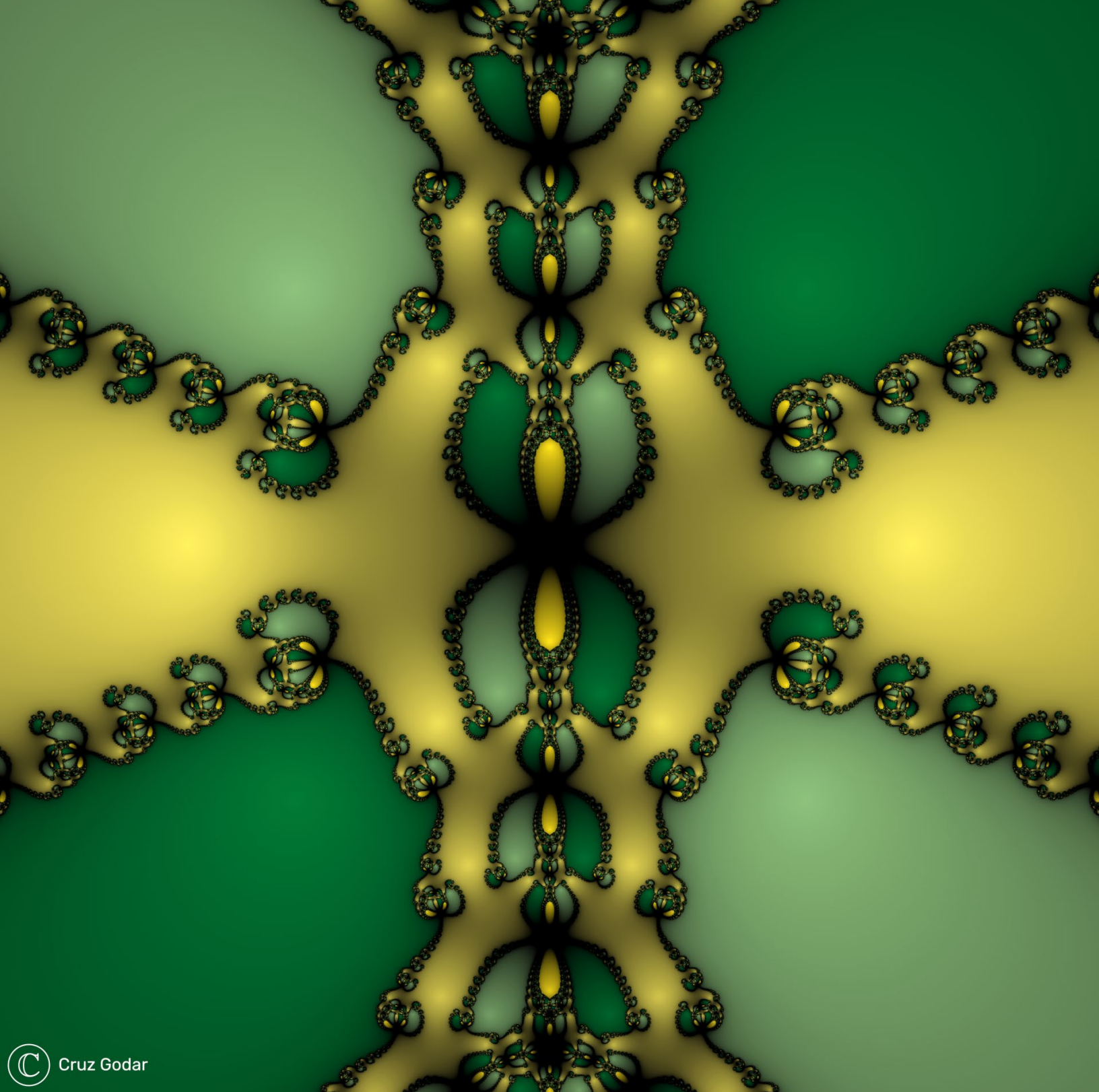




 Cruz Godar

2024 - 2025

Department of Mathematics ANNUAL NEWSLETTER



UNIVERSITY OF
OREGON

Mathematics

A WORD FROM THE HEAD



There is no getting around the fact that this has been a tough year. First, a decade-long decline in math majors has finally reached the tipping point of causing havoc in our upper-division enrollments. Then we were handed a large reduction in our graduate program. On top of all that, students in our lower-

level courses are coming in with huge holes in their understanding of math and a surprising disinterest in learning, worse than anything we have ever seen (possible explanations are pandemic-era learning failures, over-reliance on AI, loss of attention span due to constant internet access---but we don't yet fully understand what is going on). Finally, as a consequence of college- and university-wide budget shortfalls, at the end of the year we lost two Career faculty members in a round of forced layoffs. Further budget cuts are forecast for next year. I can't remember another period where we have had to deal with so many difficult things all at once.

Despite all of these challenges taking up our time and energy, we thought it was important to try to get this Annual Newsletter off the ground. It is something we have thought of doing for a while, both to celebrate the activities that go on in the department and to maintain better connections with our alumni. So much work is done day in and day out by the passionate and hardworking members of our math community, from the undergraduate students up through the tenured faculty, and it is important to find ways to honor and celebrate that---even when times are hard. There is no way any newsletter can talk about *all* the great work everyone is doing, much of which necessarily happens behind the scenes, but we have tried to capture some of it. I hope you enjoy hearing about some of the goings-on in the department, and also about some of our alumni. And I really hope this newsletter is the beginning of an annual tradition!

Finally, let me take a moment to welcome our next department head: Ben Elias will take over the job this summer, for a three-year term. He will have his work cut out for him, getting us through the hard years ahead. But we could not be in better hands, and I look forward to seeing where he takes us.

-- Dan Dugger

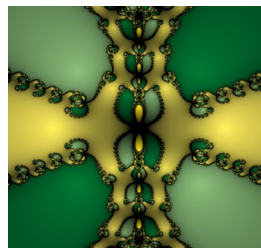
If you would like to be added to our mailing list for future newsletters and other UO Math Department Information, please write to Shelly Watson (srwatson@uoregon.edu). We promise not to barrage you with solicitations for donations!



