

University of Utah Teaching Assistantship: Graduate Teaching Mentor Program

January 2018

A. Summary:

Department: Mathematics

Mentor: Kelly MacArthur (macarthur@math.utah.edu)

Co-Nominee: Anna Nelson (anelson@math.utah.edu)

TA Assignments:

Fall 2015: Lab Assistant, Differential Equations and Linear Algebra (MATH 2250)

Spring 2016: Instructor, Introduction to Quantitative Reasoning (MATH 1030)

Summer 2016: Online Instructor, Introduction to Quantitative Reasoning (MATH 1030)

Fall 2016, Spring 2017: Instructor, College Algebra (MATH 1050)

Summer 2017: Online Instructor, College Algebra (MATH 1050)

Fall 2017: Instructor, Business Calculus (MATH 1100)

Spring 2018: Instructor, Calculus II (MATH 1220)

Co-Nominee: Rebecca Terry (terry@math.utah.edu)

TA Assignments:

Fall 2013: Lab Assistant, Accelerated Engineering Calculus II (MATH 1321)

Spring 2014: Lab Assistant, Differential Equations and Linear Algebra (MATH 2250)

Fall 2014-Spring 2015: TGLL (GK-12 NSF) Fellow

Fall 2015: Instructor, Engineering Calculus I (MATH 1310)

Spring 2016: Instructor, Engineering Calculus I (MATH 1310)

Fall 2016: Instructor, Accelerated Engineering Calculus I (MATH 1311)

Spring 2017: Lab Assistant, Engineering PDEs (MATH 3140)

Fall 2017: Lab Assistant, Engineering Calculus I (MATH 1310)

Spring 2018: Lab Assistant, Engineering Calculus II (MATH 1320)

Note on distribution of award:

This proposal is to continue the Graduate Teacher Mentor (GTM) program that was implemented for the first time in 2017-2018. To strengthen the current mentorship program, we propose two graduate students implement the program in the 2018-2019 academic year. We believe first-time instructors would greatly benefit from multiple mentors who have taught a variety of courses that cover the classes typically taught by beginning instructors. We would be able to put on more professional workshops for developing instructors and provide different yet equally valuable perspectives on teaching.

To continue the GTM program, we are proposing that the assistantship be shared between the two co-nominees. Responsibilities and funding would be divided between the Fall and Spring semesters. In each semester, there would be a primary GTM supported by the UTA and

the other co-nominee would continue to serve as an instructor in the department while participating as a secondary mentor. Given how important continuing the GTM program is to the development of graduate student instructors, if sharing of the assistantship is not possible, we would also propose one of the co-nominees receiving funding for the entire year.

B. Proposal Narrative:

Title: Graduate Teaching Mentor Program

UTA Assignment:

The Department of Mathematics at the University of Utah has a thriving graduate program, with an enrollment of 104 graduate students. Each graduate student is required to teach a minimum of two courses and unless supported by other grants, graduate students are assigned as either lab assistants or instructors each semester. Since many of the 1000 and 2000 level courses are taught by graduate students, they have a direct impact on undergraduate education at University of Utah. For the Spring 2018 semester, graduate students are teaching 41 of 71 sections at the 1000 level and 5 of 21 sections at the 2000 level as well as the majority of the 53 lab sections. In Fall 2017, these 1000 and 2000 level courses had 6,555 undergraduate students, making graduate instructors a critical aspect of undergraduate education at the University of Utah. During a 2015 study, USHE found that students who took math (including remedial courses) their first year in college are three times more likely to pass credit-bearing math in 5 years (“Education Elevated” 2016). These courses, including MATH 1010 are taught mostly by graduate student instructors.

Currently, the department requires all incoming graduate students to attend an in-depth teaching assistant training program two weeks before the start of their first semester of graduate school. In their first year, graduate students are typically assigned lab sections for their teaching assignments in preparation to manage their own classes during their second year. During this first year of full, autonomous teaching, the faculty member coordinating that particular course is required to observe the graduate student instructor at least once a semester. The department also offers an optional student teaching seminar run by faculty where students can discuss their teaching experiences, learn about pedagogy, and develop their own teaching philosophy.

