MATH MOMENTS

A Newsletter of The University of Tennessee at Chattanooga Department of Mathematics

Issue 4 Fall 2021

# Department of Mathematics Faculty Recieve Multi-Year Grants from National Science Foundation

Two members of the faculty of the University of Tennessee at Chattanooga Department of Mathematics recently received multi-year grants for their research from the National Science Foundation.

Dr. Lakmali Weerasena, Assistant Professor of Mathematics in the Department of Mathematics, has been awarded a $249,860 grant from the National Science Foundation for the project entitled “Advancing Approximation of Heterogeneous Multi-Objective Set Covering Problems with Modeling and Applications.”

This project aims to efficiently solve large-scale set covering problems (SCPs) associated with decision making in conservation planning and emergency medical service management through new multi-objective models, algorithms, and theory. The new models investigated in this project are complex covering models, and mathematically driven approximations algorithms are necessary to solve them efficiently.

Integration of education and outreach activities in this project and broadening participation of under-represented groups in STEM are among the highly impacted outcomes of this project. A significant societal impact of this project is that it involves developing systematic, structured mathematical models for locally pressing environmental problems and new theories to solve these models.

Dr. Eleni Panagiotou, Assistant Professor of Mathematics in the Department of Mathematics, has been awarded a five-year, $537,000 CAREER grant from the National Science Foundation. This is only the third CAREER grant awarded to a faculty member at the University of Tennessee at Chattanooga.

The grant will facilitate the study polymer entanglements from a topological perspective. These entanglements are an essential part of cell division, though it is still unknown exactly how they work.

Panagiotou will be working with both undergraduate and graudate students of topology to help understand how these entanglements affect cell division. The research could be used in the future to help treat Alzheimer’s and other dimential disorders.

# Note From the Department Head

Dr. Chris Cox | Department Head

## From the Department Head:

An article in the Dec. 7 Washington Post is entitled, "Gen Z most stressed by coronavirus, citing pandemic toll on careers, education and relationships, poll says." The age group identified specifically is 13 to 24. This news comes as no surprise to university faculty, staff, and administrators, as we see the effects of the pandemic on enrollment, retention, and success of our students. The math department has taken several steps to provide extra help for students in these difficult times. Last summer, we piloted a Calculus Prep Camp, led by Tracy Hughes. The program was developed at the request of and in cooperation with the UTC College of Engineering and Computer Science. This fall, we implemented new step-down courses in MATH 1010 Mathematics in the Modern World and MATH 1130 College Algebra. These new one-hour courses, taught by Professors Angelique Ramnarine and Tracy Hughes respectively, provided supplementary help for students during the second half of the semester. The Dean of the College of Arts and Sciences, Dr. Pam Riggs-Gelasco, is working with the department heads of Biology, Geology and Environmental Science, Chemistry and Physics, and Mathematics to plan a STEM teaching workshop to be held after spring classes end in May 2022. While the pandemic has created stress for students as well as university employees, I see a silver lining in the incentive to consider innovative teaching styles and formats that we will continue to use post-pandemic.

This is a year of growth for the Department's graduate program. We currently have 14 Mathematics master's students and six students in the Computational and Applied Mathematics Ph.D. program. And, barring any immigration hold-ups, we will have one new PhD and two new MS students in January. I'm grateful to our Director of Graduate Studies, Lingju Kong, and the Graduate Committee for their efforts in building up our graduate program. Thanks to the successful proposal-writing efforts of our faculty members, there are increasing opportunities for graduate research funding. Jin Wang secured further funding from NIH this year to model the impact of the COVID-19 pandemic. Lakmali Weerasena received NSF funding for her research in multi-objective optimization. Eleni Panagiotou was awarded an NSF CAREER grant to study polymer entanglements from a topological perspective. My understanding is that this is only the third CAREER award ever granted to a UTC faculty member, and one of the other two grants was transferred here from another university. Along with these recent grants for which math faculty are Principle Investigaors, there are several other grants on which our faculty are co-PI's, along with several proposals under consideration.

The holidays are often a time of reflection and goal setting. Among those things on my wish list for 2022, one of the highest priority items is seeing our undergraduate degree program more strongly achieve its potential. There is an ever-increasing demand for math majors. In support of that statement, here are three articles that I find interesting:

- 2021's 100 Best Jobs in America, https://money.usnews.com/careers/best-jobs/rankings/the-100-best-jobs. Statistician is NO. 6; three others in the top 15are IT-related.
- Is College Worth It? A Comprehensive Return on Investment Analysis, https://freopp.org/is-college-worth-it-a-comprehensive-return-on-investment-analysis-1b2ad17f84c8. "Even if students were responsible for the full cost of their education, it would still be financially worthwhile to pursue [engineering, computer science, economics, mathematics, health, or architecture."]
- The Era of the Mathematician Has Arrived, https://towardsai.net/p/l/the-era-of-the-mathematician-has-arrived. "Only those with a math background can truly make sense of the tsunami of analytics that is already on our shores." This article was recently sent to me by friend of the department Michael Colvin.

