
Saint Louis University

Department of Mathematics and Statistics

Summer 2020



Message from the chair

On February 20, 2020, the Saint Louis Academy of Mathematical Sciences presented the inaugural Julia Robinson Award jointly to Dr. Lawrence Conlon of Washington University in Saint Louis and Dr. John Cantwell of Saint Louis University. The two began working together in the 1970's, and have published over 35 joint papers in the field of topology. Together they proved important results in foliation theory, including the 1985 paper "Every Surface is a Leaf" in which they showed that an arbitrary three dimensional manifold may be foliated by an open surface.

The department graduated three doctoral students this academic year. Christopher (CJ) Halverson defended last summer. His thesis was advised by Dr. James Gill and

titled "Gradient Young Measures and Maps of Exponentially Integrable Distortion". In Fall '19, Dr. Halverson joined the faculty at Cardinal Ritter College Preparatory School, just up the street from SLU. Brent Wessel wrote "Wavelet Representations and a Calderón Condition on Odd Degree Oscillator Groups" with Dr. Bradley Currey as his advisor. Dr. Wessel is now a professor at Harris Stowe State University. Katie Radler completed her thesis, "Ideals of Leavitt path algebras and their supersymmetric analogues" with Dr. Srivastava in May, and she starts as faculty at Visitation Academy this Fall.

The largest impact on the department has been the campus closure due to the novel coronavirus. In March, the entire university transitioned from traditional in-class meetings to remote learning through online tools. Students, faculty, and staff were strained by the transition and by the economic and health impacts of the virus. In this issue, we asked mathematics students to give their take on the Spring and its effect on their lives.

Bryan Clair
Chairperson, Department of Mathematics and Statistics

Students react to remote learning

Francisco Moyet Vargas, Mathematics Master's student: "Not having the full on-site accessibility to professors, which was a disadvantage for me, made me work harder at solving problems. In turn, this gave me more confidence when I was able to solve it. Since the classroom was in my living room, I got better at time management: I have become better at balancing the time spent on classes and time spent on myself. I can say this past semester has made me a more disciplined student."



Sruthi Ainapurapu, Mathematics major: "An empty campus is a sad campus. One good thing I got out of quarantine was spending more time with my family. There are strains with having to be around people too much, but being with my sister is always a blast."

Seoyoung Lexxy Ahn, Civil Engineering, Calculus II student: "I have truly enjoyed this quarantine as an introvert. I had more freedom and flexibility in time management due to the online classes. Moreover, because of the flexibility I could allocate more time to things that I was more interested in, of course, math and reading. In personal life, I immensely enjoyed the time with the people I love and even myself. This quarantine was almost a healing therapy away from social life, which allowed me to focus on myself and my family."

Sarah Aljohani, Mathematics Doctoral student: "I learned how I should be thankful for my life before the pandemic, between school and home, and being able to hangout with my friends. So I feel that it could have a positive impact, to learn to be thankful for what we have."

Kathleen Botterbush, BME pre-med, mathematics minor: "We are living history, and the point of history is to learn from it. The 180 degree turns of this year have taught me skills in independence, resilience, and adeptness to change. In one week, I learned how to attend a university online, rebuilt my organizational systems, and adapted to life in a global pandemic. As soon as safely possible, I returned to SLU Hospital performing COVID-19 screenings as physicians, patients, and staff entered the building, and have since returned to my regular job in the Trauma Department. This has taught me how hospitals function in the midst of a crisis, how staff cope with extreme physical and mental challenges, and how medical professionals respond to an ever-changing health climate. I look forward to the challenges and changes that the next months bring as we enter into a new, albeit very different, academic year. As we come together again at SLU, please continue to wear a mask, wash your hands, and social distance – for the greater glory of God, and the health and safety of all Billikens."



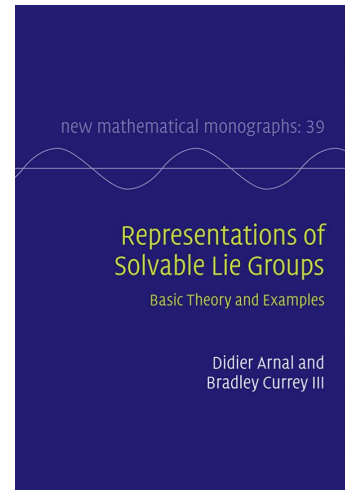
Faculty achievements

Dr. Freeman receives Simons grant

In June, Dr. Daniel Freeman received a five year \$42,000 dollar grant from the Simons Foundation to study “Frames and bases in theory and application”. This is Dr. Freeman’s second grant from the foundation.

