Statement on mentoring philosophy and practices- Caterina Rosano, MD, MPH

Personal circumstances and professional experiences have shaped my approach to mentoring. Because of a congenital hearing disability, I devised my own learning strategies as early as I can remember. The combination of limited financial resources with the stigma surrounding hearing loss in my community, prevented my access to hearing aids until I graduated from medical school and moved to the United States. By that time, I had already studied many books on the psychology of learning, and customized a method to compensate for my disability. I translated my learning experiences of those early years in my teaching and mentoring practices.

Professionally, I work at the intersection of two disciplines that have been traditionally taught separately: neuroscience and population science. In the absence of an integrated training program, I crafted my own curriculum, with wet lab rotations in neuroscience laboratories during and after medical school, a master in epidemiology, and hands-on research with leaders in these fields. This process has taught me many valuable lessons which have led to the design, award, and renewal of a brand new T32 training program in Population Neuroscience of Aging, with co-PI Dr. Ganguli.

Mentoring Philosophy.

I organize my mentoring philosophy and practices around the principles of maieutic, the process of *learning through asking*. This is a very interactive process where the learner/mentee plays the primary role, and the mentor coaches the learner to achieve their accomplishments. This was the primary learning method that I used during my formative years and I found it very effective. The English verb "*to ask*" comes from the Proto-Indo-European root "*ais*", which means "*to desire, to seek*". The premise is that "*to ask"* is a multi-step, active process. The first step is to know what to ask and why ("*desire*"); the second step is to acquire the tools to answer your question ("*seek*"). Based on my experience, I added a third step: share the answer with others, and act on it. I give practical example below.

Know what to ask and why (desire). My first question to students is: "What do you want to discover and why?" I call this first stage the "visionary" step. While it is rewarding seeing students' thoughts and visions coming into shape, a challenge inherent to this step is that the questions may easily mushroom and become overwhelming. My strategy to address this challenge is to work with the trainee through a dynamic process of asking/answering until there is a clear understanding of the overarching conceptual model, with testable hypotheses. I provide scientific literature and time for such discussions. This step uncovers the creativity and vision of the students, builds confidence in their own vision, and creates a solid motivation to move forward. The deliverable of this step is that the student gains ownership of their research question.

Acquire the tools to answer your question (seek). Next, we switch gears toward a very concrete and operational approach. For this step, I use an individualized development plan, tailored after the T32, articulated in specific questions: what does this person need to achieve her goals? Coursework, skills, hands-on practical research? How can other faculty help support this process? This process is uniquely tailored to fit each person's strengths and needs. The challenge of this step is that the amount of work and effort may seem insurmountable, and there is the risk of being overambitious. My strategy is to help identify timelines, expectations, milestones, as well as contingency plans. I also find that it is helpful to go back to step one, and remind the student of the motive underlying their work, renew their focus on the original goal they wanted to achieve. The deliverable of this step is a clear list of needs/haves, milestones and a timetable.

Share the answer to your question. I spend a lot of time working with my trainees to help them publish their findings, present their work at conferences/seminars, mentor junior students, as well as applying for funding. I introduce my students to my scientific community, and help them identify new networks of like-minded scholars with whom they can share their ideas. For example, I encourage them to publish at least one paper with another faculty as senior author during their training. I also encourage my students to engage each other in team writing. A challenge is to take on too many commitments, say too many "yes", and fall behind with deadlines. My strategy is to use every opportunity, including delays and rejections, to teach about time management and honest self-assessment. I believe that remembering one's goals helps to deal healthily with academic challenges (including rejections!), thus I gift my students the book "Advice for a young investigator", by the neuroscientist Ramon y Cajal, where I highlight the sentence: *"And there were so many times [...] that I thought about abandoning my work [...] until I began to see the first tenuous flashes of new ideas!"*.

In sum, my mentoring philosophy is to help the students uncover their interests, and coach them to find actionable answers through a series of concrete, goal-oriented work assignments. This process takes considerable time and effort, and I budget my time accordingly: I advise 1-2 graduate students per year.

Mentoring Practices.

I list here the main ingredients of my mentoring.

Identify and communicate clear expectations. The first thing I discuss with my trainees is to use concrete accountability benchmarks to measure their progresses. According to these benchmarks, my trainees have all been very successful: they all have publications as 1st author, submit grant proposals (many funded), engage in collaborative efforts (publications and conference presentations as co-authors), obtain gainful employment immediately upon graduation (they typically receive offer letters even before graduation). Collaborative efforts grow organically among my trainees and with other faculty. For example, my trainees typically reach out to faculty outside of my team, and engage new collaborators in their research projects. With each trainee, I have met new faculty with whom I would not have otherwise worked with. Many of my trainees are active members in conferences and associations aligned with their research topic. For example, as a graduate student, Dr. Ehrenkranz served on the Society for Epidemiologic Research panels and the Center for Neural Basis of Cognition student committee.

Foundational knowledge; I provide foundational knowledge both through one-on-one and group meetings, and through a summer course that I designed to advance scientific writing in population neuroscience via individualized and peer-mentoring classes.

Training in conducting rigorous research. I use the T32 NIH model to create an individualized development plan to set up milestones and objectives, evaluated twice a year. This is custom-tailored to each trainee's project, to ensure synergy among coursework, dissertation and professional development activities. Because my research is multi-disciplinary, I believe mentoring should be multi-disciplinary too. Therefore, I set up multidisciplinary teams to identify the curriculum tailored to each trainee's needs, and professional development activities targeted to the trainee's goal, as well clinical rotations in neurocognitive geriatric assessments and dementia adjudication. As the primary mentor, I cover key aspects of the trainee's project, and the mentoring team provides complementary expertise. I introduce my mentees to faculty who could serve in the mentoring team, and I require that each mentee ultimately chooses the faculty with the best match. As an example of cross-training, Dr. Shaaban (PhD in epidemiology) enrolled in a MS in Neuroscience while pursuing the PhD in Epidemiology, and she graduated during her postdoc.

