



University of Colorado **Boulder**

Department of Mathematics

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This issue of Prime Bits is edited by Professor David Grant, working in concert with designer 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.

Be Boulder.



University of Colorado **Boulder**



Prime Bits
Department of Mathematics

2021-2022

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Chair's Communiqué

Alexander (Sasha) Gorokhovsky

Dear Friends and Alumni,

I am grateful to have so much good news to report!

After a year when most of our classes had to go remote, almost all our classes this year were in person, to the obvious relief of our students (and our faculty). It was good to see my colleagues awash in chalk dust again!

Many were also awash in praise. Three of our more junior faculty garnered prestigious national recognition. Topologist Agnès Beaudry and Probabilist Sean O'Rourke won National Science Foundation (NSF) CAREER Awards. They are two of only a few dozen mathematicians so honored nationwide.

The CAREER Program, one of the NSF's most prestigious awards, supports early career faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their department or organization.

In addition, probabilist Kyle Luh won the Ralph E. Powe Junior Faculty Enhancement Award from the Oak Ridge Associated Universities.

I'm also happy to report that number theorist Kate Stange and algebraic geometer Jonathan Wise won Simons Fellowships.

Finally, it is my privilege to tell you that our longtime colleague Ágnes Szendrei, who retired just this past year, was elected to the Hungarian Academy of Sciences.

And I want you to know how proud I am of all our staff, students, and faculty, who worked so hard to get us through the worst of this pandemic, constantly adapting and improvising to make sure our core mission of education continued unabated. That same spirit got us through a flood in our building this past year (a sprinkler pipe burst), and wildfires near Boulder that took the homes of so many.

As always, our spirit is strengthened by the strong support we get from our wonderful alumni family. Special thanks are due to William Kerr, who gave a generous donation to our innovative Mathematical Resource Center (MARC), where students go to get help with their work or further their mathematical enrichment.

On the educational front, the Department and the College are investing in the quality of our introductory courses, which are taken by math majors and thousands of students across campus each year. We will be jointly funding two new "Visiting Teaching Assistant Professors," new PhDs who want to dedicate their academic lives to the pursuit of teaching excellence.

Indeed, in recent years our Department has earned a national reputation as a model for how these courses should be taught -- in small classes, employing active learning, with graduate student teachers who are trained by coordinators who specialize in these courses. These visiting teaching assistant professors will be mentored by our faculty in our pedagogy and methodologies, and then will display and hone these skills in the classroom. This will benefit our students, and mathematical education nationwide.

Ours will be one of very few such programs in the nation, and one we have high hopes for --- if we are able to secure permanent funding for it.

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► *Chair's Communique Continued*

We already are lucky enough to have annual "Meyer Postdoctoral Fellows," named after our former colleague Burnett Meyer, who generously gave funds that allowed us to endow these research postdoctoral positions. We are hoping that some

angels will appear to similarly help our Visiting Teaching Assistant Professor Program become a permanent fixture.

I know that current events can make one's heart heavy, perhaps nowhere more than in my native Ukraine.

I hope this issue of Prime Bits finds you well and imbued with some of the optimism we have here in the Department, which is constantly replenished by working with our wonderful students and supportive alumni family.

Department Research News

In 2021 the Department brought aboard three new postdoctoral fellows:

Meyer Postdoctoral fellow **Menevse Eryuzlu**, who received her Ph.D. at Arizona State University. She earned her Masters in 2016 at Western Kentucky University. Her research is on operator algebras and she is being mentored by Professor Robin Deeley.

Meyer Postdoctoral fellow **Dr. Padi Fuster Aguilera**, who received her Ph.D. at Tulane under the supervision of Kyle Kun Zhao. Her research interests are Partial Differential Equations and

Riemannian Geometry, and she is being mentored by Professor Magda Czubak. Fuster is co-founder of the conference "Math for all in New Orleans" (an inclusive conference in mathematics) and of "Meet a Mathematician" (a collection of short video interviews of mathematicians from historically excluded backgrounds.)

Meyer Postdoctoral fellow **Marcos Mazari-Armida**, who received his Ph.D. at Carnegie Mellon under Rami Grossberg. He researches model

theory and is being mentored by Professor Ágnes Szendrei.

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.

The Department had one Ulam Visiting Professor in the past year, **Michael Woodbury** of Columbia University, in Spring 2022.

