UCCS MATH DEPARTMENT

All the v's that's Fit to Print



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LAS Outstanding Student Awards

During the "end of year awards ceremony," the following mathematics students were honored for their academic achievements during the Academic Year 2017/2018 by the College of Letters, Arts & Sciences:

Outstanding B.S. Math Student

• Elizabeth Peterson

Outstanding Graduate Student

- Meng Li (MS)
- Jacob Karn (MSc)

Lorch Family Scholarship

Tristan Neighbors



LORCH SCHOLARSHIP

The family of former UCCS Professors Bob and Barbara Lorch established the Robert S. and Barbara R. Lorch Department of Mathematics Endowed Scholarship in 2009. The late Drs. Lorch taught political science and sociology, respectively, at UCCS for more than 30 years. Bob and Barbara's son John earned a B.A. degree in math at UCCS in 1988, went on to earn his Ph.D. in mathematics, and is now a Professor of Mathematics at Ball State University in Indiana. The funding provides for merit-based scholarships for junior or senior math majors.

In this, the tenth year of its existence, the department awarded the Lorch Scholarship to **Tristan Neighbors**. "The faculty in the mathematics department have been an incredible asset in my education, and I am grateful to have received even more support in the form of the Lorch Scholarship. I plan on graduating in May 2019, and would like to pursue mathematics at the graduate level afterwards. It fills me with optimism to see that such generous awards exist to promote education and empower students. I could not have made it this far without the support of the close-knit academic community at UCCS." Congratulations, Tristan!

Math Kangaroo 2018 Competition

The Math Kangaroo Challenge was hosted again this year by the UCCS Math Department for the 7th year in a row! Math Kangaroo is part of a worldwide annual event held on each third Thursday of March. More than 6 million grade school students (grades 1-12) participate in this 75-minute no-stakes challenge, which engages students in ageappropriate math, fun problems, which in many parts of the world constitute the type of math thought in the school system. During this year's Math Kangaroo we had a group of 75 passionate students from grades 1-12 from the local community.

More information about Math Kangaroo can be found on their website at: http://www.mathkangaroo.org



Math Center

The Math Center (ENG 233), under the directorship of **Dr. Jenny Dorrington**, continued its robust growth (including the addition of some new programs) in 2018. "The coffee and hot chocolate may have a little to do with the significant number of visitors, but it is most likely due to the friendly atmosphere and helpful tutors." To show appreciation for students, and to encourage new visitors, the Center hosted its usual social events, "Math Isn't Scary" on Halloween, and Casino Night in April. This October, in conjunction with the Math Department, the Math Center hosted the fourth annual "Math Convergence" event. Over 50 people attended to socialize and hear about goings-on in the department.

This fall, Jenny worked with Jerry Phillips (Executive Director of the Excel Centers), Julie Albertson (Instructor in Mechanical Engineering), and Les Tekamp (Instructor in Electrical Engineering) to pilot Excel affiliate centers in Mechanical Engineering and Electrical Engineering. Both centers added tutors and hours to their schedules, and have seen a sharp increase in the number of students they've been able to help. In addition, the Math Center is hosting four computer science tutors, in a pilot program to increase availability of tutoring in those courses. In August, Jenny and the Math Center's Assistant Director, **Sean Dean**, trained new tutors for the engineering centers, as well as the tutors working in the College of Business help center (and the Math Center's own tutors, of course).



GTF Luke Harmon chats with Peter Braza at Math Convergence 2018

Congratulations Math Graduates!

Undergraduate Degrees Here is the list of the graduates from each of the department's degree programs in 2018.

