


AMERICAN MATHEMATICAL SOCIETY
MATHEMATICAL ASSOCIATION OF AMERICA
SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS

FRANK AND BRENNIE MORGAN PRIZE FOR OUTSTANDING RESEARCH IN MATHEMATICS BY AN UNDERGRADUATE STUDENT

THE Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student recognizes and encourages outstanding mathematical research by undergraduate students. It was endowed by Mrs. Frank Morgan of Allentown, Pennsylvania.

CITATION

Amol Aggarwal

Amol Aggarwal is the recipient of the 2016 AMS-MAA-SIAM Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student for his outstanding research in combinatorics. He has four published papers, which have appeared in *Journal of Combinatorial Theory, Series A; European Journal of Combinatorics; Discrete Mathematics*; and *Electronic Journal of Combinatorics*. His numerous letters of support describe these papers as being of postdoctoral caliber.

Aggarwal participated in the 2014 University of Minnesota–Duluth Research Experience for Undergraduates, in the 2013 MIT Undergraduate Research Opportunities Program, and in the 2012 MIT Summer Program for Undergraduate Research. The research Aggarwal conducted as a high-school student under the direction of Professor János Pach has recently been published.

Aggarwal has also been awarded the National Science Foundation Graduate Research Fellowship, the National Defense Science and Engineering Graduate Fellowship, and was named a finalist for the Hertz Foundation Fellowship. As a high-school student, he was a finalist in the 2011 Intel Science Talent Search and a 2010 Siemens Research Competition semifinalist.

Biographical Note

Amol Aggarwal was born and raised in New York until the age of eleven. He then moved with his family to California, where he went to middle school and

high school. It was in high school when Amol was introduced to mathematical research, after unwittingly working on an unsolved question in combinatorial geometry about convex point configurations. After graduating from Saratoga High School in 2011, Amol attended the Massachusetts Institute of Technology, where he had the privilege of learning a diverse selection of mathematical topics from experts in the field. As a student at MIT, Amol pursued several research projects in different areas, including integrable probability, random matrices and map enumeration, and simultaneous core partitions. Recently having graduated from MIT with a major in mathematics, Amol is currently a doctorate student at Harvard University, where he is planning to focus on probability theory.

Response from Amol Aggarwal

I am deeply honored to receive the 2016 Frank and Brennie Morgan Prize, and I express my profound gratitude to Mrs. Frank Morgan and the AMS-MAA-SIAM committee, both for selecting me for this award and for inspiring young mathematicians to pursue research. The list of people who have influenced my perspective towards mathematics goes well beyond the capacity of this response, but please permit me to mention a few names regardless. First, I would like to thank my research advisors. These include János Pach, who selflessly agreed to advise me in my first research project when I was still in high school; Joe Gallian, who generously invited me to participate in his REU; and Alexei Borodin, who has consistently offered me both practical advice and academic knowledge throughout my time at MIT. Second, I would like to thank several mathematicians who had the time and patience to talk to me about their fields of interest. These include Victor Guillemin, Ivan Corwin, Jacob Fox, Alan Edelman, Rishi Nath, and Michael La Croix. Third, I thank my friends, whose kindness, creativity, and joy for life continues to inspire me. Finally, my deepest thanks go to my family, whose everlasting support has shaped who I am today.

CITATION

Evan O'Dorney

Evan O'Dorney is recognized with an Honorable Mention for the 2016 Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student. He has several published papers in the areas of number theory, algebra, and combinatorics, which have appeared in *Integers, Linear Algebra and its Applications, Semigroup Forum*, and *Annals of Combinatorics*.

O'Dorney has participated in REUs at Emory University and the University of Minnesota–Duluth. He is a recipient of the Churchill Scholarship and is a three-time Putnam Fellow. As a high-school student, he was a four-time medalist of the International Mathematical Olympiad, a three-time winner of the US Mathematical Olympiad, and the national champion of the 2011 Intel Science Talent Search.

