THE SEAWAY CURRENT

Newsletter of the Seaway Section of the Mathematical Association of America

FALL 2022
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IN THIS ISSUE...

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The Seaway Current is published at least twice per year by the Seaway Section of the Mathematical Association of America (MAA) for the benefit of its members. Its pages are open to all members of the MAA and, by invitation to others, for the exchange of information and opinion. Contributed announcements, articles, and editorials are welcome and should be sent to the editor.

Material may be submitted to the editor by e-mail. Opinions expressed in this newsletter are those of the editor or of individual contributors and do not necessarily represent the views of the MAA or of the Seaway Section.

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SEAWAY SECTION FALL MEETING

Siena College, Loudonville, NY

October 28 - 29, 2022

Check out the program!

BACK IN PERSON!

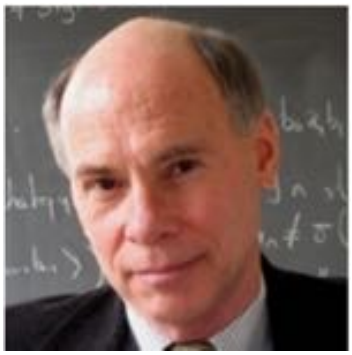
Thanks to local organizers, headed up by Mohammad Javaheri, and our Seaway Section officers, the FALL 2022 meeting is planned to be *in person* at Siena College. We can't wait to see you there!!

Thank you, Siena College Math Department, for hosting us!!

FALL 2022: THE INVITED SPEAKERS

Friday Banquet Speaker: Alan Taylor, Union College

Title: The unreasonable ineffectiveness of mathematics (with and without the axiom of choice)



Abstract: The title is a bit tongue-in-cheek with apologies to Eugene Wigner; nothing we say is in conflict with his wonderful 1960 paper in the Journal of Pure and Applied Mathematics entitled "The unreasonable effectiveness of mathematics in the natural sciences." But although the abstract mathematics we do does, as Wigner suggests, produce many results that yield strange-but-true things about the real world, it also produces some results that seem to be in conflict with the real world that we know. The most famous example is the Banach-Tarski paradox, asserting that a solid ball can be decomposed into five pieces and then reassembled using translations and rotations into two solid balls that are each the same size as the original. We'll mention a couple of others along these lines (predicting the future ...) that rely on the axiom of choice (AC), but we'll also mention a couple that don't (more teams than players; more leagues than teams ...). And we'll mention (with permission) some remarkable unpublished results of Elliot Glazer that reveal paradoxes in the absence of AC and anything contradicting AC.

The University of Waterloo will host the SPRING 2023 meeting, May 5-6, 2023.

Thank you to the University of Waterloo for welcoming the Section to campus, after a two-year delay in plans, and thank you to the local organizers, headed up by Diana Skrzydlo. We look forward to being back in Canada!

FALL 2022: THE INVITED SPEAKERS

The French Connection: Borda, Condorcet, and the Mathematics of Voting Theory

Janet Heine Barnett, Colorado State University Pueblo

Abstract: Voting theory has become a standard topic in the undergraduate mathematics curriculum. Its connection to important issues within a democratic society and the accessibility of its methods make a unit on voting theory especially well-suited for students in liberal studies program. The piéce de resistance of such a unit is a somewhat startling theorem known as Arrow's Impossibility Theory which essentially asserts that there is no fair voting system for elections involving three or more candidates. Unpacking what this means by exploring the relationship between different methods for determining election results (called voting methods) and different notions of fairness (called fairness criteria) is the primary objective of the standard undergraduate treatment of voting theory.

The study of specific voting methods and their drawbacks itself dates back well before Arrow's twentieth-century work. This talk considers the contributions of two revolution-era French mathematicians for whom certain key ideas of voting theory are now named: Jean Charles, Chevalier de Borda (1733-1799) and Marie-Jean-Antoine-Nicolas de Caritat, Marquis de Condorcet (1743-1794).

In addition to exploring the technical contents of works written by Borda and Condorcet about elections, I provide an overview of the intriguing biographical and historical contexts in which they developed their ideas. Along the way, I describe a classroom-ready project designed to introduce students to all of the content contained in today's standard textbook treatment of Voting Theory by engaging them directly with Borda's and Condorcet's original writings through a series of project tasks. By drawing on Condorcet's rich discussion of his personal motivations for studying the problems of collective decision-making, the project then goes beyond a standard textbook treatment in terms of its investigation of why Arrow's Impossibility Theorem, and voting more generally, matters in today's society.