B.A. Mathematics

- Lizeth Bustillos
- Morganne Logar
- Seth Wells
- Areeya Wichaiyo

B.S. Mathematics

- Tempest Campbell
- Ronald Carroll
- Taryn Christoff
- Brian Durbin
- Valeria Fisher
- Nikolaus Higgins
- Alexander Jurgs
- Killiam Kocher
- Rebecca Mitchell
- Elizabeth Peterson
- Carmen Plowman
- Katherine Pulham
- Caitlin Randall
- Emma Shirley
- Hari Sridhar
- Aidan Tiernan

Graduate Degrees

MS Applied Mathematics

- Allison Donahue
- Justin Garrish
- Jacob Karn
- Meng Li

MSc Mathematics

- Xian Feng Liang
- Ryan Sandee
- Suzanna Snyder



For more information about UCCS Commencement please visit: http://www.uccs.edu/~commencement/

Honors Track in Mathematics

Students with a high Math GPA are encouraged to consider the Honors Track within the BS Math Degree. Optimally, students enter the track in their sophomore or junior year. This track's main purpose is to help identify and encourage qualified students to take on challenges beyond the standard math curriculum. A Math GPA of 3.5 and a general GPA of 3.0 are part of the requirements by the time of graduation. The highlight of the track is an undergraduate research project under the supervision of a mathematics faculty advisor.

For a detailed description and application form, visit: http://www.uccs.edu/math/undergraduate-programs/math-honors-track.html

Profile of a recent graduate: Dominique Brasee



Dominique Brasee graduated from UCCS in December 2016 with a B.S. in Applied Mathematics. She is currently working at Aircraft Performance Group in Castle Rock. APG is an aviation technology company, which supports business aviation and charter companies all over the world through a couple of web-based programs as well as an iPad app. The iPad app currently allows pilots to perform point calculations from airport to airport and runway to runway for take off and landing. Dominique was hired to be part of a team, which is currently working on updating the app to include everything in between take off and landing. Dominique was an engineering intern at APG from May 2016 to December 2016, and became a full engineer in January 2017.

"Most of my job involves receiving the flight planning data in a raw form from the flight manual and parsing it out into digital data files for our back-end software and testing both sources to make sure the data line up." She uses Excel VBA to perform most of the parsing, so the programming experience she got from taking two semesters of Java has helped her a lot. "I don't do a TON of math on a daily basis, but having the mathematical/critical thinking skills has served me well when troubleshooting the data; interpolation and rounding error are a huge part of my job!". That is not to say that there are no challenges in her position. Flight manuals do not have any set standards about what kind of data is used or how it is presented, so she does have to get a little creative when manipulating the data into a form that the APG software can read it. Coming into the position, she knew nothing about flight or aircraft, "other than planes have wings and a fuselage!" She has learned much about aeronautics through the company's Chief Engineer, as well as a couple of textbooks on the subject.

In her free time, Dominique tutors high school math (ed's note: thanks for paying it forward!), and takes classical ballet classes with a local studio.

Newsletter Interview: Jacob Karn



Jake, in graduate student days



Jake, in Full Time Instructor days

The Math Department's newest member is Jacob Karn. Jake joined the department in August as a Full Time Instructor.

v's : Tell us a little bit about your life before arrival at UCCS.

JK: I grew up in Southern California, north of San Diego. For undergraduate studies I wanted to go to a really small school, and wound up at College of Idaho, which has about 1200 students. I liked math in high school, and I was able to start college with a Calc III course. It was fun, but I really caught the math bug when I took my first proof-based course, which was complex variables, when I was a sophomore.

v's: What was it about that course that you really liked?

JK: My dad had told me that somewhere along my academic career in math there would be a wall, a situation where it just seemed impossible to move forward. I felt I hit that wall in the complex variables course, but I loved it! I realized in that course that *not* knowing what's going on can be a lot more interesting than just being able to do calculus-type problems. College of Idaho turned out to be a great fit for me, there were a few closely-knit math majors and a lot of different math courses that I took in my time there.

v's: And then?

JK: I decided to head to grad school in math. The location of the school was really important to me; I looked at Washington State as well as Colorado State, but I decided to come to UCCS because of both the beautiful location and the size of the department. During the process of writing my Master's Thesis (supervised by Dr. Oman), I got a glimpse of what the math research process is all about. I'm thinking of returning to grad school in a few years to work on a PhD.

