MATHEM@TICS

This issue is dedicated to our graduating majors and minors in mathematics and in data science. Congratulations!

ν_0: From the Desk of the Chair

One of the math department's numerous strengths is assisting students in determining their path. A math degree can lead to a variety of career routes after graduation, while a minor can provide opportunities that would not otherwise exist. As you read about this year's great graduates, take note of the various directions they are taking.

We have a very busy department that serves both our students and the wider community. This year, Math Exploration Day attracted 200 high school students and their teachers to our campus. Community Math Day brought another 100+ to campus and IC Women in Math Day had participants from all around the country, thanks to Zoom. We do all of this because we believe it is important.

Our graduates and soon-to-be alumni have plenty to be proud of, and your pride is evident in how well our endowment has grown. Our endowment has more than doubled since our anonymous donor's initial gift, and it is now well over $50,000 and on its way to our goal of $100,000. We are grateful to all of our donors. Your gifts benefit our students and are much appreciated.

This is my final report from the chair's desk; I will leave you in not just good hands but better hands as Ted Galanthay will be taking over. I've received notes from many alums over the last few years, and I have enjoyed and appreciated them. Thank you, and congratulations to our soon-to-be new alumni. Please stay in touch.

Tom Pfaff, chair

ν_1: Hats off to our Graduates

Lenley Aikin is a Mathematics major and Deaf Studies minor from Pittsburgh, PA. Graduating with a B. S., she has taken a variety of math courses at Ithaca College. Her favorite courses include Calculus III, Abstract Algebra, and Connections in Advanced Mathematics. One of Lenley's favorite memories at IC was helping with Math Exploration Day. Both years she participated in Math Exploration Day, Lenley helped with Professor Megan Martinez's stations related to Fold and Cut and Hexaflexagons. She also helped co-design this year's t-shirt for Math Exploration Day with Madolyn Donaghy-Robinson. Lenley would like to thank all the faculty of the Mathematics Department for their support and cultivating her joy in mathematics. After interning for Willis Towers Watson (WTW) as a Pension Analyst intern during the Summer of 2023, she was offered a full-time position with the company at the beginning of her senior year. Lenley will begin her full-time job as a Pension Analyst for WTW shortly after graduation.

Tommy Angel is a Mathematics, B.S. major with a minor in Finance. Some of his favorite memories at IC were the time spent with professors and the relationships and friendships he's made within the small math community. Additionally, the classes that were memorable were Math Experimentation and Differential Equations as it introduced Tommy to the beginnings of academic research and real life applications of mathematical concepts. He remembers

learning about fractals in math experimentations and was so fascinated about them and since then all he can see in trees and plants are fractal elements in them. In differential equations, it was one of the classes where Tommy struggled to understand the math in the class but after spending countless hours studying and asking questions, he also see differential equations in every day life, for example the suspension systems of a car is one that he constantly thinks of as that's such a daily thing in life that we don't really think about the ins and outs of it. In the future Tommy hope to work in some form of Data Science or Data Analytics and further his education more based on his place of work.

Jay Barrett is a Writing major with minors in Mathematics and Graphic Design. He's so grateful to have continued fostering his love of math along his passion for the creative arts, as the more he learns, the more he feels that mathematics is another art. One of his favorite experiences in college was his research seminar with Professors Wiesner and Galanthay, where he was encouraged to learn according to his own curiosity – something he'll have to grow accustomed to as a graduate. While he hopes to eventually get an M.F.A. in Nonfiction Writing, in the meantime, he'll finally have time to teach himself about logistic regression.

Megan Brody is a Clinical Health Studies major with minors in Mathematics and Recreation, from Kingston, PA. One of her favorite memories at IC was her Math Experimentation final project, which allowed her to explore more about KenKen Puzzles and also gave her the opportunity to create a poster with one of her friends. After graduation, Megan will be returning to IC for graduate school, where she will be pursuing a Doctorate of Physical Therapy.

Madolyn Donaghy-Robinson is graduating with a dual-degree in Mathematics (B.A.) and Art (B.F.A.). One of her favorite classes was the research course where she was able to explore bead crochet bracelets. She also participated in the Ithaca College Dynamical Systems R.E.U. where she worked with a small group of other researchers on three dimensional fractal trees. This experience was very exciting to take part in and helped Maddie to decide on her future plans after graduation. She plans to continue her education by pursuing a PhD at Syracuse University.

Jordan Garcia is an Economics major with a minor in Data Science from White Plains, NY. One of his favorite memories was the final project in Data Science

with R, as it opened his eyes to other methods for testing economic theory and solidified his interest in mathematics. His long-term plan following graduation is to pursue a PhD in Economics, but first he'll spend a couple of years working in the government sector as a research associate.

