JMM 2021 Call for MAA Contributed Papers

The MAA Committee on Sessions of Contributed Papers solicits papers pertinent to the sessions listed below. Any paper that fits the subject of one of the themed sessions should be submitted directly to that session. All others should be submitted to the general sessions, which will accept abstracts in all areas of collegiate mathematics, mathematical pedagogy, and the undergraduate mathematics curriculum. Presentations in the themed sessions are normally 15 minutes in length while presentations in the general sessions are limited to 10 minutes each.

Each participant may make *at most* one presentation in an MAA Contributed Paper Session, either a presentation in one of the themed sessions or a presentation in one of the general sessions (exclusive or). If a paper cannot be accommodated in the themed session for which it was submitted, it will automatically be considered for the general contributed paper sessions. The session rooms are equipped with computer projectors and screens. Please note that the dates and times scheduled for these sessions remain tentative. Questions concerning the submission of abstracts should be addressed to abs-coord@ams.org. Abstracts may be submitted electronically at http://jointmathematicsmeetings.org/meetings/abstracts/abstract.pl?type=jmm

The deadline for submission of abstracts is Tuesday, September 15, 2020.

Contributed Paper Sessions with Themes

Combining Technological Tools and Innovative Practices to Improve Student Learning Outcomes, organized by **Charlotte Knotts-Zides**, Wofford College, **Karl Schmitt**, Valparaiso University, **Marianna Bonanome**, MAA CTME, **Ariane Masuda**, City Tech, CUNY, **Andrew Parker**, City Tech, CUNY, and **Manmohan Kaur**, Benedictine University. Experimentation in instructional methodologies is blooming. An increasing number of instructors are adapting more than one technological tool, integrating them with LMSs, and combining them with active learning techniques to improve student learning both in and outside of the classroom. The number of institutions that recognize and support these efforts through grants and special programs also continues to grow. This session will provide a venue for exposition of recent initiatives, thereby disseminating results (positive and negative), reducing duplication of effort, promoting collaboration between instructors, as well as across institutions, and providing recognition for those on the front lines of experimental learning. Sponsored by CTME (Committee on Technologies in Mathematics Education).

Data-Driven Modeling Projects to Motivate Active Learning and Engagement, organized by **Corban Harwood**, George Fox University, **Mark Branson**, Stevenson University, **Patrice Tiffany**, Manhattan College, **Rosemary Farley**, Manhattan College, **Gizem Karaali**, Pomona College, **Victor Piercey**, Ferris State University, and **Luke Tunstall**, Trinity University. Modeling is widely used to motivate student learning in courses across the mathematics curriculum. Implementation of the modeling process through data-driven inquiry-based activities varies by course and backgrounds. This session seeks to present such a variety of implementation including a breadth of mathematical models, from conservation laws in differential equations to

regression analysis in statistics. Students develop mathematical reasoning through inquiry, as results of a model depend upon the questions asked in forming it. This motivates students to learn needed content, familiarize themselves with technology to make their analysis more efficient, and become aware of assumptions as they revise their model in response to the data. We invite scholarly presentations of data-driven in-class activities or projects that generate active, inquiry-oriented learning across the mathematics curriculum. The diversity of presented modeling implementations benefits the community through shared resources, support, and new perspectives. Presenters are encouraged to discuss the value of modeling to themselves as teachers and to their students as learners, as well as techniques for improved data collection, implementation, and assessment. Sponsored by the QL SIGMAA & SIMIODE.

The EDGE (Enhancing Diversity in Graduate Education) program: Pure and Applied talks by Women Math Warriors, organized by **Laurel Ohm,** University of Minnesota, **Shanise Walker**, University of Wisconsin - Eau Claire, and **Ziva Myer**, Duke University. Since its beginning in 1998, over two hundred and fifty women have participated in the EDGE program. Approximately seventy are currently working towards a PhD, over one hundred and thirty have earned Masters degrees, and more than one hundred have gone on to successfully complete PhDs. This session will be comprised of research talks in a variety of different subdisciplines given by women involved with the EDGE program. For more information on the EDGE program, see http://www.edgeforwomen.org/.

Incorporating Realistic Applications of Mathematics Through Interdisciplinary Collaborations, organized by **Mary R. Parker**, Austin Community College, **Mary Beisiegel**, Oregon State University, **Rebecca Segal**, Virginia Commonwealth University, and **Suzanne Doree**, Augsburg University. Finding realistic applications of mathematics from other disciplines that can be included in mathematics courses is challenging. Many of us have benefited from our interactions with faculty and practitioners from other disciplines. Others of us realize that this would be useful but are unsure how to begin such a collaboration. Papers in this session will highlight the process of the collaboration (how it began, the eventual results, and a summary of "lessons learned") as well as showcasing a particular example of an application of mathematics that was added to the curriculum as a result of the collaboration. Examples at any level of the mathematics curriculum are welcome. All presentations should include evidence of success in the collaboration process as well as evidence of impact on students, for example on student engagement, sense of belonging, student learning, persistence in math/STEM, etc. In the abstract, please identify the partner discipline(s), mathematics course(s), and the nature of examples developed. Sponsored by the Math Across the Disciplines subcommittee and the Committee on Curriculum Renewal Across the First Two Years, subcommittee of the Committee on Undergraduate Programs in Mathematics.

