MAA Awards and Prizes

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MAA
MATHEMATICAL ASSOCIATION OF AMERICA

maa.org/awards

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Awards and Prizes

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Integral Tiling Pentagons, *Mathematics Magazine,* 96:2, 130–140. doi.org/10.1080/0025570X.2023.2176101

John Chase and Matthew Wright

"Bacterial Growth: Not So Simple," *Mathematics Magazine,* 96:4, pp. 433–441. doi.org/10.1080/0025570X.2023.2232259

Beckenbach Book Prize

Roger B. Nelsen

Nuggets of Number Theory: A Visual Approach, MAA Press, Providence, RI, 2018.

Chauvenet Prize

Jeff Witmer

"Simpson's Paradox, Visual Displays, and causal Diagrams," *American Mathematical Monthly*, 128:7, pp. 598-610. doi.org/10.1080/00029890.2021.1932237

Mary P. Dolciani Award

Darryl Yong, *Harvey Mudd College*

Euler Book Prize

Sarah Hart

Once Upon a Prime: The Wondrous Connections between Mathematics and Literature. Flatiron Books, 2023. ISBN: 9781250850898

Trevor Evans Award

Megan Martin, Cornelia A. Van Cott, and Qiyu Freda Zhang

"The Beauty of Halving it All," *Math Horizons,* 31:2, 14–17. doi.org/10.1080/10724117.2023.2249357

Yueh-Gin Gung and Dr. Charles Y. Hu Award for Distinguished Service

Michael Dorff, *Brigham Young University*

Deborah and Franklin Tepper Haimo Award

Candice Price, *Smith College*

Jan Rychtář, *Virginia Commonwealth University*

Malena Español, *Arizona State University*

Paul R. Halmos – Lester R. Ford Awards

Dan Kalman and Robert Mena

"A Tale of Two by Two Matrices," *The American Mathematical Monthly,* 130:9, 837–854. doi.org/10.1080/00029890.2023.2242039

Eli M. Hicks, R. Andrew Hicks, Ron Perline, and Sarah G. Rody

"Frobenius Integrability, Automotive Blind Spots, Non-reversing Mirrors, and Panoramic Mirrors," *The American Mathematical Monthly,* 130:3, 251–266. doi.org/10.1080/00029890.2022.2157659

Rafael López

"What Is the Shape of a Cupola?" *The American Mathematical Monthly,* 130:3, 222–238. doi.org/10.1080/00029890.2022.2154557

Andrew M. Bruckner, Judith B. Bruckner, and Brian S. Thomson

"Can One Visualize a Continuous Nowhere Differentiable Function?," *The American Mathematical Monthly,*, 130:3, 214–221. doi.org/10.1080/00029890.2022.2154555

MAA Award for Inclusivity

José María Menéndez, *Pima Community College*

George Pólya Awards

Damiano Fulghesu, James A. Sellers, and Courtney K. Taylor

"Infinite Families of Infinite Series With Integer Sums," *The College Mathematics Journal,* 54:1, 33–43. doi.org/10.1080/07468342.2022.2160611

William Dunham

"Bryn Mawr College Matriculation Exams from a Century Ago," *The College Mathematics Journal,* 54:2, 83–89. doi.org/10.1080/07468342.2023.2189820

Annie and John Selden Prize

Daniel Reinholz, *San Diego State University*

Daniel Solow Author's Award

Joel David Hamkins, *University of Notre Dame*

Proof and the Art of Mathematics: Examples and Extensions, MIT Press, 2021. ISBN: 9780262542203

T. Christine Stevens Award for Leadership Development

Jesús A. De Loera, *University of California, Davis*

Meritorious Service Awards

James Smith, *San Francisco State University*
Golden Section

David Housman, *Goshen College*
Indiana Section

Roger Waggoner, *University of Louisiana Lafayette*
Louisiana-Mississippi Section

Mark Sand, *The College of Saint Mary*
Nebraska/SE S. Dakota Section

Julie Barnes, *Western Carolina University*
Southeastern Section

Competitions

The 84th William Lowell Putnam Mathematical Competition

The William Lowell Putnam Mathematical Competition is the preeminent mathematics competition for undergraduate college students in the United States and Canada. Prizes are awarded to the participants with the highest scores and to the departments of mathematics of the five institutions the sum of whose top three scores is greatest.

The Putnam Fellows

Ankit Bisain, *Massachusetts Institute of Technology*
Jiangqi Dai, *Massachusetts Institute of Technology*
Papon Lapate, *Massachusetts Institute of Technology*
Brian Liu, *Massachusetts Institute of Technology*
Luke Robitaille, *Massachusetts Institute of Technology*

Elizabeth Lowell Putnam Prize

Isabella Zhu, *Massachusetts Institute of Technology*

Winning Teams

1. **Massachusetts Institute of Technology:** Ankit Bisain, Papon Lapate, Luke Robitaille
2. **Harvard University:** Kevin Cong, Andrew Gu, Arav Karighattam
3. **Duke University:** Erick Jiang, James Rydell, Kaixin Wang
4. **Stanford University:** Jack Albright, Quanlin Chen, Andrei Mandelshtam
5. **University of Toronto:** Ethan Bottomley-Mason, Michael Li, Zhiyuan Li

The United States of America Mathematical Olympiad

The USAMO is part of a worldwide system of national mathematics competitions, a movement in which both educators and research mathematicians are engaged in recognizing and celebrating the imagination and resourcefulness of our youth. The USAMO is a six-question, two-day, nine-hour essay/proof examination. This year it was held March 21–22.

Gold Medal Winners (in alphabetical order)

Christopher Bao, *Davidson Academy*
Warren Bei, *Vancouver Olympiad School Inc.*
Rohan Bodke, *Homestead High School*
Hannah Fox, *Proof School*

Jordan Lefkowitz, *EO Smith High School*
Krishna Pothapragada, *Naperville North High School*
Charlie Qian, *Vanguard Berkshire International Academy*
Vasawat Rawangwong, *Concord Academy*
Sam Shi, *Vanguard Berkshire International Academy*
Linus Tang, *AlphaStar Academy*
Aprameya Tripathy, *West Windsor-Plainsboro High School North*
Alexander Wang, *Millburn High School*
Allen Wang, *Millburn High School*
Feodor Yevtushenko, *UCI-Math Circle*
Qiao Zhang, *Sierra Canyon School*
Alex Zhao, *Lakeside School*

The International Mathematical Olympiad

Members of the team (in alphabetical order)

Jordan Lefkowitz, *EO Smith High School*
Krishna Pothapragada, *Naperville North High School*
Linus Tang, *AlphaStar Academy*
Jessica Wan, *Florida Atlantic University*
Alexander Wang, *Millburn High School*
Qiao Zhang, *Sierra Canyon School*

The European Girls' Mathematical Olympiad

The European Girls' Mathematical Olympiad (EGMO) is a mathematical olympiad for girls which started in 2012. This year's competition was held in Georgia. The United States took first place represented by the team of

Hannah Fox, gold medal
Angela Liu, gold medal
Kristie Sue, gold medal
Jessica Wan, gold medal

The Romanian Master of Mathematics

The Romanian Master of Mathematics is an annual competition for students at the pre-university level, held in Bucharest, Romania; the 15th RMM was held from February 26–March 2, 2024. The United States took first place represented by the team of

Andrew Carratu, silver
Hannah Fox, silver
Krishna Pothapragada, silver
Linus Tang, gold
Allen Wang, gold
Qiao Zhang, gold

Edyth May Sliffe Awards

The Edyth May Sliffe Awards for Distinguished Mathematics Teaching in Middle School and High School are given annually to middle and high school mathematics teachers who have done outstanding work to motivate students in mathematics by participating in one of the MAA American Mathematics Competitions (AMC) competitions.

Anne-Marie Lanz, *Burleigh Manor Middle School,* Ellicott City, MD
Anu Aiyer, *The Harker School,* San Jose, CA
Byungjong Moon, *Oaks Christian School,* Westlake Village, CA
Carol May, *Thunder Mountain High School,* Juneau, AK
Catherine Wachtler, *Woodside High School,* Woodside, CA
Danny Young, *Moscrop Secondary School,* Burnaby, BC, Canada
David Leviten, *Timberline Middle School,* Redmond, WA
Eric Anderson, *Adlai E. Stevenson High School,* Lincolnshire, IL
Erica Cheung, *University of Chicago Laboratory Schools,* Chicago, IL
Forest Reid, *Deerfield Academy,* Deerfield, MA
Geoff Brown, *Chagrin Falls Middle School,* Chagrin Falls, OH
Hossein Fassa, *The New School for Leadership and The Arts,* Bronx, NY
Jennifer Taylor, *Boulan Park Middle School,* Troy, MI
Karen Key, *Ransom Everglades,* Coconut Grove, FL
Kerim Aklaycin, *Orlando Science Middle High Charter,* Orlando, FL
Larisa Bukalov, *Bayside High School,* Bayside, NY
Lora Saarnio, *Castilleja School,* Palo Alto, CA
Marty De, *Tierra Linda Middle School,* San Carlos, CA
Michael Allwood, *Brunswick School,* Greenwich, CT
Michael Caines, *Walter Payton College Prep High School,* Chicago, IL
Reymelinda Villaruel, *Jackson Heights SDA School,* Woodside, NY
Sabina Khatchatrian, *Princeton Charter School,* Princeton, NJ
Shannon Denna, *WIlliam Fremd High School,* Palatine, IL
Sophie Sindhu, *The Banff School,* Houston, TX
Stanislav Kats, *Brooklyn Technical High School,* Brooklyn, NY
Thomas Morey, *Bishop Hendricken HS,* Warwick, RI
Trent Tormoehlen, *Sycamore School,* Indianapolis, IN
Ziwei Lu, *F.W. Buchholz High School,* Gainesville, FL

Young Women in Mathematics Awards and Certificates

The MAA American Mathematics Competitions' Young Women in Mathematics Awards and Certificates program honors the top-performing, self-identifying girl students on the AMC 8, 10, and 12. The top 5 scorers in each competition (including ties) split a $5,000 scholarship, and the top 5 scorers from each MAA Section receive a certificate. Here are the 2024 Award winners who provided their permission to be listed:

D. E. Shaw Group AMC 8 Award (in alphabetical order)

Elena Beckman, *S B Family School*
Carolyn Cao, *Burleigh Manor*
Angela Chen, *Think Academy Cupertino*
Angela Du, *Think Academy New York*
Helen Jiang, *Cinco Ranch Junior High*
Reva Khaire, *Community House Middle School*
Katherine Li, *Kennedy Middle School*
Emma Li, *The Independence School*
Emma Li, *TT Math School*
Xinyi Li, *UT Dallas*
Michelle Lin, *Longfellow Middle School*
Elena Liu, *Think Academy Cupertino*
Claire Qi, *Burlingame Intermediate School*
Ellie Su, *Danbury Math Academy, WCSU*
Brianna Su, *Think Academy Cupertino*
Victoria Wang, *Flintridge Preparatory School*
Yiqing Wei, *Outlook Club*
Man Hei Wong, *Brilliant Tree Education White Rock LTD.*
Yunong Wu, *Rye Country Day School*
Sophie Xu, *Indiana University*
Hanxin Yang, *Chapin School Princeton*
Hanyu Zhang, *Joaquin Miller Middle School*
Tianqi Zhang, *Oxford Academy*
Grace Zheng, *Oak Hill Academy*

Maryam Mirzakhani AMC 10 A Award (in alphabetical order)

Amy Cui, *Lakeside School*
Selena Ge, *Jonas Clarke Middle School*
Anne Huang, *Scarsdale High School*
Sylvia Lee, *Lexington High School*
Isabella Orellano, *Tampa Bay Math Circle*
Serena Wang, *Great Neck South High School*
Wanting Wang, *Middlesex School*
Sophia Zhang, *Princeton International School of Mathematics and Science*
Vivian Zhong, *Saratoga High School*

Two Sigma AMC 10 B Award (in alphabetical order)

Sylvia Chen, *Harker Upper School*
Gloria Ma, *Valley Christian High School*
Sophia Zhang, *Princeton International School of Mathematics and Science*
Amy Zhang, *Cupertino High School*

Jane Street AMC 12 A Award (in alphabetical order)

Marina Lin, *Alpha STEM*
Sargam Mondal, *Rutgers University*
Jessica Wan, *Florida Atlantic University*
Sophia Yan, *RSM - Newton*
Emily Yu, *Pittsford Mendon High School*

Akamai AMC 12 B Award (in alphabetical order)

Rongrong Liu, *Temecula Valley High*
Jessica Wan, *Florida Atlantic University*
Chuyun Wang, *Mulgrave International School*
Yi Yu, *Debang College*

Awards and Prizes

Henry L. Alder Awards

In January 2003 the MAA established the Henry L. Alder Award for Distinguished Teaching by a Beginning College or University Mathematics Faculty Member to honor beginning college or university faculty whose teaching has been extraordinarily successful and whose effectiveness in teaching undergraduate mathematics is shown to have influence beyond their own classrooms. An awardee must have taught full time in a mathematical science in the United States or Canada for at least two, but not more than seven, years since receiving the PhD. Each year, at most three college or university teachers are to be honored with this national award and are to receive $1,000 and a certificate of recognition from the MAA. Award recipients will be expected to make a presentation at the national meeting of the MAA. Nominations for the award may be made by any member of the MAA or by any section of the MAA.

Haydee Lindo

Harvey Mudd College

Dr. Haydee Lindo of Harvey Mudd College is a gifted and inspiring teacher who is lauded by her students and colleagues for her rigorous yet supportive instruction that is rooted in her belief that every student is capable of mastering the course material. Through her involvement with several national organizations, she has worked to remove some of the structural barriers in mathematics faced by minoritized students.

Dr. Lindo earned her PhD in 2016 from the University of Utah. She joined the faculty at Harvey Mudd in 2020 after teaching several years as a fellow and an assistant professor at Williams College. At both institutions, Dr. Lindo's teaching has been described as outstanding, innovative, challenging, and inclusive. She employs multiple instructional strategies to promote active learning and to create supportive learning communities in her courses where her students feel safe and encouraged to ask deep questions. Her students find her love of mathematics to be "infectious." Dr. Lindo believes deeply in her students' ability to succeed in the authentic work of the mathematician as she cultivates skills in formulating conjectures, writing proofs, and reading research articles.

Dr. Lindo has developed productive research programs within the Claremont consortium. She designs advanced courses to guide students from being math learners to being math creators. To date, she has mentored several cohorts of undergraduates as they completed publishable research in commutative algebra, some of which has been internationally recognized. Notably, a majority of the research students she has worked with come from communities underrepresented in mathematics, and many of them are now attending graduate school in mathematics or related fields due in large part to these research experiences and her mentorship.

Dr. Lindo's contributions to the larger mathematical community are impressive and impactful. She works to address issues of social justice through data science and mathematical modeling. She reaches audiences across the nation through her MAA NAM Lectureship, her popular YouTube videos, and her contributions to the MAA Math Values Blog on topics ranging from pedagogy to the promotion of marginalized mathematicians.

For these accomplishments, and several others, we enthusiastically recognize and honor Dr. Haydee Lindo with the 2024 Henry L. Alder Award.

Response

The previous Alder Award winners have profoundly affected my approach to pedagogy through their inspiring work as educators. I am deeply honored and humbled to receive this award. Many thanks to the MAA for the opportunities they have provided me, and others, to learn, teach and grow as mathematicians. More still, I am grateful to my many mentors at the University of Nebraska-Lincoln, the University of Utah, and Harvey Mudd College. This award would not be possible without them and the positively challenging educational and professional environments they provided. They empowered me by gifting me the freedom and guidance to try new things, fail, pivot and succeed in ways that were new to me and, sometimes, also new to those institutions. Now, I am surprised but overjoyed that this quiet work over the years has resulted in teaching worthy of acknowledgement. But ultimately, this award is the result of the brilliance, grit, ambition, open minds and good humour of my incredible students. My sincerest thanks to you all.

Biographical Sketch

Dr. Haydee Lindo is an associate professor of mathematics at Harvey Mudd College. Dr. Lindo is from Jamaica and earned her BAs in mathematics and political science. She received her PhD in mathematics from the University of Utah and was previously a Gaius Charles Bolin Fellow and, later, an assistant professor of mathematics & statistics at Williams College. Dr. Lindo is

a commutative algebraist with research interests in homological algebra and representation theory. She focuses on the development and application of the theory of trace modules over commutative rings. She has received funding from the National Science Foundation to support her research and the creation of enriching research experiences for her students. Lindo is committed to removing barriers to participation in the mathematical sciences and developing the research capabilities of junior mathematicians. She has served as editor in chief for publications on the board of the National Association of Mathematicians and has encouraged great math exposition, outside of the classroom, in her role as a Section Lecturer for the Mathematical Association of America.