Do Teachers Need Real Analysis?

Xiao Xiao, Utica University

Abstract: In 1965, MAA's Committee on the Undergraduate Program in Mathematics made a recommendation in the General Curriculum in Mathematics for Colleges report that real analysis should be part of any general undergraduate mathematics curriculum. A few years later in 1971, the same committee recommended that real analysis should be part of the minimum requirement for preparing high school mathematics teachers. Since then, real analysis has been taught extensively in many universities and colleges that have an undergraduate mathematics program. Based on a 2015 survey conducted by the Conference Board of Mathematical Sciences, approximately 66% of all mathematics programs and 54% of the secondary mathematics teacher training program require at least one semester of real analysis.

A traditional real analysis course often contains a broad range of topics that tends to focus on preparing students for graduate school. Essential though they are, it creates a disconnect for future high school teachers because only very few topics are directly relevant to what these students will be teaching in the future. In this talk, we report on a recently completed textbook on real analysis written in an inquiry-based style with secondary school mathematics teachers in mind. We choose course content to give students a working knowledge of that part of real analysis that directly underlies the materials on numbers and functions that is taught in high school. The book is a joint work with David M. Clark.

Kostant's partition function and magic multiplex juggling sequences

Pamela E. Harris, University of Wisconsin, Milwaukee

Abstract: Kostant's partition function is a vector partition function that counts the number of ways one can express a weight of a Lie algebra g as a nonnegative integral linear combination of the positive roots of g. Multiplex juggling sequences are generalizations of juggling sequences that specify an initial and terminal configuration of balls and allow for multiple balls at any particular discrete height. Magic multiplex juggling sequences generalize further to include magic balls, which cancel with standard balls when they meet at the same height. In this talk, we present a combinatorial equivalence between positive roots of a Lie algebra and throws during a juggling sequence. This provides a juggling framework to calculate Kostant's partition functions, and a partition function framework to compute the number of juggling sequences. This is joint work with Carolina Benedetti, Christopher R. H. Hanusa, Alejandro Morales, and Anthony Simpson.

Fall 2022: The Invited Speaker Bios

Janet Heine Barnett holds a PhD in set theory from the University of Colorado Boulder and is Professor Emerita of Mathematics at the Colorado State University Pueblo (CSU Pueblo) where she taught from 1990 - 2018. Her scholarly interests have long included the history of mathematics and its use in promoting mathematical understanding and as a vehicle for promoting teacher reflection on pedagogical issues. Most recently, she has served as an editor of *Convergence*, MAA's online journal for the history of mathematics and its use in teaching, and as a lead PI for the NSF-funded project TRansforming Instruction in Undergraduate Mathematics via Primary Historical Sources (TRIUMPHS). Her distinctions include the MAA Haimo award for excellence in undergraduate teaching and the CSU Pueblo Presidential Award for service to education. Janet shares her passions for mathematics and history (as well as dance and travel) with her husband, George W. Heine, whom she met while serving as a Peace Corps volunteer in the Central African Republic (1982 - 84).

Pamela E. Harris is a Mexican-American mathematician and serves as Associate Professor in the Department of Mathematics and Statistics at Williams College and as Associate Professor of Mathematics at the University of Wisconsin Milwaukee. She received her B.S. from Marquette University, and M.S. and Ph.D. in mathematics from the University of Wisconsin-Milwaukee. Dr. Pamela E. Harris's research is in algebraic combinatorics and she is the author of over 50 peer-reviewed research articles in internationally recognized journals. An award-winning mathematical educator, Dr. Harris was the 2020 recipient of the MAA Northeast Section Award for Distinguished College or University Teaching, the 2019 MAA Henry L. Alder Award for Distinguished Teaching by a Beginning College or University Mathematics Faculty Member, and the 2019 Council on Undergraduate Research Mathematics and Computer Sciences Division Early Career Faculty Mentor Award. She has supervised the research of over 120 undergraduate students, a majority of whom identify as members of groups historically excluded in higher education, has served as a research faculty mentor for undergraduate research programs at the Mathematical Sciences Research Institute and the Institute for Computational and Experimental Research in Mathematics, and she is a trained Entering Mentoring Workshop Facilitator. She is the President and co-founder of Lathisms: Latinxs and Hispanics in the Mathematical Sciences, cohosts the podcast *Mathematically Uncensored* and is a coauthor of the books *Asked And Answered: Dialogues On Advocating For Students of Color in Mathematics*, *Practices and Policies: Advocating for Students of Color in Mathematics*, and *Read and Rectify: Advocacy Stories from Student of Color in Mathematics*.