Undergraduate news

The Math Club, which is dubbed "QED" — standing for Quest, Explore, Discover — is run by Teaching Associate Professor Divya Vernerey, and provides faculty talks aimed at undergraduates — which are very popular with our math majors and minors. You can follow its activities at <https://math.colorado.edu/mathclub>

They were very glad to go back to in-person talks this year after a year of being forced to go remote (and they serve real pizza again to our students,

instead of the less-fattening virtual kind!)

You can find out more news about our undergraduates by reading the Math Club Newsletter Vernerey produces. Check it out at:

<https://www.colorado.edu/math/undergraduate-program/research-industry-undergraduate-students>

Our Summer Research Experience for Undergraduates program continues to thrive under the able leadership of Professor Nathaniel

Thiem. In summer 2021 we were able to fund 16 undergraduates and 11 first year graduate students. We had six different projects mentored by Professors Deeley, Luh, Pflaum, Thiem, Wise, and Zhang.

In 2020-21 the Department had 50 of its students inducted into the local Pi Mu Epsilon (PME) Chapter. PME is an honors math society which recognizes undergraduate achievements.

Continued ►

► *Undergraduate News Continued*

There were twenty graduating seniors awarded PME memberships: **Nicholas Anastasi, Hannah Beehler, Ellie Bowers, Zhuoyi Chen, Julia Conn, Alexis Davis, Jackson Earles, Alici Edwards, Ezzeddine El Sai, Samuel Greenidge, Spencer Griffith, Cheng Jiang, Medhane Kiflom, Oscar Laird, Wei Qu, Brenna Royersmith, Samuel Scheeres, Kyle Schneider, Michel Stahli, Connor Weisburg.**

Every non-pandemic 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. After a hiatus, the exam resumed in 2021.

The top participants from CU Boulder were Evan Indge (first place), Boris Shapoval (second place), and Jose Zenon Cortez and Zackary Jorquera (tied for third place).



A picture of the summer 2022 students and mentors at their weekly lunch



The Department sponsored its annual Pi Day celebration, serving homonymic dessert: One of our students celebrated by suspending the laws of physics!

The top three scorers all receive cash prizes from the Department of

Mathematics in recognition of their achievement.

Department Welcomes New Graduate Program Assistant

This past year the Department was very happy to welcome its new Graduate Program Assistant, Kellie Geldreich.



Kellie brings a wealth of experience in graduate school administration to her new job, having previously worked in similar roles at the University of California, Irvine, and at the University of Oregon, where she also served as academic affairs manager for the graduate school.

She has a degree in Conservation Resources Studies, and consciously

set out to do “good work” in her career. She says she is “very grateful” to be working for the math department, where “everyone has been really nice.”

“It’s very fulfilling to guide students,” she added. “I feel like I’m making a difference and helping them on their journey.”

Mathematicians pushing boundaries: Jeanne Clelland works to make redistricting fair

Following every census, state legislatures redraw Congressional districts. The process is famous for Gerrymandering, where districts are drawn into tortured shapes to produce the biased outcomes desired by the politicians in control. Colorado is one of several states that has worked to removed politics from redistricting, creating an independent commission to do the job. Our Department's Professor Jeanne Clelland is one of a growing group of mathematicians working to give such commissions the mathematical tools they need to do their work fairly.

A differential geometer by training, Clelland got interested in the redistricting process a few years ago and is happy to employ her talents to help empower the people of Colorado.

"Litigation around redistricting has been going on for a long time, especially when it comes to racial gerrymandering," Clelland said. "But it's only in the last 10 years or so that mathematicians have started getting into the game."

"As a pure mathematician, I've always enjoyed my research, but it's kind of lousy for cocktail parties," Clelland said. "Suddenly, I have research that people are excited to hear about."



Left-to-right: Jade VanAusdall, Nick Bossenbroek, Adam Nelson, Clelland, Peter Rock, and Tom Heckmaster.

Along with her collaborators Beth Malmskog and Flavia Sancier-Barbosa of Colorado College, and Daryl DeFord of Washington State University, Clelland was hired to consult with the Colorado Independent Legislative Redistricting Commission. They performed ensemble analysis to evaluate the constitutionally-mandated competitiveness criteria for the new districts, and their report was cited by the Colorado Supreme Court's ruling that adopted the districts drawn by the Commission.