Henry L. Alder Awards

Shelby Stanhope

U.S. Air Force Academy

Dr. Shelby Stanhope is an innovative and passionate teacher who actively collaborates with other educators to impact student learning in her classes, at her institution, and across the mathematical community. Dr. Stanhope earned her PhD in 2016 from the University of Pittsburgh. She joined the faculty at the U.S. Air Force Academy in 2018 after teaching for two years at Temple University. Both institutions have honored her with teaching awards. Dr. Stanhope actively shares her work with the broader mathematical community, showcasing strategies for inclusive teaching, and providing resources nationwide for MAA and Project NExT members to help them transform their teaching of multivariable calculus.

Dr. Stanhope uses low-stakes formative assessment activities and opportunities for anonymous participation to create a supportive and inclusive environment where students believe that they can achieve success. She intentionally creates a low-threat environment for learning. Dr. Stanhope employs evidence-based, learner-focused practices, including exam reflection, knowledge organization scaffolding, and exit tickets. The latter provide opportunities for students to assess their own learning through a low-stakes activity.

As course coordinator for multivariable calculus, Dr. Stanhope revamped the curriculum and assessments for the course and led a team of six instructors. Without changing the topics covered, she incorporated CalcPlot3D to enhance students' spatial understanding and, through activities using 3D printed models, integrated experiential learning opportunities into the course structure. Dr. Stanhope's redesign created a significant positive shift both in the student experience and student success rates, resulting in increased student enrollment in subsequent course offerings.

Dr. Stanhope's excitement about CalcPlot3D and 3D-printing and how to best leverage these tools for student learning has led to research collaborations and an NSF Improving Undergraduate STEM Education grant. The work of the team has begun to reach instructors nationwide through conference presentations and workshops.

For her effective teaching, both in day-to-day classes and for the deeper thinking about pedagogical innovations that will improve student learning, we enthusiastically recognize and honor Dr. Shelby Stanhope with the 2024 Henry L. Alder Award.

Response

I am honored to receive the Henry L. Alder Award, and I have many people and organizations to thank for their support in my growth as an educator. In pursuing a PhD in mathematics, I knew that I wanted to teach at the collegiate level. However, it wasn't until my postdoc years that I realized my passion for active learning and student-centered teaching pedagogies. I am grateful for Maria Lorenz and Irina Mitrea at Temple University for their mentorship during this time. I soon found myself wanting to spend all of my time running teaching workshops and attending professional development opportunities instead of focusing on my research in mathematical biology. This revelation led me to pursue a teaching focused position, and I am forever grateful to have landed at the U.S. Air Force Academy (USAFA), where innovative, research-based teaching practices are valued and embraced. I would like to thank USAFA and my Department Head Col Scott Williams for putting teaching at the center of their priorities and for always supporting ambitious teaching practices. The collaborative nature of our department is one of our most valuable attributes; thank you to all of my colleagues, including Beth Schaubroeck, who I learn from every day. Thank you also to my research collaborators Paul Seeburger, Deb Moore-Russo, and Stepan Paul. Working together with you to advance CalcPlot3D and the use of 3D visualization and 3D printed models in the multivariable calculus classroom has been a joy over the past several years.

Throughout my career, the MAA has played a pivotal role in shaping the educator I am today. My involvement in the MAA's Project NExT in 2018 was a wonderful experience in learning about research-based teaching practices and networking with other new faculty members. The Rocky Mountain Section of the MAA has also provided a great community of educators to be involved with at the local level. The conferences, workshops, and programs through the MAA, are events that I always look forward to attending. I have been grateful for the opportunity to also contribute to these events to pass on what I have learned to fellow educators. Finally, I would like to thank my family for their support over the years. Thank you to my Mom and Dad for cheering me on through all of my endeavors. I know exactly what you would say to me today, Dad. Thanks to my kids for understanding when I have to be away from you for conference trips. Thank you to my husband Chris for your enduring support through grad school and my early career. I wouldn't have gotten through it all without you.

Biographical Sketch

Shelby Stanhope is an associate professor of mathematics at the U.S. Air Force Academy. She was born and raised in Ft. Collins, Colorado, and she

completed bachelor's and master's degrees in mathematics from Colorado State University. She earned a PhD in mathematics from the University of Pittsburgh in 2016, followed by a 2-year postdoc at Temple University, before joining the Department of Mathematical Sciences at the U.S. Air Force Academy in 2018. Her teaching has been recognized through awards from Temple University, the U.S. Air Force Academy, and the MAA Rocky Mountain Section. Her work focuses on innovative teaching methods in multivariable calculus, aiming to help students grasp three-dimensional concepts through tactile activities using 3D-printed models, computer visualization with CalcPlot3D, and experiential learning field trips. She is a PI on a collaborative NSF Improving Undergraduate STEM Education grant. Her grant team has been twice selected to lead MAA OPEN Math workshops, and she enjoys interacting with other educators in a collaborative effort to continually improve teaching and learning in undergraduate mathematics.

Henry L. Alder Awards

Axel Brandt

John Carroll University

Dr. Axel Brandt received his PhD in applied mathematics from the University of Colorado Denver in 2016. Dr. Brandt was a teaching postdoctoral fellow at Davidson College (NC) for two years, and assistant professor at Northern Kentucky University for four years, before returning to his family home near Cleveland, OH, in 2022 as assistant professor in the Department of Mathematics, Computer Science, and Data Science at John Carroll University. At each of these stops in his early professional journey, Dr. Brandt has shared an infectious enthusiasm for mathematics with his students, colleagues, and wider communities.

In the classroom, Dr. Brandt strives to use inclusive and equitable practices, engaging students with active learning, utilizing Open Educational Resources, and incorporating service learning. His classroom teaching extends to mentoring research with at least 15 undergraduates, leading in several instances to co-authored publications with his students. Described as a "math community organizer," Dr. Brandt has been a leader in professional development and community learning, organizing "Professional Idea Exchange" (PIE) sessions for faculty at multiple institutions, initiating a "Student Challenge Corner" in the Kentucky MAA Newsletter, chairing the Ohio Section NExT Organizing Committee, and publishing about incorporating philanthropy and teaching mathematics through games. Indeed, Dr. Brandt has an arsenal of math games and activities that he draws upon to provide students with mental refreshment while also demonstrating the magnificence of mathematics.

Aware of the barriers that some students may face relative to others, Dr. Brandt has dedicated considerable time to work on grants aimed at improving STEM retention and outcomes. At both his prior and current institution, Dr. Brandt has contributed to programs for PEERs, low-income, and first-generation students.

In his work with pre-college students or their teachers through outreach, teaching college students at any level, or conversing with university parents or alumni, Dr. Brandt never fails to share his energy and excitement for mathematics. Indeed, whether it be from colleagues across disciplines, students, or even parents of students, a consistent theme of those that reflect on their interactions with Dr. Brandt is how his enthusiasm has made a positive impact on their mathematical experiences and outlooks. One cannot help but to be infected with that enthusiasm, and so we enthusiastically recognize Dr. Brandt as a recipient of the 2024 Henry L. Alder Award.

Response

The MAA community and its members have provided so many learning opportunities during the early stages of my career. I am overwhelmed with gratitude to everyone who welcomed me, supported me, guided me, and advocated for me. It is a testament to the values and commitment of the MAA community that I found these people throughout my experiences at three academic institutions across three sections of the MAA.

So, thank you to the community for investing in early-career faculty and each other. In particular, thank you both to everyone supporting Project NExT, which was an incredibly valuable source of knowledge and ongoing support, and also to everyone supporting graduate students, without whom I would not be where I am. Thank you to my students, who are a consistent source of fulfillment and motivation for continued learning. Since investments in faculty professional development benefit these students, thank you also to administrators and academic institutions who invest in robust faculty professional development programs, particularly through active Centers for Teaching and Learning. Thank you also to community organizers for establishing mechanisms through which we support each other's development, in particular educators at the Crooked River Math Teacher Circle who I continue to learn from.

Next, love and gratitude to some particularly impactful people. To my parents, for being there throughout my journey; from introducing me to logic puzzles as a child to helping me prepare for my thesis defense and proofreading my dissertation. To Kristen Stephens, for facilitating my early formative steps in developing self-efficacy as a mathematician. To Mike Ferrara, for investing in my all-around development as an academic and facilitating pursuits in both research and maths enrichment. To Tim Chartier, for your thoughtful conversations and instilling a confidence to embrace maths for funsies. And finally, recognition that my professional endeavors would not have been possible without the understanding and support from my spouse. Kim, thank you for everything. In particular, thank you for continuing to put up with my slow progress in (i.e. ongoing failure to) establish a healthy work-life balance.

Biographical Sketch

Before his formal academic training, Axel engaged in an assortment of extracurriculars including academics, athletics, social, service, the arts, and the outdoors. This well-rounded collection of experiences fostered a deep appreciation for self-discovery and personal growth across a variety of settings.

As an educator, he strives to facilitate meaningful learning experiences for students with mathematics serving as the context. Axel seeks to pay it forward

by presenting students with new opportunities and supporting them through their academic and personal growth. He brings his whole self to his teaching, frequently sharing with students both his successes and struggles while connecting over similar interests and experiences. When not in the collegiate environment, he can often be found engaging K–12 students in active explorations of advanced mathematical topics at an accessible level.

Outside his mathematical life, Axel has remained recreationally active. He qualified for and ran the Boston Marathon and has completed a Half Ironman triathlon. He recently ran his first ultramarathon and has started trail running more consistently. Axel enjoys hiking and camping with his family; they hope to someday visit all of the National Parks.

Carl B. Allendoerfer Awards

The Carl B. Allendoerfer Award, established in 1976, is made to authors of expository articles published in *Mathematics Magazine*. Carl B. Allendoerfer, a distinguished mathematician at the University of Washington, served as president of the Mathematical Association of America, 1959–60.

Alissa S. Crans and Glen T. Whitney

Integral Tiling Pentagons, *Mathematics Magazine,* 96:2, 130–140.
doi.org/10.1080/0025570X.2023.2176101

For nearly a hundred years, mathematicians—professionals and amateurs alike—have been on a quest to find all convex pentagons that tile the plane. In their paper, the authors gift readers of *Mathematics Magazine* in several ways: they give a lively recounting of the quest, acknowledging the sometimes decades-long gaps between advances; they concisely summarize the status of the problem (namely, that 15 families of convex pentagon tilings were discovered between 1918–2015; and, in 2017, mathematician Michael Rao announced that he had computationally verified that the list of 15 families is complete); and as per the title of their paper, they completely solve the integral tiling pentagons problem, providing "exact criteria to determine whether a given 5-tuple of natural numbers can occur as the side lengths of a pentagon within each of the 15 families."

The writing and the organization of the paper are outstanding. Proofs are accessible, relying, as the authors note, on classical number theory and properties of continuity and convexity. Geometric diagrams that show side-angle relationships in pentagons from different families illuminate the proof, as do tables of integer side lengths and "smallest examples" that are arranged by family. Readers finish with clear take-aways: (1) "The 15 families are characterized by relations among their sides and angles." (2) Families 14 and 15 do not admit even rational side lengths. (3) The other 13 families "have infinitely many dissimilar, integer-sided representatives." (4) Families 1–13 form two groups: a group of five families whose solutions involve Diophantine equations, and a group of eight families, where the integer constraint plays only a minor role and whose solutions draw upon convexity.

Of special mention, this paper offers an example of how to engage and inspire the public with mathematics. On being invited to speak at a United Nations conference on educating girls, the authors relate how they planned to engage audience members in experiencing and discovering mathematics by providing them with store-bought, integer-length rods and inviting them to try their hand at constructing integral pentagonal tilings. This sharing is another gift to readers, adding to the rich contributions of the paper.

Responses

We are thrilled and honored to have our work recognized with the Allendoerfer Award. Jason Rosenhouse and the reviewers improved the quality of our exposition, for which we are grateful, and they deserve their share of the credit. We hope that the outreach leading to our article could help encourage others to share their love of mathematics with broad, diverse audiences, especially in hands-on ways. Who knows, you might also find a whole new problem to work on, as we did! "Integral Tiling Pentagons" only includes the details for fewer than half of the families, leaving ample opportunity for interested readers and their students to explore the remaining ones. Although of similar flavor, each has its own unique charms. In the end, we're just delighted to have contributed a tiny epilogue to the hundred-year history of this wonderful tiling problem.

Biographical Sketches

As a professor of mathematics at Loyola Marymount University, **Alissa Crans** is known for her active mentoring and supporting of women, underrepresented students, and junior faculty. She shares her enthusiasm for math in settings ranging from school classrooms to public libraries to "Nerd Nite Los Angeles." Alissa continues to be intrigued by problems in the intersection of quantum algebra and geometric topology. Outside of mathematics, you can find her rehearsing with the Santa Monica College Wind Ensemble or on her quest to find the spiciest salsa in LA.

Glen Whitney trained as a logician, became a quantitative analyst at a hedge fund, and then founded the National Museum of Mathematics. From teaching at Harvard and Rutgers to leading public constructions such as an exhibit of polyhedra embodying Euler's formula, Glen continues to promote the importance of illustrating mathematics. He has a serial habit of editing problems columns: Varsity Math in the *Wall Street Journal*, The Playground in *Math Horizons,* and now the Prisoner's Dilemma for the *Prison Math Project*. He currently serves as a trustee of the Seattle Universal Math Museum.

Carl B. Allendoerfer Awards

John Chase and Matthew Wright

"Bacterial Growth: Not So Simple," *Mathematics Magazine,* 96:4, pp. 433–441.
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If a bacterium divides once per hour, what will the population size be after *t* hours?

Exponential models of bacterial growth are among the first mathematical models students see, often when first encountering logarithms. Due to these models' ubiquity and reliance on techniques from high school algebra, it is easy to discount them as "simple" and assume they hold little interest beyond being a starting point for more sophisticated population models. In "Bacterial Growth: Not So Simple," authors John Chase and Matthew Wright demonstrate that this seemingly straightforward problem holds unexpected depths.

The authors start by encouraging us to question our assumptions via a deterministic model, in which every bacterium divides after exactly the same amount of time. This produces an "exponential step function" that is equal to the familiar population size function 2t at integer values of t. However, this model highlights the absurdity of supposing that a large population of bacteria would double in size instantaneously, and then remain a constant size for exactly an hour. It is more reasonable to suppose that the time to division varies within the bacteria culture; in other words, time to division is a random variable, not a constant. With that in mind, we might expect that if we replace a constant 1-hour time to division with a 1-hour mean time to division, then 2t would still be a reasonable model for the number of bacteria after t hours. And indeed, this is how we often talk informally about the situation with our students. But as the authors of this article describe, things are much more interesting than this approach suggests: the bacteria population depends on the distribution of the time to division, not just the mean.

After the introduction to the deterministic model, the authors explore a stochastic model in which the time to division has an exponential distribution with mean a = 1, since exponential distributions are often appropriate for lifespans or time to failure. Using well-known results for this distribution, they reveal the surprising result that in this case, the population size is not approximated by 2t, but by et instead! Because the median of the exponential distribution is less than the mean, the classic deterministic model substantially underestimates the population growth function.

The splitting of bacteria, however, is not a single biological process but a sequence of interrelated subprocesses. If each subprocess is modeled by an exponential distribution, then the splitting process might be better modeled by a

sum of exponentials, which is a Gamma distribution. This is the next case the authors consider. Using simulations, the authors determine that the population size is still modeled well by an exponential function whose base depends on the variance of the underlying Gamma distribution. One might consider other time-to-division distributions, so the authors conclude by describing a result that under mild assumptions, every distribution will lead to an exponential model for the population size.

This paper is a delight to read, with an enjoyable mix of theory and simulation. The authors take a topic many readers will feel they know well and reveal hidden aspects of the underlying models. That these new insights can be seen playing out in the real world just adds to the fun.

Responses

John Chase: I am honored to receive the Carl B. Allendoerfer Award, together with my coauthor Matthew Wright. Our paper was inspired by conversations with one of my high school math teacher colleagues, Will Rose, who questioned the underlying premises of bacterial growth. I did work in stochastic processes in my graduate program, and I thought this would be a perfect time to put that knowledge to use. When Matthew and I first uncovered the results in our paper, we found them surprising and delightful. Using bacterial growth as a first example of exponential growth is so commonplace it seemed unlikely that there would be anything new to say. We are pleased that others found the paper surprising and delightful as well. Our results are not groundbreaking and are likely well-known by those who have a deep knowledge of stochastic processes, but we were glad for the opportunity this paper gave us to popularize these results. We hope that this expository treatment of the topic will open conversations among educators and students in both undergraduate and secondary settings. I hope that any recognition the award brings will broaden the reach of our paper and highlight the delightful mathematics, not just the authors.

Matthew Wright: It is a surprise and an honor to receive the Allendoerfer Award. Ever since I was an undergraduate student, I have sought out and enjoyed reading well-written mathematical exposition. While it has been my desire to write mathematical papers that others would enjoy reading, I never imagined winning the Allendoerfer Award. It is especially an honor to win this award together with John Chase. I met John in college, where we were friends, classmates, and roommates. In the years since, we've co-written two mathematical papers. Discussions that led to this award paper started in late 2016. As I recall, John asked me about whether I used cell division as an example of exponential growth in my teaching, and whether I had ever thought

about how the individual splitting times affected the growth rate. Since I regularly teach differential equations and probability theory, I was intrigued to explore this question. We did some calculations and simulations, but we only thought about this question sporadically until 2019. The results we found were surprising to us, and we thought they deserved to be more widely known, so we decided to bring our thoughts together into a coherent paper. It took us a few more years to finish the paper, and we are grateful to *Mathematics Magazine* for publishing it. We hope others find this paper as enjoyable to read as it was for us to write!

