Math News

A publication of the Mathematics Department at the University of Idaho
2016-2017

Inside this issue

Letter from the chair

Greetings!

Welcome to this year's edition of the Mathematics Department newsletter. Inside you will see news about all the exciting work being done in the department. The work in teaching, research, and service impressed a group of mathematicians in an external review of the department that was conducted last year. The external review, which is conducted periodically of all programs at the university, allowed us to report on the work we have been doing. We prepared a report, which the reviewers read prior to a site visit last May. The reviewers were impressed by many of our activities, in particular our faculty research productivity, our undergraduate research and extracurricular activities, teaching opportunities for graduate students, and the Polya Center. They found faculty research productivity to be high, particularly for a program of our size; and they noted the extensive collaboration between mathematicians and other researchers on campus. They appreciated the research opportunities for undergraduates and symposia we have had to allow undergraduates to talk about their work, as well as activities such as Pi Day and the Math Club. For graduate students, in addition to close contact with professors they noted that our grad students get extensive teaching experience and mentoring. In the Polya Center they were impressed with the 'Try Score' that has been developed here at UI. The Try Score measures how much effort a student is devoting to their Math 108, 143, or 144 course. It has been shown that if students put in sufficient effort, then the chance is very high that they will get a good grade in their course, thus showing students that they can succeed at math if they work at it. The reviewers made several recommendations to university administration on how valuable further investments in our programs would be, which may be helpful in future budget requests.

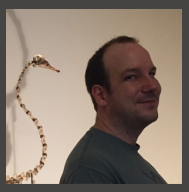
Although the university is finally addressing increased funding for TA packages, your donations have been crucial in helping us to recruit and support high-quality students, which in turn helps our faculty to continue to do cutting edge research.

One way to keep in touch with developments in the department and with contacts is to join the department LinkedIn group. LinkedIn is free to join at www.linkedin.com.

- Chris Williams

LLAMA Research Team

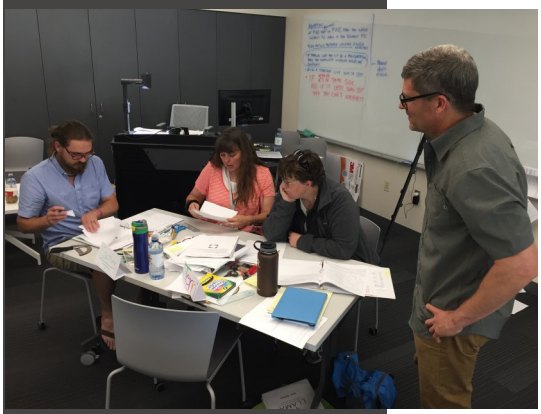
David Yopp



Rob Ely

Anne Adams

Annelise Nielsen



LLAMA participants

LLAMA Project

Article prepared by Amber Crowley

The project Longitudinal Learning of Viable Argument in Mathematics for Adolescents (LLAMA) examines the learning in eighth grade mathematics with a specific focus on students' learning of reasoning and proof. The intervention builds on a prior study in algebra that demonstrated increases in students' knowledge of argumentation and their performance on mathematics assessments. This project extends the use of the argumentation intervention into all eighth grade content areas.

The investigators also address support for teachers in the form of teacher materials that link the argumentation content with mathematics standards and state-wide assessments, and a learning progression to engage students in proving tasks. The project uses assessments of mathematics learning and additional data from teachers and students to understand the impact of the argumentation intervention on teachers and students. The project contributes to understanding how students can learn about mathematical practices such as proving that can help them learn mathematics better. A significant contribution is the definition of aspects of proving and descriptions of student outcomes that can be used to measure how well students have achieved these components of proving.

In the summer the LLAMA teachers took 2 weeks of full-day workshop classes. Each day they went through about 6 days' worth of viable argumentation lessons that they will be running in their own 8th-grade classes this year. These math champions made direct, contradiction, contrapositive, existence, and exhaustion arguments covering the scope of 8th-grade mathematics, and this year they will lead their students to do the same.

The LLAMA Research Team

David Yopp, Ph.D.
Principal Investigator
A Professor of Mathematics Education in the College of Science and College of Education. David Yopp's interests include teaching and learning with and through viable argumentation and the knowledge needed for effective mathematics instructional coaching. He has published in numerous research journals including, but not limited to: The Journal for Mathematical Behavior, Educational Studies in Mathematics, Investigations in Mathematics Learning, For the Learning of Mathematics, The Mathematics Teacher, Mathematics Teaching in the Middle School, Teaching Children Mathematics, the MAA Focus, and Linear Algebra and Its Applications.

Rob Ely, Ph.D.
Co-Principal Investigator
An Associate Professor of Mathematics in the College of Science. Dr. Ely's research focuses on (a) how students reason with the infinite and infinitesimal, particularly in calculus, and (b) K-12 student justification and viable argumentation in the classroom, particularly with generic examples. He has published research articles in a variety of journals, including the Notices of the American Mathematics Society, Journal for Research in Mathematics Education, and Journal of Mathematical Behavior.

Anne Adams, Ph.D.
Co-Principal Investigator
An Associate Professor of Mathematics Education in the College of Education. Dr. Adams has an ongoing interest in the development of student mathematical reasoning and the use of content literacy strategies for sense-making in mathematics. Her work focuses on teachers' role in developing, eliciting, and supporting student reasoning. She also focuses on working with teachers to enhance strategies for teaching and learning mathematics with understanding for all students.

