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This issue of *Prime Bits* is edited by Professor David Grant and Professor Judy Packer is our movie critic. The issue was designed by Rémy Jambor. It is available in electronic format at math.colorado.edu/alumni. If you would prefer to receive only the online version in the future, please just drop us an email at mathalumni@colorado.edu

In any format, we will endeavor to keep our loyal alumni and friends abreast of what's going on at their alma mater, and express our gratitude for what their continuing support has meant for the Department and its continuing generations of students.
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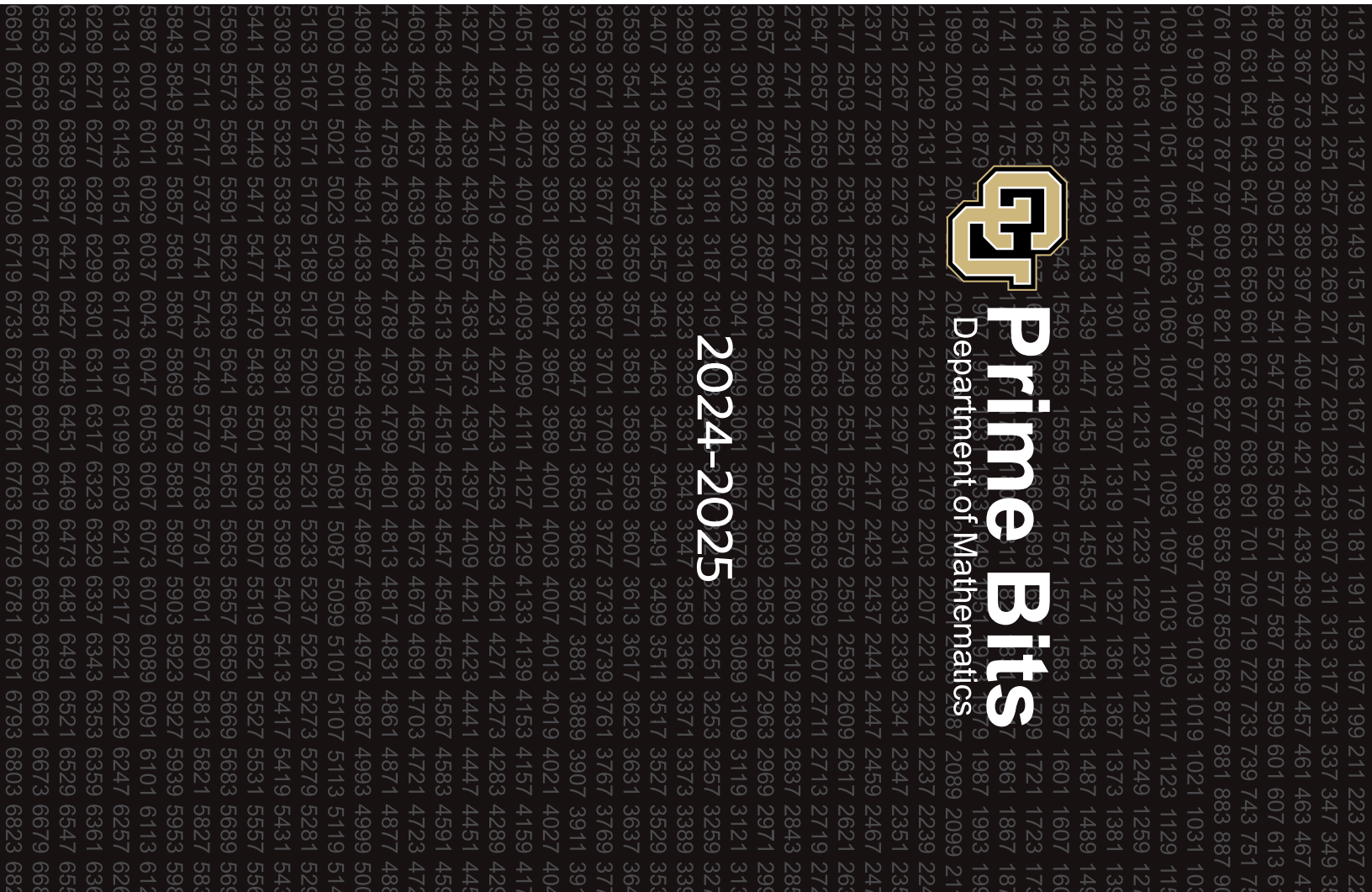

Prime Bits

Department of Mathematics

Chair's Communiqué

Sebastian (Yano) Casalaina-Martin

Dear Friends and Alumni,

It is a pleasure to address you and share the many exciting developments happening in the CU Math Department—from new hires and postdocs, to new courses and student initiatives, to awards earned by our students and faculty. I have served as Chair for two years and continue to be amazed by the accomplishments of our students, colleagues, and alumni.

I am thrilled to announce that in Fall 2024, we welcomed a new Assistant Professor, Siddhant Agrawal, who joins our differential equations research group. We also hired two Assistant Teaching Professors, Rebekah Jones and Patrick Newberry, who strengthen our teaching expertise. In addition, Autumn Franklin-Phillips has joined us as our new Undergraduate Program Professional, providing expert support for our students.

We are tremendously proud of Professors Katherine Stange and Agnès Beaudry, who both received prestigious national honors this past year in recognition of their research excellence. Professor Stange was awarded a Joan and Joseph Birman Fellowship from the American Mathematical Society, as well as a CU Boulder Faculty Assembly Award for Excellence in Research, Scholarly, and Creative Work. Professor Beaudry was named a Fellow of the American Mathematical Society.

It is bittersweet to announce the retirement of our esteemed colleague, Professor Judith Packer. She served as Department Chair and contributed in countless other ways. While we will deeply miss her, we wish her all the best in the next chapter of her life.

It is with great sadness that I note that this issue of *Prime Bits* includes five obituaries—for Professors Emeriti Jerry Malitz, Jan Mycielski, Dave Rearick, and Dan Stroock, as well as for Professor Jeff Fox, who was still an active faculty member at the time he passed away.

Although the department naturally evolves over time, some things remain constant—each fall, students line up to discover the wonders of calculus, and we remain committed to sharing our passion for mathematics. While elements of our curriculum, such as calculus, are timeless, we also strive to stay at the forefront of the field: you will read inside about our new Data Science course.

