MATH DEPARTMENT

2021-2022 Newsletter

Sacred Heart UNIVERSITY

WELCOME to our annual Mathematics Department Newsletter. As we are slowly coming out of the pandemic, we were able to resume many of our normal events. After doing it virtually last year, we were able to hold our annual Alumni Night in person this year. We also held a more traditional Pi Mu Epsilon Induction and Awards Night in which we were able to invite the students' parents. After a two-year hiatus due to the pandemic, we were finally able to invite a guest speaker to speak to the university community. We have also had an amazing year that involved the department receiving a grant, continuing with another grant, several students getting university-wide awards, the hiring of additional faculty, and a conference held for middle school students. Keep reading!

Welcome to our newest faculty member!

Our department continues to expand! This year, we welcomed Prof. Rachel Andriunas as our newest Instructor of Mathematics. Rachel was an adjunct with us for a year before being hired full-time. She has been teaching courses in precalculus, algebra, and statistics. Rachel earned her Master's degree at Kansas State University in 2020 and her bachelor's degree in 2018 right here at SHU! We are please to welcome Rachel back to the department.

Society of Actuaries Designation

The math department and SHU have been approved by the Society of Actuaries for listing in the UCAP list (Universities & College with Actuarial Programs). We are one of only five schools in Connecticut with this designation! This is quite an honor for our actuarial science track in the math major, and certainly a boost to our program.

Some Fun Stuff

In the Spring semester, Dr. Andrew Lazowski taught MA 314 Geometry. The students in the class were primarily math majors. In this class, various geometric surfaces were discussed. Among such surfaces were the two-holed torus and the Klein bottle. Below are pictures of these images that our students printed in the IDEA Lab using a 3D printer.

The two-holed torus is an example of a hyperbolic surface. The Klein bottle is interesting in that it intersects itself in three dimensions, but not in four dimensions!

Support the math department by clicking here and donating to the College of Arts & Sciences.

Graduating Seniors

As we say goodbye to our graduating seniors, we are excited for what the future holds for them. Gabrielle Bentz is hoping to start her career working in analytics and finance. Linnea Caraballo will be attending Wesleyan University as a PhD student in the Mathematics department. Amanda Haydu will be continuing to work with Mathnasium, Sacred Heart, and Girl Scouts for the summer. Ultimately, she plans is to join AmeriCorps, hopefully by next summer. Sophie Pindrys got an exciting job offer from a company that is a federal contractor. She is hoping to begin work there in September pending a security clearance. Mike Watt will be beginning his Master's in Teaching. We wish all of our graduating seniors the best in their future endeavors.

Below is a picture taken at graduation. Unfortunately, we could not find all of our graduates after the ceremony to get a group shot, but we did manage to grab some faculty (Professors Guillaume, Lazowski, Molitierno, Romansky, and Bertrand) and our medal recipients: Linnea Caraballo (silver medal) and Sophie Pindrys (gold medal).

Student Accomplishments

Our students have accomplished a lot this year. Erica Juliano '23 won the **CAS Board of Visitors Award for Academic Distinction** for her project "An Introduction to Atmospheric Science and Data Analysis of the TRMM Data Set". Her research mentor for the project was Dr. Frank Robinson.

We had two student winners in the university's **Writing Across the Curriculum Writing Prize** contest. Linnea Caraballo '22 won second prize for her paper, "Quaternion Rotation: A Mathematical Journey to the Fourth Dimension". Her research mentor was Prof. Tina Romansky. Sophie Pindrys '22 won an honorable mention for "The Lorenz System". Her research mentor was Dr. Elliott Bertrand. Finally, although submitted for another discipline, it is worth noting that Erica Juliano '23 won an honorable mention for her paper "The STEM Gap: Women from Low Socio-economic Backgrounds are Underrepresented in STEM Fields". Congratulations to all of the winners!

Student accomplishments continued . . . . .

Four of our students presented at the meeting of the **Northeastern Section of the Mathematical Association of America** held virtually in November. Linnea Caraballo '22 presented "Quaternion Rotation and Why We Use It". Makinzie Youngblood '23 presented "Applications of Matrix Theory in Business and Finance". Erica Juliano '23 presented "Data Analysis of TRMM Data Set". Sophie Pindrys '22 presented "The Lorenz System".

