THE SEAWAY CURRENT

Newsletter of the Seaway Section of the Mathematical Association of America

Fall 2018 Vol. 42, No. 1

IN THIS ISSUE...

- Upcoming Meeting
 - Friday Speaker
 - Saturday Speakers
 - Special Events
- Articles
- Section Notes
- Reports & Minutes
 - 1. Representative's
 - 2. Chair's
 - 3. Treasurer's
 - 4. Executive Committee
 - 5. Ext. Exec. Committee
 - 6. Business Meeting
- 2018-2020 Committees
- Upcoming Mtg. Program
- Upcoming Mtg. Abstracts

THE SEAWAY CURRENT

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.

Editor

Elizabeth Wilcox, Asst. Professor Department of Mathematics Oswego State University of NY tel. 315-312-6586 elizabeth.wilcox@oswego.edu

The University of Toronto Mississauga will host the FALL 2018 meeting, October 12-13, 2018.

Founded in 1967, the University of Toronto Mississauga has an enrollment of 14,000 students spread between 17 academic departments. The Department of Mathematical and Computational Sciences offers programs and courses in topics such as bioinformatics, information security, and applied statistics in addition to mathematics and computer science. The Message from the Chair states, "Our department combines the beauty, innovation and power of Mathematics, Computer Science, and Statistics, to stimulate your mind and provide you with tools for the modern technology driven world." (UTM Mathematical & Computational Sciences website)

Thank you, University of Toronto Mississauga, for hosting our meeting!

FALL 2018: THE INVITED SPEAKERS



Friday Banquet Speaker: Dror Bar-Natan, University of Toronto

Title: My Favourite First-Year Analysis Theorem

Abstract: Whatever it may be, it should say something useful and exciting and it should not be *about* rigour, yet it should *demand* rigour. You can't guess. You probably think it the dreariest. You are wrong.

BIOGRAPHY: I believe math is too deep. Rather than making it deeper, a better use of my time would be to make some deep ends easier and more accessible. I believe math is too abstract, or at least appears to be too abstract, for much of what may be computed hardly ever is. Thus, whenever I can, I code. Yet I have sinned a few times and written on deep math that was not accompanied with programs. I usually work on knot theory and its surprising relationship with algebra, geometry and quantum field theory. I got my Ph.D. at Princeton, did time at Harvard, Hebrew U., Berkeley and MSRI, and I now work at the University of Toronto. Practically everything I've ever done (including even this paragraph) can be found somewhere on my website, starting at http://www.math.toronto.edu/~drorbn/.

SPRING MEETING: April 5 & 6, 2019 at St. John Fisher College

ARTICLES IN THIS ISSUE Memo from MAA President – Remembering Dr. Clarence Stephens – Note from the Chair

FALL 2018: SATURDAY INVITED SPEAKERS

From Monte Carlo to Markov Chains Jeffrey Rosenthal, University of Toronto



Abstract:

Monte Carlo algorithms use random sampling to approximately compute quantities which are too complicated to evaluated exactly. I will use computer simulations to illustrate their application to such diverse areas as coin

tossing, opinion polls, repeated gambling, integration, expected values, particle physics, and statistical inference. I will discuss their mathematical underpinnings, including the law of large numbers and sampling errors. Finally, I will connect them to Markov chain convergence theorems and Markov chain Monte Carlo (MCMC) algorithms.

JEFFREY ROSENTHAL is a professor in the Department of Statistics at the University of Toronto. He received his PhD from Harvard University in 1992. He was awarded the CRM-SSC Prize in 2006, the COPSS Presidents' Award in 2007, and teaching awards in 1991 and 1998. His book for the general public, *Struck by Lightning: The Curious World of Probabilities*, was published in sixteen editions and ten languages, and was a bestseller in Canada. His web site is www.probability.ca.

The Role of "Assessment" in Teaching Online Mathematics Courses Brian Forrest, Waterloo University

Abstract:

There are many challenges to teaching mathematics in a fully online environment. In this talk I will show the important role that assigned work plays in mitigating many of these challenges. I will also speak about how my experience in teaching online has impacted the way in which I approach my on campus courses.



BRIAN FORREST received his Ph.D. in 1987 under the supervision of Professor Anthony Lau at the University of Alberta. After two years as a Visiting Assistant Professor at Queens University in Kingston, he moved to the University of Waterloo in 1989 as a member of the Department of Pure Mathematics where he remains today. In addition to his research interests in Abstract Harmonic Analysis, Brian has always had passion for teaching. He has taught courses from first year to the advanced graduate level and over the last decade and a half has been involved in the development and delivery of numerous fully online courses. He currently holds the position of Teaching Fellow in the Faculty of Mathematics.

Extreme equality: Using research to close the achievement gap in math John Mighton, Fields Institute at the University of Toronto, JUMP Math

Abstract:

Wide differences in achievement among students appear to be natural in mathematics: by the time students enter high school, many will have fallen behind or developed negative attitudes about math. But new research in cognitive science suggests that teachers can dramatically close the achievement gap in math if they are willing to use methods of instruction that are supported by rigorous research. In this talk I will look at the main sources of academic equality in our schools and I will demonstrate a method of teaching called "structured inquiry" that reduces visible academic hierarchies and helps students' brains work more efficiently. In a randomized



controlled trial, students who were taught by this method learned significantly more than students in the control group.

JOHN MIGHTON is a mathematician and playwright and is the founder of JUMP Math, a charity dedicated to improving the teaching of math. He is a Fellow of the Fields Institute for Research in the Mathematical Sciences and received an NSERC post-doctoral fellowship for his work in graph and knot theory. His work in education has been recognized with numerous awards, including the WISE Award for Innovation in Education, the Egerton Ryerson Award for Service to Public Education and the Schwab Award for Social Entrepreneur of the Year.

FALL 2018: SPECIAL EVENTS

Workshop: Principles of Effective Practice

Facilitated by: John Mighton, JUMP Math and the Fields Institute at the University of Toronto Friday, October 12, 2:00 - 5:00 Deerfield Hall Building, DH-3050

Description: In this workshop, we will look at several evidence-based principles of effective instruction and practice, including deliberate practice and retrieval practice, that are well supported by research in cognitive science and that can be applied at a college or university level. We will also discuss the implications of recent research in motivational psychology for post-secondary students.

Please note that to park on campus on Friday, participants would need a permit. Permits purchased on site cost \$14 CAD; please contact Camille Angiers (camille.angiers@utoronto.ca) by Friday, October 4 to order a permit in advance for \$10 CAD. Participants may also park at the conference hotel and enjoy an ≈ 10 minute walk to campus.

Workshop Fee: \$15 CAD

Math Trivia Contest

Hosted by: Blair Madore (SUNY Potsdam) Friday night, following the banquet speaker Credit Valley Meeting Room, Glenerin Inn & Spa

Description: All (students and faculty) are welcome to participate in round one of this mathematics trivia contest. The top scorers from round one will form teams and play a round of Jeopardy to determine the champions. There will be prizes!

Workshop on Leadership in the Mathematical Sciences

Facilitated by: Dr. Mihail Barbosu (RIT) Saturday, October 13, 2:00 - 2:55 Instructional Centre Building, Room IB-235

Description: The 10th Edition of the Workshop at the Fall 2018 MAA Seaway Section Meeting will focus on "Developing New Undergraduate and Graduate Programs in Mathematics."