Lily Goulding is a Chemistry major with a Mathematics minor from Mansfield, MA. Her favorite thing about IC-Math is creating friendships with peers and professors throughout their classes together. Having friendly faces around makes each day more fun! She also loved her computer science class with Professor John Barr and learning more about the world of code. After graduation, Lily will be attending the University of Colorado Boulder to pursue a PhD in organic chemistry.

Joseph Guidi is a B.S. Computer Science major with a Data Science minor and a native to the Ithaca area. His passion for data has flourished, particularly within the dynamic sphere of sports analytics. Fondly reminiscing about engaging discussions with Pete Maceli and mentoring students as a TA, Joseph cherishes his favorite math moments. As he approaches graduation, Joseph eagerly anticipates delving into the realm of sports data analytics, ready to apply the wealth of knowledge acquired during his time at IC to real-world scenarios.

Wenchard Pierre Louis, an Accounting major with a Mathematics minor, is totally blown away by all the cool stuff he's learned in college. His top picks? Calculus and statistics, hands down. A huge shoutout to his amazing teachers for making math real and exciting! Wenchard's all about spreading good vibes. After graduation, he's pumped to jump into teaching or accounting, where he can make a difference. Plus, he's totally down for more learning adventures (maybe a master's degree) or rocking it as a influential content creator.

Bryan Raber is a B.A. in Mathematics from Westfield, New Jersey. He started at Ithaca College as a Music Composition major; but after taking Calculus II with Prof. Yurekli, Brian decided to take a different route with his education. One of his favorite memories from studying math here was creating a linear regression to try and predict winning playo teams based on their regular season performance in Prof. Visscher's Intro to Linear Algebra class! Brian is excited to utilize the many skills from his time at Ithaca in a new job doing insurance ratings starting this June.

Noah Rosenzweig is graduating with a B.S. in

Physics and a minor in Mathematics. Because of high school, he was prepared to fight an uphill battle with the expectations set by his teachers. Upon coming to Ithaca, every single math class was enjoyable in one way or another; the assignments were interesting and the professor had a fantastic overall personality that carried into their lectures. In the coming years, Noah will be traveling to Israel to learn more about his ancestors and the Torah, and later on get his Master's in Education, allowing him to teach Math and Science to middle and high school. He also wants to give a little shout-out to Dr. Osman Yürekli, a professor he's had multiple times - Osman, thank you.

Matthew Weil is graduating with a B.S. in Physics with double minors in Computer Science and Data Science. One of his favorite memories in the mathematics department was when he was taking Modern Data Science with R with Dr. Peter Maceli in which his final project included using random forests to try and predict the MLB Hall of Fame Inductee's. Due to bias from the sports writers who voted during this election, his data-driven prediction was sadly not accurate at all. After graduation, Matthew will be attending Boston University as an Earth and Environment PhD student conducting research in the Air Quality Remote Sensing and Modeling group, and is excited to continue to apply much of what he has learned at IC in his future studies.

Joe Averill, Computer Science major, Data Science minor

Tyler Kaplan , Applied Physics major, Data Science minor

Christian Leach, Computer Science major, Mathematics minor

Cole Munger, Mathematic major

Jack Pento, Mathematic major

Alex Powell , Applied Physics major

Violet Van Buren, Writing for Film, Tv, Emerging Media major, Mathematics minor

2023 Senior Capstone Poster Session

ν_2: Math Department Events 2023-24

Department Colloquia and Interdisciplinary Speaker Series

The 2023-24 season of the Mathematics Colloquium series featured a variety of topics from faculty, students, alumni, and guests. In the fall, Emilie Wiesner (IC faculty) talked about "the hat"—a recently found shape that tiles the plane without a repeating pattern, John Maceli (IC faculty emeritus) performed magic tricks and let us in on some of the mathematical secrets behind them, David Freund (Cornell University) presented on knot theory, and Lenley Aiken and Earth Sonrod (IC students) described their experiences from the past summer working in an internship and conducting math research. In the spring, we heard from Pete Maceli (IC faculty) on self-complementary graphs and their role in classifying graphs, Daniel Tjie (IC alumnus) on his experience going to grad school for a masters degree while working a job in analytics, and Susanne Pumpluen (University of Nottingham) on quaternions and other algebras beyond complex numbers.

