



HematoVascular Engineering Laboratory

Engineering Better Cardiovascular Health through Blood Mechanobiology

To my future and current trainees,

Welcome to the HematoVascular Engineering Laboratory. If you are reading this manual, you have likely joined or are considering joining my team. In either case, I am excited to meet you! Our home is located at UC Irvine's Department of Biomedical Engineering through the Cardiovascular Innovation and Research Center (CIRC). The **mission** is to relentlessly pursue biomedical discoveries that improve human healthspan by enhancing cardiovascular care and equity.

The **research vision** of the HematoVascular Engineering Laboratory is to integrate hematology, cardiovascular biology, and biomedical engineering to study blood as a mechanosensitive tissue. The idea is that the blood is composed of circulating cells that release biochemical signals when they are mechanically stimulated in physiological flow. These mechanobiological signals released by the blood cells can affect cardiovascular function in health and disease. A core direction of our lab is investigating how stress affects the communication between the blood and cardiovascular system, specifically in the context of exercise-induced stress and chronic psychosocial stress. You can expect to learn a wide range of skills using computational, cellular/molecular, animal, and human research techniques. I expect those interested in our lab to be interested in translational cardiovascular research, exercise physiology, and/or disparities research.

My approach to **equity** is to weave it into the fabric of our research program. I encourage students from underrepresented backgrounds to join the laboratory, but all candidates will be evaluated on the same metrics. I will try my best to support any local outreach and advocacy initiatives. We will strive to engage in open discussions about the systemic issues that affect academia, industry, and healthcare, and reflect on the equity challenges within our own lab.

The primary function of this lab manual is to help you begin your research journey under my mentorship. This manual will evolve over time with input from the trainees who join the lab, so I consider this manual a living document. My goal is to train socially conscious biomedical engineers with the scientific and professional maturity to pursue a meaningful career. With this objective in mind, my role as a mentor is to provide the structure, guidance, and support to help students develop the skills they need to be successful in the next stages of their careers. I expect my students to foster discipline and strive for continuous improvement in their work. The lab will work with each student to create an individual development plan (IDP) so we can dedicate energy to what is most meaningful to us in research and life.

Take it easy,

Gurneet S. Sangha, Ph.D.

Assistant Professor of Biomedical Engineering
Samueli Faculty Development Chair
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Mutual Expectations

- **Transparency.** Clear and open communication is essential in our lab. I expect everyone to be honest about progress, challenges, and any issues that arise. Regular updates and candid discussions will help us work together effectively, address problems early, and maintain a collaborative and supportive environment. As outlined in the building laboratory culture section, there will be multiple opportunities to discuss challenges individually and as a group.
- **Research.** I expect you to prioritize your dissertation research and take ownership of your projects. Your research will ultimately prepare you for your next career stage. Although most of your work must be done independently, you will always have support from me and others in the lab. You can expect me to help foster an environment where your research is supported, including facilitating collaborations, securing funding, and providing emotional and labor support when needed.
- **Mentoring.** Mentoring is a cornerstone in any successful laboratory. Mentoring enables undergraduates to create an impression of research, graduate students to develop their identity as researchers, and postdocs to become leaders in their field. Therefore, I expect everyone in the laboratory to mentor. Investing time in others can also speed up your research by having help collect and analyze data.
- **Scientific Communication.** We will push each other to communicate more precisely when preparing abstracts/presentations for conferences, manuscripts for publication, and funding applications. Scientific communication is a skill that can be improved, but this requires considerable time and effort. Therefore, everyone should dedicate time and effort to improving our scientific communication.
- **Deadlines.** I will help plan experiments, prioritize tasks, and set deadlines, but it is up to you to ensure everything gets done on time. In general, you are not expected to come into the lab on weekends or holidays or stay late at night. You are expected, however, to improve over time and get your work done. I will also share my goals, so you know my deadlines and areas I am trying to improve.
- **Career Development.** Reflect on what you want for your career so we can ensure you get the training you need. This means investing time in thinking about what work-life balance means to you and what you hope to achieve throughout a lifetime, both personally and professionally. I will help you develop your IDP so you have structure for working towards your goals, connect you with those who can provide you with insights, and be available to discuss things on your mind.