I also want to acknowledge that research universities nationwide have faced increased scrutiny this year, and it is understandable that you may wonder how this has affected our department. In short, this has led to a time of uncertainty, which may take some time to resolve. At CU Boulder, we are working proactively to prepare for possible changes. What will not change is our commitment to our students—undergraduate majors and minors, graduate students, and the tens of thousands of CU students who rely on mathematics in their studies. We remain deeply committed to our internationally recognized, cutting-edge research.

On behalf of the entire department, I want to emphasize that we are grateful

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▸ *Communiqué Continued*

for the generous support of our donors, as well as funding at both the federal and state level, which makes possible the research and educational environment that enables our students and faculty to excel.

I would especially like to thank longtime supporters Jim and Laura Marshall for endowing a new undergraduate scholarship, Bob Gunning for his continued support of the student scholarship he set up in 2018, and Philip Robinson for founding a new graduate scholarship. These scholarships will not only help our students with their financial responsibilities, but will also empower them to pursue ambitious academic goals, engage more deeply in research, and contribute meaningfully to our scholarly community.

One of my priorities as Chair has been to strengthen our Mathematics Department community—students, alumni, faculty, staff, and all those connected to mathematics at CU Boulder. Our student community spans a seamless continuum: alumni, current students, and future students. In supporting this community, I invite your involvement. Alumni can make a tremendous impact by mentoring current students, offering career guidance, or sharing professional experiences. We also welcome insights from alumni on how best to prepare the next generation. Please feel free to contact me any time if you'd like to get involved—I'm always eager to hear your thoughts, questions, and hopes, and I look forward to your active participation in the life of the department.

If you are ever in Boulder during Fall, please join us at our annual department BBQ for our mathematics majors, which we hope will serve as a gathering point for our broader community. We also plan to recognize our scholarship recipients during this event. Details will always be available on the department website. We would love to see you there!

Best,
Sebastian

Department Welcomes New Faculty

Professor Siddhant Agrawal

The department is pleased to welcome **Dr. Siddhant Agrawal** as a new Assistant Professor.

Agrawal received his PhD from the University of Michigan in 2018 working under Professor Sijue Wu. He had two three-year postdoctoral positions, one at the University of Massachusetts Amherst, and the other at the Instituto de Ciencias Matemáticas in Madrid, Spain.

Professor Agrawal's research is in the analysis of nonlinear partial differential equations, in particular in water waves and the Euler equation. He is interested in questions of existence, uniqueness, singularity formation, and the effect of boundaries.

Professor Magda Czubak – who also works on partial differential equations – is serving as his mentor in the Department. The two paired up this summer to mentor four undergraduates in our summer REU Program. Agrawal is also heading up the Department's Putnam team, coaching talented undergraduate students.

Agrawal grew up in Aurangabad, India, a historic area, known for its rock-cut Buddhist cave monuments, including the Ajanta and Ellora Caves, which are UNESCO World Heritage Sites. He is enjoying his new home, saying: "Boulder is awesome! The weather is great and the mountains are awesome. It's a mecca of hiking."

Despite his degree at Michigan, Agrawal has thrown his hat in with the Buffaloes, adding, "I'm following Coach Prime, now."

In 2024 the Department hired two new Teaching Professors, **Dr. Rebekah Jones** and **Dr. Patrick Newberry**.

Professor Rebekah Jones

Professor Jones was hired in 2022 as a "teaching postdoc" – part of the Department's innovative program that recruits recent mathematics PhDs who seek academic careers focused on teaching, instead of research. Jones did such an excellent job, the Department decided to keep her on as faculty.

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Jones got her PhD at the University of Cincinnati, and her first job after that was at New College of Florida, where she decided she wanted to emphasize teaching in her career.

In her first year as an assistant teaching professor, Jones revived the department's undergraduate Math Club [see more in *Undergraduate News*]. She said "my goal for Math Club was to try to build up the community for our math majors and to introduce them to some cool math that they wouldn't otherwise see in their classes." She reports the first year was a success, and that she hopes the Math Club will continue to grow in the coming years.

Newberry was hired as an Assistant Teaching Professor in August 2024, but was no stranger to the Department.

Professor Patrick Newberry

After an undergraduate degree at Northern Arizona University, Newberry came to the Department as a graduate student, earning his PhD in 2012 on Non-Communitive Geometry under the supervision of Professor Sasha Gorokhovsky. He said he "realized in grad school that teaching's where my real passion lies" and he made that his priority.

After his doctorate he was an Instructor for two years in the math department, where he worked on revamping our precalculus course. He then spent ten years as a math instructor/lecturer in the College's Environmental and Natural Sciences Residential Academic Program. Since his return, he has been in charge of the Department's Undergraduate Course Assistant Program (these UCAs help instructors facilitate in-class active learning.) For more on UCAs, see *Undergraduate News.*

Department welcomes new Undergraduate Program Professional

Autumn Franklin-Phillips

This past October the Department was very happy to welcome its new Undergraduate Program Professional, **Autumn Franklin-Phillips**.

Franklin-Phillips earned a BS in environmental sustainability at the University of Oklahoma. She worked at the OU School of Social Work as an actor pretending to be a patient presenting with different life scenarios, to allow students to see what working in social work would be like – but in a safe and controlled environment. She came to Colorado when her husband joined the Masters in Music program at CU, and worked as an academic advisor at Front Range Community College, working with undecided students trying to find their academic path.

Now that she is at the Math Department at CU, she reports that she feels "very lucky to have such a great department and coworkers," while working on such a beautiful campus.

As Undergraduate Program Professional, Franklin-Phillips manages all things dealing with undergraduate students, whether evaluating transcripts for course overrides, or helping to schedule undergraduate classes and assign course coordinators. She says she "sees a lot of students with a different issue every day. They all have different needs that need attending to."

▸ Gifts from our generous donors

We are thrilled to report that our alumni and friends have been incredibly generous to the Mathematics Department in the past two years. University policy now precludes us from individually listing all the donors from 2023-2025, but the Mathematics Department had 163 donors giving a total $454,554. We are overwhelmed by your generosity and eternally grateful. It is these gifts that allow us to provide our students with the type of education they so richly deserve.

▸ How to donate

We are deeply grateful for these and all our donors. The easiest way to donate to the Department is to go to math.colorado.edu/alumni/donor.php, which has a list of funds that you can donate to with the click of a button or by mail.