ABOUT THE COVER IMAGE

Fractal Art created by UO student and Mathematics PhD graduate Cruz Godar, 2025

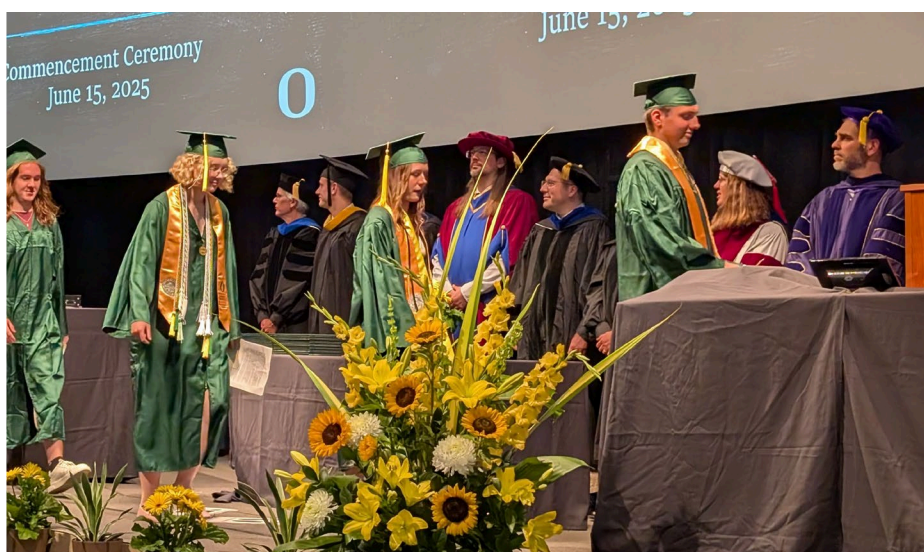
Newton's method is a technique to find the values x where a function $f(x)$ is equal to zero (its so-called roots). Given a guess of a root, we approximate f by its tangent line at that x -value, find where that tangent line is zero, approximate the function by its tangent line at this new x -value, and so on. This fractal is the result of applying Newton's method to a degree-8 complex polynomial and trying every point as a starting guess, coloring each by the root it eventually reaches.



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Mathematics | Natural Sciences

Commencement 2025

In recent years the department has held our commencements in Straub Hall, and the tradition continued this year. We share some photos below. Sadly, the university administration recently announced that it is moving away from department-level ceremonies. We will miss our special event! Photos by Charlotte Mueller and GradImages.



2025 Award and Scholarship Recipients



Award winners Benjamin Goldlust, Zoe Tandingan, Andrew Rehmann, and William Doerr wait to receive awards

Frank W. Anderson Graduate Teaching Award

Francis Dunn; continuing Mathematics doctoral student

E.E. and E.J. DeCou Prize in Mathematics

William Doerr; B.S. Mathematics, 2025;

Oregon Six Recipient; summa cum laude

Andrew Rehmann; B.S. Mathematics, B.S. Computer Science, B.S. Economics, 2025; summa cum laude

Marion Walter Future Teachers Award

Zoe Tandingan; B.S. Mathematics, Secondary Teaching, 2025

Richard Koch Undergraduate Mathematics Community Award

Makenna Greenwalt; B.S. Mathematics, Pure Math, 2025

The Charles W. and Elizabeth H. Curtis Scholarship

Benjamin Goldlust; continuing Mathematics undergraduate

Sam C. and Ruth Ann Saunders Scholarship

Cat Annjanette; continuing Mathematics undergraduate

Erwin and Gertrude Juilfs Scholarship

Mahina Carlon; continuing Mathematics undergraduate

Kellan Murakami; continuing Mathematics and Philosophy undergraduate



Zoe Tandingan receives her award from Dan Dugger. Photos by Charlotte Mueller



Makenna Greenwalt accepts her surprise award from Dan Dugger



2024-2025 PhD Graduates

The Department of Mathematics celebrates these students who have earned their PhD.

Neda Bagherifard, Robert Lipshitz
"An Excision Theorem in Heegaard Floer theory"

Tatyana Benko, Benjamin Young
"Double Boxes and Double Dimers"

Halley Fritze, Dev Sinha
"Multiscale 2-mapper – Exploratory Data Analysis Guided by the First Betti Number"

Cruz Godar, Benjamin Young
"Bijectivizing the PT-DT Correspondence"

Siavash Jafarizadeh, Robert Lipshitz
"Equivariant Khovanov Homology and Equivariant Ribbon Concordance"

Nico Jaramillo Torres, Benjamin Elias
"Diagrammatics of Folded Soergel Bimodules of Type $A1 \times A1$ "

Jacob Lebovic, Dev Sinha
"Homotopy Types of Spaces of 2-dimensional Functorial Field Theories"

Dennis Nguyen, Boris Botvinnik
"Cobordism Obstructions to Complex Sections"

Ville Nordstrom, Alexander Polishchuk
"On the Map Induced on Hochschild Homology of Matrix Factorization Categories by the Inclusion of a Divisor"

Jaxon Shumaker, Benjamin Young
"Classification of Quartic Monogenic Orders"

Chandan Tankala, David Levin
"Mean field Langevin dynamics, neural networks, and Ising model"

Emily Windes, Boris Botvinnik
"Perturbed Special Lagrangian Submanifolds"



Graduate Halley Fritze and family after commencement



Some 2025 PhD graduates followed by undergraduate math majors.

ONWARD

Some of our graduates share their post-graduation plans.

Tatyana Benko

I'm going to work for Indigo BioAutomation as a Computational Mathematician, where I'll be developing algorithms for signal processing, automated data analysis, and operational optimization in clinical diagnostic laboratories.

Halley Fritze

I will be starting a Research Post-Doc in the Statistics Department at the University of Michigan under the advisership of Dr. Jonathan Terhorst.

Cruz Godar

I'll be starting as a lecturer at Yale University in the fall.

Ville Nordstrom

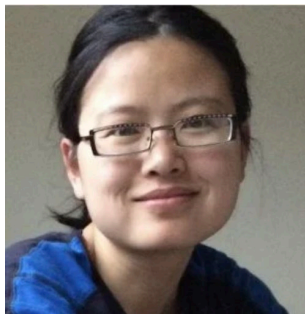
I am starting a postdoc at University of Aarhus in the fall.

New Faculty

Over the past two years we have added a few new faces to the department.



Jason Murphy joined us as an Assistant Professor in 2023. His PhD is from UCLA (2014), where he was a student of Rowan Killip and Monica Visan. Most recently he was an assistant professor at Missouri University of Science and Technology, from 2017 to 2023. Jason studies nonlinear partial differential equations, harmonic analysis, and inverse problems.



Xiaojing Chen-Murphy joined UO in 2023 as a Senior Instructor (now Associate Teaching Professor), coming to us from a position as Assistant Teaching Professor at Missouri University of Science and Technology. Xiaojing also has a PhD from UCLA (2014), where she was trained in complex geometry under Kefeng Liu.



Ian Zemke is a low-dimensional topologist, specializing in Heegard-Floer homology and related topics. He was a student of Ciprian Manolescu at UCLA (PhD 2017), and comes to UO after being a postdoc and then assistant professor at Princeton from 2017-2024. Ian grew up in Washington, so we are pleased to welcome him back home to the Pacific Northwest.

Next year we will welcome three assistant professors, none of whom have PhDs from UCLA.

- **Elizabeth Collins-Woodfin** (PhD Michigan, 2022): probability, random matrix theory, machine learning
- **Alena Erchenko** (PhD Penn State, 2018): dynamical systems, ergodic theory, geometry
- **Andrew Hanlon** (PhD UC Berkeley, 2019): symplectic topology



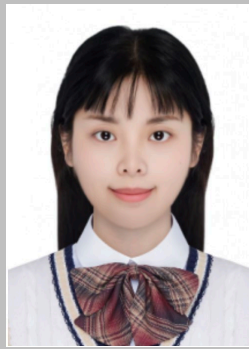
Postdocs

This year the department hosted a whopping 8 postdocs, three Paul Olum postdocs and five postdocs associated to the department's NSF Research Training Grant. Postdoc mentors listed in parentheses below.