You can see their work at <https://coloradoincontext.wordpress.com>

Clelland is famous for winning every teaching award possible for a mathematician in Colorado, and true-to-form, she has included students in the redistricting work.

She taught a course on Mathematics of Redistricting in Fall 2020, and one of her students, Samuel Greenidge, was selected to be a commissioner on the Colorado Independent Legislative Redistricting Commission.

Clelland involved more of our students by mentoring a 2019 Summer REU on redistricting (some of which are featured in the accompanying photo).

Clelland also served as an expert witness for Wisconsin Governor Tony Evers's legal team in the case of Johnson vs. Wisconsin Elections Commissions, regarding new district plans for Congressional and state legislative districts in Wisconsin, a case that eventually ended up in the U.S. Supreme Court.

Faculty News

Promotions

Professor Agnès Beaudry was promoted this year to the rank of

Associate Professor and was granted tenure. Beaudry, an algebraic topologist specializing in chromatic homotopy theory, came to CU in

2016 after being a Dickson Instructor at the University of Chicago and

Continued ►

► Faculty News Continued

earning her Ph.D. at Northwestern in 2013 under Paul Goerss.

Beaudry won the prestigious NSF CAREER award this year: see the article in this issue about that achievement for more on her and her accomplishments.

Professor Nathaniel (Nat) Thiem was promoted this year to the rank of Full Professor. Nat joined the CU Faculty in 2007 after holding a postdoctoral position at Stanford and getting his Ph.D. at Wisconsin in 2004 under Arun Ram. Thiem has long headed our Department's honors program and created and ran our Summer Research for Undergraduates Program. He served for many years as our Associate Chair for Undergraduate Studies.

Dr. Joseph (Joe) Timmer was promoted this year to the title of Associate Teaching Professor. Joe serves as our Director of Undergraduate Curriculum, which means he oversees our first-year mathematics courses, which teach more students than all our other courses combined. Timmer got his Ph.D. at USC in 2014 and has been teaching at CU since the Fall of 2015.

Three faculty who retired in the past year, Professor **Peter Elliott**, Professor **Ágnes Szendrei**, and Professor **Martin Walter**, were awarded emeritus status.

Grants and Awards

Burnett Meyer Postdoctoral Fellow **Marcos Mazari-Armida** was the winner of the 2021 Sachs Prize awarded by the Association of Symbolic Logic. The Sachs prize recognizes the year's best dissertation on mathematical logic.



Dr. Marcos Mazari-Armida

Mazari-Armida has just finished the first-year of his 3-year Meyer postdoc. He came to our Department after getting his Ph.D. at Carnegie Mellon under Rami Grossberg.

His prize-winning dissertation was entitled "Remarks on classification theory for abstract elementary classes with applications to abelian group theory and ring theory," which applied model theory to abstract algebra.

Mazari-Armida is the second mathematician from our Department to win the Sachs prize (the first was Rene Schipperus, who earned his Ph.D. in 1999 under the late Richard Laver). He is also the second Latin American to win the prize.

Professor Emerita **Ágnes Szendrei** was elected this spring to the Hungarian Academy of Sciences as an external member (external memberships are for Hungarian scientists who live outside of Hungary and who have made exceptional contributions to scientific research). She is one of only 25 current mathematicians to have earned this honor.

Recognition

Professor Emeritus **Peter Elliott** was recognized by CU Boulder Provost Russ

Moore this spring for his 50 years of service to the campus.

Moore described Elliott as a world-renowned "expert in number theory who, along with Czech-Anglo mathematician Heini Halberstam, developed the Elliott-Halberstam conjecture—a well-known conjecture in number theory concerning the distribution of prime numbers in arithmetic progressions."

"Dr. Elliott's work has been truly international," said Moore. "He has also been a valued mentor of students at all levels, a collegial and devoted member of the mathematics department, and one of our campus's great scholarly thinkers and lifetime students of his discipline."

Peter addressed the crowd at the Boulder Faculty Assembly meeting at which he was honored, saying he had come to CU: "from England as a complete neophyte" and then found himself "immersed with young people from 18 to 25 for the rest of my life," adding that he had enjoyed it very much.



