

**2016-2017 Edition
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Quick Facts About the 2016-2017 DePaul Mathematical Sciences Department:

- # of full time faculty: 30
- # of math majors: 187
- # of double majors: 34
- # of math minors: 71
- # of statistics minors: 7
- # of masters students (pure): 20
- # of masters students (applied and stats): 110
- # of MAMED students: 35

**Want to Be in the Next Issue?
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You can also follow us on [Facebook](#).

Newsletter contributors:

Editor: Kate Thompson.

Thanks to Sarah Bocking-Conrad, Bill Butterworth, Desale Habtzghi, Yevgenia Kashina, Karl Liechty, Stefanos Orfanos, Kyle Petersen, Nicholas Ramsey, Bridget Tenner, and Ahmed Zayed

Notes From the Chair

I am so delighted to write this note for the department's first newsletter. Having a department's newsletter has been one of my goals for years. My first attempt on that was in 2004 when I compiled the first draft of a newsletter, but for some reasons it never saw the light. I still have a draft of that newsletter which brought back memories of where we were as a department and where we are now.



Ahmed Zayed, Chair

Since 2004 the department has undergone a metamorphosis: 64% of the faculty either retired or moved on to take other positions. New energetic junior faculty joined the department. Since then new degrees, programs, and courses have been introduced in the curriculum to meet the demands of the changing job market. In the last two years alone we introduced a number of new degrees and concentrations, such as a new BS degree in Actuarial Science, BA degree in Data Science, MS degree in Applied Statistics with a concentration in Data Science, MS degree in Applied Mathematics with a concentration in Applied/Computational mathematics, MS degree in Applied Mathematics with a concentration in Mathematical Finance, and MS degree in Applied Statistics with a concentration in Biostatistics.

The BS degree in Actuarial Science and BA degree in Data Science were developed in collaboration with the Driehaus College of Business and the College of Computing and Digital Media, respectively. The job market for graduates with these degrees is booming. The number of mathematics majors has significantly increased in the last few years. Many of our graduate students went on to get their Ph.D's at first rate Ph.D. granting departments and 27% of the faculty are currently receiving external funding.

Student groups, such as the Math Club, Actuarial Science Club, and StatCom are very active; thanks to our dedicated faculty who advise these groups, in particular, Nick Ramsey, Kyle Petersen, Stefanos Orfanos and Yiou Li. The mathematics tutors are now supervised by Professor Bridget Tenner which made the tutoring room run more efficiently.

With the help of Dean Gerry Koocher, the department now has a Statistical Consulting Center, directed by Professor Habtzghi, that serves both DePaul and non-DePaul clients.

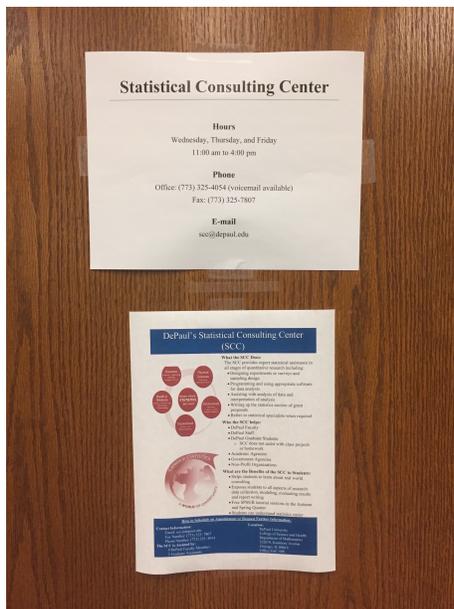
Despite some bad news about the university budget that is caused mainly by the State of Illinois' lack of funding of the Monetary Award Program (MAP) on which many of DePaul Students depend, we have some good news. The Department was chosen by the Mathematical Association of America (MAA) as one of twelve mathematics departments in the country to participate in the MAA's Progress through Calculus project. The project which is funded by the National Science Foundation, aims at improving student success in their introductory mathematics courses. According to the MAA invitation letter, our department was chosen because of the interesting things that we are doing with calculus.

Last year our actuarial science program was ranked #12 out of 15 **top colleges with actuary programs**.

