OVERVIEW OF MY MENTORING AND LEADERSHIP APPROACH

My mentoring and leadership philosophy.

For as long as I can remember, I have loved fitting together jigsaw puzzles. Now as the leader of the Methods for INcomplete Data (MIND) Lab at UNC-CH, my love for puzzles has transformed into fitting together my lab members' strengths to meet and exceed expectations. My drive to set ambitious goals and put systematic plans in place is fueled by my predilections for order, precision, and reliability. I believe that a goal without a plan is like a ship without a navigational system. I love connecting with people and understanding how to tap into their gifts and personalities and align them with the goals we aim to achieve together. I focus on getting to know people on a deep level and prefer listening and responding to their ideas and opinions first before rattling off my own. I strive to be sensitive to the emotions, behaviors, and tendencies of others, while also holding people to high standards of performance as a way to motivate them. I value tried-and-true solutions but am also willing to deviate from existing rules and traditions to find new answers when necessary. I use theories and models to solve problems, while also relying on intuition and a process-oriented approach to reach decisions. I hold myself accountable for the outcomes I experience, and I am eager to receive feedback and other perspectives to grow as a person and as a leader.

A "spicy" approach to guide my mentees' scientific and professional development.

An ongoing challenge I faced when working with my mentees was transitioning them from students to researchers: students tend to rely on existing knowledge to regurgitate answers, whereas researchers tend to question existing knowledge to create new answers. Inspired by 500+ hours of leadership training programs, I developed a workshop I call "Create Spicy Science," which consists of modules to transition my mentees into researchers. These modules include: (i) Desire and Trust: mentees learn how to identify what the field wants to solve (i.e., the desire) and what evidence the field needs to be convinced of a solution (i.e., the trust); (ii) Problem Premise and Solution Premise: mentees learn how to give their solutions significance by defining the problem that is important to the field and why their solution is the best one, creating desire and trust; (iii) Problem-Solution Path: mentees learn a step-by-step system to write a compelling and persuasive argument for their ideas—one that makes others want to learn more; and (iv) Feedback That is Heard: mentees learn how to identify critical writing issues, not simply grammar and punctuation mistakes, and how to communicate those issues in a way that is neither confrontational nor seen as a personal attack.

The benefits of this training has astounded me. Within a few months of this training, my mentees begin tapping into their creativity more and expressing their ideas with greater confidence. That newfound confidence has led many of them to start generating their own research ideas—ones that have turned into research projects that they designed, executed, and eventually published. Many of my mentees has also used the skills acquired from the "Create Spicy Science" training to obtain fellowships, travel awards, academic faculty positions, and more. So far, the running total number of achievements from my thirty-four mentees is 70 and counting. The external successes from this training have been exhilarating, but the true reward has been witnessing my mentees realize their potential. Many of them start their training telling me that they are not creative; by the end, their "idea bucket" is overflowing and they are eager to manifest those ideas *on their own.*

My strategy to cultivate original, rigorous, and reproducible research.

As the lab leader, I combine my excitement for statistical modeling with my interest in training the next generation of (bio)statisticians to confidently develop and test models for clinical use. How I mentor this next generation is largely motivated by my interest in producing original, rigorous, and reproducible research. Producing original research—the kind that breaks away from the default in favor of better alternatives—involves tackling problems with no immediate solutions. In my lab, I encourage my mentees to tackle these problems using a four-step process.

Step 1: Create an original idea. In this step, I work with my mentees to approach challenges with curiosity: to ask any and all questions, no matter how basic or out-of-left field, so that they can clarify why the challenges exist and brainstorm solutions to overcome those challenges. Mentees are trained to efficiently read through mounds of literature, pinpoint the most relevant pieces, connect those pieces together, and spot gaps in the field—all to identify a potential original solution.

Step 2: Make the idea rigorous. Once a potential original solution is identified, mentees then work to

make their solution rigorous in two ways. The first is to verify that their solution works in theory: they write out the solution with statistical models and then use statistical theory to check what properties are and are not guaranteed. The second is to test their solution with simulation studies, checking different simulation settings so as to not cherry-pick those in which the solution works and ignore the ones where it does not.

Step 3: Make the idea reproducible. This step involves implementing their solution in open source code in the lab's GitHub repository, which is managed by version control software, and designed for easy use by statisticians and clinician scientists.

Step 4: Publish the idea. In this step, my mentees go through the "Create Spicy Science" training to learn a specific iterative writing process, rather than a haphazard one, to write clear, articulated research papers.

This four-step process to create original, rigorous, and reproducible research is iterative and messy. Yet, I work side-by-side with my mentees to overcome any and all roadblocks. Together, we work to question the status quo, take risks, learn from failed endeavors, and push towards even better solutions that move science forward.

An overview of meeting interactions.
I invest a significant amount of time in guiding mentees. To facilitate effective skill development, various formats for mentor-trainee interactions will be used. The following list includes our typical meeting structure.

1. **Biannual lab retreats**: The MIND lab meets twice a year for a two-day retreat at my home. One day is focused on new research projects and activities the lab members would like to create. The second day is focused on maximizing each lab member's growth as scientists. These retreats have so far covered high performance, imposter syndrome, a lack of confidence, overwhelm, stress and anxiety, and challenges to communicating effectively. These retreats also help the lab members get to know each other better on a personal level and support each other.

2. **Biweekly lab meetings**: Every two weeks, the MIND lab host meetings that cover: (i) research presentations by lab members, (ii) coding practices to ensure reproducibility, and (iii) brainstorming sessions to discuss ongoing research challenges and potential strategies to tackle them. These meetings provide a collaborative and supportive environment in which mentees can develop their research skills, share their work, and receive constructive feedback.

3. **Weekly/Biweekly research meetings**: Every one to two weeks, mentees meet with me and other lab leaders for 60 minutes to discuss ongoing research activities. These meetings serve various purposes, such as reviewing comments on a manuscript in process, problem-solving any difficulties with ongoing projects, and planning for specific tasks in the upcoming week. Mentees prepare the meeting agenda to ensure a clear plan of what will be discussed and to give mentees agency and self-direction in managing their own progress.

4. **Contact between meetings**: The MIND lab employs Slack, a versatile software that allows lab members to communicate via text, voice, and video, to ensure seamless and secure communication during project tasks. Mentees are encouraged to use Slack to receive real-time feedback on ongoing projects.

In addition to the formal interactions described above, I regularly meet with lab members for lunch or coffee to explore shared interests or address challenges that may have emerged. The MIND lab encourages a culture of collaboration and mutual support among lab members to help all members achieve their goals. Mentees are strongly encouraged to seek guidance and support from the lab leaders whenever needed, and they are made to feel comfortable in doing so.