Professor Peter Elliott

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Three Young Faculty Win Prestigious National Awards

Topologist **Agnès Beaudry** and Probabilist **Sean O'Rourke** won National Science Foundation (NSF) CAREER Awards. The CAREER Program, one of the NSF's most prestigious awards, supports early career faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their department or organization.



Professor Agnès Beaudry

Beaudry arrived at CU in the Fall of 2016. She hails from the Province of New Brunswick, Canada (the one official bilingual province).

Agnès majored in mathematics at McGill University in Montreal. She earned her Ph.D. at Northwestern University under the supervision of Paul Goerss. She then held a postdoctoral position at the University of Chicago.

Her CAREER project involves research in an area of algebraic topology colorfully dubbed, “equivariant chromatic homotopy theory.”

The educational component of her project has the goal of making the research accessible to graduate students and advanced undergraduates through graduate workshops. It will work in collaboration with existing initiatives at CU Boulder that promote diversity, equity and inclusion in science, technology, engineering, and math. Beaudry has for several years headed our Department's efforts to promote diversity.

Beaudry commented: “I've been extremely lucky that my path through mathematics has put me in a position where I can have the opportunity to work ... with amazing mathematicians and physicists. The award will allow me to share this privilege with students, helping them join these areas of research. ... I look forward to giving students from all kinds of backgrounds the opportunity to learn about these exciting topics.”

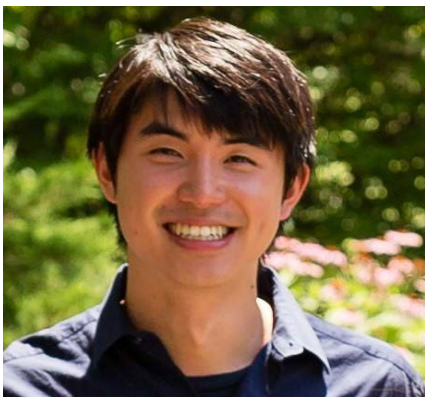
O'Rourke received his Ph.D. in Mathematics from the University of California, Davis under the direction of Alexander Soshnikov. Sean joined the CU Boulder Mathematics Department in the Fall of 2014 after completing postdoctoral positions at Rutgers University and Yale University. His CAREER project involves research on random matrix theory and its applications.

Random matrices arise naturally in many fields, including statistics, data science, computer science and physics.

The educational component of his project will integrate research and teaching by running a summer academy for high school students interested in advanced mathematics, and by promoting undergraduate and graduate student mentoring, training, and research.

“It is a great honor to receive this award, and I am grateful for the opportunities it provides. Beyond supporting my own research and the research of my graduate students, this award also recognizes the importance of mathematics education and research at the undergraduate and high school levels,” O'Rourke said.

O'Rourke is currently serving as the Chair of Undergraduate Studies in our Department.



Professor Kyle Luh

Probabilist **Kyle Luh** won a **Ralph E. Powe Junior Faculty Enhancement Award** from the Oak Ridge Associated Universities, an association working to advance national priorities in science, education, security, and health. Luh is one of only 35 so honored nationwide.

Luh's research is in Probability theory and its applications. This includes work in random matrix theory, random graph theory, and probabilistic combinatorics. He also has interests in applications to computer science and machine learning, and the emerging field of deep learning. A native of Washington State, Luh went to college at Harvey Mudd and did his Ph.D. at Yale under the supervision of Van Vu.

He then spent three years on an NSF postdoctoral fellowship at Harvard before coming to Boulder.

Awards won by students in the Department

Undergraduate Students (funded by gifts from our readers)

Cole Davis and **Brooke Wei** are the recipients of the 2021-2022 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.

Emma Goodwill and **Alan Yu** are the recipients of the 2021-2022 Marlene Massaro and David Pratto Scholarships in Mathematics. This scholarship is awarded annually to exceptional upper-level undergraduate Mathematics majors.

Raymond Cole and **Teddy Gonzales** are the recipients of the 2020-2021 Mr. and Mrs. J. Tour Scholarship, which was established to benefit full-time “senior class or graduate students in the advancement of the study of physical sciences and engineering.”

Korye Lockett and **Tuscany McCann** received 2021-2022 Sieglinde Talbott Haller Scholarships, given annually to graduate and undergraduate students in Mathematics who show exceptional mathematical promise.

Huilin Han won the 2021 Collin Starkweather Award in Mathematics.

Xiaoming Wang was awarded the 2021-2022 Jack N. Hyatt Award, 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.