DR. MIHAIL BARBOSU is Professor in the School of Mathematical Sciences and Director of the Data and Predictive Analytics Center at Rochester Institute of Technology (RIT). Previously he was RIT's Head of the School of Mathematical Sciences and before joining RIT he was Chair of the Mathematics Department at SUNY Brockport.

He completed his undergraduate and graduate studies in mathematics and astronomy at Babes-Bolyai University (Cluj - Napoca, Romania) and at Paris Observatory and Sorbonne University - Paris VI (Paris, France), respectively.

Dr. Barbosu started the Workshop on Leadership in the Mathematical Sciences at the Spring MAA Seaway Section Meeting and continued to offer it every MAA Seaway Section meeting. Topics covered in previous sessions of the Workshop include: student recruitment, retention and assessing student success; faculty hiring, workload, annual reports and evaluations, tenure and promotion; the role of department chairs, management

and leadership skills, academic planning, and developing departmental strategic plans.

IBL Special Session: Classroom dynamics for student engagement

Facilitated by: Ryan Gantner (St. John Fisher College) Saturday, October 13, 4:00-7:00 Instructional Centre Building, Room IB-270

Description: In this workshop we'll explore various techniques for maximizing student engagement in your classroom. While literature has shown that "active" classroom techniques are most often superior than "passive" ones (such as straightforward lecturing to students) when it comes to student learning and retention, there is no general agreement as to what "active" means and no generally agreed upon magic classroom technique that is "best". Inquiry-based learning pedagogies fall in the large category of active classrooms, as do some "active lectures" and flipped classrooms (and others), and there is room for overlap between these. The "active" moniker that glues all of these together indicates a degree of student engagement in and out of the classroom that is sought after.

Acknowledging that there isn't a single best technique, we'll demonstrate many ideas and techniques so that you can find one (or many)

that fit with your personality, class size, physical environment, level of course, student ability level, etc. Teaching is a complex system and there are a lot of different items to consider, so having a library of strategies can help even those who have a lot of experience find ways to increase student engagement and make their classrooms more active.

This workshop is aimed at everyone who is or is interested in becoming a teacher of mathematics. This event is organized by Shay Fuchs and sponsored by UNYIBL.

Biography:

RYAN GANTNER received a Ph.D. from the University of Minnesota in 2006 and has been a professor at St. John Fisher College in Rochester, NY ever since then. During his twelve years in New York he has had the opportunity to work on many projects. In 2014 he was a co-founder (along with others in the Seaway Section) of the Greater Upstate New York Inquiry-Based Learning Consortium (UNY IBL). This group has sought to promote inquiry-based learning in the region through workshops, mentoring, informal meetings, and other connections. After a few years, he has assumed the role of director of this group. During a similar time frame, he was Student Program Chair (2010 - 2012), Program Chair (2012 - 2014), Chair-elect (2014 - 2015), Chair (2015 - 2017) and Past Chair (2017 - 2018) of the Seaway Section. Thus, he was able to push his IBL agenda at many Seaway meetings!



More recently, Ryan has been involved in advancing inquiry-based teaching methods into the K-12 community. In 2018, he co-led a Math Teachers' Circle series targeting inquiry teaching and the Common Core. Currently he is a PI on a project titled "Math Circles of Inquiry" whereby middle and high school teachers are developing inquiry-based modules for their classrooms. Together with his involvement with the NSF PRODUCT project, which produces IBL summer workshops (among other things), and his day job, he keeps himself fairly busy. But sometimes he would rather be at home playing with his two daughters, or hiking, or riding a bicycle.

ARTICLES

The following email has been reprinted with permission from Deanna Haunsperger, MAA President.

Subject: MAA participation in the Joint Mathematics Meetings
Date: Wednesday, September 12, 2018 at 3:30:49 pm Eastern Daylight Time
From: 'Deanna Haunsperger' via MAA Congress
To: MAA Congress

Dear Congress,

The AMS and the MAA have shared management, as well as contributed equally to the programming, of the Joint Mathematics Meetings under an agreement that has been in place since 1998. Through extensive discussions over the last five years, AMS and MAA have agreed that the 1998 agreement no longer meets the needs of either organization and will end following the Joint Mathematics Meetings in 2021.

Beginning in 2022, MAA national meeting activities will occur at MAA MathFest in the summer. The MAA will build on the continued growth of MAA MathFest and will also direct resources to better support MAA Sections and other programs that expand access and services to more members. The MAA believes that the strategic move from shared management of the Joint Mathematics Meetings under the 1998 agreement will allow us to better serve our members and the broader mathematical sciences community as we work to advance the understanding of mathematics and its impact on our world.

The AMS seeks to advance research and create connections. The JMM will remain the annual meeting for the AMS. With the AMS assuming sole responsibility for the management of this annual winter meeting, they will consider new models to help provide all participating organizations with expanded opportunities to advance their missions. A new model for the JMM starting in 2022 will ensure a continued rich experience for the mathematical sciences community.

The AMS and MAA agree that certain joint activities will continue, such as the Porter Public lecture, honoring the recipients of the AMS-MAA-SIAM Morgan Prize for Research by Undergraduates, and the JPBM Communications Award.

The AMS and the MAA have a long history of collaboration, and are both committed to working together to advance our shared interests.

Cordially, Deanna

Editor's Note: More information about the split with the AMS is forthcoming. Look for additional details in the next FOCUS.

MAA Seaway Logo Contest

Do you have serious Seaway Spirit? Want to express your Seaway spirit artistically? The Seaway Section of the MAA needs you!! We are looking for submissions in our logo design contest. For a brief description of the Seaway Section, see https://people.rit.edu/maacway/. We are looking for a logo design that gives a flavor of who we are and what we do. All submitted designs must be original artwork created by the submitter. The design chosen through this contest will become the new logo for the Seaway Section of the MAA. Spread the word and send in your design(s). We will be holding a vote on finalists later in the year! Deadline for submission is **February 15th, 2019**. Submit your designs to dowk@dyc.edu or D'Youville College, Department of Biology and Mathematics, Attn: Dr. Keiko Dow, 230 Porter Ave, Buffalo NY 14201. By submitting to this contest you grant the Seaway Section a perpetual, royalty-free, non-exclusive, unconditional license to edit, alter, reproduce, copy, publish, post, adapt, exhibit and/or otherwise reuse your design.

Official MAA Logo



We are looking for something more creative than this



Violation of the MAA Logo Trademark!

Here is what others did























Remembering my extordinary Theory of Sets teacher, Dr. Clarence Stephens

Dr. Cheri Boyd, Nazareth College

The MAA Seaway Section's Clarence F. Stephens Distinguished Teaching Award is given each year to a teacher of mathematics at the post-secondary level who has been widely recognized as extraordinarily successful, whose teaching effectiveness is documented and has had influence beyond the home institution. The Seaway Section named its distinguished teaching award after Dr. Stephens in recognition of his life's



work in attracting students to study mathematics and in building extremely successful mathematics communities.