Annelise Nielsen, *Doctoral Student Research Assistant*

UI Math Club

Article prepared by Stefan Tohaneanu

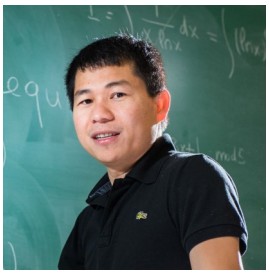
During the 2016-2017 academic year, as in the previous years, the UI Math Club continued organizing engaging meetings meant to broaden students' experience within the mathematics world. Besides the now classic meetings such as "Games Night", "Creepy Math Illusions", and the celebrated "Pi Day", this year the Club organized two movie nights to watch a couple of amazing movies centered around math and mathematicians. Also on a couple of occasions, the Club's meetings took on a more formal set-up of talks given by invited speakers, yet maintaining the same energetic and relaxing atmosphere brought by the young student participants.

More details can be found on the Club's Official Website: http://webpages.uidaho.edu/tohaneanu/MathClubUI.html

For more information about the UI Math Club, contact the Math Department, math@uidaho.edu.

Faculty Tenure and Promotions

Two Mathematics faculty members were tenured and promoted this year:



Linh Nguyen was tenured and promoted to Associate Professor. Linh's research is in analysis and differential equations, with a focus on Mathematics of biomedical imaging and material sciences. He has taught courses at the undergraduate level such as Ordinary Differential Equations (Math 310), and Intro to Analysis (Math 471/472), and graduate courses such as Topology (Math 521), Complex Variables (Math 531), Theory of Differential Equations (Math 539), and Partial Differential Equations (Math 540).

Alex Woo was tenured and promoted to Associate Professor. Alex's research is in Algebraic Geometry and Algebraic Combinatorics. He has taught courses at the undergraduate level such as Discrete Mathematics (Math 176), Ordinary Differential Equations (Math 310), Linear Algebra (Math 330), Modern Geometry (Math 391), Analysis of Algorithms (Math 394), and Abstract Algebra (Math 461/462), and graduate courses such as Groups and Fields (Math 555/556), Intro to Algebraic Geometry (Math 558), and Combinatorics (Math 579).

Congratulations, Linh and Alex!

You can learn more about the UI Math Department and see a full color version of the newsletter by visiting our website:

www.uidaho.edu/sci/math

New PhD: Malcolm Rupert

Article prepared by Jennifer Johnson-Leung

Malcolm Rupert graduated in May with his PhD in number theory and automorphic representation theory. He is now postdoctoral fellow as part of the NSF- funded Research Training Group in Number Theory, Coding theory, and Cryptography at Clemson University. Malcolm was co-advised by Jennifer Johnson-Leung and Brooks Roberts. His thesis, which constructs an explicit map from certain 4-dimensional orthogonal representations to 4-dimensional symplectic representations which are paramodular, provides a path for calculating many more examples of Siegel paramodular forms.

Integration Bee 2017

The 15th Annual Integration Bee took place during the 2017 Pi Day Celebration in March. An integration bee is like a spelling bee, but you solve integrals instead of spelling words.

The winners of this year's bee were:
1st place: Jonah Bartrand
2nd place: Daniel Furman
3rd place: Carly Scott
4th place: Melissa Dow

The deciding integral was

$$\int \frac{dx}{\sqrt{(x-1)(3-x)}}$$

Can you solve it?

(left to right)
Lyudmyla Barannyk (judge), Daniel Furman (2nd place), Jonah Bartrand (1st place), Carly Scott (3rd place), Melissa Dow (4th place), and Rob Ely (judge)

Math Donors for 2016-2017

We are grateful to all of our friends who have contributed amounts, both large and small, to the Mathematics Department this year.

Daniel Arthur '76 & Martha M. Bath
Larry Neal '81 & Dorothy Jean Beery
Carl W. '63 & Candace L. Berner
Nathan John Bialke '07 & Shannon P. Grant '07
The Boeing Company
Monte B. & Helen R. Boisen
Celeste Jane Brown '00 & Christopher J. Williams
Fred Thomas '68 & Mary Jane '68 Burton
Monika V. '61 & Francis X. Caradonna
Catherine Joan Carson '87 & David A. Roberts
John A. '74 & Ellen D. Christensen
Caroline O. Christenson
Philip Leon Cohen '80 & Deborah E. Amos '73 '75
Benjamin Noel Cote '10
Frank Darlington III '70
Philip G. '58 '74 & Lorraine J. Engstrom
Elizabeth Ann Espinoza
Thomas George '83 & Eileen S. Fields
Newman H. Jr. '63 & Neah Fisher
William T. Fletcher '66
Douglas Lawrence & Angela C. Goodman
Linette Ann Gregg '86 '08
Kevin Alan Grundy '85
Jeanne K. Hamilton '66
Eileen P. '72 & Norbert Hartmann
Sheri Lyn Hayes '78
Lee J Hixson
Burma Lee Hutchinson '87
Kent Fabien '86 & Robin Ivanoff
Jennifer M. Johnson Leung
Jana Joyce
Yung D. '63 & Young S. Kim
Peter William Marcy '06
Melvin G. '67 & Sylvia A. '67 Marietta
Lynn A. Marsh '70
Donald L. '61 & Carol A. Martinson
David J. & Ann S. Mercaldo
Micron Technology Foundation, Inc.
Ross Leonel Miller '17
Network For Good
Ralph J. Neuhaus
Shelly Jo Quinton
William M. '60 & Rea T. Rich
Kathleen Louise Rohrig '78 '83
Christopher Shannon Sanders '07
Sharon A. '74 & R. Michael Schwenk
Simons Foundation
Bert E. '72 & Carol M. '75 '75 Smith
Greg Alan '85 '87 & Jana Zahn '86 '95 Stenback
Andrew D. & Anne Marie Suk
John Anthony Sutera
William R. Totten IV '71 '72
Katie Ray Urquidi '17
William Drake '87 & Eleesha Sue Wallick
Bruce Richard '77 & Barbara
Ray Alvin & Annie Wiese
Henry Andrew Zwick '78 '86

