



The BIG News

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BUSINESS, INDUSTRY, AND GOVERNMENT SPECIAL INTEREST GROUP OF THE MATHEMATICAL ASSOCIATION OF AMERICA

Berezovski Connects Students to Industry

MAA MathFest

- Aug. 4–7, 2021
- [Registration open now!](#)

When **Mihhail Berezovski** arrived at Embry Riddle Aeronautical University, Daytona Beach Campus, in the fall of 2015, he knew that he faced some challenges. He needed a way to develop his students' math skills, while building on their established interest in applied mathematics. To that end, he developed his course *Research Project in Industrial Mathematics*, which has students work on data-driven projects provided directly by industrial partners.

Berezovski notes that many companies are sitting on enormous amounts of data that they don't know how to interpret. Students, meanwhile, have technical skills, but no experience applying them in real world situations. Berezovski's course brings the two parties together to the benefit of both.

Each project unfolds in multiple phases. In the beginning, students explore the data set, which could have missing data, unexpected values, or other challenges. They need to understand the problem, develop an initial strategy, and propose tools for further exploration. As they progress, they learn to access tools from existing codebases, to communicate their progress with their clients, and to redefine the project in the light of new information. In the end, they will have results, even if they were not what they set out to find at the beginning. As Berezovski says, in industry, done is better than perfect.

The course started as an independent study, with just one project completed in the 2016–2017 academic year. It grew to an experimental course, then a

full-blown course. In the 2020–2021 academic year, there were eight completed projects, in spite of a pandemic-related retooling of the course. Along the way, Berezovski has tried to increase his focus on underrepresented groups. The course is currently 79% female and 76% underrepresented minorities, well above the averages for those demographics in the student body as a whole.

Berezovski contrasts the research done in this course with traditional undergraduate research. Traditionally, a research project is developed by an expert in the field, who may not be able to see the end of the project, but at least knows what to expect, and is aware of potential pitfalls. On the other hand, a data-driven project is liable to be outside

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Survey Results

The BIG SIGMAA recently conducted an online survey for BIG SIGMAA members to get their input on activities that interest them. The survey received thirty-three responses. Eighteen of the twenty-nine MAA sections were represented in the responses.

Members were asked which BIG SIGMAA activities they were interested in.

- 73% were interested in BIG speakers at section meetings.
- 52% were interested in BIG paper sessions at section meeting.
- 52% were interested in BIG job fairs for students at section meetings.
- 64% were interested in BIG speakers at MathFest.
- 52% were interested in BIG paper sessions at MathFest.
- 49% were interested in BIG job fairs for students at MathFest.

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Berezovski (cont. from p. 1)

the expertise of the faculty sponsor, who may be learning just as much as the students.

There are challenges involved with working with industrial partners. It takes time to develop contacts within any particular company. An industrial partner may have reservations about students' experience or their ability to work at the level necessary. And the time frame for the project may not fit well with a company's need. A company may want an answer in the next few weeks, rather than at the end

of the semester.

Nonetheless, Berezovski has found the course to be a valuable part of his students' experience. As many as 35% of students get internship offers from companies that they work with. Even those that don't report that they can point to this course in interviews with other companies. Being able to give a five-minute pitch on your solution to a complex real world problem – a skill that Berezovski specifically practices in his course – goes a

long way to impress an interviewer.

Berezovski isn't resting on his laurels. This summer, he is running a virtual Research Experience for Undergraduates (REU), Research Projects in Data-Enabled Industrial Mathematics, sponsored by the National Science Foundation through REU Award Number DMS - 2050754. The REU is full for this year – it started on May 17 – but will run for two more years. Berezovski hopes it will be in person in Daytona Beach.

Meet the New Officers

The new Vice Chair for Membership is **Jennifer Travis**. Jennifer began her career as an engineer, then received an M.S. in Mathematics from the University of Houston and a Ph.D. in Mathematics Education from Texas A&M University. She is a Professor of Mathematics at Lone Star College, a community college in Houston, Texas. She has worked with community college STEM students on industry projects through the MAA PIC Math program. She is always looking for opportunities to help students become more prepared for STEM careers, through authentic projects, leadership in student organizations, and other learning experiences that extend beyond traditional classroom learning. Jennifer is looking forward to helping the SIGMAA build connections between BIG mathematicians, mathematicians in academia, and mathematics students.

