

# MAA FOCUS

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## From the Editor



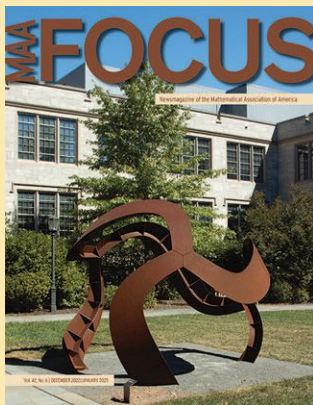
I've been thinking a lot lately about how important genuine communication is, both for building relationships and for helping people understand different perspectives and new ideas. I am a member of a small team of people who are trying to implement a big change that will affect all full-time faculty members on my campus. Nearly all of the challenges we are currently having in this process revolve around communication. I've learned that when people don't understand each other's work, when they don't feel like they're being heard, or when they don't trust each other, it's difficult to move forward and make positive changes as a community.

On the other hand, if people are in open conversation with each other, are listening to each other's fears and hopes, and are building relationships of trust, a lot of progress can be made.

The MAA understands the fundamental value of communication, embracing it as one of MAA's four core values. So, in this issue, we're focusing on many of the ways communication helps us learn and improve. For instance, Francis Su and Kira Hamman highlight the importance of communicating with the broader public our views—grounded in our mathematical and pedagogical expertise—on current events, and they suggest how we might get started writing op-eds. Jean Marie Linhart and Carrie Diaz Eaton invite us into a conversation where they share teaching strategies with each other and discuss how these approaches have evolved since the pandemic began. In this issue, we'll also see how a lack of communication can hamper our progress. Jesse Waite, an inmate at a military prison who has developed an impressive mathematics curriculum for his fellow inmates, gives us insight into how significant restrictions on his communication with the outside world has placed certain limits on his and others' ability to grow. On a practical level, I hope readers take away from this issue tips for writing for the MAA periodicals and inspiration from stories that show what we can achieve if we open up to collaborations across disciplines.

Before I leave you to enjoy this issue of *MAA FOCUS*, I want to express my heartfelt gratitude to MAA President Jenny Quinn for leading us with such positive energy, joy, and playfulness through these last couple of dark and difficult years. Jenny, you never stop being a ray of sunshine in our community. Thank you for being you and for serving us so brilliantly. I hope you take a much needed rest as your presidency ends and the new year begins!

On the Cover



*The G. David and Jane B. Gearhart Curvahedra at the University of Arkansas.*

*For more information about the sculpture, go to page 44.*

# MAA FOCUS

Mathematical Association of America

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## The MAA Welcomes Tamara Lakins as Incoming CMJ Editor

The MAA is pleased to announce the appointment of Tamara Lakins as the incoming editor of *The College Mathematics Journal*. During 2023 Tamara will be serving as editor-elect and she will start accepting and editing papers in January.

*I'm really looking forward to working with Tami, and to watching her carry CMJ into its next chapter. With a strong background as an author of books and papers, and years of service to MAA at the Section and National level, she is extremely well prepared for this work!*

— Dominic Klyve, current editor of the CMJ

### Biographical Sketch

Tamara Lakins received her PhD from the University of Illinois at Urbana-Champaign and has taught at Allegheny College for over 27 years. Tami was a 1995–96 Project NExT Fellow, has been active in the MAA at both the section and national level, and currently serves as an Associate Editor on the MAA Classroom Resource Materials Editorial Board and as Treasurer of the Allegheny Mountain Section. Her passions include singing in the Allegheny College Women's Ensemble and her 10-year-old son, Michael.



*I have been using articles from the MAA journals in my teaching of Allegheny's "Mathematics Junior Seminar," which is focused on the reading and presentation of journal articles, since 2008. Preparing to teach the Junior Seminar enabled me to spend many enjoyable hours browsing the CMJ for suitable articles. I am excited to have this opportunity to serve as the Editor of the CMJ, where I can play a role in continuing the CMJ's long tradition of publishing high quality and engaging articles focused on topics that are inspired by the undergraduate mathematics curriculum, as well as accessible to upper level undergraduates.*

— Tamara Lakins

## NOMINATIONS OPEN FOR A NEW MAA AWARD!

Call for Nominations  
for the  
T. Christine Stevens  
Award for  
Leadership Development

For more  
information  
visit  
[maa.org/awards](http://maa.org/awards).

for significant,  
sustained work to  
cultivate and strengthen  
leadership skills within  
the mathematical  
sciences

Nominations are due by January 15, 2023.



## Navigating Your New Member Portal

### Having outgrown our membership management system

after two decades of use, we recently upgraded to a modern solution which offers the flexibility and features that will help us better support your needs. This is just one part of a series of improvements and upgrades MAA is pursuing to better serve our members and the larger mathematical community.

While this upgrade is an important part of the progression and growth of the MAA, we know that change can be challenging to navigate at times. We've compiled a list of Frequently Asked Questions to help guide you through the process of accessing your new member portal. If you have a question that isn't addressed below, please reach out to the MAA Service Center for assistance at [maaservice@maa.org](mailto:maaservice@maa.org).

**Q:** How do I access the new MAA Member Portal?

**A:** Active MAA members need to create a new password for their profile in the MAA Member Portal before logging in for the first time. After setting up a new password, you can access the portal on [maa.org](http://maa.org) by logging in as before.

Follow these steps to create a new password:

- Go to [maa.org](http://maa.org). Click on the red Login button on the right.
- Select the "Forgot your password?" link. Your username is the email address you use for your MAA membership. (Since you are already an MAA member, there is no need to create a new account.)
- You will receive an email to reset your password to the email address you provided. (If it doesn't go directly to your inbox, please check your promotions or spam folders.)
- Select the link in the password reset email and set a password.
- Please make sure we have your correct contact information and preferred email (required). If you need to make changes, click the Change button.

**Q:** What membership data was migrated to the new member portal?

**A:** MAA moved all current member data to the new system including member contact information. MAA did not move financial payment information and passwords.

**Q:** Do I need to update my credit card information?

**A:** Yes, if your membership is set up as auto-renew or if you pay monthly, the new member portal will require you to add your credit card information.

For your security, we did not migrate financial information from the previous system. You can update your credit card information on your own (click on Payment Methods

in the left-hand menu), or reach out to the MAA Service Center at 800-331-1622 or [maaservice@maa.org](mailto:maaservice@maa.org).

**Q:** Can I renew my membership in the new member portal?

**A:** Yes, if you are +/- 90 days from your annual renewal date, you may renew your membership in the member portal. Log in and select Renewal Notice from the left-hand menu and follow the steps to renew.

**Q:** Have you also upgraded the Departmental Membership user experience?

**A:** Yes, we've made improvements and upgrades for Departmental Members! You and your institution will have better access to member benefits, with less work. If you are an existing MAA Departmental Member, or if you're interested in learning more about the benefits of Departmental Membership, reach out to [membership@maa.org](mailto:membership@maa.org).

**Q:** Are we getting a new website for [maa.org](http://maa.org) as well?

**A:** Yes, that's next on the list. MAA staff are in the process of evaluating how [maa.org](http://maa.org) will function for our membership and the larger mathematical community. We're hoping to introduce a new website in 2024.

Following is a list of what you can do with each menu item in the Member Portal. We will share more information and resources about the MAA Member Portal transition in the near future, including a video tour of the new portal. If you have any questions pertaining to your membership account, access to publications or journals, or anything else, please reach out to the MAA Service Center at 800-331-1622 or by email at [maaservice@maa.org](mailto:maaservice@maa.org).

**1 Change:** Use to change your contact information. It is important to note that changing your preferred email address will also change your MAA login username.

**2 Directories:** Search for MAA departmental members or regular members.

**3 MAA Member Library:** Takes you to the MAA Member Library where you can download Notes volumes and select other books for free.

**4 Contact us:**

- **Info:** Contact info for the MAA Service Center.
- **Change University Administrator:** Change the administrator for your departmental membership.
- **Request a New SIGMAA:** Links to a form for adding a SIGMAA outside of your normal membership renewal cycle. Some fields are auto-filled from your contact information.

**5 MAA Store:** Right now you can add print copies of MAA journals to your membership. Other items will be available in the future.

**6 Join MAA:** Allows non-members to join.

**7 MAA Publications:** Access MAA periodicals and MAA Press books here.



First Name Last Name

My Info

- 10 My Memberships
- 11 Renewal Notice
- 12 My Affiliations
- 13 Payment Methods
- 14 My Orders
- 15 My Involvement
- 16 Member Discount Programs

Updating your preferred email will also update your username to log in.

**It is important to remember this!**

## Contact Information

 First Name:  
 First Name

 1 

 Last Name:  
 Last Name

 Preferred Email Type:  
 Work

 Work Email:  
 workemail@email.com

 Personal Email:  
 personalemail@email.com

 Mailing Street:  
 MAA Headquarters

 Mailing City:  
 Washington

 Mailing State/Province Code:  
 DC

- **MAA Journals:** Takes you to the Taylor & Francis journal website where you can access MAA journals and the various journals MAA members can access for free because of our partnership with T&F.
- **MAA FOCUS, Convergence, and Math Values:** These links take you to their respective web pages.
- **Shop MAA Press:** Takes you to the AMS Bookstore. AMS still requires that you have an account with them and that you sign in at checkout to get your member discount.

**8 Donate to MAA:** Support the important work of the MAA by donating today.

- 9 More:**
- **MAA Connect:** Takes you to MAA Connect. Click the Sign In button to complete your log in.
  - **MAA Video Library:** Links to the MAA video library on youtube.com.

**10 My Memberships:** View and manage your membership. Clicking Renew will bring up a renewal order with your add-ons (e.g., print copies of the journals) and your SIGMAA memberships.

**11 Renewal Notice:** If it is time to renew, you can view and/or modify your renewal order, and renew immediately. You can also add a payment method by clicking Payment Methods.

**12 My Affiliations:** Make sure your institutional affiliations are listed. You may have extra benefits if your institution is a departmental member.

**13 Payment Methods:** Add a credit card. This is essential if you want to set up auto renewal.

**14 My Orders:** Use the Open Orders tab to view open or past due orders. Use the All Orders tab to search for all orders by date range. Under either tab you can view, download, or print receipts.

**15 My Involvement:** View your committee, section, and SIGMAA memberships.

**16 Member Discount Programs:** Access member discounts from affinity partners. MAA Affinity Programs provide our members with real savings opportunities. Our affinity partners offer everything from discounts on auto insurance and identity theft protection to discounts on rental cars and office supplies. MAA member discounts can save you hundreds of dollars, while every purchase you make helps support the MAA.

Finally, don't get lost! Clicking on the MAA logo will take you to the maa.org website. In the submenu under the person icon (top right), clicking Profile will bring you back to your portal home page and clicking Logout will return you to the maa.org website.

## Celebration of Math

—JENNY QUINN

On September 23, 2022, MAA celebrated the hard work and success of 23 outstanding mathematicians—gold medal winners from the United States Mathematical Olympiad (USAMO), the US European Girls Mathematical Olympiad (EGMO) team, and the US team to the International Mathematical Olympiad (IMO). Students were invited to the heart of the New York City financial district and treated to a day of activities, reunions, math challenges, and fun.

Hosted by Jane Street, Sandor Lehoczky welcomed the honorees and their parents. A Math Olympian himself, Lehoczky is a Jane Street senior trader and co-author of the influential two-volume set *The Art of Problem Solving*. In addition to introducing students to exchange-traded funds, he shared important lessons for life, including “life is a group project” and “most things you do, fail.”

The morning was spent playing Figgie ([figgie.com/](http://figgie.com/)), a fast paced card game that simulates markets and trading, and an exploration guided by Jane Street trader Nitya Mandi on mathematical questions about the card game War. By the end of the daytime activities, students understood that their love of problem solving could be harnessed for a career in finance.

The evening festivities were more formal, including a social hour, red carpet photographs, a banquet, and an award ceremony. I served as emcee and told the story of the Olympians’ journey through a hexaflexagon that highlighted MAA, gold medals of the USAMO ([bit.ly/USAMOawardees](https://bit.ly/USAMOawardees)), the first place finish earned by the EGMO team in Eger, Hungary ([bit.ly/US\\_EGMO\\_2022](https://bit.ly/US_EGMO_2022)), the third place finish earned by the IMO team in Oslo, Norway, Jane Street for their generous sponsorship, and Jane Street’s game Figgie. Trader In Young Cho regaled the celebrants with stories of friendships she formed during mathematics competitions, including the USAMO, and urged the winners to continue to work hard, using their intellectual gifts for good. Official presentations of awards were made by





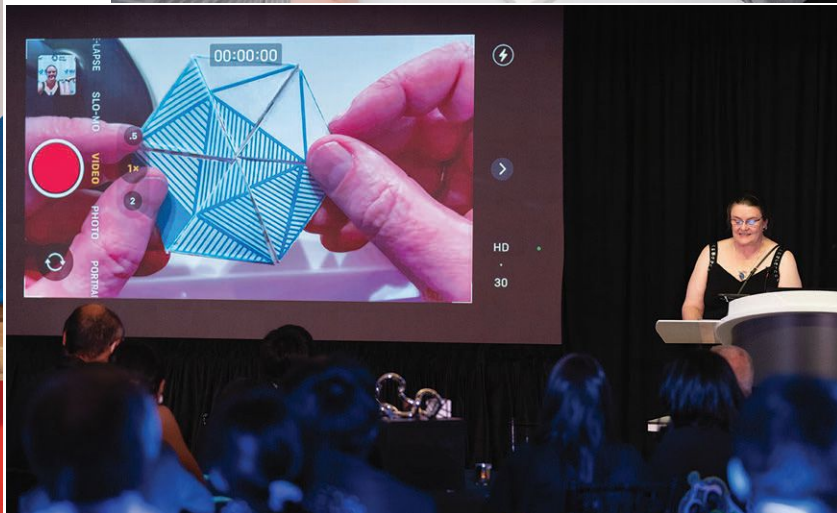
the MAA American Mathematics Competitions team Bela Bajnok and Jennifer Barton.

It was a joyful celebration that focused on friendship and play. There were puzzles on every table. Perhaps the biggest lesson was that games can be an important foil for mathematical thought. Start simple. Understand deeply. Ask interesting questions. The answers can be surprising and surprisingly useful. And remember to play. The Olympians showed the way by merging several tangle puzzles and making a jump rope. Much laughter was had by all.

Thank you to Jane Street Financial for their generous support of MAA's mathematics competitions and for hosting this fantastic celebration.

The celebration of mathematics hexaflexagon is available at [bit.ly/celebrate\\_math\\_hexaflexagon](http://bit.ly/celebrate_math_hexaflexagon). You can print, cut, fold, and flex your own. ■

*Jennifer Quinn is the MAA president and a professor of mathematics at the University of Washington Tacoma (jquinn@uw.edu).*



## OPEN Math

### How did the year 1 workshops go?

—DOUGLAS ENSLEY

For many academics, summer is a time for rejuvenating, retooling, and retraining, especially on matters of course design and instructional practices. To support these efforts, the new MAA OPEN Math program launched its inaugural workshops in 2022, providing teaching-focused professional development to mathematics instructors across the country. The brainchild of Sandra Laursen, Stan Yoshinobu, Deirdre Smeltzer, and myself, the OPEN Math project delivers intensive, teaching-focused professional development workshops through online delivery and networking, making it more convenient and less resource intensive than traditional face-to-face models, thus potentially reaching into parts of the mathematics community previously underserved.

In total, over 200 people participated in the nine workshops, representing all kinds of institutions and career stages. There were as many participants in their first five years of teaching as in their 20th+ year of teaching, almost as many in non-tenure positions as in tenure/tenure-track jobs, and a significant representation from each of two-year, four-year, and doctoral-granting institutions. The workshops were intensive (each with 20–30 hours of synchronous meetings) and small (averaging about 22 participants each), features that set the stage for these experiences to draw close parallels to more traditional, face-to-face training.

*Getting hands-on demos and help from a variety of experts with all of the tools we covered was fantastic!*

The goals of the OPEN Math project include not only delivering excellent content but also to evaluate how various online practices lead to success in supporting individuals or departments to implement new teaching practices in their classrooms. Thanks to some sharing of ideas during the OPEN Math “Winter Training Sessions” (organized by Stan Yoshinobu, Dana Ernst, Matt Jones, and TJ Hitchman), a common core to most of the summer workshops included online tools such as Zoom breakout rooms, Zoom chat, something like Google Jamboards or Padlets, and lots and lots of communication. The full range of strategies used by



OPEN Math panel from MAA MathFest 2022. L to R: Doug Ensley, Rebecca Machen, Nancy Kress, Mary Pilgrim, Allison Henrich.

the 2022 workshop teams was broad, varied, and extremely creative.

Allison Henrich, co-leader of “Mentoring Undergraduates in Research: A DEI Approach,” described an activity run by Michael Young in which participants were given “a list of the 500 most common words in the English language, and they then had to describe their research area using only words from the list. This helped people think differently about communicating about their research in an accessible way.”

*Overall, I enjoyed (and was invigorated by) meeting other like-minded people.*

Olwynn Lancaster, co-leader of “Redesigning your Course for Mastery Grading” reported that with the significant use of Zoom breakout rooms, “we mixed things up by sometimes using randomly assigned rooms, so everyone had a chance to work with everybody, and other times assigning consistent groups because people needed time to plan and time to work together.” Attention to building community in an online session is a core feature of all OPEN Math workshops.

The online format over multiple days allowed the facilitators to adjust to the particular needs. Rebecca Machen, co-leader of “Inclusive Active Learning in Introductory Mathematics Courses” provided one example: “After some reflection after Day One we implemented a change midway through Day Two to hold online office hours at the end of the day and to provide opportunities for folks to connect with us during the breaks.”

In reflecting on the one-week intensive workshop, Machen noted that her team was pleasantly surprised by the level of engagement among the participants. “People were consistently participating in our session even though it was a long, four days and a lot of [sometimes uncomfortable] material, but people were ready for it.” Similar praise for the dedication and energy of the online participants was common across all of the workshops.

