University of Kentucky
College of Arts & Sciences
Mathematics

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Dear members of the search committee,

I am excited to apply for the tenure-track Assistant Professor position in the Department of Mathematics at _____. Fine to stand alone or add here with particular professional ties to this location.

In my ten semesters of teaching experience, I have served as both a primary instructor and as a recitation leader. I have taught courses ranging from Contemporary Mathematics, a survey course for mostly freshman, to Matrix Algebra, a course for junior STEM majors. I ultimately want students to leave my class better prepared to enter the next chapter of their lives. This means helping them develop personal and professional skills in addition to technical skills. I focus on critical thinking, communication, and collaboration, each of which fits into the mathematical curriculum and is transferable to other aspects of life. I also like to incorporate flexibility in assessment when I have input in course design. This helps prevent unconscious bias in grading because there are multiple avenues to succeed. Through surveys and direct communication, I continue to learn from my students and adapt my instruction to their needs during and after each semester. I was honored to receive the UK Arts & Sciences Outstanding TA award in May of 2022, for my cumulative teaching history and my excellence in undergraduate instruction. This award is one of only five annual awards for STEM teaching assistants in our college.

My research uses combinatorial structures to study problems in algebraic geometry. For instance, algebraic curves can be transformed into discrete graphs by a process called tropicalization. My thesis particularly studies if the Wahl map is surjective on a curve by examining the corresponding graph. For my research in this area, I earned the Ed Enochs Graduate Scholarship in Algebra at the University of Kentucky in 2021. While I reframe advanced algebraic problems into combinatorial ones in my own research, this research also provides opportunities to make problems more attainable. I have worked with undergraduate students at the University of Kentucky to study the solvability of sliding-block puzzles by reframing the problem using graphs. The nodes for these graphs represent a particular orientation of tiles, and the edges represent when one orientation can transform into another by sliding a single tile. While this problem is not tropical, it also uses graph theory to study the group of solvable puzzle orientations. I have several ideas on projects that encourage junior collaborators, especially undergraduates.

Particular to school…

My undergraduate program was at a STEM school, so I am familiar with courses in mathematics taught with applications to science and engineering. During that time, I had one summer internship at the NSA and another at MIT Lincoln Laboratory, each in machine learning. I have used both python and SageMath in my research and these internships. Therefore, I can share my experiences with students who are interested in a career in industry or academia. I am excited about the emphasis on interdisciplinary studies at _____ and would look forward to collaborations to help develop such courses.

Through my position as a researcher and instructor, I pride myself in advocating for social justice in my classroom and my community. I was honored in 2022 with the Diversity, Equity, and Inclusion (DEI) Award by

my department at the University of Kentucky for starting a petition to make doctoral regalia more gender inclusive, for my inclusive teaching methods, and for my role as a Graduate Student Council representative of my peers in the department. I look forward to the opportunity to discuss further how I can contribute to the mission of the Department of Mathematics at _____.

*Conclusion with reference to enclosed materials and JMM attendance. “I will be attending JMM 2023 in Boston and would look forward to meeting with a representative from _____.” Also could put personal ties to location here.

Sincerely,

Angela Hanson