Biographical Sketches

John Chase is the head of the math department at Walter Johnson High School in Bethesda, Maryland. He earned a BA in Math Education from Messiah University and an MS in Applied and Computational Mathematics from Johns Hopkins University. John is a National Board-certified teacher. He has spoken at the national NCTM conference, the Association of Christians in the Mathematical Sciences annual conference, and the Association of Teacher Educators annual meeting. He performs every year at the New York City Math Festival and has been a guest presenter at the Museum of Mathematics in New York City. John maintains a math education blog at mrchasemath.com. Outside of mathematics, he enjoys spending time with his wife and three daughters and pursuing hobbies such as juggling, Lego, and magic. Most important of all is John's faith in Jesus—the axiom on which the rest of his life is built.

Matthew Wright is an associate professor at St. Olaf College in Northfield, MN, where he teaches applied and computational math courses. He earned an undergraduate degree in mathematics and computer science from Messiah University and a PhD in mathematics from the University of Pennsylvania. He was a postdoctoral fellow at the Institute for Mathematics and its Applications. His research is in topological data analysis and computational mathematics, and he is an author of the RIVET software for topological data analysis. Matthew lives in Minnesota with his wife and two children. In his spare time, he enjoys reading, juggling, and anything constructive. Find him online at mlwright.org.

Beckenbach Book Prize

The Beckenbach Book Prize, established in 1986, is the successor to the MAA Book Prize established in 1982. It is named for the late Edwin Beckenbach, a long-time leader in the publications program of the Association and a well-known professor of mathematics at the University of California at Los Angeles. The Prize of $2,500 is intended to recognize the author(s) of a distinguished, innovative book published by the MAA and to encourage the writing of such books. The award is not given on a regularly scheduled basis. To be considered for the Beckenbach Prize a book must have been published during the five years preceding the award.

Roger B. Nelsen

Nuggets of Number Theory: A Visual Approach, MAA Press, Providence, RI, 2018.

In the Preface of *Nuggets of Number Theory: A Visual Approach,* Roger B. Nelsen writes: "Some time ago I was looking at several textbooks for the undergraduate number theory course. I was struck by how few illustrations were included in many of those textbooks. A number—specifically a positive integer—can represent many things: the cardinality of a set; the length of a line segment; or the area of a plane region. Such representations naturally lead to a variety of visual arguments for topics in elementary number theory. Since the number theory course usually begins with properties of the positive integers, the texts should have more pictures. That observation became the motivation for this book."

Nelsen's work has an accessible and engaging writing style, and compelling historical references and anecdotes. His topics are consistently engaging throughout the book, with nice figures to draw the reader in. Nelsen's innovative style is obvious: if you open *Nuggets of Number Theory* to any page, you will find a neat visual proof, an interesting numerical insight, or a fun historical anecdote.

The 2024 prize committee found Nelsen's work to be a fun read. While this book may not be directly used as a textbook, it is a great source for extra projects, additional reading, or extra-credit assignments. This book begins with an opening quote, "Why are numbers beautiful? It's like asking why Ludwig van Beethoven's Ninth Symphony is beautiful. If you don't see why, someone can't tell you. I know numbers are beautiful. If they aren't beautiful, nothing is." —Paul Erdős

This opening quote from the book is indicative of the style of writing that follows, with shapes, and pictures for illustration of numbers, and ideas as a supplement to a traditional number theory text or coursework.

Response

I am humbled and honored to have *Nuggets of Number Theory* selected to receive the 2024 Beckenbach Book Prize. It was quite a surprise, since the book is not a text, and I am not a number theorist. I want to thank the members of the Committee on the Beckenbach Book Award for their kind words in the citation. In his book *A Mathematician's Apology,* G. H. Hardy advised "Young men should prove theorems, old men should write books," so I learned late in life to appreciate the value of that year-long freshman English course I endured as an undergraduate. Since retiring from teaching fifteen years ago I have discovered the pleasure of sharing some of what I learned from my Lewis & Clark students about the teaching and learning of mathematics. And that explains the subtitle of the book, *A Visual Approach.*

Where do I begin with thanking those who helped me along the way? Clearly with the woman at Lewis & Clark who took a chance and hired me on tenure-track fresh out of graduate school with no teaching experience and no on-campus interview: Professor Elvy Fredrickson (1921–2008). Elvy chaired the Department for 28 years and was a true mentor and friend. As chair she cultivated a spirit of collegiality and a deep commitment to students which persists in the department today. Elvy also introduced me to the MAA through its journals and meetings and insisted that I become a member!

The *Nuggets* book and several others would not exist without the ongoing support I receive every day at the College from the Mathematical Sciences faculty and students. My thanks to the faculty for insuring, fifteen years after my retirement, that I still have my attic office! And so, my heartfelt thanks to Paul Allen, Yung-Pin Chen, Peter Drake, Jeff Ely, Andy Fry, Alain Kägi, Jens Mache, Liz Stanhope, Iva Stavrov, and Sweta Suryanarayan—the best colleagues an emeritus could ever have.

It is my hope that readers of *Nuggets of Number Theory* will see that elementary number theory, one of the oldest branches of mathematics, is still a vibrant and evolving subject where one can discover new approaches to old theorems and problems.

Biographical Sketch

Roger B. Nelsen is a professor emeritus of mathematics at Lewis & Clark College in Portland, Oregon, where he taught mathematics and statistics for 40 years. He earned his BA in mathematics at DePauw University and his PhD in mathematics at Duke University. Early in his teaching career he learned that drawing an appropriate figure on the chalkboard was much better pedagogically than a board full of equations. So, it was natural that he would begin collecting and creating such pictures for "proofs without words" (PWWs) to

be used as end-of-article filler in MAA journals. Many of those PWWs have appeared in the more than a dozen books he has authored or coauthored for the MAA, including of course, *Nuggets of Number Theory.* Although Nelsen is not a number theorist, the undergraduate number theory course was one of his favorite teaching assignments.

Chauvenet Prize

The Chauvenet Prize, consisting of a prize of $1,000 and a certificate, is awarded at an Annual Meeting of the Association to the author of an outstanding expository article on a mathematical topic. First awarded in 1925, the Prize is named for William Chauvenet, a professor of mathematics at the United States Naval Academy. It was established through a gift in 1925 from J.L. Coolidge, then MAA President. Winners of the Chauvenet Prize are among the most distinguished of mathematical expositors.

Jeff Witmer

"Simpson's Paradox, Visual Displays, and Causal Diagrams," *The American Mathematical Monthly,* 128(7), 598–610. doi.org/10.1080/00029890.2021.1932237

With the world awash in data, it's more important than ever to highlight common pitfalls in interpretation. "Simpson's Paradox" refers to the phenomenon that an inequality can hold for several groups of data but reverse itself when the groups are combined into a single data set. This reversal (not precisely a paradox!) was first described by Udny Yule in 1903, and then (paradoxically?) named after Edward Simpson in 1951. Despite this pedigree, the apparent paradox continues to confuse both statistics students and lay people. Witmer's article not only nicely illustrates (literally, with pictures) the phenomenon, but shows the reader a useful technique for avoiding the paradox, namely the use of causal diagrams. These diagrams give a methodical way to clarify the hypothesized causal link that is being tested, and therefore determine which is the most appropriate way to look at the data. With the appropriate choice of context, the apparent paradox is resolved. The paper ends with a plethora of examples for the reader to consider, from sports statistics to SAT scores to the Titanic. Something for everyone!

Responses

I was shocked, but delighted, to learn that I was receiving the Chauvenet Prize. Simpson's paradox has long been an interest of mine and I was happy to write a paper that pulled together what I've learned about this topic over many years, but I never expected anything beyond the satisfaction of seeing my thoughts published.

As an educator I am always trying to find ways to help others understand important concepts—and to help myself better understand them. When I stumble upon an idea, like the BK-plot, mosaic plot, or directed acyclic graph (DAG)—three key components of my paper—the excitement energizes me.

And to be clear: I didn't create any of those ideas, I merely borrowed them from others and used them in my paper. I should credit Stan Wagon, who a few years ago wrote to me looking for new examples of Simpson's paradox. Our email exchange led to him encouraging me to write up my thoughts, which resulted in the paper. Also, the reviewing process was very helpful, as comments from the referees helped me to better understand my subject, as well as more clearly present it to readers, reminding me that I am part of a community of scholars.

Biographical Sketches

Jeff Witmer was an undergraduate mathematics major at the University of Wisconsin - La Crosse, where he discovered a passion for statistics. This led to a PhD in statistics from the University of Minnesota, followed by a career in teaching. He has spent nearly 40 years writing about statistics and teaching at Oberlin College. Working with members of the Statistics in the Liberal Arts Workshop, he is one of the authors of *Stat2: Modeling with Regression and ANOVA* and recently served as editor in chief of the *Journal of Statistics and Data Science Education*.

Mary P. Dolciani Award

The Mary P. Dolciani Award recognizes a pure or applied mathematician who is making a distinguished contribution to the mathematical education of K–16 students in the United States or Canada. The recipient will be actively contributing to math education at the time of the selection.

Darryl Yong

Harvey Mudd College

The MAA Dolciani Award is presented to Darryl Yong for his fundamental and extremely significant contributions to the mathematical education of K–16 teachers and students. Darryl Yong earned his BS in Mathematics from Harvey Mudd College in 1996 and that same year he received his MS in Applied Mathematics from the Claremont Graduate School. He earned his PhD in Applied Mathematics from the University of Washington in Seattle, finishing in 2000. Darryl has made and continues to make deep contributions to inclusive pedagogy and to the education and support of secondary mathematics teachers. His impact on the field includes 7 books and 14 publications in STEM education and 9 NSF grants which have supported his work to improve teacher quality, retention, and empowerment as well as student performance. As one of his nominators wrote, Darryl Yong "is a brilliant teacher of teachers, a true master of his craft." He "serves as a model—perhaps the preeminent model—for the way in which a mathematician should productively interact with teachers."

While Darryl has been an impressive applied mathematician, including 7 papers in distinguished journals, in recent years he has focused his energies on mathematics education, pedagogy, and teacher development. His nominators detailed the ways in which Darryl's work has been "deep, high-quality, and long-lasting." They write "that he knows how to create great teachers"… "by exciting them about the subject they teach." "He is a resource and a treasure to mathematical education, and he has improved the professional lives of thousands of teachers, indirectly affecting hundreds of thousands of students." In the words of one of his colleagues: "Darryl embodies the single ideal captured by the two words 'mathematics' and 'teacher'. I can think of no one who does so better."

In 2003, Darryl co-founded a professional development group for mathematics teachers in the Los Angeles area and that soon led to his co-founding of the non-profit Math for America Los Angeles (MfA LA). Since that time Darryl has been integrally involved in the day-to-day operations of MfA LA. This organization, co-founded with Maria Klawe (then President of Harvey

Mudd College) and others, has supported over 200 secondary school mathematics and computer science early career and master teachers through the multi-year program. The organization provides participants with professional development opportunities, community, and salary supplements. These 200 hundred teachers have returned to influence their local schools with renewed enthusiasm and much greater resources. His NSF grants have raised over $12 million dollars to support the organization.

Since 2003, Darryl has participated in the Teacher Leadership Program at the IAS/Park City Mathematics Institute every year. Since 2008 he has taught mathematics courses at Park City for more than 650 US elementary and secondary school mathematics teachers. His astoundingly successful classes have inspired passion for the college level mathematical topics in them and all the while Darryl has modeled inclusive pedagogy and active learning.

Darryl's *AMS Notices* article from 2012, entitled "Adventures in Teaching: A Professor Goes to High School to Learn about Teaching Math," describes Darryl's year-long sabbatical from Harvey Mudd College during which he taught mathematics in the Los Angeles Unified School District. The article was cited by Roger Howe as being "among the best pieces on education that the *Notices* has published." This article on the issues in math education and high school explains the delicate and complicated reality of the lives of both high school mathematics teachers and of their students. The Dolciani Award committee urges the MAA community to read Darryl's article. Darryl ends the article with the final paragraph:

> I am more aware of my students' self-concepts now and how that affects their motivation and performance. I use more formative assessment to guide my teaching. My experiences that year gave me new perspectives about my job and informed the way that I think about and work with teachers. Let us all seek first to understand, then to be understood.

For his unparalleled leadership in the teaching of teachers, his deep mathematical insight in books and publications on inclusive pedagogy, his passion for broadening participation in STEM and the study of mathematics, and his ability to inspire excitement and enthusiasm in teachers, Darryl Yong is an extraordinary choice for the 2024 Mary P. Dolciani Award.

Response

I am truly grateful to the MAA, the Mary P. Dolciani Halloran Foundation, and the Mary P. Dolciani Award selection committee for this honor. The teacher professional development work that I have been engaged in has been a team effort and I would be remiss for not thanking Pam Mason, executive

director of Math for America Los Angeles; Gail Burrill and Peg Cagle, former directors of the PCMI Teacher Leadership Program; research collaborators Lani Horn, Brette Garner, and Ben Rydal Shapiro; my departmental colleagues at Harvey Mudd College; and the many teachers that I've had the privilege of working with and learning from over the last 20 years.

The increasing complexity of the work of teaching and polarization of mathematics education requires that, now, more than ever, mathematicians in institutions of higher education and K–12 mathematics teachers and teacher leaders need to work together to do what's best for the students that we are trying to nurture. There are too few spaces and venues where these two communities of mathematics educators get to authentically listen to one another. May we all seek to understand before seeking to be understood.

Biographical Sketch

Darryl Yong is the McGregor-Girand Chair in STEM Equity Innovation and Research and a Professor of Mathematics at Harvey Mudd College and currently serves as Core Curriculum Director and Associate Dean for Special projects. He was an ACE Fellow for the 2022-23 academic year. He has served as the Associate Dean for Diversity and Director of the Mathematics Clinic Program at Harvey Mudd and was the Founding Director of the Claremont Colleges Center for Teaching and Learning. His scholarship has several foci: the retention and professional development of secondary school mathematics teachers, effective teaching practices in undergraduate STEM education, and equity, justice, and diversity in higher education.

Euler Book Prize

The Euler Book Prize is awarded annually to an author or authors of an outstanding book about mathematics. The Prize is intended to recognize authors of exceptionally well written books with a positive impact on the public's view of mathematics and to encourage the writing of such books. Eligible books include mathematical monographs at the undergraduate level, histories, biographies, works of fiction, poetry; collections of essays, and works on mathematics as it is related to other areas of arts and sciences. To be considered for the Euler Prize a book must be published during the five years preceding the award and must be in English. The Euler book prize is $2,000. The prize was established in 2005 and will be given every year at a national meeting of the Association, beginning in 2007, the 300th anniversary of the birth of Leonhard Euler. This award also honors Virginia and Paul Halmos whose generosity made the award possible.

Sarah Hart

Once Upon a Prime: The Wondrous Connections between Mathematics and Literature. Flatiron Books. 2023. ISBN: 9781250850898

Once Upon a Prime is a lively, well-researched excursion through the overlapping worlds of mathematics and literature. Drawing from diverse literary and mathematical traditions and cultures, Hart compellingly demonstrates mathematics' role in poetry and story-telling. She gives each example just the right amount of attention, situating both the mathematics and the literature in its own context. She shows how different authors have used mathematics in different ways. For some, mathematics is a symbol of logical structure, demonstrating a deep meaning at the heart of existence; for others, it is a symbol of authority, to be co-opted or overthrown. Some writers have used mathematical structures to organize poems and novels; others use famous numbers like the Fibonacci numbers, the prime numbers, or pi for their structure or numerology. Some famous authors, such as Hermann Melville, George Eliot, and Leo Tolstoy, incorporate surprisingly advanced mathematical knowledge. Other authors, such as Jonathan Swift and James Joyce, play with mathematical impossibilities. Throughout the book, Hart's exposition of mathematics history, both ancient and modern, is careful and engaging, conforming nicely to present standards of historiography. The writing style is very accessible without being condescending; the humor enlivens the text without distracting from the narrative. This book will help every reader see both mathematics and literature in a new light, expanding the joy of both reading literature and learning mathematics.

Response

I feel honored and humbled to join the distinguished list of winners of the Euler Prize. My love of both literature and mathematics goes back to my earliest childhood—I always had my head in a book. For me, there was no disconnect between the imagined worlds of fiction, and the abstract playgrounds of mathematics—both involve a similar feeling of creative expression subject to carefully chosen constraints. The rules of a sonnet inspire the poetic imagination to explore what is possible, just as the axioms of a group inspire the mathematical imagination. Since literature is full of structure, it's only natural that it is full of beautiful mathematical ideas just waiting to be revealed.