Faculty News

Professor Katherine Stange

Professor Katherine Stange was honored twice in the past two years for her outstanding research in number theory.

Stange received a 2025 CU Boulder Faculty Assembly Excellence in Research, Scholarly, and Creative Work Award. The BFA Excellence Awards specifically recognize outstanding work and a concerted effort to make advances in the academy. For more information see: www.colorado.edu/bfa/excellence-awards-0

Stange was also named the 2025-26 American Mathematical Society Joan and Joseph Birman Fellow, which is a mid-career research fellowship that aims "to address the paucity of women at the highest levels of research in mathematics by giving exceptionally talented women extra research support during their mid-career years." Fellows are those "whose achievements demonstrate significant potential for further contributions to mathematics."

See the article on this achievement in the Colorado Arts and Sciences Magazine: www.colorado.edu/asmagazine/2024/12/10/katherine-stange-named-2025-26-birman-fellow

Professor Agnès Beaudry

Professor Agnès Beaudry, who researches algebraic topology, was selected for the 2024 Class of Fellows of the American Mathematical Society (AMS). She is one of forty researchers around the world who were thus honored for their outstanding contributions to the mathematical sciences. AMS members designated as fellows have made outstanding contributions to the "creation, exposition, advancement, communication and utilization of mathematics."

For more information see the article in the Colorado Arts and Sciences Magazine: www.colorado.edu/asmagazine/2023/11/20/cu-mathematician-wins-high-recognition-peers

Professor Judy Packer

Professor Judy Packer retires

Professor Judy Packer retired in June 2025, after serving more than a quarter century on the Math Department faculty. Packer earned her PhD at Harvard in 1982 under George Mackey, and came to CU in Fall 1989 after spending postdocs at the Mathematical Sciences Research Institute in Berkeley, the Institute for Advanced Study in Princeton, and working at the National University of Singapore. She remembers fondly how "all the senior faculty were always so welcoming" when she came to Boulder.

On her own and with her collaborators, Packer has published more than 60 research papers, two of which won the prestigious Ames Award, and edited three books. She supervised dozens of PhD, Masters, and Honor Students, and has given talks around the world.

She has been a role model for faculty, and has given selflessly in service to the Department, serving as Chair from 2010 to 2013. In retirement, she is looking forward to traveling, and the readers of *Prime Bits* should bid her farewell but not goodbye – thankfully, she'll be continuing on as our movie critic.

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Postdoctoral Fellow Dr. Padi Fuster Aguilera received the CU President's Inclusive Excellence Annual Award, which honors individuals and units who have demonstrated outstanding commitment and made significant contributions to advancing inclusive excellence within our diverse University of Colorado community.

Lecturer Michael Roy was the recipient of the 2023-2024, and Lecturer **Ally Graf** was the recipient of the 2024-2025 Prime Time Lecturer award, which recognizes a lecturer in the Department of Mathematics for outstanding service in teaching undergraduate courses.

Graduate Student News

Graduate student **Emily Montelius** will be the Department's Inclusive Pedagogy Teaching Assistant for academic year 2025-2026, and as such will serve as a mentor to other Teaching Assistants, helping them facilitate active learning and inclusive pedagogies.

Graduate student **Edouard Heitzmann** is being funded on a Research Assistantship, working under Professor Jeanne Clelland on new ways to create electoral districts.

Graduate student **Eli Orvis**'s research in Post-Quantum Cryptography is being supported by an IBM PhD Fellowship, part of which allowed him to spend three months at the IBM Research Lab in Zurich, Switzerland. There he worked with Luca De Feo, a leading expert in the field.

Graduate Student **Bob Kuo** won a Graduate School Dissertation Completion Fellowship that he used in Fall 2024. This fellowship is intended to provide outstanding PhD candidates with financial support to assist in the process of completing their doctoral dissertations.

Graduate Student **Nicholas Christoffersen** won a Foreign Area and Language Studies Fellowship in Korean (Fall 2024 –Spring 2025). He is interested in doing research at the Korea Advanced Institute for Science and Technology in the future.

For the past few years, our graduate students have been running the mathematically-correctly named "Last Annual Math Department Talent Show."

Created by former graduate student **Erik Knutsen**, the event brings together graduate students, postdocs, faculty, and staff to display their talents – which include songwriting, climbing, martial arts, trivia, singing, dancing, and of course, cruciverbalism.

New Data Science Course

The Department is committed to tailoring its curriculum to meet the changing needs of its students. The most recent example of this is the development of MATH 4350: Theoretical Foundations of Data Science.

The goal of the course is to provide our students with what they need to get a job in data science, Professor Sean O'Rourke, one of the developers of the course, explained. "Hopefully they learn the foundations of what they need, and then they can learn the details of their industry when they start their jobs," he said.

The course topics include randomized algorithms, machine learning, random matrices and graphs, compressed sensing, and then other optional areas like Artificial Intelligence or singular value decompositions of matrices and allied algorithms. Students also engage in computation projects.

O'Rourke said the course addressed a basic problem: "You have a bunch of data, how do you find patterns in the data? They could be geometric – but in too high dimensional a space to analyze by using these algorithms." The course is the brainchild of O'Rourke, Professor Kyle Luh, and former Teaching Professor Divya Vernerey, and took years to develop. Luh taught the inaugural version of the course in Spring Semester 2023 and O'Rourke taught the course in Spring 2024.

The Department's 2025 Pi Day celebration was held in a biting wind. Speaking of biting, about 27π pies were consumed with about 6π cans of Reddi-Whip.

Undergraduate News

The Experimental Mathematics Lab continues to support undergraduate research projects, led by graduate students, lecturers, and faculty in the Mathematics Department. In the past two years these included projects on: "A Gallery of Theorems" (run by postdoc Sarah Petersen) where students produced art that showcases theorems; "Creating Interactive Teaching Materials for Early Undergraduate Mathematicians" (run by graduate student **Emily Montelius**), and "Creating Educational Videos with Manim" (run by postdoc **Justin Barhite**). Students have also worked on "Indecomposable Modules for the Virasoro Algebra" with **Professor Florencia Orosz Hunziker**. These projects provide an opportunity for undergraduates to be involved in many different aspects of mathematical research, from data collection, to visualization, to writing and proving theorems.

