

MATH DEPARTMENT

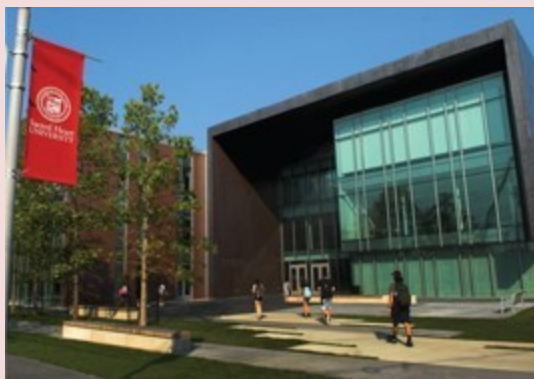
2019-2020 Newsletter

Sacred Heart University

WELCOME to our annual Mathematics Department Newsletter. This was an unusual year for our department as the coronavirus cut short our time on campus this year. Hence we were unable to have our usual events such as the Annual Mathematics Lecture, the Pi Mu Epsilon Induction and Awards Night, and there was no in-person commencement ceremony. But despite that, many great things happened in our department.

We moved!

As with many other departments in the College of Arts & Sciences, we moved to the Martire Center for the Liberal Arts. We have moved to a much more spacious office suite on the third floor East wing of the building that we are really enjoying (although the chair's office is smaller). Please stop by and visit!



Welcome to our new faculty!

We welcomed two new full-time faculty members into the department at the beginning of this year: Dr. Jean Guillaume and Prof. Zoe Cramer. Dr. Guillaume came to us directly after finishing his Ph.D. at the University of Rhode Island. Prof. Cramer finished her Master's Degree at University of Connecticut directly before beginning her time with us.

The department is also pleased to announce that after a successful search which included preliminary

interviews at the Joint Meetings in Denver and highly qualified candidates coming to campus for interviews, we have hired a new Ph.D. faculty member at the rank of lecturer. Dr. Elizabeth Tripp will be joining us this coming Fall. Dr. Tripp is completing her Ph.D. at Dartmouth College. Her area of specialization is probabilistic dynamics on networks. Welcome, Lizzie!

In addition to doing a search for a Ph.D. lecturer, we also did a search for two Master's level instructors. After conducting preliminary interviews and bringing highly qualified candidates to campus, we hired two such instructors. Julianne Howard will begin teaching with us in the Fall. Most recently, she was an adjunct in the department last year. Catherine Carrigan will also begin teaching with us in the Fall. Most recently, she was an adjunct instructor at Quinnipiac University and Southern Connecticut State University. Both Julianne and Catie have extensive experience teaching at the college, high school, and middle school levels. Welcome Julianne and Catie!

Redesigning the Math Major

This year, we made a substantial curriculum change by redesigning our math major. See page four of this newsletter for a special article about this.

Keep Reading!

The department is excited about many of its accomplishments this past year. Our students have participated in and presented at conferences, our graduates have exciting plans for the future, and our faculty have had some notable accomplishments. We have also been fortunate to keep in touch with several alumni who have written to us letting us know how they are doing. We have noted their accomplishments as well. We hope you enjoy reading about all of this in our annual newsletter!

Student Accomplishments

Stephen Clarke Wins First Prize in Writing Across the Curriculum Contest

The math department is so proud to congratulate Stephen Clarke for earning first prize in the Writing Across the Curriculum Competition. Stephen's paper, "Quantum Computing, A Mathematical Analysis of Shor's Algorithm" was submitted by Prof. Tina Romansky and was selected from many well-written submissions from a variety of disciplines across the university. Stephen presented his award-winning paper at the 2020 Academic Festival. If you didn't catch it live, you can still view his recorded presentation on this timely topic.

Students Participate in Academic Festival

This year, four of our students participated in the university's Academic Festival. While the event was held virtually this year, this is still a notable achievement for our students. Their work is available on the university's Digital Commons website. Delaney Howe presented the paper, "Ancient Arabic Mathematics". Chelsea Thakkar presented the poster "In the Race Towards Infinity, Who wins: Exponential or Polynomial?" in which she won first prize for most creative work. As noted above, Stephen Clarke presented "Quantum Computing, A Mathematical Analysis of Shor's Algorithm." Finally, Lauren Bolcar presented "Weights of Linear Codes and Their Dual". Congratulations to all who participated.



Students Present at Regional MAA Meeting

In addition to students participating in the university's Academic Festival, two students also presented their work at a meeting of the Northeastern Section of the Mathematical Association of America held at Babson College. Stephen Clarke presented his paper "Quantum Computing, A Mathematical Analysis of Shor's Algorithm". Lucinda Cahill presented her paper "Difference Equations and Lyness' Equation". Photos of them presenting are on this page. Both students also participated in the annual Collegiate Mathematics Competition that was held at this meeting.