It's a great sadness that there is still a perception that you are either a "creative" or a "numbers person." In my mathematics communication work I am evangelical about trying to break down this misconception. As Sofia Kovalevskaya wrote: "Many people who have never had occasion to learn what mathematics is confuse it with arithmetic and consider it a dry and arid science. In actual fact it is the science which demands the utmost imagination." She continues: "it is impossible to be a mathematician without being a poet in soul."

Becoming Gresham Professor of Geometry in 2020 gave me the chance to bring together my decades of thinking about mathematics and its place in history and culture. This professorship is one of the few Tudor jobs still around —it was created in 1597 in the will of Elizabethan courtier and financier Sir Thomas Gresham. As Jordan Ellenberg noted, it's a position so old that the first incumbent invented long division. I'm privileged to be the 33rd person, and first woman, to do it. I get to give public lectures on any mathematical subject of my choosing. *Once Upon a Prime* came about because of that freedom. But none of it would have been possible without the love and support of my wonderful husband Mark, and our incredible daughters Millie and Emma. I'm so lucky to have them. The existence of the Euler Prize signals that the MAA values expository mathematics writing. I am grateful to the MAA for emphasizing that important message. I do not know who nominated me for the award, but my heartfelt thanks goes to you and to the 2024 Euler Prize Committee—you have made me very happy!

Biographical Sketch

Sarah Hart grew up in England, in a small suburban town about 20 miles south-east of London. Her parents were high school math teachers and the house was full of books. She gained her BA in mathematics in 1996 from Balliol College, Oxford, and then went to Manchester for a Master's degree in pure mathematics. She stayed on for a PhD focusing on Coxeter groups,

which was awarded in 2000. After a postdoctoral research fellowship and fixed term lectureship, she was appointed to a permanent lectureship at Birkbeck College (University of London) in 2004. She was promoted to senior lecturer, reader, and finally full professor in 2013. At that time this made her the youngest STEM professor at Birkbeck, and its first ever woman professor of mathematics. In 2020, she was appointed as the Gresham Professor of Geometry, at Gresham College, London, believed to be the UK's oldest mathematics chair. She is now a sought-after public speaker and mathematics communicator. *Once Upon a Prime* is her first book, and she's hoping that if she asks her family nicely, they'll let her write another.

Trevor Evans Award

The Trevor Evans Award, established by the Board of Governors in 1992 and first awarded in 1996, is made to authors of expository articles accessible to undergraduates and published in *Math Horizons*. The Award is named for Trevor Evans, a distinguished mathematician, teacher, and writer at Emory University.

Megan Martin, Cornelia A. Van Cott, and Qiyu Freda Zhang

"The Beauty of Halving it All," *Math Horizons,* 31:2, 14–17.
doi.org/10.1080/10724117.2023.2249357

In the article "The Beauty of Halving it All," the authors divide a triangle into equal areas with a straight line. They then consider the family of all lines with this property. This simple idea leads to an explosion of mathematically beautiful and intriguing illustrations, along with an endless stream of possible investigations. By extending this idea to cutting off a fixed proportion of the area, the reader is led on a journey involving envelopes, combinatorics, and differential equations. Dividing regular polygons instead of only triangles leads to more fascinating illustrations and even more questions. The authors have created a beautiful story that flows naturally from a simple idea to meaningful mathematics.

Response

We are thrilled to receive this award. Thank you! The three of us started working together on this project on Friday afternoons over Zoom during COVID. We particularly loved the many beautiful pictures and animations that arose during our investigation, and we hope that readers enjoy them, too. Many thanks to Tom Edgar, editor of *Math Horizons,* for his helpful support throughout the publication process.

Biographical Sketch

Megan Martin is a research associate at University of California, San Francisco, where she studies the effects of congenital heart defects on neonatal brain development using MRI. She received her BS in mathematics and chemistry at University of San Francisco. In the fall, she will begin her PhD in bioengineering at Stanford University.

Cornelia Van Cott is a professor of mathematics at the University of San Francisco, where she has been since 2008. She received her BS in mathematics

at Wheaton College (Wheaton, Illinois) and her PhD at Indiana University. Outside of teaching, Cornelia enjoys thinking about geometric topology and speaking about mathematics to all audiences from children to adults.

Qiyu Freda Zhang is currently a first-year graduate student studying at the University of Washington on track for a PhD in mathematics. She received her BS in math and physics at the University of San Francisco in 2023. Qiyu has been a teaching assistant since her early undergraduate years, and helped many students get a better understanding of various math concepts. She enjoys thinking about abstract concepts and attempting to understand such concepts visually. When she is not doing math, Qiyu likes observing the night sky and the movement of the stars.

Gung and Hu Distinguished Service Award

The Yueh-Gin Gung and Dr. Charles Y. Hu Award for Distinguished Service to Mathematics, first presented in 1990, consists of a cash prize of $5,000, a citation, and the recognition of the American mathematical community. As the endowed successor to the MAA's Award for Distinguished Service to Mathematics, first presented in 1962, this award is intended to be the most prestigious award for service offered by the Association. It honors distinguished contributions to mathematics and mathematical education–in one particular aspect or many, and in a short period or over a career. The initial endowment was contributed by husband and wife Dr. Charles Y. Hu and Yueh-Gin Gung. It is worth noting that Dr. Hu and Yueh-Gin Gung were not mathematicians, but rather a professor of geography at the University of Maryland and a librarian at the University of Chicago, respectively. They contributed generously to our discipline because, as they wrote, "We always have high regard and great respect for the intellectual agility and high quality of mind of mathematicians and consider mathematics as the most vital field of study in the technological age we are living in."

Michael Dorff

Brigham Young University

The Yueh-Gin Gung and Dr. Charles Y. Hu Award for Distinguished Service to Mathematics is the most prestigious award for service offered by the Mathematical Association of America (MAA). It celebrates contributions to the community that have influenced the field of mathematics in a significant and positive way.

Michael Dorff's service to mathematics has changed the face of undergraduate research. Thousands of undergraduates and their faculty research mentors have now experienced the joy of collaborative mathematical discovery, thanks to Dorff's work. With this award, we recognize his imaginative proposals for multiple grants, his diligence to ensure that those projects were successful in serving diverse populations, and his passion to draw others into this meaningful and inclusive enterprise.

Dorff's first signature achievement was founding the Center for Undergraduate Research in Mathematics (CURM) in 2007. Their website describes CURM as "an NSF-funded program that provides funding and training for academic-year undergraduate research groups in mathematics." With three NSF grants so far, and a fourth in progress, CURM has supported more than 300 faculty and 1,000 students across the United States for more than 15 years. The continuing health of CURM can be seen in its diverse board of directors/

co-directors, showing a successful transition from the founding leadership.

To share best practices from CURM, Dorff authored, with Allison Henrich and Lara Pudwell, the book, *A Mathematician's Practical Guide to Mentoring Undergraduate Research,* published by the American Mathematical Society. Letters from coauthor Henrich, CURM Director Kathryn Leonard, and Co-Director Alicia Prieto Langarica attest to the tremendous lasting impact that CURM has had in their lives and many others, including disproportionate numbers from groups traditionally underrepresented in mathematics. In 2015, CURM received one of two Programs that Make a Difference awards from the AMS, for its "significant efforts to encourage students from underrepresented groups to continue in the study of mathematics." It's easy to understand this choice.

With CURM safely up and running, in 2013 Dorff co-founded with Suzanne Weekes the program, Preparation for Industrial Careers in Mathematical Sciences (PIC Math). According to the MAA website, PIC Math "prepares mathematical sciences students for industrial careers by engaging them in research problems that come directly from industry." It does this by teaching faculty "how to make industry connections in order to provide research experiences for their students to work on real problems coming directly from business, industry, or government." One nominator's letter speaks of PIC Math's "huge impact," saying that in "the first five years of the program, there were 179 different faculty participants from 154 different U.S. universities/colleges located in 37 states and Washington D.C. and of diverse types of institutions, including 8 Historically Black Colleges and Universities and 12 Hispanic Serving Institutions. The PIC Math courses have had over 2,000 undergraduate students (41% female, 23% ethnic groups underrepresented in STEM)… [and] over 150 partners from business, industry, and government." Another writes that the courses the faculty develop and teach have "been shown to improve students' problem solving and critical thinking skills. Moreover, many PIC Math courses provide faculty members themselves with new skills." The program has been supported by the MAA, SIAM, NSA, and NSF.

In addition to his inspiring work to create new structures to foster undergraduate research, Dorff has held leadership roles in many other programs. The Regional Undergraduate Mathematics Conference (RUMC) program is not just a permutation of CURM, but an entirely different NSF funded and MAA- program that provides venues for the dissemination of undergraduate research. Dorff took on the directorship of this program from Douglas Faires, the founding director, in 2012. Transforming Post-Secondary Education in Mathematics (TPSE Math) is recognized for extraordinary efforts to increase access to mathematics among diverse populations. From 2021–2024 Dorff served as their executive director.

He has also contributed to the health of the international mathematical community by serving on the planning committee of the East African Centre for Mathematical Research (EACMaR). It seems almost an afterthought to say that Dorff served as President of the Mathematical Association of America for two years, 2019–20; of course, his devoted performance in that role has been praised enthusiastically.

The MAA is delighted and honored to present the Yueh-Gin Gung and Charles Y. Hu Award to Michael Dorff.

Response

I want to thank the many friends and colleagues who have served as role models for me. In my mind, they are equally deserving of this award because of the important service and activities they have done working in critical areas often without the recognition they deserve. They are my mathematical heroes who have given me the inspiration to do the activities I have done. Thank you!

Biographical Sketch

Michael Dorff is a professor of mathematics at Brigham Young University and a former President of the Mathematical Association of America (MAA). He earned his PhD from the University of Kentucky. He is interested in promoting mathematics to the general public, in math careers in industry and undergraduate research, and has given over 500 math talks and published over 80 articles about math research and education. He co-directs the MAA PIC Math program (Preparation for Industrial Careers in the Mathematical Sciences), was the executive director of TPSE Math (Transforming Post-Secondary Education in Math) and was the founder of CURM (Center for Undergraduate Research in Mathematics). He is a Fellow of the AMS, a CUR Fellow (Council on Undergraduate Research), and a Fulbright Scholar in Poland. He is married with 5 children. In any free time he has, he enjoys writing, exercising, and traveling (he has traveled to 49 U.S. states and over 60 countries).

Deborah and Franklin Tepper Haimo Award

In 1991 the Mathematical Association of America instituted Awards for Distinguished College or University Teaching of Mathematics to honor college or university teachers who have been widely recognized as extraordinarily successful and whose teaching effectiveness has been shown to have had influence beyond their own institutions. In 1993 the MAA Board of Governors renamed the award to honor Deborah and Franklin Tepper Haimo. Each year at most three college or university teachers are honored with this award. Recipients of the Haimo Award receive $1,000 and a certificate of recognition; recipients must be members of the Association (teaching in the U.S. or Canada). At least one of the Award recipients must be a current Section nominee. The Section nominee may be the current recipient of the Section Award for Distinguished Teaching or a previous recipient of a Section Award for Distinguished Teaching from any Section. At most one of the Award recipients may be other than a current or past recipient of a Section Award for Distinguished Teaching.

Candice Price

Smith College

Dr. Candice Price is recognized for her excellent teaching, for her support of students both in and out of the classroom, and for the impact of her contributions. She has helped us all to learn how to build welcoming, supportive classrooms and recognize the achievements of students of color at both the local and national level.

Within the classroom, Dr. Price is a devoted professor. She favors active teaching methods, with students learning from each other as well as from her, but much of her preparation involves setting the stage for success even before that teaching begins. "Her calm demeanor and focus on teamwork in the classroom create an environment where students feel safe to fumble as they push themselves to learn". "Dr. Price's consideration, patience, and powerful ability to articulate intricate mathematical concepts are key reasons why students not only gravitate towards her, but also grasp an enhanced understanding of math."

Dr. Price goes beyond the borders of her own classroom to engage the whole community in teaching conversations. In the book Radical Grace: Essays and Conversations on Teaching that she wrote with Dr. Miloš Savić, Dr. Price shares their own experiences and thought processes on creating a welcoming classroom by building relationships with students based on mutual

trust. She and four others—Dr. Jeannine Abiva, Dr. Syvillia Averett, Dr. Erik Insko, and Dr. Shannon Talbott—founded the Underrepresented Students in Topology and Algebra Research Symposium (ustars.org) more than 10 years ago when they were graduate students themselves. As suggested by the name and described on the website, the primary mission of USTARS is "to showcase the excellent research conducted by underrepresented students studying topology and algebra."

Dr. Price and the other founders, Dr. Erica Graham, Dr. Raegan Higgins, and Dr. Shelby Wilson of the website mathematicallygiftedandblack.com, know the power of personal stories. They have provided what are now hundreds of examples of excellence for students to look at and see what is possible and what they, too, can accomplish. In addition, Candice Price is the Director of the MAA Tensor SUMMA Program designed to encourage the pursuit and enjoyment of mathematics by students historically underrepresented in the field of mathematics."

The MAA recognizes Dr. Candice Price for her tremendous contributions to the mathematical community. Her warm inclusive classroom and programs have a significant impact on so many people, students, and teachers alike. "For students in her class, her teaching goes well beyond mathematics. She teaches students to be confident, to advocate for themselves, and to know that they belong in whatever space they want to thrive in."

Response

I first want to acknowledge that the land on which I have the privilege to work and live is the traditional and unceded territory of the Nipmuck and Pocumtuc Nations. I want to pay respect to the citizens of the Nipmuck and Pocumtuc Nations, both past and present, and their continuing relationship to their ancestral lands. It's important to me as a descendant of stolen and enslaved people to recognize and acknowledge that I am living and working on stolen land. It's important to me that I acknowledge that this land takes care of me and that I should take care of the land as well. I will be donating 20% of my award to the Native Forward Scholars Fund.

I am honored to be recognized with this award, one that signifies a lifetime achievement in teaching. In every classroom I step into, I hope my students know that I am actively working towards being anti-racist, denouncing white supremacy and its characteristics, and working towards being an advocate for all of them. I care about my students' growth and encourage their feedback; and I trust and believe them.

There are two ways to accept an award like this. Humbly stating it's undeserved: I wish I was special, but I'm a creep, I'm a weirdo. What the hell am I doin' here? I don't belong here… Or be braggadocious: I am legend, I feel like

all of y'all are peasants. I feel like all of y'all are desperate. I feel like all it takes is a second to feel like Mike Jordan whenever… But it would be disingenuous to react in either of these extremes. So I land in the middle. I am grateful for all of the support and guidance I have received to be a better person in the classroom. I cannot deny that much of my success is also fostered by my personality of kindness, patience, and grace. And that it's done with reflection, style, and humor. I recognize the privilege it is to have students, friends, and colleagues who have spoken my name in spaces I was not in and did the work to nominate me for this award. I am forever grateful. A special shout-out to Dr. RB McGee for nominating me for the NE section teaching award which is the catalyst for this prestigious award. I will never forgive you for this… thank you.

Biographical Sketch

I was born in Long Beach, CA but was raised in Sacramento. I am the daughter of Lauren Ann (neé Wilson) and William Dwight Price, and sister to the talented Talya Price, Geoffrey Price, and Jean Tashima. I am also the proud aunt of the brilliant Lyra Tashima Price. And very recently I gained the honor of becoming the mother to the charming Xavier Optimus Price.

I earned my bachelor's in mathematics from California State University, Chico, my master's in mathematics from San Francisco State University, and my doctorate from the University of Iowa. I am currently an associate professor in the Department of Mathematics at Smith College, where I am a co-director of the Center for Women in Math at Smith. My research area is primarily in the area of DNA topology but I am currently working in various areas of mathematical modeling. I am the Director of the MAA Tensor-SUMMA program, a co-director of the Mathematical Sciences Research Institute-Undergraduate Program (MSRI-UP), a co-founder and co-director of the website Mathematically Gifted and Black, and the co-founder and co-CEO of 619 Wreath Publishing LLC.

Deborah and Franklin Tepper Haimo Award

Jan Rychtář

Virginia Commonwealth University

Dr. Jan Rychtář completed his PhD in functional analysis at the University of Alberta, Edmonton, Canada and has held positions at two minority serving institutions, the University of North Carolina at Greensboro (UNCG) and Virginia Commonwealth University (VCU). He developed an extensive collaboration with Dr. Hyunju Oh to support their mentoring of undergraduate students at Bennett College, one of the only two HBCUs for women. His teaching, undergraduate research experiences, and mentorship have been transformative for his students and colleagues and have had an impact on the mathematics community more broadly.

One of his students writes, "If I could take one course again in undergrad, it would be with Dr. Rychtář. He will give 110% of his effort to make sure you have a positive and engaging class experience." One day in Dr. Rychtář's real analysis course when students were not getting the material, Dr. Rychtář. stopped the lecture to reassess where students were and started an impromptu review. "That was not only the day that I finally understood the difference between continuous and uniformly continuous, but I also finally understood that it is okay to not understand sometimes and admit so." Dr. Rychtář. uses real world data in his beginning undergraduate courses. Another student writes, "I took a Preparation for Industrial Careers in Mathematical Sciences (PIC) class with him. He arranged for the class to receive and analyze stop data from the Greensboro police in order to address concerns around racial profiling." Another writes, "Dr. Rychtar designed his class to foster a collaborative, interdependent, and inclusive environment between teams."