Karn Interview Continued...

v's: Have there been any real surprises in the classroom?

JK: Well, because I was a GTF during my grad school days, I had a good sense of the demands of teaching undergrads at UCCS. So I don't think the transition to Instructor was too bad.

v's : And outside of the university?

JK: I am really into music, both listening and playing. I play guitar (actually, I've played some sets in public at open mic nights). I'm also learning saxophone and piano. I've got a lot of books to read that I've put off for too long. I recently moved into a new house, which has put me even closer to the mountains for hiking with my dog Pepper.

v's: Stop by Jake's office and say hi! [Ed's note: He'll be in ENG 277 starting Spring 2019, taking over James Parmenter's old desk.]



Pepper (photo taken by Jake)

Thank You to all the UCCS Math Department Lecturers in 2018!

- Jacob Bíble
- Casey Chalífour
- Gaetan Delavígnette
- Cynthía Doorack
- Rachel Drawbond*
- Andrea Essler
- Justín Garrísh*
- Joseph Gasteiger
- Katerína Gkogkou*
- Lucas Goad*
- Sara Goldman
- Luke Harmon*
- Jewell Anne Hartman
- Veroníca Marth*

- Taylor McMíllan*
- Clark Mourning*
- Krísta Parnell
- Elízabeth Peterson*
- Vírgína Ramos
- Shane Ríchmond
- Ryan Sandee*
- Stephen Sívetts
- Wendy Spratte
- Rachel Wood
- Míchael Zowada*





Around the Department... (in random order)

Wojciech Kossek

Wojciech Kossek gave a talk titled "*Matematyka dla studentów kierunków technicznych i nie tylko z perspektywy wykładowcy na uczelni amerykańskiej*". Got it? (roughly: "Mathematics for students at technical universities - a point of view of an American faculty".) The talk was presented at the conference called OKNMUT 2018 in Łódź, Poland on September 23, 2018. This was a conference on mathematics education at so-called technical universities, which in Poland describes schools similar to UCCS. Wojciech also shared some of the ideas in his book "Calculus for the Forgetful".

[Ed's note: Wojciech will be leaving the UCCS Math Department as of December 15, 2018; he will be moving to Denver with his family. The department wishes him all good success in his future endeavors.]

Radu Cascaval

Radu Cascaval was active on many fronts during 2018; but everything paled compared to the efforts he put (together with a colleague from UCCS Physics Department) into the idea and the organization of the first scientific conference on hyperloop and related technologies. This meeting, called *LoopTransPort 2018*, took place at UCLA in July; nearly 100 people were in attendance. The complete record of the video lectures is available at <u>https://www.hyperlooppartnership.org/looptransport-2018-program</u>. Now that's what a multidisciplinary gathering looks like! Photos from the conference are at <u>https://tinyurl.com/y73klp87</u>. He continued to advise a team of students and faculty (now with fresh energies), now past the first round (in top 52 out of 1000+ submissions) in the 4th edition (2019) of the SpaceX Hyperloop Pod Competition! Break a Pod! Locally, the team continues to educate the community on the concept of hyperloop. Photos from the recent Cool Science Festival at UCCS (October) are here <u>https://tinyurl.com/y74a4wgz</u>.

Kulumani Rangaswamy

During the last 12 months, Professor Emeritus **Kulumani Rangaswamy** continued his research on Leavitt path algebras, which resulted in the completion and/or publication of a number of research papers on this topic. In addition, he was invited to write two expository articles on Leavitt path algebras by Editors of two conference proceedings. During June-July, he participated in the celebrations of his 80th birthday at his 200 year old ancestral house in India. Ranga also continued his activities at the local Y.M.C.A., and did some hiking, including hiking up to the top of Pikes Peak! (ed's note: Whew!)

