

2017

Volume 21 Number 1

FALL 2017

In this issue:

- Lorch Scholarship Awarded
- Math Kangaroo Competition
- Putnam Exam
- Math Department Logo Contest
- Math Department Graduates
- Welcome three new Instructors!
- Math Faculty Updates
- Oman's Offerings

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 2016/2017 by the College of Letters, Arts & Sciences:

Outstanding B.S. Math Student

- Clark Mourning
- Karl Buvarp

Outstanding Graduate Student

- Tommy McDowell

Lorch Family Scholarship

- Elizabeth Peterson



Putnam Exam



(L to R) Titus Sharman, Colton Hill, and Jonathan Ramirez
The 2017 UCCS Putnam Exam Team

This year's UCCS Putnam team consisted of **Titus Sharman**, **Colton Hill**, and **Jonathan Ramirez**, who took the exam on Saturday, December 2, 2017. Information about the Putnam Exam can be found at:

<https://www.maa.org/math-competitions/putnam-competition>

Any *Newsletter* reader interested in the Putnam Competition or other math department undergraduate activities should contact Dr. Cascaval (rcascava@uccs.edu).

Math Department Logo Contest Winners!

The winners of the 2017 Math Department logo contest are:

1st place

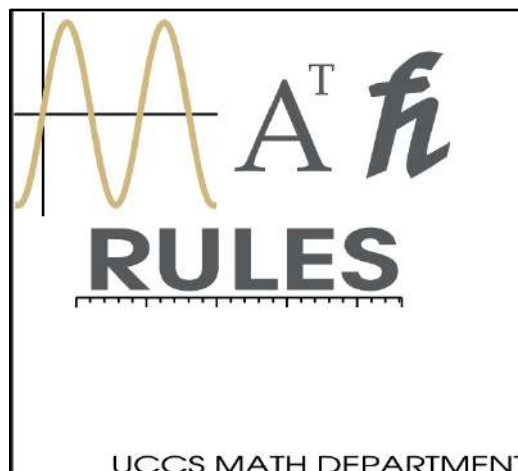
Titus Sharman

2nd place

Justin McConnell

3rd place

Jessica Janz



Titus Sharman's winning logo entry

Math Club Q&A

Q1: Continuing the revival that was started last fall, the Math Club is focused on promoting Math Club, recruiting new members, and planning events for the spring semester. Tell us about those efforts.

Answer: In an effort to promote Math, and Math Club, we have delivered pencils to every Math class during their finals during the Fall 2017 semester. In the Spring 2018 semester Math Club is going to focus on tabling to raise awareness and Math Club is going to try to host an event, around Spring midterms, (eg. Math movie night, Math games, Math book club, etc.).

Q2: What can faculty or students do to support your efforts?

Answer: "Tell us about your research!! Math club is wanting to host professors and students who are interested in presenting their Math related research to a live audience. We will help promote your talk, and will be able to provide food and drinks!"

Are you researching something that could benefit from cross department or industry collaboration? Contact the Math Club and we can help track down qualified researchers that are willing to work with you.



Q3: How can students join or contact math Club?

Answer: Students can connect with math club by going to the Mountain Lion Connect and searching for the Math Club, or by emailing sdean@uccs.edu.

Lorch Scholarship: Elizabeth Peterson

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 ninth year of its existence, the department awarded the Lorch Scholarship to **Elizabeth Peterson**. "Receiving the Lorch Scholarship has proven to be more than just financial aid. With the complications and setbacks I experience due to chronic illness, I feel blessed to have been recognized for my hard work through this award and am beyond thankful for the generous support I continually receive from the Math Department in particular and from UCCS as a whole. I am currently in the Accelerated Masters Program and plan on transitioning to graduate school after receiving my bachelor's degree in May 2018."

Congratulations Math Graduates!

Here is the list of the graduates from each of the department's degree programs in 2017.

Undergraduate Degrees

B.A. Mathematics

- Daniel Boyle
- Britney Clark
- Chelsea Cornett
- Kayleen Furrer
- Steven Hanenberg
- Matthew Rixman
- Michaela Taylor
- Michael Tucker

B.S. Mathematics

- Yaser Ali Al Qatifi
- Alice Bright
- Brooklyn Bowers
- Karl Buvarp
- Rebecca Shaw
- Dinorah Gamez
- Nikolaus Higgins
- Clark Mourning
- Mary Stilley

Graduate Degrees

MS Applied Mathematics

- Thomas McDowell

MSc Mathematics

- Stephen Sivetts, Jr.



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 and BA Math Degrees. 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.