A benefit of intensive workshops is that participants can have time to focus on tasks that they may not normally have outside of a workshop setting. Several teams created individual or small-group tasks to make effective use of participants' time. The "Redesigning Your Course for Mastery Grading" workshop included short literature reviews intentionally designed to be done during the workshop. According to co-leader Sharona Krinsky, "The first lit review is about what's wrong with traditional grading, and at the end of that session, participants were passionate about the need to make a change, perfectly setting us up for the rest of the workshop."

## *The best aspects were the team spirit, the sharing of experiences and resources, and amazing presentations!*

The workshop topics ranged from issues about inclusion and equity to specific pedagogical practices to training with materials for particular courses. Even in the latter case, OPEN Math workshops put "inclusive, active pedagogy" front and center, a feature aided by the open sharing during the Winter Training Sessions.

Therese Shelton, a co-leader of Modeling Inspiration for Differential Equations, notes that even in their workshop focused on the vast SIMIODE collection of resources, "Having students use simulations and technology is very much centered on pedagogy, so students make sense of what they are doing and can communicate it clearly. But, of course, people also need the materials to support doing that."

The Winter Training Sessions explicitly focused attention on the ways that issues of inclusion and equity can flow

*We had a great experience with OPEN Math and lots of support from everyone on the team. We had lots of participants, they were enthusiastic the whole time, and we had a great time with them.*

—Ambika Silva, co-leader of Utilizing Technology to Teach Data-Centric Statistics

through every workshop. Kate Kozak, co-leader of "Utilizing Technology to Teach Data-Centric Statistics," credits the Winter Training Sessions for improving that workshop. According to Kozak, "We showed participants how to bring equity and diversity issues into their own classrooms simply by choosing appropriate data sets on issues related to social justice. We may not have thought about that without those winter sessions."

The schedule of OPEN Math workshops for summer 2023 will be announced by January 1 through various MAA channels and will also appear in the next issue of *MAA FOCUS*. ■

*Doug Ensley is Emeritus Professor of Mathematics at Shippensburg University and Principal Investigator at MAA for OPEN Math (NSF #2111260).*

### 2022 Workshops

- Infusing Practical Harm Reduction Strategies
- Mentoring Undergraduates in Research: A DEI Approach
- Inclusive Active Learning in Introductory Mathematics Courses
- Inclusion and Inquiry: Fostering Student Belonging and Ownership
- Rich Mathematical Tasks in Mathematics for Elementary Teacher Courses
- Modeling Inspiration for Differential Equations
- Utilizing Technology to Teach Data-Centric Statistics
- Leveraging the IP Guide in Coordinating Large Multi-section Courses
- Redesigning your Course for Mastery Grading

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## MAA FOCUS Welcomes a New Deputy Editor—Matthew Pons

—ALLISON HENRICH

At the end of 2022, our beloved MAA FOCUS deputy editor and longtime MAA book acquisitions editor, Stephen Kennedy, is retiring. While he will remain on the editorial board of MAA FOCUS and continue to provide me with sage guidance, he is stepping down from the role of deputy editor. I'm delighted to invite a new member to our board, Matthew Pons, who will serve as my deputy editor starting in January of 2023. Matthew was the driving force behind the Euler Award-winning book *Living Proof: Stories of Resilience Along the Mathematical Journey*, and one of the founders of the Living Proof blog, which is now a sub-stream of the MAA Math Values blog. Given his editorial experience and great ideas, I couldn't be happier to have him join me on the MAA FOCUS team.

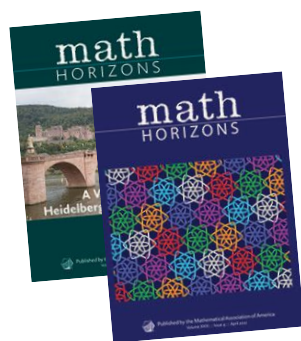
### Biographical Sketch

Matthew Pons is the Marie and Bernice Gantzert Professor in the Liberal Arts and Sciences at North Central College and is also the chair of the Department of Mathematics and Actuarial Science. He has a bachelor's degree from the University of North Carolina at Asheville and advanced degrees from the University of Virginia. Matthew authored the text *Real Analysis for the Undergraduate*. His research is in operator theory and functional analysis. He is also passionate about well-being and advancing conversations on mental health within the mathematical community.



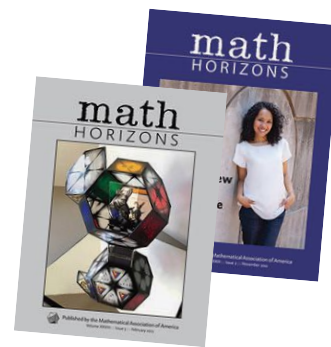
*"I'm excited to join the editorial board of MAA FOCUS for several reasons. First, I'm excited to support my dear friend, Allison, in her new role as editor. We've worked together for several years, we understand each other's strengths, and we trust each other. I'm honored that she asked me to join her on this journey. I'm also excited to join the other members of the editorial board. Many of these folks have mentored me (often-times unbeknownst to them) and shown me what it means to be both an outstanding mathematician and an outstanding human being, and I'm excited for the chance to work alongside them. Finally, I have been looking to give back in a more substantive way to the mathematical community and this seems like a great place to focus my energy. I'm still learning the process but hope to be able to contribute more significantly in the coming months."*

—Matthew Pons



## Want to Influence a New Generation of Student Mathematicians?

*Math Horizons* provides a vibrant and accessible forum for practitioners, students, educators, and enthusiasts of mathematics. It is dedicated to exploring the folklore, characters, and current happenings in mathematical culture, and presenting exceptional mathematical exposition accessible to an undergraduate-level audience.



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## 5 Grant Applications Now Launched!

### Dolciani Mathematics Enrichment Grants (DMEG)

**Deadline:** February 12, 2023

DMEG supports projects designed to develop mathematical enrichment programs for interested and promising students in middle and high school. Grants will be up to **\$5,000** and will be made to the college or university of the project director for a one-year project.

College and university mathematical sciences faculty working in partnership with middle or high school math teachers are eligible.

**For more information and to apply go to:** [maa.org/DMEG](http://maa.org/DMEG).

### Tensor Strengthening Underrepresented Minority Mathematics Achievement (SUMMA) Grants

**Deadline:** February 12, 2023

Tensor Strengthening Underrepresented Minority Mathematics Achievement (SUMMA) Grants support programs that encourage the pursuit and enjoyment of mathematics among middle school, high school, and college students from groups traditionally underrepresented in the field of mathematics. Grants will be awarded up to **\$6,000** and will be made to the institution of the project director for a one-year project. An institution is expected to supply matching funds or in-kind support as an indication of commitment to the project. These grants will not support any institutional indirect costs or provide fringe benefits.

College and university faculty, as well as secondary mathematics faculty who work in conjunction with college or university faculty and their institutions are eligible.

**For more information and to apply go to:** [maa.org/tenant-summa](http://maa.org/tenant-summa).

### Tensor Women & Mathematics Grants

**Deadline:** February 12, 2023

Tensor Women grants support projects designed to encourage college and university women or pre-college girls to study mathematics. Grants will be awarded up to **\$6,000** and will be made to the institution of the project director for a one-year project. An institution is expected to supply matching funds or in-kind support as an indication of commitment to the project. These grants will not support any institutional indirect costs or provide fringe benefits.

College and university faculty, as well as secondary mathematics faculty who work in conjunction with college or university faculty and their institutions are eligible.

**For more information and to apply go to:** [maa.org/tenant-women](http://maa.org/tenant-women).



*Tensor SUMMA 2019: University of North Carolina at Chapel Hill Girls Talk Math: Recruiting Underrepresented Minority Mathematicians through a Non-Traditional Math Camp  
Project Director: Hans Christianson*

### Neff Outreach Fund

**Deadline:** February 12, 2023

The John and Mary Neff Foundation provides funding to support projects designed to encourage middle school students to study and persist in their interest in mathematics. The MAA is proud to partner with the Neff Foundation to offer a pilot outreach program that serves middle school students in rural and indigenous communities. Through the MAA outreach initiatives, MAA strives to offer support to faculty and program directors to offer math education projects to middle school, high school and early college students.

Nonprofit organizations, secondary school districts, and higher education institutions who work in conjunction with secondary mathematics faculty are eligible.

**For more information and to apply go to:** [maa.org/neff-grants](http://maa.org/neff-grants).

### National Research Experience for Undergraduates Program (NREUP)

**Deadline:** February 1, 2023

NREUP helps faculty recruit and mentor undergraduate research students from underrepresented groups. The MAA invites mathematical sciences faculty to apply for grants to host an MAA Student Research Program on their own campuses for **at least seven weeks** during summer. The program works to increase student interest in advanced degrees and careers in mathematics through focused and challenging research experiences. Direct costs for each grant will not exceed **\$27,500**.

College and university mathematical sciences faculty are eligible.

**For more information and to apply go to:** [maa.org/nreup](http://maa.org/nreup).

## 25th Annual NCUWM Celebrates its Growing Community

—LINDSAY AUGUSTYN AND CHRISTINE KELLEY

**The Nebraska Conference for Undergraduate Women in Mathematics (NCUWM)** is celebrating its 25th annual event in January 2023 in Lincoln, Nebraska. Original co-founder Judy Walker, professor of mathematics and associate vice chancellor for faculty and academic affairs at the University of Nebraska–Lincoln, will be one of the three distinguished plenary speakers commemorating this milestone year.

Made possible with generous support from the National Science Foundation and the National Security Agency since 1999, the NCUWM has grown from 53 undergraduate participants to about 260 each year, impacting nearly 5,000 undergraduates total. This conference was founded by the Department of Mathematics to provide undergraduate students with role models, insider knowledge, and the opportunity to present their undergraduate research, amid a growing community of peers who are interested in creating a supportive environment for women in mathematics.

In 2013, the NCUWM received the American Mathematical Society’s Award for Mathematics Programs that Make a Difference for the conference’s significant efforts to encourage women to continue in the study of mathematics. The mission of the NCUWM is to encourage undergraduate mathematics majors to attend graduate school, to increase their success in graduate school, and to help them identify possible careers using mathematics.



Attendees visit at the NCUWM poster session in 2020.



An undergraduate presenter discusses their poster at the NCUWM in 2019.

After holding two virtual conferences, the NCUWM is returning to an in-person format for 2023. NCUWM features three plenary talks, 48 student research talks, a poster session, three panels, and several breakout sessions. A return to in-person meetings means a long-awaited return to the banquet—a conference favorite—and a wide range of networking events.

“About 10 years ago, I was an undergraduate sitting at a banquet dinner table at my very first NCUWM,” said 2023 invited guest panelist Jessica De Silva, assistant professor of mathematics at California State University, Stanislaus, and doctoral alum of Nebraska. “Around me were other undergraduates who came from all sorts of schools and backgrounds, but we connected quickly with our shared experiences as women in mathematics. While getting to know peers with very different mathematical journeys from my own, I remember hearing stories reminding me of myself, when the successful women mathematicians spoke on the stage. The stories they told of their lives gave me a glimpse of what my life could be like five and 10 years from that time. Ten years later, I will be sitting on a stage at NCUWM telling my own story.”

Along with UNL’s Walker, the other plenary speakers for 2023 are Deanna Haunsperger, professor of mathematics at Carleton College, and Talithia Williams, associate professor of mathematics at Harvey Mudd College.

Haunsperger is the co-founder and co-director of Carleton’s Summer Mathematics Program for Women and currently serves as the editor of the MAA’s blog site, *Math Values* (mathvalues.org). Walker, who chaired or co-chaired the NCUWM organizing committee for many years, is a Fellow of the Association for Women in Mathematics, the AMS, and the American Association for the Advancement of Science, and currently serves on the AMS Board of Trustees. Williams is cohost of the PBS series *NOVA Wonders* and author of the

2018 book *Power in Numbers: The Rebel Women of Mathematics*.

Some undergraduates with high self-confidence and prior research experience strongly benefit from prominent mathematicians as role models. For other undergraduates, it is much easier to look for inspiration from individuals who are only one or two professional steps ahead of them. Thus, in addition to two or three prominent plenary speakers, the NCUWM features invited women mathematicians from a variety of career stages and paths, including women who are established working mathematicians in academia, industry, and government; recent PhDs.; and graduate students sent by their respective graduate programs to represent their departments. The conference also attracts a cadre of women faculty who attend with their students, and many of these women model the self-confidence that comes from being successful over a number of years in a career.

Many undergraduate students know very little about what is important when pursuing a career in mathematics. The conference tries to address these issues, including available undergraduate research opportunities, job skills, how to develop mathematics expertise, career options outside of academia, what graduate school and mathematics research entails, what options exist for graduate school, what factors to consider in choosing a graduate program, and what opportunities exist for funding and professional development.

There are ample opportunities for peer interaction among undergraduate attendees, invited graduate students, and early career faculty. These participants form personal connections during the NCUWM that continue after the conference has ended and positively influence the attendees' follow-up education and career development, providing a lasting impact that goes far beyond what is gained during the conference itself.

UNL alumna Allison Cruikshank is now a mathematics graduate student at Duke University and will be an invited graduate student representing Duke at the NCUWM in 2023.

"As a presenter and participant at NCUWM in undergrad, I was exposed to different areas of mathematical research that I had no idea existed," Cruikshank said. "Being able to share experiences with other women undergraduates was special and gave me the confidence I needed to apply to graduate school. I am excited to return this coming year to share my story and hopefully give women undergraduates the confidence they need to excel."

Faculty who attend the conference with their students have indicated that the most valuable part of the NCUWM is the variety in topics and levels of the student presentations, high-



Panelists at the NCUWM in 2019 advise students on choosing a graduate program.

lighting the exceptional work done by advanced students to the great exploratory work by early and intermediate students.

"I have attended NCUWM twice as an undergraduate, five times as a graduate student volunteer while at UNL, and three times with four students since becoming a faculty member," said Ashley Weatherwax Johnson, an associate professor of mathematics at the University of North Alabama. "As an undergraduate participant, this conference gave me the confidence I needed to pursue graduate studies. As a graduate student and now as a faculty member, I enjoy interacting with undergraduate students, telling them all about the opportunities available to them and contributing to the supportive environment that this conference is known for."

For most students, this conference is the first time they have presented to an audience. This opportunity not only gives them practice at public speaking but also leads to an increase in their self-confidence and comfort level, as well as the chance to network with faculty who are interested in their own area of research.

In 2021, 82% of respondents on the conference evaluation indicated that they were more likely to pursue mathematics in graduate school or as a career as a result of being a part of the NCUWM. The number of students indicating four or more role models more than doubled from before the conference to after the conference. Additionally, the percentage of students indicating a high level of confidence in their mathematical abilities increased from 28% before the conference to 47% after the conference (while students indicating low confidence decreased from 31% before to 11% after).

"Just like it did for me, NCUWM gives its participants the opportunity to be inspired by the uniqueness of others' stories and the potential of their own future story as a woman in mathematics," De Silva said. ■

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*Lindsay Augustyn is the associate director of the Center for Science, Mathematics and Computer Education, which oversees the event coordination for the Nebraska Conference for Undergraduate Women in Mathematics for the UNL Department of Mathematics. Christine Kelley is a professor of mathematics at the University of Nebraska-Lincoln and has been on the organizing committee for NCUWM since 2008 and has served as co-chair since 2012.*

## GET MORE

NCUWM will be held January 20–22, 2023. Please see [math.unl.edu/ncuwm](http://math.unl.edu/ncuwm) to register and for more details.



# Authors should be positional; Editors should be contextual.

*Brian P Katz*

**The new journal *La Matematica* was designed “to support the flourishing of all mathematicians** by adopting best practices towards equity in STEM publishing” [1]. In particular, the *LaMa* Editors-in-Chief have synthesized a broad research base that shows that doubly-anonymous reviewing leads to more equitable outcomes in STEM publishing.

I strongly support doubly-anonymous reviewing and *LaMa*'s other efforts, but I want to caution against a problematic over-generalization of this idea that exists in STEM. Publishing is not objective or neutral, and it neither could nor should be.

## **Authors and Positionality**

Positionality matters for all authors, meaning that our work is situated in our identities and contexts. I'll go first. I write this piece as a member of the *MAA FOCUS* editorial board, and I am the Co-Editor-in-Chief of *MAA Notes*, part of the lead editorial team of *PRIMUS*, and part of the editorial board of the inclusion/exclusion blog. I am a queer person who is offered benefits of whiteness and masculinity in most contexts, even if there are sometimes threats that these benefits will be revoked. I am trained in proving theorems but employed to research education and prepare teachers. These contexts matter. While it should not work this way, whiteness and masculinity shield me,

*Getty Images*  
*Credit: David Malan*  
*Creative #: 993596448*

queerness gives me a foothold, and my credentials lend me some authority across domains while I write about justice. My work should be viewed in this context, and I believe that this context gives me an ethical obligation to engage in this work.

Authors' positionality matters in all mathematical writing. In pedagogical writing, reviewers and readers regularly (and rightly) demand to know about institutional demographics and resources. We ask ethical questions about human subjects data collection to make sure that students are not coerced into participation, and we qualify data that might seem rosey because of social desirability or because students are writing to instructors who have power over their futures. More subtly, we often interpret the transferability of strategies through positionality: those of us with tenure or who resemble the tweedy, upper-middle class, white male cultural stereotype of a professor have greater license to break norms (even norms that are broadly understood to be toxic).

Similarly, positionality matters in writing about applications of mathematics and working with data. Modeling is not an abstractly deductive process; it is a creative act of choosing how to approach a phenomenon and how to interpret outcomes. Of course, we need good data and reproducible methods, but it also matters who's in the room when it happens. Modelers who approach their work as a universal process (meaning decontextualized and independent of people, time, and place) for investigating abstracted data sets often miss important interpretations and produce models that can be used to do harm, such as with predictive policing; attending to positionality would increase awareness of both unexamined assumptions and possible impacts of the models in the world. This harm is often experienced by communities who were not represented in the room as the models were built [2].

