Math News

A publication of the Mathematics Department at the University of Idaho

2017-2018

Letter from the chair

Greetings!

Welcome to this year's edition of the Mathematics Department newsletter.

The department granted 32 Bachelor of Science degrees, three Master of Science degrees, and four Master of Arts in Teaching degrees during 2017-2018.

There is much exciting news about our faculty ranging from the hire of Assistant Professor Ben Ridenhour to the promotion of Hirotachi Abo to Professor and many accomplishments in between.

The Jon A. Wellner Lecture, established this year by Jon and Vera Wellner, will bring well-known probabilists and statisticians to UI, giving these fields wider exposure to the broader university community.

A great highlight of student activity is the UI team who took first place in the Montana Mathematical Modeling Challenge. A UI team also won first place in this competition last year!

A news item that involves both faculty and student accomplishments is the Data Science Competition. The first University of Idaho Data Science Competition was led by our own professors Frank Gao and Linh Nguyen. Data Science is an emerging field that involves a combination of skills from Mathematics, Statistics, Computer Science, and other fields. This competition has shown that faculty from the Mathematics Department play a leading role in campus-wide efforts in Data Science.

The funding situation for the department in the past year has been mixed. On the one hand the university took steps to improve compensation for graduate assistants that will help the department be competitive for strong students. On the other hand recent university budget cuts have limited our ability to do some things we have done in the past such as student travel and funds for graders. Now more than ever the department can make good use of any donations from our alumni. See page 17 for ways to donate.

One way to keep in touch with developments in the department and with contacts is to join the department LinkedIn group at https://www.linkedin.com/grp/home?gid=6936949.

- Chris Williams

UI Math Club

Article prepared by Stefan Tohaneanu

During the 2017-2018 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 Math Club organized two movie nights to watch a couple of amazing movies centered around math and mathematicians. Also on a couple of occasions, the Math Club's meetings took on a more formal setup of talks given by invited speakers, yet maintaining the same energetic and relaxing atmosphere brought by the young student participants.

Thanks to the generosity of alumni donations to the Math Gift Fund these Math Club activities are possible. If you would like to consider donating, please see page 17.

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.

Jon A. Wellner Lecture

The Jon A. Wellner Lecture was established by Jon and Vera Wellner to provide educational experiences outside the classroom for students and faculty and to help raise the profile of the University of Idaho by bringing well-known experts in the fields of Statistics and Probability to Moscow.

The inaugural Jon A. Wellner Lecture was held on Thursday, September 6th. Dr. Jon Wellner gave a talk titled "New Multiplier Inequalities and Applications."

A video recording of the inaugural lecture, as well as additional information about the Jon A. Wellner Lecture, can be found at: https://www.uidaho.edu/sci/math/news/wellner-lecture

We look forward to the 2019 Jon A. Wellner Lecture. Watch for more information on this lecture!

Vera and Jon Wellner

About Jon A. Wellner

Professor Wellner earned his B.S. in Mathematics at the University of Idaho and his Ph.D. in Statistics at the University of Washington. He served on the faculty of the University of Rochester from 1975 to 1983, and in 1983 joined the faculty of the University of Washington, where he is Professor of Statistics and Biostatistics. His research interests include uses of large sample theory in statistics.

Professor Wellner is a fellow of the Institute of Mathematical Statistics, a fellow of the American Statistical Association, and a fellow of the American Association for the Advancement of Science. In 2010, he was named a Knight of the Order of the Netherlands Lion in recognition of his exceptional research in probability and statistics, much of which has been done in collaboration with Dutch colleagues. He also received a John Simon Guggenheim Foundation Fellowship and an Alexander von Humboldt Foundation Fellowship. He was inducted into the College of Science Academy of Distinguished Alumni in 2014.

Montana Mathematical Modeling Challenge

Congratulations to UI students Beau Horenberger, Danny Bugingo, and Ned Caisley for taking first place in the 2018 Montana Mathematical Modeling Challenge (MMMC). This year's competition took place October 20-21, 2018, at Carroll College in Helena, Montana. The UI team finished 1st for both the oral presentation and the written paper, a feat that has only happened twice in ten years, winning a $300 cash prize.

The MMMC 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. This year's MMMC featured 14 teams from four institutions (University of Idaho, Washington State University, Montana State University, and Carroll College).

Congratulations!