Dr. Clarence F. Stephens was born in Gaffney, SC on June 24, 1917 and died in Conesus, NY on March 5, 2018. Family, friends and colleagues gathered at Central Presbyterian Church in Geneseo on March 9 to remember and celebrate his life, accomplishments and impact on mathematics education and our lives. Though the group in attendance was quite varied, each one of us realized how similarly inspiring our interactions with Clarence had been. He had a gift for creating welcoming environments and inviting individuals to learn and grow with purpose. Dr. Stephens clearly influenced people in many ways with much success. He will be surely missed, and remembered with grateful thanks. If you visit Temple Hill Cemetery in Geneseo, his tombstone inscribed *Go fast slowly* (Clarence's mantra for teaching and learning mathematics) will invite you to stop, rest and enjoy some clear thinking.

His obituary (Rochester Democrat and Chronicle) and an MAA SUMMA Archives biography report that Dr. Stephens was the 9th African American to ever receive a Ph.D. in 1943. In 1953 he was awarded a Ford Fellowship to study at Princeton University alongside Dr. Albert Einstein. Dr. Stephens was inducted into the National Museum of American History, Smithsonian Institution in Washington, DC in 1983.

Clarence studied at Johnson C. Smith University in Charlotte, NC earning his BS Mathematics in 1938, followed by his MS (1939) and PhD (1943) in Mathematics from the University of Michigan. He dedicated his career to excellence in teaching mathematics, reaching many faculty and students as follows:

US Navy Teaching Specialist (1942 - 1946) Prairie View A&M University (1946 - 1947) Morgan State University (1947 - 1962) SUNY Geneseo (1962 - 1969) SUNY Potsdam (1969 - 1987).

During his tenure, Potsdam became one of the top schools in the nation producing mathematics graduates, following Clarence's teaching philosophy that centered on helping students learn to read, understand and appreciate the beauty of mathematics independently. The Seaway Section appreciates and remembers Dr. Clarence Stephens with affection.

PLUS ONE PERCENT A Note from the Section Chair

> Recently, I read the book *Raving Fans: A Revolutionary Approach to Customer Service* by Ken Blanchard and Sheldon Bowles. You might naturally wonder what a business book has to do with mathematics, teaching, or the Seaway Section, none of which are exactly profit-driven enterprises. Over the past decade, we have watched traditional colleges behave ever more like businesses, and by now the transition in mentality seems nearly complete at many of our



institutions of higher learning. A few years ago, I accepted this fact, and there doesn't seem to be much remaining dispute of or resistance to the situation. I used to resent the notion that students are customers and teachers should do whatever it takes to make them happy. Although it then seemed ill-advised, even detrimental to a productive learning environment, I now embrace (a variation of) it. And I propose that you should too, independently of surrounding circumstances or prevailing trends. This has nothing to do with making money (from the teacher's perspective anyway). It's about doing what is right and best for students.

My change of heart came from reflecting on the words and attitudes of some great mathematics teachers, particularly two from our section: Clarence Stephens and John Mighton. Even while employing all sorts of innovative teaching techniques and approaches over the years, in practice I had still clung to the fundamental misconception that the purpose of teaching was to convey information or learning, to instill some sort of commodity to the students. No. My goal is to ensure the students succeed. Granted, a student's vision of success may be different than mine. But in the end they will correlate strongly.

Inspired by these educational heroes, I have endeavored to create conditions in my classes that will maximize student success. But there is a huge obstacle that stands in the way of achieving the goal. Noting how far previous iterations of my courses fell short of this vision, I set out to change everything about them at once. (And I do mean everything - from textbook to syllabus to structure of class time to grading scheme...) Dumping too much fuel on a fire doesn't make the fire burn brighter and longer. It will either put the fire out or cause an explosion. Consequently, I cannot deliver on everything expected or promised, and become overwhelmed trying to do so. The results are frustration for me and the students, dampening of the class spirit, incomplete or delayed materials, and loss of focus on the goal of student success. Looking back, I realize I've made the same mistake semester after semester, every time bright new ideas come to my attention that I am sure will transform my teaching. What to do? With the shifts I've made, there is no going back to the "safe, old way". Yet the summit of my vision seems to have proven an impossible mountain to scale.

Article continued on page 8.

My comments [continued on page 7] were shared at the MAA Seaway Section celebration of Clarence Stephens' 100th birthday.

During the 100th birthday celebration of Dr. Stephens, Dr. Cheri Boyd reminisced ...

I was intrigued during the summer between first and second year, wondering what Set Theory and class with Dr. Clarence Stephens were going to be like. Instead of filling in details that were missing in the proofs in Stewart's *Calculus* (2nd edition!), we were going to be writing our own proofs from scratch.

I still have my copy of Pinter's *Set Theory* from Clarence's course, and I consider it a beautiful book to introduce young mathematicians to set theory and writing proofs. The pages have quite a lot of blank space, the notation is sparse and each symbol is absolutely necessary.

Similarly, when we walked into Clarence's classroom, he would be calmly sitting at the teacher's desk, waiting patiently, almost like your grandfather sitting in an armchair next to a low fire in the fireplace. The room was still, the students were mostly silent and expectant. When Clarence did begin teaching, his voice was soft and slow, musical and inviting. When I remember his voice, it makes me think he was always smiling and happy at the opportunity each day to introduce us to a new beautiful piece of mathematics. (But maybe that's how he always spoke, even about class scheduling and reports for the Dean and needing to go to the dry cleaners.)

He would simply walk among our seats and talk. You had to listen to every word and try to figure out what he was telling us. He did not lecture, he invited us to think about a definition and conjecture some related property about a set or a relation. Then he invited us to prove it ourselves, at our seats, during class. We could ask each other questions, and try something, and try something else. I guess this was the Moore method, but we had no information about his approach. We were just calmly invited to write down our thoughts. Eventually he would start writing a definition or a problem on the board, get something started, give us a bit of notation, then stop in the middle after a few lines. Finishing the proof on our own was part of the assignment.

Clarence would instruct us to go down by the Raquette River and sit under our favorite tree, in order to talk with ourselves about the problem and ask ourselves questions. I often give my students this same recommendation, substituting Hundred Acre Pond at Mendon Ponds Park near Nazareth College, or taking a walk along the Erie Canal.

It's usually a foreign idea to be told you should be talking to yourself and solving the problem over many hours of time while you are doing something else relaxing. It takes time to develop your own understanding, to own it and KNOW IT inside and out, without needing paper or pencil by the time you are done.

My favorite recollection of Clarence was that in the middle of class, when no one was making any progress on the day's list of new conjectures to prove or find a counterexample, he would sometimes choose an empty desk, pull out its chair, step up on the chair so that he was standing tall above our heads. This was 1983, so you can calculate how old he was then, if this year is his 100th birthday. (2017 aÅŞ 1983 = 34 years, so 100 aÅŞ 34 = 66 years old! I think he retired soon after teaching my class.)

He explained that standing up on the chair was a very good way to gain a new perspective, which is what you need when you are stuck. He would stand up there and instruct us all to look out the window with him, stand up, go look in the garbage can, check out in the hallway, go sit in his chair at the teacher's desk, try something different until you get a new idea to sit down and try writing about that idea.

Basically he was constantly, calmly, pleasantly encouraging each of us to keep trying to develop our own mathematical thinking.

He also offered his mantra, that we needed to "know when you know." We each spent the entire semester developing our own ability to know when we knew. Third semester students, we didn't really know what we knew. By fifth semester, we were starting to know.

Perhaps many students every semester have the experience I had: you donâĂŹt really know how much you know. But over time, you start to know. And as long as you always care about knowing and want to learn how to know, thatâĂŹs all that matters.