Bob Carlson

Bob Carlson's year began with the publication of the second edition of his undergraduate textbook, *A Concrete Introduction to Real Analysis.* He was a bit perplexed when the publisher wanted him to design the cover art. After a bit of thought, he incorporated pictures of Newton, Euler, Gauss, and Riemann into a tic-tac-toe pattern, together with formulas associated with each mathematician.

Bob spent the spring semester on sabbatical. Inspired by some neglected papers from the 1970's, his research blended three of his favorite subjects: differential equations, complex variables, and functional analysis. The product of his labors was the usual paper, which is still under review.

Bob is looking forward to retirement at the end of May 2019. He joined the UCCS faculty in 1990, so his work at UCCS has largely defined his professional career. He hopes to continue with his mathematical research, while avoiding meetings and the grading of homework papers.



Barbara Prinari

Barbara Prinari had yet another busy year. In addition to publishing five research articles, she continued to advise Alyssa Ortiz on her PhD work. (Alyssa is on track to finish her degree in May 2019.) Barbara gave invited lectures at various locales throughout the world, including Lecce, Italy; Anaheim, CA; and Taipei, Taiwan. As well, she was invited as a speaker for an Association of Women in Mathematics "Women in Applied Mathematics" panel, organized by the graduate students in the Math Department at Colorado State University

In January she started a 3-year service as editor of the Springer-published European Physical Journal Plus (EPJP). Barbara continued her ongoing activities related to the promotion of underrepresented groups on campus (she received a mini-grant from the UCCS Faculty Minority Affairs Committee for activities during 2018). Barbara also somehow found the time to organize the 15th annual Pikes Peak Regional Undergraduate Mathematics Conference, hosted at UCCS (Feb 23-24). The gathering was a rousing success, with almost 130 participants and 16 student talks.

In June Barbara finished a three-year adventure as a leader of the UCCS Faculty Assembly (Year 1: president-to-be; Year 2: president; Year 3: president-that-was). (ed's note: whew!).

Reece Adragna

Reece Adragna spent most of his outside-the-classroom time working to improve the effectiveness of his teaching, including in Calculus 2 and Business Calc. He also taught a new (for him) class, Calculus 3. "Through this process, I have really enjoyed working with students at various stages of their academic careers as well as attempting to improve my instruction through new instructional techniques, examples and implementation of technology." Reece has had the opportunity to use *Mathematica* as an instructional tool to help Calculus 3 students visualize concepts such as parametric curves in space, vectors, Lagrange multipliers, 3-Dimensional surfaces and solids, and line integrals.

Outside of school, as last year, Reece spent most of his time on a bicycle or with family and friends. In addition to spending time in the saddle around Colorado Springs, he had the opportunity to travel to Moab, Utah over Spring Break to ride mountain bikes. "I generally consider myself a road cyclist, but recently I have embraced the idea of mountain biking at night; let's just say that I have never appreciated the gift of sight so much as when the light of day is fading on a fast descent!"

Greg Morrow

In Spring semester, **Greg Morrow** taught Theory of Probability II. It was the first time he had ever taught that course. He has been enjoying the challenge of teaching new material, as well as writing new problems for courses he continues to teach in both analysis and probability. This has recently meant increased office traffic for student questions ("which is really satisfying!"), because he never considered that students might actually be motivated by such a problem-centered approach. His paper on a persistence model of gambler's ruin was accepted as a book chapter after a long review process during which he wrote a companion *Mathematica* document (published on his website) to verify the many computations for this work. Greg continues to serve on the mathematics graduate committee and the colloquium committee.

The colloquium is open to all: <u>http://www.uccs.edu/math/events/current-colloquium-series.html</u> Greg thanks the many people who play roles in supporting these talks.