The UI MMMC team: Beau Horenberger, Ned Caisley, Danny Bugingo

Faculty Promotion: Hirotachi Abo

One Mathematics faculty member was promoted this year:

Hirotach Abo was promoted to Professor. Hiro's research is in Algebraic Geometry, Commutative Algebra, and Multilinear Algebra. He has taught courses at the undergraduate level such as Linear Algebra (Math 330), Theory of Computation (Math 385), and Abstract Algebra (Math 461/462), and graduate courses such as Topology (Math 521), Algebraic Topology (Math 523), Groups and Fields (Math 555).

Congratulations, Hiro!

REU Experience: Tristie Stucker

This summer, undergraduate Tristie Stucker participated in a Research Experience for Undergraduates (REU) at Texas A&M University. She was a member of the Number Theory program and worked under Dr. Matthew Young. During the eight-week program, Tristie and another REU participant studied Dedekind sums arising from generalized Eisenstein series. When asked about the REU, Tristie had this to say: "The REU was a wonderful learning opportunity. I have a better understanding of the nature of mathematical research, and I was able to practice giving mathematical presentations and writing a mathematical paper. Beyond the academics, Texas A&M was a welcoming community. I enjoyed exploring the area, getting to know my fellow REU participants, and I even became connected with the Texas A&M table tennis community."
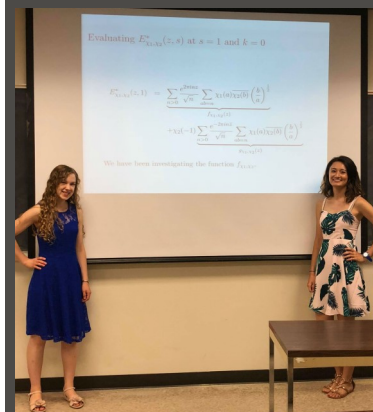
Tristie Stucker and her REU research partner during one of their REU presentations at Texas A&M University

Well Done!

Alumni Updates

Jonah Bartrand joined the University of Idaho in Fall 2014 and graduated in Spring 2018 with a double-major of Physics and Mathematics-Applied Scientific Modeling Option. This fall he started a master's degree program in Geophysics at the Colorado School of Mines in Golden, Colorado. In the process of searching through graduate school programs, he realized that there are many other fields which place a high value on a strong mathematical background; it is untrue to believe that a math degree only prepares you for graduate school in math.

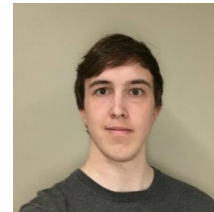**Hannah Pearson** joined the University of Idaho in Fall 2014 and graduated in Spring 2018 with a double-major of Computer Science and Mathematics-Applied Computation Option. After graduation, she spent her summer as an intern at Idaho National Laboratory. This fall she started a master's degree program in Information Security at Carnegie Mellon University in Pittsburgh, Pennsylvania.

Hannah's current career aspirations include public service as a federal employee doing cyber security research. She applied to graduate schools which offer a program called Scholarships for Service that offers scholarships in exchange for civilian government service in the field cyber security.

When asked about her time at UI, Hannah had this to say, "The past four years have been excellent and I'm thankful for my time at the University of Idaho, and with the Mathematics Department in particular. I am indebted to the professors who have invested their time and energy in sharing their curiosity and interest in mathematics. Their enthusiasm is contagious and inspired me to want to continue learning."

Alex Wezensky joined the University of Idaho in Fall 2014 and graduated in Spring 2018 with a double-major of Computer Science and Mathematics-Applied Computation Option. After graduation, Alex began working for Fast Enterprises, where he had an internship during a previous summer. Fast Enterprises works with state governments and other clients to enhance online tax filing.

When asked about his job search and time at UI, Alex had this to say, "I was very lucky in my internship and job search. Last spring, I applied for 10 to 15 internships with companies I was interested in working for. I got interviews or coding tests from only 4, and only got an offer from Fast. My advice to other students just starting their job experience is to apply for anything that interests you. If you have questions, use the resources available to you, like Career Services and the Career Fair. Talk to professors about their previous jobs and research."

Congratulations to alumna **Chelsea Small** on her induction into the Vandal Athletics Hall of Fame. Chelsea was a standout UI women's soccer player from 2009-2012. She graduated in 2013 with a B.S. in Mathematics.

