

# MAA Section Meetings & Non-Academic Mathematics

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MAA Section Officers Meeting  
MathFest  
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- BIG – a brief introduction
- Section Meetings and Math Outside of Academia
  - MAA Section Meetings as an under-tapped resource
  - Getting BIG involved at Section Meetings
  - Current BIG presence in MAA sections
- A new player – PIC Math
  - What is PIC Math?
  - PIC Math and MAA Sections
    - PIC Math teams
    - How Sections can get involved

BIG is (Mathematics/Mathematicians) in:

- **B**usiness
- **I**ndustry
- **G**overnment

BIG entities in MAA:

- BIG SIGMAA
- BIG Committee

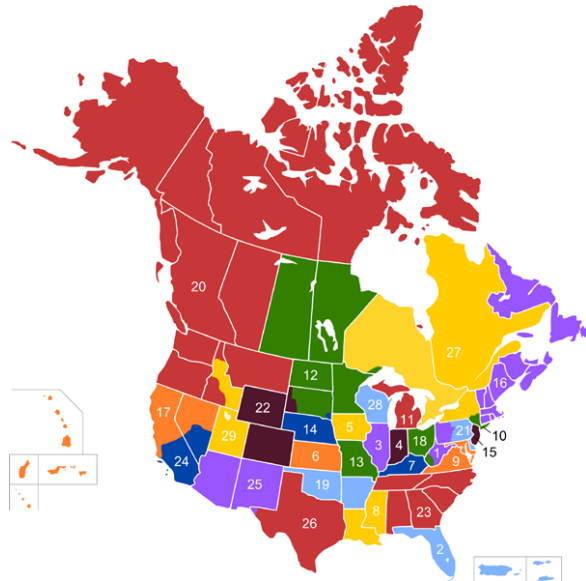


- Listserv with 300-400 subscribers
  - Subscribers from both academia and BIG organizations
- Bi-annual electronic newsletter
- Annual invited speaker at JMM
- Annual reception at JMM

Section Meetings are a valuable resource:

- Relatively **convenient**
- **Inexpensive** to attend
- **Interesting** and **Fun!**

# Everyone Has a Section



BIG organizations may not necessarily:

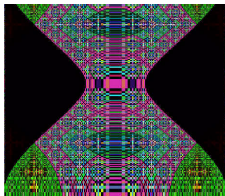
- Appreciate the value of hiring Mathematicians
- Be aware of MAA, or of MAA Section meetings happening nearby
- Realize the advantages of getting involved with MAA
- Know how to participate, or whom to contact about participating.

We have to tell them!

# What if BIG Organizations Attended Section Meetings?

They might:

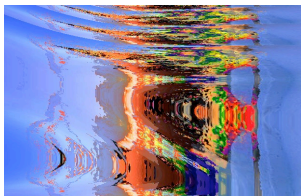
- Open up a new career path for a rising Mathematician.
- Explain the hiring process at their organization.
- Discover bright young mathematicians eager to do interesting work.





# Ways BIG Organizations Might Participate

- Present contributed papers/posters
- Develop career workshops
- Lead lunch table discussions
- Provide and staff a public affairs table during the meeting



# Recent Breakdown of BIG SIGMAA

<b>Section</b>	<b>BIG Members</b>	<b>Section</b>	<b>BIG Members</b>
Allegheny	1	Neb and SE SD	1
EPaDel	5	New Jersey	7
Florida	5	North Central	3
Golden	5	Northeastern	19
Illinois	11	Ohio	2
Indiana	4	Okla-Ark	2
Intermountain	2	NW	4
Iowa	2	Rocky Mtn	6
Kentucky	1	Seaway	4
La-Miss	2	Southeastern	10
MD-DC-VA	27	So Cal & Nev	9
Metro-NY	8	Southwestern	2
Michigan	5	Texas	7
Missouri	4	Wisconsin	3