Continuing on this thread, postdoc **Justin Barhite** has also weaved together the Experimental Mathematics Lab Quilting Group (see colorado.edu/math/mathematical-quilting). Participants work together to create quilts that visually represent mathematical ideas such as symmetry, tessellations, algebraic structures, and more.

Every year the Mathematical Association of America holds the William Lowell Putnam Mathematical Competition for university students in mathematics. Students attempt to solve twelve notoriously difficult problems over the course of six hours on the first Saturday in December. The 85rd Putnam contest was in 2024, and there were 3,988 students at 477 institutions who participated.

This year 14 CU students took part in the competition and the Boulder team ranked 68th. The top 3 students from CU Boulder were in order**: Jeremy Huang**, **Aidan Tiruvan**, and **Brandon Baggett**. In addition, Huang ranked in the top 500 students in the competition. The top three scorers all receive cash prizes from the Department of Mathematics in recognition of their achievement.

The CU Undergraduate Math Club (dubbed QED for "Quest, Explore, Discover") is led by new **Assistant Teaching Professor Rebekah Jones**. In academic year 2024-2025, the club hosted seven talks, two panels, and three interactive workshop days. It also hosted an "Integration Bee" in the Fall and Spring semesters, which was devised and planned by math major and COSMOS student leader, **Thomas Whitehead**. For more information on math club activities see: math.colorado.edu/mathclub/ and for COSMOS: sites.google.com/colorado.edu/cosmos/home

The Department has a national reputation for innovative mathematics education because of its use of active-learning pedagogies. In-class activities are led by faculty and specially trained undergraduates. Originally, all of these

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undergraduates were “learning assistants” trained by the Learning Assistant Program at CU that invented the idea of learning assistants (a movement that has spread across the country: see colorado.edu/program/learningassistant)

The Department's demand for these student assistants exceeded supply, so it started recruiting and training another set of “Undergraduate Course Assistants” (UCA) which are being used in courses like the innovative MATH 1112: Mathematical Analysis in Business course, and MATH 2510: Introduction to Statistics, the sophomore-level course taken by students throughout the College. The UCA program is headed by **Assistant Teaching Professor Patrick Newberry**, who recruits and trains the UCAs.

In October 2024 the Department hosted a talk geared to an undergraduate audience by Professor Adriana Salerno of Bates College entitled, "A circular tale: An introduction to arithmetic geometry," as part of its Mates para todes event, which was in Spanish, with simultaneous interpretation to English. (See poster below.)

In May 2024 the Department hosted an event to celebrate women in mathematics, called May12, where students ate pizza and watched two animated documentaries, "Alicia Boole in the land of polytopes/Alicia Boole au pays des polytopes" and "Kovaleskaya' Spinning Top/La toupie de Kovaleskaya."

The event is named May12 in honor of Maryam Mirzakhani, who was born on May 12, 1977, and was one of the world's leading experts in geometry and dynamical systems. Mirzahkani was the first woman, and the first Iranian, to be awarded the Fields Medal. To learn more, see may12.womeninmaths.org/

For the 2025 celebration, the Department held a showing of "Secrets of the surface: the Mathematical Vision of Maryam Mirzakhani."

Department Research News

In 2023 and 2024 the Department brought aboard eight new postdoctoral fellows.

Research Postdoctoral Fellows are crucial for the research life of the department and expose our students to the very latest in mathematical progress. The funding for them comes from a generous bequest by our former colleague, Burnett (Bernie) Meyer and from support of the College.

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New Research Postdoctoral Fellows (2023):

Alonso Delfín Ares de Parga earned his PhD in 2023 from the University of Oregon working under the supervision of N. Christopher Phillips. His current research is on modules over algebras of operators acting on Banach spaces, with a particular focus on L^p spaces, and he is being mentored by Professors Judy Packer and Carla Farsi.

Nhan Nguyen earned his Ph.D. in Mathematics from the University of Virginia in 2023 under the supervision of Yen Do. His research covers various fields, including probability theory and stochastic processes, real functions, integral transforms, operational calculus, functional analysis, partial differential equations, and operator theory. He is being mentored by Professor Sean O'Rourke.

New Research Postdoctoral Fellows (2024):

Charlotte Aten received her PhD from the University of Rochester in 2022 under the supervision of Jonathan Pakianathan. Her research interests lie at the intersection of universal algebra, combinatorics, and category theory. She enjoys exploring connections with algebraic topology, computer science, and logic, and is being mentored by Professor Keith Kearnes.

Spencer Daugherty completed their PhD at North Carolina State University in 2024, advised by Laura Colmenarejo and Sarah Mason (at Wake Forest). Their research interests are enumerative and algebraic combinatorics (in particular, combinatorial Hopf algebras), quasisymmetric and noncommutative symmetric functions, the Tamari lattice, parking functions, and chromatic symmetric functions. They are being mentored by Professor Nat Thiem.

Juan Villarreal received his PhD in 2018 at the Instituto de Matemática Pura e Aplicada in Rio de Janeiro, Brazil, under the direction of Reimundo Heluani. His research interests include Lie groups, Lie algebras and their geometry with a focus on the study of infinite dimensional algebras and vertex algebras. He is being mentored by Professor Florencia Orosz Hunziker.

Chindu Mohanakumar received his PhD in 2023 from Duke University, where he worked under Leonard Ng in symplectic topology. He was hired collaboratively with the Division of Natural Sciences, the Division of Social Sciences, the Department of Mathematics, and the Department of Political Sciences.

Teaching Research Fellows are all mentored by Teaching Assistant Professor Harrison Stalvey, and are crucial for the teaching mission of the Department. They are being funded on an experimental basis by the College.

New Teaching Research Fellowships (2023)

Justin Barhite received his PhD from the University of Kentucky in 2023 under the direction of Kate Ponto. His research interests are generalizations of the trace of a square matrix using the language of category theory. He is also interested in exploring non-traditional grading schemes such as specifications-based grading and standards-based grading. He is running the QUILT project at the Department's Experimental Math Lab: colorado.edu/math/mathematical-quilting

Jack Dalton received his PhD at the University of South Carolina in 2023 under the direction of Ognian Trifonov. His math research interests lie in number theory, and his teaching philosophy aligns well with constructivism. While at USC, he also worked on some pedagogical research projects under Sean Yee about problem-based learning and their graduate student peer-mentor program.