Sarbarish Chakravarty

Sarbarish Chakravarty published two papers on automorphic differential equations last year. "This is an interesting area of research, in which I am collaborating with colleagues from India." He continued to work on integrable systems, in part supported by a grant from the National Science Foundation. Dr. Chakravarty also continued to serve as the chair of the math department's graduate committee. In his "spare time" (during the summer), he supervised Lorch Scholarship Recipient **Tristan Neighbors'** research on nonlinear waves. This project was part of a Summer Research Grant awarded to Tristan by the College of Letters Arts and Sciences.

Tareq Dalgamoni

Tareq Dalgamoni taught two of his favorite courses for the first time: Differential Equations (3400), and Linear Algebra (3130). "I use these topics a lot in my dissertation research". The research has been on the back burner for the last few months, but Tareq is planning to resume it soon.

So far, he has taught about half a dozen sections of Calculus 1 (1350) at UCCS (as well as some College Algebra sections). This allowed him to refine his course material, and find different ways to reach to his audience. "Every time you teach a course, there are new things to learn. I am also learning how to incorporate more technologies into my classroom to reach out to the 21st century learners. This millennium generation grew up with technology, and we need to find some ways to better connect with them and make learning more accessible to them." Tareq is also looking forward to teaching the Diff Eq course for the MathOnline program this coming Spring.

Tareq's wife Nermeen has passed two big milestones in her Ph.D. program in Design and Planning at CU Denver, and is now officially a Ph.D. Candidate (ABD). Nermeen is studying regional food systems planning in the Middle East. Even with all the time and energy she devotes to her studies, "... this strong beautiful woman is still a great mother and a very supportive wife!"

Tareq and Nermeen are expecting a baby boy (Omar) by the end of the year. "Our son Mohammed is acing his second grade, and is training himself to act like a parent to his brother." Mohammed gave a presentation last month about Jordan in the Heritage Day at his school, which Tareq unfortunately had to miss, but was able to watch the video. "The kid was impressive! I didn't give my first presentation until I was 25, when I defended my Master's thesis!"

Katherine Cliff

Katherine Cliff taught a variety of classes this past year, including Precalculus, Calculus I, College Algebra, and Differential Equations. She has enjoyed digging into these courses and refining her teaching strategies for different student audiences. Katherine continues to serve as course mentor for College Algebra and Precalculus. She likes the opportunity to help new teachers to develop their craft in these courses. Over the summer, Katherine and her family travelled across the Midwest, through St. Louis, and back to her hometown in Moline, Illinois. The Cliff family highly recommends City Museum in St. Louis – they estimate there are 1.5 slides for every pair of stairs there! [Ed's note: for context, the Cliffs have two



Yu Zhang

Yu Zhang was on sabbatical during Spring 2018. Yu spent a good deal of that time in China, continuing some research projects he has been working on for awhile. One project, on the topic of random matrices, took him to Sudan University in Shanghai. While there, Yu learned that the limit behavior of a multiple normal random matrix is still unsolved; he has subsequently devoted much time and energy to investigate this topic. Yu also visited Beijing Normal University, and gave a lecture entitled "A geometric property in first passage percolation."

Theresa Killebrew

Professionally, 2018 was a "fantastic" year for **Theresa Killebrew**. She was able to teach two sections of the Strengthening Institutional Programs (SIP) Grant College Algebra course. This allowed her to slow the pace of the course, embed more practice time, and facilitate activities that helped students make connections between the topics covered. She also taught Calculus III this summer; that's her favorite course to teach. Additionally, she participated in a Teaching Circle through the UCCS Faculty Resource Center. This activity focused on small changes in teaching practice that yield great rewards for student achievement. As a result, she was already able to implement some of the ideas into her courses this Fall.

Personally, 2018 was a "very challenging" year. Theresa broke her leg on a family ski trip in March, and it certainly changed her "normal" for a few months. But, as with all challenges, when faced head-on she persisted and was back on both feet (literally) by the end of May. That allowed her to enjoy a summer road trip that took her family to the East Coast and back over 17 days. (ed's note: Whew!) The Killebrew family visited Chicago, Boston, New York City, and many smaller cities and towns in between.