Idaho Alpha Chapter of Pi Mu Epsilon

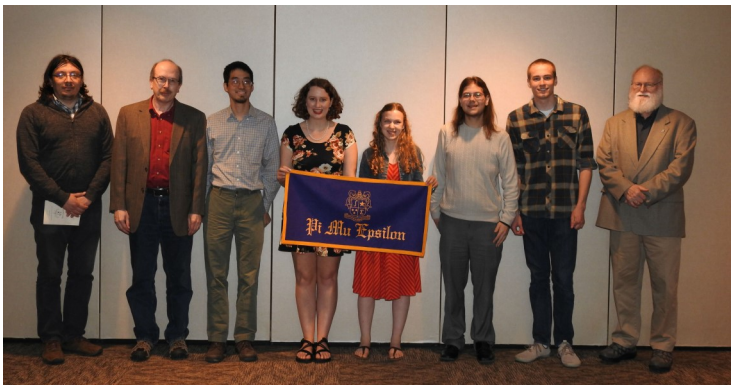
The Idaho Alpha Chapter of the Pi Mu Epsilon Mathematical Honor Society inducts new members each spring. On May 12, 2017, eight new members were inducted into the Idaho Alpha Chapter:

Jonah Bartrand
Ashley Bryant
Kierra Funderburg
Beau Horenberger
Dustin Pierce
Carly Scott
Tristie Stucker
Joseph Uberuaga

The current officers are:
Tristie Stucker, *President*
Ashley Bryant, *Vice President*
Eduardo Ramos-Arteaga, *Secretary/ Treasurer*

Alex Woo is the Chapter Advisor and Mark Nielsen is the Faculty Correspondent.

Students must meet certain minimum requirements to qualify for membership. Qualifying students will be contacted in the spring.



Some of our Idaho Alpha members of Pi Mu Epsilon during the 2017 induction ceremony.

The Math Department has a group on LinkedIn.

We would love to have you join our group!

https://www.linkedin.com/grp/home?gid=6936949

Putnam Competition

Article prepared by Frank Gao

The William Lowell Putnam Mathematical competition began in 1938 and is designed to stimulate a healthy rivalry in mathematical studies at colleges and universities in the United States and Canada. It is administered by the Mathematical Association of America.

The examination is designed to test creativity in problem solving as well as technical competence. It is expected that the contestants are familiar with the formal theories taught in undergraduate mathematics courses. Questions may cut across the bounds of various disciplines. Self-contained questions involving elementary concepts from group theory, set theory, graph theory, lattice theory, number theory, and cardinal arithmetic may also appear.

The competition is organized in two sections (morning and afternoon) on the first Saturday of December. Each section has 6 problems and the total score for both sections is 120. Each problem is graded on a basis of 0 to 10 points, with partial credit given when a contestant has shown progress toward a solution. The questions are so hard that about half of all contestants fail to earn any points.

The 77th Putnam contest was held December 3, 2016 with 4164 contestants from 568 institutions. The University of Idaho had three participants score points: Ben Anzis, Jonah Bartrand, and Tristie Stucker.

Congratulations to our 2016 Putnam participants!

College of Science Dean's Award

Brian Carter with College of Science Interim Dean Mark Nielsen

Congratulations to Brian Carter on receiving a College of Science Dean's Award during the College of Science Graduation Reception in May.

This award is given to the outstanding graduating senior in each department.

Congratulations, Brian!

Showcase of Student Research

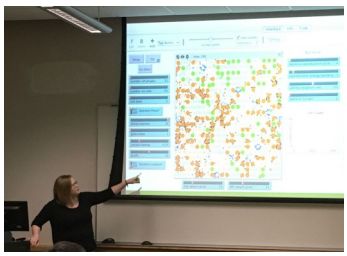
In April the Mathematics Department hosted the Showcase of Student Research in Mathematics. Five participating undergraduate and graduate students gave 20-30 minute presentations on their research projects:

Daniel Reiss *(upper left)*
Dorothy Catey *(upper right)*
Jordan Hardy *(lower right)*
Brenna Peever *(lower left)*
Kelly Christensen *(center)*

Kelly Christensen

***Title*:** The Impact of Spatial Structure on Phage-Bacteria Interactions

Abstract: Phage (viruses that infect bacteria) produce a burst of progeny upon lysis of a bacterial cell. "Phage therapy" (as an alternative to antibiotics) has thus far not lived up to initial expectations.