Finally, I would like to express my gratitude to Professor Kate Thompson, one of the last three tenure-track faculty who joined the department this year, for taking the initiative to create this newsletter. This project would have not been possible without her. [Back to Contents](#)

Statistical Consulting Center Opens

The College of Science and Health now offers statistical consulting services to both internal and external clients through the Statistical Consulting Center, housed in the Department of Mathematical Sciences. The Statistical Consulting Center provides expert statistical assistance in all stages of quantitative research by faculty and graduate students working under the supervision of statistics faculty from the Department of Mathematical Sciences. The center consists of nine faculty members and three graduate students from the applied statistics program. The center is open Wednesdays, Thursdays, and Fridays from 11AM to 4PM. For a more detailed description of services offered and fees, please consult the Center's [website](#), or Center Director Desale Habtzghi at dhabtzgh@depaul.edu. [Back to Contents](#)



Awards to Students

- The Walter A. Pranger award is given to an outstanding full-time undergraduate student who has achieved a superior academic record in upper-level math courses and shows an interest in advancing the study of the mathematical sciences. The 2017 recipient is Connor Thomas. Connor Thomas came to DePaul from a nearby suburb with the plan to study math. By his sophomore year he already felt welcomed into the DePaul math community, having joined the math club and started student tutoring as well. He has immersed himself in the close-knit math community, taking advantage of the opportunity to take and excel in advanced undergraduate and graduate courses. In the Summer of 2015, Connor received support from the Undergraduate Summer Research Program of the College of Science and Health to collaborate with DePaul professors T. Kyle Petersen and Andrew Carroll on a research project. This research experience resulted in a fine publication in the Electronic Journal Combinatorics, and Connor went on to present the results at both the Math Club and the Undergraduate Research Showcase. As he finishes his undergraduate degree, Connor looks to expand his studies to other fields like Computer Science and Literature, but will still always hold the math learned at DePaul as a foundation. Connor reflects on his time at DePaul, saying "I hope in my work here that I, much like the teachers and peers who helped me along my journey, can welcome other incoming students into this community that I am so proud to be a part of."
- The Outstanding Student award is given to a student who has demonstrated excellence in their mathematics career at DePaul. The 2017 recipient is Greg Zanotti. Greg Zanotti is a lifelong Chicagoan who has been fascinated by the idea of artificial intelligence for as long as he can remember. His primary interest is in machine learning and the intricate and rewarding math behind it. Although motivated by applications, Greg hasn't shied away from rigorous mathematics, and has engaged in research that touches on both pure math and its applications. At DePaul he has work with professors in both the mathematics and computer science departments. During the Summer of 2016 he participated in a Research Experiences for Undergraduates program in machine learning at UCLA. During the Summer of 2017 Greg will be attending a summer school on random matrix theory at the Park City Mathematics Institute in Utah, run by the Institute for Advanced Study. Later this year, Greg plans to apply for graduate school, for which his DePaul coursework, independent learning, and research experiences have given him a solid foundation. In his spare time, Greg works in software development at a trading firm and enjoys dabbling in computer security, dabbling in economics and finance, cooking delicious dishes, and making terrible puns. [Back to Contents](#)

Building a Menger Sponge

A Menger Sponge is a type of geometric object called a *fractal*. First described by Karl Menger in 1926, it is a three-dimensional generalization of the Cantor set. It is created by starting with a single cube where each of the six faces is divided into nine squares. Just like a Rubik's Cube, this means a single cube has become 27 smaller cubes. Then, you remove the smaller cube in the middle of each face, as well as the smaller cube in the very center. This leaves you with 20 of the original smaller cubes. But now, run these same steps on each of those 20. This process continues until you have removed infinitely many pieces. The resulting object has zero volume, but has infinite surface area.

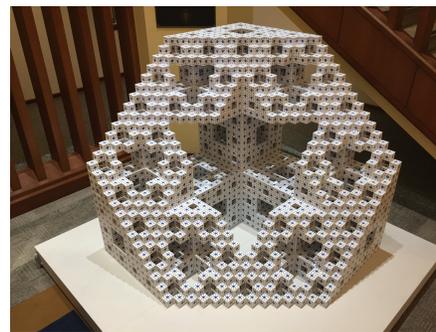
Inspired by the MegaMenger project (where 20 colleges around the world each created a similar-sized Menger sponge that were “combined” online into the largest constructed Menger sponge), the DePaul Math Club set to create their own Menger sponge. The construction is simultaneously delicate and strong. The group began construction by taking six standard-sized business cards, folding them together to make the sides of a cube. Busi-

ness cards are rectangular and cubes have square faces, so this means that in the construction the cubes had “flaps.” This allowed the team to interlock the cubes to make the larger structure and *eliminated the need for any glue or tape*.