The new Vice Chair for Services is **Benjamin V.C. Collins**. Ben joined the MAA as an undergraduate member at Central College (Iowa) in the mid-1980s, and has been a member ever since. He has served as the Director of Section NExT-Wisconsin, Public Information Officer for the Wisconsin Section, and a member of the Committee on Sections. For twenty years, he taught at the University of Wisconsin-Platteville. He now works at Epic, the medical software company in Verona, Wisconsin, which has sparked his new interest in Business, Industry, and Government. Ben is looking forward to helping build connections within the BIG SIGMAA community.

A Mathematical Limerick

This was making the rounds when I was in grad school at the University of Michigan:

$$\frac{12 + 144 + 20 + 3\sqrt{4}}{7} + 5 \cdot 11 = 9^2 + 0$$

We didn't know it at the time, but it was written by **Leigh Mercer** (1897-1977), and appeared in *Word Ways*, 13, 1, (Feb, 1980), p. 36.

If you are having trouble reading it as a limerick, it goes:

A dozen, a gross, and a score,
Plus three times the square root of four,
Divided by seven,
Plus five times eleven,
Is nine squared, and not a bit more.

It's a true equation.

Source: <https://www.lockhaven.edu/~DSIMANEK/mayhem.htm>

Survey (cont. from p. 1)

Some members offered additional suggestions for activities they would like to see from BIG SIGMAA. These suggestions included:

- Making announcements about conferences, fellowships, etc. on the mailing list.
- Having at least one BIG Invited Address at each future MathFest.
- Doing outreach to high school or junior high school studies to show what BIG members do.
- Creating an active discussion board where people can post ideas about placing students in internships and jobs.
- Having more discussion on how we can change undergraduate curriculum in math programs to make them more friendly to BIG interests and less focused on preparation for graduate school in pure math.
- Learning more about departments that excel in advising students for careers in BIG.
- Setting up a more direct communication channel to better push items to the Association for Women in Mathematics community and their student chapters.
- Writing a guide to best practices in preparing math students for BIG careers (related to but not identical to the recent SIAM BIG publication).
- Having more events for BIG employers and math faculty to improve networking and their understanding of needs for both sides.
- Having BIG articles in periodicals, creating activities to connect BIG with academia in a more productive way that goes both directions (BIG in academia, like PICMath, but also academia in industry).
- Interacting more about mathematical questions on what used to be the listserv.

Members were asked if they are willing to support their section meetings by spearheading BIG activities.

- 30% are not willing to spearhead BIG activities.
- 46% are potentially willing to spearhead BIG activities.
- 24% are willing to spearhead BIG activities.

The members who were willing to spearhead BIG activities were asked which activity or activities they are interested in carrying out. Of the MAA responses that were received:

- 26% work in BIG and can give a presentation and/or be in a career panel about mathematics in their work.
- 11% are experienced at interviewing candidates and would be willing to set up a mock interview.
- 16% are experienced at reviewing resumes and would be willing to set up a resume review service.
- 26% have participated in PIC Math and would be willing to share their experience of building a course with an industry component.
- 26% would be willing to organize a career panel.
- 21% would be willing to talk about projects or internships for students.

Other individual suggested ways to help were organizing section meetings or activities, hosting section meetings, helping recruit BIG employer participants at events, and organizing the Tondeur initiatives. Lastly, there were committee members who responded that are past and/or retired BIG employees who offered to be speakers or panelists and to help organize events.

These results are very encouraging. There is a lot of interest in BIG activities. The BIG SIGMAA has to figure out how to harness that interest.

SIGMAA Officers:

Caroline Maher-Boulis, Chair
 Jennifer Travis, Vice Chair for Membership
 Benjamin V.C. Collins, Vice Chair for Services
 Vinodh Chellamuthu, Vice Chair for Programs
 Aaron B. Luttman, Secretary/Treasurer