Paul Olum Postdocs:



Yan Ge (PhD University of Alberta, 2021)
Functional Analysis and approximation theory (Xu)



Min Chen (PhD Univ. of Science and Technology of China, 2022). Geometric analysis. (Lu and He)



Pu-Ting Yu (PhD Georgia Tech 2024). Harmonic analysis. (Bownik)

RTG Postdocs:



Alex McDonough (PhD Brown, 2021) Combinatorics. (Young)



Kayla Wright (PhD Minnesota, 2024) Algebraic combinatorics. (Young)



Joe Foster (PhD Univ. Mass. Amherst, 2024). Algebraic Geometry. (Addington)



Ben Tighe (PhD Univ. of Illinois at Chicago, 2023) Algebraic Geometry. (Addington)



Emily McGovern (PhD NC State, 2024). Tensor categories and combinatorics (Elias)

Faculty Honors And Promotions



Jason Murphy was awarded tenure and was promoted to Associate Professor.



David Steinberg, Jennifer Thorenson, and Cassy Fisher were all promoted to Teaching Professor



Ellen Eischen was named a member of the Class of 2025 Fellows of the American Mathematical Society. Only around 40 Fellows are named per year!



Ben Elias received the UO College of Arts and Sciences Collegiate Faculty Award (only two recipients across the college)

Alumni News

We caught up with a few of our alumni to find out what they have been up to since their time at UO.

Jackson Champer, B.S. 2004

Jackson transferred from Lane Community College to the University of Oregon at age 16, earning a degree in math and physics two years later. He went on to complete a master's degree in physics and eventually, inspired by his students, a PhD in biology. Jackson studied gene drive at Cornell from 2016-2020 and started a laboratory at Peking University in Beijing in May 2021.



Jackson (with hat) and most members of the laboratory, twenty years after his graduation from the University of Oregon.

Whitney George, BA '04, MS '06

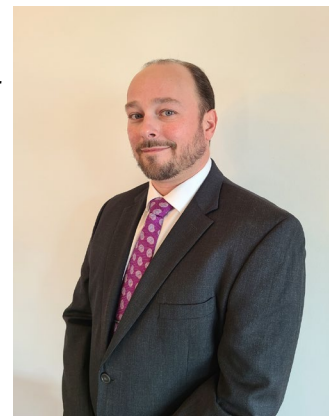
Whitney is a Professor of Mathematics & Associate Dean of the College of Science and Health at University of Wisconsin-La Crosse (PhD Univ. Georgia, 2012). Her research interests include Legendrian knot theory, contact topology, and social justice & mathematics. Whitney is married with 3 children. She also competed at international and national levels in roller derby.



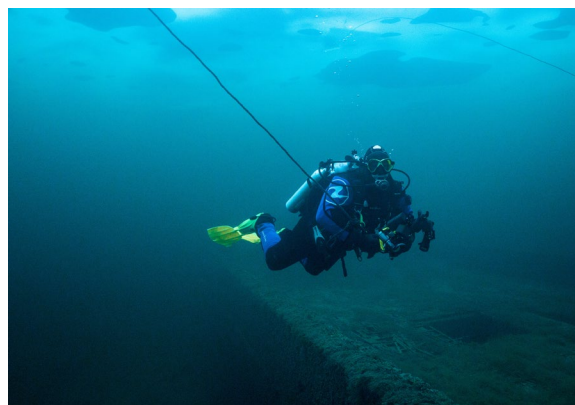
Whitney with her family (left) and pursuing other activities (right)

Aaron Heuser, PhD 2010

After receiving his Ph.D. Aaron began his career in the public sector as a Postdoctoral Fellow and later a Mathematical Statistician at the National Institutes of Health.



In this work, he was instrumental in helping refine the Social Security Administration's Compassionate Allowance program, receiving the NIH Clinical Center Director's Award in Science. He then transitioned to roles with increasing technical leadership, serving as a Senior Data Scientist at IMPAQ International before becoming a Principal and then Managing Director at the American Institutes for Research (AIR). This career path has led him to his current role as a Manager in Economic & Statistical Consulting Services at KPMG, where he leverages his extensive background to implement methodology from the fields of agentic AI, multimodal AI, and open-weight large language models.



Aaron scuba diving under the ice in Lake Charlevoix in winter.

ALUMNI NEWS cont.

Eric Hogle, Ph.D., '18



Eric lives in Spokane, Washington, where he works as an associate professor at Gonzaga University. He just finished a blissful sabbatical and is excited to teach at GU's satellite campus in Florence, Italy next Spring semester!



UO Alumni Eric Hogle walks a tightrope

What are you doing?

To all of our alumni: **We would love to hear from you!** If you are willing to be included in a future newsletter or would just like to let us know what is going on in your life, please reach out to either Dan Dugger (ddugger@uoregon.edu) or Shelly Watson (srwatson@uoregon.edu).

Rebecca Lee, B.A. '20



This fall Rebecca is entering her 5th (and final) year as a statistics Ph.D. student at Texas A&M University. Her research focuses on non-parametric Bayesian time series analysis methods, and she plans on entering academia due to her love of teaching. She will also be President of the Statistics Graduate Student Association at Texas A&M this Fall and is looking forward to implementing ideas that will help PhD students have fun and navigate graduate school.

Krista Wurscher, B.S. '20

Krista graduated from the Ohio State University in 2022 with a master's in applied statistics and is now working as a data analyst and public health researcher at Ohio State. She just moved from Columbus, Ohio to live with her partner in Cincinnati and is settling in, biking around town, and training for a half marathon!



Alumni Interview

We had the pleasure of talking with Jeske Glenn (BS 2018), who is a math and computer science teacher at Fremont High School in Sunnyvale, CA. The following is a digested version of our conversation.



DD: Can you start by catching us up on your life since UO?

JG: Sure! Immediately after graduation I went into a one-year masters and teacher-credential program called STEP (Stanford Teacher Education Program). It's an intensive year where there are classes in the evening and student teaching in the daytime. I graduated from that in June of 2019, and then got hired at the same school where I student-taught! I felt very fortunate, since then I was familiar with the school and the classes I would be teaching.

DD: Does that happen frequently, a person getting hired at the same school where they trained?

JG: It's somewhat uncommon, but it does happen. The school just happened to be looking for a person in my area, and it helped that in addition to my math major I had a minor in computer science and so was able to teach both subjects. That definitely makes a teacher more marketable. But yes, they hired me and then immediately threw me into the deep end, having me teach both those subjects. All of my training had been in how to teach math, and I had never thought about the pedagogy of how to teach computer science. It was really fun figuring out for myself how to do that on the fly.