Dr. Rychtář has an exceptional ability to engage undergraduate students in research. He has worked with over 156 undergraduate students on research thus far in his career. Over 57% of these students are women, 19% are African American, 13% are Hispanic, and 8% are Pacific Islanders. Many of his research students identify themselves as the members of the LGBTQ+ community. He is a founding member of Undergraduate Research SIGMAA, a member of MAA's BIG committee and BIG SIGMAA. Dr. Rychtář is a co-editor of a book recently published by the MAA titled *Expanding undergraduate research in mathematics: making UR more inclusive*. He promotes mathematics amongst high school students and is a judge for international high school math modeling competitions on a yearly basis. He redesigned VCU's introduction to math biology course to include a full research experience. Dr. Rychtář attracted a wide variety of faculty members to mentor students in the

math-bio research programs. "The mentors encouraged a sense of community and teamwork that became foundational to the program and in which I always felt supported to grow and learn."

The MAA recognizes Jan Rychtář for the profound impact he has had on multitudes of students through his teaching and undergraduate research programs. We acknowledge the breadth of his positive impact among faculty colleagues through MAA programs and conferences. The MAA is honored to present him with the Deborah and Franklin Tepper Haimo Award for Distinguished College or University Teaching of Mathematics.

Response

Thank you! I am honored and grateful to be one of the award recipients. First, I would like to thank the MAA as a whole as well as all the individual members working tirelessly to make a huge difference in students' and teachers' careers, including my own. The MAA's core values, community, inclusivity, communication, and teaching and learning, provide endless inspiration. Incorporating these values into my classrooms and beyond has had a tremendous impact on my teaching. Second, I would like to thank all my former and current students. Through our interactions, they all helped me become a better teacher and mentor. I can only hope that I made a positive impact in their lives too. Third, a big thank you goes to many mentors that I was fortunate to learn from. I cannot name them all, but let me explicitly thank Drs. Mary Crowe, Michael Dorff, Hyunju Oh, my colleagues at VCU, and former colleagues at UNC Greensboro. They, and many others, have my deep gratitude for all the lessons they taught me. I can only aspire to be as good as them. Finally, I would like to dedicate this award to my family, Dewey and Walter. They are the loves of my life and I am so happy to be with them. Their constant support and encouragement are irreplaceable.

Biographical Sketch

Jan Rychtář is professor of mathematics and applied mathematics at Virginia Commonwealth University. He has bachelor's and master's degrees from Charles University in Prague, Czech Republic, and a PhD from the University of Alberta in Edmonton, Canada, all in mathematics. He started teaching at UNC Greensboro in 2004 and moved to VCU in 2019. Over his career, he has mentored more than 150 undergraduates in mathematical biology and game theory, including modeling disease prevention and elimination. When he is not teaching or doing mathematics, he enjoys spending time with his family.

Deborah and Franklin Tepper Haimo Award

Malena Español

Arizona State University

Dr. Español is a distinguished scholar-teacher who has taught at a wide variety of institutions in both the US and Argentina. She is a well-respected and highly influential researcher who uses her research and status to help as many students as possible find success in mathematics. Dr. Español is a remarkable educator in and outside the classroom, who cares deeply for the success and well-being of her students and who is hugely committed to removing the barriers for participation for all students, especially for women and members of other underrepresented groups.

Her work inside the classroom sets Dr. Español apart as an extraordinary educator. She is profoundly dedicated to infusing humanity into the classroom environment. She creates an immersive and interactive learning atmosphere that fosters intellectual growth through mastery grading, group work, engaging discussions on real-life applications, and final research projects. By contextualizing mathematical principles within the framework of real-world problems, she inspires her students to recognize their studies' tangible impact and appreciate the true beauty and utility of mathematics.

Outside of her institution, Dr. Español is highly active in promoting the wonders of mathematics to a wide variety of audiences. Some examples are her mini-course "Re-Imaging the World Through Linear Algebra" given to undergraduate students from the Americas for Mathematics Sin Fronteras, her talk "The Matrix Revolution: Data, Images, and Beyond" at the National Museum of Mathematics (MoMath) and her interviews for AMS' "Mathematical Moments" and "Meet a Mathematician," where she shared her passion for mathematics and her story as a first-generation college student.

What is especially noteworthy is Dr. Español's remarkable success in mentoring students, particularly through mathematical research. Dr. Español's dedication to mentoring extends to a diverse range of students, including high school students, master's students, applied math PhD students, and postdoctoral scholars. Her intentional efforts in fostering a supportive community within her research groups have led to remarkable successes among her mentees. This is best expressed by her research students.

"We must also highlight Dr. Español's efforts to demonstrate to her students that a mathematical career is possible for anyone. In class, she explained her own educational journey and made an effort to notify her students of relevant career and internship opportunities. We are especially proud of her work to make mathematics a more welcoming and diverse field, which we

experienced firsthand as part of her CURM team composed of students of a wide variety of educational and personal backgrounds, including community college students. She encouraged students to join ASU's chapter of AWM, and helped the chapter organize a trip to the first-ever Arizona Women's Symposium in Mathematics. Her passion for the important work of addressing the inequity in mathematics is inspiring."

Response

I am deeply honored and grateful to receive this prestigious award from the MAA. The MAA and its supportive community have played a pivotal role in shaping my journey, providing invaluable lessons and fostering meaningful connections. As a Project NExT (New Experiences in Teaching) Fellow and Ohio NExT participant, I found inspiration and camaraderie that significantly contributed to my growth. My involvement in MAA PIC Math (Preparation for Industrial Careers in Mathematical Science) and the PIC Math Workshop in Data Science also broadened my perspective and enhanced my teaching practices.

During my time at the University of Akron from 2012 to 2019, I had the freedom to incorporate capstone research projects into my classes, which became an integral aspect of my teaching philosophy. I want to express my gratitude to Kevin Kreider, whose remarkable teaching style deeply influenced mine. Now, as a faculty member at Arizona State University (ASU), I have the freedom to incorporate some of these practices and innovate in terms of content and style, and I am very grateful for that.

Mentoring students has been one of the most rewarding aspects of my career. I began mentoring students during my postdoc years at Caltech and then continued at the University of Akron and now ASU. I thank Pat Wilber and Dmitry Golovaty at the University of Akron for their mentorship and guidance. The three of us have mentored many undergraduate and graduate students, forming small research communities that became part of my academic family. I enjoy mentoring doctoral and postdoctoral students at ASU, something I haven't had before. Witnessing my mentees succeed and contribute to the field brings me immense joy. I also want to thank the AWM and SIAM communities, which have allowed me to create opportunities to mentor students beyond my institution, further expanding my academic family.

I humbly dedicate this award to my husband Agustin and my son Sebastian. Their support and presence have been my pillars of strength throughout my academic career. I also dedicate this award to my late father, Pedro Oscar Español, whose profound wisdom and unwavering support have been my guiding lights. My father instilled in me the belief that education serves as a powerful social equalizer, motivating me to pursue mathematics with the con-

viction that it is a tool to tackle any challenge. Additionally, he imparted the values of empathy, respect for all individuals, and a deep appreciation for the preciousness of life. This recognition is a testament to his enduring influence on my journey, and I am profoundly grateful for the invaluable lessons he continues to inspire me, even in his absence.

Biographical Sketch

Malena Español is an Argentine-American applied mathematician who is an assistant professor in the School of Mathematical and Statistical Sciences at Arizona State University. She holds a Bachelor's degree in applied mathematics from the University of Buenos Aires, along with a Master's and PhD in mathematics from Tufts University.

Prior to her current position, she completed a postdoctoral fellowship at the California Institute of Technology and later assumed a faculty role at The University of Akron, where she attained the rank of associate professor with tenure in 2018. She specializes in developing, analyzing, and applying mathematical models and numerical methods to address complex challenges in science and engineering focusing on materials science, image processing, and medical applications.

She has supervised over 60 undergraduate and graduate students in research projects and has mentored several more as part of the AWM mentor program and the Math Alliance. In 2018, she co-organized the Women in Mathematics of Materials workshop and co-edited the Springer AWM Series volume titled "Research in the Mathematics of Materials Science 2023", she co-organized AMIGAs, a summer program for graduate students in applied and computational mathematics. Additionally, she has served in several AWM and SIAM committees, and is currently a member of the Education Advisory Board at the Institute for Computational and Experimental Research in Mathematics (ICERM). Malena was named the 2022 Karen EDGE Fellow and is a visitor scholar of the Institute for Advanced Study.

Paul R. Halmos - Lester R. Ford Awards

The Paul R. Halmos-Lester R. Ford Awards recognize authors of articles of expository excellence published in *The American Mathematical Monthly*. The awards were established in 1964 as the Ford awards, named for Lester R. Ford, Sr., a distinguished mathematician, editor of *The American Mathematical Monthly*, 1942–1946, and President of the Mathematical Association of America, 1947–1948. In 2012, the Board of Governors designated these awards as the Paul R. Halmos–Lester R. Ford Awards to recognize the support for the awards provided by the Halmos family and to recognize Paul R. Halmos, a distinguished mathematician and editor of the *Monthly*, 1982–1986.

Dan Kalman and Robert Mena

"A Tale of Two by Two Matrices," *The American Mathematical Monthly,* 130:9, 837–854. doi.org/10.1080/00029890.2023.2242039

Using a set of matrices introduced in 1949 by Kjell Kolden as the thread, the authors of this article tell a tale that weaves together solutions and proofs across a wide range of problems and theorems. The tale begins and ends with quadratic equations that have long histories and to which the smallest integer solutions are large and impressively large. The matrices in question encode continued fraction expansions and enjoy multiple properties, including a unique factorization property. The authors show how to develop and use those properties, along with associated directed graphs and sequences, to provide efficient approaches to numerous results, ranging from standard ones commonly encountered by undergraduates to a well-ordering of the positive rationals. The infusion of bits of humor and history throughout makes reading this interesting article an enjoyable journey.

Response

We are deeply honored and grateful that our paper has been selected to receive the Halmos-Ford Award. Having a paper appear in the *Monthly* was in itself highly gratifying, not least because it allowed us to share a mathematical development showcasing the power and beauty of matrix methods. To see this work also recognized with a Halmos-Ford Award is both thrilling and humbling. Throughout a friendship and collaboration spanning thirty years, we have shared an appreciation for and fascination with matrix analysis. Somehow, when mathematical structures are represented using matrices, the notation seems to reveal hidden and surprising properties and methods. In the current work, a humble semigroup of 2 by 2 matrices leads us very nat-

urally to new perspectives on classical results in Diophantine equations. We wrote this paper with the hope of bringing these perspectives to a broad audience of readers of the *Monthly*. The Halmos-Ford Award offers the possibility of extending that audience still further. For this we are truly grateful. Indeed, we thank the editors, referees, and production team of the *Monthly* for their efforts on behalf of expository mathematics, we thank the many committee members whose efforts make it possible to recognize all of the authors receiving awards here today, and more broadly, we thank the MAA for supporting publications and award programs that enrich our profession.

Biographical Sketches

Dan Kalman and **Robert Mena** have been friends, colleagues, and coauthors since the late 1980's, when Mena was a new department chair at Cal State Long Beach and Kalman was a member of the technical staff at the Aerospace Corporation. They share an appreciation of discrete mathematics, number theory, and the history of math, with a special affinity for matrices. With another coauthor, Shahriar Shahriari, they won an Allendoerfer award in 1998. Now retired after teaching for 30 years and 48 years, respectively, they continue to enjoy studying, talking about, and writing about mathematics. Among their non-mathematical pursuits, Kalman solves crossword puzzles and Mena solves acrostics.

Eli M. Hicks, R. Andrew Hicks, Ron Perline, and Sarah G. Rody

"Frobenius Integrability, Automotive Blind Spots, Non-reversing Mirrors, and Panoramic Mirrors," *The American Mathematical Monthly,* 130:3, 251–266.
doi.org/10.1080/00029890.2022.2157659

Inverse problems are ubiquitous throughout science, engineering, and mathematics. Given a prescribed set of data, can one determine the system, mathematical or otherwise, which produced such data? Given a prescribed image reflected through a mirror, can one determine the mirror that realizes such an image? In this engaging article, the authors take us through a series of inverse problems in geometric optics. Using the language of multivariable calculus and linear algebra, the authors give an accessible discussion of planar distributions, the Frobenius Theorem, and how such mathematical tools can be used for physically relevant problems. Lively diagrams and elucidating photographs bring the geometric study of automotive blind spots and mirrors of all types to life. The discussion of historical and technological context sprinkled throughout the article is sure to motivate the reader to delve deeper into the study of optical design. Likewise, the hints at deeper mathematical ideas of projective and differential geometry are sure to motivate further study of geometry and mathematics more generally.

Response

We were pleasantly surprised and deeply honored to learn that our paper had been awarded the Paul R. Halmos - Lester R. Ford Award. This recognition holds significant meaning for us. We are sincerely grateful to the MAA and the Halmos-Ford committee for acknowledging our work. Additionally, we extend our thanks to the *Monthly* editorial staff and referees for their invaluable feedback throughout the review process, which greatly enhanced the clarity, rigor, and overall quality of our paper. One of the aims of our article was to alert the mathematical community to some of the recent developments in optical design. Historically, optical designers were constrained to using mainly spherical surfaces, due to the significant difficulty and cost associated with fabricating any other shapes. Consequently, designers hesitated to address optical problems involving, for instance, partial differential equations, as it would be unlikely that the corresponding solutions could be physically realized. However, with advancements in fabrication techniques in the late 1990s, the creation of optical surfaces of any shape became feasible. This has

opened up new possibilities in optical design, along with a slew of mathematical problems.

Biographical Sketches

R. Andrew Hicks graduated from Queens College CUNY in 1988 with a BA in mathematics. He received his PhD in 1995 in mathematics from the University of Pennsylvania, with a thesis titled "Group Actions and the Topology of Nonnegatively Curved Four-Manifolds." From 1996 to 1999, he was a postdoc at the UPenn GRASP laboratory, where he developed panoramic vision systems for the control of mobile robots. Currently, he is a professor of mathematics at Drexel University.

Eli Hicks is a sophomore studying engineering science at The Cooper Union. His interests include art and organic chemistry.

Ron Perline received his undergraduate degree from UC Santa Cruz, and his PhD from UC Berkeley. He returned to Santa Cruz as a Visiting Assistant Professor, and then joined the math faculty at Drexel University. He is interested in applied mathematics in various contexts, including integrable systems and differential geometry, and (of course) mirror mathematics.

Since graduating from Drexel in 2017, **Sarah Rody** has been teaching at Chestnut Hill College where she is now the chair of the math department. She loves teaching everything from Calculus to Senior Seminar and watching her students grow into mathematicians. When she's not doing math, she likes to knit and play Ultimate Frisbee.

Paul R. Halmos - Lester R. Ford Awards

Rafael López

"What Is the Shape of a Cupola?" *The American Mathematical Monthly,* 130:3, 222–238. doi.org/10.1080/00029890.2022.2154557

A famous problem from the early history of differential equations is that of determining the shape of a hanging chain, (or, equivalently, the shape of an arch that will stand under its own weight with only tangential forces). This beautiful article considers a natural generalization of this problem, to determine the shape of a (suitably idealized) hanging surface, or the shape of a cupola or dome which will stand under its own weight. We learn that Poisson analyzed this problem in depth in a paper of 1812, but that, surprisingly, this and other work was "apparently nearly forgotten until the 1980s." The author takes us through the analysis of the simplest case, carefully minimizing any prerequisites from differential geometry or the calculus of variations. In the process, we see a beautiful application of central concepts in those subjects. We are also treated to interesting connections to the work of architects, in particular the work of Antonio Gaudí. The author closes with a new design for a roof, whose rotational axis of symmetry is horizontal rather than vertical.

Response

I am very pleased and honored to receive a Paul Halmos - Lester Ford Award from the MAA. The fact that the *Monthly* is a high level journal that publishes articles that combine both research in mathematics and accessibility to a broad audience makes this award especially meaningful. This article arose when I was studying articles from the 1980s about the two-dimensional analogue of the catenary: what is the shape of a surface that hangs on its own weight. I already knew, as often happens in mathematics, that a problem in dimension 1 has a known solution (in this case, the catenary), but that in higher dimensions, there is no explicit solution. But this problem held more surprises for me. The first is that the equation of the ideal model was already derived by Poisson in the 19th century. This shows us that we always have to go back to the sources. A second surprise is that the solutions could be applied to architecture, being models of roofs and domes. Some of us mathematicians are sometimes concerned about whether what we do is useful to others. And it was a greater surprise for me to learn that the Spanish architect Antonio Gaudí, who did not know the equation of the mathematical model, was already making his own experimental models for the cupolas of the Sagrada Familia in Barcelona. Finally, my last surprise that I wanted to share

with *Monthly* readers is, as we prove in the article, that there are rotational solutions of the equation (cupolas) whose rotation axis is horizontal, contrary to intuition.