One of the great qualities of mathematics is its relevance to so many other disciplines. In this spirit, we started an Interdisciplinary Speaker Series this year. In the fall, Prof. Matthew Sullivan (Physics) showcased how the cancellation of certain terms in Taylor series gives a way to construct physical magnetic multipoles in practice. In the spring, Prof. Daniel Visscher (Math) and Prof. Mike Caporizzo (Music) explored how the geometry of your ear generates

location data for sounds and how audio technicians are currently using this information to create personalized spatial audio in headphones. If you have suggestions for future iterations of this series, please let us know!

—*Dan Visscher*

Celebrating our students' achievements

In the fall of 2023, the mathematics department held an awards ceremony to recognize and honor several students for their outstanding achievements in mathematics. The awards were distributed across four categories: The *Noether Award* in Mathematics was presented to Jay Barrett and Madolyn Donaghy-Robinson; the *Ramanujan Award* was given to Patrick Bierach, Brianna Bownas, Jordan Garcia, Phuong Ha, Evelyn Huang, Noah Rosenzweig, and Surya Sharma; the *Newton Award* recipients were Uday Lamba, Kyler Lester, Suryash Malviya, Ariel Odessky, and Sarah Wrzos. Lastly, the *Most Improved Award* was bestowed upon Zanyjah Coleman-Northern, Noah Fand, Grace Hickey, Lilly Johnson, Kayla Kelly, Michael Mai, Connor Mushorn, Charlize Ntiamoah-Larbi, Jake Raynsford, and Kevin Yang.

The Ithaca College Upsilon Chapter of the Pi Mu Epsilon math society welcomed twenty-two students and three faculty members into its fold on Monday, April 15th. Math Major Sarah Wrzos took the stage to deliver the keynote address titled "Exploring Magic Squares." Professor Osman Yürekli, serving as the chapter advisor, both coordinated and emceed the event.

—*Joash Geteregechi and Osman Yurekli*

2024 Inductees for the Pi Mu Epsilon-Upsilon Chapter

Math Club

At Math Club, we hold a variety of meetings that seek to create positive environments and build community for the math enjoyers at Ithaca College. This semester, the Ithaca College Math Club arranged mul-

tiple activities. The students and many volunteers helped professors run activities for the 2024 Community Math Day. After the first club meeting of the semester, the club promoted recreational mathematics on campus by hosting a math game night and a Pi Day contest. Then the club members engaged with the community by running math activities at the 2024 Math Exploration Day.

We meet roughly every other week, with our meetings being held in Williams 310 at 7 pm on Wednesdays. Be sure to check out our flyers on the second floor of Williams and our Instagram: ic math. We are always looking for new members!

—*Sarah Wrzos and Eath Sonrod*

Math Club Game Night

COMAP Modelling Competition

Sara Wrzos and Earth Sonrod worked together to create and analyze a mathematical model to explore the effects on the lamprey eel population and its surrounding environment when the sex ratio of lamprey eels changes as the abundance of resources change. They submitted their 24-page report at the conclusion of the 100-hour event on February 5.

This unique opportunity provides students interested in mathematics and applied mathematics some real-world experience as they apply time-management skills, exercise effective delegation, and use their talents and skills to solve one of six interesting, open-ended problems. Students interested in learning more about this opportunity should contact advisor Ted Galanthay this spring.

—*Ted Galanthay*

Outreach Events

The Ithaca College Math Department believes that reaching out to our community to share our expertise and love of mathematics is the best way to make math accessible to a diverse group of students. We

held three different outreach events in Spring 2024.

Community Math Day was back in full swing, moving from the fall to the spring semester. Williams Hall welcomed elementary-aged children and their families—over 110 in all—to explore mathematics through games, puzzles, music, art, and more. Math department faculty and students, as well as friends from the Physics and Computer Science departments and IC alumni, helped students build geometric balloons, construct fractals, create pointillistic art, and engage in many more activities.

The 7th Annual IC Women in Math Day was held on Saturday, March 2 and was back in person for the first time since the pandemic! The event is aimed at high school girls and began with an exploration on Game Theory, continued with a lunch with some of our math majors, and drew together a diverse array of women to be on a career panel to share their experiences in the workplace. The professions represented ranged from High School Math Teacher, to Data Analyst, to Electrical Engineer. We were able to invite participants from across the country to participate in the panel portion of the event via Zoom, and ended with a dessert reception for the in-person participants and the panelists.

Math faculty and student volunteers shared their love of math with nearly 200 high school sophomores, juniors, and their 32 teachers from 17 schools at the 18th annual Math Exploration Day on March 30. Professors Ted Galanthay and Osman Yürekli gave presentations on The Prisoners' Dilemma and Babylonian Numbers, respectively. Faculty from the Math, Chemistry, Computer Science, and Philosophy Departments designed activities that had the students exploring origami, labyrinths, hexaflexagons, hypercubes, tilings, atomic structures, sorting methods, and logical puzzlers. Many math majors, including Kian Broderick, Brie Bownas, Will Moore, Lenley Aikin, Phuong Ha, Surya Sharma, and Sarah Wrzos helped run the activities.