Some may think that writing about theorems is immune to these issues of positionality, but I disagree in several ways. We disclose our funding sources; the US government often funds work because lawmakers believe that our discipline contributes to their vision for the economy and national security. We know that publication in some subdisciplines is gate-kept when a small group of scholars determine the 'interesting' conjectures worth exploring. And the normative writing style in theorem-proving involves positioning the writer as a near-omniscient narrator writing to encourage a reader to imagine an idealized homunculus who can carry out infinite processes perfectly while attending to what each of these three characters (narrator, ideal agent, and reader) knows at all times [3]. I think theoretical math writing gets its reputation as notoriously bad because we forget to position these three characters explicitly in this writing, leading to inaccessible writing that can make readers feel incompetent. In meme form: "Author: Let  $U$  be an open set. Reader: OK, well what if I don't, huh?" [4].

Mathematicians say [e.g., 5] that they read papers looking for questions and strategies. To me, this means that the author ought to be positioned more as an inquirer who details the methods and explorations of their journey, rather than a narrator who starts with the denouement. As a start, I think it would help for authors to acknowledge their basic beliefs about the nature of mathematics in their writing, as well as "the sweat, hard work, number of wrong turns, and major mistakes" [6]. And I would like to know the full costs of the research, including carbon footprint, unpaid emotional support labor, and junior scholars pushed out of the field.

## Editors and Context

An editor's job is to evaluate a piece of writing in context. We employ significant latitude in selecting reviewers who can comment on the piece, making sure that the most important potential criticisms are considered. We synthesize reviewer comments and contextualize them for the authors, often through the positionality of the reviewers. Reviewers at *PRIMUS* have a range of exposure to education research, and authors usually find reviewer comments more helpful with framing that contextualizes comments with reviewers' expertise. More subtly, gender and other identities impact how we are socialized to communicate [e.g., 7,8], so it is entirely possible that even doubly-anonymous reviewers are using this kind of information implicitly in their evaluations. Editors need to resist the harm done when reviewers use cues of marginalized identities to make negative evaluations of the work.

Editors decide if a piece is appropriate for the publication venue. Is a piece of writing contributing to the mission of the publication? Do we want to lift up this work? What impact will it have in the community? The MAA's core values are Community, Inclusivity, Communication, and Teaching & Learning. Each of these values is fundamentally about human activities that must be considered in context. With this piece, I am trying to articulate how a vision of mathematical publication as decontextual removes that communication from community and contributes to ongoing patterns of exclusion by dehumanizing authors, educators, and readers. The problematic over-generalization of doubly-anonymous review comes in when people insist that editors pretend to make anonymous decisions about writing and ignore their context. Here are two examples.

Citation is political. People of color, women, and especially women of color see their work undervalued through under-citation [e.g., 9,10]. I worked with a piece by a white man that synthesized work that had been done mostly by scholars of color and that was positioned to repeat this pattern by siphoning off citations. The author revised the piece so that readers would be much more aware of how the ideas were developed by specific scholars of color, and we have been careful to establish a pattern of sharing the original work of

scholars of color rather than allowing the synthesis to become the only citation.

Publication is not neutral. Readers will likely be familiar with another magazine of a math society that has published pieces that put forth opinions about false narratives of meritocracy in mathematics and claims that efforts to support inclusion and justice are somehow harming the discipline. Evaluating such writing out of context does harm, and I believe that publishing such work is an abdication of the responsibility of an editor. Treating this kind of publication as a conversation starter misses the point that this ‘conversation’ has been going on for a long time, but by validating it in print and giving it the seal of approval of the publishing organization, bigotry has been emboldened in our discipline and a tremendous amount of emotional labor has been set for already taxed members of our community.

Three thoughts before you accuse me of censorship. First, no one is owed a publication, and no one has a constitutional right to be published. The First Amendment to the US Constitution says that many kinds of speech are protected from legal action by the federal government, but that is very far from saying that we need to use our publishing platforms to amplify all speech. Editors have a responsibility to select and develop writings that forward the publication’s mission while guiding the evolution of that mission.

Second, I am not proposing a political litmus test for publication. Context matters precisely because the concern is with the impact of our actions and choices, not our intentions or the ideas in the abstract. I left a previous job because of abuse. One of the most upsetting pieces of the situation was how my institution knew of the problems but refused to act while also lifting up other work by the perpetrators. I will not perpetuate this kind of harm by knowingly lifting up the work of harassers in our discipline in the name of editorial neutrality. If someone deserves the benefit of the doubt in these decisions, it’s the folks who have been marginalized by harassment.

And third, you may be concerned that these kinds of editorial stances would be used against marginalized folks. But the system is *already* being leveraged against marginalized people, often specifically through the guise of editorial neutrality. The alternative to using context to inform decisions is attempting to build a universal process that purports to be multiply-anonymous. But decontextualized systems get implemented in practice through privilege, allowing many harassers to reap the benefits of the maximum spirit of the law while their targets have to fight to access the tools of the minimum letter of the law.

There is no way to universalize our way out of this issue because universality is an active political stance, not a neutral position. And only white men are given the luxury of disentangling their identities from their work. Instead, editors must work hard to educate themselves so that they can evalu-

ate the impact of work in the context of authors’ positionality and community. From this perspective, reviewers should be asked to work doubly-anonymously as an effort to provide independent information for editors, but editors should never pretend that anonymous reviews are without context or that publication is about some abstract merit of a piece of writing that could be measured universally.

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Brian P Katz (BK) is faculty in mathematics education at CSULB. BK is passionate about interactions between inquiry, epistemology, identity, authority, and justice as both a scholar and teacher, especially in the context of preparing teachers to lead student-centered and rehumanizing classrooms of their own.



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# Reach the World

## Writing Mathematical Opinion for a Post-Truth Culture

*Kira Hamman and Francis Su*

### Introduction

In January 2017, public discourse in the United States was not exactly thriving. The effects of the 2016 presidential election cycle rippled across communities and dinner tables around the country. Cries (or, often, tweets) of “fake news” abounded and were soon joined by the introduction of “alternative facts.” In many academic circles, where we pride ourselves on evidence-based reasoning and decision making, there was something bordering on despair.

In this context, at the Joint Mathematics Meetings in Atlanta, the authors bumped into each other in an elevator and recalled a vague plan we’d had to design a session intended to help other mathematicians learn to write timely op-eds (as guest opinion pieces were then called) for the mainstream media. Such essays are often authored by people with expertise on the topic of discussion; in a physical paper, they typically appear opposite the editorial page. We knew that many in our community have important analytical and evidence-based expertise to bring to bear on the problems facing society, but they often lack the confidence to write for a non-technical audience, an understanding of how to get such writing into print, or both. Suddenly, this seemed a far more urgent task, and by the time we reached the hotel lobby we had agreed to propose a minicourse for the following January.

And so, *Reach the World: Writing Math Op-Eds for a Post-Truth Culture* began. It ran at JMM 2018 in San Diego and was attended by a delightfully talented and determined group of 21 mathematicians from all over the country. (It will run again at JMM 2023 in Boston.) By the end of the minicourse, each participant had a

*Presenters and organizers of the op-ed minicourse held at JMM 2018. L to R: Francis Su, Tara Holm, Keith Devlin, Kristen Vu, Kira Hamman, and Michael Starbird.*

working draft of an op-ed, and within six months, five participants had published op-eds in news outlets ranging from *The Minneapolis Star-Tribune* to *The Cleveland Plain Dealer*. These were on topics ranging from vote-auditing to gerrymandering to the Roman numeral system, using the Super Bowl as a hook. Many participants have continued to publish similar pieces since then, and their contributions have both broadened and enriched the public discourse in their communities.

Our intention in writing this article is to offer some of the guidance provided in the minicourse to a wider audience in the hope of generating a still larger pool of public scholars, mathematicians who are actively contributing mathematical expertise to the public discourse. If anything, this is even more urgent now than it was in 2017. Of course, quantitative analysis alone will never be sufficient to address the complex problems we face as a society—climate change, global health, the integrity of the democratic process—but neither can we meaningfully address those problems without it. To empower non-mathematicians to include quantitative considerations when addressing public problems, we need mathematicians who are willing and able to step up to the task of providing it in a digestible format. The opinion piece is an excellent avenue for doing that.

The advice that follows is broken into four parts, as is our minicourse. First, prospective opinion writers must choose what to write about and figure out how to present it in a way that will grab the attention of a non-mathematical audience. Second, the piece must be structured appropriately so that mainstream media outlets will consider publishing it. Third, it must present the relevant quantitative information in a way that is accurate and meaningful without being overwhelming or incomprehensible to the average reader. This is, perhaps, the hardest part. Finally, authors must get their work into print, a process that is both similar to and vastly different from academic publishing.

## Choosing Compelling Topics and Angles

*Why would anyone want to read this?* It's a question we don't typically ask ourselves about our professional writing in mathematics. If we have something new to say—a theorem, a pedagogical strategy—we take for granted that at least some of our colleagues will want to hear about it, and generally speaking, we are correct. Not so in opinion writing.

The first thing an opinion essay needs is a *hook*. This is the answer to the above question and is usually a connection to something timely—a current issue or event, a person in the news, even a national holiday will sometimes do. There are two ways to get a good hook: (1) look for mathematical connections to things going on around you and then write about them when they happen, or (2) write about what you want, then wait for something to happen that makes it timely and tie your piece to that. The first approach requires flexibility

and, often, fast writing. The second can be more deliberative but also harder to get into print since it can take time for a connection to arise. The authors have seen both approaches be effective.

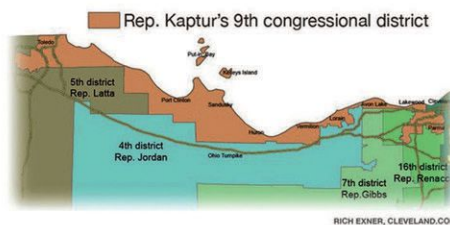
One of the us, who lives in Maryland's heavily gerrymandered 6th Congressional District, took the opportunity of a visit from her congressman to write about gerrymandering for her local paper. Another time, an incident involving actions by local police toward an African American girl provided an opening to write about race, incarceration rates, and conditional probability. Another of us wrote an opinion piece about gender inequity in mathematics which appeared in the *L.A. Times* shortly after Maryam Mirzakhani became the first woman to win the Fields Medal. Although that topic of gender inequity is (unfortunately) timeless, publishing it in conjunction with that award gave it a hook and made it relevant for readers of the *Times* and interesting to the editors.

An article about the mathematics of climate change could be linked to a climate-related event. A piece on the Gini coefficient could be released in conjunction with a report about unemployment numbers. And as bills about math education make their way through state legislatures, newspapers will likely be receptive to articles citing recent research on effective teaching of mathematics. Of course, gerrymandering and the COVID-19 pandemic are likely to remain fertile ground for mathematical opinion. Readers can undoubtedly think of many examples of situations in which the public discourse would benefit greatly from the introduction of quantitative information.

Opinion

## In the geometry of gerrymandering, the prettiest voting maps may not be the fairest: Aaron Montgomery (Opinion)

Updated Jan 30, 2019; Posted Feb 18, 2018



Rep. Marcy Kaptur's 9th Congressional District in Ohio, also known as the Snake on the Lake for its obvious gerrymandering aimed at forcing one longtime urban Democrat in Congress (Dennis Kucinich of Cleveland) to go up against another. Kaptur won that contest in the 2012 primary. Mathematician Aaron Montgomery writes that not all strangely configured districts will reflect unfair political aims. (Rich Exner, cleveland.com, File, 2017)

Aaron Montgomery, "In the geometry of gerrymandering, the prettiest voting maps may not be the fairest," *Cleveland Plain Dealer*, 2/18/18. [bit.ly/geometry\\_gerrymander](http://bit.ly/geometry_gerrymander)

# Roman numerals, so prominent this week, have their place — in the past

OK, on the Super Bowl, too. But today's system is far superior and makes possible much of our technology.

By Rafe Jones | JANUARY 30, 2018 — 6:15PM



BRIAN PETERSON • STAR TRIBUNE

The Roman numerals LII (52) are attached to this year's Super Bowl and to U.S. Bank Stadium, site of Sunday's game.

Rafe Jones, "Roman numerals, so prominent this week, have their place — in the past," Minneapolis Star-Tribune, 1/30/18.

[bit.ly/roman\\_numerals\\_Rafe\\_Jones](http://bit.ly/roman_numerals_Rafe_Jones)

## Structuring Your Essay

Most opinion pieces are about 800 words long. While an online publication may not have the same restrictions as physical paper, most readers will not have the patience to read something much longer. For that reason, it is also important to get the most important ideas up front in a way that will keep the audience wanting to read more. The essay should make clear what's at stake: why does this matter right now? This is where a hook to a timely event can be useful.

You should write for the uninformed reader or thoughtful skeptic. Your goal is to change opinions, not preach to the choir. This also means writing with a gracious, non-condescending tone to those who hold a different view.

With just 800 words, you should make every sentence count. Entice with a compelling lead. Write declarative sentences, grab the readers' attention, and advance the argument. Ruthlessly trim unnecessary words: write 1000, trim 200. Avoid the passive voice.

As an expert, your opinion will be more highly valued both by readers and by the newspaper if you marshal evidence. Back up your opinion with facts that support your claims. But don't write like an academic! Avoid jargon. Write in simple sentence structures. Don't try to be too precise in a way that could lose people. Avoid ambiguous sourcing ("Some people

say...") and equivocation ("on the one hand... on the other hand"). This doesn't mean you shouldn't express nuance, but an opinion piece should have a clear point of view. More on this in the next section.

Where possible use stories, drawing on your life experiences in a way that people can relate to. Be conversational, even humorous. Use powerful imagery and compelling non-clichéd analogies.

Try to anticipate the strongest objections to your arguments and address them. Sometimes this is called the "to be sure" paragraph. But beware setting up "straw man" arguments, which can make someone who disagrees feel you are mischaracterizing their position and disassembling an argument they aren't making.

Your greatest asset, as a subject matter expert, is your truthfulness. Ask yourself: is every sentence you wrote defensible? Are all the facts confirmed?

End strong. What should a reader do or reconsider as a result of your essay?

Finally, always get feedback. Give your draft to friends and colleagues and take their reactions seriously.

## Distilling Quantitative Information

For many mathematicians, this is the most difficult part of writing for a general audience. We love our subject and, quite understandably, tend to be averse to oversimplification that could lead to inaccuracy. Alas, dear reader, this you must get over. Asked how much math an article like this should contain, Keith Devlin, a master of reaching general audiences and a panelist at our 2018 minicourse, replied, "almost none." Devlin is justifiably famous for his ability to explain complex mathematical ideas to non-mathematicians, so this is advice we should heed.

Your audience does not want to hear the details. Your audience probably does not even want to hear a precisely stated claim. Your audience wants to know what this has to do with the thing you mentioned in your hook, which is the thing they care about. No equations. No variables. If a word requires you to define it, think seriously about whether there is a different word you could use. You want to explain exponential growth in the context of global average temperatures? Talk about "doubling," not exponents. You want to show how game theory can be used to predict political behavior? Keep Nash equilibria out of it. Remember: you are already on thin ice because you are asking your readers to think quantitatively. Don't push it. Focus on the *implications* of the mathematics, not the mathematics itself.

## Getting it Out There

The most obvious way to get your work considered for print is to send it directly to a newspaper through its open submission process. This may not be most effective, however,

because the paper probably receives more submissions than it can handle. If you go this route, be sure to explain up front why you are qualified to write this piece.

If you're an academic, you can lean on your institution's communications or public relations office, whose staff often have contacts at the local papers. They will probably be more than happy to pitch your piece to the contacts they have. If you have other colleagues or acquaintances with connections to newspapers or other media outlets, draw on them. You can even reach out to an editor directly to pitch an idea for a piece, particularly if you already have a connection to them. Once you develop a relationship with a newspaper, they will often be receptive to future work from you, so it's worth building this relationship early.

Remember that papers like exclusive pieces, so submit to only one paper at a time.

If your essay gets accepted, the paper will do some light fact-checking, and the editor may have some edits or require you to change your word count. Be prepared for the possibility that you may not like their edits! You can push back, but be respectful, and choose your battles carefully. Remember that the paper can always decide not to publish. Also be aware that the paper will choose the title for your essay, which they consider a marketing decision. The print and online versions of an essay may have different titles, for example.

After a successful experience, thank the editor and express openness to writing again for the paper in the future. You never know—they might reach out to you next time!

## Last Thoughts

We hope this brief tutorial has given readers the inspiration and confidence to try writing their own mathematical opin-

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COLUMNS & GUEST COMMENTARY OPINION & COMMENTARY

# Audrey Malagon: Vote auditing can ensure integrity of elections

By AUDREY MALAGON  
JAN 21, 2018 | 12:00 AM



Audrey Malagon, "Vote auditing can ensure integrity of elections," The Virginian-Pilot, Jan 21, 2018. [bit.ly/vote\\_audit\\_Malagon](http://bit.ly/vote_audit_Malagon)

ion pieces and the tools to make such pieces effective and publishable. For readers who would like a more hands-on experience, we invite you to register for *Using Your Voice for Influence and Impact: Incorporating Mathematics into Public Discourse*, our Professional Enhancement Program (the new name for minicourses) at JMM 2023. We believe that mathematicians have both the potential and the responsibility to make substantive contributions to public discourse, and we want to help you reach the world. ■

Kira Hamman teaches at Penn State Mont Alto and writes opinions, of which she has many, for her local paper in Washington County, Maryland. Francis Su is a professor at Harvey Mudd College and former MAA President, who has written op-eds for the Los Angeles Times and the Sacramento Bee.



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## Math on the Inside

By Jesse Waite

"Prisoners who participate in any educational opportunities while behind bars were 43% less likely to return to prison within 3 years than prisoners who did not participate."