Last year, the current **Graduate Teaching Mentor** (GTM) program was implemented for the first time by Sean McAfee who mentored first year instructors for the 2017-2018 school year. The GTM met with first-time instructors, observed their teaching, and helped course coordinators mentor beginner teachers. However, due to the size and demand from current graduate student teachers, we propose expanding the role and number of GTMs in order to assist all the graduate instructors that would benefit from peer mentoring. We would also like to double the number of workshops held for first-time instructors and open these workshops to instructors of all levels, as there is little teaching development for graduate student teachers after the two-week teacher training. Therefore, in this proposal we wish to create a program for multiple GTMs with an expanded role in the department. The responsibilities of the GTMs would include the following:

- Meet with mentees prior to their first day of teaching to discuss teaching goals for the course and help with course preparation (syllabus, first lecture).
- In-class observations of mentees during the first week of class and throughout the semester, followed by debriefings where the mentee and GTM discuss the lecture.
- Coordinate mid-semester and end of semester course evaluations for mentees and analyze trends in student feedback.
- Have mentees observe other graduate students teach a similar course and meet to discuss the lecture.
- Hold quarterly workshops for first-time and beginning instructors on topics such as: active learning (engaging students in the classroom), online learning, classroom prep, technology usage, and equity and diversity in the classroom.
- Meet with course coordinators to discuss mentee development throughout the semester. Also, fill in for course coordinators and observe beginning instructors during the semester when the coordinator is unavailable.
- Monthly peer discussion with first-time and less experienced graduate students to discuss classroom management and teaching strategies in a low-risk, peer-to-peer environment.
- Continue compiling database of resources for 1000 level classes, including: sample syllabi/course materials, prior instructor contact information, and useful information about the course, such as “What are the most common questions students ask?” and “What are some good examples to use for this concept?”
- Continued assessment of the 2017-2018 GTM program, including evaluation of collected data.

Continuing the GTM program in the department would allow for stronger graduate student instructors and more opportunities for career development. As cited in Yee & Rogers 2017, it has been shown that peer-to-peer mentoring improves the quality of graduate education and fosters a community of practice among participants. The addition of multiple GTMs would provide first-time instructors with different perspectives on teaching as a graduate student, and offer multiple peer mentors with whom new instructors can discuss different teaching styles. The co-nominees for the 2018-2019 GTM program have teaching experiences that complement each other by covering a large number of courses that would be taught by new graduate teaching assistants. With more resources and additional mentors, the expanded and renewed GTM program would continue the professional development of our most talented graduate teachers and provide peer-to-peer guidance for new and less experienced instructors.

Interaction with Undergraduates:

Given that graduate teaching assistants account for more than half of the instructors at the 1000 and 2000 level, many undergraduate students taking math classes at the University of Utah will receive instruction from beginning instructors. As these entry-level mathematics classes serve as prerequisites for a number of majors, it is important for undergraduates to receive quality instruction. Teaching a course for the first time provides challenges regardless of the level of the instructor. For new, graduate teaching assistants, having a peer

mentor would help mitigate many of these challenges, providing a higher quality educational experience for undergraduate students.

Mentor:

Kelly MacArthur is an instructor lecturer and an associate chair of the Department of Mathematics. Kelly is considered to be one of the most experienced instructors in the department and coordinates two courses offered at the University of Utah. She is also the organizer and co-facilitator of TA training for first-year teachers. Kelly routinely observes graduate student instructors and has extensive experience mentoring first-time teachers. As mentor to the Graduate Teacher Mentors, Kelly will offer leadership and advice and will meet regularly with the GTMs to assess the progress of the program.

The UTAs:

Anna Nelson is a fourth year graduate student in the Department of Mathematics. She is one of the highest rated instructors in the department in terms of student evaluations and has teaching experience in a variety of classes. Anna has been an instructor for the graduate student teacher training seminar held every summer for two weeks, and will be the head facilitator for the training seminar this coming summer.

Rebecca Terry is a sixth year graduate student in the Department of Mathematics. She has experience as both an instructor and lab assistant in the engineering math sequence. She also received a Think Globally, Learn Locally (TGLL) GK-12 NSF Fellowship through the Center for Science and Math Education (CSME). She will be an instructor at the 2018 summer, two-week, intensive TA training for first-year instructors.

The teaching experiences of these two TAs complement each other and cover the scope of courses that are typically assigned to beginning graduate teaching assistants.

Prior support:

Last year, Sean McAfee received UTA support for the Graduate Teacher Mentor program, which was implemented for the first time. As the program is currently taking place, Sean is continuing to conduct observations and collect data that will be used for overall assessment of the program. As part of the observations, Sean kept track of student-instructor interactions in the classroom and provided feedback to mentees. Sean mentored 8 students in Fall 2017 and 6 students in Spring 2018. He also ran a January Workshop for instructors preparing to teach in Spring 2018. Anna Romanova also received support to teach a Representation Theory course during Spring 2018.