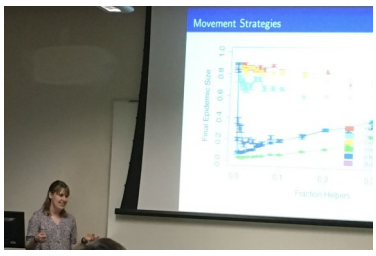


Lab experiments have shown that bacteria are able to survive even when phage density is high. Additionally, surviving cell densities in biofilms are orders of magnitude larger than in liquid cultures. We constructed two models (an agent based model and an ODE model) to examine various bacterial protection mechanisms and how these are influenced by spatial structure. In some cases, coexistence of phage and bacteria was a consequence of self-organization that segregated phage and bacteria, with most bacteria surviving in regions with phage sinks and most phage lurking in complementary areas.

Dorothy Catey

***Title*:** Seek vs. Sought: Movement Strategies in Epidemics

Abstract: When a disaster, such as an epidemic, occurs, a common response is to flood the affected area with volunteers.



Organizations like the CDC and WHO implement intervention strategies such as contact tracing, quarantine/isolation, vaccination, and treatment, which have often been studied using epidemiological models at the institutional or access level. We are interested in studying implementation at the individual level. We construct a simple agent-based model that has an SIR-like structure in order to study the effects of movement strategies and to inform decision-maker intuition. We find that the movement strategy chosen by volunteers can have a large impact on the attack rate of the disease.

Showcase of Student Research

Daniel Reiss

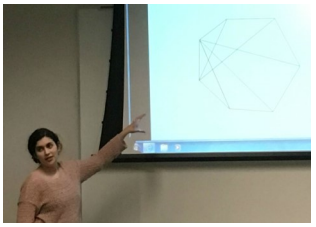
***Title*:** Fourier Coefficients of Siegel Paramodular Forms and Paramodular Hecke Operators

Abstract: Modular forms are periodic functions, and as such have Fourier expansions. The Fourier coefficients of elliptic modular forms satisfy certain arithmetic properties and are related to the eigenvalues of Hecke operators. Much work has been done of late to produce similar results in the theory of Siegel modular forms, which are a natural extension of elliptic modular forms. In current research we seek to fill some of the gap for Siegel paramodular forms. In this talk we will present the known results and discuss where we are trying to fill the gap.

Brenna Peever

Title: Crossing Fans of Segments Determined by a Finite Point Set

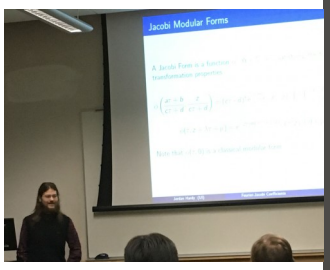
Abstract: Let S be a finite set of points in the plane in general position. We investigate the number of points S must contain in order to guarantee the existence of specified patterns of intersecting segments determined by S. Specifically we are interested in "fans" of segments sharing a single point of S in which each segment in the fan is crossed by a single segment or set of segments.



Jordan Hardy

Title: Fourier-Jacobi Coefficients of Twists of Siegel Modular Forms

Abstract: Modular Forms are defined to be functions of a complex variable satisfying a certain restrictive set of functional equations. For such a restrictive set of objects, they appear in a variety of contexts; originally appearing in the work of mathematicians such as Jacobi, Dedekind and Klein, they have far-reaching applications in analysis, algebra, topology and number theory.



Two generalizations of the modular form are the Jacobi form and the Siegel modular form. A degree two Siegel modular form has a Fourier-Jacobi expansion written in terms of Jacobi forms. The goal of my research is to write the formula for a twisting function developed by Johnson-Leung and Roberts in a (hopefully) cleaner way using the Jacobi-Fourier expansion.

Congratulations to all of the participants on a job well done!

Visit the Showcase webpage for a better view of photos from the event!

http://www.uidaho.edu/sci/math/news/showcase

Watch for the next Mathematics Showcase of Student Research in 2019!

College of Science Dean's Award

Ben Anzis with College of Science Interim Dean Mark Nielsen

Congratulations to Ben Anzis on receiving a College of Science Dean's Award during the College of Science Graduation Reception in May.

This award is given to the outstanding graduating senior in each department.

Congratulations, Ben!

College of Science Dean's Graduate Award

Malcolm Rupert with College of Science Interim Dean Mark Nielsen

Congratulations to Malcolm Rupert on receiving the Dean's Graduate Award during the College of Science Graduation Reception in May.

This award is given to the outstanding graduating graduate student in each department, based on academic achievement and service.

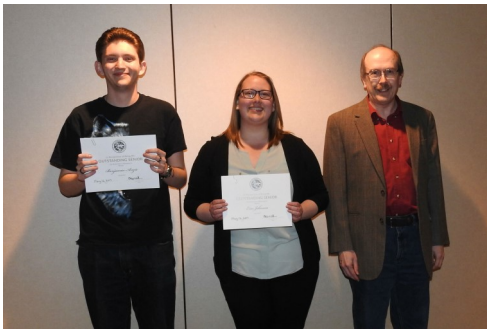
Congratulations, Malcolm!

Undergraduate Award Winners

Several of our outstanding students received recognition for their achievements during the May 2017 commencement celebrations.

Outstanding Seniors

Awarded to seniors who have shown exceptional mathematical talent.



Ben Anzis, Erin Johnson, Chris Williams

Ben Anzis is from Marshalltown, Iowa.

Erin Johnson is from Spokane, Washington.

Chair's Award for Excellence

Awarded to graduating seniors in recognition of excellent academic performance.