Alan Taylor: My graduate training was in the field of mathematical logic, and I spent the first fifteen years of my career doing infinitary combinatorics. Most of my work involved ultrafilters on omega, ideals on uncountable cardinals, and partition theory (including a bit of work with finite Ramsey theory). I spent the following fifteen years with a number of questions from the area of "fair division" and with some topics arising from the theory of voting. Here, I was primarily studying simple games. For the past decade I have returned to set theory with somewhat of a focus on coordinated inference as captured by so-called hat problems.

Xiao Xiao received a Ph.D. in mathematics from State University of New York at Binghamton in 2011. After completing his Ph.D., he has been teaching at Utica University and he is currently professor of mathematics. His scholarship interests include arithmetic geometry, and more specifically on classification of F-crystals. More recently, he is also interested in studying arithmetic derivatives and their natural extensions. His teaching interests include the use inquiry-based learning and preparation of secondary mathematics teachers. Between 2016 and 2020, he has co-facilitated annual inquiry-based learning workshops at Academy of Inquiry-Based Learning. He is the recipient of the Clarence Stephens Award for Teaching Excellence by the Mathematical Association of America Seaway Section in 2020. He is a Silver '12 Project NExT fellow.

Section Notes and Announcements

Fall 2022

Roberts Wesleyan College

The Department of Computer Science, Mathematics, and Physics at Roberts Wesleyan University welcomed Susan Geer from a part-time role to a full-time role in physics and Dr. David Jacome to a part-time role in physics this year. We have just begun a search for a full-time faculty member in Computer Science. *(Submitted by Gary Raduns)*

Want to be Involved in the Section?

Good! We want you involved!

- Volunteer: Check out the governance page of the Section website for the list of committees. If something seems up your alley, email the Section Chair, Leah Bridgers, and ask to become a member of that committee. You can also share ideas with committee members, if your idea is related to the charge of that committee and you want some help to get something moving.
- Organize: You can organize a special section on your favorite research or pedagogical topic, or you can organize a workshop or special event at the next meeting. Just get in touch with the Program Chair, Brad Emmons, well in advance of the meeting to get the organization underway.
- Write: You can write articles for the Seaway Current — contact the Editor, Elizabeth Wilcox, for more information — or even contribute news items or articles to the Section webpage or social media group.

Members lead our Section.

Fall 2022: Meeting Special Events

Refer to the online meeting program for locations and updates.

Friday

Friday Workshop — "MAA Convergence Workshop : Mining the Resources of MAA Convergence: Where Mathematics, History, and Teaching Meet"
Facilitated by: Janet Heine Barnett (Colorado State University Pueblo & MAA *Convergence*
3:00 pm - 5:00 pm
Registration fee: $0

> *Abstract:* The value of using the history of mathematics in its teaching as a support for student learning has been increasingly recognized by instructors and educational researchers alike. History of mathematics is not only for the history of mathematics classroom any longer! Since 2004, MAA's peer-reviewed, online, open-access journal *Convergence* has offered its readers high-quality scholarship and classroom resources to help them leverage that value in teaching a wide range of grades 8-16 mathematics courses. Whether you're looking for new ideas for bringing history into your classroom, a venue for sharing your own ideas, or just wanting to know more about the benefits that history has to offer for student mathematical learning, this interactive workshop will help you to mine *Convergence*'s riches. Workshop activities will include a scavenger hunt (with prizes!) that will wind its way through *Convergence*'s pages to uncover its hidden (and not-so-hidden) gems. **Note to Participants: Please bring your laptops with you if you are able to. It is not necessary that everybody have one, but the more that we have, the better!**

Banquet + Lecture: 6 pm - 9 pm
Math Game Night: 9 pm - ??

Saturday

Leadership in Mathematical Sciences Workshop: Department management during and post-pandemic
Organizer: Mihail Barbosu (RIT)
12:15 pm - 1:15 pm

> Every semester Mihail Barbosu leads a workshop on effective leadership in the mathematical community. The latest workshop focuses on managing a department during and post-pandemic. Recent chairpersons, former chairpersons, and especially anyone who has considered the path to becoming a department chair are all welcome to participate!

