About CUR's Mathematics and Computer Sciences Division

The Mathematics and Computer Sciences Division of the Council on Undergraduate Research provides networking opportunities, activities, and resources to assist mathematics and computer sciences administrators, faculty members, students, practitioners, and others in advancing undergraduate research.

● **Newsletter Editors**

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2018 MathFest Student Award Winner: Vladamir P. Sworski

by Chad Awtrey

Through the national mathematics honor society Pi Mu Epsilon, the division sponsors an undergraduate student award for "Best Presentation on Original Research" at the Mathematical Association of America's national MathFest conference. This year, the recipient was Vladimir P. Sworski, who completed his undergraduate degree in mathematics at Cleveland State University in May 2018. The award was presented by CUR councilor Chad Awtrey during the Pi Mu Epsilon banquet on August 3, 2018. Vladimir's presentation, "Problem 21: An Exploration of Dial Rings," was an independent research project conducted under the mentorship of Dr. Steven Gubkin. "Problem 21" explores a puzzle somewhat akin to the classic game "lights out." In this puzzle, n "dials" are placed in a

ring pattern, where each dial can take on m states. However, changing one dial to the next state also changes the two neighboring dials' states. The goal of Vladimir's project was to try to understand, using module theory, when it is possible to go from one configuration of the dials to another, under what conditions, and what the minimal solution is.

The original puzzle, and presentation at MathFest, demonstrate the case where there are 4 dials that can be placed in 4 positions each; which is the simplest interesting case of the puzzle. Vladimir will be attending Colorado State University this fall to begin working toward a PhD in mathematics and is interested in pursuing postdoctoral positions afterward. His ultimate goal is to become a professor and conduct research, much like his many mentors at Cleveland State.

CUR Biennial Conference

by *Patricia Morreale*

The 2018 CUR Biennial Conference in Arlington, VA, included a panel on "Sharing and Reflecting on the Institutional Models which Support Undergraduate Research." Several CUR Math and Computer Science counselors joined with colleagues John Barthell and Michael Jackson to present and discuss a variety of institutional models from a range of schools.

After an introduction from Patrick Rault, current CUR Math/CS Division chair, Michael Dorff (math chair, BYU; past CUR Math/CS Division chair) discussed the similarities and differences in undergraduate research experiences in theoretical and lab disciplines. Examples from both theory and applied math were presented, leading to a summary of the national Preparation for Industrial Careers in Mathematical Sciences (PIC Math) program that Michael has established. Patricia Morreale (computer science chair, Kean University, current Math/CS counselor) followed with a discussion of growing undergraduate research within a department, using the Affinity Research Group model for mentoring and peer collaboration while encouraging diverse teams.

Mike Jackson (dean of science and technology, Millersville University) provided a perspective from his start as an undergraduate researcher to physics faculty member and now dean, stressing the importance of developing research skills early. In addition to student opportunities, the infrastructure to support faculty work with undergraduates was outlined. John Barthell, provost of the University of Central Oklahoma and a biologist, concluded the panel presentation by identifying how the University of Central Oklahoma has grown significantly through undergraduate research, culminating in the hosting of 2018's NCUR Conference with more than 5,000 participants.

The use of undergraduate research as part of the transformative learning process, and leading to high-impact practices was underscored by several panelists. The audience participated in a discussion with the panel, with the conclusions being that there are many institutional models that can support undergraduate research, and a continuum of support is needed, from students and faculty through to deans and higher administrators.

2018 Faculty Mentor Awards

Liz Bouzarth

Liz Bouzarth is an associate professor of mathematics at Furman University in

Greenville, South Carolina. She attended Dickinson College as an undergraduate where she majored in mathematics and physics, and got her first experience with undergraduate research at a liberal arts institution. After receiving her bachelor's degree, she earned her PhD in mathematics from the University of North Carolina at Chapel Hill, focusing on applied mathematics. Before coming to Furman in 2011, she was an assistant research professor at Duke University.