Biographical Note

Evan O'Dorney, a resident of Danville, California, was fascinated by numbers from an early age and gained an appreciation for mathematics from many popular books, especially the works of Martin Gardner. Throughout high school, he enrolled in college-level math courses at the University of California, Berkeley. He received his B.A. in mathematics *summa cum laude* from Harvard in 2015. He is currently attending the one-year "Part III" program at Cambridge University, UK, after which he plans to pursue a Ph.D. at Princeton under Manjul Bhargava. His nonmathematical pursuits include composing and improvising on the piano and organ and praying the rosary.

Response from Evan O'Dorney

It is a privilege to be counted among the young mathematicians that AMS, MAA, and SIAM honor through the institution of the Morgan Prize. I thank the many advisors who made my undergraduate research career possible, especially Lek-Heng Lim (who introduced me to mathematical research in the tenth grade), Zvezda Stankova, Ravi Vakil, Brian Conrad, Joe Gallian, Ken Ono, David Zureick-Brown, Joe Harris, Benedict Gross, and Noam Elkies.

CHAUVENET PRIZE

THE Chauvenet Prize is awarded to the author or authors 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.

CITATION

Susan Marshall and Donald R. Smith

Susan Marshall and Donald R. Smith "Feedback, Control, and the Distribution of Prime Numbers," *Mathematics Magazine*, Volume 86, No. 3, June 2013.

As you might expect from an exemplary piece of mathematical exposition, the first sentence of this article speaks for itself: "We explore the system of prime numbers from an unusual viewpoint, that of an applied mathematician employing mathematical modeling to study a natural phenomenon." Differential equations and numerical analysis are then used to derive well-known properties of the distribution and density of prime numbers. After being introduced to the concept of a feedback and control system, the reader is given a clear, number-theoretic intuition for why it makes sense to apply this particular mathematical model to the system of prime numbers. Graphs of various estimation functions support that intuitive explanation. The article includes fascinating connections to such topics as the Prime Number Theorem, the Riemann Hypothesis, and the work of Gauss. The authors accomplish a surprising amount in only thirteen pages, and their prose is extremely readable. The reader comes away understanding why the system of prime numbers "appears to have an element of randomness yet the primes do 'stay on track' in a very specific way."

Biographical Note

Susan H. Marshall received a B.S. in Mathematics from Wake Forest University in 1993, with a minor in Psychology. After a brief stint as a data analyst for the Hubble Space Telescope at Goddard Space Flight Center in Maryland, she returned to school and received a Ph.D. in Mathematics from the University of Arizona in 2001. While in graduate school, Susan studied arithmetic geometry with Minhyong Kim. Following graduate school, Susan was a postdoctoral fellow

at the University of Texas at Austin from 2001–2004. She is currently an Associate Professor of Mathematics at Monmouth University, and enjoys living on the Jersey Shore with her husband (and colleague) David, and their two children Gillian and Dylan.

Biographical Note

Donald R. (Bob) Smith received an A.B. in Physics (magna cum laude) from Cornell in 1969, an M.S. in Operations Research from Columbia University in 1974, and a Ph.D. in Operations Research from the University of California at Berkeley in 1975. He was an Assistant Professor of Operations Research at Columbia University from 1975–1979, before working at Bell Laboratories as a Member of Technical Staff and a supervisor from 1980–2001. After leaving Bell Laboratories, he joined the faculty at Monmouth University where he is currently an Associate Professor in the Management and Decision Science Department. Most of his publications are in operations research journals in the areas of stochastic processes. Bob has always been fascinated by prime numbers because they are a deterministic system with elements of apparent randomness but hidden control. He and his wife Pat have three grown children and two grandchildren. He is an avid cyclist averaging over 11K miles per year.

Response from Susan Marshall and Donald R. Smith

We are excited and grateful for the recognition of our work with the 2016 Chauvenet Prize. Last year, this same article received a Carl B. Allendoerfer award and we were surprised and grateful; this year we are (almost) beyond words!