Brian Carter is from West Richland, Washington.

Brett Menzies is from Post Falls, Idaho.

Krista Stanley is from Idaho Falls, Idaho.

Brian Carter, Krista Stanley, Chris Williams

Some of the Math graduates at the Spring 2017 commencement. Congratulations to all of our graduates!

NSF National Fellowships for Graduate Research

Benjamin Anzis, a mathematics student who graduated in May with his B.S. in Mathematics, was a recipient of a National Science Foundation Graduate Research Fellowship. This fellowship provides a three-year stipend of $34,000 and a $12,000 education allowance for tuition and fees, towards the pursuit of a graduate degree.

Ben will use this fellowship as he pursues a doctorate in algebraic geometry at Stony Brook University in New York.

Ben was one of three fellowship recipients from the University of Idaho.

Congratulations, Ben!

Mathematical Modeling Competition

Three UI undergraduate Math majors (Danny Bugingo, Beau Horenberger, and Carly Scott) took first place in a mathematical modeling competition for undergraduates at Carroll College in Montana. 17 teams from 6 different schools participated: Carroll College, Montana State University, Washington State University, University of Providence, Rocky Mountain College, and the University of Idaho.

The Montana Mathematical Modeling Challenge presents teams with two open-ended, real world problems, and gives them 24 hours to choose and solve one of them using a mathematical model. At the end of the 24 hours, teams submit papers and give ten minute presentations describing their solutions. The UI team presented a model of how presidential campaigns ought to reallocate resources in the event of changes to the Electoral College system. They finished 1st out of 17 teams, winning a $100 cash prize.

Congratulations!

Beau Horenberger, Danny Bugingo and Carly Scott at the Mathematical Modeling Competition.

Excellence in Teaching

Awarded to graduate students who demonstrate excellence in teaching.

At the Spring 2017 Mathematics Graduation Reception, five math graduate students received the Excellence in Teaching Award:

Thomas Jacobs
Mark McDonald
John Pawlina
Daniel Reiss
Brad Wiest

Congratulations!

(left to right) Daniel Reiss, Brad Wiest, Thomas Jacobs, Mark McDonald, John Pawlina, Chris Williams.

Recent Graduates

In May 2017, five students earned graduate degrees in mathematics:

Malcolm Rupert, Ph.D.
Mark McDonald, M.S.
Kileen Sutherland, M.S.
Brad Wiest, M.S.
Darren Miller M.A.T.

Congratulations, graduates!

Scholarships

Several scholarships are available to math majors. Scholarship amounts range from $500 up to $6500.

All mathematics majors are automatically considered for a scholarship.

Non-mathematics majors are eligible for scholarship consideration if they change their major to mathematics or add mathematics as a second major.

Scholarship selection is made by the faculty of the department in March.

The generosity of our donors makes it possible to award scholarships to some of our best students.

J. Lawrence Botsford Scholarship

This scholarship was established by the family of J. Lawrence Botsford who was a member of the department from 1949 until his retirement in 1970. He also served as head of the department from 1950 to 1954. This scholarship is based on merit and is awarded to mathematics majors entering their junior or senior year. ***Alexander Wezensky was the 2016-2017 recipient.***

Eugene and Osa Taylor Mathematics Scholarship

This scholarship was established in 1979 by the family and friends of the first head of the department, Eugene Taylor, and his wife, Osa. He directed the department from the time he came to the department in 1920 until he retired in 1950. In 1981, his family donated many of his personal mathematics books to the University of Idaho library. This scholarship is based on merit and is awarded to mathematics majors entering their junior or senior year. ***The 2016-2017 recipients were: Brian Carter, Dorothy Catey, Joshua Gloyd, Elyce Gosselin, Jaya Gundy, Erin Johnson, Alison LaDuke, Krista Stanley, and Zachariah Stockton.***

Ya Yen Wang Memorial Scholarship

A long-time member of the Mathematics faculty, Ya Yen Wang died in January of 1995. Acting on her wishes, her family established the Ya Yen Wang Memorial Scholarship. This scholarship is intended for a junior or senior in Mathematics, preferably to be awarded to a woman. It is based on merit. ***Keegan Hedge was the 2016-2017 recipient.***

Pyrah Family Scholarship

The Pyrah Scholarship was established in 2012 in memory of J. Karen Pyrah, her parents, Walter Glen Pyrah and Georgia Anderson Pyrah, and her brother, David Anderson Pyrah. The scholarship is for undergraduate mathematics majors, with preference to students from Idaho. ***The 2016-2017 recipient was McKayla Smith.***

Linn Hower Honor Scholarship

This scholarship was established in 1991 by Mildred and Loyal L. Hower, parents of Linn Hower, who graduated from the University of Idaho in 1979 with a B.S. in Mathematics. This scholarship is awarded to junior and senior applied mathematics majors, preferably from rural Idaho, with a high potential for success in a mathematics or scientific field. It is based on merit. ***Brett Menzies was the 2016-2017 recipient.***

The Mathematics Department Scholarship

This scholarship supported by annual contributions of friends of the department and is awarded primarily to freshman and sophomore mathematics majors. ***The 2016-2017 recipients were Allyson Klaes and BradLee Speirs.***