So that was the first part of 2019-2020, and it was really amazing. For every first-year teacher the experience is like drinking from a firehose, but you get better as you go, you get more confident. Then March 2020 came around

(JG cont.) and, as we know, that became a time where the whole job changed. We taught on Zoom for the remainder of that school year and then for the entire school year after that. Doing that was very interesting, but it was my least favorite part of the last few years. While I love the content, so much of teaching then was stuff like helping the students enter things into the computer in the right way. Being at school, engaging in-person with math and students, I will take that any day over being on the computer. The 2021-22 school year was the first that we were back in person, and I've been through four years since then!

DD: What kinds of classes do you teach?

JG: I've taught a bunch of math classes that I have really liked. In my department I might be the person most likely to jump around and teach different subjects. I've taught Geometry, Algebra I, Algebra II, Stats, and my Computer Science class. I'm excited to be teaching the BC Calculus class next year. My CS students are often taking pre-calc or calc and will ask me about problems they are stuck on, and it's super fun engaging with that higher level of math. I love my Algebra I classes, but the mathematical content is very easy for me. I'm looking forward to challenging myself with the calculus class.

DD: What do you cover in your CS course?

JG: I teach Intro to Programming. The whole class is taught in Java because the AP test is based on that. As an intro class it covers the basics: variables, conditionals, looping structures, all that stuff. We get a bit into object-oriented programming, lists, 2d-lists for gaming. I teach using a model I adopted from a colleague, where at the end of every unit the students make a project that is in some sense a video game. At the beginning it's just like a text-adventure, a bunch of if-then statements, but as the class goes on they learn to do more sophisticated things. It is really fun for them, bringing their knowledge together into a concrete project like that, something exciting that they want to share with their friends and families.

Jeske Glenn Alumni Interview cont.

DD: We are starting to see students with shocking gaps in their understanding of math. Do you see any of that, or are things back to normal for you?

JG: Things are certainly not back to normal after the pandemic. The effects vary a lot based on where in their education the pandemic hit a student. The thing I notice the most are problems with retention, where students learn something but not in a way that they deeply understood it---they learned enough to get through a thing one time, in that one class, but then it's gone. I don't know if this is an overall mentality shift, but it doesn't feel like students are seeing the connections across classes. And yes, there are strange gaps. Students know how to solve linear equations but then you realize they don't know which is the x-axis and which is the y-axis on a graph. It is a real challenge for teachers trying to fill in those gaps, preparing materials to beef up their curriculum but then finding the next year that the gaps of the new students are completely different.

DD: Do you have problems with student attention spans and engagement?

JG: Yes, cell phones are the bane of my existence, not only in my classroom but also just in terms of what they have done to the teenage brain. You scroll through something, 15 seconds, then move on, and I think doing that for years and years when your brain is developing has a negative impact. But as a teacher, it's really interesting finding ways to improve their ability to sustain attention while also being mindful of the fact that I need to build in breaks and other things that allow them to re-engage.

DD: Are there any memorable things from your time at UO that jump to mind?

JG (smiles): So many things...I have very vivid memories of hiking the stairs of Deady Hall when it was the middle of winter and 100 degrees inside the building. I remember certain professors I had, particularly ones who I had for multiple classes...you, and Hayden Harker, and Eric Merchant, for example. I remember cool classes that I got to take, for example I still remember writing a research paper about the calculus behind rainbows [MATH 397, though Jeske took it as MATH 410]. I worked at the tutoring center [TAEC] on the fourth floor of the

(JG cont.) Knight library, and that was a super fun part of being a math major because I got to use what I knew to help other people. And that directly correlated with what I knew I wanted to do, in terms of teaching and education.

I was also a learning assistant for David Steinberg. I remember teaching at the chalkboards and coming back home at the end of the day totally covered in chalk, my roommates asking "What exactly happens to you in a school day?" I also really loved being social while at school, I'm a huge fan of sports and I loved going to the football and basketball games. Recently my sorority had a five-year reunion and so I got to come back and we all went to a football game. That was really great, walking down memory lane.



DD: Speaking of getting covered with chalk, do you have blackboards at your school?

JG: No, just whiteboards. We have a very tech-savvy school, which I really appreciate because it's been fun to get to learn to use all the tech. We have Apple TVs and I do everything on my iPad now, which is really cool because that's then a digital resource that I can give to students after the lesson...but no chalkboards.

DD: We don't have as many students wanting to be high school teachers as we used to. Do you have any advice for people who might be drawn to that calling? Is it a good career?

JG: It's a great career in certain regards, but also difficult. It's not the highest paying career, and given the level of difficulty of the major that was the hardest adjustment---you work your butt off for this degree, but then don't get compensated in the same way as people who become actuaries, or whatever. I don't think that's

Jeske Glenn Alumni Interview cont.

(JG cont.) necessarily a deterrent, but it is a reality that we face as teachers...though hopefully one day we can fix that!

I do find it very rewarding and valuable, as a career, because you can see the impact you have. There are so many young people who are incredibly afraid of math, and all it takes is that one experience with one good teacher for them to be more open to it.

That is really where I feel like I am making a difference. When I get home from work it's not like I just spent the day crunching numbers, I have these impactful interactions to look back on. And I really appreciate having the young people there. They keep *me* fun and young, I learn all the time about new phrases and apps, they ask me to be in their Tik-Tok videos---I always say no, but they keep asking! I've learned that if I'm willing to be my full self in the classroom then they are too, and then you just get to experience this whole human. You get to build these relationships over a whole year, or sometimes multiple years. Being six years in, I've seen former students who have now graduated from college, and these kinds of things trickle down into something that just feels so meaningful and rewarding.

DD: Can a person live in California on a teacher's salary?

JG: I can, absolutely! Part of that was being okay with having roommates, I had roommates for quite a while, until I moved in with my significant other and then we got married and bought a house. You're not living a life of luxury, buying a mansion or something, but it's very doable to live in this area on a teacher's salary. After buying a house I do need to commute a little further to get to work, but that's just the way the housing market worked out for me. There are quite a few teachers who live in the same neighborhood as the school and walk or bike to work.

DD: I think you have answered all of my questions! Is there anything else you would like people to know?

JG: Hmm. When I first got into teaching I felt a bit like "Man, I took all this incredibly difficult coursework, and now what I'm teaching doesn't require any of that." But I think the really impactful part is that when students ask those incessant "why?" questions, I have the training to engage with them---I can truly understand the deep-seeded "why" behind what it is they are asking about. So many students aren't satisfied with "this is the formula and it is because it is", and when they want to go down that path I have



Jeske Glenn, 2018 Undergraduate Commencement Speaker

(JG cont.) the knowledge and feel confident enough to go there with them. Most days I'm not talking about groups, and fields, and all of those things, but I still think it was cool and beneficial to have learned all of that, so as to not shy away from those deeper questions when they show up. I'm not saying one has to major in math in order to teach math, but I do think it helps. I majored in math because I loved it, and I think people who are passionate about the subject make the best teachers; they really care about someone else also understanding it and maybe even coming to love it as much as they do. That has a huge impact on what your classroom looks like. If you love the subject you are teaching, that totally comes across to students.