Careers in Mathematics Panel Discussion
12:15 pm - 1:15 pm

Special Session on the History of Mathematics and its Use in Teaching
Moderated by: Toke Knudsen (SUNY Oneonta) & Elizabeth Wilcox (SUNY Oswego)
12:15 pm - 2:45 pm

> *Convergence* is the MAA's free online journal about the history of mathematics, and ways to use historical documents, scenes, and ideas in teaching. To celebrate the participation of Janet Heine Barnett, editor of *Convergence*, in the Seaway Section's fall meeting, Toke Knudsen (SUNY Oneonta) and Elizabeth Wilcox (SUNY Oswego) are organizing a special session dedicated to presentations on the history of mathematics and its use in teaching.

Listening Session with your Section Chair and Program Chair
Facilitated by: Brad Emmons (Utica University) and Leah Bridgers (SUNY Oneonta)
1:30 pm - 2:20 pm

> Sit down with the Chair of the Seaway Section to discuss initiatives for the future. Do you have suggestions for future meetings? Any requests for workshops, mini-courses, or other fun events? Suggestions or thoughts about charity fundraisers? Do you want to get involved with the section? Maybe you just want to talk about mathematics? Our section chair, Dr. Leah Bridgers (SUNY Oneonta) and Program Chair, Dr. Brad Emmons (Utica University) are ready to listen!

Discussion about the needs of the post-Covid student
Facilitated by: Alex Rennet (University of Toronto—Mississauga)
1:45 pm - 2:45 pm

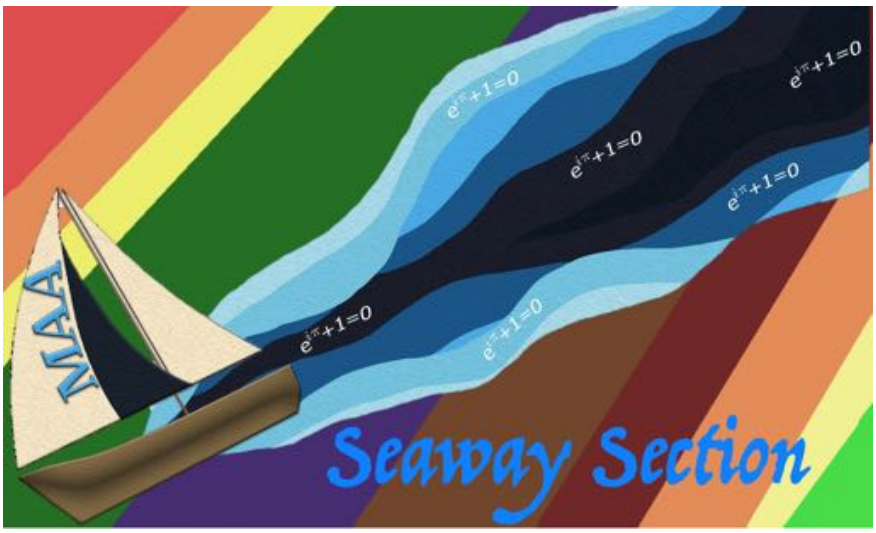
> While Covid as a disease isn't over, its impact on the educational system has shifted to a new phase. As students who had weeks or years of remote instruction — or no instruction — in mathematics matriculate into colleges and universities, we need to adapt to changes. But how? What are our current students better at than our previous students? What deficiencies do they have? How has the pandemic changed our efforts toward active learning, inclusive education, and instructional technology? This isn't a lecture but rather a discussion; all will be invited to contribute to the discourse.

UNYIBL/Seaway NExT Workshop : Beginning IBL with today's students
4:30 pm - 6:00 pm

> Students who are entering college have had an interrupted high school learning experience. What does this mean about their eagerness to participate in an inquiry-based learning (IBL) classroom? What about considerations such as social anxiety of students, content coverage, and disparities in prerequisites? In this workshop, we'll address some of these as we look at what it takes to get started in IBL with today's students. Note: Afterward, we invite anyone who is interested to meet at a particular local restaurant for dinner.