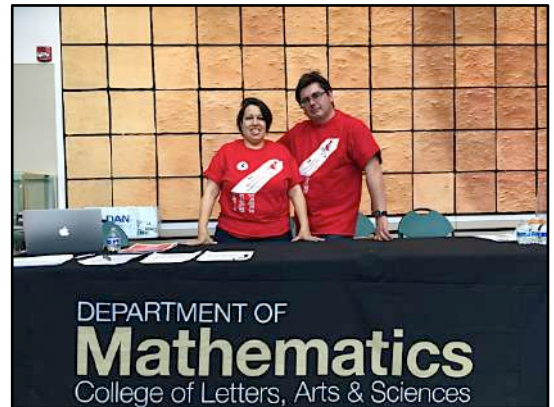
For a detailed description and application form, visit:
<http://www.uccs.edu/math/undergraduate-programs/math-honors-track.html>

Math Kangaroo 2017 Competition

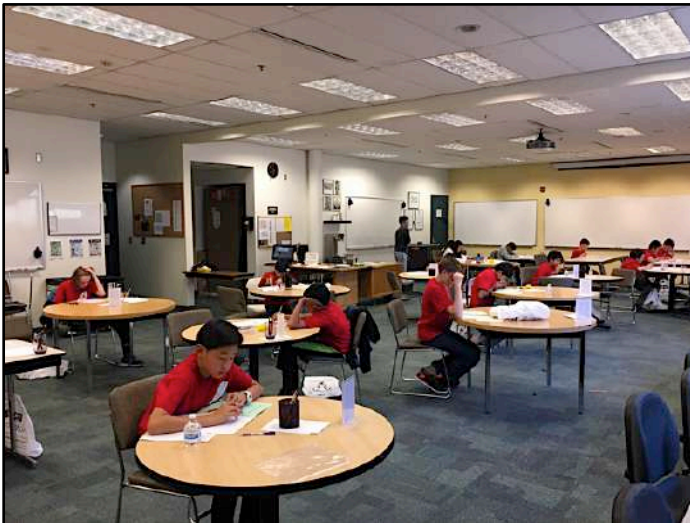
The Math Kangaroo Challenge was hosted again this year by the UCCS Math Department for the 6th year in a row! Math Kangaroo is part of a worldwide annual event held on each third Thursday of March. More than 6 million grade school students (grades 1-12) participate in this 75-minute no-stakes challenge, which engages students in age-appropriate 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 64 passionate students from grades 1-12 from the local community.

Thanks to everyone for the help in organizing and running the event. In particular, thanks to the student volunteers: **Xian Feng Liang**, **Alex Sielaff**, **Julia Lucero-Orebaugh** and **Alexandrea Dillon** for the invaluable help in proctoring; **Jenny Dorrington** for hosting us in the Math Center (and putting up with the inconvenience to close the center one hour early); **Kristina Woods** for hosting us in one of the physics rooms; and **Vickie Newkirk** for agreeing to lend us the UCCSTeach room. Most importantly, thanks to **Emanuelita Martinez** for the enormous energy she put into this before and during the event!

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



*Emanuelita Martinez & Radu Cascaval
at the UCCS Math Kangaroo Event.*



Profile of a recent graduate: Benjamin Griffith

Ben Griffith graduated from UCCS in December 2016 with a BA in Mathematics. Ben was offered a job at Berkshire Hathaway Specialty Insurance as an actuarial assistant in January 2017. The office is located in Manhattan's financial district. "My day-to-day is dynamic: in any given week I might price an insurance policy for a large corporation, design or improve an automated program for pricing simple policies, or assist in the process of reserving, which consists of observing our company's entire portfolio of insurance accounts and using actuarial methods to suggest *reserves* to cover future incurred losses and expenses." Ben is also studying for exams in pursuit of the Fellow of the Casualty Actuary Society (FCAS) designation. The exams cover a range of topics in probability, statistics, and stochastic modeling as well as relevant insurance concepts. He has passed at least four out of ten of these exams so far (he gets results for the fifth exam soon).



(ed's note: Ben currently has significantly less hair than he did when he was taking the Modern Algebra sequence a few semesters ago ...)

Ben spends his free time with friends or on his own exploring. "I recently returned from an exciting solo trip to Iceland!" He plans on flying back to Colorado over the holiday to see his family and do some snowboarding.

"I definitely have not out-ruled the possibility of returning to math in some way, shape, or form. My favorite parts of my current job are the rare moments when we have the opportunity to discuss our work from a more theoretical, purely mathematical perspective." His plan is to continue exploring his options and hopefully come closer to a decision by the time he earns his actuarial designation.



Three New Instructors!

In early 2017 the UCCS Math Department was given the go-ahead to hire THREE full time Instructors. This decision by the UCCS administration was interpreted both as a vote of confidence in the ability of the department to deliver quality instruction, as well as an acknowledgment of the explosive growth in student demand for math courses which has occurred over the past few years.

Our three new Instructors are: **Theresa Killebrew**, **Edgar Diaz Herrera**, and **Tareq Dalgamoni**. The *Newsletter* sat down with each of them for a chat about math in particular, and life in general.