Biographical Sketch

Rafael López is a professor of mathematics at the University of Granada where he received his PhD in 1996. His research interest is differential geometry, including elliptic equations, relativity and variational problems in physics. Rafael enjoys performing mathematics outreach activities in schools using soap bubbles and, in his free time, he loves trekking and bicycling in the Sierra Nevada.

Paul R. Halmos - Lester R. Ford Awards

Andrew M. Bruckner, Judith B. Bruckner, and Brian S. Thomson

"Can One Visualize a Continuous Nowhere Differentiable Function?," *The American Mathematical Monthly*,, 130:3, 214–221.
doi.org/10.1080/00029890.2022.2154555

Although a continuous nowhere differentiable function (aka a "monster") is a classic example in introductory analysis texts, it is not very easy to visualize. The authors offer a geometric approach, using all non-vertical lines in a special way, to avoid the computational and visual complications of using infinite sums of functions for constructing monsters. Historical examples and the geometry of "typical" continuous functions are discussed. This lively paper will certainly give mathematicians at all levels a chance to reevaluate their visual concept of a continuous nowhere differentiable function.

Response

We were surprised and honored to learn that we are recipients of the Paul R. Halmos - Lester R. Ford Award. We decided to write this paper when we discovered many questions and answers posted online about continuous nowhere differentiable functions. A number of these posts illustrated various misconceptions about the behavior of such functions. What made them nowhere differentiable? Some posts provided a popular picture showing a stage of the construction of the Weierstrass example. This was a source of misconceptions—the picture suggested "corners everywhere," a feature no function possesses. We felt it would be helpful to describe the graphs of most continuous functions. We find them interesting and basically "all the same."

Biographical Sketches

Judith B. Bruckner obtained her PhD in mathematics from UCLA in 1960 with a dissertation in the field of Riemann Surfaces. She worked in industry in the areas of pattern recognition, computer design, and operating systems. She has taught at several colleges and collaborated in the publication of papers and books, mostly in real analysis.

Andrew M. Bruckner obtained his PhD from UCLA in 1959 and joined the faculty at UCSB that year. He retired from UCSB in 1994 as Professor Emeritus. Through 1990–1994 he served as an editor for the *AMS Proceedings*. In 2013 he was elected as a Fellow of the American Mathematical Society. The Andy is an award given each year at the annual Symposium in Real Analysis, which is organized by the Real Analysis Exchange.

Brian S. Thomson received his mathematical training at the University of Toronto and the University of Waterloo. In 1968 he joined the faculty of the newly-created Simon Fraser University on the west coast of Canada. He has served on the editorial boards of the Real Analysis Exchange and the *Journal of Mathematical Analysis and Applications*. In 2021 he was the recipient of the MAA Halmos-Ford Award for an article he published in the *Monthly* and he is delighted to share a second award with his two favorite collaborators, Andy and Judy Bruckner.

MAA Award for Inclusivity

This award is given annually to a person or persons (not a program) who has performed significant, sustained work to broaden access to mathematics. The award may be made based on one or several activities that exemplify inclusivity and embrace and affirm diversity. The contribution should be such as to influence the community and culture of mathematics or mathematical education in a significant and positive way on a national scale or have that potential.

José María Menéndez

Pima Community College

Menéndez first earned a degree in teaching mathematics and physics at the secondary level from the Universidad Centroamericana in El Salvador. Then he went on to earn a BS in math from LSU and an MS and PhD in applied mathematics from Virginia Tech. After a three-year post-doc at the Center for Mathematics Education of Latinos/as (CEMELA) and two years at Radford University, he settled down at Pima Community College in Tucson, Arizona in 2011.

During Menéndez's post-doc at CEMELA, he studied the role of language and culture in mathematics education, publishing several papers and giving presentations on his work. He continued pursuing his scholarly passion for understanding what creates an equitable classroom through his work on an NSF-funded project through the University of Arizona. The grant explored how math problem-solving course and mentoring affect the performance and persistence of students from two-year Hispanic Serving Institutions (HSIs) before and after their transfer to a four-year institution. He worked as co-principal investigator on the second iteration of that grant, *Active-learning learning for 2-year HSI students and 4-year transfers: Faculty development, and impact on students' attitudes, math performance, and persistence (NSF #1644899).* According to the principal investigators, "This project was aimed at exploring the effectiveness of a successful, evidence-based, university-level, precalculus problem-solving course, in a new context, and for a new purpose: improving performance and persistence of 2-year HSI students, before or after transfer to the university. More generally, this 'problem-solving + mentoring' project sought to infuse equity in the transition from 2-year Hispanic Serving Institutions (HSIs) to the university."

Menéndez has presented at the JMM, most recently on "Promoting equity through active learning in undergraduate mathematics: Precalculus." His recommender notes that he is a frequent presenter at the American Mathematical

Association of Two-Year Colleges (AMATYC) conference, and his scholarship was highlighted by AMATYC in their MathAMATYC Educator in May 2017. Also in 2017, Menéndez co-authored the book *Reflecting the World: A Guide to Incorporating Equity in Mathematics Teacher Education.*

Response

I am honored and grateful for being recommended and receiving the MAA Award for Inclusivity. There is still so much more to learn and more work to do in our communities to make everyone feel that they belong in our mathematical spheres: work, school, and society in general. I was lucky to have wonderful opportunities and experiences that helped me develop some sensitivity in the matter.

Before starting my teaching program, I was involved with the Marist Brothers' youth group whose motto was El que no vive para servir, no sirve para vivir (who does not live to serve, is not useful to live). One of the activities in the program was a week-long immersion in a poor community, in my case it was a rural community, and we would visit as many households as we could and listen to their stories, work with them, and learn from their realities. Those experiences carried on, and probably helped me get a position as a post-doc fellow for the Center for Mathematics Education of Latinos/Latinas (CEMELA) at the University of Arizona, where a large part of my research and service was working with Latino parents of middle school students at a local public school. Listening and learning from their mathematical knowledge and their perceptions on schools and schooling in the U.S. informed a lot of my work. Indeed, I feel I have gained from these experiences mentioned in the citation more than what those people I worked with gained from my work. As I continue walking this path, I am also thankful for the ongoing professional development opportunities at work. I just hope that the best impact I make is through the lives of the students that I teach at Pima Community College.

Biographical Sketch

José María Menéndez was born in El Salvador and grew up between the family farm and the city for schooling. After finishing his teaching degree, he moved to Baton Rouge, LA, to complete his bachelor's degree in mathematics at LSU. After finishing his doctoral studies in mathematics from Virginia Tech under the supervision of Martin Day, José María was a postdoctoral fellow at the Center for Mathematics Education of Latinos/Latinas (CEMELA) at the University of Arizona. José María joined the mathematics faculty of Pima Community College in 2011 where he teaches classes from developmental math to calculus. Prior to Pima, he was an assistant professor at Radford

University, in Virginia, teaching classes for the teacher preparation program, mostly. His interests include incorporating social justice in mathematics education and using collaborative learning.

George Pólya Awards

The George Pólya Awards, established in 1976, are made to authors of articles of expository excellence published in the *College Mathematics Journal*. The awards are named for George Pólya, who was a distinguished mathematician, well-known author, and professor at Stanford University.

Damiano Fulghesu, James A. Sellers, and Courtney K. Taylor

"Infinite Families of Infinite Series With Integer Sums," *The College Mathematics Journal,* 54:1, 33–43. doi.org/10.1080/07468342.2022.2160611

In the article, "Infinite Families of Infinite Series With Integer Sums" by Damiano Fulghesu, James A. Sellers & Courtney K. Taylor, the authors have created a splendid deep dive into a topic that many of our students, even at the calculus level, find curious: infinite series that actually converge! And while everyone is rightfully fascinated by an infinite series when the series converges to a number involving our faithful companions π or e, we are even more puzzled and delighted when the sum, with a liberal dose of magic, turns out to be an integer. Here, though, the authors do not merely pull away a curtain to reveal a value that just magically turns out to be the sum; the authors lead the reader on a journey of discovery to construct their own convergent infinite series with an integer sum. It's a journey that an introductory level mathematics student and an experienced faculty member can enjoy, separately or even together. And, it's a journey that a current or future teacher can appreciate and from which extract nuggets of joy for a classroom experience.

Beginning with a discussion of familiar power series from calculus, the article moves through Worpitzky numbers with the tools of the "$x(d/dx)$" operator and induction to conclude that for every integer between 26 and 2420, there is an infinite series in the constructed family that converges to the given integer. The authors then sweep the reader back to the 14th century work of Oresme and Swineshead on $\sum_{n=1}^{\infty} n\left(1/2\right)^n$ (spoiler alert: it converges to 2) to develop notation, tools, and results that show that there is an infinite series converging to your favorite positive integer, and even manage to pull the Golden Ratio into a collection of infinite series that each converge to an integer.

In short, "Infinite Families of Infinite Series With Integer Sums" is an incredibly fascinating excursion that many of our calculus students, future teachers, and current faculty members can enjoy, and one that can satiate some of our curiosity about converging infinite series – curiosity that we oftentimes can't stop to explore during a crunched calculus sequence. At the same time, the contagious energy and enthusiasm of the authors is conveyed

clearly underneath the content, supporting the investigation and development of the curious series under consideration and also inviting the reader to keep thinking about this topic even after the article has concluded.

Response

We are truly pleased and grateful to be chosen to receive a George Pólya Award. This article arose in an extremely organic manner, fueled by talks given at the MAA Indiana and North Central Sections along with subsequent dialogue, much of which took place electronically during the COVID pandemic. All three of us share a common interest in the teaching and learning of convergent infinite series, which provided the spark needed to bring this paper to fruition. The completion of this work proved to be an extremely enjoyable experience. This material has historical roots dating back to the insights of Jacob Bernoulli and Leonhard Euler, and some of the work herein relies on their original approach to convergent infinite series. Of course, there is also a modern take on the material. Our overarching goal was to think about questions related to infinite sums that result in integers, with an eye towards making the material approachable and, simultaneously, interesting to our students. We hope that this work will motivate students and faculty alike to think about these ideas more fully. We also hope faculty will consider including some of these sums in their calculus courses. As longtime members of the MAA, it is exciting to publish a paper in the College Mathematics Journal, and we thank the Pólya Award selection committee for this wonderful honor.

Biographical Sketches

Damiano Fulghesu has been a professor of mathematics at Minnesota State University Moorhead (MSUM) since 2010. In 2005, he received his Doctorate from Scuola Normale Superiore in Pisa, Italy. He then held post-doctoral fellowships at the University of Missouri in Columbia and the University of Strasbourg in France. In 2010, he joined the Department of Mathematics at MSUM as an assistant professor, where he became a full professor in 2022. He enjoys supervising undergraduate research projects and the participation of students in mathematical competitions. His research interests lie in algebraic geometry and intersection theory.

James Sellers received his BS from the University of Texas at San Antonio in 1987 and his PhD from Penn State University in 1992. Over the last 30 years, he has taught at Cedarville University, Penn State University, and the University of Minnesota Duluth. James has published more than 125 research papers and has dedicated much of his career in service to the mathematical

community. This includes his service as Secretary of the MAA which he completed in 2022, as well as his current work as the Information Officer for the MAA North Central Section. When he's not thinking about infinite series or research in number theory, you can often find James playing Candy Crush; as of now, he has completed more than 14,000 levels of the game.

Courtney K. Taylor serves as the Provost of Anderson University. He received his PhD from Purdue University for work in algebraic topology. He was chair of the Anderson University Department of Mathematics, during which he was involved in a variety of collaborative institutional projects and strategic initiatives. His publications include an open access abstract algebra textbook, and he greatly enjoyed overseeing a multi-year undergraduate research project concerning the geometry of polynomials.

George Pólya Awards

William Dunham

"Bryn Mawr College Matriculation Exams from a Century Ago," *The College Mathematics Journal,* 54:2, 83–89. doi.org/10.1080/07468342.2023.2189820

Professor William Dunham's background as an accomplished historian of mathematics is evident in this very readable and enjoyable selection of examples from Bryn Mawr College's "Matriculation Exam" over the years 1890-1922.

In 2012 the Bryn Mawr Mathematics Department won the AMS Award for an Exemplary Program or Achievement in Mathematics (Notices, May 2012). The article cited the outstanding work done in producing female mathematics majors and graduates, among other achievements. Professor Dunham's article seems, therefore, especially appropriate, illustrating a long history of challenging women in undergraduate mathematics.

In this well-written article Professor Dunham demonstrates the range of mathematical skills that students of the time should have, from non-trivial arithmetic to Euclidean geometry, basic trigonometry, and intermediate level algebra, such as the challenge to

> Determine a so that $x-1$ shall be a factor of $x^3+ax^2+2ax-4$.

Among the examples he cites are simplifying a messy improper fraction for arithmetic and simplifying radical expressions from algebra. He notes that applications of the quadratic formula appeared often but that graphing of equations appeared nowhere.

Word problems are "easily identified (then as now) by their contrived, artificial nature." One time/rate/distance word problem is cited: it features the proverbial two trains with lengths in the ratio of 5:6 and traveling at speeds measured to three decimal places!

The author notes a demand for more knowledge of geometry than would be typical today, and cites an especially challenging problem:

> Prove that the area of a triangle is $\sqrt{s(s-a)(s-b)(s-c)}$, where $2s$ is the perimeter of the triangle.

This is Heron's formula!

The reader will enjoy the selection of examples, and several solutions, that Professor Dunham provides, and, like the example just cited, be sometimes amazed at the mathematical skills demanded on the exam.

Dunham notes that subjects other than mathematics appeared on these Matriculation Exams. "The tests covered an array of subjects, from Greek and

Roman history to English literature. The young women were asked to translate Homer's Greek and Virgil's Latin, even as they had to demonstrate familiarity with modern languages, chemistry, biology, etc." The author shares some examples of the non-mathematical exam questions. These, along with the mathematics he illustrates, show that the expectations of entering students at this exclusively women's college were truly amazing.

This well-written historical exposition will interest any reader and could be useful for in-class examples or could provide reading and work for an undergraduate mathematics club. The award committee is charged with selecting "outstanding expository articles published in the College Mathematics Journal." A reader will undoubtedly agree with the committee's assessment.

Response

Many thanks to the MAA for the 2024 Pólya Award. I never had more fun writing an article. With the assistance of Bryn Mawr librarians Eric Pumroy, Marianne Hansen, and Allison Mills, I found myself in the college archives, thumbing through yellowed matriculation exams from days of yore. These were the in-house admissions tests of the time. And they were horrifying. Candidates seeking admission to Bryn Mawr might be asked to inscribe a square in a semicircle with a compass and straightedge (try it!) or to prove Heron's formula for the triangular area (have a lot of paper handy). They might have to establish intricate trig identities or solve strange problems from solid geometry. And, once the math was done, they'd still have to translate Latin poetry, write intelligently about the essays of John Ruskin, and identify major battles from the Punic Wars. In short, applicants had to be extremely well-educated just to get into Bryn Mawr. Knowing that I would have stood no chance of passing a matriculation exam, I came away mightily impressed by these bright young women of long ago.

Biographical Sketch

William Dunham is a historian of mathematics who has written four books on the subject: *Journey Through Genius, The Mathematical Universe, Euler: The Master of Us All,* and *The Calculus Gallery.* He was the MAA's George Pólya Lecturer from 2014 to 2016 and is featured in the Teaching Company's DVD course "Great Thinkers, Great Theorems." Most recently, he co-edited an anthology from Cambridge University Press titled *The G. H. Hardy Reader.*

Since Dunham retired from Muhlenberg College (emeritus, 2014), he has held visiting positions at Harvard, Princeton, Penn, Cornell, and at Bryn Mawr College, where he now is a research associate in mathematics.

Annie and John Selden Prize

The aim of this prize is to promote and recognize research in undergraduate mathematics education (RUME). It is to be given every other year to a researcher who has been in the field at most ten years; that is, it has been at most 10 years since her/his PhD. in mathematics education, or for those not holding a doctorate in education, since publication of her/his first paper in RUME. The recipient should have a significant record of published work in RUME, normally several articles in reputable journals, or in *Research in Collegiate Mathematics Education* (which is refereed like a research journal).

Daniel Reinholz

San Diego State University

Dr. Daniel Reinholz received his doctorate from UC Berkeley in 2014 and his subsequent scholarly productivity, impact on the field, and external funding reflects that of someone in the profession for decades. He has 68 refereed journal articles (most of which appear in our field's most top tier journals) and over 6 million dollars in external funding. In 2020 he received the NSF's Early Career Award, which is arguably one of the most prestigious grants. Dr. Reinholz's early career was grounded in undergraduate student thinking, focusing on how students develop deep disciplinary knowledge in mathematics. This early work also drew attention to how meaningful learning opportunities are not equitably distributed amongst students, which then led to deeper developments in Dr. Reinholz's scholarly focus on equity. Dr. Reinholz's equity-focused research uniquely balances fine-grained qualitative and quantitative approaches and has pushed the field forward by documenting the ubiquity of racial and gender inequities in classroom participation, highlighting how similar patterns of marginalization reproduce themselves across hundreds of undergraduate classrooms in various settings. Foundational methodological progress was made possible through Dr. Reinholz's development of the Equity Quantified In Participation (EQUIP) observation tool. EQUIP allows researchers to track patterns of student participation in classroom practice and disaggregate data by a variety of social markers (e.g., race, gender, disability). The EQUIP app currently has over 2500 registered users with a national network of scholars who are utilizing EQUIP to support pre-service teachers, in-service teachers, community college instructors, and university faculty. Dr. Reinholz is a tireless champion of equity in the classroom, and a truly unique innovator who has used his experience, originality, creativity and dedication to deliver ground-breaking innovation. Recognizing Dr. Reinholz through the

Annie and John Selden Prize is a special opportunity to amplify the importance of the core principles of RUME—quality, originality, innovation, and genuine life-changing impact.

