scientists' Misbehavior? Findings from a National Survey of NIH-Funded Scientists. Academic Medicine 82(9):853-860.
2. Anderson MS, Louis KS (1994): The graduate student experience and subscription to the norms of science. Res Higher Ed 35:273-299.
3. Macrina FL (2014): Chapter 3. Mentoring. In: (Macrina FL, au.) Scientific Integrity. An Introductory Text with Cases. 4th Edition, ASM Press, Washington, D.C.
4. Resources for Research Ethics Education (2016): Mentoring
5. Swazey JP, Anderson MS (1996): Mentors, advisors, and role models in graduate and professional education. Association of Academic Health Centers, Washington, DC.
6. Wright DE, Titus SL, Cornelison JB (2008): Mentoring and Research Misconduct: An Analysis of Research Mentoring in Closed ORI Cases. Science and Engineering Ethics 14(3): 323-336.

For Mentors

7. National Academy of Sciences, National Academy of Engineering, and Institute of Medicine (1997): Adviser, Teacher, Role Model, Friend: On Being a Mentor to Students in Science and Engineering. National Academy Press, Washington, D.C, 84 pp.
8. National Institutes of Health: A Guide to Training and Mentoring in the Intramural Research Program at NIH.
9. University of Michigan (2011): How to Mentor Graduate Students: A Guide for Faculty. Rackham Graduate School.
10. Zimmerman E (2010): A Modern Mentor is a Listener, Too. NY Times 4 June 2010

For Mentees

11. UC San Diego Research Ethics Program overview of Mentoring
12. University of Michigan (2010): How to Get the Mentoring You Want: A Guide for Graduate Students, Rackham Graduate School.
13. University of Wisconsin: Resources for Each Phase of the Mentoring Relationship.