Theresa Killebrew

Theresa Killebrew was born in Pennsylvania, but moved with her family to Mesa, Arizona when she was in eighth grade. Why did she choose to study math? "I had some really good math teachers in middle school and high school, and some great math professors at Northern Arizona University." (ed's note: we like these kinds of stories!) Based in part on such positive role-modeling, Theresa decided that she herself would/should/could become a math teacher. She attended Arizona State University and earned a master's degree in math (with some extra coursework in math education), which she was able to parlay into getting her "dream job" of teaching math at a community college. After teaching for ten years at Mesa Community College, her family (husband, son, and daughter) moved to Colorado Springs in 2014. This past spring Theresa earned a second master's degree in Applied Statistics via an online program offered through CSU Fort Collins.

All of this prepared her for her second "dream



job", now teaching math at the university level. Theresa is teaching a variety of courses for us this semester, College Algebra, Precalculus, and Calculus III. She tries to model some of the instructional techniques that she saw her teachers utilizing when she was a student.

In her spare time (ed's note: with two elementary-school-aged kids?? LOL) she enjoys some "hands-on" hobbies, including a recent interest in furniture restoration.

Edgar Diaz Herrera



Edgar Diaz Herrera's road to mathematics did not start at Mile Marker 0. He studied the standard math curriculum in junior high and high school in his native Mexico. While the curriculum didn't give him much of a sense of the big picture of math, one of his relatives had loaned him some math books, and Edgar wound up learning a lot of "new" things on his own. He went on to university at the National Autonomous University of Mexico (UNAM) in Mexico City. (ed's note: UNAM is a hotbed of cutting edge math research ...) "I was really underprepared at first for the coursework at UNAM, but I worked hard and was able to gain some confidence in my math studies." The curriculum at UNAM has students taking classes in only their major area; so, for example, Edgar's classes included a linear algebra course, a calculus course (taught out of Courant!), an analytic geometry course, and a non-Euclidean geometry course. *As a first semester freshman!* Along the way, he was selected to participate in a student summer program on mathematical biology at the famous Mexican

math research institute in Guanajuato.

Edgar so enjoyed the math bio ideas that he went to University of Utah to get a master's degree in the subject. He then enrolled in a PhD program at Arizona State University, where he earned a degree under the supervision of Professor Carlos Castillo-Chavez. Edgar then took a postdoc position in Southern California, where he split an appointment between Cal Tech and California State University Los Angeles. Edgar subsequently returned to Mexico and took a three year position at the Mexico Autonomous Institute of Technology (ITAM).

During his ASU days, Edgar met his wife Kendra while training to run a marathon. "That was the *only* marathon I've ever run!" Once Edgar's stint at ITAM was completed, he and Kendra and daughter Francisca moved to Michigan (where Kendra's family is from), and Edgar taught math at both Western Michigan U. and Grand Valley State U.

All of this background (ed's note: whew!) eventually led Edgar to a position at UCCS. He is teaching precalculus and business calculus for us this semester. He and his family are enjoying the Colorado Springs lifestyle and surroundings; Edgar and Francisca took a drive up to Cripple Creek during the aspen change, and were duly impressed.



Tareq Dalgamoni

Tareq Dalgamoni grew up in Irbid, Jordan. (Irbid is Jordan's second largest city, after Amman.) In Tareq's family, mathematics was part of the culture: Tareq and his parents and four siblings would challenge each other with "mental math" questions. Tareq was inspired by his math teachers both in elementary and high school, especially his 12th grade teacher. "He was honest, and dedicated to his students, and full of energy." His university studies were split between two places, Mu'tah University and Yarmouk University. Tareq excelled at these studies, and finished his B.Sc. degree in Mathematics with the highest GPA from among the 72 graduates. He also earned an M.Sc. degree in Mathematics from Yarmouk University.



After graduation, Tareq taught math full time in grades 4-6 for four years at one of the best school in the city and the country, Yarmouk University Model School, while being a full time Master's student. He has since heard from some of the students in those classes (they are now young adults; some are in graduate school!): "they say I was tough, but we really learned". Eventually, Tareq and his wife Nermeen came to the US, where Tareq spent some time in a Ph.D. program in Math Education at the University of Northern



Colorado, but eventually transferred to a PhD program in Mathematics after earning an M.A. degree in Mathematics with Emphasis on Teaching from UNC. He is currently finishing up his dissertation (On Multi-scale Finite Element Methods for Semilinear Singularly Perturbed Boundary Value Problems), and hopes to have his Ph.D. from the University of Wyoming in hand within the next few months. His wife is a Ph.D. student in Landscape Architecture at University of Colorado, Denver. They have a son, Mohammed, currently a first grader.

Tareq is teaching College Algebra and Calculus 1 for us this fall. He has had a great deal of teaching experience, at many levels; this has allowed him to develop a philosophy around teaching and learning of mathematics. "All students are born with the possibility to learn and enjoy mathematics. I hear the harmony in math, and love to share that with my students."