Alumni Updates

Garrett Huff joined the University of Idaho in Fall 2012 and graduated with a degree in Secondary Education with an emphasis in Mathematics and Chemistry teaching in Fall 2016. After completing an internship, he took a semester off to work and travel with his wife. He then returned to UI and graduated with a degree in Mathematics-General Option in Spring 2018. Garrett hopes to one day teach at the college level.

to attend graduate school in Statistics. As I was researching graduate schools this year, I realized I was not ready to jump straight in after finishing my bachelors. I'm looking forward to a year out of school where I can reaffirm my interests before coming back with renewed energy. I loved my time studying mathematics at U of I. The department is full of professors who take an interest in their students and want them to succeed.

Jodi Frost earned tenure at Indiana State University in 2018. Jodi received two graduate degrees from UI. She graduated in 2008 with her M.S. in Mathematics and in 2012 with her Ph.D. in Mathematics. Her doctoral dissertation was on "Pre-Service Teachers' Conceptions of Literal Symbols." She is now an Associate Professor in Mathematics Education at Indiana State University. Congratulations, Dr. Frost!

Meredith Sargent received her Ph.D. in Mathematics from Washington University in St. Louis in May 2018. Her dissertation was on "Carlson's Theorem for Different Measures". Meredith graduated from UI in 2013 with a B.S. in Mathematics. She is now a Visiting Professor in Mathematical Sciences at the University of Arkansas.

Dorothy Catey joined the University of Idaho in Fall 2014 and graduated in Spring 2018 with a double-major of Chemistry and Mathematics-General Option. When asked about her future plans and her time at UI, Dorothy had this to say, "After graduation, I will be working as a campus missionary intern with Chi Alpha at Central Washington University. Chi Alpha is a faith based organization that works to build a loving community where college students can grow together. I will facilitate small group discussions, plan outreach events, and mentor students each week. Following that year, I plan

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

Staff Award

Melissa Gottschalk, Management Assistant for the Mathematics Department, was awarded a College of Science Staff Outstanding Service Award in May.

Congratulations, Melissa!

Integration Bee 2018

The 16th Annual Integration Bee took place during the 2018 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: Daniel Furman
   2nd place: Lucas Dibelius
   3rd place: Conal Thie
   4th place: Ataullah (Mohammed) Zawad

The deciding integral was:

$$\int \frac{dx}{x\sqrt{x-1}}$$

Can you solve it?

(left to right)
Jennifer Johnson-Leung (judge), Daniel Furman (1st place), Lucas Dibelius (2nd place), Conal Thie (3rd place), and Mark Nielsen (judge). Not pictured: Ataullah (Mohammed) Zawad (4th place)

Math Donors for Fiscal Year 2018

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 and Martha M. Bath
Larry Neal '81 and Dorothy Jean Beery
Eric Sherman Benson '86 and
   Andrea K. Misterek-Benson '88 '88
Carl W. '63 and Candace L. Berner
Monte B. & Helen R. Boisen
Brent A. '68 and Donna L. '67 Bradberry
Celeste Brown '00 and
   Christopher Williams
Sharon K. Buehler '64
Monika V. '61 and Francis X. Caradonna
John A. '74 and Ellen D. Christensen
Caroline O. Christenson
Jan R. Culp '67
Nicholas John '02 and
   Elizabeth Alford '02 '02 '04 Cunningham
Frank Darlington III '70
David M. '63 '66 '74 and
   Mary H. Daugharty
Jackson Lee Deobald
Philip G. '58 '74 and Lorraine J. Engstrom
Joanne Fahrenwald '74
William T. Fletcher '66
Gary Walter Garrabrant '78 '81 and
   Eve A. Riskin
Linette Ann Gregg '86 '08
Kevin Alan Grundy '85

Jeanne K. Hamilton '66
Eileen P. '72 and Norbert Hartmann
Sheri Lyn Hayes '78
Joseph Peter '75 and Diana C. '77 Johns
Jana Joyce
Lynn A. Marsh '70
Thomas C. '71 and Linda McMillan
Paul Henry Meier '79
David J. and Ann S. Mercaldo
Brent Jack '86 and Judy J. Morris
Ralph J. Neuhaus
Jesse Ernest Oldroyd '12 '16
Roy Christian '70 and Carmen R. Olson
Robert Reeve Park Jr. '90 and
   Jana Pandula-Park
Gary L. '74 and Charlotte '74 Peterson
Loren D. '61 and Kay S. '60 Pitt
Clarence J. '60 and Barbara G. Potratz
Kathleen Louise Rohrig '78 '83
Sharon A. '74 and R. Michael Schwenk
Jeffrey A. Scott '90
Andrew D. and Anne Marie Suk
Osamu and Yuko Tamada
William R. Totten IV '71 '72
Annette Utter '83 '85 and John D. Wallner
Jesus Salvador Vargas
William Drake '87 and Eleesha Sue Wallick
Jon A. '68 and Vera H. Wellner
Seth Alexander Yannes
Henry Andrew Zwick '78 '86