Dr. Bouzarth is an applied mathematician whose early research focused on computational fluid dynamics and its applications to biology. She has expanded her research interests while at Furman to include applications of mathematics to sports, health, theme park touring, and various community engagement projects within both the Furman and Greenville communities. Dr. Bouzarth often collaborates with students on research and engaged learning projects, blending teaching, scholarship, and mentorship. Along with two colleagues at Furman, she developed Math and the Mouse, a three-week study away Maymester course that immerses students in learning about the breadth and applications of mathematics and related topics in Walt Disney World. Dr. Bouzarth has published in respected peer-reviewed journals and professional society magazines, and has also contributed to public interest pieces in *ESPN The Magazine* and the Huffington Post Science Blog.

Gabriela Marcu

Gabriela Marcu is an assistant professor in the School of Information at the University of Michigan. Her research combines ubiquitous computing, interaction design, and community-based participatory research to promote coordination and equity in the delivery of behavioral health services and support.

Dr. Marcu directs the Empathic Research Group, a highly diverse and interdisciplinary team working on user experience projects funded by the NSF, NIH, HRSA, and Pennsylvania Department of Health. For her active support of underrepresented students

in computing, she was recognized with a 2018 NCWIT Undergraduate Research Mentoring Award.

She also partners with the district attorney's office on computing-based truancy prevention programs for Philadelphia youth. She holds a PhD in human-computer interaction from Carnegie Mellon University and a BS in informatics from the University of California, Irvine.

Karl Schmitt

Dr. Karl Schmitt received his PhD in scientific computing in 2013 from the University of Maryland, College Park. Currently he is an assistant professor and director of data sciences at Valparaiso University (Valpo) in Indiana. At Valpo, he is housed in the Mathematics and Statistics Department with an affiliate appointment to the Computing and Information Sciences Department.

He's directed the Master's in Analytics and Modeling program since 2014 and is the founding director of Valpo's Bachelor's in Science in Data Science (started in fall 2016). His teaching includes Optimization, Data Mining, Multivariable Calculus and Differential Equations. He's also designed and implemented an Introduction to Data Science course targeted at students with minimal programming experience that centers around a data-driven service learning/undergraduate research project.

His formal research specializes in data science as applied to networks and graphs. He's led undergraduate research projects on designing algorithms to discover hidden networks, and fundamental work in understanding K-Dense graphs. He's also very interested in finding ways to connect data science with social good, especially through the classroom and experiential learning.

SPUR seeks Math, Computer Science, and Statistics Participation

by Andrea Tartaro

Scholarship and Practice of Undergraduate Research (SPUR), the flagship journal of CUR, seeks both submissions and reviewers from math, computer science, and statistics. SPUR publishes articles relating to all aspects of undergraduate research that are of interest to a broad readership. SPUR invites submissions for both themed issues as well as general interest articles. Articles regarding the effects of the research experience on the development and subsequent endeavors of students, and how to initiate, support, or sustain undergraduate research programs are appropriate for this journal.

SPUR also seeks submissions of Research Highlights – short summaries of recently published research coauthored by faculty and undergraduate students. Also watch for SPUR's upcoming special issues, "Big Data as a Tool to Promote Undergraduate Research," in spring 2019 and summer 2019. Please urge your colleagues to submit articles or submit one yourself, and sign up to review. For more information, visit the SPUR website.

Funding for Academic-Year Research Groups in Mathematics through CURM

The Center for Undergraduate Research in Mathematics (CURM) calls for minigrant applications from faculty by November 15. Mini-grants provide support for pairs of research groups from two institutions in a nearby geographic region (preferably institutions of different type) to mentor academic-year student research. Each research group will consist of 3-5 undergraduate students and a faculty mentor. Each group will receive:

- a $3,000 stipend or course credit for students
- a $5,000 stipend for each faculty member
- funding for supplies
- funding provided for professors to attend a summer workshop on best practices for research mentoring
- funding for travel to a regional meeting in spring

For more information, please visit curm.urmath.org.