Thank You to all the UCCS Math Department Lecturers in 2017

- *Cassandra Ahrens-Learned**
- *Casey Chalifour*
- *Gaetan Delavignette*
- *Cynthia Doorack*
- *Rachel Drawbond*
- *Andrea Essler*
- *Justin Garrish**
- *Katerina Gkogkou*
- *Sara Goldman*
- *Luke Harmon**
- *Jewell Anne Hartman*
- *Jacob Karn**
- *Veronica Marth**
- *Clark Mourning**
- *Alyssa Ortiz**
- *Krista Parnell*
- *Mike Popovic*
- *Virginia Ramos*
- *Ryan Sandee**
- *Wendy Spratte*
- *Rachel Wood*
- *Michael Zowada**

**Graduate Teaching Fellow*



thank you!

Around the Department

(in increasing order by OFFICE NUMBER; hey, this is a MATH department Newsletter)

Jenny Dorrington

This past year, **Jenny Dorrington** (ENG 233) spent her time teaching, watching the Math Center grow, and recruiting and training tutors. The Math Center had over 22,000 visits since last December, and shows no sign of slowing down. The energy in the center most days is really positive, with students sounding like they are having fun while working on problems and discussing math, physics, computer science and occasionally politics. In an effort to attract ever more students and to build the feeling of community in the center, Jenny and her staff hosted another highly successful Casino Night in April, where students gamble with “math bucks” that they accrue throughout the year. In October, the Math Department joined with the Math Center to host the third annual “Math Convergence” event for the mathematics community on campus. This year, fifty-two students showed up to socialize, meet the faculty, learn about research opportunities, and win raffle prizes. On October 31, the department and center co-hosted the popular “Math Isn’t Scary” Halloween event.

Jenny also spent time working with Katherine Cliff and Shannon Michaux on the SIP grant classes. She interfaced with grant administrators and collected data for assessment. She taught Introduction to Geometry for the second time this fall, and has really enjoyed the energy and enthusiasm the students have shown for non-Euclidean geometry.

Outside of UCCS, Jenny spent time at Ghost Ranch in New Mexico, painting and hiking. She continues to paint whenever she can find the time.



Math Center, October, 2017



Casino Night, April, 2017



Casino Night, April, 2017



Math Convergence, October, 2017

Radu Cascaval

Radu Cascaval (ENG 271) had a "hyper" year 2017. He worked on several research projects, some in collaboration with students, on meshless methods for solving PDEs. Teaching the year-long PhD sequence of courses in Scientific Computation for the first time presented challenges but also a lot of rewarding interactions. In Fall, he kicked-off the Analysis and Application (AaA) Seminar, with the inaugural talk given by his former postdoc advisor, **Dr. Fritz Gesztesy**, now at Baylor University.

And now to the really fun stuff:

He advised the UCCS *HyperFalcos* Team and made two trips to SpaceX Headquarters in Southern California (one in January, one in August). These experiences were amazing and paid off; now the team is participating in the third Competition, with real chances to make a splash.



On the side, he likes to show the hyperloop prototype to the public, the latest being during the UCCS Cool Science Carnival in October. Somewhat related, he joined the Hyperloop Advanced Research Partnership (HARP) by becoming a Senior Advisor; he remains interested in all things hyperloop (and why not, even hyperloop algebras).

In his 'spare' time, he drives his non-autonomous cars around town and dreams of the time when kids will hop in a driverless car to get to their after-school activities.

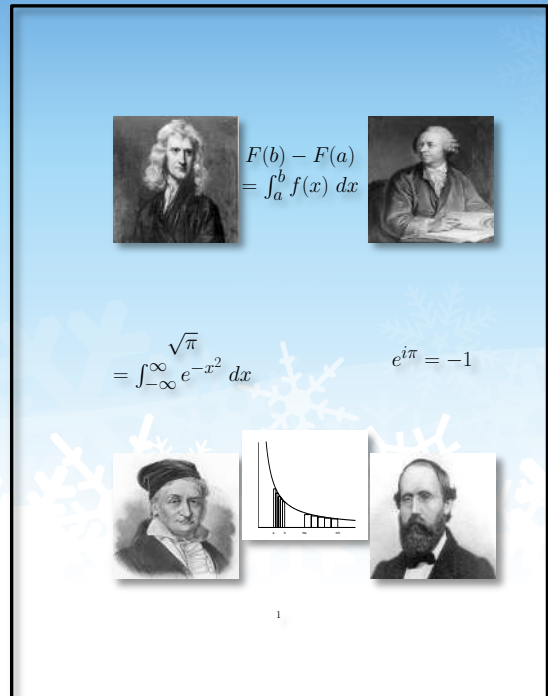
Robert Carlson

At the end of 2017 **Bob Carlson** (ENG 272) will step down as chairman of the Mathematics Department, after three and a half years of service. (ed's note: THANKS for all the hard work, Bob!) He is planning to enjoy a spring sabbatical reviving his research program in differential equations. He is also looking forward to the publication of the second edition of his analysis text, *A Concrete Introduction to Analysis*. (Last year at this time the manuscript was in the "final" editing stages.) Bob recently got a request from the publisher to produce the cover art for the book. After the publisher rejected a suggested cover text that said "buy this book and make millions", Bob settled on a mixed array of pictures of famous and long dead mathematicians with equations they are known for.