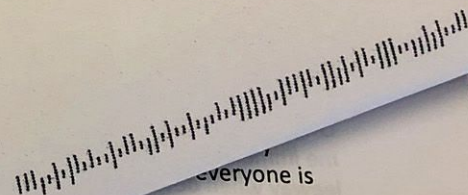
What if knowing fractions and decimals was key to staying out of prison? Would the confidence gained from moving between fractions and decimals be enough to be successful? Does a prisoner's value become greater with the skill to interpret percentages? These may be basic math skills yet the struggle to use them is real within the inmate population where an inmate's success hinges on their ability to solve problems rationally.

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# Math on the Inside

Jesse Waite

"Prisoners who participate in any educational opportunities while behind bars were 43% less likely to return to prison within 3 years than prisoners who did not participate." —RAND Corporation, 2013

**What if knowing fractions were key to staying out of prison? Would the confidence gained from moving between fractions and decimals be enough to be successful? Does a prisoner's value become greater with the skill to interpret percentages? These may be basic math skills yet the struggle to use them is real within the inmate population where an inmate's success hinges on their ability to solve problems rationally.**

Teaching mathematics is challenging, especially in a prison like the world-famous United States Disciplinary Barracks (USDB) at Fort Leavenworth, Kansas. The USDB houses active-duty military personnel convicted of crimes carrying sentence lengths of 10 years or longer. To ensure their safety, visiting instructors must go through a background check and a set of specialized briefings spelling out personal conduct and emergency response, even if they already have clearance to teach on the base.

Despite the hype surrounding the USDB, its inhabitants represent the general public. What you see on TV or read in books about prison does not exist here. This is due to the overall education and maturity of the USDB inhabitants. Imagine a classroom with inmates who are eager to learn algebra, each person attentively sitting with a pencil in hand. Visiting instructors routinely comment about how well behaved everyone is compared to the outside world.

The general feeling in the classroom is that nobody cares about your crimes. Everyone is there to learn. The time spent in the classroom focused on mathematics is time spent away from the stressors normally found in prison—from prison politics to senseless shouting and slammed dominoes. The aim is for at least one person to learn something no matter how insignificant it seems. To that one person, it may be a revelation, a missing piece of the puzzle connecting two ideas. That is what I hope for in each class session. The big picture is: each person leaves as a better person than when they arrived.

## How does college education work in the USDB?

As the world becomes more technologically advanced with nearly every aspect of life conducted online, so has college education. This relegates the prison population to the technological dark ages. The USDB inmates have no email and are forbidden internet access, while most prisons and jails across America at least offer email. This makes communication especially difficult with the outside world leaving the USDB population to gain information via mail, TV, radio, or phone.

Pursuing a college education in STEM in this environment is remarkably difficult. We are limited to two degree paths: (1) General Studies or (2) Business through Kansas City Kansas Community College, Adam State University, or Upper Iowa University. Other universities offer limited remote study options with no degree path. If the interest is computer programming, good luck receiving any study material in the mail. The USDB mailroom rejects coding textbooks because of the threat to the “safety and security” of the facility. The tools needed to create a working program are inaccessible. The lack of internet access and the necessary computer account permissions prevent us from becoming that which they fear. Therefore, we must remain shut out of the world of coding.

Inmate-led courses in the USDB are labeled Adult Continuing Education (ACE) because they cannot be used as credit toward any degree, even though they cover the same material. Instead, the Academic Department presents students with a certificate of completion they can include in their parole packet to show the world that education is important to them.

Making the effort to learn about a subject like math helps time pass faster. Concentrating on something other than prison life certainly helps avoid the more negative aspects of prison. Getting an education demonstrates to those we care about, to those who care about us, that we are doing something immensely positive with our lives.

## How did I become the mathematics teacher I am today?

After a year of confinement, I began tutoring a friend with his algebra homework. Then, the word got out about how well I was able to explain the process, so the head of the Academic Department offered me a position to assist the lead math teacher, a fellow inmate who was to be released in two years. The math programs available were Intermediate Algebra and Functional Adult Skills Test in math. The former prepared students for college algebra while the latter was remedial education for the Test of Adult Basic Education (TABE), which examines a newly arrived inmate on the basics.

One thing people must understand is that when someone first arrives to the USDB, they may not be in the right state of

mind. They recently lost everything, their world was turned upside-down, and they are angry at the system. Taking a test, much less doing well on it, is the last thing on their mind. What they do not know is having a poor score will inhibit them from some privileges, such as a paying job or enrolling in an educational program.

Saturday mornings are the standard time for remedial math instruction, typically devoted to helping inmates get over the hump of passing the TABE test. If they do not score at the 10th grade level or better, they see me for additional instruction. It may appear like punishment since they have to give up their Saturday mornings, but I make their time enjoyable and fun by using math tricks to liven the mood.

Once I took over the teaching duties, I expanded the types of courses offered beyond pre-algebra and TABE preparation, based on feedback from the inmate population. I created and developed courses such as the Scientific Calculator Skills, Origins of Math, Pre-Calculus, and Statistics Primer. The Academics Department and my brother helped me immensely with books and any printed internet resources. The Department gave me a great deal of leeway when developing courses, but they still provided oversight. For instance, a textbook is rejected if it contains a CD, is spiral bound, or it did not originate from a place of business.



*Jesse Waite in Iraq.*

The math classes have become very popular. Over the last eight years, I have taught more than 300 students with an average class size of about 10 to 15 students. When Kansas City Kansas Community College (KCKCC) decided to bring in college algebra, the school asked me to organize an intermediate algebra course to help prepare prospective students in lieu of a placement exam. I appreciate the opportunity to teach, but I have spent such a great deal of time building up the program that I fear that it will fall apart when I am released. What gives me hope, though, is that the facility is full of very intelligent and capable people that need a sense of purpose. Teaching could provide that sense of purpose.

## My mathematics background

Unfortunately, I do not have a degree in mathematics nor any previous teaching experience. The highest level of formal education I achieved is three associate's degrees: one each from the University of Maryland, Community College of the Air Force, and KCKCC. Before coming to the USDB, I was pursuing a bachelor's degree in computer and information science from University of Maryland. Today, I am three classes away from completing the degree. The highest formal math course I completed was calculus about 12 years ago. Since then, I have been self-studying, albeit slowly, various areas of math to include differential equations, discrete math, and number theory.

My love for mathematics presented itself after my arrival to prison. It was the long stretches of time where my mind would gravitate toward solving or creating puzzles. To have a sense of purpose, I had to do something constructive to keep my mind occupied. Mathematics gave me the joy and purpose needed to move forward. The more I learned about the subject, the more I realized what I don't know about it. It is very humbling, but it's also motivating. My long-term goal is to earn a high-level degree in mathematics and make a meaningful contribution to the subject and community.

## My Prison Mathematics Project story

After COVID shut down all in-person instruction, I struggled to find something more to do with my free time. Reading my calculus book became a chore. One day, someone showed me an article in *Popular Mechanics* discussing the Prison Mathematics Project (PMP). I immediately became intrigued and wrote the Project inquiring about how I could get involved.

The story about how someone behind bars can affect such positive change is inspiring. Calculus and differential equations books surround me, while the PMP founder, Christopher Havens, who is still currently serving time, managed to make a mathematical discovery with pencil and paper. He couldn't have done it without the support of his family and members of the math community. By contacting the PMP,

I was hoping that I could gain some of that inspiration and support.

Several weeks after sending my initial request, a letter arrived from PMP containing what would be the beginnings of a master and apprentice relationship. I was astonished to learn that my mentor, Professor Tim Pennings, is a celebrity in the community. Perhaps the real celebrity was his corgi named Elvis about whom he published a paper entitled *Do Dogs Do Calculus*. It created such a sensation that talk shows and newspapers across the country wanted to meet Elvis. With PMP acting as an intermediary, Dr. Pennings helped me study higher mathematics and differential equations.

The PMP publishes a newsletter informing the community of its activities, the future goals of the project, and interviews. Former *Math Horizons* Playground editor, Glen Whitney, edits the Prisoner's Dilemma column, which contains challenging puzzles. I took the challenge working on two problems and sent my solutions to Dr. Whitney. To my surprise, he was kind enough to include my solutions in the following newsletter. I am extremely grateful for what PMP has done for me, and I have been encouraging others to get involved with PMP so they can experience the same sense of gratitude.

## A few memorable and inspiring stories

On the first day of the statistics course, I opened the session with my usual math motivator. First, I wrote the numbers one through 10 on the whiteboard. Then, I asked the class to think of a number but keep it secret. To help make the calculations easier, I asked them to think of a one- or two-digit number. Next, I asked everyone to double their secret number, add 10, and then take half of their calculated number. Finally, I asked the class to subtract their original number. I called the result the "magic number." Before I revealed that I knew everyone's magic number, I looked around the room to help me eliminate the unneeded numbers. Returning to the numbers on the whiteboard, I erased 1 and 10, telling the class that those numbers are not needed. I looked around again and said, "Nobody is thinking about any even numbers." Then, I erased them. I repeated this process until only two numbers remained: 5 and another number. Finally, I said to the class, "You're thinking of the number 5." Immediately, the class erupted in amazement. Needless to say, I got everyone's attention. To quell the accusations of sorcery, I revealed the algebra behind the trick so they could use it as a prank with friends or family over the phone.

Several years ago, the Commandant, an Army Colonel equivalent to a prison warden, came into the pre-calculus class while I was in the middle of teaching and sat in the back. I politely greeted her, and she asked me to continue as if she was just another student. So, I returned to deriving the formula for a parabola. In the back of class, she sat quietly

Examples of the “magic number” trick.

Allison's #: 73

$$\begin{aligned} 73 \times 2 &= 146 \\ 146 + 10 &= 156 \\ 156 / 2 &= 78 \\ 78 - 73 &= 5 \end{aligned}$$

Beverly's #: 20

$$\begin{aligned} 20 \times 2 &= 40 \\ 40 + 10 &= 50 \\ 50 / 2 &= 25 \\ 25 - 20 &= 5 \end{aligned}$$

Steve's #: 39

$$\begin{aligned} 39 \times 2 &= 78 \\ 78 + 10 &= 88 \\ 88 / 2 &= 44 \\ 44 - 39 &= 5 \end{aligned}$$

observing my teaching method. I suspected that she had her doubts about an inmate teaching other inmates mathematics. After maybe 10 minutes, she stood up, said, “Looks like you know what you’re doing,” and left the classroom.

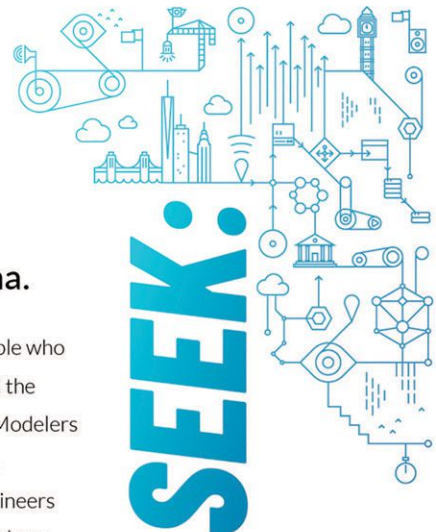
Sometimes, I meet the most remarkable people in the USDB. A death row inmate received clemency, and his sentence was reduced to life in prison. This gave him the privilege to join the general population. He was treated as a new arrival and given the usual exams. Unfortunately, he did not score well enough in math and was assigned to me for remedial instruction. I cannot imagine what life was like for him after spending more than 20 years on death row. The moment he stepped outside onto the grassy field for the first time, he knelt down to kiss the ground. When the next round of remedial math started, he was the first person to show up to class sitting in the front row. He was always attentive, taking notes, asking questions, and doing all the homework. I was amazed because he not only did the homework but also found errors in some of the problems. After completing the course, the academic staff reexamined him. This time, he passed with flying colors. Each time I see him now, he makes an effort to say hi, sometimes thanking me for the help I gave him.

Other times, we get people who have not completed high school nor have a GED. This is rare because one minimum requirement to join the military is to have a GED. One particular person needed help studying for his upcoming high school diploma equivalency exam, so the academic staff asked me to help him study. Over the next few months, we spent evenings going over the math essentials needed to pass the exam. The big day came, and he had no problem performing well on the exam gaining his diploma. This positive momentum helped propel him to enroll into the General Studies program with KCKCC. He told me that he would be the first one in his family to attend college. He continued to sign up for classes each semester moving closer to graduation. He became an inspiration for others to continue the educational drive and not give up.

Prison life can be a horrible experience, or it could be an opportunity to make positive changes in other people’s lives. I chose the latter. Who knew there could be many opportunities in prison—opportunities to grow, learn, move

forward, and help others? All you need to do is open your eyes. If you know fractions give you heartache, instead of ignoring or running away from the problem, look deeper as to why they trouble you. Ask questions. Look at the problem from a different perspective. Reduce it to smaller, more manageable problems. The techniques found in the classroom can be applied easily to life’s bigger problems and hopefully allow you to become successful in solving them. ■

*Jesse Waite was court-martialed in 2012 and sent to the United States Disciplinary Barracks (USDB) in Fort Leavenworth, Kansas to serve a 15-year sentence. Prior to his confinement, he served a combined 18 years active-duty between the Army and Air Force with deployments to Bosnia, Iraq, and Afghanistan. His duties included missile maintenance, satellite communication equipment maintenance, chief of maintenance, and logistics test and evaluation. Today, he designs furniture and other woodworking projects using AutoCAD in the USDB woodshop. He enjoys teaching algebra and statistics and hopes each student gets their “aha!” moment.*



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# Pandemic Teaching

## Revising our Model of Teaching

*Carrie Diaz Eaton and Jean Marie Linhart*

**We first met at MathFest, where we shared our love for teaching and mathematical modeling.**

Because of our common modeling background, we talked about updating our models of teaching in response to the challenges of the pandemic. Here, we invite you into our conversation!

### Our Contexts

**Jean Marie:** I am at Central Washington University (CWU), a regional comprehensive university with a pre-pandemic enrollment of around 12,000 students, many of whom are first-generation and low-income. We are on the cusp of becoming a Hispanic-serving institution. Our finals week during the Winter 2020 quarter was online, and we extended Spring break an extra week to allow instructors to prepare to have our Spring 2020 quarter entirely online. This caused us to lose a week of instruction from our Spring 2020 term. We were mostly online in the 2020–2021 academic year, although instructors did have a choice of being on-line, hybrid, or in-person.

My husband is also a math professor, and we were both teaching mathematics from home. We were fortunate that our personal circumstances were secure, and we were able to isolate ourselves easily. We had the resources we needed to do our jobs, and we didn't have to worry about taking care of anyone aside from ourselves.

**Carrie:** I am at Bates, a small liberal arts college of 1800 students in Maine. “Pandemic teaching” started earlier for me than March 2020. Since January 2020, the content of my classes had begun to shift, first to

include disease modeling and sort through misinformation on COVID, and then to address Anti-Asian hate crime and racism, which was appearing in discourse related to COVID and became more frequent in accounts from students.

Bates went fully remote toward the end of the spring 2020 semester with one week to transition. In 2020–21, we temporarily implemented a 7-week module calendar, and students took half as many classes in a module as in a semester. Our instructors also had a choice of modality, and I chose to be fully remote.

My instructional experiences during the pandemic were not separate from my personal circumstances. When my children were at home for remote instruction, I was thankful to also be working at home, though this created additional challenges. This was also true for students—I noticed some students became caregivers for younger siblings as they went home. In fall 2020, many international students were taking courses remotely while overseas due to travel restrictions, shifting instructional needs.

## Revising our Models of Students

**Carrie:** I most significantly revised my model of teaching because I revised my model of my students and how they experience the world. The experience of having my own children navigate emergency remote teaching and online school gave me an appreciation for what it feels like to try to navigate new expectations as a student. For example, it was difficult for my son in middle school to adapt to his teachers doing completely different things. It motivated me to make a stronger commitment to utilizing our course management system, where possible, and to encourage common practices within my department. Students had multiple modalities to complete assignments, which allowed for flexibility to accommodate students' individual needs and technology access. For example, students could opt to write a summary for a reading (instead of using Perusall, a cloud-based, collaborative annotation software) so that they would not have to be connected to the internet continuously. Also, the college began to acknowledge and prioritize technology access needs, scaling up their laptop loaning program and setting up remote access to software.

**Jean Marie:** CWU at least knew at the beginning of the pandemic that we had real disparities in our student body in terms of access to the internet and computers, and consequently, we were working proactively to address the problem. The university worked to get loaner laptops and wi-fi hotspots to students that needed them before we started instruction online. Concerns for students in terms of their internet connectivity, needing to work to support family, getting sick, and being caregivers for others were front and center in my thinking.

**Carrie:** The fact that almost all of our students lived on campus pre-pandemic hid access inequality. The pandemic unmasked inequalities in ways that could no longer be ignored. Other aspects of students' lives related to well-being, health, and safety also came to light. I mentioned that in the early pandemic, my Asian and Asian American students were experiencing a dramatic increase in outwardly racist interactions and were struggling. In response, we reflected together on the impact of terms like "China Flu." In the emergency dismissal, a co-instructor and I had a lot of conversations about anxiety and the mental health of our students, which really helped me implement care practices in future courses. I took more time to check in at the beginning of class on more than just questions on reading, but also to simply ask what was new in their lives and how they were doing.

Beyond COVID, the renewed broader dialogue on racism in America spurred much needed conversation both at home and in the STEM education community. Contributing to these conversations as a leader and a person of color required emotional energy in addition to time. Many of my students were also taking on similar calls-to-action in their lives. When we talk about the pandemic, it is important to realize that we are talking about more than just a social shift due to a disease.

## Student Engagement and Support

**Carrie:** For fall 2020, I was focused on creating an accessible and joyful experience and instilling a supportive community. This was for a few reasons—the worry about community building in a virtual modality, the need for a community of care for students who had been experiencing a higher emotional toll due to racism in America, and the invocation of high-impact practices such as fostering rich discussions and collaboration. I wanted to make sure all students could access the course materials both physically—by ensuring it was freely available—and culturally—by making the course topics relevant and the featured experts whose work we referenced diverse.