James Parmenter

James Parmenter will leave the UCCS Math Department at the end of the 2018 calendar year so that he and his wife can return to California to be closer to their immediate and extended families. James began his career at UCCS as a graduate student in the math department,



how we'll remember James ...

earning his Masters Degree in May of 2012. He has spent the last seven and a half years as a faculty member getting to do what he loves: teach math. James will continue to do what he loves at the University of California at Davis for the foreseeable future, although he intends to apply for positions at the Sacramento area community colleges. "I am thankful for all that UCCS has given me and, although I look forward to returning to the place that feels like home, it is bittersweet to be leaving a place that I have come to love." [Ed's note: The department thanks Senior Instructor James Parmenter for his outstanding work and dedication to the department over these

past years. He will truly be missed.]

George Rus

This past year **George Rus** kept busy, both professionally and personally. On the professional side, George was again very active in the department, teaching multiple courses, collaborating on curricula, and serving in committees. In April, George convinced the math department to purchase a 3D printer for educational purposes. For the remainder of the year, George spent countless hours creating 3D shapes for his Calculus II and Calculus III students. In all, he has built over 50 different shapes and about 100 total shapes! (See accompanying photo.)

On a personal note, this summer George and his family visited Alaska, while travelling on their first ever cruise ship. The trip was extremely enjoyable, so much so, that they can't wait to travel again on a cruise ship. In July, George and his wife took their 7-year-old daughter Zara to Mount Sherman, where they hiked up their first 14er. In the late fall, the Rus family decided to become more environmentally friendly and are now in the process of installing electric solar panels at their residence.



George shows off his 3D printer creations!

Shannon Michaux



Shannon Michaux continues to enjoy working with students in the classroom. When she's not teaching she's also continuing to enjoy running. The Spring of 2019 will mark Shannon's 30th year of running. She estimates she's probably logged almost enough miles to have run around the circumference of the earth three times. (ed's note: Whew!)

Oksana Bihun

During 2018, **Oksana Bihun** had 3 papers published, 1 book chapter accepted and 1 paper submitted. The book chapter is to appear in the volume "Nonlinear Systems and Their Remarkable Mathematical Structures", N. Euler (ed), CRC Press. Bihun enjoyed working on a research project with Kathy Driver. Professor Driver visited UCCS for three weeks during the spring, and during her stay here she delivered the department's annual Distinguished Lecture.

https://www.uccs.edu/math/events/distinguished_lecture_series

Among the more rewarding (and time consuming) reviews Oksana did this year was the one of Christoph Börgers' book "An Introduction to Modeling Neuronal Dynamics". Oksana also found time to co-organize the Special Session "Dynamical Systems, Geometric Structures and Special Functions" at the April AMS sectional meeting at Northeastern University (Boston). "I am thoroughly enjoying teaching the graduate Complex Analysis I course this Fall." It was also a great experience for her to teach Intro to Analysis and Intro to Differential Equations. **Xian Liang**'s Masters Project "Generalized Spectral and Pseudospectral Representations of Differential Operators", which Oksana supervised, was finalized in Spring 2018. Xian graduated since, he now works at the Community College of Denver.

In May, Oksana was interviewed by the UCCS campus' Newsletter "Communique". In addition to other topics, she discussed and shared what mathematics means to her personally. The interview is available

here <u>http://communique.uccs.edu/?p=31500</u>.