Robert Carlson Continued...

"Looking back over the past three and a half years, one of the most significant changes in the department was the addition of quite a few new faculty members." Faculty hiring is always a challenging process, involving all members of the department. During his time as chair, the department added Assistant Professor Oksana Bihun, as well as *seven* (full-time) Instructors: Reece Adragna, Katherine Cliff, Tareq Dalgamoni, Edgar Diaz Herrera, Theresa Killebrew, Wojciech Kossek, and Meredith Casey. (Profiles of Theresa, Tareq, and Edgar are given above; Meredith left our department in June 2017; see paragraph below.) All have been outstanding additions to the department.

Although the job of department chair was not conducive to research production, Bob did have a recent publication about analysis on highly symmetric graphs. He is now trying to breathe new life into work of others that was published in the 1970's, a period that some (ed's note: a *dwindling few*) of us are old enough to remember.



The cover of Bob Carlson's new book on mathematical analysis, titled "Buy This Book and Make Millions"

James Parmenter

During the Spring semester **James Parmenter** (ENG 277) taught a typical course load of College Algebra, Precalculus, and Calculus 1. However, during the Fall semester, James got to add a little variety to his résumé by teaching Calculus 2 for the first time in quite a few years. "Calculus 2 is one of my favorite courses to teach, and I'm happy to have a chance to refine some of the topics I have presented in the past."

Outside of UCCS, James did quite a bit of traveling throughout the year. During Spring Break he and his wife Katy visited their nephew and four-month-old niece who reside in San Luis Obispo, and had a great time. The weather was quite beautiful (and a welcome change from the cold March weather of Colorado Springs). In June James traveled on his own back to his hometown of Arcata, CA to attend his 20 year high school reunion. "It was a lot of fun to catch up with people whom I hadn't seen in so many years, and to meet the adults my high school friends turned into." A short two months later James and Katy were off again, this time to the Grand Cayman Island. This was a first for both Katy and James and they enjoyed the Caymans to the fullest: relaxing on the beach, swimming with the Stingrays, and dining at *Blue*, one of only two restaurants headed by celebrity chef Eric Ripert. "We can't wait to see where we travel to next!"

George Rus

The year 2017 was an eventful one for **George Rus** (ENG 277). During the Spring semester, while teaching a section of Math 1320 (Calculus with Precalculus Refresher) and two sections of Math 2350 (Calculus III), George became a student himself. He attended a semester long Introduction to Spanish class, which proved to be quite exciting and challenging. Over the Summer, George did not teach. Instead, he and his family visited four countries in Europe over a span of two months. Their trip took them to Scotland (yummy Scottie dog cookies!), Romania (tried to find Dracula in Transylvania), Italy (sunny beaches), and Germany (beer!!). While it was difficult to be away from home for such a long time, the trip was definitely worth it! For the Fall semester, George taught two different Calculus courses, and, for the first time in four years, he was able to teach one of his favorite courses, Introduction to Differential Equations.

Barbara Prinari

Barbara Prinari (ENG 278) had another extremely busy year. Research-wise, she submitted two papers (both of which are still under review). She worked with **Alyssa Ortiz** on her PhD research. (Barbara notes that in March 2017, Alyssa received a Graduate Research Fellowship Award from the UCCS Graduate School for the proposed research work; Alyssa's fellowship proposal was ranked number 1 out of the 15 such proposals over the entire campus.)

Barbara gave numerous presentations, throughout the world. She gave two invited lectures, one in Trieste, Italy in June, the other in Toronto in August. In addition she gave talks at an AMS sectional meeting in Buffalo, another at an AMS sectional meeting in Charleston, and one at the Canadian Math Society Winter Meeting at Niagara Falls. She also organized a workshop on Nonlinear Waves, held in Rosh Pinna, Israel, in May.

At the end of June Barbara completed her one-year term as UCCS Faculty Assembly President. (ed's note: this position requires a near-infinite amount of work.) She is currently serving as past-president (through June 2018). Barbara also served / is currently serving on numerous administrative committees. In addition, she also served on two National Science Foundation grant-selection panels.