Ulam Visiting Professor

For academic year 2023-2024, the Department had the honor of hosting **Technion Professor Uri Shapira** as its Ulam Visiting Scholar. Shapira ran an Ulam seminar on the nexus of number theory and dynamics.

Ulam Visiting Professors are esteemed mathematicians from around the world who come to our Department for a semester or year to teach a course and add to the research life of the Department. They are named in honor of the great Stanislav Ulam, who was a professor (and later Chair) in our Department. For a remembrance of Ulam, see the Transitions section of this issue.

William Reinhardt Memorial Lectures

The William Reinhardt Memorial Lecture Endowment Fund was established by family, colleagues, and friends of Professor Reinhardt, a member of the Mathematics Faculty from 1967 until his untimely death in 1998 at the age of 59. The Reinhardt Memorial Lectures reflect his deep interest in the foundations and philosophy of mathematics.

The 2024 lecture was delivered by Professor Elaine Landry of The University of California Davis, entitled: "*As If Mathematics Was True.*"

The 2025 lecture was delivered by Professor Joel David Hamkins of Notre

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Dame, and was entitled: "How we might have taken the Continuum Hypothesis as a fundamental axiom, necessary for mathematics."

DeLong Lectures

Professor Laura DeMarco of Harvard University, an expert on dynamical systems, delivered the Fifty-Sixth DeLong Lecture Series in February 2025. Professor DeMarco, who is also Radcliffe Alumnae Professor at the Radcliffe Institute for Advanced Study, gave a general audience lecture, "*From the solar system to the Mandlebrot Set,*" and a Colloquium talk, "*The Geometry (and Algebra) of the Mandlebrot Set*."

These were followed by a Departmental reception in the speaker's honor.

The Lecture Series is funded by an endowment given by Professor Ira M. DeLong, who came to CU in 1888 at the age of 33, and played a vital role in the life of the University and the City of Boulder until his death in 1942. The lectures were organized by Professor Florencia Orosz Hunziker.

Conferences

BLAST 2025, the 15th conference in the series dedicated to **B**oolean Algebras, **L**attices, universal **A**lgebra, **S**et theory, and **T**opology, was organized and hosted by **Professors Keith Kearnes**, **Peter Mayr**, and postdoctoral fellow **Charlotte Aten** at CU in May 2025.

The Department hosted the Mathematical Association of America Rocky Mountain Section Meeting on April 11-12, 2025. There were five Plenary Addresses and five parallel sessions over the two-day conference.

In April 2024, the Department hosted two speakers at "*Topology Day*," an annual one-day conference which features talks that are accessible to a broad audience. The main goal of the event is to foster mathematical discussions and build community among those interested in topology at CU Boulder and, more generally, in the Colorado Front Range.

As we highlighted in our last edition, faculty **Padi Fuster**, **Magdalena Czubak**, and **Florencia Orosz Hunziker** won a University of Colorado Impact Grant that helps fund Math For All in Boulder conferences. The 2024 and 2025 Conferences were held in the first week of April, with the purpose of fostering inclusivity in mathematics by holding talks and discussions in both research and education in a friendly, open environment.

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Awards Won by Students in the Department

Undergraduate Students

(funded by gifts from our readers)

Audrey Deck was the 2024-2025 winner of the Robert C. Gunning Scholarship, given annually to a student in the math department who shows potential for achievement in mathematics, its applications, or related areas.

Jonathan Mellina, Asa Morrison, Keenan Powell, and **Austin Walsh** are the 2023-2024 recipients of the Sieglinde Talbott Haller Scholarships, given annually to graduate and undergraduate students in Mathematics who show exceptional mathematical promise.

Steven Liang Wu and **Ella Chambers** are the recipients of the 2024-2025 Jack Hodges Award for Excellence in Mathematics, given annually to advanced undergraduate students majoring in Mathematics who have demonstrated the greatest promise in the mathematical sciences.

Sarah Asres and **Cai Kenemore** were awarded the 2024-2025 Jack N. Hyatt Awards, given annually to provide scholarship support for students majoring in Mathematics and planning on becoming high school or junior high school math teachers or attorneys in the State of Colorado.

Ella Luce and **Victoria Von Buhr** are the 2024-2025 winners of the Adele V. Leonhardy Memorial Scholarship. These scholarships are awarded annually to outstanding students who plan careers in teaching mathematics.

Luke Coffman was the 2023-2024, and **Ella Todd, Jeremy Huang,** and **Noah Song** were the 2024-2025 winners of the Jim & Laura Marshall Scholarship, given annually to the advanced undergraduate students majoring in mathematics who have demonstrated the greatest promise in the mathematical sciences.

Adithya Bhaskara, Jeremy Huang, Khizar Pasha, and **Ella Todd** are the 2023-2024 recipients, and **Sidera Hilt, Quan Tran, Christina Fernandez, Cam Mars, Kira Radil,** and **Josiah Smith** are the 2024-2025 recipients of the Marlene Massaro and David Pratto Scholarships in Mathematics. This scholarship is

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awarded annually to exceptional upper-level undergraduate Mathematics majors.

Awards won by Graduate Students

(funded by gifts from our readers)

Summer Haag, Jon Kim, Paige Robertson, and **Jasmin Rodriguez** are the 2023-2024 winners, and **Edouard Heitzmann** and **Basia Klos** are the 2024-2025 winners of the W. E. Briggs Teaching Excellence

Awards, given annually to first-year graduate teaching assistants or graduate part-time instructors in the Department in recognition of outstanding accomplishments in teaching.

Rachel Chaiser, Levi Lorenzo, and **Emily Montelius** are the 2023-2034 winners, and **Howy Jordan, Chase Meadors,** and **Adrian Neff** are the 2024-2025 winners of the Burton W. Jones Teaching Excellence Award, given annually to veteran graduate teaching assistants or graduate part-time instructors in the Department in recognition of outstanding accomplishments in teaching.

The Briggs and Jones Teaching Excellence Awards are supported by the B. W. Jones and W. E. Briggs Teaching Excellence Award funds.

Rachel Chaiser, Helena Davenport, Levi Lorenzo, and **Chase Meadors** are the 2023 winners, and **Connor McCranie**, **Adrian Neff**, **William Eli Orvis**, and **Maggie Reardon** are the 2024 winners of Frances C. Stribic/University Summer Fellowships.