Malcolm and Carol Renfrew Scholarship

The Malcolm and Carol Renfrew Endowed Scholarship in Mathematics was established in 2014 through a bequest from Malcolm and Carol Renfrew. Malcolm earned B.S. and M.S. degrees in chemistry in 1932 and 1934, respectively. Carol earned a B.A. in economics in 1935. After a successful career in industry, Malcolm returned to the University of Idaho as head of the Department of Physical Sciences and later the Department of Chemistry. During his time on the faculty, Malcolm helped to raise the research profile of the university and played a leading role in establishing a Ph.D. program. Following retirement, the Renfrews remained incredibly supportive of the University of Idaho and the Moscow community. The scholarship is open to all students in the math department. ***The 2016-2017 recipient was Joshua Duran.***

Scholarships

Newman and Neah Fisher Mathematics Scholarship

This scholarship was established in 2016 by Newman and Neah Fisher for students majoring in the Department of Mathematics who are preparing for a career teaching math at the secondary or community college level. Dr. Newman Fisher was the first person to earn a Ph.D. in mathematics at the University of Idaho. He is professor and chair emeritus of math at San Francisco State University. The scholarship is based on merit and is open to full-time students (undergraduate or graduate level) majoring in mathematics. Preference is given to students preparing for a career teaching math at the secondary or community college level. ***Joelle Moniz was the 2016-2017 recipient.***

Clancy and Barbara Potratz Math Education Scholarship

This scholarship was established by Clancy and Barbara Potratz. Clancy was on the Mathematics Department faculty from 1966 to 1994. He served as head of the department from 1990 to 1994. The scholarship is available to full time sophomore, junior, or senior students majoring in mathematics. Preference is given to students preparing for a career teaching mathematics at the middle through high school levels. This scholarship is based on merit. ***Jaya Gundy was the 2016-2017 recipient.***

Boisen Mathematics Graduate Scholarship

The Boisen Mathematics Graduate Scholarship was established in 2014 by Helen and Monte Boisen to enhance the support the department can give to teaching assistants. Monte served as the Chair of the Mathematics Department from 2001-2015. The scholarship is awarded to full-time mathematics graduate students. It is based on merit. ***Joshua Parker was the 2016-2017 recipient.***

Arnold Misterek Family Scholarship

The Misterek Scholarship was established by Arnold R. and V. Kay Misterek in 2007. Mr. Misterek earned a master's degree from the University of Idaho in 1965. He was a high school math teacher for 25 years. Two of the Mistereks' children graduated from the University of Idaho with math degrees. Mr. Misterek passed away in 2009. The Misterek Scholarship is awarded to graduate students majoring in mathematics, with preference to United States citizens. Selection is based on merit. ***Jordan Hardy and Kileen Sutherland were the 2016-2017 recipients.***

Perry Math Scholarship

The William J. Perry Mathematics Scholarship was established in honor of William Perry and his connection to the University of Idaho. Dr. Perry was the nineteenth Secretary of Defense for the United States. He previously served as Deputy Secretary of Defense and as Undersecretary of Defense for Research and Engineering. He taught in the University of Idaho Mathematics Department during the 1950-1951 academic year. The scholarship is awarded to mathematics graduate students. ***The 2016-2017 recipient was Daniel Reiss.***

Leo F. Boron Memorial Fellowship

Established in 1987 by the colleagues and friends of Leo F. Boron. This fellowship is based on merit and need. It is awarded to international students in their first year in the United States. ***The 2016-2017 recipient was Tuan Pham.***

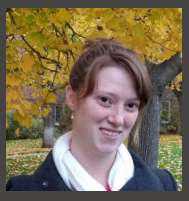
Mathematics Graduate Student Scholarship

This scholarship is supported by annual contributions of friends of the department and is awarded to mathematics graduate students at the discretion of the Math Department. ***The 2016-2017 recipients were: Joshua Duran, Jordan Hardy, Kevin Meek, Joshua Parker, John Pawlina, Daniel Reiss, Kileen Sutherland, and Brad Wiest.***

New Graduate Students

In the Fall of 2017 the Math Department welcomed four new graduate students:

Lucas Everham
M.S. student



Annelise Nielsen
Ph.D. student

Irene Ogidan
M.S. student

Deanna Vining
M.S. student

Welcome to our department!

Alumni News Request

We would like to hear from you!

If you have some news/information about yourself that you would like printed in the next Math News, please send your information to math@uidaho.edu or to:

Department of Mathematics,
University of Idaho,
875 Perimeter Drive MS 1103,
Moscow, ID
83844-1103

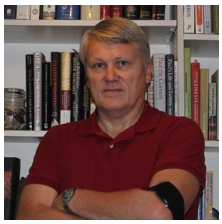
Please include as much of the following as possible:

- Name
- Year you graduated from UI
- Degree and Major at UI
- Current Occupation
- News about yourself
- Comments, corrections, additions for the newsletter

Faculty Updates

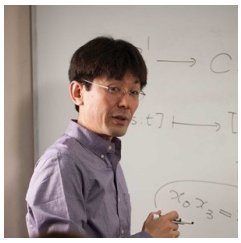
During the last year, **Steve Krone** gave talks at the University of Utah Probability Seminar and the Washington State University Mathematical Biology Seminar. He continued serving as an Associate Editor for the Journal of Mathematical Biology and working with the Center for Modeling Complex Interactions.

Frank Gao presented an invited talk at the 4th IMS Asia Pacific Rim Meeting (IMS-APRM) in Hongkong in July 2016, participated in the SQuaRE workshop Persistence Probability at the American Institute of Mathematics in March 2017, and attended the 2017 Deep Learning Summit in Boston in May 2017.