Thank you to the Selection Committee for their time, and for choosing our article among so many worthy options. Thank you to the MAA for sponsoring this and its many other awards. Receiving the Allendoerfer award last year led to many opportunities for which we are extremely grateful! Thank you to *Mathematics Magazine* Editor Walter Stromquist. This article would never have been published without his compassionate and persistent support, and we are indebted to him! Thank you also to our colleagues and family who supported us through the rather lengthy process of writing and revising this article. Finally, Susan would like to thank Bob (Donald) for sharing his discovery of the star of our article, the differential equation modeling the density of primes, and giving her the opportunity to be a part of telling its story.

EULER BOOK PRIZE

THE Euler Book Prize is awarded annually to the author 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. The Euler Prize, established in 2005, is 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.

CITATION

Jordan Ellenberg

How Not to Be Wrong: The Power of Mathematical Thinking, The Penguin Press, New York, 2014.

"Mathematics is the extension of common sense by other means." This is a recurring theme in Ellenberg's wide-ranging, informative, and engaging survey of the application of critical mathematical thinking to situations ranging from sex, politics, lotteries, and diplomacy to physics, biology, and, of course, mathematics itself.

Through parables and cautionary tales, Ellenberg shows how to apply fundamental mathematical ideas to perplexing problems, while keeping the discussion (relatively) nontechnical and avoiding complex computations.

Many of the book's chapter titles beg that they be read, e.g., "Everyone is obese" (linear regression predicts that all Americans will be obese by 2048!), "Does lung cancer make you smoke cigarettes?" and "Miss more planes!"

The book succeeds in making some really advanced math seem accessible and delightful, like the projective plane, the seven-point Fano plane and its application in coding theory, Zhang's recent theorem on bounded gaps between primes, and Bernoulli's "untwisting" of the St. Petersburg paradox, that includes a slick tabular proof that $1/2 + 2/4 + 3/8 + 4/16 + 5/32 + \ldots = 2$. Its treatment of Buffon's Needle and its generalization, Buffon's Noodle (an early result in integral geometry), is a superb piece of pedagogy.

The conversational style of much of the text gives you the feeling that you're in Ellenberg's office, chatting with him about the problems and issues at hand.

This impression is reinforced by the nature of most of the figures in the book, which are hand-drawn and the sort of diagrams one would scribble on the office blackboard to illustrate a point.

Occasionally, Ellenberg provides clues to his pedigree and experience—he is a prominent number theorist, the son of statisticians, a Harvard Ph.D., and a script consultant for the "Numb3rs" television show—that both reinforce his mathematical authority and provide motivation and texture for the mathematics. For example, in the course of discussing why a person looking for "remarkable" coincidences in a large enough data set will find them, we learn that he was a graduate student at Harvard when a controversy erupted among the faculty there about the possibility of secret prognostications encoded in the Torah.

How Not to Be Wrong is a *tour de force* of mathematical and statistical reasoning applied in diverse theoretical and applied settings that appeals to specialists and nonspecialists alike. Just about everyone should find something to like and learn from in this delightful book.

Biographical Note

Jordan S. Ellenberg is the John D. MacArthur Professor of Mathematics at the University of Wisconsin-Madison. He received his Ph.D. in math at Harvard under the supervision of Barry Mazur and his M.A. in fiction writing from Johns Hopkins. He was a postdoc at Princeton and has been on the faculty at Wisconsin since 2005, specializing in algebraic number theory and arithmetic geometry. He is a Fellow of the American Mathematical Society and a 2015 Guggenheim Fellow, and has advised thirteen Ph.D. students. Ellenberg has written about math for the public in the *New York Times*, the *Wall Street Journal*, the *Washington Post*, and *Slate*, among many other publications. *How Not To Be Wrong* is his first book about math.

Response from Jordan Ellenberg

It's a really great honor and pleasure to have my work on *How Not To Be Wrong* recognized by my professional community. When I started writing about math for a broad audience, almost fifteen years ago, some people counseled me to worry about whether people would take me less seriously as a mathematician. That worry was misplaced. I think the community of mathematicians now recognizes and honors outward-facing mathematics (general-interest writing, blogging, giving interviews to journalists, generally spreading the word about what we do) as a part of our mission and a worthy use of our time.