Barbara was pleased to co-organize the 3rd annual "Colorado Nonlinear Days", held at UCCS Nov 11-12. "The purpose of this short meeting is to bring together local scientists who are engaged in nonlinear (dynamics, waves, equations, computation...) research, and give them a chance to interact." Faculty from both the UCCS Math and UCCS Physics departments participated, and there were attendees from all over Colorado (School of Mines, CU Boulder, CSU, UNC), as well as researchers from Kansas, Wyoming, Texas, Ohio, and New York. "Given the remarkable attendance (more than 50), this Fall for the first time the meeting was a day and a half long." The conference website is:

<https://www.uccs.edu/math/events/colorado-non-linear-days.html>

Oksana Bihun

For **Oksana Bihun** (ENG 279), one of the highlights of 2017 was participation in a workshop on Orthogonal Polynomials and Special Functions (OPSF) and the OPSF s7 conference at the University of Kent, Canterbury, UK (for which she received funding from London Math Society). This was a chance to present the results of her solo paper on properties of the zeros of Krall polynomials that came out this year, in front of an audience that packed the room. Apart from publishing another paper on solvable discrete time dynamical systems, she submitted four more papers, one of them coauthored with UCCS colleague Sarby Chakravarty, and another one with former UCCS undergraduate (and current UCCS graduate student) **Clark Mourning** (the paper was Clark's Honors Project, this was an outcome of the work supported by Oksana's CRCW grant).

Oksana gave four invited talks, a presentation at the 10th Symposium on Integrable Systems among them. This was a satellite conference of the *Banach 125* Conference that was held at Lviv National University, Ukraine, which is Oksana's alma mater. She travelled to the "La Sapienza" University of Rome, and also to the University of Saskatchewan, for invited research visits. Oksana is supervising a Master's project of Xian Liang, and has served on Marc Moreno Lopez's (Computer Science graduate student) Master's Thesis Defense Committee.

In addition to the Introduction to ODE courses, she has taught Math Modeling and Modern Analysis I that are new in her UCCS teaching portfolio. This Fall, in addition to serving on the department's Graduate Committee, she has been serving on the LAS Curriculum and Requirements Committee and the UCCS Women's Advisory Committee. She also has sponsored the visits of two colloquium speakers: Diego Dominici and Alessandro Arsie.



Dinner with colloquium speaker Alessandro Arsie. From left to right: Oksana Bihun, Alyssa Ortiz, Ryan Sandee, Luke Harmon and Alessandro Arsie. "It was rewarding to have a meaningful conversation about the joys and challenges of graduate school for both the current and the long ago graduate students."

Sarbarish Chakravarty

Over the past year, **Sarbarish Chakravarty** (ENG 280) taught Calculus III and the Ordinary Differential Equations course; chaired the math department's Graduate Committee; and continued his research work on Integrable Systems. Sarby gave a talk at the AMS Sectional Meeting (Denver) in Fall 2016, as well as at the S. N. Bose Institute, Kolkata, India in July 2017 ("when it is very hot and humid there!")

Two of Sarby's students, **Tommy McDowell** and **Tristan Neighbors**, are working with Sarby as part of his NSF-funded project. Tommy presented his work at the SIAM Front Range Student Conference (Denver) in April 2017. Tommy also received an LAS Dean's Summer Research Award. Tristan received a Student - Faculty research award (College of LAS) in Fall 2016, and a summer 2017 research award from the Undergraduate Research Academy (UCCS). Tristan gave student research talks at the PPRUMC (Colorado College), CSURF (UCCS), and MAA Rocky Mountain Sectional Meeting (CSU, Pueblo) in Spring 2017.

Greg Oman

Greg Oman (ENG 281) gave two off-campus research lectures in 2017: one at Ohio University, and the other at the University of Houston on applications of model theory to operator algebras. In addition, he had several research papers published, including one coauthored with former UCCS undergraduate Katrina Eidolon (who is now a Ph.D. student in math at Berkeley). He continues to be active in advising -- currently he is advising 4 undergraduates, an M.S. student, and a Ph.D. student on research. Finally, he is still very interested in problem-posing, and published 10 problems in 2017. (ed's note: see the Oman's Offerings section below.) Among the most rewarding aspects of his position at UCCS is his interactions with his research students. "I feel quite fortunate to be an advisor to so many budding young mathematicians."

Zak Mesyan

This year **Zak Mesyan** (ENG 282) published one article, had another accepted, and submitted two more. Some of these papers include UCCS colleagues Greg Oman and Kulumani Rangaswamy as coauthors, both for the first time. This is Zak's third year as the chair of the undergraduate committee. Recently the committee completed proposals to restructure the mathematics minor and the statistics minor, both of which have been approved by the department. This year the committee, together with the graduate committee, also created a new combined BS/MS program. There are already two students in this program.

On a more personal note, by the end of this year Zak plans to increase the number of US states he's visited to 33, after trips (not entirely by choice) to Nebraska and Oklahoma. He's also gone to quite a few concerts: Bad Plus, Charlie Hunter Trio, Edgar Meyer & Christian McBride, Guns N' Roses, Hudson, King Crimson, Murray Perahia, Metallica, Renée Fleming, Scorpions & Megadeth, Takács Quartet, and Yo-Yo Ma. (ed's note: Look up the word *eclectic* in the OED.)