Raymond Baker, **Adam Claman**, and **Xin Yuan** were the winners of the 2020-21 Jim & Laura Marshall Scholarship, given annually to the advanced undergraduate students majoring in mathematics who have demonstrated the greatest promise in the mathematical sciences.

Mick Walker is the recipient of the 2021 Adele V. Leonhardy Memorial Scholarship. These scholarships are awarded annually to outstanding students who plan careers in teaching mathematics.

Graduate Students (funded by gifts from our readers)

Jennifer Gensler, **Joseph Macula**, and **Emily Montelius** are the winners of the 2021 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.

Krisztina Dearborn, **Andrew Stocker**, and **Patrick Wynne** are the winners of the 2021 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.

Andre Davis, **Jonathan Quartin**, **Michael Wheeler**, and **Patrick Wynne** won the 2021 Frances G.

Stribic/University Summer Fellowships.

Andrew Campbell and **Lucas Gagnon** were the winners of the 2021 W. J. Thron Summer Fellowships, awarded annually to the most outstanding third or fourth year graduate students.

Richard Dyer, **Howie Jordan**, **Juan Moreno**, **Adrian Neff**, **Joel Ornstein**, and **Andrew Stocker** won the 2021 Sieglinde Talbott Haller Scholarships, which get awarded annually to select students in the Math Department.

Sarah Arpin, **Krisztina Dearborn**, **Christopher Eblen**, **Erik Knutsen**, **Isabelle Kraus**, **Sangman Lee**, **Ali Lofti**, **Ian Miller**, and **Cherry Ng** were recipients in 2021 of University Fellowships.

Degrees Awarded

In 2021, the Department awarded 7 doctorate degrees. The recipients were:

Braden Loil Balentine, Ph.D.
Graduate Advisor: Dr. Magdalena Czubak
Dissertation Title: Well-posedness and Global in Time Behavior for -mild Solutions to the Navier-Stokes Equation on the Hyperbolic Space

Ruofan Li, Ph.D.
Graduate Advisor: Dr. Su-Ion Ih
Dissertation Title: Primitive prime divisors, rings of integers and class numbers in arithmetic dynamic

Shen Lu, Ph.D.
Graduate Advisor: Dr. Judith Packer
Dissertation Title: Morita

Continued ►

► *Awards Continued*

Equivalence of Irrational
Noncommutative Solenoids

Dr. Matthew Carter Pierson, Ph.D.

Graduate Advisor: Dr. Alexander
Gorokhovsky

Dissertation Title: Some Applications
of a Duality in Cyclic Homology

Carlos Enrique Pinilla-Suarez, Ph.D.

Graduate Advisor: Dr. Magdalena
Czubak

Dissertation Title: Hodge
decomposition for the Sobolev space
on a space form of nonpositive
sectional curvature

Albany Rose Thompson, Ph.D.

Graduate Advisor: Dr. Magdalena
Czubak

Dissertation Title: Foundations of the
Steady Navier-Stokes Equation on
the Hyperbolic Space

James Robert Van Meter, Ph.D.

Graduate Advisor:
Dr. Emanuel Knill, NIST

Co-Advisor: Dr. Richard Green

Dissertation Title: Universality of
swap for qudits: a representation
theory approach

**The Department also awarded 7
Masters Degrees (departmental
advisors listed in parentheses) in
2021 to:**

Christopher Eblen, MS (Dr.
Nathaniel Thiem)

Parker John Eckstein Gara, MS (Dr.
Markus Pflaum)

Yuwei Jia, MA (Dr. Sean O'Rourke)

Erik Knutsen, MS (Dr. Agnès
Beaudry)

Isabelle Krause, MA (Dr. Sean
O'Rourke)

Trevor Manders, MA (Dr. Nancy
Rodriguez)

Ian Miller, MS (Dr. Magdalena
Czubak)

**and three awarded concurrently
with a BA degree:**

Richard Dyer, BA/MA
(Dr. Martin Walter)

Connor Meredith, BA/MA
(Dr. Keith Kearnes)

Shumin Zeng, BA/MA
(Dr. Sean O'Rourke)

Patrick Michael Wynne, MA
(Dr. Peter Mayr)

**In 2021 six undergraduates
graduated with honors in
Mathematics:**

Tobias Aldape (magna cum laude),

Jenna Marie Allen (summa cum
laude), **Khaled Charles Allen**

(summa cum laude), **Hannah Lee
Beehler** (summa cum laude),

Thomas Michael Magnuson (magna
cum laude), **Kyle Schneider** (magna
cum laude).