Thanks to Clarence, and thanks to all of you who love doing math together every day. Being a mathematician is a gift for each of us. I hope that we might all spend 100 years sharing that gift with as many people as we can.

SECTION NOTES FALL 2018

Roberts Wesleyan College:

The Department of Computer Science, Mathematics and Physics at Roberts Wesleyan College welcomes Professor of Computer Science Paulo Fernandes. Professor Fernandes joins us following service spanning 30 years at Pontifícia Universidade Católica do Rio Grande do Sul in Porto Alegre, Brazil. He received his Ph.D in Applied Mathematics and Computer Science from Institut National Polytechnique de Grenoble, France. (Submitted by Gary Raduns)

Seaway Section: Facebook Group

First a newsletter, then a website, and now a Facebook group? That's right! Check out @MAASeaway and join the group to get updates on all things Seaway ... and if you have ideas for other social media platforms the Section should investigate joining, contact our Public Information Officer, Christine Uhl.

Seaway Section: Be a Liaison!!

There's no reason why your institution needs only ONE liaison – the position is no longer associated with a free MAA membership. And it's better to have *two* people in your department passing on flyers, printing schedules, gathering info for the Section Notes part of the Current, ... Contact Jeff Johannes (johannes@geneseo.edu) to get on the email list and be at the front of the line to get info from the Section!

Seaway Section: Give a contributed talk!

A contributed talk can be on an expository topic. A contributed talk can be about pedagogy that you're exploring or experimenting with. A contributed talk can even be a *panel discussion*! We need MEMBERS to fill the programs of our meetings with interest, passion, and mathematics. Don't be shy! Talk to your Program Chair today!

(Disclosure: Your Program Chair is also the Seaway Current editor, Elizabeth Wilcox. You can email her at elizabeth.wilcox@oswego.edu or snag a quiet moment at the next meeting.)

PLUS ONE PERCENT continued

This brings us back to Raving Fans. It is full of valuable insights that apply to teaching or any other vocation, and I highly recommend it. But let's just look at its third secret of creating Raving Fans: Deliver the Vision Plus One Percent. A key point the book makes with this principle is that "it's difficult, if not impossible, to try to change too much at once." Instead, it recommends trying to improve on what you are currently doing by one percent. Advantages include avoiding customer anger over broken promises, focused time to perfect each change, consistency in delivery, flexibility to adjust direction based on response, and the means and ability to continue expanding your vision. It suddenly became very clear to me why my attempts at reform fizzle into disarray, and how I can build up a solid system going forward by following this advice. If I only improve a course by one percent each time I teach it, progress would be too slow to ever get very far. But I can keep asking myself, whether for a course I am currently teaching or for one I am preparing for next semester, "What can I do today toward improving this course by one percent?" Then the changes will be manageable and reasonable, not scary, but will compound effectively. As to the idea of viewing students as customers, even this business book says "It's really a human relationship, isn't it? It's not really customers and company ... It's just people and people. People arrive with needs and people go out and serve them to fulfill those needs." That sounds like an accurate description of teaching to me.

In the Seaway Section too, we have recognized the need and desire for changes in the last few years. From completely reworking our bylaws, to starting new programs, to increasing our social media presence, to implementing online registration payment, to switching up the talk schedule at our meetings, we have been making those changes. In doing so, we are building on a long tradition of leaders and members committed to making the Seaway Section the best it can be. And, based on current discussions, I can forecast that the section will continue to introduce exciting new aspects in the near future. I would love to see as many of you as possible involved in this work. If you are interested in serving on a committee or any other way, please let me know. Yes, all this change could be overwhelming, especially for those involved in deciding upon and implementing the changes. It is a lot to keep up with, but there is something everyone can do. I invite you to join with me in thinking (maybe not every day, but some days) "What can I do today to help make the Seaway Section one percent better?" Then we can move forward to act with purpose and joy toward realizing our vision.

As my Calculus II students this semester are learning, even infinitesimal changes can amount to a big difference if you add up enough of them. So, let's dedicate ourselves to building, bit by bit, raving fans of mathematics, our teaching, and the Seaway Section!

Jonathan Cox (State University of New York at Fredonia)

Seaway Section Chair

(Editor's Note: Readers may also enjoy Small Teaching: Everyday Lessons from the Science of Learning by James M. Lang, which shares many ideas for small changes one can make to improve learning and discusses the scientific evidence supporting those ideas. Additionally, for those motivated to join a section committee, the section committee listing is appended.)



Get Funded

MAA offers funding opportunities for college and university mathematical sciences faculty to improve teaching, learning, and student engagement. Ask us how to get funded.

- **Dolciani Mathematics Enrichment Grants** support projects designed to develop mathematical enrichment programs for talented students in middle or high school.
- **National Research Experience for Undergraduates Program** supports the participation of math students from underrepresented groups in summer research experiences to increase their interest in advanced degrees and careers in mathematics.
- **Tensor-SUMMA** (Strengthening Underrepresented Minority Mathematics Achievement) grants support programs designed to encourage pursuit and enjoyment of mathematics among middle school, high school, and/or beginning college students from groups traditionally underrepresented in the field of mathematics.
- **Tensor Grants for Women and Mathematics** support projects designed to encourage college, university, and pre-college women to study mathematics.
- The **Preparation for Industrial Careers in Mathematics (PIC Math)** program prepares mathematical sciences students for industrial careers by engaging them in real-world industry-created research problems.
- Attend MAA workshops on topics such as graduate TA training, data science, and preparing pre-service teachers, and receive travel funding for doing so through the **StatPREP**, **CoMInDS**, and **META Math** projects.

Learn more at maa.org/programs

1. SEAWAY SECTION REPRESENTATIVE'S REPORT – FALL 2018

Charles B. Ragozzine, Jr., Seaway Section Representative to the MAA Congress

The Congress of the MAA met at MathFest in Denver on August 1, 2018. This marked the beginning of the new schedule where the Congress will convene once a year at MathFest. The day-long meeting consisted of a variety of discussions, activities, and exchange of information.

Some highlights included discussions on the following topics: MAA Programs and Communities, expectations of being a member of Congress, how to include more voices on and with Congress, and the need for representatives to be informed members of Congress. There were opportunities to provide feedback during an open microphone session on communication between the Congress and the Board of Directors and a table activity where representatives were tasked with coming up with a list of items that we wish the MAA would consider. There were several announcements from the MAA Board of Directors that they wanted us to share with our sections:

- (a) A task force has been created to look at how national MAA can help better communicate with and support sections.
- (b) A task force has been created to study the role of the MAA's 100+ committees in governance.
- (c) The proposal of a non-financial strategic plan of the MAA for about the next 5 years is forthcoming.
- (d) The MAA ended up with a \$673,000 surplus for 2017. This was due to 3 factors: changes in publications including a one-time influx of funds from the AMS for our book deal and ongoing income from Taylor & Francis for journals, unexpected donations, and the careful financial stewardship of the MAA staff.
- (e) The Board of Directors meets fours times a year including a fall meeting by video conference. The Committee on Committees now meets by video conference and the results have been successful. Video conferencing is cost-effective and provides the opportunity for broader participation on national MAA committees by our membership.