Greg Morrow

Greg Morrow (ENG 284) continued in his role as Math Colloquium chair. "Thanks to Emanuelita Martinez and the many participants and speakers who make the colloquium meetings both interesting and fun!" For a list of upcoming speakers, see:

<http://www.uccs.edu/math/events/current-colloquium-series.html>

Greg is teaching the PhD-level Theory of Probability course for the first time in his mathematical career. He's learning new aspects of the subject and enjoying a rekindling of his old passion. He served as advisor for **Suzanna Snyder**'s MSc final paper entitled: "The Infinitely Divisible Laws for Sums of Independent Random Variables". In April, Greg participated in Worldwork Greece 2017, working among groups from diverse cultures on awareness issues of gender, rank, and diversity. He taught a summer graduate course on Chaotic Dynamical Systems. Greg continues to serve on the mathematics graduate committee.

Yu Zhang

Yu Zhang (ENG 286) continued his research effort in the area called percolation theory. He published a (long!) article in the journal *Probability Theory and Related Fields* regarding the limit behavior of the flow on a net. In addition, he is working on a few topics in the first passage percolation model. In teaching, Yu taught a wide range of courses in probability and statistics, courses from the 3000 level through the 5000 level.



Katherine Cliff

Katherine Cliff (ENG 287) taught a variety of classes this past year, including Precalculus, Calculus I, and Business Calculus. She has enjoyed digging into these courses and refining her teaching strategies for different student audiences. Katherine has also taken on some more administrative duties within the department, including coordinating the College Algebra course and (with **Shannon Michaux**) investigating methods of increasing student success in mathematics as part of the SIP grant. Over the summer, Katherine, her husband Michael, and daughter Adeline welcomed new baby Rosamund into the family. Said Adeline, *"She's wrinkly... but we shouldn't iron her."* (ed's note: CONGRATS to Katherine and Michael!!)

Shannon Michaux

Shannon Michaux (ENG 287) stayed very busy this year with teaching responsibilities. She taught *four* sections of Calculus 2 during the year. She's still amazed how every class has its own personality and how different groups of students make the class different. She enjoyed working with College Algebra students during the Spring term in a Strengthening Institutions Program (SIP) grant (from the US Department of Education) that is aimed at helping students succeed in Gateway courses. She also did some work to help the Pre-Collegiate Development program revamp the College Algebra course they offer to students enrolled in their program. To round out the College Algebra work, Shannon rebuilt her online section of College Algebra to help it better address students' needs. During the Fall term, one of the Department's long-time lecturers (**Wendy Spratte**) moved away from Colorado Springs; Shannon graciously finished out the semester of Wendy's section of Discrete Math.

Gene Abrams

Gene Abrams (ENG 288) enjoyed all three legs of the teaching / research / service triad last year. For the first time in his career, he taught the second semester of the PhD-level Rings and Modules course in the Spring. (This is the first time this course has ever been offered at UCCS.) "It was both fun and satisfying to share these



The 'road' up *Serra do rio do rostro* (near Florianopolis, Brazil)

ring-theoretic ideas with students; although I use a lot of these ideas in my research, some other ideas I have not thought about since I was a graduate student about 1000 years ago."

On the research side, Gene finished up a joint paper with Cristobal Gil Canto and Stefan Erickson, and had a joint paper accepted (with Zak, Ranga, and Be'eri Greenfeld of Bar Ilan University, Israel). Gene (and his wife Mickey) got to spend a week at a meeting in Florianopolis, Brazil in March. (They took one day off to ride bikes; see photo) They also go to spend a week in May in Padova, Italy; Gene got to finish up a joint paper with some colleagues. (Mickey and Gene then spent four days in Cortina d'Ampezzo, riding bikes and eating pasta.)

On the administrative side, Gene will change offices from ENG 288 to ENG 272 starting January 1, 2018.

Peter Braza



In addition to doing dean-type (deany?) work, Dean of the College of Letters Arts and Sciences **Peter Braza** (COL 2025) was involved in a number of community outreach programs last year. One of those is Springs in Bloom; more info at <https://coloradosprings.gov/SpringsInBloom>

Here's a photo from the Springs in Bloom awards ceremony. Included are: **Peter Braza** (blue shirt); LAS College Community Relations Director **Margie Oldham** (red dress); Colorado Springs mayor **John Suthers** (center), and UCCS student **Tamara Twitty** (between Margie and Mayor Suthers); Tamara represented the UCCS LAS Ambassadors

Reece Adragna

During this past year **Reece Adragna** (COL 4014) mentored the Calculus for Business and Economics Math 1120 class. He spent some time developing new lessons which incorporate more technology and visualizations into the content. Currently Reece is developing the curriculum to teach that course online in Spring 2018. To that end, he is currently completing the Teaching Online Certification Program through the UCCS Faculty Resource Center. "Teaching online is not something I had considered until beginning at UCCS and I am looking forward to learning the in's and out's through experience this next year!" In addition to his teaching duties this year, Reece had the opportunity to serve on the search committee which led to the hire of the department's three new Instructors.