Inquiry-Based Learning and Teaching, organized by **Susan Crook**, Loras College, **David Failing**, Lewis University, **Nathaniel Miller**, University of Northern Colorado, **Carl Mummert**, Marshall University, and **Mami Wentworth**, Wentworth Institute of Technology. The goal of Inquiry-Based Learning (IBL) is to transform students from consumers to producers of mathematics. Inquiry-based methods aim to help students develop a deep understanding of

mathematical concepts and the processes of doing mathematics by putting those students in direct contact with mathematical phenomena, questions, and communities. Within this context, IBL methods exhibit great variety. Activities can take place in single class meetings and span entire curricula for students of any age. Students can be guided to re-invent mathematical concepts, to explore definitions and observe patterns, to justify core results, and to take the lead in asking questions. There is a growing body of evidence that IBL methods are effective and important for teaching mathematics and for fostering positive attitudes toward the subject. This session invites scholarly presentations on the use of inquiry-based methods for teaching and learning. We especially invite presentations that include successful IBL activities or assignments, that support observations about student outcomes with evidence, or that could help instructors who are new to IBL try new methods. Sponsored by IBL SIGMAA.

MAA Session on Mathematical Experiences and Projects in Business, Industry, and Government (BIG), organized by **Vinodh Chellamuthu,** Dixie State University and Caroline Maher-Boulis, Lee University. The extraordinary growth of complex open-ended problems facing business, industry, and government, along with the flood of available information and data to address these challenges, may seem overwhelming. It should not! As mathematicians, operations research analysts, and engineers, including those within academia who have addressed these issues, we experience and tackle these problems with experience, knowledge, and technological tools. We solve applied mathematics problems in business, industry, and government, including military applications, almost daily. We seek presenters to share their real world applied examples of this type of problem-solving. These talks may include successful mathematical applications or problems where you have no clue how to proceed and are seeking ideas from our audience. Your talks will serve as inspiration to solve and tackle the real challenges that we may face in the future. You do not have to be a BIG SIGMAA member to attend or present. Sponsored by BIG SIGMAA.

Mathematics and Music, organized by **Darren A. Narayan**, Rochester Institute of Technology and **Douglas Norton**, Villanova University. Connections between mathematics and musical elements such as rhythms, scales, and musical compositions been well established. We welcome presentations from various areas of mathematics that have connections to music. In addition, we seek papers that have synergy between the learning of mathematical concepts and the learning of music. Sponsored by the MAA CUPM Subcommittee on Mathematics Across the Disciplines and SIGMAA-ARTS.

Mathematics and the Life Sciences: Initiatives, Programs, Curricula, organized by Timothy D. Comar, Benedictine University, Raina Robeva, Randolph-Macon College, and Carrie Diaz Eaton, Bates College. The 2015 CUPM Curriculum Guide to Majors in the Mathematical Sciences identified the life sciences as a key path through the mathematics major to graduate programs and the workforce. Presentation topics include scholarly contributions addressing initiatives, programs, curricula, and course materials at the interface of mathematics and the life sciences that have been implemented and tested at institutions of higher education. Sponsored by BIO SIGMAA.

Mathematics and Sports, organized by **John A. David**, Virginia Military Institute, and **Elizabeth L. Bouzarth**, Furman University. The expanding availability of play-by-play statistics and video-based spatial data have led to innovative research using techniques from across the mathematical sciences, with impacts on strategy and player evaluation. Other areas of interest include ranking methods, predictive models, physics-based analysis, etc. Research presentations, expository talks, and contributions related to curriculum or pedagogy are all welcome. With a broad audience in mind, talks should be accessible to undergraduate mathematics majors, and projects involving undergraduate students are particularly encouraged for submission. Sponsored by the Sports SIGMAA.

The Philosophy of Mathematics, in Memory of Reuben Hersh, organized by **Sally Cockburn**, Hamilton College, **Tom Morley**, Georgia Tech (emeritus), and **Kevin Iga**, Pepperdine University. Philosophy of mathematics since the late 1970s owes a great debt to Reuben Hersh (1927-2020), who, arguably more than anyone else at the time, re-engaged mathematicians with questions on the nature of mathematics and proof. Hersh's writings on social constructivism (that the reality of mathematics is as a social, cultural, and historical construct), on actual proofs done by mathematicians (as opposed to formal proofs) and mathematics as a human activity (as opposed to a platonic ideal or a formal system) were and still are controversial. However, his work inspired many mathematicians to elucidate their own views on such matters, and the resulting discussions remain fruitful today. This session welcomes talks engaging with any of the many topics in the philosophy of mathematics that Hersh discussed. Sponsored by the SIGMAA on the Philosophy of Mathematics.