Lauren Vowinkle '23 and Julia Simoneau '23 recently planned a field trip to go to the Museum of Mathematics in NYC on May 3rd with their 7th and 8th grade classes at Discovery Magnet School. Lauren is also the president of her sorority, Delta Zeta, and just won "President of the Year" and "Executive Board of the Year".

Roisin McGuirk '23 also got an internship with PartnerRe full-time this summer and part-time in the fall.   Additionally, after finishing two years as her sorority's Chief Financial Officer, she was elected as the president. They also won chapter of the year.

Rounding out student accomplishments, several students have been named Noyce Scholars. Dr. Andrew Lazowski, along with colleagues Dr. Mark Beekey, Dr. Kristin Rainville, and Bonnie Maur, have completed the first year of their **NSF Robert Noyce Grant: BioCheMACS**, which is a scholarship program for future secondary education teachers. Currently, Kimani Long '23, Julia Simoneau '23, and Lauren Vowinkel '23 are in the program. Congratulations to Abigail Poleway '24, Maya Salamone, '24 and Francesca Daniele '25 for being accepted into the program.

Pi Mu Epsilon Inductions and Awards Night

The department held our annual Pi Mu Epsilon Induction Ceremony and Awards Night on April 6th. Inductees of Pi Mu Epsilon were Teresina Berni '23, Linnea Caraballo '22, Allyson Kenny '23, Hoony Kwak '23, Alexa Ocel '23, Maya Salamone '24, Julia Simoneau '23, and Chelsea Thakkar '23. Winners of the Freshman Award were Francesca Daniele and John Guarini; winners of the Sophomore Award were Danielle Leblanc and Maya Salamone. Alexa Ocel won the Junior Math Award; Erica Juliano won the Rose Marie Kinik award for top junior math major. The Silver Medal of Excellence was awarded to Linnea Caraballo and the Gold Medal of Excellence was awarded to Sophie Pindrys. Congratulations to our 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 Vontell '18 had two big things happen in her life. First, Rachel was hired this past year in the SHU math department as a full-time instructor and had a great first year teaching. She is excited to be back in SHU's math community in her new role. Second, Rachel got married to Jon Paul Vontell. Of course, she could not get married without her "Sacred Heart Math Squad"! Pictured below at Rachel's wedding are Sarah Riccio '19, Akeylah Khandwala '17, Sarah Bylo '18, and Nicole Esposito '18.

Michael Bubolo '19 is continuing to work at KMS Actuaries and enjoys working in the retirement benefits industry. This year, he and his team are doing a lot of work on public pension plans for Massachusetts retirement systems. Also, he is making significant progress towards his ASA designation. He passed five SOA exams and he is currently working on his FAP modules. In the summer of 2023, Mike is expected to earn his Associateship with the Society of Actuaries. If there are any students who are interested in learning more about the actuarial field, they are more than welcome to contact Mike.

Christopher Carbone '11 has been teaching mathematics and data science classes at Post University as an adjunct for 6 years. Chris has also been teaching mathematics at Fairfield University as an adjunct for 2 years.

Nick Dasilva '19, MAT '20 is completing his first year as a high school math teacher at Bunnell High School in Stratford.

Michael Fenech '13 is working on his PhD (still), but has finally passed his qualifying exam! He is going to propose soon (both inside and outside of academia). His research is going to examine the relationship between students' goals in math and their attitudes toward math.

Cariann Johnson '19, MAT '20 is currently teaching 8th grade Pre-Algebra and Geometry at Leonia Middle School in Leonia, NJ. This is her second year teaching there. She is loving it so far!

Nick Kapoor '11, MBA '14 Nick will begin his fourth year of full-time teaching in the Fairfield University Math Department this upcoming Fall. In the 2021-2022 academic year, he taught the entire math major-level calculus sequence of Calculus I, II, and III, and piloted a new Honors Seminar entitled "Redrawing the Lines: Gerrymandering in American Politics." Nick is extremely grateful for the assistance he received from SHU Alum, Dr. Kyle Evans, in preparing for this new class. Nick has also taken on an administrative role at Fairfield U as the Part-Time Faculty Coordinator in the Center for Academic Excellence where he is responsible for the Adjunct Faculty Orientation as well as programming and workshops for adjunct faculty. Nick continues to serve on the Monroe Board of Education and was promoted to Acting Chair of the Connecticut Commission on Human Rights and Opportunities. Nick looks forward to getting involved in several campaigns leading up to November's elections.