Idaho Alpha Chapter of Pi Mu Epsilon

The Idaho Alpha Chapter of the Pi Mu Epsilon Mathematical Honor Society inducted nine new members on April 18, 2018:

> Trevor Griffin
> Robert Goes
> Matthew Holman
> Todd Nagel
> Irene Ogidan
> Brenna Peever
> Eli Smith
> Johnny Stuto
> Deanna Vining

The current officers are:
Eli Smith, *President*
Eduardo Ramos-Arteaga, *Vice President*
Tristie Stucker, *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 are contacted in the spring.

Some Idaho Alpha members of Pi Mu Epsilon during the 2018 induction ceremony.

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 78th Putnam contest was held December 2, 2017 with 4,638 contestants from 575 institutions. The University of Idaho had 3 participants score points: Jonah Bartrand, Brenna Peever, and Hannah Pearson.

Congratulations to our 2017 Putnam participants!

College of Science Dean's Award

Congratulations to Jonah Bartrand 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, Jonah!

Data Science Competition

University of Idaho

2018 Data Science Competition

The first-ever University of Idaho Student Data Science Competition was held March 13-April 22, 2018. The competition was open to undergraduate and graduate students of all majors.

The competition consisted of two categories. For the Machine Learning Competition, participants created a model to grade 20,000 handwritten math quizzes. For the Data Visualization and Story Telling Competition, participants created an illustrative and informative visualization from the provided dataset.

A celebration was held on May 8th to honor the winners and celebrate a successful competition.

The winners for the 2018 Data Science Competition were:

Machine Learning—Vandal Awards
Golden Vandal Ben Price
Silver Vandal Isaac Curtis
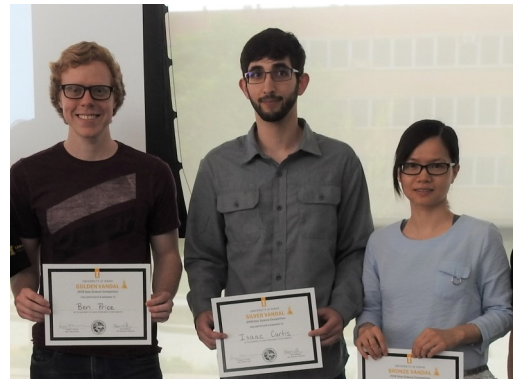*Bronze Vandal* Xinming Lin

Machine Learning—Net Awards
Golden Net Camden Clark
Silver Net Daniel Furman
Bronze Net Isaac Curtis

Data Visualization—Viz Awards
Golden Viz Camden Clark
Silver Viz Robert Goes
Bronze Viz Russell Romney

Congratulations to all of the award recipients.

Machine Learning—Vandal Awards

Left to Right: Ben Price, Isaac Curtis, Xinming Lin

Machine Learning—Net Awards

Left to Right: Camden Clark, Isaac Curtis, Daniel Furman

Data Visualization—Viz Awards

Left to Right: Camden Clark, Russell Romney, Robert Goes

New Faculty Interview: Ben Ridenhour

BIRTHPLACE
Dekalb, Illinois

FAMILY
Berkley (wife), Gaea (daughter), Heidi (dog)

DEGREES
I received my Bachelor's degree from Utah State University after transferring from Vanderbilt University; my major was Biology with minors in Mathematics, Biomathematics, Statistics, and German. Afterwards, I earned a Ph.D. in Ecology and Evolutionary Biology from Indiana University.

RESEARCH AREA
Mathematical Biology. I am interested in describing the dynamics we observe in natural systems by creating mathematical models. These models can then be extended to other natural systems, used for making predictions, or understanding the consequences of perturbations. I am particularly interested in systems related to disease (e.g., forecasting influenza seasons). My work typically involves using numerous approaches including dynamical systems, probability, linear algebra, numerical solution, and simulation.

FAVORITE LIVING MATHEMATICIAN
Jerry Ridenhour (Dad! What a "gimme" question!)