**Jean Marie:** You were wise to have that focus. By contrast, I initially thought the best way to support students would be to make my courses wholly asynchronous. This would help students who needed to share computers or internet bandwidth with family or roommates, and it would help students who had to work or take care of children during the day. I did not realize how much some students needed the community of the class and the joy and camaraderie that goes with it. That was the big thing I changed in fall 2021; I incorporated optional synchronous class meetings with collaborative activities, questions and answers, and an option to do the weekly discussion "in person" instead of in writing.

One thing I feel like I did right almost immediately was

that I started monitoring student progress differently. In the first few days of class, I checked to make sure students had engaged with our learning management system and their first assignments. If they had not, I would email to ask if anything was wrong and offer my help. Likewise, I would check up if work was not handed in, asking if everything was okay. At the end of class announcements, I would remind students: “Please reach out if there’s anything going on with you that I should know about or that is affecting your ability to do the work needed for this class.”

**Carrie:** YES! Reframing lack of student engagement into opportunities to ask “Are you okay?” was an intentional shift that I felt made a huge impact. I credit Pamela Harris and Aris Winger—their AMS-hosted workshop series, their books (Harris et al., 2020; Harris & Winger, 2020), and their Mathematically Uncensored podcasts (Harris & Winger, n.d.)—for pushing me to be much more intentional about it.

I think you had a good idea in enabling students to work asynchronously; this was a feature of my courses too. I recorded all lectures, posting them with captioning and associated slides. I moved passive reading assignments to collaborative class annotation software (perusall.com). This helped me understand what themes were resonating and which concepts students struggled with. This asynchronous work gave me information that helped me to efficiently plan my in-class discussion time. My students also used online discussion forums for peer-review activities. By switching some work to asynchronous, we could use scheduled class time for group discussion, projects, and “office hours” dedicated to questions and troubleshooting, ensuring that students could access the support they needed. The balance of this synchronous and asynchronous work varied from semester to semester and class to class. At the start of the pandemic, I was almost completely asynchronous with only synchronous help sessions. In the next year, I still utilized discussion boards extensively in my largest classes, particularly for peer review. But by the fall of 2021, I had mostly phased those assignments back to in-class activities.

**Jean Marie:** One way technology changed my synchronous classes was that rather than students raising their hands to ask a question, they could anonymously post questions on sticky notes on a Google Jamboard (an online free whiteboard tool) for me to answer. I noticed this made a big difference in participation. Students felt a lot more comfortable asking questions when they were anonymous.

**Our revised model:** *We both reframed “a lack of engagement” into an opportunity to ask if the student is okay. Many students need a community where they feel they belong and are supported for them to thrive. Technology and design choices can be used to lower the barriers for participation and support.*

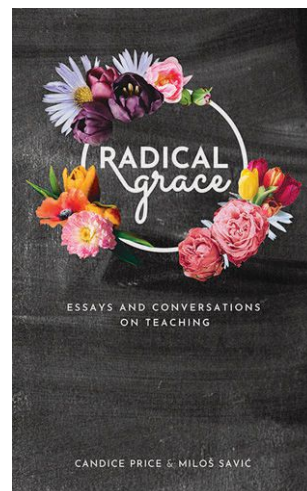
## Student Assessment

**Jean Marie:** Assessment and academic integrity have been big topics during the pandemic with online courses, and I am hoping we are coming to a consensus that surveillance of students is not the best solution to the challenge. Instead, as instructors, we need to think about testing differently. In preparing to write this article, I came across an article about pandemic teaching and assessment (Savić, 2022) that impressed me with a creative and thoughtful approach that used technology to incorporate engagement, support of learning, assessment, and academic integrity. The author carefully crafted questions posed on discussion boards in a multivariate calculus class for student assessment. The example questions were interesting. Each student was charged with getting an answer different from their peers, but they could use their peers’ posts in the discussion to figure out approaches to answering the questions.

I rethought testing before the pandemic. There is research that shows that frequent low-stakes testing helps students learn, but a lot of traditional testing in math courses is infrequent, high-stakes, and high-stress. I switched to having many smaller tests—graded for mastery of the subject, not on points or partial credit—that students can retake without penalty. This helps put the focus on student learning, developing fluency, competency, and confidence with the mathematical ideas. This change helps foster a growth mindset for my students and me. Students correct their mistakes and get a better grade, and in seeing where students struggle, I improve my teaching.

I was able to bring this system online by randomizing questions whenever possible and by using an honor pledge at the beginning, not at the end, of each test. The honor pledge was especially important with tests that I could not randomize.

**Carrie:** Prior to the pandemic, the vast majority of my classes were already exam-free, as I had been making the transition out of exams towards projects intentionally. A wonderful introduction to the reasons why is echoed in *Radical Grace*, a new book by Candice Price and Miloš Savić. But by reflecting on how to create a community of care for students, I more solidly committed to refusing to police them through exams, late penalties, or attendance policies. I explicitly involve class members in the discussion of academic integrity in other ways. Among my



colleagues, relaxing such policing policies was more common in the emergency remote setting, but several of us maintained this philosophy in subsequent semesters. In the last academic year, I experimented with variations to encourage students to seek help early. For example, in my largest course, I expanded the meeting times from two to three days per week with Fridays as a check-in and support day. Any student who did not complete the work due before Friday just needed to show up on Friday and make progress at that time to get a “late pass.” Relaxing late assignment policies meant a lot more work for me keeping track of assignments and grading. However, most students just needed that space and time to get started with extra support to make progress.

**Our revised model:** *We both realized that surveillance is not our answer to academic dishonesty. Assessment should support student growth. Projects, creative tests, and retests without penalty can be more supportive of student learning than high-stakes, high-stress tests.*

**Both of us:** The most important thing we plan to keep from pandemic teaching is reframing “a lack of student engagement” or other issues with students as an opportunity to adjust how we support students. With the right support in place, students can learn joyfully, especially students historically and contemporaneously excluded from STEM. There are many more practical teaching practices that we will keep, and they support this pedagogical philosophy. We will never

## GET MORE

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- Savić, M. (2022). Utilizing discussion boards for test questions: opportunities for students’ mathematical creativity and uniqueness. *International Journal of Mathematical Education in Science and Technology*, 53(3), 656–661. [doi.org/10.1080/0020739X.2021.1983657](https://doi.org/10.1080/0020739X.2021.1983657)

be done revising our model of teaching since students and content change and we also learn more as instructors, but we hope some of what we learned resonates with our readers. ■

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*Carrie Diaz Eaton is an associate professor at Bates College and can be found as @mathprofcarrie on Twitter. Jean Marie Linhart is the chair of the mathematics department at Central Washington University and can occasionally be found as @jmlinhart on Twitter.*

## Recommendations for MAA Committee Members!

It’s that time of year again, time to recommend a colleague (or yourself!) to serve on one of our many MAA committees beginning in 2024. The form is easy to complete. Just visit

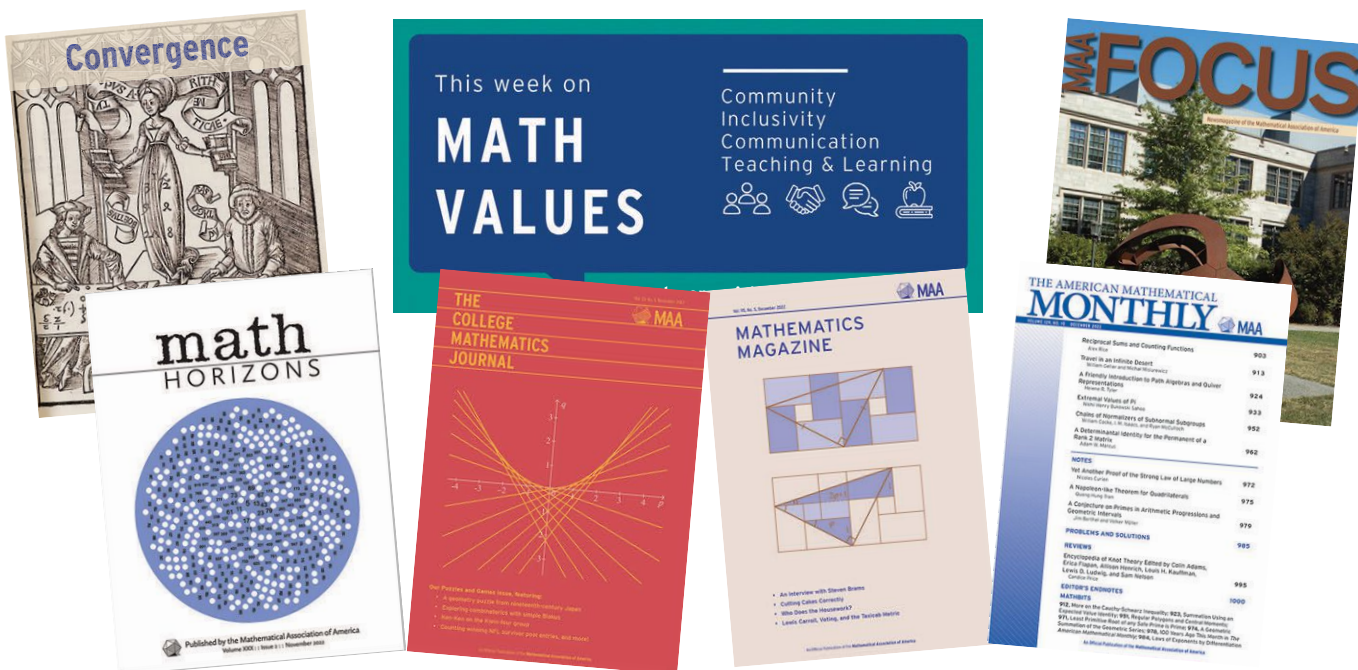
[surveymonkey.com/r/MAAcommitteesuggestions](https://surveymonkey.com/r/MAAcommitteesuggestions)

to make a suggestion!

More information about the various MAA committees and the overall governance structure of the Association can be found at

[www.maa.org/about-maa/governance](http://www.maa.org/about-maa/governance).

There are many ways to serve—committees exist with a focus on prizes, special lectures, meetings, publications, student activities, and continuing attention to the profession and all aspects of the curriculum and our community. So please take a moment to identify a niche and make a recommendation!



# How Much Do YOU Know About the MAA Periodicals?

Tom Edgar and Allison Henrich

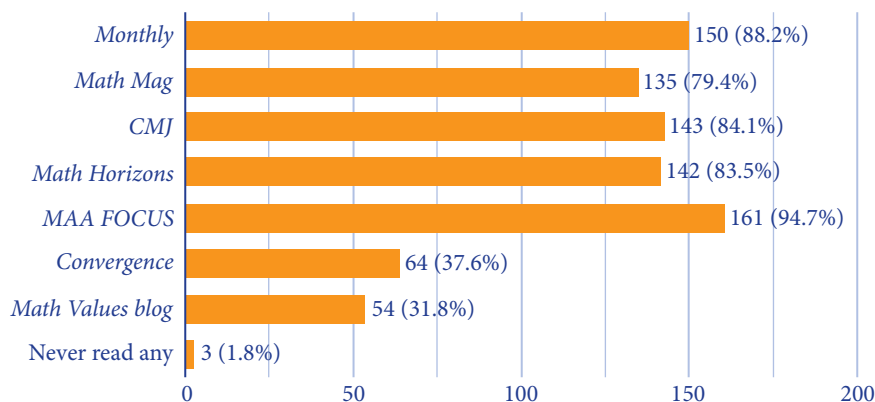
**“You can read *Math Horizons* in the smallest room in your house. You can read *The College Math Journal* in bed. You can read *Math Mag* standing up or at a desk, armed with writing implements. Reading the *Monthly* requires chalkboards or white boards, mathematical software and writing implements, and plenty of room to pace up and down.”**

According to an anonymous survey respondent, this is how Martha Siegel (editor of *Mathematics Magazine* from 1991–1996) once described the differences between the MAA’s longest-running periodicals. While this may not be a perfectly accurate characterization—in particular, the *Monthly* is meant to be more accessible to non-specialists than the quote suggests—there are nuggets of truth in it.

In September, we sent out a poll through MAA Connect to learn about people’s engagement with the MAA periodicals and their understanding of each one’s aim and scope.

## Which of the following have you read before? (By “read” we mean you’ve read some part of it, including simply the table of contents.)

170 responses



In our admittedly unscientifically-conducted poll of MAA members, we had 170 respondents, only three of whom had never read any of the following: *The American Mathematical Monthly* (aka the “Monthly”), *Mathematics Magazine* (aka “Math Mag”), *The College Mathematics Journal* (aka “CMJ”), *Math Horizons*, *Convergence*, *MAA FOCUS*, and the *Math Values* blog.

This engagement makes perfect sense to us, since we think one of the biggest perks of being an MAA member is that membership comes with access to all of these publications. While you, dear reader, have clearly read at least one of these yourself, how much do you know about the MAA periodicals?

## History of MAA's Periodicals

MAA's history is intertwined with its periodicals. In fact, the society was formed, in large part, to garner financial support for *The American Mathematical Monthly*. The *Monthly* was founded in 1894 by Benjamin Finkel, a school teacher who wanted the journal to serve the needs of high school teachers. The journal evolved beyond the scope of this original goal, its content largely resonating with college faculty, and in 1915, the idea was pitched to the American Mathematical Society to adopt the *Monthly* as one of its journals. Even though AMS leadership declined, they passed a resolution in support of the formation of a new mathematical society that would have the *Monthly* as its flagship journal. The resolution read: "The Society would entertain towards such an organization only feelings of hearty good will and encouragement." And so just before the new year of 1916, the MAA was formed! (Tina Straley, "A Brief History of the MAA," [maa.org/history\\_maa](http://maa.org/history_maa), and "History of *The American Mathematical Monthly*" [maa.org/amm\\_history](http://maa.org/amm_history)).

Ten years later, the Louisiana-Mississippi section of the MAA created *The Mathematics News Letter*, and the publication became a national publication in 1934. Due to budget cuts, the periodical almost disappeared in 1945. By a stroke of luck, the magazine was revived in 1947 as *Mathematics Magazine* with a primary emphasis on expository articles, while also beginning to include more research papers. It became an official MAA publication in 1961 ("History of *Mathematics Magazine*", [maa.org/mm\\_history](http://maa.org/mm_history)). Roughly a decade later, *The Two Year College Mathematics Journal* was "created to provide a communication forum for mathematicians interested in the curricular and pedagogical problems of two-year colleges." The journal was renamed *The College Mathematics Journal* in 1984 with a new goal of "emphasizing connections between teachers of secondary, two-year college, and freshman-sophomore college mathematics" ("History of *The College Mathematics Journal*", [maa.org/cmj\\_history](http://maa.org/cmj_history)).

In 1981, then MAA Associate Director, Marcia Sward, launched *MAA FOCUS* as the official newsletter of the organization ([bit.ly/devlinsangle](http://bit.ly/devlinsangle)). *MAA FOCUS* has evolved and now provides much more than news. Sward also had a hand in creating *Math Horizons* in 1993, encouraging Don Albers to bring the magazine into existence. Albers built upon an idea by Lynn Steen from the mid 1970's and created a publication dedicated to undergraduate-level students, bringing interesting mathematical ideas to these readers in the hopes of expanding their horizons (Sophia D. Merow, "Broadening Horizons", *Math Horizons*, Nov. 2018).

The MAA posted its first blog post in 1996 on Devlin's Angle, from Keith Devlin. The MAA blog has expanded over the years, with *Math Values* arising in 2018. The blog has grown considerably under the leadership of current editor, Deanna Haunsperger. It still includes Devlin's Angle, but it also

highlights a diverse group of writers, including contributors to seven other "sub-blog" streams: Dana Center Connections, DUE Point, Launchings by David Bressoud, Learning Through the Ranks: A Graduate Student Blog, Living Proof, National Association of Mathematicians, and Testimonios. Each current blog post connects to at least one of the four core MAA Values: Community, Inclusivity, Communication, and Teaching & Learning.

Finally, in 2004, *Convergence* appeared as an online journal focused on the history of mathematics, but with a particular emphasis on helping "instructors enrich their students' learning experiences by teaching mathematics using its history."

## What types of articles and other features do MAA periodicals publish and who reads them?

The MAA publications value high-quality exposition first and foremost. According to current editor of the *Monthly*, Della Dumbaugh, "Ideally, every item in the *Monthly* should inform every reader while telling a good mathematical story." Jason Rosenhouse, the current editor of *Math Mag*, suggested that "potential authors should aim to write using a conversational, engaging tone. Excessively technical and jargon-filled style is not appropriate." *CMJ* editor-elect Tamara Lakins added that appropriate submissions "do not necessarily follow the typical definition-example-theorem-proof outline." A commitment to quality writing is shared by all MAA periodical editors, but what differentiates these different publication venues?

Of the MAA journals, the *Monthly* is known for being the most research-oriented, typically geared towards an audience of math researchers (which, of course, may include undergraduate and graduate students). *Math Mag* includes not only traditional articles in pure or applied mathematics, but also the philosophy and history of mathematics, connections between mathematics and the humanities, mathematics education, and others. All the articles should be readable by any mathematician, and many can be read by strong undergraduates. Meanwhile, *The College Mathematics Journal* is aimed at undergraduate mathematics instructors and focuses on topics

[Home](#) » [MAA Publications](#) » [Periodicals](#) » [Convergence](#)

## Convergence



Welcome to *Convergence*, MAA's online peer-reviewed journal where history, mathematics, and teaching meet! Since 2004, *Convergence* has offered a wealth of resources to help instructors enrich their students' learning experiences by teaching mathematics using its history. **Make *Convergence* your source for math history and its use in teaching!**

▶ See **Featured Items** (below) & **2022 Table of Contents** for our latest articles.

More from MAA

- > [MAA Career Resource Center](#)
- > [MAA Conferences](#)
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Math Horizons >

inspired by the undergraduate mathematics curriculum, particularly ideas from the first two years. While the journal does not publish pedagogy, math education research, or discussions of the profession itself, *CMJ* includes Classroom Capsules (1–3 page notes that could be used as examples in the classroom), and each issue contains Media Highlights, showcasing math-related topics found in various media outlets.