Special Appreciation to our Math CLAs and Tutors

Under the most typical of semesters, the math department is so grateful to those who serve their fellow students as Classroom Assistants and Tutors at the Learning Center. Their support is always a valuable resource to students who need extra help with a topic or two or even the entire semester. After the semester went online, these exceptional students were asked to give even more and they stepped up and put into practice a new way to tutor utilizing online communication and teaching tools. From all of us in the math department who had been working double-time getting courses online, thank you from the bottom of our hearts for going above and beyond.

Pi Mu Epsilon Inductions and Awards Night

Due to the coronavirus pandemic, we were unable to hold our annual Pi Mu Epsilon Induction Ceremony and Awards Night which would have taken place on April 7th. However, we feel it is important to give the students the recognition they deserve.

Inductees of Pi Mu Epsilon were Lucinda Cahill, Amanda Haydu, Jaime Maggio, Christina Magliocco, and Nathan Vargoshe. Winners of the

Freshmen Award were Erica Juliano and Chelsea Thakkar; winners of the Sophomore Award were Linnea Caraballo and Amanda Haydu. Lucinda Cahill and Sophie Pindrys each won the Junior Math Award; Jaime Maggio won the Rose Marie Kinik award for top junior math major. The Silver Medal of Excellence was awarded to Stephen Clarke and the Gold Medal of Excellence was awarded to Lauren Bolcar. Congratulations to our students!

Graduating Seniors

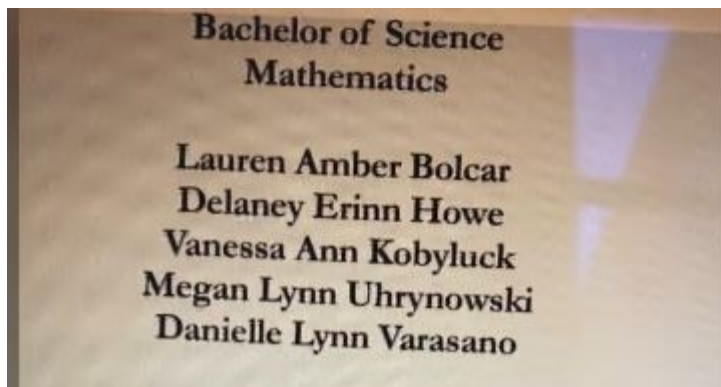
As we say goodbye to our graduating seniors, we are excited for what the future holds for them. Stephen Clarke is currently looking for an internship over the summer. He also has a lot of personal projects he is going to be working on, possibly including a micro-bio lab simulation to be used by teachers. Stephen also plans to start studying and taking the GRE so that he can start a PhD program in Fall 2021, most likely in computer science/ astronomy/physics.

Lauren Bolcar will be looking for a jobs in the economics or actuarial science field as well as some intelligence agencies. She will most likely start exploring grad school options within a year or two. Vanessa Kobyluck will be obtaining her Master of the Arts of Teaching through the Sacred Heart University campus in Griswold, CT. Danielle Varasano plans to begin studying for the first actuary exam, Exam P.

Meghan Uhrynowski completed her degree in December. Meghan owns her own business, Next Level Nutrition, and her business was recently made a member of the Fairfield Chamber of Commerce.

Lucinda Cahill, while not technically graduating just yet, will be leaving us to complete a combined degree at Columbia University in Mechanical Engineering. After that she hopes to work in the United States for a few years using both her engineering and math degrees. Lucinda hopes to return to Australia after working in the United States for a few years.

We wish our graduating seniors all the best as they embark on their futures. Since there was no commencement ceremony this year due to the coronavirus pandemic, we were unable to get a group shot of our graduating seniors. Below is a still clip from the video of the virtual conferral ceremony.



Our Redesigned Math Major

After doing an Academic Program Review in 2019 in which we closely examined our curriculum, the department felt that we should modernize it in order to better suit our students' needs. Hence beginning this upcoming Fall semester, we have divided the major into three tracks: the Traditional track, the Actuarial Science Track, and the Data Science track. Actuarial science and data science are hot fields, and we're offering these tracks to ensure that students who want to pursue these careers are well prepared to succeed. As we enter a new decade, these updates in the math major make our offerings more pertinent to workplace needs. We see the new math major as a dynamic curriculum that will prepare students well for their chosen careers.

Traditional Track

The traditional track most closely resembles the math major as it has been up to this point. The traditional track includes core courses in calculus, linear algebra, real analysis, and abstract algebra. This track will suit students who want to teach math at the high school level, have prospects for graduate school, or simply want broad-based mathematical knowledge that can open doors to a variety of careers.