I am really grateful, not only to the MAA, but to *Slate*, whose idea it was in the first place to write newspaper columns about math; and to the editors and marketers at the Penguin Press, who let me write a very unusual and idiosyncratic book with

a lot of math in it, and promised me they could get lots of normal people to buy it. I thought they were crazy. But they were right.

THE DEBORAH AND FRANKLIN TEPPER HAIMO AWARDS FOR DISTINGUISHED COLLEGE OR UNIVERSITY TEACHING OF MATHEMATICS

IN 1991, the Mathematical Association of America instituted the Deborah and Franklin Tepper Haimo 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. Deborah Tepper Haimo was president of the Association, 1991–1992.

CITATION

Satyan Devadoss

Professor Satyan Devadoss is a dynamic, engaging, and inspirational teacher who is devoted to connecting math with other disciplines. Colleagues praise his uniquely visual style of teaching involving unforgettable pictures, and they admire his ability to attract students into the math major while teaching courses that are known for their difficulty. One semester, Professor Devadoss taught three sections of multivariable calculus and earned difficulty ratings in the ninety-fifth, ninety-seventh, and ninety-eighth percentiles. His senior seminar course tied in student surveys for the most difficult course at Williams.

Professor Devadoss' colleagues and students admire the exciting array of courses he has developed at Williams since his arrival in 2002. There is the notoriously challenging yet incredibly popular *Computational Geometry*, which led to the "strikingly beautiful" textbook *Discrete and Computational Geometry* (Princeton University Press), coauthored with Joseph O'Rourke of Smith College. Williams students describe *Computational Geometry* as "awesome," "amazing," "flat-out cool," and "by far the most entertaining math course I have ever taken." Professor Devadoss shared the ideas behind this extraordinary level of success in an MAA short course he co-taught at JMM in 2012. Tapping into his interests in art and design, Professor Devadoss also developed three interdisciplinary courses offered through Williams' Art Department: *Modeling Geometric Shapes*; *Design School*; and *Mural*. In these courses, students not only had the opportunity to learn about important ideas and open problems in mathematics, they explored the visualization of these ideas and produced

sculptures, newspapers, and murals to make these ideas more visible and accessible to the community at large. Other courses designed by Professor Devadoss include *Lessons in Go*, *Visualization*, *Origami*, *Phylogenetics*, and a senior seminar titled *Geometric Group Theory*. Finally, Professor Devadoss has made mathematics more accessible to an even wider audience through his thirty-six-lecture DVD course *The Shape of Nature*, produced in 2010 by the Great Courses Company.

Outside of the classroom, Professor Devadoss has advised ten original research undergraduate theses and six undergraduate research projects (through the Williams SMALL REU program). As an undergraduate research mentor, he is known for his ability to find a simple and beautiful problem, one that is probably way too hard but that has the potential to develop in many different directions in the hands of students. Professor Devadoss' collaborations with students have led to over a dozen research publications. One joint paper, "Deformations of bordered Riemann surfaces," appeared in the *Notices of the American Mathematical Society*.

Professor Devadoss is no novice when it comes to winning awards. In 2007 he won the MAA's Henry L. Alder National Teaching Award, and in 2014 he was the recipient of the MAA Northeastern Sectional Award for Distinguished Teaching. In 2013 he was named an inaugural fellow of the American Mathematical Society, and in 2012 he was awarded the Nelson Bushnell Prize at Williams for his excellence in both scholarship and teaching.

Biographical Note

Satyan Linus Devadoss was born and raised in south India, where he developed his lifelong love of rice. During the reign of Michael Jordan, he became valedictorian at North Central and received a doctorate at Johns Hopkins. This was followed by an Arnold Ross postdoc at Ohio State, ideal preparation for arriving at Williams in 2002. His current mathematical interests range from cartography and origami to phylogenetics and design, attracting support from the National Science Foundation, the John Templeton Foundation, the Mellon Foundation, and the Department of Defense. He is particularly fascinated by the different approaches taken by academic disciplines in measuring truth and reality. In addition to invitations at Google, Pixar, and LucasFilm, he has held visiting positions at Harvey Mudd, Ohio State, UC Berkeley, MSRI, and Stanford. Regardless of location, the pursuit of exceptional ice cream is a high priority.