FAVORITE DEAD MATHEMATICIAN
John von Neumann

FAVORITE THEOREM
Bayes' Theorem

FAVORITE MOVIE
Inception

FAVORITE TV SHOW
Game of Thrones

FAVORITE BOOK
Lord of the Rings (trilogy)

FAVORITE SPORT
Soccer, soccer, and soccer. (Maybe some basketball.)

FAVORITE PLACE TO VISIT
The wilderness/outdoors. The region around Moscow is a wonderful playground for someone like me.

IN MY SPARE TIME I LIKE TO
I have too many hobbies! These include: play guitar, do crosswords, read, hunt, fish, hike, ski, garden, mountain bike, kayak…

I WISH I KNEW HOW TO
Speak more languages. I try to keep up with German; I've forgotten a fair amount of French; have some soccer pitch Spanish; and took a few Russian courses as an undergrad (also long forgotten).

I WOULD MOST LIKE TO MEET
David Hilbert

FUN FACT ABOUT ME
I love collecting wild mushrooms. Chanterelles are my favorite!

ASUI Student Achievement Award

Congratulations to Samuel Hernandez on receiving an ASUI College of Science Student Achievement Award during the College of Science Graduation Reception in May.

Congratulations, Samuel!

Tuan Pham with College of Science Dean Ginger E. Carney

Congratulations to Tuan Pham 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.
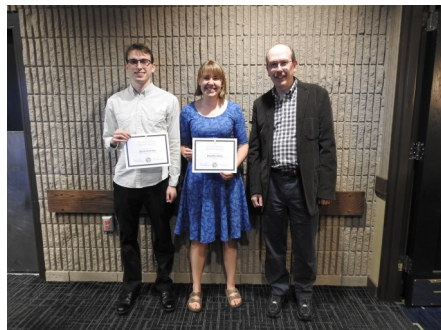
Congratulations, Tuan!

Undergraduate Award Winners

Several of our outstanding students received recognition for their achievements during the May 2018 commencement celebrations.

Outstanding Seniors
Awarded to seniors who have shown exceptional mathematical talent.

Daniel Furman, Dorothy Catey, Chris Williams.

Jonah Bartrand is from Beverly, Washington.

Dorothy Catey is from Moses Lake, Washington.

Daniel Furman is from Bonner's Ferry, Idaho.

Chair's Award for Excellence
Awarded to graduating seniors in recognition of excellent academic performance.

Elyce Gosselin is from Boise, Idaho.

Todd Nagel is from Post Falls, Idaho.

Hannah Pearson is from Idaho Falls, Idaho.

Morgan Spraul is from Post Falls, Idaho.

Hannah Pearson, Morgan Spraul, Todd Nagel, Chris Williams

Some of the Mathematics graduates at the Spring 2018 commencement.

Congratulations to all of our graduates!

Hill Undergraduate Research Fellowships

Thanks to the generosity of Brian and Gayle Hill, the College of Science awarded 8 Hill Undergraduate Research Fellowships for 2018. Two of these recipients were mathematics students: Tristie Stucker and Eli Smith.

Eli Smith
Eli is working on the project "Multistability Analysis of Sound Effects on Binocular Vision" with Associate Professor Linh Nguyen.

Tristie Stucker
During the academic year 2017-2018, Tristie Stucker continued working on her Hill Foundation project, titled "Spectral theory of orthogonal matrices over F_2" with Assistant Professor Stefan Tohaneanu. The main results in this project concern finding the connections between the characteristic polynomials and the eigenvalues of such a matrix A, and those of the symmetric matrix $A+A^T$. The project is in its final stages, soon to be submitted for publication to an undergraduate math journal, with Tristie as sole author.

Excellence in Teaching
Awarded to graduate students who demonstrate excellence in teaching.

At the Spring 2018 Mathematics Graduation Reception, five math graduate students received the Excellence in Teaching Award:

Jordan Hardy
Thomas Jacobs
Joshua Parker
Daniel Reiss
Deanna Vining

Congratulations!

(back row) Deanna Vining, Jordan Hardy, Joshua Parker, Chris Williams (front row) Daniel Reiss, Thomas Jacobs

Recent Graduates

In May 2018, three students earned graduate degrees in mathematics:

Jordan Hardy, M.S.

Thomas Jacobs, M.S.

Tuan Pham, M.S.