Promoting Women in Mathematics, organized by **Anila Yadavalli**, University of Minnesota, **Sarah Greenwald**, Appalachian State University, **Francesca Bernardi**, Worcester Polytechnic Institute, **Judy Holdener**, Kenyon College, and **Semra Kilic-Bahi**, Colby-Sawyer College. The purpose of this session is to encourage meaningful discourse surrounding the underrepresentation of women in mathematics and statistics. Certainly, these disciplines benefit from the talents and contributions of all people — regardless of gender — and gender equity is a matter of social justice. To this end, we solicit talks offering promising ideas and solutions for recruiting, encouraging, supporting, or retaining women in mathematics. We also welcome talks focusing on issues residing at the intersections of gender with cultural, ethnic, sexual, or other identities. Talks might include, but are not limited to, a novel idea for teaching and learning, a bridge program, a mentoring program, an outreach program, or extracurricular activities. Talks should have practical, transferable advice encouraging scalability and facilitating implementation by practitioners. Claims made within a talk regarding the success of a program/activity/practice or teaching pedagogy should be compelling and may be substantiated by anecdotal reports or by a summary of a formal study. Speakers will be invited to submit their work for consideration in the upcoming PRIMUS special issue on Promoting Women in Mathematics. Sponsored by the AWM 50th Anniversary Committee, the Joint Committee on Women (JCW), the MAA Committee on the Participation of Women, *PRIMUS*: Problems, Resources, and Issues in Mathematics Undergraduate Studies, and SPECTRA.

Recreational Mathematics: Puzzles, Card Tricks, Games, and Gambling, organized by **Paul R. Coe**, Dominican University, **Sara B. Quinn**, Dominican University, and **David A. Nash**, Le Moyne College. Puzzles, card tricks, board games, game shows, and gambling provide an

excellent laboratory for testing mathematical strategy, probability, and enumeration. The analysis of such diversions is fertile ground for the application of mathematical and statistical theory. Solutions to new problems as well as novel solutions to old problems are welcome. Sponsored by the SIGMAA on Rec Math.

The Teaching and Learning of Undergraduate Ordinary Differential Equations, in memory of William E. Boyce, organized by **Christopher S. Goodrich**, University of New South Wales and **Beverly H. West**, Cornell University. The teaching of undergraduate Ordinary Differential Equations (ODEs) provides a unique way to introduce students to the beauty and applicative power of the calculus. ODEs are also rich with aesthetically pleasing theory, which often can be successfully communicated visually and explored numerically. This session will feature talks that describe innovative teaching in the ODEs course as well as the description of either projects or pedagogy that can be used to engage students in their study of ODEs. Successful contributions could include but are not limited to: (1.) innovative ways of teaching standard topics in the ODEs course; (2.) strategies for teaching both differential equations and linear algebra simultaneously; (3.) the inclusion of technology in the ODEs course; (4.) examples of interdisciplinary lessons such as, for example, those that connect to social justice and environmental concerns; and (5.) descriptions of applications or nonstandard topics and how such topics can lead to student engagement and interest. In addition, contributors should include some discussion of the success of their methods, such as in what ways the activity or method under discussion has improved student learning, retention, or interest in the differential equations course. Bill Boyce, working with Richard DiPrima and Douglas Meade over the years created 11 editions of their famous Elementary Differential Equations with Boundary Value Problems, from 1969 to 2017. Boyce transitioned early from a traditional approach finding analytic solutions, to a more reformed approach to teaching ODEs, and jumped on the bandwagon of the computer graphics revolution by the early 1990s. We honor one of our best advocates. Sponsored by CODEE.

Teaching Math Modeling and Sustainability, organized by **Victor J. Donnay**, Bryn Mawr College, **Ben J. Galluzzo**, Clarkson University, and **Thomas Pfaff**, Ithaca College. An oft-stated rationale for improving STEM education is the crucial role of STEM in economic competitiveness. Given the wide range of social and environmental issues facing the nation and the world, we suggest that a more motivating rationale, for both students and teachers, would be using STEM to address issues of sustainability. In this session, speakers will present a variety of ways that they have brought issues of sustainability into their college and university math teaching. These examples span a continuum from stand-alone lessons focused on a sustainability topic that can be incorporated into existing courses such as calculus and statistics to entire courses focused on applying techniques of mathematical modeling to issues of sustainability. These more extensive links to sustainability can also include community-based service-learning projects in which math students serve as consultants to analyze a sustainability issue of interest to a community partner. These presentations, while aimed at faculty in higher education, would also be of interest to secondary school teachers. Sponsored by SIGMAA EM.

GENERAL CONTRIBUTED PAPER SESSIONS

GENERAL CONTRIBUTED PAPER SESSIONS will not take place at the 2021 Virtual JMM.