Todd A. Castoe Ph.D.: UTA Doctoral Student Mentoring Award Application 2021 – Essay

## Mentoring Philosophy

The single most rewarding aspect of my academic career is the mentoring of graduate students, and it is also the most challenging. I find it remarkably rewarding to play a central role in empowering developing scientists to be successful in the diverse ways demanded of a professional scientist, to learn how to think critically, broadly, and creatively, and to effectively shape the trajectory of their careers. One challenge is simply the importance of the role that a mentor plays, and the pressure that places on the quality and ramifications of my decisions. Another major challenge is that every mentee requires a remarkably different ‘recipe’ for success, has distinct strengths and weaknesses, and is motivated by different goals and outcomes. And, many times, this ‘recipe’ can change through time, depending on recent successes (and failures), as well as the challenges and rewards that come with conducting impactful research. Overall, the challenge of being a good doctoral mentor is that being the ‘perfect’ mentor is quite difficult, and requires a highly dynamic, flexible, open-minded, and inductive approach. Yet, despite the extraordinary scope of challenges in being an effective mentor, succeeding at this challenging goal is highly rewarding, and can have significant long-term positive ramifications for both the mentor and the student.

At its essence, I believe that good mentoring represents a mixture of empowerment, encouragement, and compassion. Empowerment comes in many forms, including both academic and personal. Conducting a Ph.D. (and conducting science in general) is quite a monumental and complex task that, at times, can be quite intimidating and overwhelming. The essential role of a good mentor is to balance enthusiasm, advice, and sincere personal/emotional support as you guide mentees through this process with the goal of developing their sense of empowerment. I am enthusiastic and passionate about science, and I incorporate this passion for science and research into my mentoring of doctoral students, and try to leverage this enthusiasm to help mentees develop their own drive and excitement about their career in science. I approach doctoral mentoring with professionalism, humor, humility, respect for the students, and a desire to create an inviting and inclusive learning and mentoring environment that represents a safe and confident atmosphere to grow, take risks, and learn from mistakes. To foster this, I provide opportunities for students to think critically and to practice formulating clear, coherent, and logical arguments, which I believe is the foundation for conducting good science. While being a leader and mentor, I also do my best to show my own humility and humanity. This includes acknowledging that I also struggle at some aspects of being a professional scientist, and sharing how I overcome my own weaknesses and develop my strengths, with the hope of empowering my mentees to learn how to do this for themselves. This transparency provides valuable insight that is crucial for motivating students to take ownership of their education, to learn to overcome weaknesses and exploit strengths, and to teach them how to effectively take control of their careers.

Since starting at UTA in 2012, I have mentored 13 Ph.D. students, and I currently have five Ph.D. students in my laboratory. Throughout this time, I have remained highly committed to making sincere investments in my students and their success, and all graduate students and postdocs have been highly successful after leaving my lab. Of the seven Ph.D. students that have graduated from my lab, six have gone on to other universities to conduct postdoctoral research, and one moved directly into a position running a genome core facility at a medical school. Two of my Ph.D. students have received NSF Doctoral Dissertation Improvement Grants to conduct research in my lab, and these two have also gone on to receive NSF Postdoctoral Fellowships. An additional current Ph.D. student graduating in May 2021 (Blair Perry) has already accepted a postdoctoral position, and has an NSF Postdoctoral Fellowship proposal pending. All of my students have been successful and productive, having published multiple papers from their doctoral work, and many have received awards for their excellence in research, including two that received Biology Department Outstanding Graduate Student Research awards, one that received the UTA-COS ACES Best Student Presentation Award, as well as those that received a number of other awards and grants. Importantly, all have moved on to successfully pursue careers in various aspects of science and education.

## Promoting success through monitoring progress and providing feedback

Goal setting, prioritizing, and time management are critical skills for success in a Ph.D. and beyond, and these are major foci of my mentoring approach. A number of studies have shown that early career productivity during your doctoral studies is a strong predictor of long-term success and trajectory in science careers. I discuss these findings openly and often with my doctoral students, as the basis for developing realistic goals for their doctoral training that can propel them forward, and work with them to develop and continually refine goals and priorities. I believe it is important to continually provide a clear path for success that incorporates long and short term goals, through careful planning that includes timelines for achievements that can be continually evaluated to understand if students are still on course to succeed in their goals, and if not, provide opportunity to reevaluate, re-plan, and reengage new plans. All students develop “planning documents” in which the students and I can continually modify and shape goals, timelines, and priorities during our regular meetings together. When we review these often, I provide supportive constructive feedback, discuss options, and when necessary, identify issues or shortcoming in the plan or our timelines. To help students understand what reasonable expectations are in the field for various types of careers, I have them attend faculty recruitment seminars and discuss current qualifications of top applicants and relate these to the developing curriculum vitae of my students. Overall, I believe that mentoring using these objective self-evaluations to assess the criteria it takes to be competitive in a scientific career is very helpful for the productivity and motivation of students, and provides actionable and empowering goals for them to work towards.

## Investing in long-term professional development

## Re-enforcing mastery through dissemination and presentation, and developing long-term professional skills

Communication skills in science are critical. In our weekly laboratory meetings, all students are required to give 3-5 slide presentations on their ongoing work, and to explain the motivations of their work to others in the lab, which provides regular opportunities to practice and improve presentation skills. Additionally, I typically expect students to give formal talks at local and national scientific meetings 2-3 times per year to further practice presentation skills. These presentations provide key opportunities for students to demonstrate mastery of their research areas, and often times expose areas important for improvement that would not otherwise have been obvious. Our lab also publishes at a relatively high rate of ~10 papers per year, and a large fraction of my time is spent working directly with students on these papers, while simultaneously providing opportunities to work with them to improve their writing skills. Perhaps unlike many other doctoral mentoring approaches, I strongly encourage students to participate in larger projects in the lab, in addition to their core dissertation research project. I believe this has a number of benefits, including expanding the training and research exposure of students, teaching them to work collaboratively, building group belonging and morale, and ultimately increasing student productivity that results from them being legitimate coauthors on multiple papers beyond their core dissertation work.

