Mathfest 2024 in Indianapolis
Rick Gillman
Fall 2024

Mathfest 2024 was held in Indianapolis during the first week of August of that year and the Indiana Section was prominently engaged with the meeting. There were over 1600 registrants for the meeting, plus their families and guests. Nearly 100 of them were from Indiana, representing our large public institutions and most of the small private colleges. There were representatives from Ivy Tech Community College, several high schools, and the local business, industry, and government (BIG) community.

The section highlighted its delight at having the national meeting in Indiana by maintaining a booth in the exhibit area, and co-organizing the Introduction to Mathfest event, thanks to Livia Hummell (University of Indianapolis). Charles Bower (Indiana University) co-organized the Backgammon competition and Thomas Langley (Rose-Hulman Institute of Technology) organized the Student Dessert Reception. The section also held its first national reception, welcoming current and past members of the section and honoring David Housman (Goshen College), the section's Meritorious Service Award winner.

Rick Gillman (Valparaiso University) organized a special session on Notable Events in the History of the Indiana Section. In addition to these general sessions, Indiana organized or co-organized many panels, invited paper, contributed paper, and special sessions. They also organized mini-courses and workshops.

Amber Russell (Butler University) and Thomas Langley (RHIT) organized an undergraduate poster session titled Research in Motion. Hoosiers co-organized three contributed paper sessions: New Twists on your Favorite Mathematical Circle by A. Gwinn Royal (Ivy Tech Community College), Advances in Algebraic Topology, by Sarah Klanderman (Marian University) and Amelia Tebbe (Indiana University Kokomo), and Differential Equations Student Activities and Projects, Big and Small by Pushpi Paranamana, Saint Mary's College.

Rachael Kenney (Purdue University) co-organized the panel session How to hire a math educator: Considerations for mathematics departments, while Thomas Langley (RHIT) co-organized the panel on Career Paths in Business, Industry and Governments. Two other members of the faculty at Rose-Hulman co-organized invited paper sessions: Rethinking number theory, Tyler Billingsley, and The Mathematics of Post-quantum Cryptography, Joshua Holman.

Members of the section organized or co-organized two mini-courses. David Housman (Goshen College) put on Game Theoretic Modeling, while Tracy Weyand and Kurt Byan (both from RHIT) co-organized the minicourse Differential Equations: A Toolbox for Modeling the World in your Classroom. Other members of the section helped to organize four workshops. Tiffany Kolba, Zsuzsanna Szaniszlo, and Jenna Van Sickle (all from Valparaiso University) lead a workshop on Implementing Standards-based Grading in Introductory Mathematics Courses; Rick Hudson (University of Southern Indiana) lead Preparing Future Teachers to Investigate Data with CODAP; Mark Frantz (Indiana University Bloomington) was a co-organizer of Geometric Puzzles and Brain Teasers in Perspective Art; and finally, Olguta Buse (Indiana University Bloomington) and Rodrigo Pérez (Indiana University Indianapolis) led a workshop on The Shape of the World.

Each year at Mathfest, the MAA's Special Interest Groups (SIGMAAs) are invited to host sessions devoted to their topic of interest. This year, six SIGMAAs invited speakers from Indiana. The SIGMAA on Mathematical and Computational Biology invited Julia Arciero (IUPUI) to speak on Mathematical

Modeling in Medicine: Applications to Glaucoma and Heart Transplantation, while Jeffery Oaks (UIndy) spoke to the SIGMAA on the History of Mathematics about Zero and Nothing in Medieval Arabic Arithmetic. Timothy Bays (University of Notre Dame) spoke about Why should we care about Foundations to the SIGMAA on the Philosophy of Mathematics. Jeremy Case (Taylor University) co-organized the meeting of the SIGMAA on Statistics and Data Science Education, at which Sarah Kessler, with the Indiana Fever basketball team, spoke about Performance Analytics in Professional Basketball. Similarly, the SIGMAA on Environmental Mathematics invited Morgan Mickelson, Director of the Office of Sustainability with Indianapolis, to speak on Navigating Sustainability in Indianapolis. Finally, Hasseb Kazi (Trine University) spoke to the SIGMAA on Undergraduate Research on Within Bounds and Without Borders.

Many people from Indiana gave presentations and shared posters. Here is a list of them, with apologizes to anyone that I missed in compiling the list.

Further Improvements to the Chevally-Warning Theorem
Rachel Petrick RHIT
Life Together: A Holistic View of Mathematical Community
Derek Thompson, Taylor University
Scaffolded Explorations with a Modified Rubic's Cube
A. Gwinn Royal, Ivy Tech Community College
Action Graphs for Catalan Sequences
Amelia Tebbe, Indiana University Kokomo
Rainbow Numbers of Equations
Katie Ansaldi, Wabash College
Graphs, Games, and Undergrads: Total Graph Labelings
Ranjan Rohatgi, Saint Mary's College
Impartial Two-player Pebbling Games
Jacob Roeder, Trine University
Using an LLM to Code Online Assessment Questions
Corrin Clarkson, Indiana University
The History of Indiana's Squared Circle
Melissa Desjarlais, Valparaiso University
Hoosiers, the MAA, and the Indiana Section
Colin McKinney, Wabash College
Peter & Paul: A surprising intersection of lives
Rick Gillman, Valparaiso University
Rodney & Dwight: Purely pure vs purely applied
Dan Callon, Franklin College
The Indiana College Mathematics Competition
Justin Gash, Franklin College
Removing Isolated Zeros by Homotopy
Adam Coffman, PFW
Steenrod Operations on Polyhedral Products
Sanjana Agarwal, Indiana University Bloomington
Fiber of the Cyclotomic Trace for the sphere Spectrum and Tate-Poitou Duality
Myungsin Cho, Indiana University Bloomington
On the Decoding failure Rate of BIKE
Tyler Billingsley, RHIT

Cultivating an Investigative Mindset in Mathematics for the Liberal Arts
Amy DeCelles, Bethel University

New Venn Diagram Puzzles
Rodney Lynch, Indiana University Columbus

A Capstone Course in Statistics using local data
Heather Cook, University of Southern Indiana

Verifying the Hanging Chain Model
Michael Karls, Ball State University

Implementing Modeling Activities and Project Assignments in Differential Equations Course
Pushpi Paranamana, Saint Mary's College

Navigating Trigonometry: A Student-Friendly Pre-calculus Approach
Sabrina Akelbek, Purdue University

Occurrences of Reciprocal Sign Epistasis in Single- and Multi-peaked Theoretical Fitness Landscapes
Manda Riehl, RHIT

Topological Versus Biochemical Features: Comparative Performance in Protein Stability Predications
Amish Mishra, Taylor University

Extended Springer Fibers Big Picture
Amber Russell, Butler University

Compact Bicomplex Linear Transformations
William Johnston and Rebecca Walt, Butler University

Outer Product Decompositions, Generalized Identities, and Generalized Inverses
Rodney Lynch, Indiana University Columbus

Estimating Multiple Missing Observations in Factorial Experiments
Mohammad Shaha, Butler University

Equal Play, Equal Pay! Engaging Students in Actuarial Justice
Kristin Kuler, Saint Mary's College

Learning Expected Value through Board Games
Joshua Ruark, Indiana Academy for Science, Mathematics, and the Humanities

Like Sunshine to a Plant – Utilizing DEIA in Mathematics to help students grow and flourish in Academia
Haseeb Kazi and Areeba Kazi, Trine University

Abstracts for these talks and for the sessions are available in the MAA's Mathfest 2024 program, available at the Association's website.