This year **Mark Nielsen** was working as Interim Dean in the College of Science. As a break from those responsibilities he was able to work with undergraduate Math major Brenna Peever on a research project in combinatorial geometry.

David Yopp continued his research on improve 8th grade students mathematics achievement through teaching and learning with and through viable argumentation. Funded by a $3 million National Science Foundation award, Yopp and his UI coPIs, Rod Ely and Anne Adams, have partnered with 59 teachers across Idaho, Montana, and Washington to revise curriculum and use argumentation and proving as the central mode of instruction. Yopp's pilot studies have demonstrated large gains in student achievement.



In 2016, **Hirotachi Abo** was invited to give presentations in three different countries in Asia. The first was the international conference on tensors, matrices, and their applications which took place at the Chern Institute of Mathematics, Tianjin, China, May 21-24, 2016. The second was the workshop on syzygies, exterior algebras, coherent sheaf cohomology and applications which was held in Jeju, South Korea, August 24-27, 2016. The third was the symposium on algebraic curves, Yokohama, Japan, December 17-18, 2016. In April 2017, he co-organized with Stefan Tohaneanu and Alex Woo a special session at the AMS Spring Western Sectional Meeting, which was held at WSU.

Chris Remien continued his research in Mathematical Biology, presenting at the Mountain West CTR-IN Meeting in Las Vegas, Nevada, the Symposium on Host-Microbe Systems Biology in Eugene, OR, and the Society for Mathematical Biology Annual Meeting in Salt Lake City, UT. He participated in a NIMBioS Working Group in Knoxville, TN, and led a Working Group on Modeling the Dynamics of Microbiomes through the University of Idaho's Center for Modeling Complex Interactions. Additionally, Remien has continued work developing a mathematical theory of transmissible vaccines in collaboration with Scott Nuismer and Jim Bull, funded by the National Institutes of Health.

Faculty Updates

Alexander Woo spent Fall 2016 at the Fields Institute in Toronto participating in the semester-long program on Combinatorial Algebraic Geometry. In Summer 2017, he attended conferences on Permutation Patterns (in Iceland) and Formal Power Series and Algebraic Combinatorics (in England). He learned much mathematics and failed to learn much more at all of these events. He will be on sabbatical in 2017-2018, doing research with collaborators at the University of Illinois and the University of Washington.

In October, 2016, **Cynthia Piez** gave a talk at the Northwest Regional Mathematics Conference in Yakima, Washington. She spoke about the concept of comparison through context and visual models. This talk was geared towards teachers of grades 3 – 6.

Last academic year **Rob Ely** started work on the Longitudinal Learning of viable Argumentation in Mathematics among Adolescents (LLAMA) project with Drs. Yopp and Adams, and is continuing work on the Making Mathematical Reasoning Explicit (MMRE) project. He presented at the Research in Undergraduate Mathematics Education conference in San Diego in February as well as the Pacific Northwest Association for College Physics conference in Yakima in April. He has been analyzing the results experimental calculus classes he has been teaching as well as results of student work with viable argumentation, generalization, and justification.

Kirk Trigsted was on sabbatical for the 2016-17 academic year, researching the corequisite model of teaching College Algebra and Precalculus. He visited many institutions that use the Emporium model to bring back valuable best practices to further the success of the Polya Mathematics Center.

During the academic year 2016-2017, **Dr. Stefan Tohaneanu** published one article in Journal of Algebraic Combinatorics and has three more articles awaiting the decision. In the Summer of 2017 Stefan gave a talk at SIAM Conference on Applied Algebra and Geometry, and was a coorganizer (with Hiro Abo and Alex Woo) of a special session in the AMS conference held at WSU, and was a coorganizer (with Somantika Datta) of the Showcase of Student Research in Math at UI. Stefan is very proud that his research advisee Ben Anzis won GRFP and was accepted in the PhD program at Stony Brook. Together with Somantika, Stefan is mentoring in research the UI undergrad Tristie Stucker.