Actuarial Science Track

The actuarial science track is for students who want to pursue a career as an actuary. Actuaries are professionals who manage and measure risk and uncertainty. Students will study calculus, linear algebra, theoretical and applied math, probability, statistics, accounting, finance and actuarial mathematics, in preparation for the first three

actuarial exams. Coinciding with this new track, the mathematics department and the Jack Welch College of Business & Technology are applying for inclusion on the Society of Actuaries UCAP-IC list.

Data Science Track

The data science track readies students for careers in computer science, business, statistics, data mining and big data, all of which are in demand. The curriculum will include calculus, linear algebra, statistics, theoretical and applied math, computer programming, data structures, financial analytics, artificial intelligence and machine learning.

New Course Offerings

To enhance these three tracks, the department has added some new courses to the curriculum. This past spring, we offered Numerical Analysis for the first time, taught by Dr. Elliott Bertrand. Numerical Analysis deals with approximating solutions to numerical problems. Emphasis is placed on the algorithms used. This coming year, the department will be offering Mathematical Modeling for the first time. The goal of mathematical modeling is to represent real world problems using mathematical concepts and to explain the behavior of problems from the sciences. The department has also recently created a course in topology, revised its geometry course, and will be offering Differential Equations, Probability, and Mathematical Statistics on a more regularly defined basis. There is also a movement in the department to use modern programs such as Octave, R, and Python. This is definitely an exciting time for the math department and its students!

Alumni Page

One of the greatest joys of the math department is keeping in touch with our alumni. It's always exciting to hear about their accomplishments, both professional and personal. Here are some highlights:

Rachel Andriunas '18 will be completing her Masters degree in Mathematics from Kansas State University at the end of this summer. She will be starting at University of New Haven as a Part-time Math Professor in the fall of 2020. Rachel had a lot of fun being able to road-trip back and forth from Kansas to Connecticut with her boyfriend during the past two years when she was attending KSU, but she is excited to come back home to Connecticut for good now. The department is also excited that she will be adjuncting for us in the Fall!

Connor Bohl '15 will be teaching math at UCSD (San Diego) this summer to high school students through the TRiO outreach program.

Michael Bubolo '19 started working in February as an actuarial analyst at KMS Actuaries, LLC. The company's primary area of practice is retirement benefits and the firm specializes in other post-employment benefits (OPEB), which focus on employees who have insurance benefits aside from pensions. In addition to working as an actuary, he passed two actuarial exams and completed the three VEE requirements established by the Society of Actuaries. If any student is interested in pursuing an actuarial career, Mike says that he will be more than happy to share his experiences and insights with them.

Christopher Carbone '11 after graduating from Fairfield University with his Master of Science in Mathematics and Applied Statistics certification, Chris is now teaching classes there as an adjunct.

Michael Fenech '13 is finishing his first year as a STEM Education PhD student and Graduate Research Assistant at The University of Texas at Austin. His current research interests include how students' experiences influence their attitudes towards mathe-

tics. Michael will be piloting an instructional model called Argument-driven Mathematics in an Algebra 1 classroom in the fall to investigate how students respond to argumentation. He is also implementing a Quantum Computing course at a local high school this year and next, which is the first time such a course has ever been offered at a public school in the United States.

Nicole Lay-Alaimo '08 and her husband welcomed their daughter, Sophie, in June 2019. She's almost a year old, time really flies, and Nicole is loving being a mom! Nicole is also proud to be teaching 7th grade math at Eisenhower Middle School in Freehold, NJ.

Igor Mikolic-Torreira '79 left his position as a Senior Fellow at RAND Corporation to join the faculty at Georgetown University and serve as Director of Analysis at their new Center for Security and Emerging Technology.

Katie Perzanowski '13 is currently an Environmental Analyst with the State of CT Department of Energy and Environmental Protection (DEEP). She is currently in the Water Permitting Enforcement Division working on wastewater permits, but also is a Site Administrator for the DEEP website. This past December Katie performed in Dublin, Ireland's Improv Festival.

Nicole Trommelen '15 is teaching Math at Trumbull High School and is also the head girls varsity volleyball coach. This past fall the Trumbull Girls Volleyball team won the Class LL State Championship for the first time in school history! They were honored by our State Representative, the Trumbull Board of Ed and the Town of Trumbull even declared January 6th "Trumbull Girls Volleyball Day."



Faculty Spotlight

The faculty have accomplished a lot this year. Dr. Jason Moliterno continued in his role as Secretary/Treasurer of the Northeastern Section of the Mathematical Association of America. Dr. Moliterno also gave a presentation at a national conference. He presented "Teaching Elementary Statistics from A to Z" at MathFest in Cincinnati, OH in August 2019.