With the move to the one meeting per year model, the MAA Congress will now have a plan for year-round work that will include a new pilot program. All representatives will serve as a member of a Congress Learning Community (CLiC). The CLiCs are centered around 7 themes: Community of K-12 Students and Teachers, Community of Students' Activities and Sections, Inclusivity, Communication (MAA Publications/Talks), Reading/Listening Activities at the JMM, Teaching and Learning (and Professional Development), Mission and Membership, and Math Beyond the MAA. I will be working on the Community of Students' Activities and Sections CLiC. Congress members will be in contact throughout the year via email and video conference calls. The purpose of each CLiC is to learn about a theme, communicate highlights to Congress, and then serve as a resource on the CLiC's topic.

Respectfully submitted,

Charles B. Ragozzine, Jr. (State University of New York at Oneonta), Seaway Section Representative to the MAA Congress

2. REPORT FROM THE CHAIR OF THE SECTION – FALL 2018 Jonathan Cox, Section Chair

With several major initiatives completed in the past year, the executive committees are looking to the future. Of course, the work already accomplished will have ongoing impact. We will be operating under our revised bylaws, approved by the MAA Board of Directors on April 27, for the foreseeable future. The Distinguished Lecturer Program has successfully entered its inaugural year. Distinguished Lecturer Dave Brown has a full schedule of visits to colleges which were chosen through the application process. Thanks to efforts of Public Information Officer Christine Uhl, the section is elevating its presence on social media. The section's committees are abundantly staffed, in many cases with new members who will bring fresh perspectives and directions to section activities. The executive committee expressed support for a "the more the merrier" approach toward committee membership. Thus, if you want to get involved with the section, just let me know – there is no need to wait until the next terms start in 2020!

There are several exciting ideas under consideration or development for the coming years. We will explore the possibility of offering professional development credit for high school teachers who attend section meetings. There are prospects for some intriguing workshops, panels, and other events at upcoming meetings. At least one, and possibly two, new contests for section members are on the horizon. And we have a proposal for a Seaway Section theme for the 2019-2020 academic year. While I canâĂŹt go into detail on these items yet, get ready for an adventurous ride! And remember, you can help steer this magic carpet! (Yeah, ... my son is in the musical *Aladdin Jr.* this fall.) I look forward to seeing and working with many of you as we continue our section's forward progress this year!

Respectfully submitted,

Jonathan Cox (State University of New York at Fredonia), Seaway Section Chair

3. TREASURER'S REPORT – FALL 2018

Gary Towsley, Seaway Section Treasurer

Balance as of 3/15/2018		\$16,877.15
SPRING Meeting at SUNY Brockport		
Meeting Receipts	\$986.44	
Meeting Expenses	\$948.62	
Net		\$37.82
Balance as of 9/15/2018		\$16,914.97

Notes:

- (a) The subvention check from the MAA has not arrived yet. It is on its way. The check is normally for about \$1100.
- (b) The meeting receipts and expenses do not contain the receipts and costs of the Friday night banquet and the Saturday lunch. They are smaller than these items have been in the past.

4. THE EXECUTIVE COMMITTEE MEETING – April 13, 2018

Present: Jonathan Cox, Jeff Johannes, Jim Conklin, Cheryl Chute Miller, Steve Kilner, Gary Raduns, Ryan Gantner, Deanna Haunsperger (MAA president)

The meeting was called to order at 3:00 pm.

Minutes from the Fall 2017 Executive Committee meeting were approved.

Jim Conklin, Section Representative, highlighted his written report. The Executive Extended its thanks to Jim for his service to the Section as Governor-turned-Section Representative.

Gary Raduns, Secretary, reported the election of Charlie Ragozzine as our new Section Representative. Gary Towsley, Treasurer, submitted a written report highlighting that the Section's balance is up about \$1000 since the last meeting, mostly due to timing of the subvention check. Jonathan Cox noted that registrations paid by credit card are up for this meeting (\$400 versus approximately \$100 at SUNY Broome and at SUNY Oswego).

Cheryl Miller, Program Chair, provided a written report and updated registration counts for this meeting to 211 registered of which 103 are students. Speakers have been arranged for the Fall 2018 Meeting at University of Toronto – Mississauga. St. John Fisher College will host the Spring 2019 meeting.

Jonathan Cox, Chair, reports that things are going well in the Section. His report further highlights:

- This is the committee change-over meeting: all committees are fully staffed with significant new membership on committees. The Section discussed (without resolution) a past practice of staffing the Distinguished Teaching Award Committee with past recipients of the award and the implicit biases this may introduce.
- The Seaway Section Distinguished Lecturer program is ready to start. Schools interested in hosting the distinguished lecturer should apply by the April 30 deadline.
- The Chair formed an ad hoc committee to investigate options for the section website and online registration. Discussion included hosting of the meeting site, links to that site, and more recent delays in updating the Section website.
- The officers also discussed the non-engagement list from the MAA and how it is generated. The discussion highlighted the importance of opening mailings from the MAA as repeatedly unopened e-mail triggers inclusion on the non-engagement list.
- The officers also discussed the new MAA policy and timeline for Section e-mails including the official delay between submission to the Association (early week n) to be sent early week n + 1. Submission late in week n may delay sending to early week n + 2.
- The Executive Committee took no action on the AssociationâĂŹs request that the Section give \$2500 to support a Project NExT Fellow.

In his report, Past Chair Ryan Gantner, highlighted his written report, in particular some common frustrations related to hosting AMC. Weather was a significant contributing factor, but concerns included delays in scoring and poor communication.

OLD BUSINESS:

- (a) By-laws revisions have been approved by the Committee on Sections. Motion was made and seconded to recommend revised by-laws, as published in the Seaway Current, for approval by the Section. The motion passed.
- (b) Continued discussion of the MAA non-engagement e-mail list.

The Executive Committee adjourned at 4:39 and moved to the Extended Executive Committee.

Respectfully submitted, Gary L. Raduns, Jr. (Roberts Wesleyan College), Seaway Section Secretary

5. THE EXTENDED EXECUTIVE COMMITTEE MEETING – April 13, 2018

The Executive Committee was joined by Blair Madore, Elizabeth Wilcox, Christine Uhl, and Jane Cushman for the Extended Executive Committee Meeting.

Minutes were approved with corrections: Erin Newton joined in the meeting, and Yousuf George was the Randolph Lecturer for Fall 2017.

NEW BUSINESS

Shay Fuchs, local organizer for the Fall Meeting at Mississauga, ON came to discuss some of the logistical details for a meeting in Canada. In addition to the passport or enhanced driver's license requirement; SUNY institutions face additional hurdles for international travel with students – plan ahead.

REPORTS

Speakers for this meeting are set: Eugenia Cheng, Deanna Haunsperger, Satyan Devadoss, Patti Frazer Lock, and Jim Matthews.

Speakers for the Fall Meeting at U. of Toronto Mississauga are set: John Mighton (Randolph Lecturer), Dror Bar-natan (Friday evening), Jeffrey Rosenthal, and Brian Forrest. Ryan Gantner will lead the IBL Special Session.

St. John Fisher College (Rochester) will host the Spring 2019 meeting April 5-6, 2019. Dave Richeson will be speaking this meeting.

Ithaca College will host the Fall 2019 meeting. Locations have not been arranged for Spring 2020 or beyond.

The chair presented a summary of the Executive Committee meeting highlighting:

- Program Chair: We have a great program for the meeting with an exceptional lineup of speakers including MAA President Deanna Haunsperger. There are lots of students attending and the meeting will feature a student poster session.
- Treasurer: The Section is in good financial shape.
- Committees have been appointed with terms running 2018-2020. Committees are open to additional members.