Response from Satyan Devadoss

Accepting this honor, I am humbled to stand in the stead of those who have poured their hearts into mine. My life has been paved with exemplary teachers, starting with my parents: my father instilling in me the love of structure and puzzles, my mother the love of art and nature. My wonderful colleagues at

Williams have modeled for me excellence, purpose, and stewardship, entrusting me with freedom to pursue my passions. Wise mathematicians have guided me, including Shirley Wilson (North Central), Jack Morava (Johns Hopkins), Jim Stasheff (UPenn), Peter March (Ohio State), Joe O'Rourke (Smith), Bernd Sturmfels (Berkeley), and Ed Burger (Southwestern). A big shout-out to my students for showing me grace, and teaching me compassion. A special thanks to Regina Graeter and Jeni Britton Bauer for elevating the dignity of the physical. And most of all, to my wife Doris, who has stood in the shadows, laying her life down while lifting mine to the skies.

CITATION

Tyler Jarvis

Tyler Jarvis is a master teacher who has had a significant national impact on the mathematics education of students. In his twenty years of teaching, he has demonstrated that he is both a superb classroom teacher and also a skilled administrator, creator, and founder of math programs and resources that help train mathematicians throughout the country as math educators.

Professor Jarvis has a strong passion for mathematics and a talent for inspiring students to learn as he challenges them to do more than they normally would. His teaching evaluations note the care he has for students, and his sincere desire for them to learn. Over the past several years, 63% of the evaluations note that Professor Jarvis is either one of the best teachers at Brigham Young University or an "awesome teacher." He has been successful both in teaching large lecture classes and in working with students in smaller groups. In larger classes, his sections have demonstrated high student retention rates and above-average performance on common exams. He has been extremely successful in mentoring undergraduate students; thirty-two undergraduates have completed projects as part of his algebraic geometry research group.

Professor Jarvis has made fundamental contributions to mathematics education nationally through the creation or co-creation of the "We Use Math" web site, the Center for Undergraduate Research in Mathematics (CURM), and the Applied and Computational Mathematics Emphasis curriculum materials. He created the `WeUseMath.org` website in 2009 to help inform students about careers in mathematics. The website has had over 1,000,000 page views and been linked to by the MAA, AMS, Utah State Office of Education, and numerous mathematics departments as a resource for helping students learn about math careers. Professor Jarvis has served as the co-director of CURM since cofounding it in 2007. CURM trains mathematics faculty throughout the United States to successfully do undergraduate research. CURM has supported more than eighty professors from seventy different colleges and universities nationwide, and over 225 undergraduates have been mentored in undergraduate research. In 2015,

CURM received the American Mathematical Society's "Programs that Make a Difference" award.

Professor Jarvis is also the co-creator of the Applied and Computational Math Emphasis (ACME) program at BYU, and a co-PI of the related NSF-supported project "A New Curriculum in Applied and Computational Mathematics." These two programs, both started in 2013, aim to modernize the mathematics major by better integrating it with the broader STEM community through the creation of an upper level mathematics curriculum with increased use of math modeling and advanced computational expertise in interdisciplinary work.

Biographical Note

Tyler Jarvis earned a B.S. and an M.S. in mathematics from Brigham Young University in 1989 and 1990, respectively. He earned a Ph.D. in mathematics from Princeton University in 1994. In 1995 he received an NSF CAREER award. He has taught mathematics at Mississippi State University, Boston University, and Brigham Young University.

He served as chair of the Department of Mathematics at Brigham Young University from 2006 to 2012. In 2007 he cofounded the Center for Undergraduate Research in Mathematics (CURM) [`http://curm.byu.edu/`], and he is currently a co-director of CURM. He is also a coauthor of a new curriculum for undergraduates in applied and computational mathematics, designed to better integrate the mathematics major with the broader STEM community, and increase the use of mathematic modeling and advanced computational expertise in interdisciplinary work.