Rebecah Storms is the 2023 winner, and **Jackson Carpenter, Nicholas Christoffersen,** and **Jon Kim** are the 2024 winners of the W. J. Thron Summer Fellowship, awarded annually to the most outstanding third or fourth year graduate students.

Christopher Eblen, and **Isabelle Kraus** were awarded in 2023-2024, and **Helena Davenport**, **Levi Lorenzo**, and **Juan Moreno**, were awarded in 2024 the Richard Laver Graduate Fellowship. The Laver Fellowships are awarded annually to support graduate education.

Nicholas Christoffersen, Jennifer Gensler, Nicholas Jamesson, Bob Kuo, Maggie Reardon, and **Peter Rock** were awarded in 2023, and **Colin Jackson, Alex LaJeunesse, Daniel Lyness, Chase Meadors, Calum Shearer, Rebecah Storms,** and **Matthew Watson** were awarded in 2024 Sieglinde Talbott Haller Scholarships, which go annually to select students in the Math Department.

In 2023 **Rebecca Deland, Howy Jordan, Erik Knutsen, Connor McCranie, Ian Miller, Mateo Muro,** and **Adrian Neff**, and in 2024 **Andrew Doumont**, **Courtney Hauf**, **Cinea Jenkins, Howy Jordan, Joseph Macula**, **Ian Miller**, **Emily Montelius**, and **Breeann Wilson** were recipients of University Fellowships.

In 2023 **Andrew Doumont, Joseph Macula, Juan Moreno, Breeann Wilson,** and in 2024 **Rebecca Deland, Christopher Eblen, Jennifer Gensler, Nicholas Jamesson,** and **Bob Kuo** were recipients of Adele V. Leonhardy Memorial Scholarships. These scholarships are awarded annually to outstanding students who plan careers in teaching mathematics.

In 2023 **Eli Orvis, Calum Shearer,** and **Matthew Watson** were awarded Dean's Natural Sciences Fellowships.

In 2023 **Patrick Wynne** and in 2024 **Mateo Muro** were supported by the William N. Reinhardt Fund.

Degrees Awarded

In 2024, the Department awarded 8 doctorate degrees. The recipients were:

Clifford Bridges, PhD
Graduate Advisor: Dr. Agnes Szendrei and Dr. Peter Mayr
Dissertation Title: Occurrences of the Embedding Problem with Galois Groups of Prime Power Order

Rachel Marie Chaiser, PhD
Graduate Advisor: Dr. Robin Deeley
Dissertation Title: A Low-Dimensional Counterexample to the HK-Conjecture

Erik Royd Feirin Knutsen, PhD
Graduate Advisor: Dr. Agnès Beaudry
Dissertation Title: Homotopy Representations in the Equivariant Stable Homotopy Category

Peter Robert Rock II, PhD
Graduate Advisor: Dr. Jeanne Clelland
Dissertation Title: Symmetries of an Olver-Multispace Over a Smooth Manifold Under Lie Group Actions

Patrick Michael Wynne, PhD
Graduate Advisor: Dr. Peter Mayr
Dissertation Title: Clonoids and Nilpotent Mal'cev Algebras

In 2025, the Department awarded eight doctorate degrees. The recipients were:

Christopher James Keala Eblen, PhD
Graduate Advisor: Dr. Nathaniel Thiem
Dissertation Title: Beach Combinatorics in Schur—Weyl Duality for the Upper Triangular Matrix Groups

Harold Lee Jordan II, PhD
Graduate Advisor: Dr. Markus Pflaum
Dissertation Title: Gluings and Stratifications of Bundles and Infinite-Dimensional Spaces

Isabelle Kraus, PhD
Graduate Advisor: Dr. Sean O'Rourke
Dissertation Title: On the Real Roots and Real Eigenvalues of the Generalized Large Box Model for Random Polynomials and Random Matrices

Continued ▸

Levi Samuel Lorenzo, PhD
Graduate Advisor: Dr. Robin Deeley
Dissertation Title: Finitely Summable K-homology, the Index Pairing, and Cantor Minimal Systems

Connor Alexander McCranie, PhD
Graduate Advisor: Dr. Markus Pflaum
Dissertation Title: Applications of Hyperfunctions in Quantum Field Theory and Mathematical Physics

Chase Edward Meadors, PhD
Graduate Advisor: Dr. Keith Kearnes and Dr. Guram Bezhanishvili
Dissertation Title: Local Finiteness in Varieties of MS4-Algebras.

Ian Miller, PhD
Graduate Advisor: Dr. Magdalena Czubak
Dissertation Title: On Momentum in Nonlinear Schrödinger Equations

Juan C Moreno, PhD

Graduate Advisor: Dr. Agnès Beaudry
Dissertation Title: Chromatic Applications of Equivariant Stable Homotopy Theory

The Department also awarded 11 Masters Degrees (departmental advisors listed in parentheses) in 2024 to:

Athbi Aljadi, MA
(Dr. Keith Kearnes)

Charlotte Mayt Crotwell, MA
(Dr. Peter Mayr)

Jackson Robinett Carpenter, MA
(Dr. Sean O'Rourke)

Courtney Hauf, MA
(Dr. Agnès Beaudry)

Colin Jackson, MA
(Dr. Katherine Stange)

Cinea Jenkins, MA
(Dr. Eric Stade)

Joo Young Kim, MA
(Dr. Sebastian Casalaina-Martin)

Alexander Ney LaJeunesse, MA
(Dr. Agnès Beaudry)

Daniel Lyness, MA
(Dr. Sebastian Casalaina-Martin)

Ian Daniel Miller, MA
(Dr. Magdalena Czubak)

Emily Ann Montelius, MA
(Dr. Markus Pflaum)

The Department also awarded eleven Masters Degrees (departmental advisors listed in parentheses) in 2025 to:

Edouard Pierre Francois Heitzmann, MA
(Dr. Jeanne Clelland)

Barbara Monika Klos, MA
(Dr. Florencia Orosz Hunziker)

Sylvia Ramona Maher, MA
(Dr. Jonathan Wise)

Sarada Anoushka Nerella Kameswari Umamaheshwari, MA (Dr. Carla Farsi)