About a third of the Menger Sponge was assembled in the math department's tutoring room (which doubles as an unofficial undergraduate lounge). The rest of the sculpture was put together on-site in the atrium of the Richardson Library, where it now resides—in part, because at over five feet in each direction the sculpture can no longer fit through the doors.

Associate professor Kyle Petersen, a faculty adviser for the DePaul Math Club, says, “We are extremely thankful for the help and encouragement we received from folks in the math department, the College of Science and Health, and the library. We hope the university community enjoys the sculpture as much as we do. For now, the club is back to regular weekly meetings, but you never know what the next big project might be.”

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Specifications

Building the DePaul Menger Sponge

1. required over 35,000 business cards.
2. used no adhesive of any kind (glue, tape, etc.).
3. took over eight months to construct.
4. was a team project between the Math Club, faculty, and other members of the DePaul community.

About the DePaul Math Club:

- Faculty mentor: Nicholas Ramsey
- President: Carson Schuetze
- Vice-President: Enrique Leon
- Treasurers: Rebecca Guthrie, Henry Jahelka
- Secretary: Savannah Buik
- Meetings: Fridays at 12:30 (LPC)
- Free food: Yes!
- [Website](#)
- Want to give a talk (about math, career paths, etc.)? Contact nramsey@depaul.edu

DePaul's Menger Sponge



“Art and mathematics have a long history together. Even the sheer scale of the sculpture is something our students will remember for a long time.”

— Kyle Petersen

Want one of those cool t-shirts? How about a DePaul math department coffee mug? Contact Kyle Petersen at tpeter21@depaul.edu. Shipping and handling costs may apply.

Faculty Corner

Beginning in 2016, three new tenure-track faculty members joined the DePaul Mathematical Sciences department:



Yiou Li earned her PhD in Applied Mathematics from the Illinois Institute of Technology in 2014. Prior to her appointment as an Assistant Professor, Li taught graduate-level statistics courses in the Department of Mathematical Sciences here at DePaul as an adjunct professor in 2013, and then as a Visiting Assistant Professor from 2014-2016. Li's research interests include developing methodologies in statistics and computational mathematics, as well as statistics modeling and data analysis in finance and engineering.



David Sher earned his PhD from Stanford University in 2012. While at Stanford he was awarded the Centennial TA Award in 2011, and then the George Polya Teaching Award in 2012. Before joining the faculty at DePaul University in 2016, Sher held a CRM-ISM Fellowship at McGill University and the Centre de Recherches Mathematiques in Montreal from 2012-2013, and then an RTG Postdoctoral Assistant Professorship at the University of Michigan from 2013-2016. Sher's research interests are in spectral geometry, at the intersection of partial differential equations and geometric analysis.



Katherine Thompson earned her PhD from the University of Georgia in 2014. She then held a Visiting Assistant Professorship at Davidson College until joining the faculty at DePaul University in 2016. Thompson's research is in number theory, with a particular emphasis on the study of integral quadratic forms. Thompson is passionate about conducting research with undergraduates; from 2015-2018 she is a co-PI on an National Science Foundation grant establishing a Number Theory Research Experience for Undergraduates (REU) for students across the country.

In addition to these new faces:



Effective July 1, 2016, Department of Mathematical Sciences faculty member Christopher Drupieski has been promoted to the rank of Associate Professor with Tenure. Dr. Drupieski earned his PhD in Mathematics from the University of Virginia in 2009. He then held a postdoctoral appointment at the University of Georgia until joining the faculty at DePaul in 2012.



Associate Professor Kyle Petersen is one of two faculty in the College of Science and Health who have been selected to receive the Quality of Instruction Council's Excellence in Teaching Award for 2016. The awards are announced each autumn at Academic Convocation, and include a plaque and a \$2000 stipend. Congratulations, Kyle!

Two Conferences, One Summer, Oh My!

In collaboration with the Academy of Inquiry Based Learning, from June 20-23, 2017 the Department of Mathematical Sciences will host a workshop on Inquiry Based Learning (IBL) as part of a greater development series funded by a \$2.5 million grant from the National Science Foundation. Participants will learn new skills from experienced IBL instructors, will reflect on current teaching practices, and will prepare to teach their own IBL math course during the next academic year. For more information, go to the [workshop website](#).

