

Hugenschmidt Lab Mentoring Contract

My goals for any undergraduate trainee is that they 1) learn at least one new skill, 2) can effectively communicate to both lay and professional audiences about their project, and 3) better understand the scientific method in a human- and community-focused laboratory. I consider a training relationship to be ‘successful’ if the trainee leaves the experience with new scientific knowledge and skills that help them make choices about their life and career paths. My mentoring relationships are long-term commitments.

My expectations include:

- **Read the literature** directly related to the research focuses in the lab and your project. Reading scientific literature is a skill that is a life-long endeavor. Expect initially to take up to 10 hours reading one paper thoroughly, which means looking up terms you do not know, restating in your head what you read in your own words, and generating questions about what you read.
- **Ask questions independently.** Ignorance is never an excuse (in the lab or elsewhere). If I or someone in the lab doesn’t know the answer, we’ll find out together. Expect to identify problems on your own and actively seek out guidance as you need it – do not wait for me or someone else to ask if you have a question. Do not wait for our meeting if you need an answer to get your work done. If you have a question about anything – scheduling, a protocol, a result – bring this to my attention as soon as possible and I will respond to you as soon as I can.
- **Be a good citizen.** This can mean lots of things – work collaboratively and respectfully with your lab-mates; understand and follow federal/state/institution guidelines related to safety and protection of human subjects; protect your data by following lab guidelines; be ethical in everything you do; respect my time and the time/efforts of your lab-mates.
- **You are responsible for your own career.** Set short-term and long-term goals. Be committed – science is the lab’s priority. At the end of the training, you’ll get out of your experience exactly what you put into it. Expect to add meetings and reminders to your own calendar, use correct grammar and spelling in all written communication, and respond to emails from me and others in the lab within 24 hours, even if it is to say you will send a more complete response later.
- **Strive for independence.** Ultimately, your intellectual contributions to your project should be greater than anyone else’s, including mine. Initially, you’ll need help thinking about how to analyze and present your data, generate hypotheses, and write scientifically. But, as your training experience matures, your contributions to these activities should greatly exceed mine. Collaborations within and outside of the lab can add to your independence.
- **Have fun.** Science can be frustrating and even infuriating at times. But, every day, you basically have the opportunity to see something no one else in the history of mankind has seen before. If that doesn’t excite you, you’re in the wrong job (AND that is OK! we’ll talk about it and help you take your next path forward).

I promise to:

- Help you **develop short- and long-term research goals** and pursue strategies to achieve them.
- Help with your **professional development.** This includes more general professional development questions you may have or shadowing opportunities within the Geriatrics section.
- Help you **achieve independence.** This includes not only the projects you’re currently working on, but any new directions you see as exciting opportunities.
- Keep lines of **communication** open. We can meet informally in my office or more formally. I’m busy and you’re busy – but our relationship is important. If I don’t respond to you within 24 hours, email me again to put your email at the top of my inbox – I may have just missed it.
- Provide **honest, timely, productive/constructive, and regular feed-back** on your performance. Foremost, I’ll be honest with you. But I’ll be as kind as I possibly can be in the context of that honesty.

Please use this page to guide you through the first steps of identifying your priorities for a research rotation in the lab.

1. What is your motivation for wanting to have a research experience? What is the story of why you are here?
2. Are there specific skills you would like to learn? Think about what you want to put on your resume at the end of this experience.
3. Do you have any specific interests or passions? For example, you would like to interact with brain imaging somehow, you want to learn more about cognitive testing or neuroanatomy, or you are passionate about healthy lifestyles, aging-related cognitive impairment, changes in gait, or dance?
4. What skills do you have right now? Have you had any training in statistics? Are you a good writer? Have you worked in a laboratory before? Have you done any coding? Do you know any neuroanatomy? Are you good with Excel or spreadsheets?
5. Is there a product you need to generate by the end of this experience, like a paper or poster? If so, what is the due date?
6. How long do you plan to be involved in this research rotation? Please include start and end dates if you have them.
7. Have you completed any human research ethics training before? If yes, is it CITI training and when does it expire?
8. Are there other clinical or research experiences you would like to have? For example, shadowing study visits in other studies, shadowing doctors, counselors or other professionals, etc.

9. Information needed for on-boarding:*(You can email these to me separately if you would like)
- a. Date of birth: _____
 - b. Phone number: _____
 - c. Last 4 digits of your social security number: _____

FAQs

Q: Can I investigate any question I would like to in your lab?