Stephanie Youngmi Oh, MA
(Dr. Agnès Beaudry)

Aidan Powers, MA
(Dr. János Engländer)

Samuel Thomas Reeder, MA
(Dr. Florencia Orosz Hunziker)

Paige Susan Robertson, MA
(Dr. Nathaniel Thiem)

Taylor Rogers, MA
(Dr. Agnès Beaudry)

Darwin Xavier Tallana, MA
(Dr. Robin Deeley)

Wei Jit Wu Lu, MA
(Dr. Eric Stade)

In 2023 five undergraduates graduated with honors in Mathematics:

Raymond Gareth Baker
(summa cum laude)

Olivia Courtney (summa cum laude)

Clyde Kertzer (summa cum laude)

Graham Roderick Mauer
(summa cum laude)

Nathaniel Robert Douglas Ward-Chene
(summa cum laude)

In 2025 one undergraduate graduated with honors in Mathematics:

Emmett Fitz (summa cum laude)

Commencement Keynote Speakers

In 2024 and 2025 the Department was thrilled to have two of its cherished family, **Professor Emeritus Kent Goodrich** and alumnus **Dr. Matthew Grimes**, as its eighth and ninth annual Commencement Speakers.

Professor Kent Goodrich

***Kent Goodrich**, CU Boulder Mathematics Professor Emeritus*

Kent earned his PhD in 1966 from the University of Utah and started teaching mathematics at CU Boulder in Fall 1966, and retired at the end of 2010. He won several teaching awards while at CU. He was a visiting Scientist at NCAR from 1985 until 2013. At NCAR he worked on wind shear, turbulence and icing algorithms related to air safety (of note; the team he worked with at NCAR on turbulence was cited as one of 50 outstanding scientific achievements by Scientific American in 2003). He is a Casual Scientist until the present. He produced eleven PhD students while at CU, and reported loving every minute of it.

Dr. Matthew Grimes

***Dr. Matthew Grimes,** CU Boulder Mathematics Alumnus*

AWS Senior Applied Scientist

Matt earned his PhD in 2016 at CU Boulder in algebraic geometry under the supervision of Professor Sebastian Casalaina-Martin, where his penchant for sharing the excitement of mathematical thinking with others resulted in his receipt of the Burton Jones Teaching Excellence Award. He continued pursuing his research and teaching at Boston College. By 2018, Matt became increasingly interested in emergent questions in AI and data science, and he accepted a position at The Hartford, which enabled him to investigate problems in pricing and competitive intelligence. In 2020, he transitioned to an AI consulting startup, rising to Head of Data Science and Product. In 2022, Matt joined Amazon Web Services as a Senior Applied Scientist, where his work in networking, graph theory, and operations research spans industry and academia and has resulted in multiple publications and pending patents.

In Remembrance

Professor Jeff Fox

Professor Jeff Fox

We are very sad to report that Professor Jeffrey Fox passed away just before the beginning of Fall semester in 2023 at age 70. Fox received his PhD from Berkeley in 1983 working under Calvin Moore, and after spending five years at Purdue, came to Boulder in 1988. He had a brief hiatus at SUNY Albany from 1990-1992 before spending the rest of his career at CU.

His main research was in modern analysis, but Jeff expanded into computation neurobiology in the late 1990s. He was especially known for his research projects with undergraduates. He served as associate chair of the Department and was a pioneer in bringing computation into the classroom.

The Department held a memorial seminar in Jeff's honor on December 3, 2024, which was delivered by his co-author Peter Haskell of Virginia Tech, entitled: "My collaboration with Jeff Fox: Mathematical and personal connections formed as products of Kasparov's bivariant K-theory."

Outside of mathematics, Fox was a talented amateur photographer and was a renowned black-belt in Judo, who at one time trained military personnel. For more information see everloved.com/life-of/jeffrey-stephen-fox/obituary

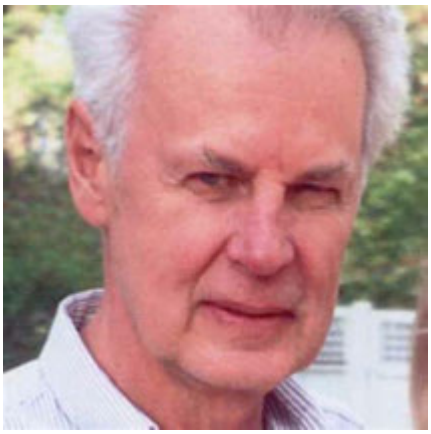
Professor Emeritus Jerry Malitz

We are sad to report that our longtime colleague, Professor Jerome "Jerry" Malitz passed away on November 19, 2024 at age 88. He was on the Mathematics Department Faculty from 1969 until his retirement in 2001.

He received his PhD in mathematics from UC Berkeley in 1966 working under Robert Vaught, and then spent two years as a postdoctoral fellow at UCLA. His research specialty was Mathematical Logic and related areas, but the breadth of his writing was remarkable. He authored a dozen books on a variety of subject matters, including an undergraduate introduction to mathematical logic, landscape design, pictorial hiking guides, critical thinking, medical decision-making, and personal essays. Some were co-written with his wife Susan or his son Seth. Jerry and Seth's book, Reflecting Nature: Garden Designs from Wild Landscapes won the Quill and Trowel Award from the Garden Writers Association of America.

Professor Jerry Malitz

Professor Emeritus Jan Mycielski



Professor Jerry Malitz

We are sad to report that Professor Emeritus Jan Mycielski passed away on January 18, 2025, at age 92. He got his PhD in 1957 from Wroclaw, Poland, working with Stanislaw Hartman.

Jan came to the US in 1961 to work with Alfred Tarski at the UC at Berkeley, and then came to the University of Colorado Boulder in 1967 as a visiting professor to work with Stanislaw Ulam (see below). He became a permanent member of the CU math faculty in 1969, and is one of the greatest mathematicians to ever grace our faculty.

During his career, Jan wrote more than 150 papers, supervised 6 PhD students, and won several awards: the Stefan Banach Prize, the Alfred Jurkowski Award, and the Waclaw Sierpinski Medal. He was a Fellow of the American Mathematical Society.