Assessment Plan:

The success of the proposed Graduate Teacher Mentor program will be evaluated through several methods. To assess the initiative to help first-year teachers engage students in the classroom, GTMs will observe first-year instructors and quantify the number of student-instructor interactions. To assess the impact of the program on undergraduate learning and

performance, we will review student grades across course sections and over previous years to determine the effect on student performance. We will also compare data on final exam assessment questions utilized to determine key conceptual understanding.

To assess the efficacy of the mentoring program with respect to graduate student instruction, the department will review and compare student course evaluations of first-time instructors to the evaluations of other instructors teaching similar sections during the same semester. We will also compare the course evaluations of first-time instructors participating in the mentoring programs to those of first-time instructors teaching similar sections in years prior to the initiation of the mentoring program to determine if the mentoring program has a significant impact on the quality of instruction as evaluated through student feedback. As this will be the second year of the program, we also plan to utilize these assessments to track the progress of graduate students who went through the inaugural program to determine long-term impacts of the mentoring program on teaching efficacy.

To assess the overall teaching development of the beginning graduate teaching assistants, we will also design evaluations to be completed by both the mentees and GTMs at the start and end of each semester to track progress with respect to classroom presence, student interactions, and instruction confidence. Finally, to assess the efficacy of the quarterly workshops we will design pre- and post-workshop surveys to determine what knowledge was gained by participation in the workshop.

References:

- “Education Elevated by 2022”, Utah State Board of Education, 2016.
<http://le.utah.gov/interim/2017/pdf/00000235.pdf>
- S. Yee and K. Rogers. “Training Graduate Student Instructors as Peer Mentors: How were mentors’ views of teaching and learning affected,” *Proceedings of the 44th Annual Conference of the Research Council on Mathematics Learning (RCML)*, v. 44, 2017.

C. Additional Requirements:

Letter of Support:

See attached.

Statement of Purpose:

Graduate teaching assistants (TAs) in the mathematics department are an integral part of undergraduate instruction. Many graduate students enter graduate school with little or no, formal teaching experience. However, instruction quality is one of the most important aspects of any class. This is especially true in mathematics where one ineffective instructor early in a student’s academic career may have a dramatic effect on future performance and retention in STEM. Since graduate students teach more than half of the 1000 and 2000 level math courses, fostering quality graduate student instructors is incredibly important to undergraduate education at the U.

While the two-week, intensive TA training in the first year provides a solid foundation for beginning instructors, there are unanticipated questions and issues that arise throughout one's first year. When we were both beginning instructors, we sought out advice from experienced instructors, including graduate students to gain insight and feedback on our teaching. By extending the GTM program, all beginning instructors would benefit from a peer mentor who would observe their teaching practices, provide constructive feedback and answer questions about best practices, classroom management, and student-centered techniques.

Students who choose to attend graduate school in mathematics typically have an academic record of excellence in mathematics. Learning mathematics well and teaching mathematics well are two, distinct abilities. For beginning instructors, there is a question of how to present concepts effectively, and a lack of insight into which topics students find especially challenging. An experienced peer mentor would help beginning instructors anticipate common mistakes and introduce methods of instruction that would mitigate confusion. When teaching for the first time, it sometimes feels like one is "reinventing the wheel." A database of course materials would provide access to models of well-structured courses that beginning instructors could refer to while developing their own materials and coming into their own teaching styles.

A challenge for many graduate TAs is balancing the demands of being a student and researcher with the demands of being an instructor. Peer mentors could provide insight into how to balance these responsibilities and identify resources for struggling students. As graduate student instructors, we also understand the importance of quality instruction from the perspective of both student and teacher. While we recognize that there is no unique way of being an effective teacher, consistent mentoring and development of teaching methodologies is key to becoming a quality instructor. As peer mentors, we would help instructors navigate their first year of teaching and offer them different teaching strategies to develop throughout their careers.

Mentoring graduate instructors throughout their first year will not only foster growth in the mentees' teaching abilities but also enhance the teaching and communication skills of the mentors as well, providing the opportunity for additional reflection on teaching philosophies and techniques and continued professional development. By continuing the GTM program, we hope to improve the teaching experience and quality of instruction of graduate TAs at all levels as well as the learning experience of the undergraduates in their classes.