I envision great opportunities ahead for the UTC Math Department.

I learned a new word recently. Under a friend's e-mail signature, I saw the phrase "pursuing eudaimonia one day at a time." On psychologytoday.com I see that eudaimonia is sometimes defined as flourishing or living a life that is worthwhile, fulfilling, and elevating. The "Eudaimoniacs'" might be an interesting name for a philosophy department's intramural athletic team. More seriously, helping students prepare to flourish or live a life that is worthwhile, fulfilling, and elevating is one of the most rewarding aspects of my work. I look forward to our continued effort in that endeavor.

I wish you a safe and recuperative holiday season.
-Chris

# Department of Mathematics Welcomes Dr. Xiunan Wang to Faculty

The University of Tennessee at Chattanooga Department of Mathematics welcomes Dr. Xiunan Wang to the faculty for the 2021-22 academic year. She will be serving as an Assistant Professor in Mathematics in the department. Wang originally obtained her tenure-track position offer from UTC in 2020. She was delayed, however, to start in fall 2021 due to the Covid-19 pandemic.

Wang is originally from China and received her Ph.D. from Memorial University of Newfoundland in Canada in 2017, under the supervision of Dr. Xiaoqiang Zhao. After graduating from MUN and before joining UTC, she worked as a postdoc with Dr. Xingfu Zou at the University of Western Ontario and with Dr. Hao Wang, Dr. Mark Lewis and Dr. Michael Li at the University of Alberta.,

Wang's research area is Mathematical Biology. She uses the methods and theories from differential equations and dynamical systems to solve problems in ecology, epidemiology, and immunology.

The projects that she and her collaborators have studied during the past few years include rabies transmission in spatially heterogeneous environments, the effects of insecticide-treated bed nets and novel bacteria in malaria control, modeling Lyme disease among tick population with stage-dependent feeding durations, stage-structured mosquito population dynamics with nested delays, HIV infection dynamics and treatment evaluation, the impact of regional climate on sea lice dynamics on salmon farms, seasonal predator-prey population cycles, review of delay differential equations and memory-based animal movement models, and prediction of COVID-19 daily confirmed cases.

# Department of Mathematics Celebrates Fall 2021 Graduates

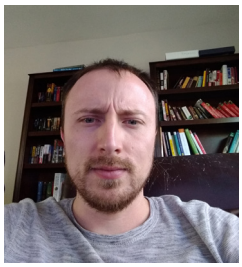
**BS Math: STEM Education**

Taylor Lutgen is from Ringgold, GA and plans to begin her career in full-time teaching in August. She does not have a specific memory of her time at UTC but believes the Math Department has some of the most understanding and kind professors on campus. She says, “from college algebra to analysis I’ve had the honor of learning from the best and I’m so happy I chose UTC!”

Cody Rind is from Chattanooga, TN and is currently working as an IT Business Analyst at Unum. He plans on continuing in this position after graduation. While here at UTC, he took advantage of the Unum Scholar Program to gain experience in the field of mathematics. He hopes to move up the ranks at Unum in the IT operations department using what he learned here at UTC.

Megan Seals is from the Henderson/Brentwood area of Tennessee and has already accepted a position at Covenant Solutions in Chattanooga as a brokerage pricing analyst. She plans on staying at Covenant and is considering graduate school in the future. Her favorite memory at UTC was working in the Math Department as an Undergraduate Classroom Assistant. At the time, it seemed quite useful when she believed she would be a teacher after college. It was handy for getting a refresher on basic statistics and hearing the experiences of instructors on campus.

**MS Math: Math Education**



Joshua Nowlin graduates with his master’s degree in mathematics education after serving as a Graduate Assistant in the Math Department assisting with various courses and teaching Math 2100 Introductory Statistics. He is originally from Beechgrove, TN and plans to teach at either the college level or in a private school. His favorite memory at UTC was hanging out in the EMCS Math room with all the other math majors.

**Also graduating in Fall 2021**

Baylee Brown - B.S. Mathematics: General Mathematics
Sally McDonald - B.S. Mathematics: General Mathematics
Daniel Wittry - B.S. Mathematics: Genreal Mathematics

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