DD: It has been so great catching up with you, Jeske! It's very inspiring hearing the joy you take in your teaching, and in your students, and the passion you are bringing to your job. Thank you so much for taking the time to share that with us!

Makenna Greenwalt is the recipient of this year's Richard Koch Undergraduate Community Award. We spoke to her about her experiences as a UO math major. The following is a digested version of our conversation.



DD: You worked with Ben Elias this year to start a Peer Mentorship program. Can you tell us a bit about that?

MG: This was inspired by my own experiences here. My first two years in the program were pretty rough, especially my second year. There was not much sense of community among the math majors and it felt very isolating. I was also often the only woman in the advanced math classes I was taking, which made it worse. I ended up working on a couple of things to make the situation better for people, one of which is the Peer Mentorship program. The idea was to hire a handful of senior math majors, give them some training, and then assign interested freshman (or others new to the department) to these senior "mentors". Last year Ben Elias and I worked to design the program and get funding, and this year it ran for the first time.

DD: How did it go?

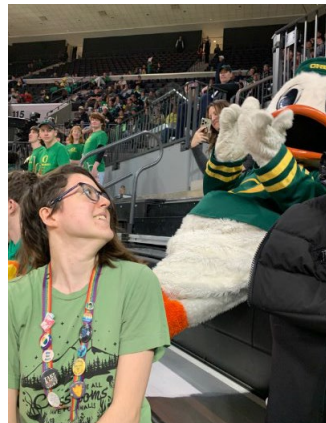
MG: It was mixed. It turned out to be very hard to get freshmen to engage; only two responded to our initial emails. We had a big event in the fall to start things off, but it was poorly attended. And for the winter event, the people who showed up were mostly older math majors. So reaching people and capturing their interest has been harder than expected. Also, our design kind of missed the sophomores and juniors. We trained these senior mentors, but now they are graduating. But I think we learned a lot this year, and I hope the program is able to build off of that and get better for the future.

DD: You've worked on some other community-building projects. Can you tell us about those?

MG: I worked with the student chapter of the AWM, which has been focused almost entirely on graduate students, to start an "undergraduate chapter". This is essentially a subset of the existing student chapter, but with undergraduate members. At first this was just a kind of hangout club, but that didn't work so well---again, there was a lack of engagement. Then we moved towards hosting specific events: panels that talked about getting involved in research, one about how to apply to graduate school, and so forth. That took a while to get off of the ground but worked out well. We also had a "family feud" event with the graduate students that was really fun. Another thing I did was start a "lunch with a math professor" series. Twice a term I would organize a few undergraduates to go to lunch with one of the math faculty. Jason Murphy and Laura Fredrickson did this in the fall, Ben Elias and Ben Young did the winter, and you and Nick Addington came in the spring. These lunches were popular with students and usually filled up.

DD: Are there other things you would like to share about your experiences trying to build community here?

MG: It's hard for students to meet each other, and I think we have some cultural problems around that. The department having such a non-diverse faculty also doesn't help. The Directed Reading Program was really outstanding, and most of my own community has ended up revolving around the graduate students. In addition to being research mentors, it was very helpful to meet people who were willing to read my graduate school application essays and give feedback. It has been hard having Hilbert Space down for the past two years [with University Hall closed for construction] because there just isn't a space for undergraduates to easily get together.



DD: Are you off to a graduate program next year?

MG: Yes! I'm excited to be heading to graduate school in math at Colorado State.

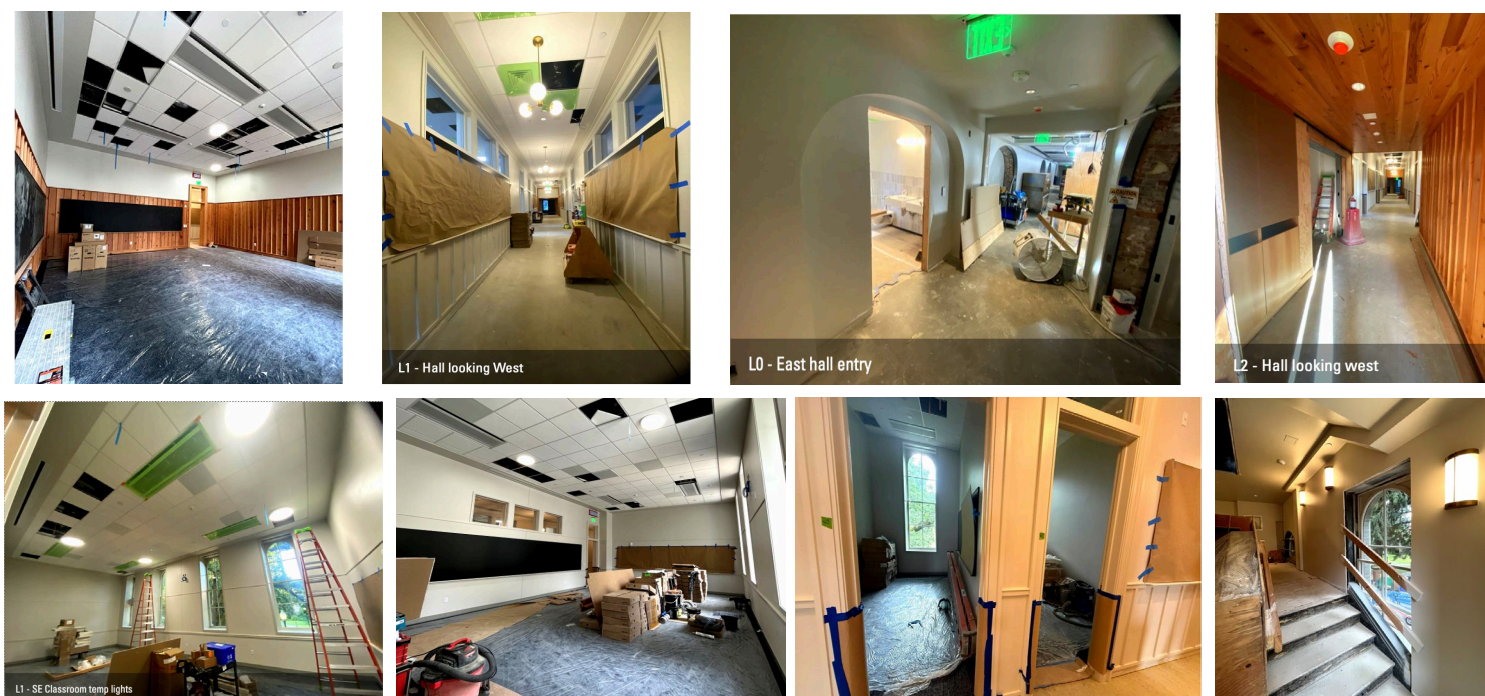
DD: Thank you for all of your work in the department over the years, and thank you for taking the time to talk with me and share your experiences. Good luck in graduate school!