Response

I am humbled and honored to receive this recognition. I have always felt at home in the RUME community, and I still remember meeting Annie and John at my very first RUME conference over a decade ago. To my mentors, colleagues, and collaborators, thank you for your unwavering support and invaluable guidance. Your wisdom, encouragement, and constructive feedback have shaped my journey and helped me navigate the challenges along the way. To me, this accomplishment speaks to the dedication and resilience of our community. We are committed to a common purpose, to improve mathematics education so that more students can experience the joy, beauty, and wonder of our discipline.

In accepting this award, I am reminded of the responsibility that it comes with to continue striving for excellence, to pay forward the support and encouragement I have received, and to remain committed to improving the student experience in mathematics. I also thank my family and friends from the bottom of my heart, this never would have been possible without you!

Biographical Sketch

Daniel L. Reinholz, PhD, is an associate professor in the Department of Mathematics and Statistics at San Diego State University. Dr. Reinholz engages in transformative research on classroom equity in postsecondary mathematics. This work has been organized around the development of the EQUIP methodology, which focuses on generating actionable data to illuminate the subtle and sometimes invisible patterns that play out in classroom participation (by race, gender, disability, etc.). These data can be incorporated into robust professional learning opportunities through equity learning communities that support instructors to transform their teaching. Beyond the classroom, Dr. Reinholz is a co-founder of Sines of Disability, which aims to disrupt ableism and make mathematics more inclusive. Dr. Reinholz also serves as a Working Group Leader in the Accelerating Systemic Change Network, which aims to catalyze sustainable and scalable changes to STEM higher education. This work involves developing new models grounded in organizational change, and helping STEM departments build their own capacity for change. Dr. Reinholz has published over 70 refereed journal articles, and is the author of the recent book, *Equitable and Engaging Mathematics Teaching: A Guide to Disrupting Hierarchies in the Classroom*.

Daniel Solow Author's Award

This annual award recognizes the author(s) of undergraduate mathematics teaching materials, which may comprise a textbook, lecture notes, computer software, web-based learning materials, video lectures, or other materials, as approved by the Council on Prizes. The primary criteria for selection will be … *by the material's impact on undergraduate education in mathematics and/or the mathematical sciences (operations research, statistics, computer science, applied* mathematics). The award was proposed and funded by Daniel (Danny) Solow, professor in the Department of Operations at the Weatherhead School of Management at Case Western Reserve University and long-time member of MAA.

Joel David Hamkins

Proof and the Art of Mathematics: Examples and Extensions. MIT Press. 2021. ISBN: 9780262542203

Proof, the primary and most characteristic form of advanced mathematical discourse, consists of convincing narratives in support of claims of truth about mathematical objects and their relationships. And for nearly a generation now, an increasing number of colleges and universities have built into their curricula a "First Proofs" course, designed to offer students both an appreciation of the nature and me-chanics of mathematical proof as well as training in writing up proofs of their own. Textbooks that support such courses have proliferated. Many of these are designed with a focus on building an appreciation in the student for the logical structure of a valid argument. For instance, many such books begin with a smattering of propositional and predicate logic, then look to provide straightforward examples of theorems whose proofs allow students to practice a variety of proof schemes.

In contrast, Joel David Hamkins' *Proof and the Art of Mathematics* is a textbook that, according to one recommender, is "organized around mathematically rich topics rather than methods of proof, allowing students to learn to write proofs with material that is itself intrinsically interesting." Another recommendation continues: "Beyond proof writing skills, the students learn about graph theory, the theory of games, and infinity, … a much wider variety of topics" than in other textbooks. The book even in-cludes a section on proofs without words, illustrating"—literally!—"the power of figures and diagrams to communicate mathematical ideas."

Hamkins operates from the perspective that mathematics is a creative activity, and that proof writing is a craft, the art of responding to the wonder and

amazement that learning mathematical truths induces by creating a meaningful explanation for these phenomena. This amazement compels students to develop their own "convincing narratives" with elegance and precision. After sharing a wide variety of "theorems that are interesting to a general audience" with his readers, Hamkins offers them engaging exercises of progressively more challenging complexity, "interlaced with intriguing historical comments [and] insightful remarks about the creative process of mathematics." These exercises sometimes include problems in which "students are asked to criticize a proof, which [they] enjoyed" doing. According to one recommendation, Hamkins provides "a look behind the curtain at the workings of the mind" of a mathematician; how one may "wander a bit before coming up with a [full] proof, and might go down a few wrong roads before we find the right one," and he shows that "there can be many ways to prove the same theorem." Each section of the book ends with a summary list of "mathematical habits" that should guide students' strategies for future proof writing.

As for the impact that the textbook had on students, one writer reported that "students were amazed with the variety of topics, often sharing that they had not realized that math had so many different faces and [involved so many] different ways of thinking." Another used the book with students out-side the mathematical sciences and realized that it served as an exemplary recruitment tool for math-ematics at the research level. Another mentioned that "[their students'] view of mathematics changed completely after taking the course, as they had previously not known the deep philosophical issues that arise in mathematics, especially around [the concept of] infinity." A third remarked that "one learns to write proofs well by seeing many well-written proofs, and *Proof and the Art of Mathematics* is chock-full of beautifully written proofs. … It develops the skill of proof writing as mathematicians actually practice it; the emphasis is on writing clearly and well, and on communicating intuition."

The MAA is happy to recognize Joel David Hamkins of the University of Notre Dame for his innovative and beautifully written textbook, *Proof and the Art of Mathematics.* Congratulations on being the 2024 recipient of the MAA Daniel Solow Award!

Response

One of the great pleasures for any mathematician is to share the fascination and wonder of mathematics with those who are eager to learn it—to teach aspiring mathematical minds the art of mathematics, watching as they bend the logical universe to their purpose for the first time. They bring one idea into reactive contact with another, and we observe a carefully controlled explosion of insight, an Aha! moment, the natural consequence of clear and correct mathematical proof.

What a joy it has been for me to experience these moments with my students using my book Proof and the Art of Mathematics, and I am truly honored by the recognition of the Daniel Solow Award for this book. I am so glad to learn that others have understood so well what I was trying to do with the book and that they also have benefitted from it.

The book is filled with theorems, good solid theorems, theorems which even experienced mathematicians find compelling, but all of them are amenable to elementary proof. I find it an ideal context for teaching the craft of proof writing, showcasing a range of proof methods and styles. Many theorems are proved several times in completely different ways, using different argument methods that engage the problem from totally different perspectives. One thus realizes how a mathematician's mind expands. Every chapter ends with a discussion of various mathematical habits of mind, tidbits of wisdom on how to be a mathematician. State claims explicitly, not only for the benefit of your readers but for the clarity of your own conceptions. In your mathematical thinking and analysis, Use metaphor, which can provide a scaffolding of thought for otherwise difficult or abstract mathematical ideas. For mastery and insight, Express key ideas several times in different ways, thereby exploring your concepts more thoroughly. In every mathematical context, have favorite examples, for they provide a playground of test cases to deepen understanding. For a taste of the book, let me ask you: If two polygons have the same area, can you cut the first with scissors into finitely many pieces that can be rearranged exactly to form the second? You'll find out in chapter 10. What about a square and circle of the same area, allowing cuts along curves? What about higher dimensions?

Biographical Sketch

Joel David Hamkins is an American mathematician and philosopher, the O'Hara Professor of Logic at the University of Notre Dame, studying the mathematics and philosophy of the infinite, investigating topics from large cardinal set theory and forcing to infinite computability and the theory of infinite games. He is currently serializing several new books with weekly chapters on his substack, *Infinitely More* (www.infinitelymore.xyz), including *The Book of Infinity,* an exploration of all things infinite. Hamkins was formerly professor of logic at the University of Oxford and affiliated for many years with the City University of New York.

T. Christine Stevens Award for Leadership Development

The MAA's four core values—community, inclusivity, communication, and teaching and learning—clearly explain what's important to us. Named in honor of the co-founder of MAA Project NExT, the MAA T. Christine Stevens Award for Leadership Development is the Association's recognition of the importance of professional development that seeks to build leadership capacity. It is to be awarded annually to a person or persons who has (have) performed significant, sustained work to cultivate and strengthen leadership skills within the mathematical sciences, across the full range of professional activities. The award shall be based on one or several activities that are meant to inspire future or current leaders who are committed to MAA's mission, values, and vision. The contribution should be such as to influence the community and culture of mathematics, statistics, or mathematics education in significant and positive ways on a national scale or have that potential. Rather than being a career or retrospective award, this award celebrates effective leadership efforts and encourages the awardee to sustain their efforts.

Jesús De Loera

University of Caifornia, Davis

Dr. Jesús A. De Loera's career as a professor of mathematics at the University of California, Davis, spans over 25 years, marked by groundbreaking contributions, impactful mentorship, and a steadfast commitment to diversity and inclusion in the mathematical sciences.

Dr. De Loera's journey in academia began with the pursuit of a PhD in applied mathematics at Cornell University, laying the foundation for a career characterized by academic rigor and innovation. His research has not only advanced the frontiers of mathematical knowledge but has also provided inspiration and guidance to emerging mathematicians.

A defining aspect of Dr. De Loera's career is his commitment to mentorship. This commitment goes beyond traditional academic boundaries, as exemplified by his collaboration with fellow mathematicians in organizing the "Latinx Math Network Workshops." These workshops, initiated in 2018, provided a platform for fruitful discussions on the needs of the Latinx and Hispanic mathematical community, showcasing his leadership in fostering inclusivity.

Dr. De Loera's impact extends to the national stage, where he has actively supported Latinx mathematicians and contributed to discussions on minority-focused mathematics education reform. His tenure as the chair of the Graduate Group in Applied Mathematics witnessed advocacy for holistic

admissions reviews and a reduction in reliance on standardized tests, demonstrating a commitment to fostering diversity at the graduate level.

Dr. De Loera's mentorship extends over seven years as the faculty mentor to the Chicano and Latino Engineer and Scientist Society (CALESS) at UC Davis. His dedication to the success of young STEM Latinxs is evident through various forms of support, including classroom resources, tutoring, internship connections, and active participation in mentoring events organized by the Center for Chicanx and Latinx Academic Student Success.

The impact of Dr. De Loera's work is underscored by the recognition he has received throughout his career. Awards such as the 2003 Chancellor Fellow Award, the 2006 UC Davis Principles of Community award, and the 2020 CAMPOS Award highlight his contributions to transforming STEM education and addressing issues of inequity in science, engineering, and medicine.

Dr. De Loera's commitment to advancing diversity and inclusion extends beyond workshops and local initiatives. His involvement in the AMS Education Committee of the Transforming Post-Secondary Education in Mathematics (TPSE Math) Program reflects a dedication to promoting discussions on minority-focused mathematics education reform at a national level. This sustained commitment underscores his influence in shaping the future of mathematics education. On an individual level, Dr. De Loera's mentorship has been transformative. Mentoring numerous postdocs, PhD students, and undergraduates, he has played a pivotal role in shaping the careers of emerging mathematicians. Recognition through awards, such as the 2013 Chancellor's Award for Outstanding Undergraduate Research Mentoring, attests to the positive impact he has had on the academic journeys of his mentees.

The MAA's T. Christine Stevens Award for Leadership Development is to be awarded to a person who has "performed significant, sustained work to develop leadership within the mathematical sciences, across the full range of professional activities," and Dr. De Loera is most deserving of this honor.

Response

I am grateful and honored to receive this year's T. Christine Stevens Award. This award has a special meaning to me because I had the pleasure to work with Christine and I know she has dedicated herself to leading positive change in our community somehow always wearing a huge smile!

I have been fortunate to serve my community at MAA, AMS, SIAM and INFORMS. The path toward the future is not always easy nor clear, but I know I am here because others supported me. Thus, I truly hope to continue to serve and support as many new and old mathematicians as I can. Specially, I hope to continue to advocate for and include those who are forgotten from mathematics. We tend to celebrate great mathematical achievement but

choose to ignore that there is way too much talent being wasted. We cannot afford it. I hope to continue to make everyone a bit more aware and appreciative of mathematics's beauty and usefulness. Our society needs more mathematically minded people in all walks of life as mathematics is a tool that can help all, but most people do not know this, and even mathematicians forget it.

Understanding and creating beautiful and useful mathematics was how I became a mathematician. But while I am very proud of my theorems, my books, and all scholarly work, my biggest impact has been through people. I have mentored and supported many students and aspiring young mathematicians and knowing I made a difference helping them reach their next dream is one my life's treasures. This year I also celebrate my first 20 former PhD students that have gone on to do amazing work and inspire others to enjoy mathematics. There is no better award than the students and friends who continue and support your work. Thanks to all of them, my collaborators, my wife and my sons, for supporting me in this adventure.

Biographical Sketch

Jesús A. De Loera is a distinguished professor of mathematics at the University of California, Davis. His work includes over 100 published scientific papers and two books covering a wide range of topics, including geometric and topological combinatorics, discrete convex geometry, algorithms, and optimization. He was recognized for his exemplary research: he received an Alexander von Humboldt Fellowship in 2004, the 2010 INFORMS computer society prize, and in 2020, the Farkas Prize of INFORMS optimization society. For his contributions to mathematics, as well as for service to the profession, including mentoring and diversity, he was elected a fellow of the American Mathematical Society in 2014, and in 2019 he was also elected a fellow of the Society of Industrial and Applied Mathematics. Specifically, his mentoring and teaching he received the 2013 Chancellor's award for mentoring undergraduate research and, in 2017, the Mathematical Association of America Golden Section Teaching Award. He has supervised twenty PhD students, and over 60 undergraduates research projects. He is currently an associate editor for *SIAM Journal of Discrete Mathematics*, and chief editor of the SIAM-MOS book series in Optimization.

Meritorious Service Awards

Certificates of Meritorious Services are presented, on the recommendation of the Sections of the Association, for service at the national level or for service to a Section of the Association. The first such awards were made in 1984. Each year, honorees from several Sections are recognized.

James Smith

San Francisco State University

The Golden Section is pleased to award a citation of meritorious service to James T. Smith, formerly of San Francisco State University. In 1972 Jim spoke for the section on "Foundations of Absolute Geometry in Arbitrary Dimensions." In the years 1991, 92, and 93 James served the section as vice-chair, chair, and program chair and he was section governor from 1996-99. From 1999 to the present, James has been a frequent and valuable attendee at section business meetings. He always has powerful suggestions and, when needed, constructive criticisms to make our annual meetings better than ever. Also, he doesn't hesitate to offer his help when the section needs a hand. This is an incredible span of over 50 years of service! However, his work goes way way beyond this. [Alas but most of his former colleagues, who could no doubt tell us much more of his accomplishments, are no longer with us.]

In addition to his administrative work, Jim has served the profession (and thus certainly also the MAA) through his enormously broad and powerful scholarship and collaborations over many years. His interests are in Logic, geometry, programming and history. He wrote a very powerful and thorough geometry textbook in 2000. His coauthors tell us that he is a delight to work with. In various collaborations he has completed several definitive histories on such famous mathematicians as Alfred Tarski and Mario Pieri. These books are very deep dives into the intricacies of the research accomplishments of these geniuses. James knows more than anyone how critical it is to recognize, value and really remember what these people have accomplished as we all move forward.

The early 1970s were a time when females were not valued in mathematics. As SFSU math department chair at the time, Jim began a campaign to change this. This effort resulted, for example, in the invitation to his former history student Jemma Lorenat, who spoke to the Section on "Demands on Your Imagination: Developing Mental Images in 19th-Century Pure Geometry" at our 2019 meeting. In her presentation, Jemma reminded us what it was like to learn geometry when there were no animations and few meaningful diagrams.

In 2011, Jim's paper "Definitions and Non-definability in Geometry" won a Lester Ford award for mathematical exposition. This is an excellent example of how we can understand the true optimality of the axiomatic method and why it needs to be framed so carefully when we go beyond just taking it for granted from a modern perspective. His English translation of David Hilbert's radio address in 1932 to the Society of German Natural Scientists and Physicians (see maa.org/press/periodicals/convergence/david-hilberts-radio-address) give words that still ring powerfully today. In the never-ending search for mathematical truth, Hilbert reminds us that "We must know, we will know." Thank you, James, for reminding us of our bright future as we gather knowledge from our past.