Being a professional scientist requires mastery of a wide range of skills and aptitudes, including mastery of science, critical thinking, writing, communicating, organizing, mentoring, networking, as well as proposal writing, funding management, professional service and professional reviewing of manuscripts. I also try to bring my students into various diverse aspects of my position, including them in discussions of grants and funding strategies, discussions about awards and long-term CV planning, and about presentation skills and strategies for networking. I have also kept in frequent contact with mentees that have left my lab, and frequently consult with them on academic matters and challenges as they have progress in their career. For example, not only do I continue to scientifically collaborate with past graduates, but I also continue to provide them advice on job applications, proposal writing, paper writing, and career advancement. These lasting relationships with past graduates argues for the value of my input and mentoring advice to past students that continue to rely on my mentoring even after leaving my lab.

## Creating a supportive environment to succeed and communicate

I believe in creating a safe and supportive environment for doctoral students by fostering mutual respect, through engaging in frequent interaction with me and other lab members, and by maintaining a policy of openness. Over my years of experience, I have also realized that students face many non-academic barriers to success, and often legitimately require personal and emotional support, positive reinforcement, and compassion to succeed in graduate school and beyond. To encourage these interactions and levels of support, I make certain my students trust that I am always available to them, for professional or personal matters, and work hard to maintain a very open and available relationship with them. Considering that most students are far from their families and new to the area, I believe that providing them with a personal support structure, and a sense of belonging and community are important aspect of doctoral student mentoring. To provide both professional and personal support, it is critical that as a mentor I make myself accessible and keep lines of communication consistently open to students. Indeed, students routinely call me during the evenings or weekends to discuss various professional or personal issues, and I believe this accessibility is key to their sense of belonging, security, and support.

## Connecting students to professional networks and opportunities

Connecting students with resources necessary for their professional advancement is key role of an effective mentor that I specifically try to develop for each of my students. Often when I give invited lectures, or talks at large meetings, I go out of my way to clearly and specifically champion the work of particular students and their contributions to what I discuss. Indeed, many times following my talks, various researchers in the audience go directly to my students that were mentioned and talk further with them, or come as me to introduce me to them, or even inquire if they would be interested in a postdoctoral position in my lab. I also conduct a substantial amount of collaborative projects with other labs in the field, and almost always directly involve my students in these interactions, where they can develop their own personal rapports with colleagues in the field, and thereby broaden their professional networks. Additionally, at conferences, a main goal of mine is to introduce students to professionals I know in the field, and work with them to make sincere connections with these PIs and their students to develop legitimate connections relevant to their careers. I also often help students develop professional networks and credentials by co-reviewing manuscripts (for which they get credit), engaging them in this important professional experience that enhances their networks and reputation.

## Being the mentor that you want your students to emulate

Ultimately, I believe best strategy for leadership is to lead by example, and in the context of doctoral mentoring, to do your best to embody the type of mentor that you aim for your students to emulate. At a personal level, this requires showing respect, understanding, and compassion for others, while maintaining a consistent work ethic and positive attitude that is inclusive and supportive of others. At the professional level, I believe that it important to lead by example, by being an outstanding teacher and presenter, while also demonstrating a consistent pattern of excellence in service, publication and funding. As my CV demonstrates, I have a consistent track record of publishing at high rates in quality journals, and have a strong record of research funding from multiple federal agencies (NSF/NIH). My scholarly achievements have also been recognized by multiple awards (College-level and University-level Outstanding Research Awards). In the past 8 years, I have published 56 papers (with five more in review) with my doctoral students, and coauthored 93 abstracts/presentations at scientific meetings.

## Commitments to doctoral mentoring outside of my own laboratory

In addition to the doctoral students I have mentored in my own laboratory, I have taken on a number of roles that allow me to contribute to doctoral mentoring in other ways. In 2019 I became the Chair of the newly formed Biology Graduate Student Recruiting and Admissions Committee, and as Chair have substantially restructured, streamlined, and made transparent how graduate recruiting and admissions is conducted. In this role, I am the primary contact for all thesis-based graduate admissions for the department, and also organize annual student recruiting events that have been very successful in both recruitment efforts and faculty involvement and engagement.Although this hasrepresented a major and surprisingly constant service commitment, I enjoy the position because of the importance that graduate recruiting plays in the research and mentoring enterprise of the department, and based on how much I value the importance of the graduate program overall. In the last several years I have also served on a number of departmental committees, including Team Leader for the Genomics Doctoral Core Course for our recently restructured Ph.D. curriculum. Additionally, I serve on a large number of Ph.D. student committees within and outside the department and university (averaging 25 or more Ph.D. committees in addition to my own students at a given time); while this represents a major commitment, it provides key opportunities for me to interact with other research labs and incoming students, and in several cases has led to new collaborations and interactions with colleagues and doctoral students that have been rewarding. These roles also provide me with insight into how other colleagues approach mentoring of their doctoral students, which can be highly informative, and provide new ideas and perspectives on how other colleagues approach doctoral mentoring.