

CATHERINE MARY KENYON

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EDUCATION

- Ph.D. Candidate in Engineering and Science Education *expected May 2023*
Clemson University
Advisor: Dr. Lisa Benson
- M.S. in Mathematical Sciences May 2019
Clemson University
Thesis: The Calkin-Wilf Tree and Its Various Properties
Advisor: Dr. Neil Calkin
- B.S. in Mathematical Sciences May 2017
Clemson University
Concentration: Applied and Computational Mathematics

RESEARCH INTERESTS

- Mathematics Education and Student Motivation
- Student Future Time Perspective
- Combinatorics and Discrete Mathematics

RESEARCH EXPERIENCE

- Graduate** August 2019 - Present
Clemson University *Clemson, SC*
- Currently investigating the relationships between assessments in a calculus classroom with students' Future Time Perspectives. This research motivates my dissertation to unveil how engineering students perceive the purpose of taking calculus exams and how these perceptions affect their future as an engineer.
- Graduate** August 2019 - Present
Clemson University *Clemson, SC*
- Assisted Khushi Patel (Ph.D. Clemson Engineering and Science Education) with work coinciding with her dissertation topic. We referenced concept maps students in a chemistry course drew to conceptualize stoichiometry and turned those maps into mathematical graphs in order to analyze the relationships students perceive. This work continues by abstracting the idea of using graph theory to analyze student generated concept maps from other disciplines.
- Graduate** August 2019 - May 2020
Clemson University *Clemson, SC*
- Assisted Tony Nguyen, a Ph.D. candidate in Clemson's Engineering and Science Education department, with work coinciding with his dissertation topic. We used the limited literature about symbols in mathematics to determine the symbol load and symbol density of calculus exams.

RESEARCH EXPERIENCE (CONTINUED)

Graduate

Clemson University

May 2018 - May 2020

Clemson, SC

Assisted Dr. Neil Calkin, Dr. Billy Bridges, and Dr. Matt Saltzman concerning placing kings on a $m \times n$ chess board and on an $\ell \times m \times n$ board in relation to Knuthian Theory using methods from combinatorics, probability, statistics, algebraic graph theory, and computation.

Graduate

Clemson University

August 2018 - May 2019

Clemson, SC

Co-led an undergraduate research project with Dr. Neil Calkin to establish the relationship between Newton's Method and continued fractions. We started with the function $f(x) = x^2 - 2$ to find the root $\sqrt{2}$ and how this relates to its continued fraction expansion. The research continued to explore alternate functions with roots like \sqrt{m} and imaginary roots. Undergraduates included Sylvia Wu, Evan Haithcock, and Killian Davis.

Graduate

Clemson University

January 2019 - May 2019

Clemson, SC

Co-led an undergraduate research project with Dr. Neil Calkin to understand the intricacies behind Benford's Law, its associated probabilities, and distributions that arise under certain conditions. Undergraduates included Sylvia Wu, Evan Haithcock, and Killian Davis.

Graduate

Clemson University

May 2017 - March 2019

Clemson, SC

Worked under Dr. Neil Calkin to produce a Master of Science Thesis. Research included closely studying patterns and relations found throughout the Calkin-Wilf Tree and how these results are related to other areas of mathematics research as well as proving distributions exists over \mathbb{Q}_+ and if these distributions carry over into \mathbb{R}_+ by studying properties of continued fractions in the tree.

Undergraduate

Clemson University

January 2016 - May 2017

Clemson, SC

Conducted research under Dr. Qingshan Chen through the Mathematics Department at Clemson University. The goal of the research was to better predict weather outcomes for longer forecasts. Research included closely studying the Runge Kutta method in relation to Edward Lorenz's various chaos models, including Lorenz63 and Lorenz96. Research under Dr. Chen also focused on the Multilevel Monte Carlo Method to determine the best sample size for the models as well as the uncertainties associated with the models at differing levels.

Undergraduate

Clemson University

August 2016 - May 2017

Clemson, SC

Participated in a research Creative Inquiry group under Dr. Jim Brown through the Mathematics Department at Clemson University. The goal of the research was to count the representations of sums of squares. Research was small group based with five other mathematics students at Clemson. Investigation included the study of the Gaussian integers to show unique factorization, the use of modular forms to represent the sum of squares, and the ideas of the Principle Congruence Subgroups and Eisenstein Series to find how many ways to write an integer n as a sum of r squares.

WORK EXPERIENCE

Course Coordinator Fall 2021 - Present
Clemson University School of Mathematical and Statistical Sciences *Clemson, SC*

Coordinating MATH 1040: Pre-Calculus and Introduction to Differential Calculus and MATH 1070: Differential and Integral Calculus at Clemson University. Creating course content, course structure, and assessments as well as overseeing all sections of both courses and their multiple instructors.

Lecturer Fall 2020 - Present
Clemson University School of Mathematical and Statistical Sciences *Clemson, SC*

Teaching calculus courses within the School of Mathematical and Statistical Sciences at Clemson University. Have experience teaching in-person, online, hybrid, and in a flipped classroom format.