Kimberly Mata '15 is going back to SHU this spring/summer to start the Master of Science in Athletic Training program. She can't wait to be back at SHU again after all these years!

Breanna McLaughlin '12 has been working as an actuary in the property and casualty insurance space since graduating SHU. She is currently the lead pricing actuary for Marine and Aviation at Sompo International where she has been working for about 8 years. She is an Associate of the Casualty Actuarial Society. On a personal note Breanna got married on April 8, 2022, and is enjoying married life on Long Island with her husband and their golden retriever!

Katie Perzanowski '13 is still working for CT's Department of Energy and Environmental Protection in the Land and Water Resources Division doing coastal enforcement and helping with coastal site plan reviews. She recently helped create a beach association guide to help spread awareness of rules and regulations that beach associations commonly run into with regards to structures, maintenance, and activities within the state's jurisdiction. Katie is also still volunteering with Mystic Aquarium's Animal Rescue Clinic helping rehabilitate sick and injured sea turtles and seals.

Tim Weiss '16 has a happy update……right before Easter, his fiancée (Kathleen) and he got engaged! Tim asked her on Long Island at her family's church. It was a happy and momentous occasion. They plan on marrying early-mid 2023. Other than that, Tim is on his fifth year at St. Joseph High School and is loving teaching. He just started teaching AP Calculus AB last year.

Faculty Spotlight

The faculty have accomplished a lot this year. Dr. Jason Molitierno continued serving as Secretary/Treasurer of the Northeastern Section of the Mathematical Association of America. Dr. Molitierno also gave the presentation, "An Upper Bound on the Algebraic Connectivity of Outerplanar Graphs" at the virtual Joint Mathematics Meetings. He is completing his term as Grand Knight of the Cheshire council of the Knights of Columbus and was recently elected as Faithful Navigator of the Waterbury Assembly.

Prof. Andriunas had a great first year teaching full-time at SHU. Her first year was a busy one as she was learning the ropes of teaching at SHU, and at the same time planning her wedding!   She got married in May (right in the midst of finals week) and will be traveling to Italy at the end of May for their honeymoon. In the fall, she will have to start introducing herself as Professor Vontell to her students!

Dr. Elliott Bertrand enjoyed another year teaching calculus and statistics courses at SHU. He especially appreciated the opportunity to facilitate the math senior seminar for the first time, where he was able to work with our fantastic graduating seniors on their capstone projects. Along with colleagues Dr. Lindsay Keazer and Dr. Jillian Schreffler, Elliott received NSF funding for a grant that will provide support and professional development opportunities to SHU math faculty in implementing strategies for Universal Design for Learning (UDL) in algebra, precalculus, and calculus courses. He is excited to begin working with faculty on this initiative. Elliott also presented the talk "Dynamic Scenarios for Some Second-Order Monotone Difference Equations" at the International Conference on Difference Equations and Applications (ICDEA) in July 2021.

This past year Dr. Bernadette Boyle was on sabbatical. During this time she, along with fellow math professor, Dr. Andrew Lazowski, and graduating senior, Michael Watt, published the paper "Hyperbolic Basketball" in the mathematics journal Math Horizons. Dr. Boyle also continued her research on the index of numerical semigroups. In addition, Dr. Boyle has revised several of her courses to incorporate more technology. She has also designed a new course in Topology which will be offered to math majors next spring. Dr. Boyle looks forward to returning to the classroom and teaching next year.

Dr. Hema Gopalakrishnan spent much time this year organizing the department's first Julia Robinson Math Festival which was held at the Discovery Museum on May 7th. Details about this are in a separate article in this newsletter.

Dr. Andrew Lazowski has been promoted to the rank of full professor effective for the next academic year! He also published "Hyperbolic Basketball" in Math Horizons with colleague Dr. Bernadette Boyle and graduating senior Michael Watt. He

was awarded his fourth NSF Robert Noyce Teacher Scholarship Program grant, this one in the amount of $1,449,136 for the project: Developing Elementary STEM Teachers Through Mentorships, Interdisciplinary Instruction, and Cultural Competencies (EPISTEMIC). This opportunity will help future elementary teachers who are interested in teaching within high-needs school districts. He continues to direct the Thomas More Honors Program.