—Megan Martinez and Aaron Weinberg

2024 Community Math Day and Math Exploration Day

Faculty Accomplishments

In addition to all of our work with students here on campus, faculty have also had a full year engaging with the mathematics community beyond South Hill. We've published new research articles, presented our work at both conferences and other universities, served as journal editors, volunteered with professional organizations, and much more. Here are a few highlights:

- Megan Martinez coauthored a paper on Hit-

omezashi patterns with IC alum Antara Sen '22, to appear in the 2024 *Bridges Conference Proceedings*.

- Osman Yurekli and current IC student Earth Sonrod '25 have published their joint work on parametric integral transforms in the journal *Computational Mathematics and Modelling.*
- Dave Brown, Ted Galanthay, and Dan Visscher attended the Joint Mathematical Meetings in San Francisco, accompanying their student research team from the summer REU in Dynamical Systems and presenting on their own research in dynamical systems.
- Aaron Weinberg and Emilie Wiesner collaborated with Ellie Fitz Fulmer (Education) on a paper exploring student agency and identity in reading textbooks, to appear in the *Proceedings of the 26th Annual Conference on Research in Undergraduate Mathematics Education*.
- In addition to publishing some of his own data visualizations in the *College Mathematics Journal*, Tom Pfaff has been busy sharing and analyzing data visualizations from around the web on his blog Briefed by Data.

—Emilie Wiesner
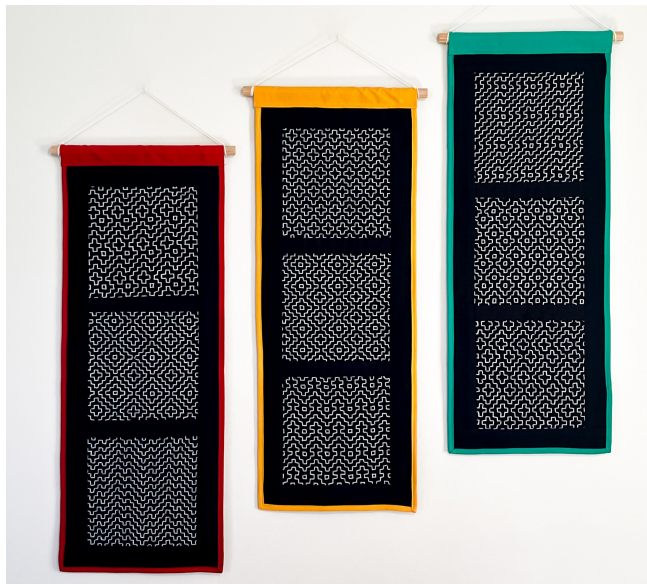
"Hitomezashi Wallpaper Triptych," Bridges 2024 Math & Art Gallery

REU in Dynamical Systems

Over the summer, professors Dave Brown, Ted Galanthay, and Dan Visscher mentored a group of 9 undergraduate students from around the country through three different projects in dynamical systems: fractals, ecological modeling, and billiard dynamics. The most memorable aspect of the REU for the students was the friendships they made around math while in Ithaca. The most memorable aspects of the REU for the mentors were mentoring young scholars and getting to work closely with each other to run the program. The summertime mentor lunches at the pond every week let us all to get to know each other as colleagues and friends.

—Ted Galanthay

Ithaca College REU in Dynamical Systems

The Math Endowment

This year, thanks to alumni contributions, we were able to send one student to the Joint Math Meetings, where he presented his undergraduate research. We were also able to take a group of students to the regional Math Association of America conference at SUNY Fredonia.

Thanks to our alumni and friends; for the second year in a row, we were the stars of Giving Day for H&S. We thank the 26 donors who added $6,200 to our endowment. Your support is truly appreciated and it will make a difference for math students for years to come.

—Tom Pfaff

Students and Faculty at the 2024 Spring MAA-Seaway Conference

ν_3: Happy retirement, Jim Conklin!

Get ready to embark on an incredible journey celebrating the remarkable career of Prof. Jim Conklin! After an awe-inspiring 36 years of shaping minds and hearts, Prof. Conklin is bidding farewell to the math department. But hold onto your hats, because we're not just talking about any ordinary departure; we're bidding adieu to an extraordinary educator, a beacon of dedication, and a true maestro of mathematical mastery!