Student Program Committee: David Brown sent a report featuring a snapshot of student speakers – over the past five years there have been 233 student presentations by students representing 25 schools in the section. 28 students are involved in the 10 posters being presented at this meeting.

Randolph Lecture Committee reports that John Mighton will be the Randolph Lecturer at the Fall 2018 Meeting.

Gehman Lecture Committee: John Maceli is stepping down as chair of the committee. Darren Narayan is the new chair.

Educational Policies Committee: Nothing to report.

Distinguished Teaching Award Committee announced that Carl Lutzer will be awarded the Clarence Stephens Disitinguished Teaching Award.

Nominating Committee sent a report noting:

- Nomination of John Maceli for the Meritorious Service Award.
- Election of Charlie Ragozzine as Section Representative.
- Nominations for elections to be held at the Business Meeting on Saturday:
 - (a) Chair-elect: Cheryl Chute-Miller
 - (b) Program Chair: Elizabeth Wilcox
 - (c) At Large Member of Executive Committee: Jeff Johannes

Seaway Section Distinguished Lecturer Committee has name David Brown as the inaugural distinguished lecturer. The deadline to apply for a visit by the distinguished lecture is April 30.

Liaison Coordinator, Jeff Johannes, asked for suggestions for identifying liaisons where we currently have none or where they are ineffective (e-mail department chairs?).

Seaway Current Editor, Elizabeth Wilcox, reports she produced three editions of the Seaway Current since the last meeting.

Seaway NExT Advisory Committee reports about 10 participants in this afternoons workshop on using clicker technology in mathematics classes.

Webmaster was not present.

The Chair introduced Christine Uhl as the new public information officer and the repurposing of this role to social media. Christine will manage the Facebook page (@MAASeaway) and promote a hashtag for the meeting.

The Chair also noted that the Executive Committee recommends he adoption of the revised by-laws.

The Extended Executive Committee adjourned at 5:59 pm.

Respectfully submitted, Gary L. Raduns, Jr. (Roberts Wesleyan College), Seaway Section Secretary

6. THE BUSINESS MEETING – April 14, 2018

The meeting was called to order at 9:45 am.

Present: Approximately 30 members of the Section were present.

There were no corrections to the minutes of the Fall 2017 Business Meeting.

REPORTS

Chair, Jonathan Cox, gave a brief report highlighting:

- (a) Committee updates and openness to have others volunteer to join committees.
- (b) Encouragement to begin preparing for the next meeting in Canada (especially if taking students).
- (c) The process for revision of the Section by-laws
- (d) The report of the Nominations Committee and a call for additional nominees from the floor. There were no nominations from the floor. Voting will occur later in the Business Meeting. Nominees:
 - i. For Chair-Elect: Cheryl Chute-Miller.
 - ii. For 1st Vice Chair/Program Chair: Elizabeth Wilcox
 - iii. For At-Large Member of the Executive Committee: Jeff Johannes.
- (e) Encouragement to open e-mail from the MAA lest you be perceived to be uninterested and are dropped from e-mail lists.
- (f) Thanks to Jim Conklin, outgoing Section Representative and introduction of Charles Ragozzine as newly elected Section Representative.

Section Representative, Jim Conklin, gave a report highlighting:

- (a) The Congress of the MAA will now meet one time per year at MathFest.
- (b) Publications are now in partnerships: journals with Taylor and Francis, and books with the American Mathematical Society.
- (c) Michael Dorff is President-elect of the MAA and Carole Schumacher is recently elected as Vice-President of the Association.
- (d) The MAA is urging consideration of department memberships.
- (e) Growth of Project NExT
- (f) Attendance up 20% at MathFest 2017.
- (g) The MAA has published a report of evidence-based instructional practices
- (h) New mission statement of the MAA: The mission of the Mathematical Association of America is to advance the understanding of mathematics and its impact on our world.

Secretary, Gary Raduns, had nothing additional to report.

Treasurer, Gary Towsley, provided a report printed in the Seaway Current. He also noted that Section Meeting Discounts for MAA books apply also to AMS titles.

Program Chair, Cheryl Miller reported total registration of 211 including over 100 students. She expressed her thanks to the local organizer, Nathan Reff. The spring meeting will be held at University of Toronto at Mississauga with local organizer Shay Fuchs.

Student Program Committee Chair Dave Brown commented on the strong student participation and program at the meeting. Students will be giving 26 presentations including the poster session. He expressed thanks to Blair Madore for organizing the math game Friday night and to the remainder of the Student Program Committee.

The Randolph Lecture Committee announced the selection of John Mighton of JUMP Math as the Randolph Lecturer for the Fall 2018 meeting.

The Gehman Lecture Committee report noted that John Maceli was leaving the committee and the committee is still looking to name the Gehman Lecture for the Spring 2019 meeting to be held at St. John Fisher College. The Gehman Lecture Committee will be chaired by Darren Narayan and includes Gordon Craig.

The Educational Policies Committee had nothing to report.

The Distinguished Teaching Award Committee announced the selection of Carl Lutzer as this year's recipient of the Clarence Stephens Distinguished Teaching Award. Please consider nominating your colleagues for this award.

The Seaway Section Distinguished Lecturer Committee announced the selection of Dave Brown as the first Seaway Section Distinguished Lecturer. The Jonathan Cox expressed our thanks to the committee for its good, quick work getting this program up and running.

The Chair reported the formation of an ad hoc committee to examine options for the Section website and for online registration.

Jeff Johannes, liaison coordinator, asked for help obtaining and identifying liaisons at each school in the Section.

Elizabeth Wilcox, Seaway Current editor, had nothing to report. The Chair expressed his thanks to Elizabeth for producing three editions since the fall meeting.

Seaway NExT reported on participation of about 10 faculty in the Friday workshop.

Webmaster was not present, no report.

Public Information Officer, Christine Uhl, reported the Seaway Section Facebook page @MAASeaway.

OFFICIAL BUSINESS

Jonathan Cox, Chair of the Section, presented the recommendation of the Executive Committee to adopt revised Bylaws of the Seaway Section as published in the Seaway Current. The Bylaws were adopted on a voice vote with no "Nays."

The slate of candidates present for Section Offices presented by the Nominations Committee was elected as a single slate with no "Nays." Cheryl Chute-Miller was elected Chair-Elect, Elizabeth Wilcox as Program Chair, and Jeff Johannes - At Large member of the Executive Committee.

Future Meetings:

- Fall 2018: University of Toronto at Mississauga
- Spring 2019: St. John Fisher College
- Fall 2019: Ithaca College
- Venues beyond these have not been determined.

The meeting adjourned at 10:12 am.