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. *Alex Wezensky was the 2017-2018 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 2017-2018 recipients were*: *Niko Icardo, Zachariah Stockton, Makayla Rodgers, Mitchell Patterson, Morgan Spraul, Dorothy Catey, Dustin Mallett, and Elyce Gosselin.*

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. *Tatiana Ford was the 2017-2018 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 2017-2018 recipient was Daniel Furman.*

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. *Mason Footh was the 2017-2018 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 2017-2018 recipients were Allyson Klaes and Ashley Bryant.*

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 2017-2018 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. *Deanna Vining was the 2017-2018 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 2017-2018 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 2017-2018 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. *John Pawlina and Jordan Hardy were the 2017-2018 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 2017-2018 recipient was John Pawlina.*

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 2017-2018 recipient was Irene Ogidan.*

### 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 2017-2018 recipients were: Kevin Meek, Jordan Hardy, Joshua Parker, John Pawlina, Tuan Pham, Joshua Duran, Irene Ogidan, and Deanna Vining.*
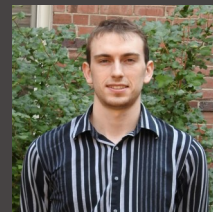
New Graduate Students

In the Fall of 2018 the Math Department welcomed four new graduate students:

Amanda Aydelotte
Ph.D. student
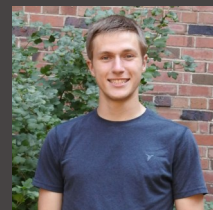
Benjamin Emehiser
Ph.D. student

Daniel Furman
M.S. student

Jake Sapozhnikov
Ph.D. student

Welcome to our department!

Faculty Updates

Dr. Christopher Remien continued his research in mathematical biology. He worked as co-PI on a one million dollar NIH grant developing a mathematical theory of transmissible vaccines with PI Dr. Scott Nuismer and co-PI Dr. James Bull. He is also key personnel on a newly funded DARPA project focussed on forecasting spillover potential and emergence risk of Lassa fever in Sierra Leone (co-PIs: Peter Barry, UC Davis; Brian Bird, UC Davis; Michael Jarvis, The Vaccine Group (UK); Scott Nuismer, UI). Within the University of Idaho's Center for Modeling Complex Interactions, Dr. Remien is the project director of a team modeling population dynamics of microbiomes. Dr. Remien was an invited speaker at the University of Utah Alumni Conference (Salt Lake City, Utah, 2017) and a contributed session speaker at the Society for Mathematical Biology Annual Meeting (Salt Lake City, Utah, 2017).

In the Spring 2018, **Stefan Tohaneanu** gave a presentation at the AMS Sectional Meeting organized by Northeastern University in Boston, Massachusetts, and during Summer 2018 he was a coorganizer and participant at the Banff International Research Station (Canada) research focus group about "Interactions between Coding Theory and Commutative Algebra". In Fall 2018, Stefan participated in a research workshop at Oberwolfach (Germany), about asymptotic properties of ideal - symbolic powers. During 2017-2018, Stefan published, or had accepted for publication, papers in Mathematische Nachrichten and in Algebra & Number Theory, and submitted for publication two other articles. In Spring 2018, Stefan wrote a paper jointly with undergraduate mathematics major **Jesus Vargas**, based on Jesus' Math 415 final project. Stefan also continued research advising for undergraduate mathematics major **Tristie Stucker**.

Alexander Woo spent his sabbatical leave working with collaborators at the University of Illinois at Urbana-Champaign and the University of Washington. He gave talks at Washington University in St. Louis, Oklahoma State University, and The Ohio State University, and visited Rhode Island and New Hampshire for conferences.

In June, **Cynthia Piez** attended the Elementary Mathematics Project Institute at Boston University (BU). She is currently piloting, and providing feedback on, modules developed by a group of Mathematics Educators at BU in her Math 235 and Math 236 classes. This NSF funded curriculum development project is focused on creating research-based open source materials for courses of this type. The focus of the materials is to develop and strengthen pre-service elementary teachers understanding of both the mathematics they will teach as well as their mathematical knowledge for teaching. During the Institute, she provided initial feedback on lessons and engaged in training in approaches to teaching the material.
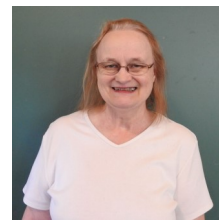
In July, **Judi Terrio** attended the 2018 Empowered Educators: WebAssign User Summit in Minneapolis, Minnesota, an all-expenses paid conference by the Cengage Publishing Company.