On the non-mathematical side of things, Oksana's volume of poetry was published by Spolom in Lviv, Ukraine. The volume contains two books of poetry: "Distance to the Border" and "Labyrinth". For those who can read (or google translate) Ukrainian, the first of the two books is available online here <u>http://oksanabihun.com/BIHUNVidstanDoKordonu.pdf</u>. Recently Oksana received the International Panteleimon Kulish Prize in Literature and Art (Ukraine) "for popularization of Ukrainian culture in the USA and poetic development of the topics of spiritual journey, death and resurrection, as well as concepts of Ukrainian identity in the modern global world in the books "Distance to the Border", "Labyrinth" and "Anticipation of Christmas"". Kathy Driver, the 2018 UCCS Math Department Distinguished Lecturer





Oksana Bihun, cover of the May UCCS Communique

Zak Mesyan

This year **Zak Mesyan** published two articles, had two additional ones accepted, and submitted another. The last, dealing with topological semigroups, resulted from a summer research visit to the University of St Andrews, in Scotland, to work with James Mitchell and Yann Peresse. Two of the other four articles are on infinite-dimensional linear algebra, which is a relatively new subject to Zak.

As a member of the Bylaws Committee, Zak (together with Sarbarish Chakravarty and George Rus) revised the department's bylaws. The draft produced by the committee was approved by the department in October, after extensive discussions, and was approved by Dean Braza in November. (ed's note: Whew!)



Zak, conducting the Paris Philharmonic Orchestra

This year Zak taught the Senior Math Seminar (MATH 4040) for the third time. The presentation topics chosen by the students in the current class include the axiom of choice, probabilities in blackjack, knot theory, pseudorandom number generation in video games, Arrow's impossibility theorem, the Game of Life, the Enigma encryption machine, the Jordan canonical form, and chaos theory.

After Scotland, Zak spent five days in Paris. (See photographic evidence.) This year Zak, together with his wife Maria, also went on a road trip to New Orleans, with stops in Kansas City, St. Louis, Memphis, Jackson, and Dallas along the way. A separate trip took them to Wyoming and South Dakota. Finally, in the interests of maintaining a tradition, here is a list of concerts Zak attended this year: Joe Satriani, Sarah Chang, Judas Priest, Branford Marsalis, Joey DeFrancesco, Trombone Shorty, Galactic, Deep Purple, Ozzy Osbourne. (ed's way-too-easy note: Judas Priest!)

Peter Braza

After enjoying his time as Dean of the College of Letters Arts and Science since 2012, **Peter Braza** will be joining the Mathematics Department in Fall 2019. Before then, he will be working with the Vice Chancellor for Administration and Finance on new budget models for the campus. On the fun side, Peter traveled to England with his college-aged son this past September. They took in London, the Lake District, York, Cambridge, Canterbury, and the cliffs of Dover. ("BTW, there's lots of chalk on them thar cliffs ...")

Greg Oman

Greg Oman taught Rings and Modules I (Math 6170) in the fall of 2018. It was the first time that Greg had taught that PhD-level course. "It finally gave me a venue to deliver both settheoretic and algebraic ideas, and has been the most enjoyable course I've ever taught." The sabbatical that Greg took during Fall 2017 was quite productive, and resulted in 3 papers being written / revised during 2018. Greg directed undergraduate **Jacob Lojewski** on the paper, "Rings isomorphic to their nontrivial subrings" and both **Logan Robinson** and **Caitlin Randall** on the paper, "Infinite sums in totally ordered abelian groups". Both of these papers were published in the journal "Involve". In addition, Greg directed M.S. student (and new Full Time Instructor) **Jake Karn** on his thesis, "Rings whose prime spectra have



Dr. Oman hard at work. Really!

various arithmetical closure properties". Currently Dr. Oman is advising Ph.D. students **Luke Harmon** and **Veronica Marth**. As if all that doesn't keep Greg busy, he became the editor of the Problem Section of the Math Association of America's *College Mathematics Journal* in spring of 2018, a five-year assignment. (ed's note: Whew!) "Problem proposals warmly solicited!"

Of course, speaking of problems, Greg himself (with one coauthored by student **Luke Harmon**) contributed a number of these to various journals and magazines. They are given further down in the Newsletter. Try them out!

But the biggest news this year is that Greg got a cat. Meet Purrsey Pawkins!