Written primarily for an audience of undergraduate-level readers with minimal background, mathematical articles in *Math Horizons* are generally self-contained, inviting, lively, and informal. The magazine also publishes a variety of other articles including stories about or interviews with mathematical people, places or traditions; historical pieces; fiction, humor, or poetry; and undergraduate-focused advice.

*Convergence* is an online, refereed journal with ideas and resources for using history to teach mathematics: articles contain both sound mathematics and sound history, and they provide a connection to classroom uses. *Convergence* has several ways to explore the intersection between history, mathematics, and teaching, including the TRIUMPHS series of mini-primary source projects; guided tours of the historical research process; and images and discussions of classic, rare, or interesting historical books.

*MAA FOCUS* contains a wide variety of articles about the MAA community, including news items, teaching ideas in the “Toolkit” column, the “Spotlight on SIGMAA” column with updates from the special interest groups, arts and culture highlights, advice aimed at instructors and department chairs, and discussions of issues related to justice and equity, among other features. The *Math Values* blog ([mathvalues.org](http://mathvalues.org)) explores the diverse voices of mathematics to bring you thought-provoking articles, informative content, and practical ideas. In *Math Values*, you can read reflections on current events, hear the experiences of people working in math-related fields, learn what is on the minds of graduate students,

discover the impact of grants that are funded by the NSF, read inspiring stories about fellow mathematicians, and more. Both *MAA FOCUS* and *Math Values* seek writing that reflects the MAA’s four core values: Community, Inclusivity, Communication, and Teaching & Learning.

You can find book reviews in almost all the periodicals, and *Math Mag* and *CMJ* consistently print “Proofs Without Words” while the *Monthly* publishes short “MathBits.” In addition, the *Monthly*, *Math Mag*, *CMJ*, and *Math Horizons* all feature problems sections, including readers’ solutions to previous problems, while both *Math Horizons* and *MAA FOCUS* publish puzzles, including crosswords, sudoku-like puzzles, and more. For insight into life as a problems editor, see Alicia Prieto Langarica’s article in the August-September 2022 issue of *MAA FOCUS* ([bit.ly/focus\\_prob\\_ed](http://bit.ly/focus_prob_ed)). Problem sections are the most downloaded elements of the MAA journals.

### Fun Facts

- Did you know that the *Monthly*, *Math Mag*, and *CMJ* use a doubly anonymous review process, where authors and reviewers don’t know each other’s identities?
- Did you know that the *Monthly* is the most selective of the MAA journals? The current acceptance rate is 13%. The top articles published in the *Monthly* are honored with the Paul R. Halmos and Lester R. Ford Award.
- *Math Mag*, *CMJ*, and *Math Horizons* each have a yearly writing award, too, given to articles selected by a committee for exemplifying expository excellence. Those in *Mathematics Magazine* receive the Carl B. Allendoerfer award. *CMJ* has the George Pólya award, and *Math Horizons* gives out the Trevor Evans award.
- Despite its name, the *Monthly* only publishes 10 issues per year. *MAA FOCUS* currently prints six issues annually. Both *Math Mag* and *CMJ* print five issues per year (in com-

plementary months), and *Math Horizons* prints four issues (two per academic semester). *Convergence* and the *Math Values* blog update regularly when they have new content.

## Nuts and Bolts Advice to Authors & Reviewers

Do you have an idea? Let's say you're fired up to submit an article to one of the MAA periodicals. That's fantastic! The *Monthly*, *Math Mag*, and *CMJ* all accept submissions via an online system. They have detailed submission guidelines on the MAA website—read these carefully. For *Convergence*, *Math Horizons*, *MAA FOCUS*, and *Math Values*, you may submit an article or pitch your idea by emailing the periodical's editor at their official maa.org email address. Amy Ack-erberg-Hastings and Janet Heine Barnett, editors of *Conver- gence*, noted that “teaching mathematics through its history is a team enterprise, and those of us in the community enjoy coaching each other!”

If you speak with any current or past editor of an MAA publication, they will likely tell you that one of the best ways to learn to write for the MAA journals is to read them. If you don't know where to start, we recommend checking out award-winning articles. Members have access to the entire catalog: the blog is searchable, both *MAA FOCUS* and *Con- vergence* are accessible via the MAA website, and the *Month- ly*, *Math Mag*, *CMJ*, and *Horizons* are all available from the MAA Journals link after logging into the MAA membership portal (on maa.org). You receive a print copy of *MAA FOCUS* with your membership, and you can choose the print mem- bership to receive the other four print periodicals. Some find that there is something quite satisfying about reading the paper copies.

Another way to learn more about how (and how not) to write for MAA journals is to review for them! If there's a journal that you enjoy and you're interested in reviewing ar- ticles, don't be shy. Reach out to the journal's editor through

their maa.org email address and express your interest in being a reviewer, including your affiliation and a list of the general subject areas for which you're comfortable reviewing. As might be expected, reviewers will always be asked to assess the quality of writing in their reviews.

## Perceptions & Misconceptions

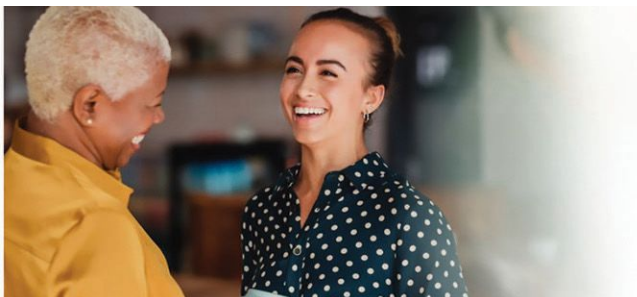
We specifically asked participants of the aforementioned survey to *not* do any research before answering the questions. We hoped that common misconceptions would surface from people responding off the cuff... *and they did*. With immense gratitude to our survey respondents, we have included a few representative quotes that highlight some misconceptions. You might test your (newfound?) knowledge of the MAA pe- riodicals by thinking through how you would counter these misconceptions before reading our responses.

**Misconception 1:** “I think *Math Mag* has more undergrad re- search, but I'm not sure. I'm not sure about *CMJ*, but I confuse this with the (others).”

**Our Response:** Many of the articles in *Mathematics Magazine* and *The College Mathematics Journal* can be read by under- graduates, but relatively few of these articles are co-authored by students. Also, it is quite common for people to not know the difference between *Math Mag* and the *CMJ*. *CMJ* articles tend to be shorter and require no more mathematical knowl- edge than what students typically learn by the end of their second year in college, while *Math Mag* articles can be longer and may require more advanced mathematical background to read.

**Misconception 2:** “*MAA FOCUS* strikes me as a straightfor- ward update on current ideas in college mathematics teaching.”

**Our Response:** This quote suggests that *MAA FOCUS* is singularly oriented towards teaching. In addition to teach-



## MATH VALUES

The Math Values blog from the Mathematical Association of America explores the diverse voices of mathematics to bring you thought-provoking articles, informative content and practical ideas, reflecting the MAA's values of inclusivity, community, teaching and learning, and communication.

Scroll down to see the latest featured posts.

JOIN THE MATH VALUES BLOG EMAIL LIST HERE

### ALL FEATURED POSTS



Playful Math - Is there a "there" there?  
Nov 1, 2022



My Mathematical Journey: France  
Nov 1, 2022



Count Me In with Della and Deanna Season 2, A Podcast  
Oct 31, 2022



A Teacher Affects Eternity—And So Do His Kids  
Oct 27, 2022



Great Resignation in Math Departments  
Oct 25, 2022

ing-focused articles, the newsmagazine also highlights topics of interest to the general math community.

**Misconception 3:** “Convergence is for math historians.”

**Our Response:** While *Convergence* is focused on math history, the goal of the publication is largely to provide historical resources to math teachers.

**Misconception 4:** “The Math Values blog aims to highlight work or needed work on equity/access.”

**Our Response:** The *Math Values* blog does highlight work the math community needs to do to increase access to mathematics, but this is only one aspect of the blog. Posts also provide information about different career paths, share teaching resources, inspire readers through the telling of personal stories, and so much more.

**Misconception 5:** “Math Horizons highlights new teaching strategies, activities, and reflections.”

**Our Response:** Students are the primary audience of *Math Horizons*, so discussions of teaching strategies are likely out of place here. If an author wants to share “new teaching strategies, activities, and reflections,” they might consider if

their idea is appropriate as a Classroom Capsule for *CMJ*. Alternatively, they could pitch an idea to the editor of *MAA FOCUS*, *Math Values*, or *Convergence* (if there’s a historical connection).

**Misconception 6:** “I assume anything from the MAA is either for undergrads or their instructors.”

**Our Response:** Our experience is that every periodical from the MAA will have at least some content that will be of broader interest. One survey respondent wrote, “The *CMJ* is the one I mostly read, for my own math growth and the exploring of new ideas that I can pass to my students in high school.”

Finally, we leave you with a quote from a survey response that comes quite close to hitting the mark:

“The Monthly is the most research-focused publication. Math Mag is research-focused, but the articles are written to be more accessible than those in the Monthly. *CMJ* is the premier publication for faculty sharing research, especially research projects completed with students and projects with direct relevance to the undergraduate curriculum. Math Horizons is written for undergraduate math majors and features some research articles as well as introductions to math topics not usually seen in the undergraduate math curriculum. *FOCUS* is the MAA newsletter that keeps all MAA members informed about what is happening in sections and nationally. *Convergence* is the place to find all things related to the history of math, including how to use the history of math in your teaching. The Math Values blog features exceptional writing from all kinds of voices from around the math community.”

We would like to thank the editors of the periodicals—Amy Ackerberg-Hastings, Della Dumbaugh, Deanna Haunsperger, Janet Heine Barnett, Dominic Klyve, Tami Lakins, and Jason Rosenhouse—for their input on this piece. We also appreciate feedback from Steve Kennedy, Bonnie Ponce, and Bev Ruedi that helped improve our writing. ■

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*Tom Edgar is a professor at Pacific Lutheran University and the current editor of Math Horizons. He loves reading all of the MAA periodicals and eagerly awaits his print copies after the virtual issues post. Allison Henrich has been the editor of MAA FOCUS since June 2022. Previously, she served as the deputy editor of the Math Values blog, and she is a founding editor of the new Living Proof sub-stream of the blog.*

## GET MORE

### Info on Submitting to MAA Periodicals

[maa.org/press/periodicals/submissions-to-maa-periodicals](http://maa.org/press/periodicals/submissions-to-maa-periodicals)

### Submission Links for all MAA Journal Articles

*Monthly*: [editorialmanager.com/monthly](http://editorialmanager.com/monthly)

*CMJ*: [editorialmanager.com/collmathj](http://editorialmanager.com/collmathj)

*Math Mag*: [editorialmanager.com/mathmag](http://editorialmanager.com/mathmag)

### Email Addresses for MAA Periodicals

[monthly@maa.org](mailto:monthly@maa.org)      [mathmag@maa.org](mailto:mathmag@maa.org)      [cmj@maa.org](mailto:cmj@maa.org)

[mh@maa.org](mailto:mh@maa.org)      [convergence@maa.org](mailto:convergence@maa.org)

[maafocus@maa.org](mailto:maafocus@maa.org)      [blogs@maa.org](mailto:blogs@maa.org)

### Writing Awards

The *Monthly* writing award:

[maa.org/writing\\_awards\\_halmos\\_ford\\_awards](http://maa.org/writing_awards_halmos_ford_awards)

The *Math Mag* writing award:

[maa.org/writing\\_awards\\_carl\\_b\\_allendoerfer\\_awards](http://maa.org/writing_awards_carl_b_allendoerfer_awards)

The *CMJ* writing award:

[maa.org/writing\\_awards\\_george\\_polya\\_awards](http://maa.org/writing_awards_george_polya_awards)

The *Math Horizons* writing award:

[maa.org/writing\\_awards\\_trevor\\_evans\\_awards](http://maa.org/writing_awards_trevor_evans_awards)

The Merten M. Hasse Prize is given for a noteworthy expository paper appearing in an Association publication, at least one of whose authors is a younger mathematician, generally under the age of forty: [maa.org/writing\\_awards\\_merten\\_hasse\\_prize](http://maa.org/writing_awards_merten_hasse_prize)

# Departments

## SPOTLIGHT ON SIGMAAS

### SIGMAA Events at JMM 2023

#### SIGMAA on Environmental Mathematics

##### JMM Workshop on Math for Sustainability: Quantitative and Ethical Reasoning in General Education Mathematics

Wednesday, 1:00–3:00 PM

**Organizer:** Russ deForest, *Pennsylvania State University*

#### Lightning Talks in Environmental Mathematics

Thursday, 6:00–7:00 PM

**Organizer:** Russ deForest, *Pennsylvania State University*

#### SIGMAA on Environmental Mathematics Guest Lecture and Reception

Thursday 7:00–8:30 PM

#### SIGMAA on Math Circles

##### SIGMAA MCST Special Session on Math Circle Activities as a Gateway into Mathematics I

Wednesday, 8:30 AM–12:00 PM

##### SIGMAA MCST Special Session on Math Circle Activities as a Gateway into Mathematics II

Wednesday, 1:00–5:30 PM

**Organizers:** Lauren L. Rose, *Bard College*

Brandy S. Wieggers, *Central Washington University*

Gabriella A. Pinter, *University of Wisconsin, Milwaukee*

Nick Rauh, *Julia Robinson Math Festivals*

#### SIGMAA on Mathematical Knowledge for Teaching

##### SIGMAA MKT Special Session on Mathematics Standards, Equity, Policy, and Politics

Thursday, 1:00–4:00 PM

**Organizers:** Yvonne Lai, *University of Nebraska-Lincoln*

Tyler Kloefkorn, *American Mathematical Society*

Dave Kung, *Charles A. Dana Center, The University of Texas at Austin*

Blain Patterson, *Virginia Military Institute*

#### SIGMAA on Mathematical and Computational Biology

##### SIGMAA BIO Special Session on Undergraduate Research Activities in Mathematical and Computational Biology I

Wednesday, 8:00 AM–12:00 PM

##### SIGMAA BIO Special Session on Undergraduate Research Activities in Mathematical and Computational Biology II

Wednesday, 1:00–4:00 PM

**Organizers:** Timothy D. Comar, *Benedictine University*

Hannah Callender Highlander, *University of Portland*

Anne E. Yust, *University of Pittsburgh*

#### SIGMAA on the Philosophy of Mathematics

##### SIGMAA on the Philosophy of Mathematics Guest Lecture

Friday, 6:00–7:30 PM

**Organizers:** Bonnie Gold, *Monmouth University*

Jeff Buechner, *Rutgers University*

Russell Marcus, *Hamilton College*, “A Philosophical Account of Mathematics that Won’t Make You Hate Philosophers”

##### SIGMAA POM Special Session on Current Directions in the Philosophy of Mathematics

Wednesday, 1:00–6:00 PM

**Organizers:** Bonnie Gold, *Monmouth University*

Kevin Iga, *Pepperdine University*

#### SIGMAA on Undergraduate Research

##### JMM Panel: Mentoring Undergraduate Research in Data-Driven Research Projects

Wednesday, 1:00–2:30 PM

**Organizers:** Vinodh Chellamuthu, *Utah Tech University*, and

Allison Henrich, *Seattle University*

**Panelists:** Michael Dorff, *Brigham Young University*,

Diana Thomas, *United States Military Academy*, and

Padmanabhan Seshaiyer, *George Mason University*

##### JMM Panel: A DEI Perspective on Undergraduate Research

Thursday, 1:00–2:30 PM

**Organizers:** Vinodh Chellamuthu, *Utah Tech University*, and

Allison Henrich, *Seattle University*

**Panelists:** Alex Barrios, *University of St. Thomas*,

Dennis Davenport, *Howard University*,

Maria Mercedes Franco, *Queensborough Community College*

## GET MORE

For more info go to [jointmathematicsm meetings.org](https://jointmathematicsm meetings.org).

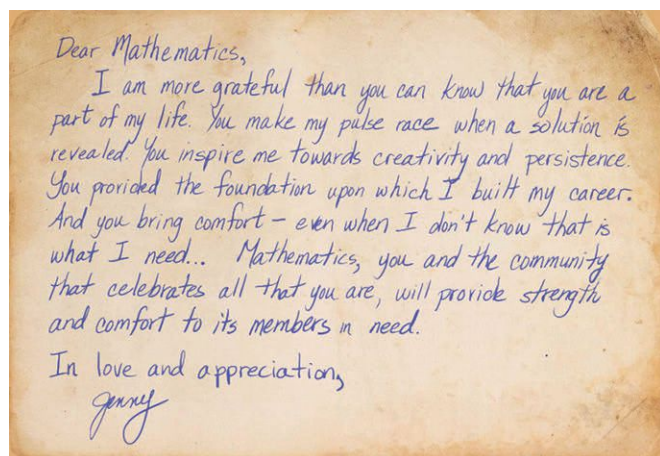
# Departments

## PRESIDENT'S MESSAGE

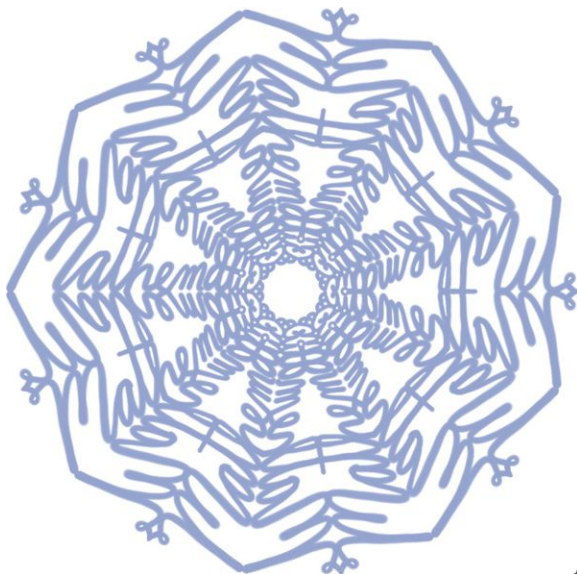
### The Power of Love

—JENNY QUINN

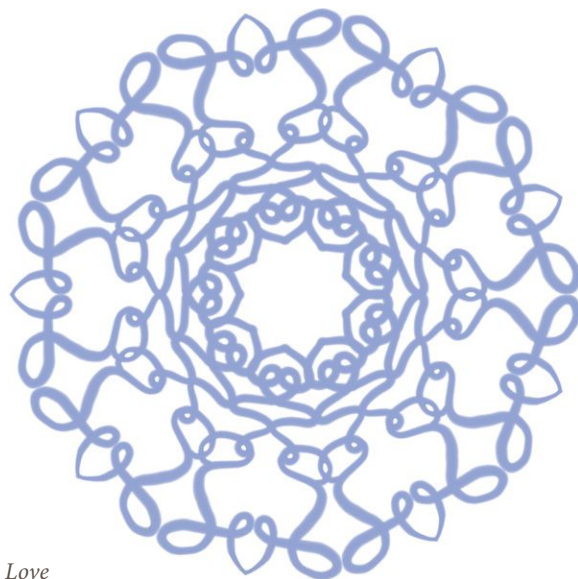
**Mathematics has the power to transform lives. It's possible** it has transformed yours. I know it transformed mine. I went so far as to write a love letter to math. Here's an excerpt:



So how can we, MAA members—both individually and collectively—help others deepen their appreciation of mathematics and access its transformative power? I believe the answer is through love.