Chicago will host the Mathematical Association of America's MathFest. This annual summer conference draws mathematicians from all over the world to celebrate mathematics and build connections. MathFest continues to bring new and upcoming mathematicians into the community: in 2016, 23% of attendees were graduate and undergraduate students, and more than 30% were first-time attendees. Chicago MathFest is July 26-29, 2017. More information can be found [here](#).

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Masters in Applied Stats and Mathematics

The MS in Applied Statistics at DePaul dates back to 1989, and was founded by Effat Moussa in our Naperville campus. Shortly after that program began, the actuarial field began to grow; the Applied Mathematics program was created to meet that demand. There were 3 students at the beginning and currently we have anywhere from 100-125 students in both the Applied Math and Applied Stats programs.

In 2016 the department restructured the two programs, adding new concentrations. Now, Applied Statistics masters students can pursue a concentration in Data Science, Biostatistics or General Applied Statistics. Students in the Applied Mathematics masters program can pursue a concentration in Actuarial Science, Statistics, Mathematical Finance or Computational Mathematics. These concentrations will equip students with skills and knowledge that are highly valued in the industry. We summarize the general areas below. For more information about any of these programs, contact Desale Habtzghi at dhabtzgh@depaul.edu.

The new concentration in Data Science provides our students with some of the computational techniques used by statistical researchers and practitioners beyond standard statistical software packages. Biostatistics is the application of statistics to a wide range of topics in biology. A major branch of this is medical biostatistics, which is exclusively concerned with medicine and health. Mathematical Finance is concerned with the theory that underlies financial markets; generally, this area derives and extends mathematical or numerical models used to predict future market prices or rates. Last, the Applied and Computational Mathematics concentration aims to provide students with a broader knowledge and perspective of applied mathematics. We hope that these new concentrations not only make our programs well-rounded and comprehensive, but also attractive to new students.

Actuarial Club in Action

Together with the Arditti Center for Risk Management, the DePaul Actuarial Science Club hosted two major 2016 events:



2016 Academy participants

- The 2016 Actuarial Science Academy. This was a 4 day summer event in late July, designed to further high-school student interest in the actuarial sciences. 28 local rising juniors and seniors in high school participated, and were divided into six teams—each representing a different nationally-recognized firm.
- The 4th Midwest Actuarial Students Conference. DePaul hosted this event from October 21-22, 2016. The two-day event featured a networking evening in the downtown campus followed by a full day of student presentations and networking opportunities with representatives from various local companies at the Lincoln Park campus.

As for future events, the Actuarial Science Club is pleased to announce that they will host a bigger and better 2017 Actuarial Science Academy. This year's Academy will now be a 5 day event and over 40 students are expected to attend. [Back to Contents](#)

About the DePaul Actuarial Science Club

Faculty mentor: Stefanos Orfanos

Alumni welcome: Yes, please! The more, the merrier!

Meetings: multiple recruiting and networking events in AQ (predominantly), WQ and SQ.

Size: 142 members

Exam Study Groups: Yes, and by demand.

Member benefits: access to actuarial study manuals in the library; mailings about scholarships and internships.

Websites: [for the general public](#), and [for members only](#).

The AfterMath: Alumni Spotlights

Elizabeth Mai Smith (BS 2011, MS Pure Mathematics 2013)



After graduating from DePaul, I joined the Knowles Science Teaching Foundation as a teaching fellow to begin my development as a new math teacher. I completed a master's program in secondary math education from Northwestern University, and shortly thereafter moved to Providence, RI to begin my teaching career (for personal reasons; I intend to return to Chicago). I'm currently in my third year teaching at Mount Pleasant High School, a turnaround high school in the Providence Public School District. I am passionate about the community of students I work with and constantly find ways to elevate their learning experiences by attending national and local math education conferences to further develop my practice. I am currently in the process of building an Interdisciplinary Committee at my school with four other colleagues to bring project-based learning to our school. I recently became a RI Teaching Policy fellow to develop my leadership skills and use my experiences as a teacher to influence education policy in RI.