Outside of UCCS, Reece spent the majority of his time riding his bicycle and spending time outdoors with family and friends. He and his wife Kaylen were able to ride their bikes up Pikes Peak, near Vail, and around their home near Cheyenne Canyon for many hours this year. "I am keeping my fingers crossed for a very "rideable" winter this year!" (ed's note: OK, as long as there's still snow in the mountains ...)



Wojciech Kossek

In addition to his teaching duties, **Wojciech Kossek** (COL 4014) was very busy with both authoring articles and developing new courses. Wojciech developed the content for the department's new course Math 2020: Problem Solving Seminar; he will also be the first to teach the new course, in Spring 2018. Wojciech is also in the process of developing a second new course, this one on the History of Mathematics. The target 'audience' for this new course is K-12 math teachers who are looking to gain some professional development and knowledge about all things mathematical. It will be offered as a 'hybrid' (in-class and online) course, likely in Fall 2018.

To cap off 2017, a short article Wojciech wrote, titled "Is a Taylor Series also a generalized Fourier Series?", was accepted for publication in the College Mathematics Journal.

Meredith Casey

In the spring **Meredith Casey** (Online; maybe call her office Hilbert Hotel Room Number \aleph_0 ?) taught calculus and business calculus. "That was also my first semester teaching with two children, which was an adventure in itself." In March Meredith's husband got orders from the Air Force to move to Greenland for the year, so Meredith and the girls moved to Savannah, GA, in May to be close to family. Meredith was hired at Savannah State University this fall, where she is currently teaching 15 credit hours. She has been able to continue teaching calculus, but also has been working with students in developmental courses for the first time, which she says has been a very different but fun experience. Although she has left the Rocky Mountains physically, Meredith is still teaching for UCCS remotely, as she continues to be the instructor for the online version of the UCCS Math 1120 (business calculus) course.

"I miss everyone at UCCS and I'm pretty sure that for the next 20 years every time we get orders to move I'm going to have my fingers crossed for Colorado Springs!"

Kulumani Rangaswamy

Professor Emeritus **Kulumani Rangaswamy** (Retired; maybe call his office Hilbert Hotel Room Number 2^{\aleph_0} ?) describes his 2017 as "reasonably busy". (ed's note: right, in the same way that Mount Everest is "reasonably high".) His work on Leavitt path algebras resulted in the publication or completion of a number of research papers. In March he gave a talk at the III Workshop on Dynamics Numeration and Tilings in Florianópolis, Brazil. He and his wife Sarah took this travel opportunity to visit Rio de Janeiro, and the incredible Iguasa Falls located at the border of Argentina and Brazil. (These falls are considered the largest waterfalls system in the world). In April he visited the University of Málaga, Spain as an examiner at the thesis defense of **Cristóbal Gil Canto**. (Some of the *Newsletter* readers may have met Cristóbal, he has visited Colorado Springs on two extended stays; he has done research work with **Gene Abrams** and with **Stefan Erickson** of Colorado College). Ranga also gave a colloquium talk at the mathematics department in Málaga. In June Ranga gave a series of lectures at a research workshop on Leavitt path algebras organized by the Indian Institute of Scientific and Educational Research, Pune, India.

Emeriti Abound!

In March, Gene Abrams had the opportunity to meet up for lunch with three of the UCCS Math Department's retired faculty: Jim Daly (2010), Laurel Rogers (1998), and Ranga (2008). Ranga's wife Sarah also joined us. Many stories were shared, some more true than others.



Oman's Offerings

(Here are some of the Problems, written by Greg Oman, which appeared in various national refereed publications during 2017)

Greg Oman is a *prolific* contributor of Posed Problems to various national and international publications. During 2017 alone, Greg had TEN different problems appear in print. We have asked Greg to choose a subset of those problems; these four make up the Newsletter's annual *Oman's Offerings*. Try your hand at these!

- (1) Find all fields F and F -vector spaces V such that any two bases of V over F have nonempty intersection.
- (2) Let V be the vector space (over R) of all real-valued sequences (a_n) such that the series $\sum a_n$ converges. Prove that there is a linearly independent subset S of V of size c (the size of the continuum, that is, the cardinality of the set of real numbers) consisting of conditionally convergent series which all sum to 0.
- (3) Let X be a set and let $f: X \rightarrow X$ be a function. Say that a subset S of X is *closed under f* provided that whenever s is a member of S , so is $f(s)$. Prove or disprove: if every proper subset of X which is closed under f is countable, then X is countable.
- (4) Suppose that $f: R \rightarrow R$ is a continuous, one-to-one function that preserves additive subgroups of R (the set of real numbers). In other words, if G is a subgroup of R , then so is $f(G) := \{f(g) : g \in G\}$. Prove that there is a real number r such that $f(x) = rx$ for all x in R .