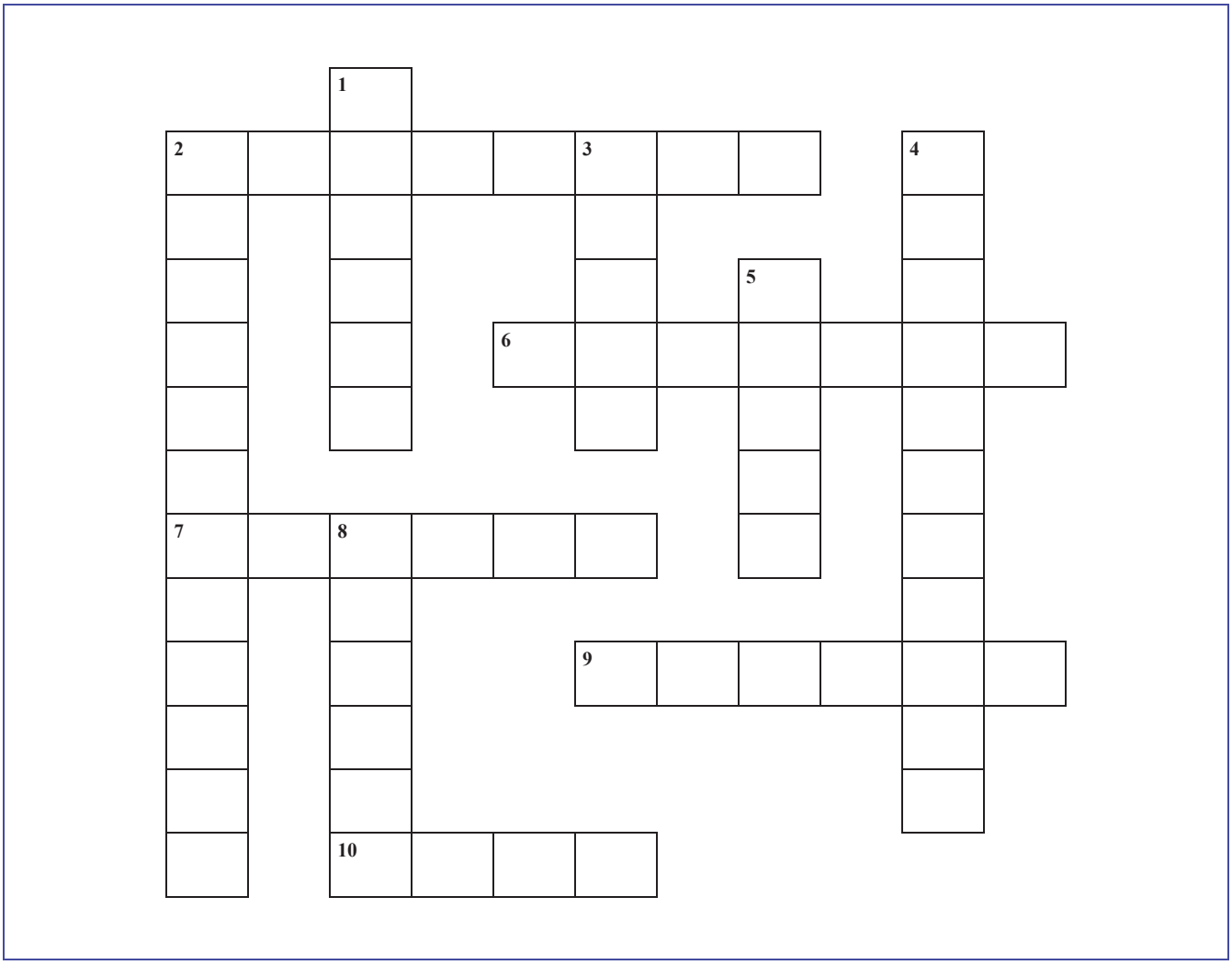
Andrew Basinski joined the Mathematics Department as a postdoc in Fall, 2016. As a grad student at the University of Utah, he worked with Fred Adler on math models to understand how social insects forage optimally. Currently, he is working with Chris Remien and Scott Nuismer to assess the benefits of transmissible vaccines in various infectious disease scenarios.

P1FCU Faculty -Staff Award

In October 2016, **Ann Abbott** received the P1FCU Faculty-Staff Award. This award is given "in recognition of being a positive impact on the success of student athletes in the classroom."

Congratulations, Ann!

Math News Crossword Puzzle



ACROSS

2. The _____ of Student Research in Math featured the research projects of five undergraduate and graduate students.
6. Mark _____ served as the Interim Dean for the College of Science during the academic year.
7. Congratulations to our newest PhD recipient Malcolm _____ .
9. The annual Fall _____ features a plethora of free pizza and time to get to know faculty, staff, and students in the Math Department. All are invited!
10. Sixteen _____ majors graduated with their B.S. degrees in May 2017. Congratulations, graduates!

DOWN

1. Thank you to the many _____ that gave gifts, both large and small, to support our department this year!
2. The Math Department has several _____ available to math majors, with amounts ranging from $500 up to $6500. All math majors are automatically considered for these awards.
3. Ben _____ received an NSF Graduate Research Fellowship, which he will put to use in graduate school at Stony Brook University in New York.
4. During our Pi Day celebration, the winner for the 2017 _____ Bee was Jonah Bartrand.
5. The four-year research study investigating students' learning of reasoning and proof in eighth grade mathematics is known as _____ project.
8. The 77th William Lowell _____ Mathematical Competition took place in December 2016 and had six participants from the University of Idaho.

Prize Problem

Solve the Prize Problem and you win a prize! The problem has a clear solution if you approach it in the right way. Prizes will be awarded while supplies last.

Show or send your written solution to the Math Department: ***math@uidaho.edu.***

Rules for participating:

- *You must be an undergraduate, an alumnus, or an alumna.*
- *You must solve the problem, giving a full explanation.*
- *One prize per person.*

Problem: Let n and d be positive integers. Show

$$2f(n,d) + 2g(n,d) - 2 = n(n-1)(d-1)^{n-1},$$

where

$$f(n,d) = \sum_{i=0}^{n-1} (d-1)^i;$$

$$g(n,d) = \sum_{j=2}^{n-1} (-1)^{n-1+j}(j-1)\left(\sum_{k=0}^{j} \binom{n}{j-k}\binom{j(d-1)-k-1}{n-1}\right).$$

I want to support students and faculty in the Department of Mathematics!

My Gift of $_____ is enclosed (Please make checks payable to University of Idaho Foundation, Inc.)
Please direct my gift to:

☐ **Department of Mathematics General Fund (MF963)**

☐ **Other (Please Specify Mathematics Department Scholarship Name) _____**

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