## Example BIG Organizations with MAA Members

<b>Section</b>	<b>MAA Representation</b>
EPaDel	SIAM, financial firms (e.g. Franklin Templeton)
Florida	Disney
Golden	Pixar, Google, Lockheed Martin
Illinois	Fermi Lab, Argonne, Wolfram, Travelers
MD-DC-VA	NIST, NOAA, NSA, AIR, FDA, NASA, Wagner
Metro-NY	Simons Foundation, publishing and financial firms
Michigan	Ford
Minnesota	3M
New Jersey	Prentice-Hall, ETS, FAA, Bell Labs
Northeastern	MathWorks, AMS
Ohio	U.S. Air Force, AFRL
Pacific NW	Microsoft, Sask Telecomm, NWRI
Rocky Mtn	Lockheed Martin
Texas	Exxon-Mobil, SWRI

# How Can Section Officers Help

- Create openings for BIG participation at Section Meetings
- Invite BIG mathematicians to lead Career Workshops
- Include items about local BIG organizations in Section newsletters
- Help identify BIG organizations and contacts in the section.

## **PIC Math:** Preparation for **I**ndustrial **C**areers in **M**athematical Sciences

What is PIC Math?

- PIC Math is an MAA program.
- PIC Math has generous support from NSF.
- PIC Math prepares mathematical sciences students for industrial careers by engaging them in research problems that come directly from industry.

The PIC Math program aims to:

- Increase awareness among mathematical sciences faculty and undergraduates about non-academic career options.
- Provide research experience working on real problems from business, industry and government.
- Prepare students for industrial careers.

A strong component of PIC Math involves students working as a group on a semester-long undergraduate research problem from business, industry, or government.

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# Impacts of Undergraduate Research

Undergraduate research is a high impact teaching and learning practice and has been shown to improve students abilities in:

- Problem solving
- Critical thinking
- Independent thinking
- Communicating

All these traits and skills are valued by employers of STEM professionals. PIC Math will supply faculty with tools to offer students experiences designed to better prepare them for the demands that accompany non-academic jobs.



PIC Math includes a three-day summer workshop in 2015 for faculty at U.S. institutions providing:

- Information on non-academic careers and internships to share with students.
- Guidance on developing business and industry connections and partnerships.
- Exposure to mathematical and statistical problems that arise in industry.
- Training on how to develop skills in students that are valued by employers.
- Preparation for PIC Math research course and competition.

- Provides faculty with content for a semester-long, credit-bearing course focused on solving industrial problems.
- Each faculty participant will assemble a team of three to five students and work with them to develop their problem solving, teamwork, and communication skills.
- Each team will choose from one of five problems that are realistic yet suitable for undergraduate students.
- Resources for students and faculty participating in PIC Math include
  - a series of training videos on techniques for generating solutions
  - decision aids useful for coping with “messy” real world problems.
- Faculty mentoring the research group receive \$5000.

# Student Competition

- Teams may include students from different institutions as long as the entire group meets weekly by teleconference or electronic means and monthly in person.
- Each team may collaborate with a business, industry, or government partner and will submit regular progress reports.
- By the end of the spring semester, students will submit a video presentation and written report detailing their solution.
- A panel of judges will review and rate each team's submission.

Students will present their results in person at a summer Student Recognition Conference and be recognized for their competition accomplishments.

## First Year (2014-2015) Participation:

- 32 faculty
- 250 undergraduate students
- 18 of the 29 MAA sections are represented.

School	MAA Section
U. of Pittsburgh	Allegheny
Ill Inst of Tech	Illinois
Roosevelt U.	Illinois
Indiana U.	Indiana
U. of Kansas	Kansas
U. of So. Mississippi	LA/Miss
Hampton U.	MD-DC-VA
Norfolk State U.	MD-DC-VA
Va. State U.	MD-DC-VA
U. of Mich. Dearborn	Michigan
Augsburg College	North Central
Murray State U.	North Central
Minot State U.	North Central
Winona State U.	North Central

School	MAA Section
Smith College	Northeastern
Wentworth Inst. of Tech	Northeastern
Kenyon College	Ohio
Marshall U.	Ohio
Youngstown State U.	Ohio
U. of Sci. and Arts	Okla-Ark
E. Washington U.	Pacific NW
Colo. Sch. of Mines	Rocky Mountain
USAF Academy	Rocky Mountain
SUNY Geneseo	Seaway
Winthrop U.	Southeastern
CSU - Bakersfield	So Cal & Nev
CSU - Fullerton	So Cal & Nev
Occidental College	So Cal & Nev
Tarleton State U.	Texas

Half of the faculty members were able to connect and obtain a research problem from a local industry or business. Examples:

- The Field Museum in Chicago
- A video gaming company.