Hirotachi Abo visited Japan this summer and gave a presentation at the workshop "Splitting, construction and stability of vector bundles and their applications," which was held at Kyushu University. During his time in Japan, he also visited Fukuoka Daiichi Hight School (Fukuoka) and the American Center Japan (Tokyo), where he gave presentations about STEM education in the United States to recruit students from Japan.
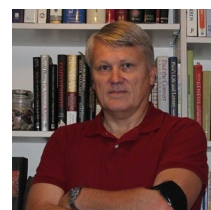
Mark Nielsen continues to serve as Associate Dean in the College of Science.

Faculty Updates

Jennifer Johnson-Leung continues to study Siegel modular forms of paramodular level and the Abelian surfaces to which they (at least conjecturally) correspond. In April, she presented joint work with **Brooks Roberts** at the TORA conference in Norman, Oklahoma. At the same conference, her doctoral student, **Daniel Reiss**, gave an excellent presentation on some of the results of his dissertation. She co-edited the book, *Women in Numbers Europe II*, and serves on the Education Committee of the Association for Women in Mathematics.

During the last year, **Steve Krone** served on an NSF grant review panel and was part of three grant submissions to NIH and NSF. He continued serving as an Associate Editor for the Journal of Mathematical Biology. Over the summer, he spent a week in the Montana wilderness doing some "applied geometry" as part of a group effort to restore hiking trails, while trying to make sure huge freshly cut logs did not crush the geometer.

Lyudmyla Barannyk organized a Minisymposium "Mathematics and Mechanics of Composite and Phase Change Materials" with Yuri Godin (University of North Carolina at Charlotte), Sofia Mogilevskaya (University of Minnesota), and Anna Zemlyanova (Kansas State University) at the 2018 SIAM Conference on Mathematical Aspects of Materials Science, July 9-13, 2018, in Portland, Oregon. At the conference, she gave a talk "On the Stefan Problem with Internal Heat Generation in Cylindrical Geometry", which was joint work with John Crepeau, Patrick Paulus (University of Idaho), and Ali Siahpush (Southern Utah University). She also served on an NSF panel. In collaboration with John Crepeau, she has been working with Sidney Williams, a Moscow high school student, on a research project "Entropy Generation in Boundary Layers".

Somantika Datta was on sabbatical leave during the 2017-2018 academic year. During this time she visited the Technical University of Denmark, Lyngby, Denmark, and the Indian Institute of Technology (IIT), Kharagpur, India. She gave two invited talks: one at a national conference on engineering mathematics at IIT Kharagpur and another one at the AMS sectional meeting at Portland State University in the special session on Wavelets, Frames, and Related Expansions. She continued to work on the NSF funded project "Stochastic Frames in Signal Processing".

Last year, **Rob Ely** worked on the NSF LLAMA math argumentation project with **David Yopp**, **Annelise Nielsen,** and others, with whom he collected data about student argumentation and coached 8th-grade math teachers in Idaho, Washington, and Montana. Rob also worked on several papers about historical reasoning with infinitesimals, and about a new type of covariational reasoning that supports student thinking with infinitesimals.
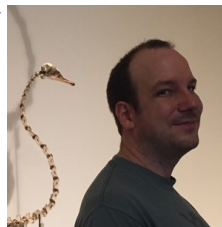
You can learn more about the UI Math Department and see a full color version of the newsletter by visiting our website:

www.uidaho.edu/sci/math

Math News Crossword Puzzle
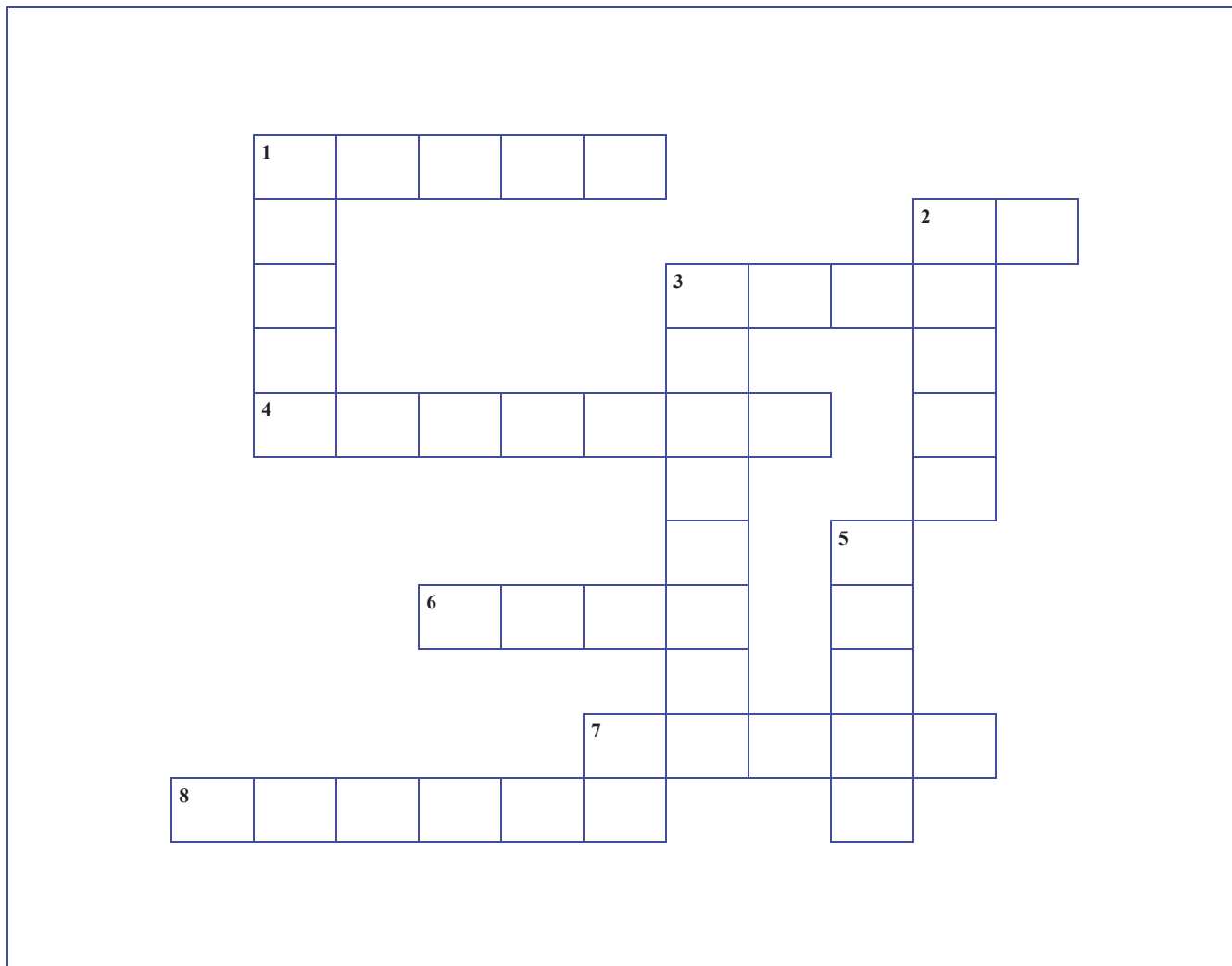
ACROSS

1. Join our LinkedIn _____ to stay connected with the department.
2. The Idaho Alpha Chapter of Pi ____ Epsilon welcomed 9 new members this spring.
3. The first ever University of Idaho Student ____ Science Competition was held this spring and culminated in a celebration on May 8th.
4. Melissa Gottschalk was the recipient of the 2018 College of Science Staff Outstanding _____ Award.
6. The Math ____ holds meetings throughout the academic year, allowing math students to interact outside of the classroom and broaden their experience with the mathematical world.
7. Successfully solve the ____ Problem on Page 17 and you could win a prize!
8. News about recent math _____ can be found on page 4. Have some news or information you'd like to share with us? We love to hear from our alumni!

DOWN

1. Thank you to the many donors who gave ____, both large and small, this year to help support the Mathematics Department.
2. Every math ____ is automatically considered for a Mathematics Department scholarship. Descriptions about our available scholarships and recent recipients is on pages 12 and 13.
3. The William Lowell Putnam Mathematical Competition takes place every year in _____.
5. Join us for the Mathematics Department Fall Picnic in September, where we offer a plethora of ____ and time to meet math faculty, staff, and students.
7. The Integration Bee is held during our ___ Day Celebration, before Spring Recess in March.

Prize Problems

Solve one of the two Prize Problems and you win a prize! Each 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 one of the problems, giving a full explanation.*
♦ *One prize per person.*

Problem 1
Let n be a positive integer greater than or equal to 2. Show that both n and $n^2 + 2$ are prime numbers if and only if $n = 3$.

Problem 2
Find the smallest real number k such that $\sqrt{x} + \sqrt{y} \le k\sqrt{2x + y}$ for all real numbers x and y.