Respectfully submitted,

Gary L. Raduns, Jr. (Roberts Wesleyan College), Seaway Section Secretary

2018 - 2020 MAA Seaway Committees and Other Positions

Standing Committees

Gehman Lecture Committee

Darren Narayan (Chair) 4/18 - 4/20 Michael Gage 4/18 - 4/20 Gordon Craig 4/18 - 4/20

Randolph Lecture Committee

Blair Madore (Chair) 4/18 - 4/20 Jane Cushman 4/18 - 4/20 Patti Frazer Lock 4/18 - 4/20 Steve Kilner (ex officio as Second Vice-chair) 4/17 - 4/19

Educational Policy Committee

Jane Cushman (Chair) 4/18 - 4/20

Tedi Cox 4/18 - 4/20

Sarah Hanusch 4/18 - 4/20

Katelynn Kochalski 4/18 - 4/20

Charlie Ragozzine (ex officio as Representative)7/18-6/21

Clarence Stephens Distinguished Teaching Award

Committee

Keary Howard (Chair) 4/18 - 4/20 Laura Person 4/18 - 4/20 Cheri Boyd 4/18 - 4/20 Hossein Shahmohamad 4/18 - 4/20 Gary Raduns (ex offico as Secretary) 4/16 - 4/19

Nominations Committee

Joe Straight (Chair 4/18-4/19) 4/18 - 4/20 Gary Towsley 4/18 - 4/20 Ryan Gantner 4/18 - 4/20 Dan Visscher 4/18 - 4/20 Cheryl Miller 4/18 - 4/19

Student Program Committee

Keiko Dow (Chair) 4/18 - 4/20 Jonathan Lopez 4/18 - 4/20 Keith Jones 4/18 - 4/20

Seaway NExT / PFF Advisory Committee

Nate Reff (Chair 4/18 - 4/20) Keiko Dow 4/18 - 4/20 Dan Visscher 4/18 - 4/20 Jonathan Lopez 4/18 - 4/20

Other section positions on the extended executive committee

Editor, Seaway Current Elizabeth Wilcox Liaison Coordinator Jeff Johannes Public Information Officer Christine Uhl Webmaster Anurag Agarwal

Ad-hoc committees

Program Committee

Elizabeth Wilcox (Chair, as Program Chair) Marlo Brown

Seaway Distinguished Lecturer Committee

Charlie Jacobson (Chair) 10/17 - 4/20 Elizabeth Wilcox 10/17 - 4/20 Olympia Nicodemi 10/17 - 4/20 Jeff Johannes 10/17 - 4/20 Gary Towsley (ex officio as Treasurer) 4/17 - 4/20

Committee on Venues

Bob Rogers (Chair)

Jeff Johannes

Committee on Website and Registration

Ryan Gantner (Chair) 4/18 - 4/20 Gary Towsley 4/18 - 4/20 Anurag Agarwal 4/18 - 4/20 Luis Moreno 4/18 - 4/20 Nate Reff 4/18 - 4/20

Contributed Talk Schedule:

Instructional Centre Building, IB-250:

2:00-2:25 Dave Ettestad and Joaquin Carbonara (Buffalo State College), Sierpinski Triangle Plane

2:30-2:55 Ryan Gantner (St. John Fisher College), Math Circles of Inquiry

3:00-3:25 **Parker Glynn-Adey** and **Xinli Wang** (University at Toronto), *Start, Stop, Continue and Ticket Out of the Door: Collecting and using student feedback to improve teaching in a large first-year math class*

Instructional Centre Building, IB-260:

- 2:00-2:25 Alvaro Nosedal Sanchez (University at Toronto), *Reproducing Kernel Hilbert Spaces for Penalized Regression: A Tutorial.*
- 2:30-2:55 James Marengo (RIT), The Remarkable Random Walk
- 3:00-3:25 **Anurag Agarwal** (RIT), What do basic calculus problems, Diophantine equations and Quadratic forms have in common?

Instructional Centre Building, IB-235:

2:00-3:00 **Mihail Barbosu** (RIT), Developing New Undergraduate and Graduate Programs in Mathematics

3:00-3:25 Discussion

Student Talk Schedule:

Instructional Centre Building, IB-280:

2:00-2:25 Leilani Leslie (SUNY Oswego), Examining Questions as Written Feedback in Undergraduate Proof-Writing Mathematics Courses

2:30-2:55 Kyler Anderson (SUNY Oswego), Little Symmetries

3:00-3:12 Marquia Williams (SUNY Oswego), The Art of Tiling and Generating Functions

Instructional Centre Building, IB-340:

- 2:00-2:25 **Seamus Henehan** (SUNY Geneseo), *Fibonacci Numbers, Power Series, and Generating Functions*
- 2:30-2:55 Jonathan McCart (SUNY Geneseo), Comparison of derivative-free optimization algorithms using a generalized characteristic metric
- 3:00-3:12 Joon-yeob Lee (SUNY Geneseo), Eigenvalues of connected anti-regular graphs

Instructional Centre Building, IB-350:

- 2:00-2:25 Melissa Marry (SUNY Oneonta), The Intricate Universe of Hyperbolic Geometry
- 2:30-2:55 **Caleb Lyon** and **Nathaniel Parks** (Houghton College), *Coadjoint orbits for the group of unipotent upper triangular matrices*

Contributed Talk Abstracts:

1. Anurag Agarwal, RIT

What do basic calculus problems, Diophantine equations and Quadratic forms have in common?

In order to construct a nice polynomial function for curve sketching and solve an optimization problem, we end up solving Diophantine equations of a certain kind. We will explore that connection and also discuss solution methods and properties of that Diophantine equation. This eventually leads us to the issue of representing prime numbers in a certain quadratic form.

2. Dave Ettestad and Joaquin Carbonara, Buffalo State College

Sierpinski Triangle Plane

The Sierpinski triangle is a fractal which has Haussdorf dimension $\log (23) \approx 1.585$ that has been studied extensively. In this talk we introduce the Sierpinski Triangle Plane (STP), an infinite extension of the Sierpinski triangle that spans the entire real plane but is not a vector space or a tiling of the plane with a finite set of Sierpinski triangles. We define a radial fractal, and then show that the STP is an example with many interesting and surprising properties.

3. Ryan Gantner, St. John Fisher College

Math Circles of Inquiry

The Math Circles of Inquiry project is a collaboration between high school teachers and college professors to create, test, utilize, and disseminate inquiry-based modules for middle and high school courses. The modules are created by teachers working in teams with college professors. Then the results are communicated to others using a Math Teachers' Circle model. In this way, the project blends two existing networks: the Greater Upstate New York IBL Consortium and the National Math Teachers' Circle Network. However, these networks are used in ways that they have not been used before in order to build connections, develop teams, and disseminate knowledge. This project is currently a work in progress and there are teams in the Buffalo and Rochester areas. Those interested in developing Math Teachers' Circles or looking for ways to get more active in the K-12 community may be interested in hearing about this project.

4. Parker Glynn-Adey and Xinli Wang, University at Toronto

Start, Stop, Continue and Ticket Out of the Door: Collecting and using student feedback to improve teaching in a large first-year math class

Awareness of student response to teaching is essential for teaching large classes. If we want to have a better knowledge about whether our teaching meets student's learning needs, we must ask the students themselves and interpret the results. We experimented with two techniques for gauging student's learning experience in our classes: Start/Stop/Continue and Ticket Out of the Door. These activities were done both in class and online. The classes involved were large first year math classes: Calculus, Calculus for Life Sciences, and Linear Algebra. Each class had approximately one hundred and fifty students. We share the process used for implementing both activities and the results of the data collected along reflection about how our teaching practices were adjusted based on the feedback received.