A: Within limits. Our lab works on research projects that span 5-10 years in planning and execution. We also either run or are part of multiple projects at one time. When you join the lab as an undergraduate for a research rotation, you will only be able to interact with one small part of this process for one project. We put years into developing the background knowledge to ask the questions we have posed in our grants. We have found the best approach for students to really learn something in a short amount of time is to focus on a research question that has already been identified as being important or interesting in the study. Then dig in and make this question you own by becoming the expert on it in the time you have.

Q: How do I identify the problem or gap in knowledge that I would like to study?

A: First, you need to identify the project you are interested in working on. Then, I will send you the grant document and/or protocol for that study. These are really important documents that can help you quickly hone in on potentially relevant questions and also the data that are available for you to ‘play’ with to answer those questions. The grant document is written as a proposal to do the research. It has a specific format that is usually either 6 or 12 pages long. The first page is called the Specific Aims and lays out the 2-3 main questions the grant aims to answer. This is followed by the main grant document, which contains a section about the Significance of the proposal (basically the background, gaps in knowledge, and importance of the questions proposed in the aims), innovation, preliminary data, and then the plan for how to execute the aims. In other words, it very succinctly tells you the gaps in literature so you can identify an important question. One caveat to this is that the grant document is usually a few years old and there may be new literature that you need to read to update your questions, but the grant document is a good place to start.

The protocol document is made once the grant is funded. It is used to document the procedures and tests used in the grant so the Institutional Review Board (IRB) can evaluate whether the study is safe and ethical to conduct. The protocol can also be used by outside auditors to evaluate whether the study team is accurately following the planned study procedures. The protocol is valuable to you because it explains the procedures and tests being done in the study, which will be the data that you can use to ask your question. There is usually a table of assessments that lists all the tests being given in the study and what visits they are collected in. This table is a your friend as you try to figure out what tools you have to answer the question you have identified.

Q: I found a gap in knowledge that is interesting. What do I do next?

A: Once you find a gap in knowledge, step 1 is to formulate a question. Plan for your question to be revised multiple times – that is part of the process! Some characteristics of a good question are that it addresses the gap in knowledge and that whether what you hypothesize is true or false, the answer moves understanding in the field forward. Step 2 is operationalizing the question. This means what actual data do you have to ask the question. Sometimes, you will find that the study did not collect the data to ask a question you are interested in. This may mean you need to formulate a different question, or you may be able to find a similar question that

you can ask with the data that were collected. Step 3 is to generate a hypothesis. The hypothesis should say what you expect to find in a very specific way that references the measures you are using. Generating your hypothesis (or trying to) may bring to light weaknesses in your question and lead you to revise the question. The rationale for your hypothesis should be based on the literature you have read, i.e., given that Smith et al. found X and Jones et al. found Y, I hypothesize that I will find Z.

Q: How do I find papers about my topic of interest?

A: A good place to start is research that is cited in the background and significance of the grant and protocol. If you see a sentence about a topic that interests you, look up the references cited for that sentence and read them. A next step is to identify leaders in the field of research you are reading about. You can sometimes identify them from reading the papers cited, or I or someone else in the lab can often tell you a key name or two for an author to look up. A good review article by a leader in the field is a big help when it exists, because this will highlight literature that expert finds to be important. You can then look up interesting papers that are cited in the review and read them. This is called 'backward searching'. Another strategy is 'forward searching', where you find one significant paper and look to see what other papers have cited it. You can do this using Web Of Science (<https://www.webofscience.com/wos/woscc/basic-search>), which is available through the Coy C. Carpenter library homepage. Web of Science will also tell you how many times a paper has been cited, which gives you an indication of the paper's importance. Most of our research relies on papers published in biomedical journals indexed on PubMed (<https://pubmed.ncbi.nlm.nih.gov/>). A search on PubMed can return a LOT of literature that varies in quality and relevance. Still, it is a tool we use a lot. Some arts-based and psychological research papers are not indexed on PubMed but may be captured by Web of Science.

Q: How do I know if a paper or journal is a good source?

A: Journals are rated by something called an impact factor. The impact factor tells you how often papers from that journal are cited. Really big and important journals like *Science* or *Nature* may have impact factors of over 40. A high impact factor for a journal does not mean that any individual article is good, but it raises the odds that the paper is judged to be important or impactful for the field. Some journals are important for a specific field, but have a lower impact factor because they are very specific, so are only read by specialists in that field (where journals like *Nature* or *Science* are read by people from virtually all scientific fields). As an example, the *Journal of Neuroscience*, the flagship publication of the Society for Neuroscience, has an impact factor of about 6. It is highly influential in the field of neuroscience and is an excellent and well-respected journal, but has a more specific readership. In general, when surveying the literature, first focus on publications from respected authors and journals with impact factors 3+.