Dr. Peter Loth was the advisor for a team of students participating in the COMAP (The Consortium for Mathematics and its Applications) Mathematical Contest in Modeling, a worldwide mathematical contest. The students Shakane Cooper, Kimani Long and Ethan Phillips received the final designation "Successful Participant" for their solution to *Problem A: Power Profile of a Cyclist.* Dr. Loth's research paper *A Distinguished Subgroup of Compact Abelian Groups* (with D. Dikranjan, W. Lewis and A. Mader) was published in the refereed journal Axioms 2022, 11(5), 200 (31pp). For the Fall 2022 semester, Dr. Loth was awarded a sabbatical.

UDL Grant

Dr. Elliott Bertrand, along with Dr. Lindsay Keazer and Dr. Jillian Schreffler in the College of Education, received a nearly $300,000 grant from the National Science Foundation to promote Universal Design for Learning (UDL) in our mathematics courses. Over the next three years, nine math faculty members will participate in this endeavor in the courses MA 106 College Algebra, MA 140 Precalculus, and MA 151 Calculus I. The goal of this grant is "to optimize teaching and learning by providing multiple means of engagement, representation, and action and expression to better align with students' diverse learning needs."

The grant provides funding for professional development for the nine faculty who will be participating in this grant. The professional development workshops "will provide opportunities for them to reflect on and implement UDL strategies that improve students' access to course content. Those faculty also will participate in professional learning communities to collaborate and share experiences with colleagues."

Congratulations to Elliott on his work in securing this grant. A more detailed article can be found at this link from where the quotes in this blurb were obtained.

Julia Robinson Math Festival

The department hosted its first Julia Robinson Math Festival on Saturday May 7th at SHU's Discovery Science Center. The festival was well attended by elementary and middle school students. The activities at the festival were led by SHU Noyce Scholars, SHU Graduate Math Teacher Interns, math teachers from public and private schools in Connecticut, and math professors from SHU and other colleges in Connecticut and New York. Students were actively engaged in the fun hands-on activities and practiced some of their math skills in context. SHU's Noyce scholars, led by Professors Andrew Lazowski and Bonnie Maur, participated enthusiastically by not only leading festival activities but also leading museum exhibits, attending activities, and assisting in other ways at the festival.
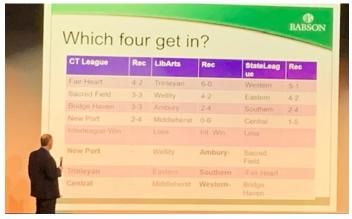

Math in Sports

After a two-year hiatus due to the pandemic, the department was finally able to invite a guest speaker to give a mathematics talk to the university community. Dr. Molitierno invited Dr. Rick Cleary from Babson College to present the annual mathematics talk to the general university community. Dr. Cleary gave the talk, "Playing Fair with Math and Stats Analytics: Applications to Sports Rules and Rankings." In this talk, Dr. Cleary explained how math and sports are often intertwined. He gave examples using the NFL playoffs and how having divisions and wildcard winners can often lead to a better team missing the playoffs. Dr. Cleary also illustrated how the NCAA basketball tournament could use mathematics to better determine which teams should be in it. The theatre was full and the talk was very well received by our students.

Alumni Night

After doing Alumni Night virtually last year, we were happy to be able to resume doing it in person this year. This evening gave our current students the opportunity to hear our alumni talk about the careers that they have been pursuing since graduation. Alumni featured, and pictured below, were Amy Ellis '16, Nicole Esposito '18, Akelyah Khandwala '17, Nicole Deissler '15, Tim Weiss '16, Steve Zito '08, and Suzanne May '13. John Munday '19 also participated via Zoom. These alumni have careers such as high school teaching, college teaching, business analytics, actuarial science, insurance underwriting, speech pathology, and more! We are always thrilled to welcome our alumni back to interact with our current students.

Coming Attractions!

As this academic year closes, we look forward to another great year ahead. With the pandemic hopefully subsiding, we will have the opportunity to do more activities. The Math Club, under the new leadership of Dr. Jean Guillaume and Prof. Rachel Andriunas, will be able to do some exciting activities. We also plan to continue our tradition of inviting a guest speaker to give a mathematics talk to the university community.

We plan to strengthen our academic programs. The department is currently organizing a new course in LaTeX, the industry standard typesetting program for mathematics. We also plan to offer MA 318 Topology for the first time, taught by Dr. Bernadette Boyle.

We also look forward to our students participating in academic activities such as giving talks and presenting posters at SHU's annual Academic Festival and at local conferences through the MAA. We also look forward to more accomplishments by our students and faculty. Stay tuned!