Mathematics



Love

My friend Renée Smith, founder of A Human Workplace ([makeworkmorehuman.com/](http://makeworkmorehuman.com/)), counsels “if you want engagement, stop the fear and love your people.” While she is striving to transform workplace culture, I think her lesson can be applied to mathematics classrooms and communities as well.

#### Stop the fear.

Anxiety and trauma are created in mathematics environments from elementary school through professional communities. Whether a student in a classroom or a professional in a research group, people recoil from being called out as wrong, different, slow, or disappointing. Some take refuge in the excuse “I’m not a math person” and stop trying. Others persist with less enthusiasm and a greater likelihood to refocus energies elsewhere. As a consequence, we lose potential mathematicians and other STEM professionals from the pipeline.

Smith wrote, “When we foster a culture of fear, people are so preoccupied by that fear and the physical and psychological toll it takes, so preoccupied figuring out how to survive, that they can’t bring or do their best.” So let’s stop the fear. How? Again, I answer through love.

#### Love your people.

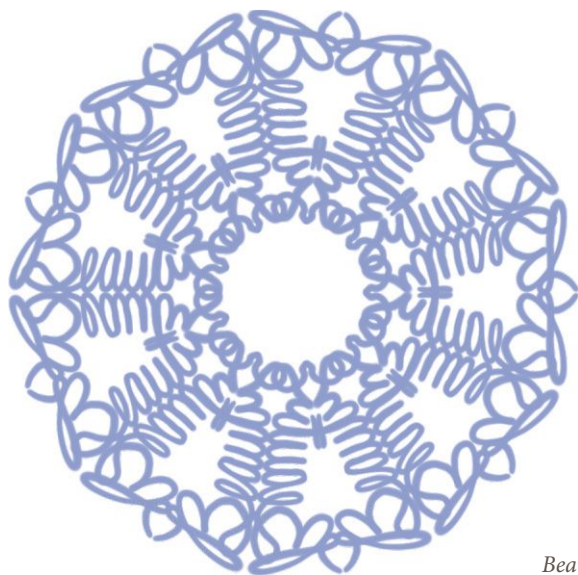
I know this sounds naïve, but really it means to care deeply about each person in your community, be it a classroom or a boardroom. Take the time to know who your community members are and what they care about. Find out their goals and provide them opportunities to stretch and learn. Listen. Challenge. Care.

Too often, students believe their value is determined by their academic performance or other tangible accomplishments. Francis Su, in his 2013 Haimo presentation, centered humanity in the mathematics classroom and taught us all that

“Your accomplishments are NOT what make you a worthy human being. You learn this lesson when someone shows you GRACE: good things you didn’t earn or deserve, but you’re getting them anyway.” Showing grace is an act of love.

Creating a loving community is an issue of equity. Members feel a sense of acceptance and belonging. They support each other, have respectful conversations and respectful conflict, and take risks—even as it exposes vulnerabilities. In essence, each person is welcomed and knows they can express their perspective, skills, and humanity without fear. Maybe in the process, they can learn to love themselves and appreciate others a little more.

What is the outcome of all this love? Creativity. Growth. Dedication. Problem-solving. Learning. Satisfaction. Belonging. All lead to increased engagement, which is a desirable end goal. Studies have shown that active learning in the classroom significantly increases students assessment performance and decreases course failure rates (Freeman et al.). But without a loving community, those active strategies might create a new source of fear and actually become a barrier to learning.



*Beauty*

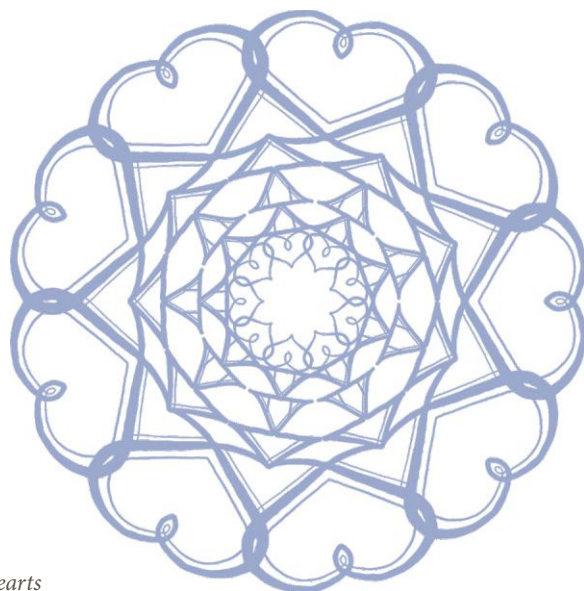
So, I encourage us to bring our whole selves and our whole hearts to our mathematical lives. Convey more empathy, more understanding, and more respect. Carry less bias, less rigidity, and less indifference. Lead with love. Teach with love. Strive to create a more loving community and keep people engaged with mathematics.

This message is my last as President of MAA. It has been a wonderful, unpredictable, and amazing adventure. I have tried to embrace my humanity and lead with love. I love mathematics. I love the MAA. And I will continue to uphold MAA’s vision of a society that values the power and beauty of

mathematics and fully realizes its potential to promote human flourishing. ■

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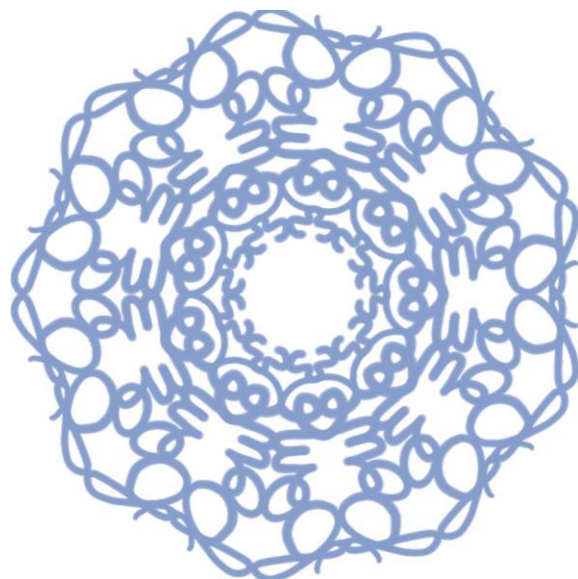
*Jennifer Quinn is the MAA president and a professor of mathematics at the University of Washington Tacoma (jquinn@uw.edu).*



*MAA Hearts*

## References

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- Freeman, S., Eddy, S., McDonough, M., Smith, M., Okoroafor, N., Jordt, H., and Wenderoth, M. (2014) Active learning increases student performance in science, engineering, and mathematics. *Proc. Natl. Acad. Sci. U.S.A.* 111 (23) 8410–8415. [pnas.org/content/111/23/8410.abstract](http://pnas.org/content/111/23/8410.abstract)



*Power*

# Departments

## MEET A MEMBER

### Ivelisse Rubio

#### What is your current position and how long have you been there?

I am a professor in the computer science department of the University of Puerto Rico, Río Piedras Campus (UPR-RP). I have been here for the last 15 years.

#### How long have you been a member of MAA and why did you initially join?

I do not remember for how long I have been a member of the MAA, but I do remember reading articles from *Mathematics Magazine* and the *American Mathematical Monthly* since I was an undergraduate student in the 80's. After I finished my masters in 1988, I worked as an instructor in the mathematics department of the UPR-RP. I participated in a MAA minicourse on using computer graphics in the teaching of precalculus and calculus. This inspired me to lead a project on using the software DERIVE in the teaching of precalculus. I probably joined the MAA in the 80's because of my interest in the teaching of mathematics: to be up to date in the new practices.



#### What has kept you a member since then?

In addition to having access to the MAA publications, I value the work that the MAA has done building community and shaping the future generations of mathematicians. By being a member, I am indirectly supporting programs to encourage students to work on research like the undergraduate poster session at the Joint Mathematics Meetings, programs that help to prepare new mathematics faculty like Project NExT, and programs that support the participation of underrepresented minorities in mathematics like the Tensor SUMMA grants. I also benefited from workshops on how to get students involved in undergraduate research, so I felt that it is important to be a member of an organization that helped me to be a better research mentor and professional.

#### The MAA's values include community, communication, inclusivity, and mathematics teaching and learning. What would you like to see MAA do to better address these values?

I think that the MAA is working well towards being an inclusive community; I do not have specific suggestions at this moment.

#### Describe the MAA in four words

Supportive community inspiring mathematicians. ■

#### Want to nominate a member to be featured in a future issue?

Go here



**WANTED**

**MAA FOCUS cover art**

Interested in revealing the beauty or community of mathematics on the cover of *MAA FOCUS*?  
Submit an image for consideration by our art committee!

[bit.ly/maafocuscover](https://bit.ly/maafocuscover)

## PUZZLE PIECES

### Union Sudoku

—DAVID NACIN

#### Instructions

Fill in the cells with the sets  $\{\}$ ,  $\{1\}$ ,  $\{2\}$ ,  $\{3\}$ ,  $\{1,2\}$ ,  $\{1,3\}$ ,  $\{2,3\}$ , and  $\{1,2,3\}$  so that each appears exactly once in every row and column. A cage is a heavily outlined region of cells. The clue in each cage reveals the union of the sets in that cage.

*David Nacin is a professor at William Paterson University and author of the book Math-Infused Sudoku. He enjoys designing and studying puzzles related to partition identities, the motion of chess pieces, finite groups, and other mathematical structures. He maintains a free mathematical puzzle blog at [quadratablog.blogspot.com](http://quadratablog.blogspot.com).*

#### Submit a Puzzle Today!

We are looking for puzzles and games that involve math and logic-based thinking along the lines of Sudoku and its variations, the game *Set*, Nerdle (the math version of Wordle), and other recreational math puzzles that could have been found in Martin Gardner's *Mathematical Games*.

Please email submissions to Michael Dorff at [mdorff@math.byu.edu](mailto:mdorff@math.byu.edu).

{1,3}	{1,2}		{1,2,3}	{1,2,3}	{2,3}	{1,2,3}	
	{3}			{1}		{1,2,3}	{1,2}
{2,3}		{1,2,3}			{1,2,3}		
{2}	{1,2,3}		{1,3}	{1,2,3}		{3}	
{1,2,3}		{1,3}			{1,2}		{1,2,3}
{1,2}	{2,3}		{2}	{1,2}		{1,2,3}	
		{1,2,3}		{1,3}	{1,2,3}		{2}
{1,2,3}			{1,3}		{1}		

# Departments

## SECTION HAPPENINGS

### Spring 2023 Section Meetings

#### ALLEGHENY MOUNTAIN

March 30–April 1, Edinboro University of Pennsylvania

**Speakers include:**

- Deirdre Longacher Smeltzer, *MAA Section Visitor, Mathematical Association of America*
- Haydee Lindo, *MAA NAM Lecturer, Harvey Mudd College*
- David Richeson, *Dickinson College*

#### EASTERN PA & DELAWARE

TBD

Speakers to be announced.

#### FLORIDA

February 17–18, Online Virtual Meeting

Speakers to be announced.

#### GOLDEN

February 25, Santa Rosa Junior College

**Speakers include:**

- Anastasia Chavez, *MAA AWM Lecturer, St. Mary's College of California*
- Edray Goins, *MAA Section Visitor, Pomona College*
- Omayra Ortega, *Sonoma State University*
- Varilly Alvarado, *Rice University*

#### ILLINOIS

March 31–April 1, College of DuPage

Speakers to be announced.

#### INDIANA

March 31–April 1, Indiana University at Kokomo

**Speakers include:**

- Catherine Hsu, *MAA AWM Lecturer, Swarthmore College*
- Heidi Berger, *Simpson College*

#### INTERMOUNTAIN

March 24–25, Utah Tech University

**Speakers include:**

- Adriana Salerno, *MAA Section Visitor, Bates College*
- Talea Mayo, *MAA NAM Lecturer, Emory University*

#### KANSAS

April 14–15, Bethany College

**Speakers include:**

- Adriana Salerno, *MAA Section Visitor, Bates College*
- Sarah Greenwald, *MAA Pólya Lecturer, Appalachian State University*

#### KENTUCKY

March 31–April 1, Georgetown College

Speakers to be announced.

#### LOUISIANA-MISSISSIPPI

March 3–4, University of Mississippi

**Speakers include:**

- Michael Pearson, *Mathematical Association of America*
- Hortensia Soto, *MAA Section Visitor, Colorado State University*
- Anastasia Chavez, *MAA AWM Lecturer, Saint Mary's College of California*

#### MD-DC-VA

April 7–8, Virginia State University

Speakers to be announced.

#### METROPOLITAN NEW YORK

April 29, Pace University - Manhattan

**Speakers include:**

- Talithia Williams, *MAA Pólya Lecturer, Harvey Mudd College*
- Boyan Kostadinov, *New York City College of Technology*

#### MICHIGAN

March 31–April 1, Alma College

**Speakers include:**

- Jennifer Quinn, *MAA Section Visitor, University of Washington*
- Sarah Greenwald, *MAA Pólya Lecturer, Appalachian State University*
- Scott Barnett, *Henry Ford College*
- Abe Edwards, *Michigan State University*
- Tim Sipka, *Alma College*

#### MISSOURI

March 30–April 1, Missouri State University

Speakers to be announced.

#### NEBRASKA - SOUTHEAST SOUTH DAKOTA

March 31–April 1, Peru State College

**Speakers include:**

- Allen Butler, *MAA Section Visitor, Daniel H. Wagner, Associates*



## NEW JERSEY

April 1, Kean University

### Speakers include:

- Jose Perea, *MAA NAM Lecturer, Northeastern University*
- April Strom, *Chandler-Gilbert Community College*
- Ken Ono, *University of Virginia*

## NORTH CENTRAL

March 24–25, Winona State University

Speakers to be announced.

## NORTHEASTERN

TBD

Speakers to be announced.

## OHIO

March 31–April 1, Baldwin Wallace College

Speakers to be announced.

## OKLAHOMA-ARKANSAS

March 30–April 1, East Central University

Speakers to be announced.

## PACIFIC NORTHWEST

March 17–18, George Fox University

Speakers to be announced.

## ROCKY MOUNTAIN

April 21–22, Black Hills State University

### Speakers include:

- Edray Goins, *MAA Section Visitor, West Pomona College*
- Sarah Greenwald, *MAA Pólya Lecturer, Appalachian State University*

## SEAWAY

May 5–6, University of Waterloo

Speakers to be announced.

## SOUTHEASTERN

March 9–11, Coastal Carolina University

Speakers to be announced.

## SOUTHERN CALIFORNIA - NEVADA

April 15, University of La Verne (tentative)

Speakers to be announced.

## SOUTHWESTERN

Dates TBA, to be held in conjunction with NMMATYC

Speakers to be announced.

## TEXAS

March 23–25, Tarleton State University

Speakers to be announced.

## WISCONSIN

April 28–29, University of Wisconsin - Stout

### Speakers include:

- Adriana Salerno, *MAA Section Visitor, Bates College*
- Anastasia Chavez, *MAA AWM Lecturer, Saint Mary's College of California*
- Tom Edgar, *Math Horizons Editor, Pacific Lutheran University*

For the most up-to-date information go to [maa.org/sections](http://maa.org/sections) and click on the link for your section. Or check your section's MAA Connect community (click on "MAA Connect" in the member portal or go to [connect.maa.org](http://connect.maa.org)).

# Departments

## ART DEPARTMENT

### Sculpting Metal Curvahedra

—EDMUND HARRISS

The metal sculpture on the cover is the G. David and Jane B. Gearhart Curvahedra. It was created through a collaborative design process, and its creation required the use of mathematics to develop new construction techniques. I led the process with several colleagues and organizations. The result provides an interesting example of effective interdisciplinary work and new ways to apply mathematical understanding.