University Hall Update

As you may know, our beloved University Hall (formerly Deady Hall) has been closed down for renovation for the past two years. This is part of the UO Heritage Renovation Project, whose goal is to modernize the two oldest buildings on campus: University and Villard Halls. Modern seismic reinforcement will be installed, and the interior spaces will be completely updated. These buildings are set to re-open in September 2025! They will look very different inside. University Hall will have classrooms in the basement and on the first floor, and then the second and third floors will be Math Department space: offices for faculty and graduate students, as well as the department seminar room and the new Hilbert Space. The mezzanines will completely disappear (at least from the outside), as their space will house the machinery for---wait for it---a modern heating and A/C system! Nick Proudfoot was the department's lead on this project during his time as head, and we look forward to seeing in September how it all turned out!



Here are a few recent pictures of the exterior



And to whet your appetite for the new building, a few pictures of the inside while under construction

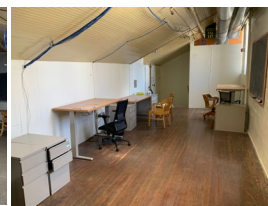
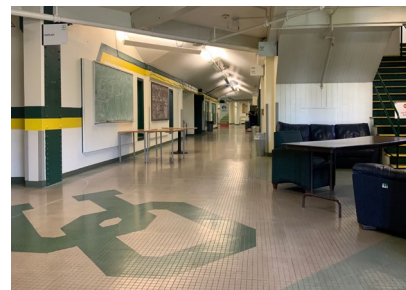
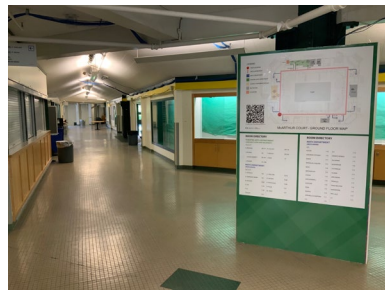
University Hall Update cont.

And in case you would like a trip down memory lane, here are some snapshots of the interior before the renovation:



Goodbye McArthur Court

During the last two years while University Hall has been under construction, the department has been scattered across campus in temporary quarters: a few have been in an odd location called the UO Annex, but most have been in McArthur Court. If you have a hard time picturing that, you are not alone! The rooms there are weird spaces carved into the open areas about the main arena, for example irregular hexagonal rooms cut into landings of former stairways. The result is that the place is a very strange maze---it is indescribable. The heating system never quite worked as hoped, so that on cold days inhabitants would don layers and sit freezing in their offices. In honor of our two years there, here are a few pictures:



Around the Department

The bulk of the work we do centers around our research, teaching courses, mentoring students, as well as the seemingly-endless administrative and committee work necessary to keep an institution running. So much hard work goes into all of that, but it is difficult to pick out individual pieces to include here. Instead, below we describe some of out-of-the-ordinary activities that went on last year.

Eugene Math Circle

The Eugene Math Circle is an afterschool program for students in grades 2-12, sponsored by the UO Math Department. It is built around collaborative problem-solving and hands-on math activities. There are classes for five different age groups, meeting once a week on Wednesdays or Thursdays, serving about 100 students per term. Our amazing math circle instructors are Maria Nemirovskaya (Elementary I & II, and Upper Division I), David Steinberg (Upper Division II), and Arkady Vaintrob (Upper Division III). Maria is also the principal organizer.

More about Math Circle can be found at <https://pages.uoregon.edu/nemirovm/emc.html>



Maria Nemirovskaya and an undergraduate assistant work with elementary students at the Eugene Math Circle.

UO Prison Education Program (PEP)

For a number of years the Math Department has taught courses as part of the PEP, starting with Craig Tingey back in 2017. In recent years AJ Rise has taken over as the primary instructor, and this year he was joined by Megan Boes. This year AJ taught the sequence MATH 101-111-112-251, starting with 101 last summer and moving all the way to calculus in the spring. Megan taught 101-111-112. Both described their students as incredibly motivated, interested, and passionate about learning. We hope we will be able to continue these classes for a long time!

WARTHOG

WARTHOG is short for “Workshop on Algebra and Representation Theory on Oregonian Grounds”. Started in 2010 by Nick Proudfoot, it has been held every year except for a two-year pause during the pandemic. Ben Elias took over as the lead organizer in 2016. The summer 2024 workshop was entitled “**Coherent-constructible equivalences in local Geometric Langlands and Representation Theory**”, and was led by Pramod Achar (LSU), Gurbir Dhillon (UCLA), and Simon Riche (Lab. Math. Blaise Pascal). Around 65 students from around the world convened at UO for a week to attend lectures by these experts and work together in directed problem-solving sessions, led by them and the local organizers.

This event has grown every year, and is on track for its biggest year ever in summer 2025. More information can be found at <https://pages.uoregon.edu/belias/WARTHOG/>

CALICO

The Cascade Lectures in Combinatorics (CALICO) is a regional conference series started by Patricia Hersh in Fall 2021, currently sponsored by the UO Math Department’s RTG grant. This conference typically meets twice a year, a day-long online conference in the fall and a day-long in-person conference in the spring hosted by an academic institution in the Pacific Northwest---this year it was University of Washington. The lead conference organizer is Tricia Hersh, and she was assisted by Alex McDonough in the fall and by the UW local organizers in the spring. There were 68 participants for the fall conference, and 50 for the spring.

Moursund and Niven Lectures

This year's Niven lectures were held April 8-9. Matt Baker (Georgia Tech) gave two talks: "Card shuffling, necklaces, and the Mandelbrot set" (UG lecture) and "Group structures on spanning trees and generalizations" (research colloquium).

Rick Kenyon (Yale) gave the Moursund Lectures, May 12-14. This was a three-part lecture series entitled "Graphs, connections, and webs".

Thanks are due to this year's organizing committee, Arkady Vaintrob and Yuan Xu, for arranging these distinguished visitors.

Daubechies visit

In an event arranged jointly by the UO Phi Beta Kappa chapter, the UO Math Department, and our student chapter of the Association for Women in Mathematics, Ingrid Daubechies (Duke) visited campus in March and gave two talks: "Discovering low-dimensional structure in high-dimensional data sets" (research colloquium) and "Mathematicians Helping Art Conservators and Art Historians" (public lecture). Laura Fredrickson worked behind the scenes with the above groups to make this visit happen.

Graduate Student Activities

Directed Reading Program (DRP)

The DRP is a program created and led by graduate students that pairs undergraduates with graduate student mentors for an intimate individualized learning experience on a topic in advanced mathematics.