Flashback to Fall 2019

A Year Celebrating Our Diversity



and the Diversity We Can Achieve
TOGETHER

We've got wonderful people in our section and, if I say so myself, we do a fabulous job putting together meetings! This year, we're going to celebrate the diversity that we have in our own membership and start a few conversations about how we can include more diverse people in our profession and community in the future. Some questions that we can ask ourselves and one another:

- What can we do to buoy the spirits of young folks, to help them believe in their own math potential?
- What can we do to encourage more women and people of color to continue on in mathematics, stay the course through graduate school and leap into the ranks of academia?
- How can we support and welcome members with physical limitations?
- How can we best welcome and support our own members who feel unheard at department meetings or section meetings, or feel unvalued by their university?
- How can we encourage more of the general population to think about mathematics *for fun*?

I can't answer these questions but, maybe together WE can! Let's brainstorm! Talk to a Seaway Section leader and **get involved!**

Love, the Editor

A lot has changed since Fall 2019. Ok, that's an understatment. But, at least one thing has remained constant:

We still have wonderful people in our section!

Invite a new colleague to come to a meeting. Share your ideas with the Program Chair or Section Chair. Join a committee. Get involved! Work to make our Section even better.

Bringing students from the U.S. to Waterloo, Canada for the Spring Meeting?

Here are a few tips to help with the planning:

Start early!

Read up on visiting Canada: Canada's Border Services Agency website is a good place to start.

Proper Identification: Work with your students to get passports, birth certificates, permanent resident cards, or enhanced driver's licenses. Check out the U.S. State Department's website with info on applying for a passport. The paperwork takes time and costs money; start early. International students may require visas to travel to Canada and definitely need their residency paperwork to get back into the U.S. Be sensitive, too — some of your students may not be comfortable disclosing their citizenship status with you, so don't ask. Just provide options.

Consult with your Study Aboard or International Office: All departments that anticipate sending students to the meeting are advised to conult with their study abroad or internation office to learn about the school's procedures and regulations. Every school has different policies and it's important to know what's expected of students and faculty travelling abroad. Check The SUNY policy on international travel with students here.

With some careful planning, you'll have an awesome trip . . . and your students will, too!

Reports & Minutes Since Spring 2022

1. Treasurer's Report – Fall 2022
   Gordon Craig, Seaway Section Treasurer

   Under normal circumstances, I would propose a 2023 budget for the section to the Business Meeting, but since Siena is our first post-pandemic meeting, it's difficult to make any kind of forecasts on what the state of our finances will be at the end of 2022. (In the event that the previous sentence alarmed any readers, I'm happy to say that we have a large cushion thanks to the careful stewardship of my predecessors and that we'll be fine for the near future.) At our spring meeting in Waterloo, I'll present both a budget for 2023 and the financial statements for 2022. There isn't much else to say; the section hasn't had much activity other than a few online workshops since the pandemic broke out, so our expenses have mostly been small clerical ones(for example web hosting and the payments platform.)

   Respectfully submitted,
   Gordon Craig (Glendon College [York University]), Seaway Section Treasurer

2. Report from the Representative to the MAA Congress – Fall 2022
   Jeff Johannes, Seaway Section Representative

   Greetings friends and colleagues,

   As your Representative to the MAA Congress, I have attended MathFest 2021 (virtual) and MathFest 2022 in Philadelphia. Unlike other congresses with which you may be more aware, the majority of this one is spent more by being reported to by administration than by discussing and proposing new ideas. Furthermore I don't believe the reports to the congress contain particularly surprising or exclusive content. There is some discussion of making the congress more interactive and receptive to input. Of course, change is slow.

   National coordination of section registration is on the way, likely for our spring meeting.

   The biggest challenge facing the organisation is increasing membership. Any ideas or actions for promoting membership will be appreciated.

   There are expanded lecturer programs. We will be taking advantage of them in our upcoming meetings. In addition there is an online distinguished lecturer series. Furthermore, there are several other virtual programming events open to participation from wherever you may be.

   This summarises both the congress meetings and the materials that national MAA asks us to disseminate. If there are any concerns that you would like me to bring back to national, I would be happy to do so, and I feel my role is more valuable in that direction than as a mouthpiece for the organisation's administration. I am honoured to serve this section and would be glad to contribute more value in doing so. Please contact me if there is a way that you see for this.

   I look forward to seeing many of you at Siena soon.

   Respectfully submitted,
   Jeff Johannes (State University of New York at Geneseo, Seaway Section Representative