The others chose problems from the eight research problems that the PIC Math program provided from industry.

- Each problem had a contact person from industry giving the students experience communicating and interacting with people in industry.

Students submitted a written report and a video of their solution to the research problem.

- Submissions were evaluated by a set of judges with experience in BIG.

The PIC Math program has a half-day session at MathFest

- Students present their research problem solutions
- Students learn more about non-academic careers in mathematics.



## The 2015-2016 Cohort is Forming

- Selection of 52 faculty participants has begun (more than a 62 percent increase from Year 1)
- 23 of 29 MAA Sections represented (up from 18)
- There will be a 3-day faculty training workshop in May at BYU.

The Faculty for the 2015-2016 will need:

- Research projects from non-academic organizations!
  - (the PIC Math directors could use back-up projects)

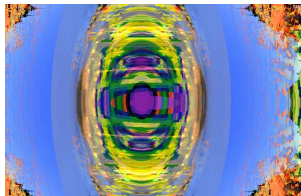
School	MAA Section
U. of Pittsburgh	Allegheny
Shippensburg U.	EPaDel
U. of Scranton	EPaDel
Embry-Riddle Aero. U.	Florida
Florida Atlantic U.	Florida
CSU Fresno	Golden
Roosevelt U.	Illinois
U. of Illinois	Illinois
Rose-Hulman Inst. of Tech	Indiana
U. of No. Iowa	Iowa
Wartburg U.	Iowa
U. of Kansas	Kansas
Hampton U.	MD-DC-VA
U. of Mary Washington	MD-DC-VA
Virginia State U.	MD-DC-VA

School	MAA Section
U. Mich. Dearborn	Michigan
Rockhurst U.	Missouri
Minot State U.	North Central
Morehead State U.	North Central
Winona State U.	North Central
Wentworth Inst. of Tech.	Northeastern
Baldwin Wallace	Ohio
Denison College	Ohio
Kenyon College	Ohio
Marshall U.	Ohio
U. of Toledo	Ohio
Youngstown State U.	Ohio
Hendrix College	OK/Ark
U. of Central Okla.	OK/Ark
U. of Sci. and Arts Okla.	OK/Ark

School	MAA Section
USAF Academy	Rocky Mountain
Nazareth College	Seaway
Bennett College	Southeastern
E. Tennessee State U.	Southeastern
Elon College	Southeastern
Georgia Southern U.	Southeastern
Lee U.	Southeastern
U. of No. Alabama	Southeastern
UNC Greensboro	Southeastern
Winthrop U.	Southeastern
CSU Fullerton	So Cal & Nev
San Diego State U.	So Cal & Nev
Texas A & M Corpus Christi	Texas
U. of Wisc. Stout	Wisconsin

# How Section Officers Can Help

- Suggest that PIC Math teams contribute talks at Section meetings
- Help raise awareness of PIC Math
- Encourage colleges and universities in the section to get involved with PIC Math
- Help find research problems and judges for PIC Math



THANKS!

# Acknowledgments

- PIC Math information: Suzanne Weekes (WPI), Michael Dorff (BYU)
- Mathematical art: Collin Carbno (Saskatchewan Telecomm)

# BIG Participation at MAA Section Meetings

Section Committee Meeting, MathFest, Washington DC

5 August 2015

## Discussion Questions

1. Do the section meetings for your section have activities in which BIG organizations can participate? (Examples from other sections: career workshops, contributed paper sessions, lunch-time discussion tables)
2. Do you know of any MAA members who work at BIG organizations located in your section?
3. Would a BIG organization be welcome to set up and man a booth at one of your section meetings, where they could meet with students and explain their activities and hiring processes?
4. Do you keep a list of BIG organizations located in your section?
5. Are there currently PicMath programs in your section? If so, would there be a possibility for a PicMath team to present a talk on their projects?
6. What is the best way to contact your section with questions or suggestions for a BIG event or activity?