The DRP organizing committee sent the following report:

"The Directed Reading Program (DRP) had a fantastic year, pairing 20 undergraduate mentees with 15 graduate student advisors for impactful independent study. The DRP empowers undergraduates to develop crucial independent learning skills while diving deep into subjects they're curious about, all with the personalized guidance of their mentor, to help understand what it's like to do mathematics beyond the traditional classroom setting. This year's program culminated in an impressive presentation session and pizza dinner on April 25, after starting off on January 13. We want to extend a huge thank you to both our undergraduate mentees and their graduate student advisors for their incredible hard work and commitment. For you undergraduates who have ever been curious about a specific math topic, want to hone your independent study skills, or just want to connect with the wider math community, we encourage you to consider participating in the DRP in the future! You can find more information about the program, including past projects and topics on our webpage:

<https://blogs.uoregon.edu/uomathdrp/>"

This year's DRP projects are listed at <https://blogs.uoregon.edu/uomathdrp/past-projects/2024-2025-projects/>

2025 Niven Lectures By: Matthew Baker

PROFESSOR OF MATHEMATICS AND MAGICIAN,
GEORGIA INSTITUTE OF TECHNOLOGY

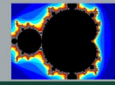


Card shuffling, necklaces, and the Mandelbrot set

April 8th, Tuesday 4:00pm
220 Chapman Hall
Aimed at undergraduates

*Content recreation to follow this lecture in Takersen Commons

We will explore a marvelous mathematical principle in card magic and encounter a surprising connection to the Mandelbrot set, a fractal shape which is magical in its own right. We'll conclude with some newly discovered links between these concepts and the combinatorial theory of necklaces. This lecture will be accessible to undergraduates.



Group structures on spanning trees and generalizations.

April 9th, Wednesday 4:00pm
220 Chapman Hall
For a General Math Audience

It was discovered in 2013 that the set of spanning trees in a plane graph naturally forms a group, modulo the fact that there is no distinguished identity element. We generalize this fact to ribbon graphs, i.e., graphs embedded in orientable surfaces of arbitrary genus. In addition to shedding light on the role of planarity in the earlier work mentioned above, our results represent one of the first substantial applications of "orthogonal matroids" to a natural combinatorial problem about graphs.



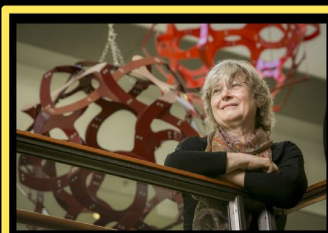
UNIVERSITY OF
OREGON

Mathematics

Alpha of Oregon Chapter of Phi Beta Kappa Presents:

PBK VISITING SCHOLAR

Ingrid Daubechies



PUBLIC TALK:

"MATHEMATICIANS HELPING ART CONSERVATORS AND ART HISTORIANS"

THURSDAY, MARCH 6TH

6:00 TO 7:30 PM

MCKENZIE HALL 229



The PHI BETA KAPPA Society



UNIVERSITY OF OREGON
Undergraduate Research and Distinguished Scholarships

AWM Student Chapter

Our very active AWM student chapter sent the following update on their year:

"The University of Oregon's Association for Women in Mathematics (AWM) Student Chapter had an exciting year across all of our committees!

Our Speaker Series Committee organized visits from two distinguished mathematicians: Ingrid Daubechies, James Duke Professor of Mathematics and Computer Engineering at Duke University, and Stephanie van Willigenburg, Professor of Mathematics and Associate Dean of Equity, Diversity, and Inclusion in Science at the University of British Columbia. During Professor Daubechies's visit she gave a talk about her research on discovering low-dimensional structure in high-dimensional data, and a public lecture on how mathematicians assist in art conservation. Over lunch with AWM members, she also shared the story behind "Mathemalchemy: A Mathematical and Artistic Adventure". Professor van Willigenburg gave a talk about her research titled "De-clawing Graph Theory", and also led an engaging discussion about the experiences of women in mathematics, and how we can all support women and other underrepresented genders in math. Both visits included dinners that gave students a chance to connect more personally with the speakers.

In outreach efforts, the K-12 Outreach Committee partnered once again with Women in Graduate Sciences to lead math activities for Girls' Science Adventures, a hands-on STEM series for girls in grades 4–6. This year's activities included Möbius strips, graph explorations, tiling, and shapes of constant width, encouraging creativity and curiosity through hands-on mathematical discovery. We also participated in the Eugene Youth Math Festival.

The Reading Room Committee continued to foster conversation and community around professional development and identity in mathematics. In the fall, we hosted a tea on self-promotion, where we practiced giving elevator pitches through a fast-paced game called "half-life." In the spring, we turned our focus to workplace confidence, using a quiz from "Nice Girls Don't Get the Corner Office" to spark reflection and discussion. We also added several new books to the reading room collection.

The Undergraduate Committee organized two panels for undergraduates this year. In the fall, graduate students offered advice on navigating the graduate school application process, sharing tips on how to choose programs, approach personal statements, and prepare for interviews. In the spring, graduate students who had participated in REUs discussed what to expect from these programs and how to make the most of the opportunity.

The SPEC Committee brought the year to a close with an end-of-year potluck. It was a chance to celebrate the year's accomplishments and connect with friends and colleagues.

In addition to these events, we were proud to be nominated for a CAS Excellence in Diversity, Equity, and Inclusion Award. Two of our members also gave invited talks at the University of Pittsburgh AWM Student Chapter, strengthening ties between AWM communities across institutions."

AMS Student Chapter

After a few years of inactivity, this year the UO Student Chapter of the American Mathematical Society hosted events to promote community among the graduate students. A highlight was the end-of-year tie-dye social which brought together over a third of the graduate students to enjoy the sunshine and take a break from their studies with some hands-on fun. In the future, the chapter plans to organize additional events to support the academic success of graduate students such as a research symposium and facilitating opportunities to connect with research faculty.



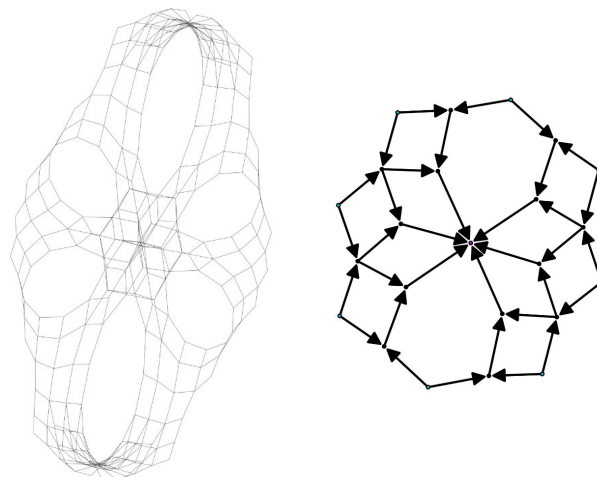
Undergraduate Research Experiences

Since 2017 the department has funded summer REUs each year for a few UO undergraduate math majors. These REUs pair an undergraduate math major (and sometimes two or three) with a faculty mentor for an intimate learning experience, often built around learning about an established math area but sometimes involving research into an unexplored topic.

Here are the participants from summer 2024, with their faculty mentors and brief project descriptions:

Raven Biskup and William Doerr (Ben Elias):

Raven and William explored the structure of the set of singular reduced expressions for the longest element in symmetric groups. They wrote some code to explore the statistics of singular reduced expressions and commutation classes thereof, and also looked for interesting homology in the graph of reduced expressions.

