

POM SIGMAA

Philosophy of Mathematics Special Interest Group of the MAA

Officers

Chair (through 1/23, after which he becomes Past Chair for one year)

Jeff Buechner, Rutgers University
buechner@rutgers.edu

Past Chair (through 1/22)

Bonnie Gold, Monmouth University (emerita),
bgold@monmouth.edu

Program Director (through 1/22, re-elected through 1/24)

Tom Morley, Georgia Institute of Technology,
morley@math.gatech.edu

Secretary-Treasurer

(through 1/22, re-elected through 1/27)

Sally Cockburn, Hamilton College, scobur@hamilton.edu

Public Information

Officer (through 1/26)

Kevin Iga, Pepperdine University,
kiga@pepperdine.edu

New Officer

Chair-Elect (2/22 through 1/23, after which he becomes Chair for two years)

Jason Douma, University of Sioux Falls,
Jason.Douma@usiuouxfalls.edu

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Online POM SIGMAA Business Meeting

We will have our annual POM SIGMAA business meeting over Zoom on Monday, February 7, 2022, at: Eastern Time: 8 pm, Central Time: 7 pm, Mountain Time: 6 pm, Pacific Time: 5 pm.

Zoom link:

<https://hamilton.zoom.us/j/95063938634?pwd=NzJxWW1nVTk2TG5uL00zc3lwKzBzZz09>

New Officers

POM SIGMAA held elections this past December for new officers. Sally Cockburn was re-elected as Secretary-Treasurer, and will hold that position until 2027. Tom Morley was re-elected as Program Coordinator and will hold that position until 2024. Jason Douma was elected Chair-Elect and will begin his term at the end of the business meeting on February 7, 2022. In early 2023, according to the POM SIGMAA charter, Jason will then be chair for two years.

Online Joint Math Meetings POM schedule

The Joint Mathematics Meetings that were originally scheduled for January 5-8, 2022 have been postponed to April 6-9, 2022, as an online conference, in response to the spreading Omicron variant of COVID-19. POM SIGMAA is sponsoring both an invited speaker (Nicolas Fillion) and a Contributed Paper Session.

Invited Speaker: Nicolas Fillion

Simon Fraser University, Department of Philosophy, nfillion@sfu.ca

Online Joint Mathematics Meetings April 8 5:30-6:30 pm Pacific

Trust but verify: What can we know about the reliability of a computer-generated result?

Since the Second World War, science has become increasingly reliant on the use of computers to perform mathematical work. Today, computers have justifiably become a trusted ally of scientists and mathematicians. At the same time, there is a panoply of cases in which computers generate demonstrably incorrect results; and there is currently no reason to expect that this situation will change. This prompts the careful user to verify computer-generated results, but it is clear that we are often not in a position to review the work of computers as we would traditionally review a putative derivation or calculation. In this sense, computational processes are epistemically opaque.

Since Humphreys introduced the phrase 'epistemic opacity' in the philosophical literature in 2004, the concept of opacity has been developed along different lines; furthermore, many incompatible claims have been

advanced--be they about what opacity is or about whether we should worry about it--leaving this field of the philosophy of computing in a state of confusion. In this paper, we propose a framework that disentangles three core questions (1. What kinds of epistemic opacity are there in scientific computing? 2. Should we worry about epistemic opacity? 3. Should we seek greater transparency whenever possible?) and systematically survey how their answers inter-relate.

Special Session on Competing foundations for mathematics: how do we choose?

Online Joint Mathematics Meetings April 6-7

Does the existence of many possible foundations of mathematics (some of which are mutually incompatible) pose a problem for mathematical realism/platonism? Is set theory or category theory the right foundation? For each, there are different versions. For example, for set theory, there's Zermelo-Fraenkel (with or without the axiom of choice, with or without large cardinals, etc.), Cantor-von Neumann, Quine's NF, and others. And then there's category theory, and topos theory. Each is importantly different from the others. But if realism about mathematics is correct, shouldn't there be just one correct foundational system? If so, which is correct? On the other hand, for physicists, a proliferation of theories does not call into question the reality of the external world. Why can mathematicians make important and meaningful contributions to their fields and yet simultaneously avoid, and indeed, often be ignorant of, mathematical foundations? How would we argue that a particular foundation is the correct choice? Or is realism wrong, and there is no one correct foundation? Should fruitfulness be the deciding mechanism? But can this lead to incorrect mathematics? In short, do specific formulations in mathematical foundations matter? This session is being organized by POMSIGMAA, the special interest group of the MAA for the philosophy of mathematics.

Day	Time (Pacific)	Presenter	Title
Apr. 6	8:00-8:45 am	John Baldwin	Category theory and Model Theory: Symbiotic Scaffolds
Apr. 6	9:00-9:45 am	Colin McLarty	Reality never has just one correct foundation
Apr. 6	10:00-10:45 am	Michael Shulman	Complementary foundations for mathematics: when do we choose?
Apr. 6	11:00-11:45 am		Discussion
Apr. 6	1:00-1:45 pm	Jeremy Avigad	The Design of Mathematical Language
Apr. 6	2:00-2:45 pm	Wilfried Sieg	Methodological Frames: Mathematical structuralism and proof theory
Apr. 6	3:00-3:45 pm	James Walsh	On the hierarchy of natural theories
Apr. 6	4:00-4:45 pm	Toby Meadows	Foundations and Interpretability
Apr. 6	5:00-5:45 pm		Discussion
Apr. 7	8:30-8:50 am	James Henderson	Realism and Undeterminism in Mathematics and the Physical Sciences
Apr. 7	9:30-9:50 am	Alejandro Cuneo	An Unorthodox Philosophy of Mathematics
Apr. 7	10:00-10:20 am	John Burke	Strict Finite Foundations of Mathematics
Apr. 7	10:30-10:50 am	Thomas Drucker	Mathematics, Bivalence, and Alternative Logics
Apr. 7	11:00-11:45 am		Discussion