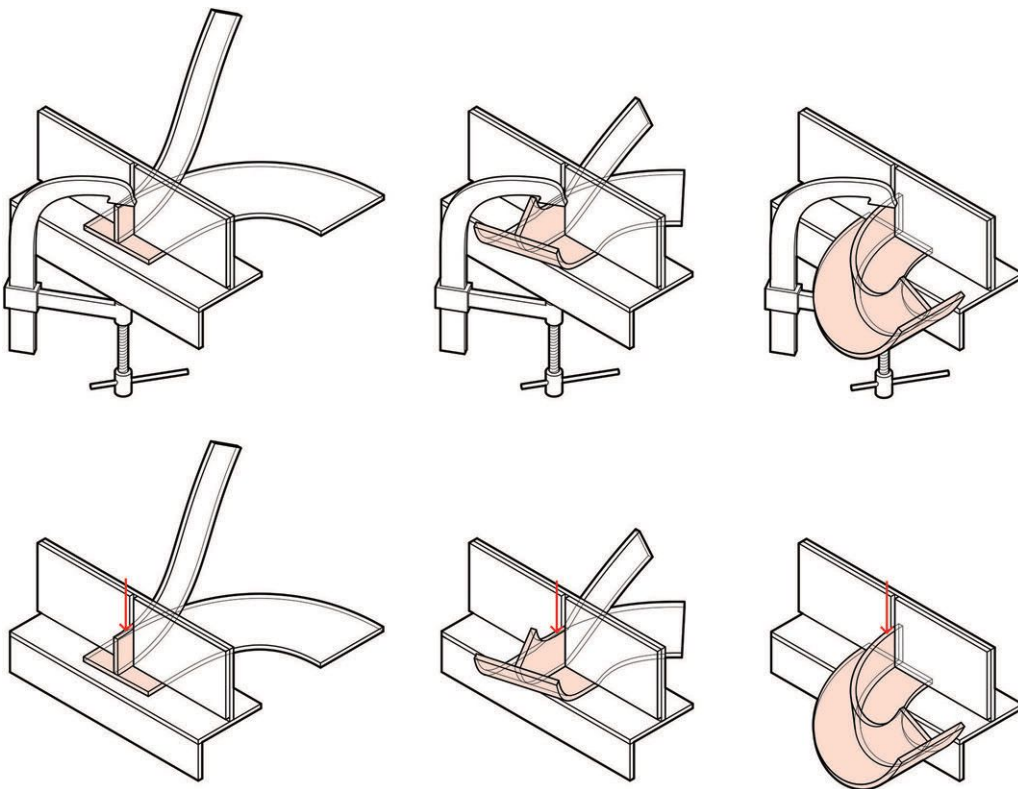
The story began in a collaboration with the University of Arkansas Honors college, with the initial design originating from the signature seminar course for honors undergraduates called “Place in Mind” that I cotaught with Carl Smith (Department of Landscape Architecture, University of Arkansas). This course came out of a conversation we had about the similarities and differences between how mathematicians and landscape architects view three-dimensional space. We were curious about how a space embodies a sense of place, how it is shaped by its history and use, and how its geometry contributes to its form and function. In the course, we chose

a campus courtyard as our object of study. The course used a perceptualist approach where the students were first asked to gather their own thoughts on the courtyard through different exercises before we shared our expectations. Without direct prompting, students noted that the courtyard space, though large, felt cramped and was not used much. In fact, this was the direct motivation for choosing the courtyard as the course topic.

A key output of the student designs from this course was a proposal for a bent metal sculpture. As we moved forward to make the proposed sculpture a reality, we learned about how bending metal presents a challenge. If you start to bend a metal sheet or rod, it gets weaker where it starts to bend and so, instead of a smooth bend over a long distance, all the bending will happen close to one point. This means that many metal sculpting techniques require a lot of highly skilled work.

Luckily, the right mathematical framework can make this whole process easier. The strategy we used involves dividing up the bending required so it can be done little by little along a metal sheet and, thus, significantly reduce the work required (though not the skill level) to create a curved metal sculpture. The manufacturing process involves cutting pieces of flat steel curved on the plane. They are then placed at ninety degrees in a T-shape and welded together little by little, maintaining the T-shape. A flat sheet can bend easily into different shapes, all called developable surfaces. Yet it cannot change its intrinsic geometry, including the shape

it had when cut. The cut curve thus determines the curvature in the plane, and this does not change when the strip is bent. By placing the two flat pieces at ninety degrees, they each control the easier bending of the other piece. A beam is made by applying a small bend to each piece in a T-shaped jig and then welding them together. The whole beam, a T-shape with two developable surface components, is thus



Converting two flat metal curves into one 3d curves by turning the parallel transport frame into a metal jig.



Alex Cogbill welding pieces of the sculpture.

made with small bends and a weld each time. Combining these two 2D curves thus creates a curve in 3D. In fact, all 3D curves can be produced in this way.

As this is a process that takes desired global movement and achieves it by small, local changes, it is natural to think about calculus. In fact, the T-shaped jig used in the construction can be viewed as a frame integrating the curvatures of the two flat pieces into the 3D curve. The two curvatures required here are used for the parallel transport, or Bishop frame, of a curve. (The Bishop frame is a relative of the more well-known Frenet frame that considers curvature and torsion rather than two curvatures).

This technique, named “Zip-Form,” was invented in collaboration with Emily Baker (Department of Architecture, University of Arkansas), an expert in creative structural metalwork. With the basic idea in place, we initially created a 1/4 scale prototype of the sculpture, showing that the

process would have the accuracy required. As it creates rigid beams that will form loops, they must fit closely together. This was followed by a full-size prototype that was tested with augmented reality through a process that shows a computer model on top of a physical one. In this case, it could show that the constructed beam had the geometry the model predicted. Twelve individual pieces were then precisely fabricated by Alex Cogbill, using a CNC plasma cutter and welding. They were then combined into the full sculpture, with the fabrication and installation by Modus Studio, an architecture firm in Fayetteville, AR, with funding from David and Jane Gearhart.

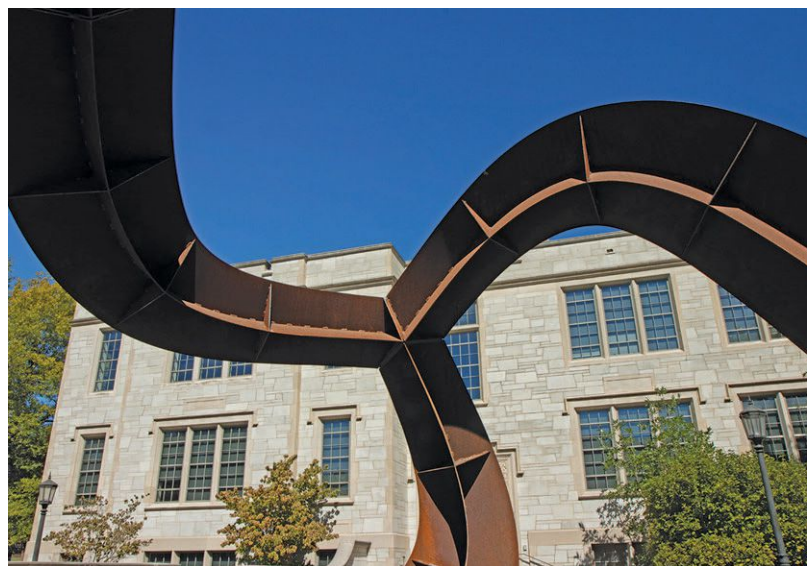
Once the Zip-Form technique was developed, it could be applied to other projects. It was used to create a hyperboloid-shaped lighthouse sculpture for the Mathemalchemy project. It was also an essential tool for joint work with Mohamed Ismail and Caitlin Muller at MIT to create reusable forms for optimized concrete beams that can be constructed in areas without access to the most high-tech machinery.

Amazingly, the day after the G. David and Jane B. Gearhart Curvahedra was unveiled, students were already pulling chairs and tables under it to engage with the space in a new way. The Dean of the Honors College will often host her office hours under the sculpture.

More about the design and process can be found at: [news.uark.edu/articles/55611/courtyard-curved-hedra-to-be-installed-at-gearhart-hall](https://news.uark.edu/articles/55611/courtyard-curved-hedra-to-be-installed-at-gearhart-hall). ■

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*Edmund Harriss is an assistant professor of mathematics and art at the University of Arkansas. His work aims to show the power of mathematical illustration well beyond images and to use mathematical ideas to create new manufacturing techniques.*



View from inside the sculpture showing how the two flat cut pieces make the three-dimensional curve.

# Departments

## BOOKS BEAT

### All in the Family

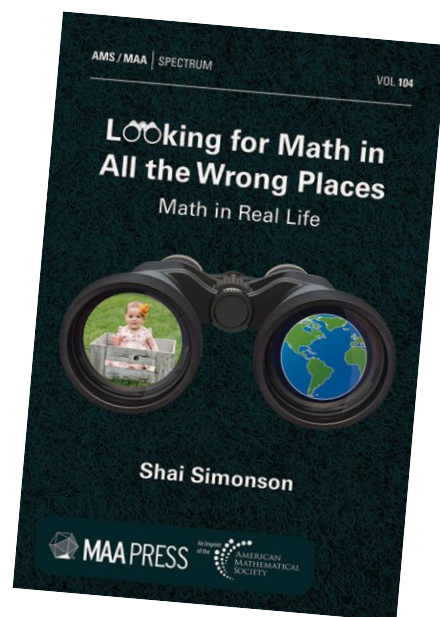
—STEPHEN KENNEDY

Shai Simonson was recently at the family celebration of his son's twenty-sixth birthday. Shai, 62 at the time, noted that his age and his son's age were digital reversals of one another. The party immediately erupted into a puzzle-solving session. Would this ever happen again? Had it happened before? Would it, or had it, ever happened with another of his children? [Spoiler alert: you might want to think about those questions before reading on. It'll be more fun for you to do it yourself, or, like Shai's family, along with some loved ones.]

Avi, a guest at the party, noticed that it would occur again in exactly 11 years as each digit would increase by one. Oh, and of course, thinking backwards it had happened 11 years previously; and 11 years before that. Shai's youngest son pointed out that the youngest possible ages, for any pair of reverse-aged people, were 01 and 10. Which sparked the observation from the birthday boy that 02 and 20, 03 and 30, etc., were also solutions. Shai's wife noticed that the differences between these pairs were successive multiples of nine and that cracked the whole problem open.

What struck me when I first read this passage in Shai Simonson's *Looking for Math in All the Wrong Places* was not the, relatively trivial, mathematical problem. It was Shai's perceptiveness in noticing the relationship and his nearly miraculous ability to turn a birthday party into a joyous family Math Circle. Everybody gets involved, throwing out ideas and conjectures, tracking down proofs and special cases. This happens over and over again in this book and, in some sense, it's the theme of the book. If you pay attention as you walk through the world, you will see mathematical questions and sharing those questions with friends and family is fun.

Another favorite story, because it hits close to home, is Shai's story of the romantic dinner with his wife that turned into a seminar on the proper pricing of carafes of wine. At this dinner Shai and his wife noted that a glass of wine cost \$8, a bottle (approximately five glasses) cost \$20.95, and a carafe (approximately two glasses) cost \$18.95. The obvious conundrum brought the romance to a screeching halt. How could this possibly make sense? After a careful discussion of the differences between the arithmetic, geometric and harmonic means, Shai and his wife agree that the correct price for the carafe should be the geometric mean of the price of a



*Looking for Math in All the Wrong Places: Math in Real Life*, Shai Simonson  
Spectrum series  
Volume: 104; 2022; 209 pp; Softcover  
MSC: Primary 00; 05; 97;  
Print ISBN: 978-1-4704-7012-8  
Electronic ISBN: 978-1-4704-7149-1  
Product Codes: SPEC/104 (print) and SPEC/104E (electronic)  
List Price: \$35.00; Member Price: \$26.25

bottle and the price of a glass, or about \$12.95. My own wife loves to tell the story of the romantic dinner at which she took my hand and lovingly commented on how warm it was, a comment that launched me into a mansplation of the perceptual properties of the thermoreceptor nerve cells in her hand and the differential equation describing the heat flow from me to her. This story is typically deployed to point out what a nerd she married. I, evidently, completely lack Shai's ability to charm and beguile with mathematics.

Beguiling is the exact right adjective for this book. Shai observes the world and sees in it mathematical questions and then charms the people around him, and the readers of this book, into participating in their solution. And the problems he sees are not the standard old chestnuts of mathematical popularization, they arise from the everyday experience of his life. There is a chapter on the mathematics (and physics) of lock-picking that will have you looking around your house for the old Master padlock whose combination you've forgotten. There is the story of the 12-sided meditation gazebo in Hawaii and his on-the-spot calculation of how far away he would have to stand to simultaneously see six sides. There's the covid-inspired problem of maximizing social distancing in his classroom.

The mathematics we encounter ranges widely—number theory, combinatorics, probability, geometry, algorithms, algebra—but is very accessible. The book's audience is the

general reader, and it would make a fine holiday gift for the person in your life who might be curious about the essence of mathematical thinking. But *MAA FOCUS* readers, too, will find much that is new and interesting to them—and potentially useful in a quantitative reasoning or liberal arts math class. Just hanging out and doing math with Shai and his family and friends is a joy.

## New in the Notes Series

A variety of reports on national issues in undergraduate STEM education over the last decade or two have implicated mathematics instruction as problematic particularly when it comes to developing transferable quantitative skills. For example, the 2013 National Research Council report *The Mathematical Sciences in 2025* says, “The educational offerings of typical departments in the mathematical sciences have not kept pace with the changes in how the mathematical sciences are used. A redesigned offering of courses and majors is needed. Although there are promising examples, a community-wide effort is needed . . . to make undergraduate courses more compelling to students and better aligned with the needs of user departments.” The MAA report *A Common Vision for Undergraduate Mathematical Sciences Programs in 2025* ([maa.org/common-vision](http://maa.org/common-vision)) recognized that a STEM-literate citizenry needs to be able to work in multi-disciplinary ways and that change must be implemented at the institutional, rather than the departmental, level.

The NSF-funded project Synergistic Undergraduate Mathematics via Multi-institutional Interdisciplinary Teaching Partnerships (SUMMIT-P) was formed (in collaboration with MAA’s CRAFTY project) to address these concerns. SUMMIT-P is a consortium of 15 institutions including two-year and four-year colleges, and both PhD-granting and masters-granting universities. Each institution formed

an interdisciplinary team, always including mathematics, to cooperate in designing curricular materials for mathematics to increase student learning and mathematical content transference. The first volume of their results is now available in the MAA Notes series. It contains a detailed description of the project’s goals and motivation, a chapter outlining the creation of, and procedures followed by, the interdisciplinary teams, and a collection of sample classroom modules developed by the teams for use in QR-courses, college algebra, calculus, and differential equations. The sample modules contain many exercises which feature fitting models to actual data and range widely over partner disciplines. There is, for example, a calculus module designed with colleagues from business and economics that predicts, with an ODE, adoption of new technologies; another module resulting from collaboration with environmental engineering and physics uses data from a local solar array and the definition of the integral to estimate solar energy collection. You can download the volume from your MAA Member Library. ■

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*Stephen Kennedy (Carleton College) manages acquisitions for MAA Press. Contact him if you’re interested in writing a book for MAA Press: [kennedy@maa.org](mailto:kennedy@maa.org).*

## MAA Member Library

It is easier to access your MAA Member Library with the new member portal!

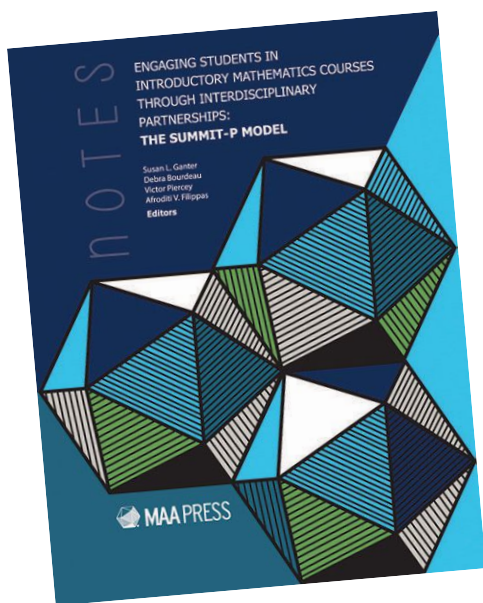
Log in to [maa.org](http://maa.org) and, on your profile page,

**click on “MAA Member Library” (top, left)**

You can still access your MAA Member Library from MAA Connect too. Go to

- Resources
- MAA Resources
- Teachers
- Downloadable Resources—your MAA Member Library is the last item under that heading.

There are over 50 volumes in the MAA Member Library covering a wide variety of topics relevant to your classroom. In addition to those Notes volumes, you can also access *Count Me In: Community and Belonging in Mathematics* edited by Della Dumbaugh and Deanna Haunsperger and *Testimonios: Stories of Latinx and Hispanic Mathematicians* edited by Pamela E. Harris, Alicia Prieto-Langarica, Vanessa Rivera Quiñones, Luis Sordo Vieira, Rosaura Uscanga, and Andrés R. Vindas Meléndez.



*Engaging Students in Introductory Mathematics Courses through Interdisciplinary Partnerships: The SUMMIT-P Model*

edited by Susan L. Ganter, Debra Bourdeau, Victor Piercey, and Afroditi V. Filippas

# NEW FROM AMS/MAA PRESS



## An Introduction to Proof via Inquiry-Based Learning

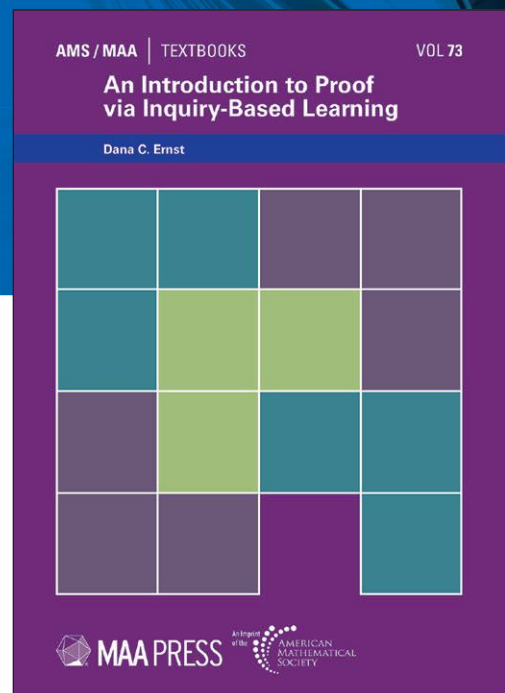
Dana C. Ernst, Northern Arizona University, Flagstaff, AZ

*An Introduction to Proof via Inquiry-Based Learning* is a textbook for the transition to proof course for mathematics majors. Designed to promote active learning through inquiry, the book features a highly structured set of leading questions and explorations.

[bookstore.ams.org/text-73](https://bookstore.ams.org/text-73)

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