From the moment Jim stepped foot into the Math (and Computer Science) Department back in 1988, he set the stage on fire with his unparalleled teaching prowess. Picture this: students flocking to his classes like moths to a flame, drawn by the promise of enlightenment and guidance. And let's not forget the awards – accolades raining down on him like confetti, from his days as a graduate student at Cornell to winning the prestigious Clarence Stephens Distinguished Teaching Award from the Seaway Section of the Math Association of America!

Jim was often the first or the last contact students had with the math department. Jim's impact spanned far and wide: from teaching introductory courses that ignited a passion for math among incoming students, to guiding first-years through the complexities of statistics, to teaching at all levels and in all areas in the curriculum. He collaborated with students across campus, helping them tackle math-related challenges in various fields. And let's not forget his pivotal role in mentoring majors, guiding them through transformative final projects and independent studies. Jim – his willingness to help and his knowledge – will be missed at all levels.

But wait, there's more! Jim wasn't just a teacher; he was a guiding light, a mentor extraordinaire who went above and beyond to nurture minds. Office hours weren't just a formality – they were a sanctuary where students found solace in Jim's unwavering support and boundless enthusiasm for their success. And if you need proof of his teaching wizardry, just ask Google – a perfect 5.0 on Rate My Professor? Now, that's legendary!

But Jim's impact didn't stop at the classroom door. Oh no, he was a force to be reckoned with beyond the confines of academia. Collaborating with colleagues from economics to biology to occupational therapy, Jim's influence stretched far and wide, leaving an indelible mark on every discipline he touched. Publications, presentations, interdisciplinary projects – you name it, Jim conquered it with his trademark passion and expertise!

And let's not forget his heart of gold – Jim's unwavering dedication to supporting underrepresented students and his tireless service to the college and profession speak volumes about the man behind the math. Whether he was serving as chair of the department, mentoring students, or spearheading initiatives to broaden access to education, Jim's commitment knew no bounds. Did you know that he served as an Associate Dean for a while or that he was Governor of the Seaway Section of the Math Association of America? Or that he served many years teaching in the Higher Education Opportunity Program Summer Institute?

So, as we bid farewell to a titan of teaching and a champion of change, let's raise our glasses to Prof. Jim Conklin – a true legend in every sense of the word. Here's to a retirement filled with endless adventures, happy dogs, joyful hikes, and everything else that brings you and Trisha boundless happiness. Thank you, Jim, for 36 years of excellence – your legacy will shine on!

—Dave Brown and Teresa Moore

ν_4: **What's the Problem... with Professor Brown**

Consider the two parabolas: $y = kx^2 + kx + 4$ and $x = ky^2 + ky + 4$ with $k \in R$. Find every value of k for which the parabolas are tangent to each other. Be sure to give the exact values of k.

Send complete answers to Professor Brown at `dabrown@ithaca.edu`. Those submitting correct answers will have their names printed in the following newsletter. People who correctly solve all problems from Volume 4 of the newsletter will receive a special prize at the end of the year.
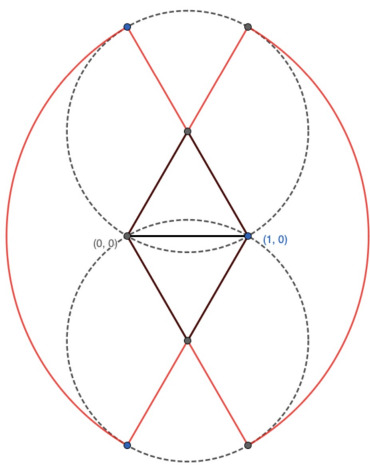

Let $\mathcal{U}$ be the union of all discs of radius 1 that cover the unit interval $[0, 1] \subset R^2$. What is the area of $\mathcal{U}$?

Solution to Prof. Brown's previous problem:

The region $\mathcal{U}$ is formed by rotating unit circles about the endpoints, $(0, 0)$ and $(1, 0)$. This makes an oval shape that consists of two (overlapping) circular sectors (highlighted in red) and two small circular sectors at either end. The area of $\mathcal{U}$ is computed by adding the areas of the four sectors and subtracting the areas of the two equilateral triangles (accounting for the overlap). The area of $\mathcal{U}$ is

$$2 \left(\pi \cdot 2^2 \cdot \frac{120}{360} \right) + 2 \left(\pi \cdot 1^2 \cdot \frac{60}{360} \right) - 2 \left(\frac{1}{2} \cdot 1 \cdot \frac{\sqrt{3}}{2} \right) = 3\pi - \frac{\sqrt{3}}{2}$$

Honor role (solvers from Issue 3): Earth Sonrod (current student)

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