Professional development. I want my trainees to be able to work with and lead multi-disciplinary research teams, thus I require them to attend, lead, and propose multi-disciplinary activities ranging from journal clubs, seminars, workshops, Science blitz, Book clubs and more. These activities facilitate inter-disciplinary networking and provide first-hand experience to bridge between separate disciplines and department-centric cultures. Through my own projects and collaborations, I facilitate networking with colleagues as well as access to many epidemiological datasets to conduct independent, trainee-led ancillary studies, either for new ancillary pilot data collection and/or for secondary data analyses. I engaged a voice and theater instructor at Duquesne University, to conduct a presentation skills workshop and help with voice projection, posture, mannerism. I give my students the book "Strength finder 2.0", which uses questionnaires to identify one's strengths as well as preferred communication methods (although I don't expect the trainees to share their results with me, I share mine with them).

Participatory learning environment. I solicit feedback in a comfortable, respectful atmosphere. I find trainees learn from each other, challenge one another, and count on one another for ongoing support. Twice a year, I use a *Speed Dating format,* where I invite each trainee to give an elevator pitch of their research project, and then we work to identify another trainee to match for their project, or to create a new project. These "Speed Dating" events catalyze collaborative opportunities among trainees, with papers and conference presentations. In addition to a "welcome" event, I host a yearly event called "Journal Club on Food for Brain", to discuss recent literature on the links between diet and brain health: each trainee brings a paper to discuss and a dish with the corresponding (micro) nutrients to share.

Transition to independence. This is very important to me. Since my department has a rich history of retaining trainees in postdoctoral and faculty positions, I am aware of the challenges of making a mark while building on

one's mentor's legacy. With one of my former students, Dr. Shaaban, we recently published that cross-institutional mobility increases the odds of obtaining a tenure-track faculty position, albeit for reasons that are not clear. As a mentor, this means that I pay attention to ensuring transition to independence for those mentees who remain at Pitt. Although our analyses included a large sample of health Science scholars at Pitt, it had a short follow-up and we continue to study what factors may influence these results.

DEI. I am very intentional in promoting a diverse work environment. When I advertise for trainees' positions, I work with the DEI committee at Pitt, and the Senior Vice Chancellor for the Health Sciences and the Provost Office to reach out to local and national venues. I email recruitment material, and have offered seminars to the Hot Metal bridge, the Health Professions Prep Pipeline Program, SACNAS, *Black in neuro*. I also reach out to faculty with overlapping interests at historically black medical Schools (Morehouse, Howard, Meharry). My trainees are diverse in terms of scientific background, research interest, and identity/demographics. Their backgrounds include epidemiology, neuroscience, exercise physiology/kinesiology, human and development family studies. One pre-doc is enrolled in the Medical Scientist Training Program. Among 10 PNA trainees, 5 self-identify as a member of an underrepresented group**:** 2 Hispanic, 1 Black, 3 disability, 4 disadvantaged backgrounds, 2 sexual/gender minority. I regularly include activities and resources to reduce isolation, increase community building, and promote scientific and professional networking.

Change to adapt. I continuously prepare to improve my mentoring. Instrumental for the developing of my mentoring practices has been the *Mentor Training Program* directed by Drs. Rollman and Kapoor at the Institute for Clinical Research and Education; I regularly attend modules on specific aspects of mentoring.

I endorse a rigorous evaluation plan of my mentoring, developed by CTSI colleagues Drs. Goldberg and Rubio, and I promptly act on these evaluations. For example, based on feedback from my trainees, I have added group meetings to discuss "life after T (training)" to provide information on preparing budgets, staff hiring etc. I began a SWOT 4DM, small group discussion, whereby trainees are asked to practice the Strength, Weakness, Opportunities and Threat (SWOT) model, to solve real-world problems that require Decision Making (DM), for example job offers, prioritize requests and demands, time management.

In response to the pandemic, I diversified aspects of my mentoring to increase interaction. For two years, all training activities operated 100% remotely: all in-person activities, including courses, and professional development meetings were cancelled. I launched a diverse series of interactive sessions, including "Shark Tanks", "Speed dating" and two book clubs focusing on brain aging/dementia, which is a shared topic of interest in my group. Additionally, I co-sponsored two "travelling" multidisciplinary seminars with the ADRC, and the Department of Psychology. I required each mentee to attend at least one activity (webinar, conference, journal club) outside of our group, and then report back to the group at the end of the year, to lessen isolation and "siloing" perceptions. All mentees responded to these challenges remarkably well. Not only did they maintain 100% attendance and high productivity, but they also attended more educational and networking opportunities than they would have likely attended without the pandemic, by taking advantage of conferences and webinars offered worldwide via the web (e.g. not requiring travel and often free of charge). Based on this success, I retain these activities in my current mentoring practices.

S.T.U.D.Y. I made up this acronym to summarize what I hope my students will take with them.
S: Start from your end-goal, and identify what you need to do now to get you where you want be.

T: Topic, team, timetable. These are the most important ingredients of our work.

U: Urgency. If you think that your work is important, then it is urgent that you accomplish it.

D: Do. Make to-do lists and do what you plan to do.

Y: You. This is your doctoral work, your paper, your work.