Rachel E. Johnson (BA 2011, MS Pure Mathematics 2013)



I am a DePaul alumna through and through. In six years, I earned both my Bachelor's and Master's degrees from DePaul. Not only was I an office aid, Supplemental Instructor, TA, and tutor for the math department, I also had the privilege to be among the first students to graduate from the Masters Program in Pure Mathematics in 2013. Promptly after graduating, I was fortunate enough to receive a tenure track position at Harry S. Truman College with a focus on developmental math studies and collaborative teaching. I have now received full tenure (2016), am the newly appointed chair of the Truman Math Department (2017), and have the pleasure of teaching part-time at the institution that helped shape me and made me a blue demon to the end.

Ahreum Amy Han (MS Applied Mathematics 2015)



I'm very thankful for my time spent at DePaul. I earned my MS in Applied Mathematics and would not imagine how helpful each class was. The professors were very knowledgeable and supportive, guiding me through career development. Most importantly, I gained very helpful experiences in statistical computation and programming, which helped me obtain an internship (and post-graduation position) as a data analyst. Currently I am an adjunct at SIU Carbondale and am a data analyst at Underwriters Laboratories Inc. I'm very proud to be a DePaul Alumna and appreciate all the faculty who have supported my career. [Back to Contents](#)

What Ever Happened To...

Want to appear in the next alumni spotlight? Know someone who would? Send nominations to math@depaul.edu.

Updates and Future Plans

- Class of 2016:
 - Charles Brittenham (MS) started a Ph.D. program at the University of Rochester. At DePaul, he co-authored a paper with undergraduate Connor Thomas and professors Carroll and Petersen.
 - Michael Dennis conducted undergraduate research at DePaul in the URAP program. He is currently a first-year Ph.D. candidate in Computer Science at UC Berkeley. An article of his was accepted for publication in DePaul Discoveries (to appear in 2017).
 - Alec Diaz-Arias (MS) started the Ph.D. program at the University of Iowa. He is working with Ionut Chifan on classification of Type II_1 Von Neumann Algebras.
 - Michael Foster (MS) as of Fall 2016 is an adjunct faculty member in the Mathematical Sciences Department at DePaul University.
 - Ryan Obermeyer (MS) started the Ph.D. program in Mathematics at UIC in Fall 2016.
- Class of 2017:
 - Matt Garvin (MS, class of 2017) and Sam Corzine (class of 2018) worked with Dr. Nicholas Ramsey over the summer of 2016 on a project to use symbolic dynamics to estimate the Hausdorff dimension of some fractal-like sets that arise in the study of the Euclidean algorithm in real quadratic fields.
 - David McManus has accepted an Actuarial Analyst position at Milliman's Chicago-Milwaukee Health Practice and will begin work upon graduation.
 - Carson Schuetze (current math club president) studied Big Data in a program at the University of Michigan in the summer of 2016.
 - Connor Thomas worked on a research project with masters student Charles Brittenham and professors Carroll and Petersen. Their joint paper appeared in the "Electronic Journal of Combinatorics".
 - Greg Zanotti studied "Change-point detection methods for body-worn video" at the Institute for Pure and Applied Mathematics (IPAM) at UCLA in the summer of 2016. In the 2016-2017 academic year, Greg has continued to do research with Dr. Enrico Au-Yeung (in the Mathematical Sciences department) and with Dr. Jonathan Gemmell (at CDM) on an independent research project. The general areas are dictionary learning and compressed sensing (with Au-Yeung) and neural networks in recommender systems (with Gemmell). Greg will be spending the summer of 2017 at the Park City Mathematics Institute undergraduate summer school.
- Class of 2018:
 - Savannah Buik has a summer 2017 internship at the American Alpine Club in Golden, Colorado.
- Class of 2019:
 - Matt McFarland will be a business intelligence intern at Combined Insurance, a supplemental health insurance provider in Rosemont, IL. He will be using SQL and data visualization software while aiding the finance department. [Back to Contents](#)

Don't You Forget About Us!

If you have alumni news or are a current student with news to share, we'd love to hear about it! Email us at math@depaul.edu—your update will appear in the next issue!

Give to DePaul Mathematical Sciences

We depend upon the generosity of alumni and friends to support students as they embark on their mathematical journeys and to fund faculty members as they conduct field-enhancing research and train students for their next endeavors. **Your investment makes a difference.**

Yes! I believe in the importance of excellence in mathematics and wish to show my support!

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