Commencement Keynote Speaker

In 2021 the Department was thrilled to have one of its cherished alumnae, Marlene Massaro Pratto, as its fifth annual Commencement Speaker.

Pratto was born and raised in Pueblo, Colorado. She majored in mathematics at CU Boulder at a time when she and fellow alumna Ann Lowdermilk were the only women majoring in the department (read their delightful reminiscences in a recent Arts & Sciences Magazine issue:

www.colorado.edu/asmagazine/2022/03/07/alumnae-skirt-convention)

Pratto worked for the National Bureau of Standards (now NIST) before graduation and then again till until 1969. After moving to Greensboro, North Carolina, she taught programming to the engineering faculty at North Carolina Agricultural & Technical State University.

She later worked at the University of North Carolina at Greensboro (UNCG), where she taught the occasional class, usually in programming. Her main position at UNCG was in the user service area for faculty and students, where she became director of Instructional and Research Computing.

She served as secretary and president of the Greensboro Branch of Sigma Xi. She left UNCG in 1995 and became an active volunteer. She is the mother of four and the grandmother of seven.

Alumni News

Our Alumni Website: 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) Alumni events (like our annual departmental Homecoming reception);
- 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;
- 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;

Most importantly, there is a site where you can provide us with information about yourself for future issues of Prime Bits!

(If you have tried before — we've made submitting information easier. Recent submissions are below.)

Check out AfterMath at math.colorado.edu/alumni

You can also get to the site by pressing the "Alumni" button atop our department's home page, at <https://www.colorado.edu/math/>

News from our Alumni

Michael Springman writes in: "Retired in 2012 after 37 years as a program manager in space & defense

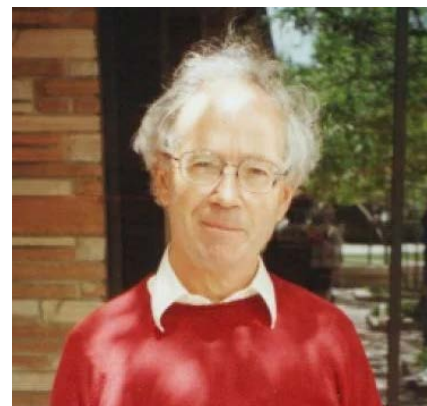
with TRW in southern California and Northrop Grumman in northern Virginia. My MS in Applied Math from CU got me into TRW, leading to a highly rewarding career involving challenging and fulfilling programs of national importance. It's satisfying to see the next generation of mathematicians, scientists and engineers build upon my generation's accomplishments to expand knowledge of our solar system and the universe overall through all the current and planned space exploration initiatives. The next few decades will be fantastic for space buffs!"

Richard Warren reports: "50 years ago I received my Ph.D. under Wolfgang Thron. I am retired after a career in the US Air Force and Lockheed Martin Corporation. Along the way I authored or coauthored 39 published papers that range from theoretical mathematics to quantum computing."

Transitions

Three faculty retired in the past year, Professor **Peter Elliott**, Professor **Ágnes Szendrei**, and Professor **Martin (Marty) Walter**.

Peter earned his Ph.D. at Cambridge in 1969 under the direction of Harold Davenport and joined our faculty in 1970. He is one of the premier number theorists of the last half-century, specializing in Probabilistic Number Theory.



He is the author of more than 150 papers and has written 4 influential books. His two volumes on Probabilistic Number Theory are the bible for the field. Many important original results appear in his book on Arithmetic Functions and Integer Products, a field he pioneered. His book on Duality in Number Theory reframes classic problems like Goldbach's Conjecture and the Twin Prime Conjecture in a uniform way and presents groundbreaking results that spurred future research.

Our margins are literally too narrow to chronicle all of his achievements, so we will have to content ourselves with mentioning just a couple of the other ways he has profoundly influenced number theorists of the current generation.

Elliott's work on the Riemann zeta function on the half plane where the series converges spawned a whole movement in number theory.