Response from Tyler Jarvis

I feel very honored to be one of this year's recipients of the Deborah and Franklin Tepper Haimo award. I am very grateful to the MAA and to the many outstanding teachers who have influenced and inspired me throughout my life. I am also deeply indebted to my wonderful colleagues at BYU and elsewhere, and most especially to my department chair, Michael Dorff. They have supported, encouraged, and improved my teaching and scholarship for many years. I am lucky to have had not only great colleagues, but also truly fantastic students—they make teaching a real joy. Finally, I thank my family for their support and for all they have taught and done for me.

CITATION

Glen Van Brummelen

Professor Glen Van Brummelen is described as a dedicated and practical teacher of mathematics. He has thought deeply about how to motivate complex mathematical ideas for his students and has mentored other faculty in his department to do the same. By focusing on why a student should learn the

material at hand, rather than presenting the material as knowledge to be learned, he allows students to see the cohesive story behind the formal language. His colleagues describe Professor Van Brummelen's students as passionate about mathematics and inspired to learn the importance and the history of the subject. Notably, Professor Van Brummelen received the highest teaching evaluation scores of all faculty at a university ranked number one in North America in the National Survey of Student Engagement. Of course, perfect scores by every student are impossible for another faculty member to beat, regardless of the institution, and perfect scores are precisely what he managed to achieve! He also earned the highest average scores this past year.

As a founding faculty member at Quest University, Professor Van Brummelen has had great influence on the teaching of mathematics at his institution. He served as a lead writer of the learning objectives document for the university, the initiator of monthly faculty pedagogical discussion groups, and was the original designer of the mathematics portion of the foundation program. His influence has expanded beyond his institution by the example he has set for his students, many of whom are now teaching in places around the world such as Vermont, Texas, and Pakistan. He has also taught mathematics to the broader community through his MAA mini courses and his published books that address accessible and provocative questions at the root of mathematics. Glen's invited address on Ptolemy's model of planetary motion at the 2010 AMS/MAA Joint Meetings in San Francisco was one more example of making mathematics relevant and interesting to a broad audience.

Professor Van Brummelen's passion for teaching also goes beyond his own classroom with the substantial work he has done in serving two terms as president of the Canadian Society for the History and Philosophy of Mathematics, his current appointment to the Education Committee in the Canadian Mathematical Society, and Governor-at-Large for Canadian members of the MAA. He is dedicated to strengthening these organizations which focus on the teaching of mathematics, because this work will in turn strengthen the teaching of mathematics on a global scale.

Whether creating curriculum and learning objectives, giving an invited address, serving as a plenary lecturer at MathPath, writing a new book, or participating in the leadership of multiple national mathematics professional organizations, Professor Van Brummelen is a leader in mathematics education.

Biographical Note

Glen Van Brummelen is coordinator of mathematics at Quest University. After receiving his B.Sc. in mathematics from the University of Alberta, he went off in search of context, studying the history of mathematics for his M.Sc. and Ph.D. with Len Berggren at Simon Fraser University. He has taught at The King's

University (Edmonton), Bennington College (VT), and is one of the five founding faculty of Quest University, starting in 2006. His passion for the mathematics of different cultures led him to explore ancient and medieval mathematical astronomy, leading to his *The Mathematics of the Heavens and the Earth: The Early History of Trigonometry* (Princeton, 2009) and *Heavenly Mathematics: The Forgotten Art of Spherical Trigonometry* (Princeton, 2013), which was short-listed for the Neumann Prize and selected a *Choice* Outstanding Academic Title of 2013. He has authored fifty publications, several with undergraduate students, both in the history of mathematics and in its uses in teaching. In addition to establishing the innovative mathematics program at Quest University, Glen has been there at the beginning of several other educational initiatives. He was the founding program coordinator of HOMSIGMAA; has taught at the summer camp MathPath (for elite eleven–fourteen year olds) since its first year in 2002; and serves on the advisory board of Proof School, a new middle/high school for mathematics students in San Francisco that opened this past September.