For more information see: en.wikipedia.org/wiki/Jan_Mycielski

Professor Emeritus Dave Rearick

We are sad to report that Professor Emeritus David Rearick passed away on August 21, 2024, at age 92. Dave earned his doctorate at the California Institute of Technology in 1960, and joined the CU Boulder Faculty in 1961 after a postdoctoral position at the University of British Columbia. His research was in number theory, and he had three Ph.D. students. He served the Department as the inaugural Director of the Mathematics Module Program (the Modules have since been replaced by in-person classes). He retired in 1991.

Dave was among the most famous faculty members the Department ever had.

As his wikipedia page details, he was a pioneering rock climber: en.wikipedia.org/wiki/Dave_Rearick. His greatest feat may be being the first person (with a partner) to scale the "Diamond" face of Long's Peak in 1960.

People can read about the ascent in Dave's own words, from 1961: publications.americanalpineclub.org/articles/12196129700/The-First-Ascent-of-the-Diamond-East-Face-of-Longs-Peak

For more information, see greenwoodmyersfuneral.com/obituaries/david-rearick

Professor Dave Rearick

Continued ▸

Professor Emeritus Dan Stroock

Professor Dan Stroock

We are sorry to report that Professor Emeritus Daniel Stroock passed away on March 13, 2025 at age 84. An illustrious probabilist, Dan earned his PhD in 1966 from Rockefeller University, working under Mark Kac. He then spent four years at NYU's Courant Institute before joining the University of Colorado Boulder faculty in 1972, on which he remained till 1984, serving a term as Chair of the Department. He spent the rest of his career at MIT. He had a dozen PhD students and nearly 200 publications.

He was on the editorial board of more than a half dozen of journals, was a Guggenheim Fellow, a Member of the American Academy of Arts & Sciences, recipient of the AMS Steele Prize for seminal research, a member of the National Academy of Sciences, a foreign member of the Polish Academy of Arts and Sciences, and a Fellow of the American Mathematical Society. For more information see en.wikipedia.org/wiki/Daniel_W._Stroock

Remembering Stan Ulam

Mathematician Stanislav Ulam (1909-1984) was one of the giants of the twentieth century – a designer of the hydrogen bomb and inventor of the Monte Carlo method, who made countless contributions to mathematics. He was a visiting professor at the University of Colorado math department in the 1960s, and then became Professor and Chair of the Department from 1967 until his retirement in 1975, attracting worldwide talent. He is memorialized by the Department, which appoints annual distinguished visitors as Ulam Chairs.

His autobiography, *Adventures of a Mathematician*, was recently adapted into a motion picture of the same name.

Our movie critic reports that the film largely centers on Ulam's time in Los Alamos working on the Manhattan Project – like the Oscar-winning "Oppenheimer" – and is nearly as good. The movie does not go into much mathematical detail, but does give a sense of the joy and fun that Ulam shared with others in working out his mathematical problems and ideas. The film also gives an excellent sense of the deep bond between Ulam and the great John von Neumann, who appears in both the beginning and the end of the film, while in general taking some artistic license with history. Our critic urges you to stream it, either on Apple+, Amazon Prime, or Tubi.

For more information on Ulam's his remarkable life, see:
colorado.edu/asmagazine/2022/11/10/movie-cu-prof-manhattan-project-mathematician-screen-boulder and
en.wikipedia.org/wiki/Stanis%C5%82aw_Ulam

Alumni News

Jim Marshall

CU class of 1968 math major **James Marshall** recently shared some reminiscences with *Prime Bits*. His name will be familiar to our readers, since he and his wife Laura are the generous donors who set up an eponymous fellowship fund for our students. He also earned an MBA at CU.

One vignette seems especially instructive for our readers. Jim recalls that after graduation, he wanted to teach in the Northwest. He applied for many jobs and was turned down. "In my desperation I wrote a letter to Oregon State accepting the job that was never offered. I thought it was finished. It turned out that the Dean of Business [at CU] was a past associate with the Dean at OSU."

"When I arrived at OSU, I was met with three faculty who wanted to take my wife and me out to dinner. They said that they wanted to meet the new instructor who accepted a job never offered!"

Erin Macdonald

CU Boulder Class of 2009 double Math and Astrophysics major **Erin Macdonald** was recently profiled in the Colorado Arts and Science magazine, for her trek from scientist and educator to a science advisor for Star Trek: colorado.edu/asmagazine/2025/04/15/cu-grad-erin-macdonald-makes-it-so

The article explains "when taking a Calculus 3 course at CU Boulder, she says she experienced a breakthrough when she came to understand how math worked with physics, and then `everything just clicked.' It prompted her to immediately declare a double major in mathematics and astrophysics."

And thereafter it seems, it was then steady as she goes!

AfterMath

Our department's website for alumni and friends, aptly dubbed "AfterMath," is a one-stop portal for everything having to do with our cherished alumni and friends. It contains links to:

1) Events that alumni can join – like our annual Department Barbeque for our math majors.
2) A repository of past *Prime Bits*;
3) Information on how to donate to the Department, with a list of funds that you can donate to with the proverbial click of a button (or by mail);
4) An online copy of a book written by former professors Burton Jones and Wolfgang Thron, chronicling the history of the Department during its first century, starting from the time the first mathematics instructor arrived in Boulder in 1878;
5) Most importantly, there is a site where you can provide us with information about yourself for future issues of *Prime Bits!*

Check out AfterMath at math.colorado.edu/alumni.

Help us create Research Opportunities for our Students

For over a decade, the Math Department has been running a wonderful program for undergraduate students, the "Summer Research Experience Program" where a group of undergraduates works on a research project with a graduate student and a faculty member for a portion of the summer. This experience is life-changing for the students, as they get a real introduction to what a research career could be like.

Back in 2014, there were five students working with five faculty. By summer 2025, we had 34 undergraduate and 10 graduate students working with 13 faculty.

Unfortunately, unlike our costs, our funding for this successful program has not grown with time. So we have to turn away an increasing number of interested and talented students each year, and without help, the program will be shrinking going forward.

Alumni and friends often ask how they can help our current students, and providing funds for this innovative program can help, as well as providing ideas for projects and volunteering to lead student groups.

To share ideas, or talk about opportunities to help, please contact the Chair, Sebastian Casalaina-Martin, at casa@math.colorado.edu

For a complete list of past projects and their participants, see: www.colorado.edu/math/undergraduate-program/summer-reu/summer-research-past-projects#accordion-1039727886-1