Elliott Bertrand enjoyed his second year at Sacred Heart. With coauthors David McArdle, Li Wu, and Lubos Thoma, Elliott published the paper "Implementing Online Programs in Gateway Mathematics Courses for Students with Prerequisite Deficiencies" in *PRIMUS*. He has continued his work in difference equations research and had a related paper accepted for publication. Elliott was fortunate to be involved with several service opportunities that included serving on departmental search committees and an NSF grant proposal team to implement universal design for learning (UDL) strategies in gateway math courses. Elliott enjoyed teaching a pilot course in Numerical Analysis and participating in the SHU Symphony Orchestra.

Dr. Bernadette Boyle has had a busy year teaching several different levels of math, mentoring a senior seminar project and quickly learning how to give live online classes and office hours during the covid19 pandemic. Outside of teaching, Dr. Boyle attended the Joint Mathematics Meetings in Denver, CO where she gave the talk: "Finding the Missing Values: An Activity for Introducing Limits in a Calculus Course". Dr. Boyle also continues to enjoy her work as the faculty mentor to the cross country and track and field teams at SHU.

This year Dr. Andrew Lazowski published the paper: "Exceptional points for finitely generated Fuchsian groups of the first kind" in the journal *Advances in Geometry*. He also was invited to speak in the *Mathematics and Computer Science Lecture Series* at Rhode Island College where he presented "Counting Sides of Hyperbolic Polygons". Andrew continues to be the director of the Thomas More Honors Program. You can see him star in videos at the honors Instagram, @shuhonorsprogram.

Dr. Peter Loth was the advisor for two teams of students participating in the COMAP (The Consortium for Mathematics and its Applications) Mathematical Contest in Modeling, a worldwide mathematical contest. The students Jordan Bauer, Cameron Robinson and Benjamin Santangelo received the final designation "Successful Participant" for their solution to *Problem A: Moving North*. Additionally, Dr. Loth's book *Abelian Groups: Structures and Classifications* (xiv, 328 pages), a research monograph coauthored with Dr. Carol Jacoby, has been published by de Gruyter in the book series "Studies in Mathematics", Berlin/Boston, July 2019. At the 2019 Fall Eastern Sectional Meeting of the American Mathematical Society in Binghamton, New York, Dr. Loth presented the research paper *Quasi-sequentially nice subgroups of abelian groups*. Finally, in May, Dr. Loth gave a presentation entitled "Simply given compact abelian groups" in the Topological Groups Seminar (online), University of Hawai'i at Mānoa, HI.

Alumni Night



This past Fall, we were happy to host our annual Alumni Night for our current students. Several of our current students attended to hear our alumni talk about the careers that they have been pursuing since graduation. Alumni featured were (left to right) Bobby Lycoudes '12, Suzanne May '13, Emily Murphy '19, Amy Ellis '17, Nicole Trommelen '15, Lauren Puskar '17, and Meredith Petralia '18. These alumni have careers ranging from teaching to finance to business analytics. We are always thrilled to welcome our alumni back to interact with our current students.

Math Club Happenings

Aside from regular meetings, the Math Club held two successful events in the Fall semester. On October 10, 2019, the Math Club hosted a “pumpkin-painting” event. Then on December 5, 2019, the Math Club held its Cocoa & Cram event. At this event, the Math Club serves cocoa and offers free tutoring for students studying for their math finals.

Unfortunately, due to the coronavirus pandemic, the Math Club was unable to host any events in the Spring semester. We are hopeful that the current health crisis improves enough in the Fall for the Math Club to resume its activity.

Coming Attractions!

As this academic year closes, we look forward to another great year ahead. We look forward to the arrival of our newest faculty members, Dr. Elizabeth Tripp, Julianne Howard, and Catie Carrigan. We also look forward to the inauguration of our new math major divided into three tracks: Traditional, Actuarial Science, and Data Science.

This past spring, we had invited Dr. Rick Cleary from Babson College to give the talk “Playing Fair with Math and Stats: Analytics Applications to Sports Rules and Rankings”. Unfortunately, this talk was cancelled due to the coronavirus pandemic. However, Dr. Cleary has agreed to come next

year and give this talk. We look forward to this. Dr. Cleary has spoken at SHU in the past and his talks have always been very well received.

The upcoming academic year, or at least the Fall, will be different since the coronavirus pandemic is still an issue. While on-campus events may be limited, we are still hopeful that our students can participate in academic activities such as giving talks and presenting posters at conferences and at SHU’s annual Academic Festival. To the best of our abilities we plan to continue with problem solving competitions and Math Club activities. Stay tuned!