Private Tutor Spring 2017 - Present
Clemson University/Tri-County Technical College/Various High Schools *Clemson, SC*

Tutoring students one-on-one for various math classes including: AP Calculus, Calculus of One Variable I, Calculus of One Variable II, Physics with Calculus I, Business Calculus, and GRE Prep.

Internship May 2014 - August 2014
Savannah River Site *Aiken, SC*

Worked closely with engineers and geologists in the Closure and Waste Disposal Department of the Savannah River Remediation branch. Projects concerned groundwater flow and the future disposal and effects of nuclear waste.

Internship January 2014 - April 2014
Tigers Teach *Seneca, SC*

Participated in an internship program between Clemson University and the South Carolina High School system. Observed high school mathematics classes at Seneca High School. Created and taught lesson plans for the class as well as generated specific goals for the students. Worked with a cooperating teacher to learn about the education system.

TEACHING EXPERIENCE

Course Coordinator Fall 2021 - Present
MATH 1040: Pre-Calculus and Introduction to Differential Calculus
MATH 1070: Differential and Integral Calculus

Lecturer Fall 2020 - Present
MATH 1040: Pre-Calculus and Introduction to Differential Calculus
MATH 1070: Differential and Integral Calculus
MATH 1070: Differential and Integral Calculus (RiSE)

Graduate Teacher of Record Fall 2018 - Summer 2020
MATH 1060: Calculus of One Variable I
MATH 1060: Calculus of One Variable I (RiSE)
MATH 1070: Differential and Integral Calculus

Teaching Assistant Fall 2017 - Summer 2018
MATH 1060: Calculus of One Variable I

JOURNAL PUBLICATIONS

What Newton might have known: Experimental mathematics in the classroom Nov 2021
Neil J. Calkin, Killian Davis, Evan Haithcock, Catherine M. Kenyon, Sylvia Wu
American Mathematical Monthly

Lognormal distributions: what not to expect when you're expecting July 2020
William C. Bridges, Neil J. Calkin, Catherine M. Kenyon, Matthew J. Saltzman
Communications in Statistics

CONFERENCE PUBLICATIONS

First-Year Engineering Student Perceptions of Calculus Exams and Future-Oriented Motivation June 2022
Catherine M. Kenyon, Lisa C. Benson, William C. Bridges
American Society of Engineering Education Annual Conference and Exposition 2022

PRESENTATIONS

ASEE Annual Conference and Exposition June 2022
First-Year Engineering Student Perceptions of Calculus Exams and Future-Oriented Motivation

Virginia Tech Engineering Education Seminar February 2022
First-Year Engineering Student Perceptions of Calculus Exams and Future-Oriented Motivation

Tennessee STEM Education Research Conference (Poster) January 2020
A Graph Theoretical Approach to Analyzing Concept Maps

Tennessee STEM Education Research Conference (Poster) January 2020
Statement Complexity and Calculus I Exam Performance

Masters Thesis Defense March 2019
The Calkin-Wilf Tree and Its Various Properties

Clemson University Math Club Talk March 2019
The Calkin-Wilf Tree and Its Various Properties

Departmental Honors Defense April 2017
Studying Chaos and Likelihood Using the Lorenz96 Model and the Multi-level Monte Carlo Method

Southeastern Conference for Undergraduate Women in Mathematics November 2016
Counting the Representations of an Integer as the Sum of Squares with Modular Forms

NOTABLE WORKSHOPS

Using Interpretative Phenomenological Analysis to Study Psychological Experience within Engineering Education

AERA: Three Approaches to Qualitative Data Analysis

CERTIFICATIONS

Group 1 Investigators Conducting Social and Behavioral Science Research (SBR)
valid through September 22, 2023

Social and Behavioral Responsible Conduct of Research Course 1 (RCR)

AWARDS

Graduate Travel Grant (\$750)	Fall 2022
Graduate Travel Grant (\$750)	Summer 2022
CECAS GSAB Travel Award (\$350)	Summer 2022

HONORS AND RECOGNITIONS

Outstanding TA Award <i>Clemson University, School of Mathematical and Statistical Sciences</i>	April 2018
Magna Cum Laude Graduate <i>Clemson University</i>	May 2017
Departmental Honors Graduate <i>Clemson University, Clemson Honors College</i>	May 2017
General Honors Graduate <i>Clemson University, Clemson Honors College</i>	May 2017

LEADERSHIP AND MEMBERSHIP

American Society of Engineering Education	2022 - present
American Women in Mathematics Member	2017 - present
American Women in Mathematics Vice President (Clemson Chapter)	2018 - 2019
American Mathematical Society Member	2017 - 2019

COMPUTATIONAL SKILLS

- nVivo
- RStudio
- L^AT_EX
- Qualtrics
- MATLAB
- Microsoft Suite

NOTABLE VOLUNTEER SERVICE

Clemson Calculus Challenge Volunteer, MAA Southeastern Section Conference Volunteer Coordinator, American Mathematics Contest Proctor, Math Kangaroo Proctor, Math Honor Society Tutor