Dr. Currey publishes textbook on Lie groups

SLU’s Dr. Bradley Currey and Dr. Didier Arnal of U. de Bourgogne published the monograph “Representations of Solvable Lie Groups” this May. The text, available from Cambridge University Press, is a fresh and self-contained exposition of group representations and harmonic analysis on solvable Lie groups. It is expected to be an invaluable reference guide for graduate students as well as researchers.



Awards honorees for Spring 2020

Traditionally, the Department honors its outstanding students at an awards ceremony in the Spring. This Spring the ceremony was cancelled, and so we recognize here the winners of the 2020 Mathematics and Statistics Departmental Awards:

Collins Award

Sravya Ainapurapu

Garneau Award

Sravya Ainapurapu
Nathan Cheung

Regan Scholarship

Alex Fagan
Lindsey Turner

Circle of Five Scholarship

Brooke Lemp
Anna Medley

Beradino Service Award

Glen Avery

Andrews Service Award

Simon McReary-Ellis

Mathematics Awards

Aaron Bi, Kathleen Botterbush, Akbar Fidahussain, Olivia Johnson, Nikita Kohli, Natalie Lassak, Marcus Lespasio, Tinevimbo Ndlovu, David Olander, Deeksha Sarda, Caroline Smyth, Anna Goranski

Statistics Awards

Sravya Ainapurapu, Alex Fagan, Conor Honan, Megan Nigg, Lauren Schmiedeler, Lindsey Turner, Katherine Vaeth

Calculus Awards

Seoyoung Ahn, Sruthi Ainapurapu, Ryan Andersen, Afrida Amira Atiar, Jordi Carbajal, Gabbie Coronado, Kamin Davis, Allison Faber, Griffin Goss, Christiana Hietter, Andy Irakoze, Sean Kim, Claire Lois, Ahmed Mahmoud, Madelyn Person, Jeremy Roenker, Harishaan Suthan, Jeffrey Thai, Jackson Woodside-Miller, Anna Zurawski

Ray Freese Teaching Award

Sadita Salihovic

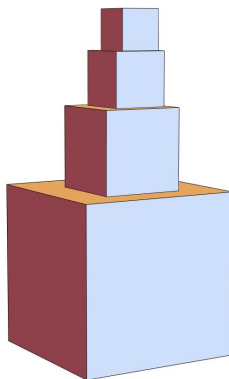
Graduating senior **Cole McNeil** received the Spirit of the Billiken Senior Recognition Award. This award, given out by the Office of Alumni Engagement, recognizes seniors who are committed to being outstanding alumni of Saint Louis University. **Hiroki Yuda**, MA '19, received honorable mention for the 2019 College of Arts and Sciences Distinguished Thesis Award. His thesis, *Topological Smoothing*

of *Reeb Graphs*, was directed by Dr. Erin Chambers. Hiroki now works in Japan, and says that his graduate student life in the U.S. was short but a very precious experience.

The Billiken challenge

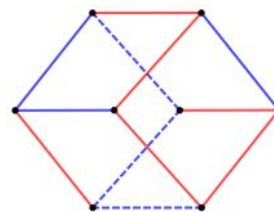
Painting a tower of cubes

Stack infinitely many cubes of side lengths $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \dots$ on each other. What is the visible surface area of the stack?



Crossing a cube

Each corner of a cube has an opposite corner, and each edge of a cube has an opposite edge. Suppose you have a cube with edges colored red and blue, and no pair of opposite edges are the same color.



Show that there is always a monochromatic path joining some pair of opposite corners.

For solutions, see our department website at <http://mathstat.slu.edu/about/newsletter>

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The Department of Mathematics and Statistics is people, creating and discovering the structures that underlie science and nature. Our faculty attract funding for research as concrete as medical statistical inference and as abstract as the geometry of infinite dimensional space. We are continually at the forefront of educational methodology, with award winning instructors, integrated instructional technology, and courses customized to meet the needs of all students. Our graduates take their skills to government and to industry, and we train the next generation of teachers. From the ratio studiorum to the internet age, Mathematics and Statistics plays a central role in a Saint Louis University education.