Organizers: Bonnie Gold (bgold@monmouth.edu), Jeff Buechner (buechner@rutgers.edu), Kevin Iga (kiga@pepperdine.edu)

Online CSHPM/SCHPM meeting

The Canadian Society for the History and Philosophy of Mathematics/La Société Canadienne d'Histoire et de Philosophie de Mathématiques will hold its [2022 CSHPM/SCHPM Annual Meeting](#) online during May 13-15. The special session topic for the meeting will be "Original Sources in the History and Philosophy of Mathematics." The [Call for Papers](#) is now available. Deadline for submissions is February 1, 2022. Student participation is especially welcomed; students who present at the meeting and publish their paper in CSHPM's *Annals* will be considered for an annual monetary Student Paper Award.

There is a roughly monthly Zoom colloquium on various topics in History and Philosophy of Mathematics, sponsored by CSHPM/SCHPM, organized by Nic Fillion. The next talk has yet to be announced, but those interested can periodically check <http://www.cshpm.org/> to look for announcements along those lines. Some of the recent talks are listed here:

<https://www.maa.org/press/periodicals/convergence/convergence-calendar>

Meet Jason Douma, new Chair-Elect

Jason Douma has recently been elected as Chair-Elect for POM SIGMAA.



Many years ago, my son Elliot faced a scheduling dilemma. If he enrolled in high school geometry for the next academic year, he would not be able to continue playing in the school's jazz band. Believing both experiences were important for Elliot's education, we negotiated a special arrangement with the school district. I would tutor Elliot and supervise his geometry studies at home through the end of the school year, at which time he would sit for the district exam to receive credit for the course.

Our nightly "class sessions" at the kitchen table would typically begin with some concept-oriented investigations closely aligned with the textbook and content standards for the course. But our conversations almost always took a more speculative turn, usually under Elliot's instigation. "Does it work this way every time?" "Since the proof relies on things we have already established, are we actually proving something *new* here?" "Can mathematics ever produce results that *don't* work in the real world?"

These discussions turned out to be the highlight—and often the majority part—of our one-on-one sessions together. Although there were moments of exasperation (for both of us), this was a profoundly stimulating educational encounter for both teacher and student. Our philosophical excursions not only added interest, but also engaged the mind at a level that would not ordinarily be required under "traditional" instruction.

For many reasons, this scenario is not scalable. Elliot's individual traits and abilities as a learner, together with our unusually flexible and intimate classroom environment, engendered this particular set of experiences. But that hardly stifles my interest in finding ways to engage all of my students in productive pondering about the nature of the mathematics they are studying.

Looking back, I recognize that these same sorts of questions and conversations prompted my own interest in becoming a mathematician. In grade school, I was good enough at "doing" math, but I had little interest in making a career out of it. Mathematics—at least at the time—seemed impersonal and utilitarian. I fancied myself as more of an artist or free thinker. While attending Gustavus Adolphus College, a small Swedish Lutheran liberal arts college in Minnesota, I discovered more of the magic and mystery of mathematics. Mathematics, virtually alone among all areas of study, claims to know the infinite, to draw conclusions not only about actual relations but also about *possible* relations, and to (at least apparently) exercise objectivity without (necessarily) relying on physical objects. Wow! I was sold. I chose a mathematics major, together with a music minor.

My doctoral research at Northwestern University focused on very abstract mathematical structures: finite p -groups and group cohomologies. While trying to work out the mathematics, I often found myself—probably to the consternation of my dissertation advisor—spending hours pondering whether any of these structures were "real," and what sort of meaning could be attributed to relations on such esoteric structures.

I am now in my twenty-fourth year at the University of Sioux Falls, another small Christian liberal arts college in the upper Midwest. The USF culture encourages interdisciplinary thinking and allows faculty the time and space to develop new areas of scholarship and professional interest. Unsurprisingly, my scholarly interests over the past two decades have gradually migrated toward questions from the philosophy of mathematics, the scholarship of teaching and learning, and the relationship between epistemology and pedagogy in mathematics. Following a well-worn path among middle-career academics, I have also found myself dedicating an ever greater share of my professional energy to efforts that support the flourishing of the colleagues and institutions I love. One-third of my role at USF is now administrative (institutional research and strategic planning). I also value my service to the MAA, including my current work as chair of the Committee for the Undergraduate Program in Mathematics (CUPM).

When I heard about plans to create a SIGMAA focused on the philosophy of mathematics, I jumped on board immediately. I have been part of the POM SIGMAA community from its earliest years, though often as a face in the crowd. I have been edified by the insightful papers/presentations and stimulating conversations that have characterized our community, and am grateful for the leadership and encouragement our officers have provided all along the way. I enthusiastically accept this opportunity to serve as your future chairperson, both as a way of heightening my participation in the work of POM SIGMAA and as a way to support the professional and scholarly contributions of the wonderful people in our community. Over the next few years, as we shake off the disruptions that have prevailed during the pandemic, we will have an opportunity to experiment with our programming portfolio in search of an effective



blend of platforms/venues for sharing content: conferences, videos/webinars, publications, MAA Connect, etc. I look forward to collaborating with you and facilitating our collective vision as we seek new ways to promote lively inquiries into the philosophy of mathematics.

With joyful anticipation,

Jason Douma

Cecilia, Elliot, Jason, and Kathie Douma
May 2019

Cecilia is now a Ph.D. Chemistry student at the University of Minnesota.
Elliot is a music educator in Minneapolis-St. Paul.
Kathie works in children's ministry in Sioux Falls.
Jason ponders mathematics.