And perhaps the most significant result in recent times in prime number theory is the theorem of Zhang, who showed that there are infinitely many pairs of consecutive primes at most $g = 7 \times 10^7$ apart from each other. Maynard showed

Continued ►



► *Alumni News Continued*

that instead one can take $g = 600$, and that if one assumed a famous conjecture of Elliott and Halberstam, one can take $g = 16$, which is tantalizingly close to the twin prime conjecture!

Ágnes earned her Ph.D. in 1982 from the Hungarian Academy of Science under the direction of Béla Csákány and was on the faculty of the University of Szeged until she joined our Department in 2003.

She has written almost 100 research papers, a research monograph, and three textbooks. She has had 10 Ph.D. students, and over two dozen masters students.



Ágnes has been one of the leading figures in general algebra for the last 40 years. Her monograph *Clones in Universal Algebra* was the first to systematically explore non-classical algebraic structures via their term functions and their invariant relations. This approach has been extremely fruitful in the last 20 years for the analysis of constraint satisfaction problems in theoretical computer science.

Szendrei's contributions to algebra and logic are numerous and cover many different areas. We just highlight a few.

She has done groundbreaking research on equationally definable classes of algebras, in particular in investigating such minimal classes.

A fundamental question straddling algebra and logic is when a class of algebras can be defined by finitely many equations. In the 1970s Jónsson speculated that this should always be possible if the algebras satisfy a certain combinatorial property. Szendrei has verified this conjecture in the most general setting to date.

Her work on the generalization of commutator theory from groups to general algebras provides a vital tool for investigating their structure.

She has received numerous honors, starting when she was an undergraduate, when she won the Kató Rényi award for outstanding mathematical research done by an undergraduate, a national medal for outstanding studies, and the Ring of the Republic – a gold ring presented by the President of Hungary to the top scholar completing studies at a Hungarian University.

Szendrei won the Géza Grünwald award for outstanding research done by a mathematician under 30.

She has been honored by the Hungarian Academy of Sciences as a 1991 winner of the Paul Erdős Mathematical Award, a Mathematical Research award in 1994, and the Farkas Bolyai Award in 2000. This past Spring she was elected an external member of the Academy.

Marty earned his Ph.D. in 1971 from the University of California, Irvine, and came to CU in 1973 after a

postdoctoral position at Queen's University in Ontario. His first research interest was in operator algebras, which garnered him fellowships from the National Science Foundation and the Sloan Foundation.

His dedication to his students is legendary, and he received multiple awards for his teaching and his service. It is rivaled only by his dedication to the environment, which became another major research interest.

He combined his love for teaching and for the planet by developing an innovative and prescient course called "Mathematics for the Environment."

The course was beloved by generations of students, teaching them mathematical tools to model the environment, and teaching them how to think for themselves.

He turned the course into a book of the same name, which one reviewer called "one of the most fascinating and comprehensive that I have ever encountered."



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 2020-2022, but the Mathematics Department had 580 donors giving a total \$742,726. 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

► Interested in donating?

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

As the Chair announced in his Communiqué, the Department is starting a new trial educational program: it is hiring "Visiting Teaching Assistant Professors," which will be new PhDs who want to dedicate their academic lives to the pursuit of teaching excellence.

These new PhDs will come to our department in postdoctoral positions and get mentored and trained in our department's innovative active-learning pedagogies. They will display and hone these skills with our students, before embarking on teaching careers elsewhere. Ours will be one of very few such programs in the nation.

Our number one fundraising priority is to build an endowment to fund these positions in perpetuity, and we are hoping some angels will appear to help make this a reality.

If you want to learn more about the program, please feel free to reach out to our chair, Professor Sasha Gorokhovsky, at Alexander.Gorokhovsky@colorado.edu



We are sad to report that Professor Emerita Ruth Rebekka Struik passed away in February at the age of 93.

Rebekka was a group theorist on our faculty from 1970 until her retirement in 1999.

A lifelong fighter for social justice, Rebekka faced discrimination not only as a pioneering woman in mathematics, but also for her political beliefs. These combined to make it hard for her to gain employment after she earned her Ph.D. in 1955 from the Courant Institute, and during the McCarthy era she had a fellowship at Northwestern University revoked.

More on her fascinating life can be found at <https://www.legacy.com/us/obituaries/dailycamera/name/ruth-rebekka-struik-obituary?n=ruth-rebekka-struik&pid=201544783>