Response

I was stunned by this award. It was unexpected, since I've kept mostly to the background. Credit for my work should be shared with many others. It shows what makes a career. My public-high-school education in Ohio taught me about language structure and to appreciate elementary geometry; I was greatly influenced by a dynamic German exchange teacher. Liberal-arts education at Harvard further opened the doors to the world and led me to appreciate mathematical elegance. My work with the US Navy taught me about engineering and writing. My research supervisor Haragauri N. Gupta introduced me to foundations of geometry and trusted me to research in it. Around 1970 the *Monthly* accepted my first little mathematics research paper, showing me that I can write for publication. My SFSU experiences provided me with vast opportunities to help others grow. Very assertive colleagues at SFSU spurred me to foster women's participation in our field. I'm proud that my Department is now a leader in that regard. My coauthor Elena Marchisotto inspired then led my historical work on Pieri, and my coauthor Andrew McFarland's assistance with things Polish enabled me to write about Tarski. My students from around the world have inspired me to keep going, even long after retirement. I hope my career may inspire others to do—Long Live Mathematics!

Biographical Sketch

Attending Springfield, Ohio, public schools, I was absorbed in academics and commercial music. The first in my family to attend college, I graduated from Harvard in 1961 with a degree in mathematics, and decided to pursue that field. After some years as a software engineer for the US Navy, graduate student, and lecturer at San Francisco State University (SFSU), I earned the PhD in 1970 from the University of Saskatchewan, Regina, with a dissertation on foundations of geometry. I met my wife Helen at SFSU. A social-studies

teacher, she has taught me much about people. I became a professor in the SFSU Mathematics Department in 1969. I served as its chair during 1975–1982, spending most of my energy starting its computer-science program and supporting colleagues' mathematics-education projects. The MAA has provided me more opportunities to foster colleagues' development. During the 1980s I worked briefly at several places around the world, and parlayed my software expertise into a series of professional books on that subject. Starting gradual retirement around 2000, I switched fields to emphasize history of mathematical logic and geometry. My current research project touches logic, history, and music. Helen and I continue to enjoy and support musical developments. And the MAA continues to entwine me in the activities of the Golden Section!

Meritorious Service Awards

David Housman

Goshen College

The Mathematical Association of America, especially the Indiana section, wishes to recognize the extensive and praiseworthy contributions of David Housman by awarding him the Certificate of Meritorious Service.

After briefly teaching at each of Worcester Polytechnic Institute, Drew University, and Allegany College, David joined the faculty at Goshen College in 1998. He is currently a full professor and serves as the Department Chair of Mathematics and Computer Science. David was recently elected by all full-time faculty at Goshen to his second term as Chair of the Faculty. In this role, he represents faculty on the President's Cabinet, leads faculty-wide meetings, and chairs the Academic Affairs Committee. Ann Vendrely, Goshen's VPAA, wrote that "I've enjoyed getting to know him better through this role as we meet for at least an hour each week. He is an organized leader of the faculty and of committees and is very collaborative with solving problems."

David has been active in the Indiana Section of the MAA since he arrived at Goshen. In fact, David has attended 46 Indiana Section meetings, which is the second highest attendance recorded since the section began tracking meeting attendance. David frequently gives talks at section meetings on interesting undergraduate topics such as game theory, apportionment, and voting. He is committed to bringing students to section meetings to connect them with the wider mathematical community.

David has held many positions in the MAA committee and governance structure. At the section level, he served as the Secretary from 2001-2008 and as the Visiting Program/Outreach Coordinator from 2012-2018. He also served as the Indiana Section Governor from 2008-2011 and is currently the Section's Congress Representative. At the national level, he has served in the Council on the Profession and the Council on Meetings, including a term on the Committee on Faculty and Departments and a term as Chair of the Committee on Sessions of Contributed Papers. He currently is a member of the Committee on the Merten Hasse Prize.

David has also been active in multiple SIGMAAs throughout the years, including RUME, Mathematical and Computational Biology, and Environmental Mathematics. This range of memberships reflects his broad interests and intellectual range. He has mentored over seventy students in undergraduate research through Goshen's Maple Scholars summer program, independent studies, and senior theses. Both textbooks he has co-authored also reflect this range of knowledge and interest in applications of mathematics.

David reports that at Goshen College, he is able to "connect mathematics and computing with other disciplines and faith. I have enjoyed teaching a course on fair allocation and collaborating with a biologist to teach a course on biomathematics. As a co-director of the regional Science Olympiad tournament, I help coordinate over 100 volunteer students, faculty and community members to provide an engaging interdisciplinary science experience for several hundred middle and high school students."

In summary, David Housman is well-deserving of the Certificate of Meritorious Service, and it is the pleasure of the Indiana Section of the MAA to nominate him for that award.

Response

As a first-generation college student, I was attracted to the mathematics profession through the mathematics faculty at Allegheny College, Joseph Gallian's first Undergraduate Research Program, and a half year undergraduate research position at Argonne National Laboratory in the Theoretical Chemistry and Modeling Group under Lester Shipman. With the encouragement of my academic advisor, Ronald Harrell, my first conference talk was at an MAA Allegheny Mountain Section meeting. My Ph.D. mentor was William F. Lucas, another great member of and contributor to the MAA. So, it has been only natural to follow these leaders in participating in and bringing students to MAA meetings. Along the way, I have followed Joe Gallian's advice to say "yes" when asked. When I see the deep involvement of many members of the Indiana Section, I am humbled that I have been selected to receive this honor. May the MAA continue to provide encouragement for ever more people to engage in mathematics.

Biographical Sketch

David Housman is a professor and chair of mathematics and computer science at Goshen College. He received the Indiana Section Distinguished Service Award in 2009. He has taught broadly across the undergraduate mathematics and computer science curriculum, has mentored many undergraduate research projects, and has been a principal investigator for NSF Research Experiences for Undergraduate programs, an MAA Strengthening Underrepresented Minority Mathematics Achievement Program, and an NSF S-STEM program. His research interests are in game theory with applications to biology, economics, and political science.

Meritorious Service Awards

Roger Waggoner

University of Louisiana Lafayette

The Louisiana-Mississippi Section nominates Dr. Roger Waggoner for the Certificate of Meritorious Service. Roger's contributions to the MAA at both the national and the local levels make him a deserving candidate. Although he retired from the University of Louisiana at Lafayette in 2011, Roger continues to be active in the MAA. He has participated in the last thirty-one LA-MS Section meetings. Throughout this time, Roger has used his personal skill set for the benefit of the MAA. He demonstrated leadership as the LA/MS Section Governor (2004–2007) and as both Section Chair and Program Chair in 1999–2000. Nationally, Roger served on the Committee on SIGMAAs for several years, including two as co-chair.

Roger's talent for writing with precision and attention to detail was put to use for the MAA as well. He contributed to the American Mathematics Competitions by proof-reading problems and submitting some of his own. This work continued after his retirement. While serving on the Committee on SIGMAAs, he created a template for the Committee to use when writing reviews of individual SIGMAAs. When changes to the LA-MS Section bylaws were required, Roger rewrote them; and the new bylaws were adopted by the membership in 2001. Finally, Roger generously used his time and talent to successfully nominate four of his colleagues for the LA-MS Section Distinguished Teaching Award.

Throughout the years, Roger's favorite service involved the promotion of student activities at Section meetings. He contributed problems for the Student Team Competition and graded the ones that were used. He also was a judge for the Student Paper Competition. For sixteen years, Roger was one of three organizers for the teams representing UL Lafayette in the Student Team Competition. During those years, he handled the bulk of the logistics. Most notably, he secured funding from various sources to cover expenses for the students' travel.

The Louisiana-Mississippi Section is grateful to Roger Waggoner for all he has done to advance the goals of the MAA. We believe that he is truly deserving of this recognition.

Response

I am deeply honored and a bit surprised to be receiving a Meritorious Service Award. The surprise is due to the fact that I never considered any one thing

that I did for the MAA to be particularly noteworthy. We possibly have here an example of the Euclidean Property of the real numbers in action. If you add up enough epsilons... I was given an MAA membership by the LSU Mathematics Department in 1968 while I was enrolled there in graduate school. Over the next 25 years I paid my dues, rather superficially skimmed over the *Monthly*, and attended exactly two Section meetings, one of which was hosted by my own department. Finally in 1994, I attended another Section meeting at the urging of two colleagues. It was there that I heard a memorable panel discussion that convinced me that I might have something to contribute. From that point on my level of involvement grew quickly. My motives were not particularly noble. I did it because it was fun. In the process, I received a great deal of satisfaction and made some life-long friends. For this I will always be grateful to the MAA. Thank you.

Biographical Sketch

Roger Waggoner was born on a farm near Popejoy Iowa. He then lived and attended public school in the much larger town of Iowa Falls. He received a BS degree in mathematics from Tulane University in 1964 and a PhD from LSU in 1969. Upon graduation he joined the faculty of the University of Southwestern Louisiana (now the University of Louisiana at Lafayette) where he remained until his retirement in 2011. Within the Department he eventually took on various organizational and administrative duties, culminating in his serving as department chair for almost eleven years.

Meritorious Service Awards

Mark Sand

The College of Saint Mary

The Nebraska Southeast South Dakota Section of the MAA honors Dr. Mark Sand with the Mathematical Association of America's Meritorious Service Award.

Mark has long been an avid supporter of the MAA and the NESeSD Section. He has served nationally on the Committee on the Undergraduate Program in Mathematics (CUPM) and as a Section Governor. With rare exception he attends the annual conference, giving a presentation of an interesting mathematical gem each year. For the MAA's Centennial celebration, Mark was instrumental in researching the section's history and updating the previous history document. In addition to this monumental effort, Mark has served as Section Chair, planning and hosting the annual conference. Furthermore, Mark is a stalwart for the section, exemplifying professionalism and service to the mathematical community.

The Nebraska Southeast South Dakota Section wishes to extend its heartfelt thanks to Mark Sand for all that he has contributed to the section, the MAA, and its members.

Response

I want to express my most sincere thanks to the Nebraska and Southeast South Dakota Section, and especially the Executive Committee, for nominating me for the Meritorious Service Award. It is a surprise and an honor to be so recognized. As a member of this section since 2000, I have had the opportunity to interact with many great people and have learned quite a lot from them. Since we are a small section, everyone pitches in where needed, and strong friendships are built. It has been a joy and a pleasure to serve the NESeSD Section in whatever way possible, and I will continue to do what I can for it after retirement. Many thanks to our section!

Biographical Sketch

Mark Sand grew up in Iowa and attended Drake University, graduating in 1980 with majors in mathematics, physics, and teacher education. After two years of teaching high school math in St Cloud, Minnesota, he decided to move on to graduate studies in mathematics at the University of Minnesota-Minneapolis. He earned his PhD in potential theory there in 1991 with Eugene Fabes as his advisor.

Sand taught mathematics at Augustana College (SD) from 1987 to 1990 and Northwest Missouri State University from 1991 to 2000. When he moved to Dana College (Nebraska) in 2000 he began teaching physics along with mathematics. Dana closed in 2010, and he was then able to join the faculty at College of Saint Mary in Omaha, where he has been teaching mathematics and physics, and serving as program director of mathematics and physical science. Though retiring in June 2024, he remains interested in mathematics, especially the history of potential theory.

Meritorious Service Awards

Julie Barnes

Western Carolina University

The Southeastern Section of the MAA is delighted to honor the significant contributions of Dr. Julie Barnes through this nomination for the 2024 MAA Meritorious Service Award. Since 1997, Julie has been a consistent presence at Southeastern section meetings. She began her involvement as a young faculty member by organizing a session on "Neat Teaching Ideas" at the section meetings from 1998–2006. In 2004, she began organizing a Math Treasure Hunt for students that is now a staple of our annual meetings. She has won both our teaching and service awards and subsequently served on and chaired those committees. Other section service contributions are listed below. Some of these placed Julie on the Executive Committee for the Section, which has collective responsibility for planning annual meetings.

- Treasure Hunt, 2004–present
- Teaching Award Committee, 2019–2022, Chair (2021–2022)
- Service Award Committee, 2019–2022, Chair (2021–2022)
- Secretary, 2020–2023
- Nominating Committee, 2017–2018
- SE Section NExT Co-Chair, 2003–2006
- Organized Neat Teaching Ideas Session at SE Section NExT, 1998–2006

In 2010, Julie began service on the Project NExT Leadership Team, a position she held until 2020. That introduction at the national level led to the numerous other service contributions seen below.

- MAA Committee on Section Meetings, 2023–present
- Search Committee for Math Horizons Editor, 2023
- MathFest Joint AMS MAA Lecture Committee, 2022
- Creator and host of Virtual Escape rooms for a national MAA Social hour, a MathFest Social Event, EPaDel Section meeting, and a Social event for the NE Section Meeting, 2021
- MAA Committee on Sections, 2020–2023
- Project NExT Leadership Team, 2010–2020
- Math Horizons Board of Directors, 2019–present
- MAA Professional Development Committee, 2012–2018 (Chair 2015–2018)
- MAA Council on Meetings and the Profession, 2015–2018
- MAA Representative on Mathematical Congress of the Americas Travel Grant Committee, 2016–2017

- Co-Organizer of a panel at an MAA meeting, 2016 (two panels), 2015
- Radical Dash Planning Team, 2015 & 2016
- MAA Mentoring Network, 2016–2017
- Organizer of speaker sessions at national MAA meetings, 2012 & 2013

In addition to the named service contributions above, Julie helped to co-organize the first meeting of the Rocky Mountain Section NExT, she spoke at Alabama and North Carolina state dinners, she spoke in several Project NExT workshops prior to joining the leadership team and led a virtual teaching session for the NE Section NExT during the pandemic.

The Southeastern Section and the MAA have benefited in unmeasurable ways from the active, creative, tireless work of Julie Barnes. We are grateful for her and cannot imagine a more deserving person for this recognition.

Response

I am extremely honored to receive this award. The day after I was notified that I had been nominated for this award, I drove eight of our students to the first event at our section meeting. My students were excited and asking a lot of questions. What is a conference like? What kind of math will there be? Will I understand it? Then we walked into the building, and immediately people were coming over to reconnect with me or ask questions about setting up the Student Treasure Hunt. A few minutes into this, one of my students looked at me and said, "Wait! You aren't just here for a math conference, are you? These people are all your friends!" Exactly, and I'm thrilled that it was that obvious. I love my section and look forward to our section meeting every year.

Our section is filled with amazing people who want to work together to explore mathematics together. I can't say that anything I have done has felt like service; it has been opportunities to be creative together. The same has been true nationally. I was first introduced to the national mathematics community as a Project NExT Fellow, and later I had the incredible opportunity to serve on the Project NExT Leadership Team. Again, this meant working alongside a team of creative, innovative people with a common goal to help others. I'm extremely grateful for having opportunities to work with all of these individuals, both locally and nationally. Many of my MAA friends are the people whom I consider to be family—they are the first people I reach out to during momentous events in my life, whether those events are professional or personal. It means a lot to me that a committee from my section would choose me for this award. I send my heartfelt thanks out to them.

Biographical Sketch

Julie Barnes earned her PhD from the University of North Carolina at Chapel Hill under the direction of Jane Hawkins. Julie is now a professor of mathe-

matics at Western Carolina University and has taught there since 1996, except for one year as a distinguished visiting professor at the United States Air Force Academy. She has been very involved with her MAA section since 1996. She especially enjoys creating Student Treasure Hunts with colleagues from across the section—so much that she has been doing it for 20 years. She has also been involved nationally with a wide range of service, especially enjoying her 10 years on the Project NExT Leadership Team.

Her academic training is a cross between complex dynamics and ergodic theory. She has published in both areas as well as on using hands-on teaching ideas and on some fun mathematical art created from complex functions. At her own university, she is an advisor for both the Math Club and for FEM in STEM which is a club that encourages women in STEM fields to interact and learn from each other. Julie lives in the North Carolina mountains with her two cats, and currently, her 86-year-old mother with dementia, and her mother's cat. In Julie's spare time, when she is not pretending to be a CNA for her mother, she enjoys hiking and playing racquetball.

MAA
MATHEMATICAL ASSOCIATION OF AMERICA

NOMINATIONS OPEN FOR AWARDS AND PRIZES

Nominations due by August 1.

Deborah and Franklin Tepper Haimo Award

Nominations due by October 1.

Teaching, Service, and Research Awards

Henry Alder Award
Certificate of Merit
Mary P. Dolciani Award
Gung & Hu Award
Inclusivity Award
JPBM Communications Award
Meritorious Service Award
Morgan Prize
Selden Prize
Sliffe Awards
T. Christine Stevens Award for Leadership Development

Writing Awards

Allendoefer Award
Beckenbach Book Prize
Chauvenet Prize
Euler Book Prize
Evans Award
Halmos-Ford Award
Hasse Prize
Pólya Award
Robbins Prize
Daniel Solow Author's Award

Info on each award and nomination forms can be found at
maa.org/awards.

Michael Dorff presenting Silvia Bozeman with the inaugural Inclusivity Award at MAA MathFest 2019 in Cincinnati, OH.