Response from Glen Van Brummelen

I'm extremely grateful for this recognition, fully aware that the MAA is chock full of teachers every bit as deserving. My career has blessed me with a incredible wealth of opportunities. I was born into a family of insightful educators—my father Harro, who was instrumental in designing a teacher education program; and my mother Wilma and siblings Tim and Yolanda, all of whom have been outstanding teachers. How can you not reflect deeply about how to teach and learn when it is on everyone's lips, all the time? As a rookie teacher at The King's University in Edmonton I found myself mentored by science education visionaries Brian Martin and Peter Mahaffy. Daily I watched them place the student first, and treat their discipline as a verb rather than a noun. At Bennington College I had the all-too-rare freedom to try, to fail, and to learn from it. Over the last decade I have worked with some of the most gifted teachers in North America at the summer camp MathPath. They have enhanced my appreciation of the beauty and diversity of mathematics, a subject that after twenty-five years still holds an endless capacity to surprise me. At Quest University I have come to appreciate that it takes a village to raise a math student. My colleagues (Ryan Derby-Talbot, Richard Hoshino, Chris Stewart, and our Project NExT fellow Sarah Mayes-Tang) may be the four most creative teachers I have ever met, and wonderful people besides. Finally, from the people who share my classroom every day, I have learned that we don't teach math…we teach students. Understand *them*, and the math will follow.

My greatest thanks to the MAA. I hope I will prove to be a worthy recipient by continuing to grow in a way that honors my mentors, supports my colleagues, and cultivates my students.

YUEH-GIN GUNG AND DR. CHARLES Y. HU AWARD FOR DISTINGUISHED SERVICE TO MATHEMATICS

THE Gung and Hu Award for Distinguished Service to Mathematics, first presented in 1990, is the endowed successor to the Association'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, writing, "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."

CITATION

George Berzsenyi

The 2016 Gung and Hu Award goes to George Berzsenyi for his remarkable career empowering generations of high school students to pursue their mathematical and scientific passions by promoting the art of problem solving, creating national and international mathematical talent searches, and supporting mathematical competitions.

George is a native of Hungary and came to the United States as a high-school student in 1957 following the end of the Hungarian Revolution of 1956. He completed his education in Texas, including a Ph.D. in mathematics at Texas Christian University. He taught at universities in Texas and Louisiana prior to moving to Indiana to chair the Department of Mathematics at the Rose-Hulman Institute of Technology (RHIT), where he is now Professor Emeritus.

Being brought up in the Hungarian tradition, George enjoyed *KöMaL*, the high-school mathematics journal dedicated to creative mathematical problem solving. In order to provide similar challenges to students in the United States, he spent his professional career writing problems and solutions accessible to high-school students in a variety of venues:

- "Competition Corner" in NCTM's *Mathematics Student* (1978–1981, twenty columns),
- "Kürschák Corner" in *Arbelos* (1982–1987, seventeen columns),
- "The USA Mathematical Talent Search" in *Consortium* (1989–1996, quarterly),
- "Problems, Puzzles, and Paradoxes" in *Consortium* (1985–1996, forty-one columns),
- "International Mathematical Talent Search" in *Mathematics and Informatics Quarterly* (1991–1999, quarterly),
- "Math Investigations" in *Quantum* (1989–1997, forty-one columns), and
- "Problem Section" in *Math Horizons* (1993–1995, six sets of problems and solutions).

Most notably, in cooperation with the Rose-Hulman Institute for Technology (RHIT) and the Consortium for Mathematics and Its Applications (COMAP), he founded the USA Mathematical Talent Search (USAMTS). Unlike other mathematics competitions, the USAMTS is about talent identification and development rather than competition. Begun in 1989, problems were printed quarterly in the COMAP publication *Consortium*. Students had a full month to work on problems and submit carefully written solutions. USAMTS continues to this day as a program of the Art of Problem Solving Foundation, though the delivery method of the problems is now electronic. Now, as then, solutions are graded by mathematicians and comments returned to the students with the goal "to help all students develop their problem solving skills, improve their technical writing abilities, and mature mathematically while having fun."