Highlights 2018-2019

Public Health Data Challenge: Coming Soon. As of 2016, 2.1 million Americans have an opioid use disorder, and drug overdose deaths are now the leading cause of injury death in the United States. But some of the country's top minds are working to fight this epidemic, and statisticians are helping to lead the charge. The American Statistical Association will sponsor a second annual fall contest to challenge college students to use statistics to dig into the data and come up with their own ideas to help end this important public health issue.

SIGMAA on UR restarts!
The Mathematical Association of America's Special Interest Group on Undergraduate Research is back in business. Please join us at the Joint Mathematics Meetings for our first business meeting, 6-7pm on Friday 1/18/19.

CUR Events
Visit the CUR Community
https://community.cur.org/home

Visit the CUR Events webpage
https://www.cur.org/conferences_and_events/

Conferences

Second World Congress on Undergraduate Research, Carl von Ossietzky University of Oldenburg, Germany, May 23-25, 2019.
https://bit.ly/WorldCUR19main

CUR Resources

What can CUR do for you?

1. CUR Department/Program Reviews
2. CUR publications about Undergraduate Research
3. CUR Resources on the benefits of Undergraduate Research

What has CUR done for you and is still doing for you?

1. Addressing future trends in UR: assessment, UR in curriculum, big collaborations in UR, etc.
2. Access to CUR programs: POH (Posters on the Hill), NCUR, Institutes, Biennial Conference, etc.
3. Networking with and learning about effective practices used in other disciplines.
4. Access to CUR publications that address issues not addressed by the MAA (e.g., assessing the effectiveness of UR).
5. Advocacy for UR: NSF REUs resulted from CUR advocacy, the Goldwater/CUR award, the founding of the MAA SIGMAA on UR, etc.
6. Help in instituting activities that promote UR at your college or university (e.g., teaching credit for faculty who are doing UR, UR being valued in promotion and tenure, etc.). Organizations like CUR that have members from multiple disciplines and administrators are more effective than disciplinary organizations.

Upcoming Events and Deadlines of Interest to Faculty

1. UNCG RMSC - Scheduled for November 3, 2018.
2. CUR-Goldwater Scholar Faculty Mentor Award - Nominations due November 5, 2018.
3. Election for CUR Councilor positions - Deadline TBD, but likely late November or early December.
4. CUR Fellows Award - The nominations portal will open in late Fall 2018.
5. JMM - The meetings are scheduled for January 16-19, 2019, in Baltimore, MD. A SIGMAA on UR business meeting is scheduled for 6:00-7:00 pm on 1/17/19.
6. CUR Dialogues 2019 - February 14-17, 2019, in Arlington, VA.
7. SIGCSE - Will be held in Minneapolis, MN, from February 27 - March 2, 2019.
8. PICMath - Applications are due by March 1, 2019.
9. CUR Division Mentoring Awards Nomination - The deadline for applications will be March 31, 2019.
10. CUR ABM - Scheduled for June 25-27, 2019, at the Ohio State University.
11. MathFest - Will be held in Cincinnati, OH, from July 31 - August 3, 2019.
12. 2020 Summer CUR Biennial Conference - June 28-30, 2020, at Purdue University.
13. SPUR - Submissions are accepted at any time.
14. CUR Institutes - Deadlines vary.

Upcoming Events and Deadlines of Interest to Students

1. UNCG RMSC - Scheduled for November 3, 2018.
2. Posters on the Hill - Applications due by November 9, 2018.
3. ASA Public Health Data Challenge - Submissions due November 12, 2019.
4. NCUR - The deadline for abstracts is December 4, 2018. The conference will be held April 11-13, 2019, at Kennesaw State University.
5. REUs in Math and CS - Deadlines range from December to April.
6. JMM Undergraduate Poster Session - the meetings are scheduled for January 16-19, 2019, in Baltimore, MD.
7. SIGCSE - Will be held in Minneapolis, MN, from February 27 - March 2, 2019.
8. MathFest - Will be held in Cincinnati, OH, from July 31 - August 3, 2019.