Jenny Dorrington

In addition to guiding the Math Center, **Jenny Dorrington** taught several classes, including Topology in the spring. It was offered for the first time as a 4000/5000 level course, and had a good mix of both graduate and undergraduate students. In March, Jenny and Sean Dean travelled to Tucson for the Association for the Tutoring Profession annual conference, where she gave a presentation on the problem-solving "Relay Race" activity that has been used in multiple GPS courses over the past few years. The activity teaches students to be aware of their own problem-solving strategies, to learn strategies from teammates, and to think about how the process of struggling through a difficult problem can be beneficial. In April, Jenny and Sean presented at the Project Lead the Way conference, offering a session to local high school teachers on developing classroom exercises that encourage students to embrace the idea of productive struggle.

In between conferences, Jenny travelled to Costa Rica and Panama in March, then Iceland and Greenland in June, and made it back to Ghost Ranch in July to unwind and paint.

Gene Abrams

Gene Abrams had a busy year. He became chairman of the department on January 1, taking over from Bob Carlson after Bob's 3.5 year stint. He taught Linear Algebra Math 3130 in both Fall and Spring, and taught Calc 1 during Summer. The book on Leavitt path algebras that he had been working on for more than eight years, joint with Pere Ara and Mercedes Siles Molina, finally appeared! (Springer Lecture Notes in Math Vol. 2191.)

Off campus, two activities stood out. First, Gene again participated in the Math Youth Days, by providing the mathematical content for these baseball + math Sky Sox games. This was the 15th consecutive year of the program. Unfortunately, 2018 will be the final year of the program, because the Sky Sox are leaving Colorado Springs (to begin play next year in San Antonio). While there will be another professional baseball team playing in Colorado Springs starting in 2019, that new team's season will not include any April or May games, so that Math Youth Days will not be feasible into the future.

Second, Gene and his wife Mickey travelled to Hanoi, Vietnam in May. They were hosted by Gene's longtime collaborator P.N. Ánh. Gene gave three lectures at the Vietnam Institute for Advanced Studies in Mathematics (VIASM). Additionally, Gene and Mickey went on a two-day bike excursion along parts of the old Ho Chi Minh Trail, and also went on an overnight trip to the beautiful Halong Bay. One quick math-related story: The Vietnamese mathematician Ngô Bảo Châu won one of the Fields Medals in 2010. (Châu subsequently helped establish VIASM.) This award was VERY BIG NEWS throughout *all* of Vietnam. In fact, when Gene shared with one of the local bicycle guides that he is a math professor, the guide immediately replied "Hey, a Vietnamese guy won that big math prize!"

Oman's Offerings

(Here are some of the Problems, written by Greg Oman, which appeared in various national refereed publications during 2018)

- (1) [Problem #12036, American Mathematical Monthly 125 (2018), no. 4, p. 370.] Let (X,d) be an infinite metric space. For the purposes of this problem, say that (X,d) is *homogeneous* if for any subset Y of X of the same cardinality as X, (X,d) and (Y,d) are **isometric**, that is, there is a bijection f:X-->Y such that for all a,b in X: d(a,b)=d(f(a),f(b)). Find all homogeneous metric spaces (X,d) (this includes explicitly finding the metric d).
- (2) [Problem #1334, College Mathematics Journal 49 (2018), no. 4, p.
 296.] The usual Euclidean metric on the set N of natural numbers defined by d(x,y)=lx-yl clearly has the property that whenever x<y<z, then d(x,y)<d(x,z). Does there exist an **uncountable** well-ordered set X and a function d:XxX--->[0,∞) such that for whenever x,y,z are in X and x<y<z, then d(x,y)<d(x,z)? Either construct an example or prove that no such example exists.
- (3) (with Luke Harmon) [to appear, Mathematics Magazine] It is well-known that for any infinite set S, there is an injective map *:SxS-->S. Note trivially that (by definition) * is a binary operation on S. Is it possible for * to be associative? Prove or disprove.