George maintained an extensive correspondence with scores of students, guiding them with respect to their reading, their selection of problems, and their scientific aesthetic. He crafted kind, thoughtful, and deliberate letters, invariably with the invitational closing "Yours in problem solving." He presented competitors with prizes of rare mathematics books and puzzles instead of trophies: a thoughtful and humbling reminder to winners that there was always more to learn. He makes mathematics personal, by sharing colorful vignettes of the lives of mathematicians and former protégés and the Hungarian mathematical tradition. Many of his protégés have never actually met him in person, but rather, forged long-distance relationships dedicated to problem solving and discovery—in a pre-Internet era when such correspondence was carried on via the US postal service.

George has an international problem-writing reputation. He served on the MAA's mathematical competitions committees for many years (USAMO twelve years; AIME six years as chair; AHSME fifteen years). He also served as a member of the Problems Committee at the 2001 IMO in Washington, DC; was a member of the Problems Committee of the Australian Mathematics Competitions four times

(a record for non-Australians); and was the Chief Coordinator of Topic Area 3: Mathematical Competitions at the 6th International Congress on Mathematics Education (ICME-6) in Budapest, Hungary, in 1988. He has edited and enhanced four collections of competition problems:

- *The Contest Problem Book V: American High School Mathematics Examination and American Invitational Mathematics Examination (1983–1988)* with Steve Maurer, MAA, Washington, DC, 1997,
- *C2K-Century 2 of KöMaL (1994–1997)* with Vera Olah, Roland Eötvös, Physical Society, Budapest, 1999,
- *International Mathematical Talent Search Part I*, Australian Mathematics Trust Publishing, Canberra, 2010, and
- *International Mathematical Talent Search Part II*, Australian Mathematics Trust Publishing, Canberra, 2011.

In 1996, George received the Paul Erdős Award from the World Federation of National Mathematics Competitions in recognition of his significant contributions to the development of mathematical challenges as a means to enrich mathematical learning.

Throughout his career, George created opportunities and supported students in many ways including the Young Scholars Program at RHIT (1990–1995), the Texas Mathematical Olympiad (forerunner of AIME), Lamar Mathematics Day (1977–1982), Texas in ARML—American Regional Mathematics League, and International Science and Engineering Fairs. George mentored students for the Westinghouse (now Intel) Science Talent Search and has been recognized as "the one person who has been most influential in the development of my career" by six scholarship winners. George's nomination letter, co-signed by ten former students, attests to his lasting and undeniable impact:

> *Though our life trajectories have taken us to very different directions, each one of us benefitted from George's mentorship. Some of us, for example, are now professional mathematicians, while others chose disciplines in neuroscience, medicine, and finance, and continue to utilize quantitative approaches. Yet others work in very diverse disciplines, such as entrepreneurship and law, and acknowledge the valuable impact high school mathematics training had on us. George encouraged us and believed that high school students could excel. He helped to nurture confidence in ourselves that would serve us a lifetime.*

George Berzsenyi has played an instrumental role in promoting creative problem solving to enrich and inspire mathematical learning, whether through the creation of the USAMTS, posing problems and solutions for worldwide

competitions, or individual mentoring of generations of talented high-school students.

Response from George Berzsenyi

I am most thankful to the members of the Committee in charge of this award and of the Board of Governors of the MAA for their recognition of the importance of my work with talented high-school students. It is my hope that this recognition will encourage other mathematicians as well to devote their efforts to talent search and, just as importantly, to talent development. I am also grateful to my wife, Kay, who was an equal partner in all of my mathematical endeavors for the past 50 years and to the thousands of students, whose enthusiasm for my programs kept me going throughout the years. Among my close co-workers I must also single out my colleagues at Rose-Hulman, as well as Steve Maurer, Peter Taylor, Vera Oláh, Andy Liu, Sol Garfunkel, Stan Rabinowitz, and Willie Yong, who are still active in the field. Moreover, I remember fondly the late Dave Logothetti, Peter O'Halloran, Erzsébet Fried, Endre Hódi, Walter Mientka, Henry Alder, and my dissertation advisor, Charlie Deeter, for their support.