5. James Marengo, RIT

The Remarkable Random Walk

In the simple one-dimensional random walk on the integers, a person initially stands on the integer zero. She then tosses a coin to decide which way to move, moving either to +1 or to -1 according as the coin comes up heads or tails. She then repeats this process indefinitely, increasing or decreasing her position by one unit depending on whether this same coin comes up heads or tails. Is this person guaranteed to return to position zero? If so, then, on average, how many steps must she take before this happens? We will answer these questions, as well as similar questions for the simple random walk in two and three (or more) dimensions. The answers might surprise you! This talk will be accessible for anyone who has had a calculus-based course in probability.

6. Alvaro Nosedal Sanchez, University at Toronto

Reproducing Kernel Hilbert Spaces for Penalized Regression: A Tutorial.

Penalized regression procedures have become very popular ways to estimate complicated functions. The smoothing spline, for example, is the solution of a minimization problem in a functional space. If such a minimization problem is posed on a reproducing kernel Hilbert space (RKHS), the solution is guaranteed to exist, is unique, and has a very simple form. There are excellent books and articles about RKHS and their applications in statistics; however, this existing literature is very dense. This article provides a friendly reference for a reader approaching this subject for the first time. It begins with a simple problem, a system of linear equations, and then gives an intuitive motivation for reproducing kernels. Armed with the intuition gained from our first examples, we take the reader from vector spaces to Banach spaces and to RKHS. Finally, we present some statistical estimation problems that can be solved using the mathematical machinery discussed. After reading this tutorial, the reader will be ready to study more advanced texts and articles about the subject, such as those by Wahba or Gu. Online supplements are available for this article.

Student Talk Abstracts

Kyler Anderson, SUNY Oswego

Little Symmetries

Sometimes it's hard to find applications of mathematics, especially when it's on the scale of 10^{-10} meters. Atomic compounds provide many ways to apply mathematics. One of the most interesting ways is by using the complex symmetries they have in order to identify them. Sometimes, two compounds can contain all of the same atoms, but their symmetries make them behave differently. In this talk we see a quick intro to symmetries, a quick intro to simple chemical compounds, and learn how symmetries help us to visualize and thereby identify these incredibly small structures.

Seamus Henehan, SUNY Geneseo

Fibonacci Numbers, Power Series, and Generating Functions

In this talk, we will investigate the generating function for the Fibonacci numbers. Using this function, we'll prove the convergence of the formal power series generating the Fibonacci numbers. Then we will derive the closed form for the n-th Fibonacci number. Ultimately we shall derive the limiting value of the ratio of successive Fibonacci numbers. Along the way, our exploration of the Fibonacci numbers will yield additional curious results.

Joon-yeob Lee, SUNY Geneseo

Eigenvalues of connected anti-regular graphs

In graph theory, the anti-regular graph is the unique graph that contains only two vertices of the same degree. Thus far, some characteristics of the antiregular graph are known but the spectral properties are not well understood. In this talk, we will discuss the eigenvalues of the connected anti-regular graph. We analyze the adjacency matrix of the anti-regular graph with the help of Chebyshev polynomials and basic linear algebra, and obtain a recurrence relation that leads to an eigenvalue equation. From the eigenvalue equation obtained, we deduce that the interval $\Omega = \left[\frac{-1-\sqrt{2}}{2}, \frac{-1+\sqrt{2}}{2}\right]$ contains only the trivial eigenvalues 0 and 1. Also, we obtain interval bounds for all eigenvalues whose accuracy improve as the size of the original anti-regular graph increases. Using the interval bounds, we show that as the size of the anti-regular graph increases, the eigenvalues exhibit a bipartite character; they become almost symmetric about the number 1/2. Finally, we discuss some possible future work regarding the relationship between the general threshold graphs and the spectral characterization of anti-regular graphs.

Leilani Leslie, SUNY Oswego

Examining Questions as Written Feedback in Undergraduate Proof-Writing Mathematics Courses

The practice of providing written feedback on an undergraduate student's proof in the form of asking questions is striking in that professors often do not know whether the student attempts to answer the questions. This phenomenon leads us to investigate the reasons why professors ask questions as written feedback. We thematically analyze the written questions of four professors teaching abstract algebra and real analysis at a medium-sized, rural, comprehensive public university in the northeast. We find that these four professors most frequently ask questions that either seek further explanation from students or address a mathematical detail within their proof. In some cases, the professors answer the questions they ask as written feedback. Overall, the professors ask questions as written feedback to encourage students' thinking, thereby engaging students in the proof-writing process and improving the students' proof production skills.

Caleb Lyon and Nathaniel Parks, Houghton College

Coadjoint orbits for the group of unipotent upper triangular matrices

The Lie group G_n of unipotent upper triangular $n \times n$ matrices acts on its Lie algebra \mathfrak{g}_n via the adjoint representation. From this, one defines the coadjoint representation of G_n on the dual space \mathfrak{g}_n^* . Although Kirillov's orbit method has long established a correspondence between the space of coadjoint orbits and equivalence classes of irreducible unitary representations of G_n , a general classification of coadjoint orbits for G_n remains an open problem. In this talk, we present an algorithm for classifying these orbits along with accompanying computational results for small n.

Melissa Marry, SUNY Oneonta

The Intricate Universe of Hyperbolic Geometry

The attempt to prove the Parallel Postulate in Euclidean Geometry led to the discovery of the socalled Non-Euclidean Geometries where lines may not necessarily be straight lines and the Euclidean Parallel Postulate may not in fact be true. In this presentation, we would like to investigate the universe of Hyperbolic Geometry or, as some mathematicians call it, a strange new universe. In particular, we would like to explore significant traits of the two fundamental models for Hyperbolic Geometry, that is the Poincare Disk Model and the Upper Half-Plane Model. We will work in these environments to define and develop an understanding of h-distances, h-angles, h-triangles, and hperpendiculars and we will present a system of trigonometric formulas that can be verified in the Poincare Disk Model by appealing to Calculus hyperbolic functions. Finally, among other things, we will investigate the new form that the Pythagorean Theorem takes in the Hyperbolic context.

Jonathan McCart, SUNY Geneseo

Comparison of derivative-free optimization algorithms using a generalized characteristic metric

For many situations, the function that best models a situation or data set can have a derivative that may be difficult or impossible to find. Thus, numerical methods for finding these important values without the direct involvement of the derivative have been developed to find the optimal value of the function. This is our motivation to use Derivative-free optimization (DFO) algorithms. In our analysis of these algorithms, we tested three global solvers: Genetic Algorithm (GA), Particle Swarm Optimization (PSO), and Simulating Annealing (SA) on a set of 25 problems of varying types: convex/nonconvex, separable/non-separable, differentiable/non-differentiable, and unimodal/multimodal. For each algorithm, we used the built-in code from MATLAB, unedited or revised. For all problems, we varied the number of dimensions, increasing from 2 dimensions to 100 dimensions. We introduce new criteria to compare DFO solver performance using certain generalized characteristics that depend on speed, efficiency, accuracy, and mobility. Numerical results proposed for most known standard benchmark problems.

Marquia Williams, SUNY Oswego

The Art of Tiling and Generating Functions

Throughout the summer I worked on developing a generating function for the number of ways to tile a 4 by k grid with 2 by 1 dominoes. The first thing I did was count by hand the number of ways to tile a 4 by 1, 4 by 2 and 4 by 3 grid. Though unsuccessful at producing a direct formula, I came up with a recursive formula. After studying generating functions, I was able to derive a generating function for my question. My goal is to use the generating function to solve for a direct formula.