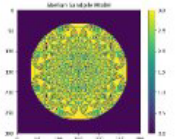


Mahina Carlon (Ben Young):

Mahina explored the 1/3-2/3 conjecture, about linear extensions of partially ordered sets. She and Ben came across this conjecture while studying a version of the “non-attacking queens” chess problem. Mahina worked on the special case of the conjecture for permutation posets, which turns out also to be quite difficult. As part of this project Mahina learned to program in Sage/Python and collected experimental data about the problem.

Abby Lewis (Ellen Eischen):

Abby’s project was about abelian sandpiles, and also about the “Dollar Game”. It culminated in her conducting a full-day outreach activity about her work, for kids at the Eugene Science Center. To the right is an excerpt from the activity sheet she prepared.



Abelian Sandpiles

Math Adventure by Abby Lewis



Summary: This lesson centers around the concept of *self-organized criticality*. That term refers to systems that tend toward barely stable states; changing small things about them can change how they look in big ways. Students will play the Dollar Game, where they will learn about how to stabilize a system. Then, they will learn about abelian sandpiles, which follow modified rules from the dollar game and create interesting patterns.

David Schmidt (Jim Isenberg):

David studied the connections between geometry and general relativity and wrote a paper explaining two main theorems from this subject, the Positive Mass Theorem and the Riemann-Penrose Inequality (the diagram to the right is taken from the paper).

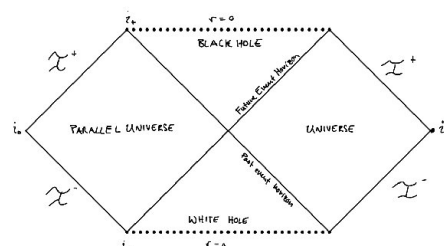


Figure 7: The Penrose diagram for Schwarzschild spacetime.

Eugene Youth Math Festival

As in past years, Maria Nemirovskaya assembled a small army of volunteers to take over McArthur Court on a Saturday in February, to share math activities with hundreds of children. This year we had over 150 volunteers, and over 475 children participants. The event is supported by the NSF grant of Robert Lipshitz, as well as all of the awesome volunteers! More information about the math festival can be found at <https://blogs.uoregon.edu/mathfestival/>



More pictures from the Math Festival



Sabbaticals

We had three faculty on sabbatical this year: Nick Proudfoot, Jon Brundan, and Luca Mazzucato. We have tried to catch up with all three and get a word about their adventures.

Nick Proudfoot

Nick spent the year at Oxford University and sent the following pictures:



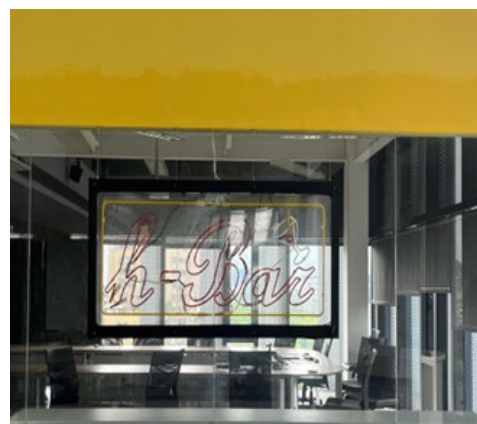
Jon Brundan

Jon Brundan complains that he is “no longer photogenic”, but he sent us the following description of his activities. “I’ve spent time during my sabbatical at the PI Institute in Ontario, Canada, and at OIST—the Okinawa Institute of Science and Technology—in Japan. Both are amazing places, perfect for quietly proving theorems and writing. The first photo is of OIST, which consists of five giant labs built like ships above the East China Sea. I also gave several talks in Boston, Taipei and Sydney, discovering the h -Bar in one of these cities, and staying in the Sanrio hotel in Naha.



Luca Mazzucato

Finally, Luca Mazzucato sent us the following: “During a hike outside Geneva with Luca Mazzucato and Tien-Tien Yu, their baby boy Oscar Donghui (in the carrier) reached his personal record elevation at 1097m. Luca is visiting EPFL [in Lausanne], and Tien-Tien is visiting CERN [in Geneva] on their sabbatical.”

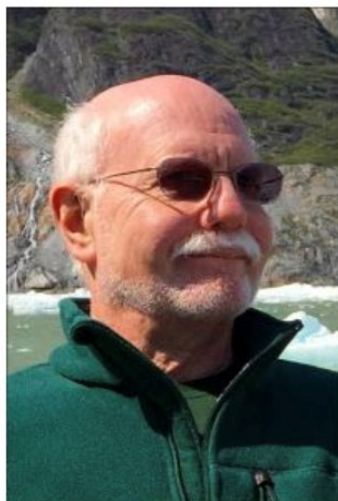


Retirements



Huaxin Lin retired in summer 2024, after 30 years at UO. We are sad to see him go! Huaxin works in operator algebras, having received his training as a student of Larry Brown at Purdue (PhD 1986). Huaxin came to UO in 1994. He was the advisor for 8 PhD students in his time here, and in 2016 was the recipient of a UO Excellence in Scholarship and Teaching award. Huaxin's career is marked by an extremely productive research record: MathSciNet lists 151 publications, and he had continuous NSF support since 1993. Despite retiring from UO, Huaxin's career as a mathematician goes on. He is now a professor at the Shanghai Institute for Mathematics and Interdisciplinary Sciences in China.

In Memoriam



Stu Thomas passed away in early January 2025. Stu came to UO in 1990, serving as Assistant Department Head until his retirement in 2004. In addition to his calm and steady hand in the department, Stu played a large role in the department's "social life": he was a regular attendee at the weekly lunch at the EMU, and was a good friend to many faculty members. He is well-remembered around the department for his earnest and generous spirit.



Thank You To Donors

We are grateful to all of our donors for their continued interest in the UO Department of Mathematics, and for their generous contributions. Donor funds support undergraduate research opportunities, allow us to bring in distinguished visitors, provide scholarships and student awards, fund curriculum development efforts, and so much more. In a time of dwindling federal, state, and university resources, the role of donors to the mission of our department is more important than ever. We are incredibly appreciative of your support and the opportunities that your gifts help provide.

Love of mathematics, and the desire to share mathematics with others, are very rare and special qualities. They drive everything that our department does. Thank you so much for your devotion to those ideals, and for helping us turn them into realities. Thank you for your belief in our department and institution.



Undergraduate math majors celebrate their graduation
From Left to right: Emily Elbaum, Abby Lewis, Andrew Rehmann, and Ryann Standke.



Graduate students at the annual department picnic 2025.
From Left to right: Arthur DressenWall, Hanna Hoffman, Kyla Pohl, Duca Delfin Ares de Parga, Annika Christiansen, Heitor Anginski Cotosky, and Cory Peters.



MAKE A GIFT

To make a donation to either the Department of Mathematics or the Eugene Math Circle, please use the link or QR code below.

<https://bit.ly/4egNMhk>

The link will take you (after a brief pause) to a secure webpage associated to the UO Foundation. Note that the gift will result in you being added to a generic UO Foundation mailing list, but you can unsubscribe from that if you wish. More information about giving to UO can be found at the link <http://giving.uoregon.edu>.

