The 2015/16 academic year has been eventful, and we are happy to share the year with you in our annual newsletter. We continue to have approximately 160 math and stats majors. We had a huge graduating class of 45 students in 2015, and this spring we are expecting another 30 graduates. The two statistics programs have established themselves as a popular choice with about 40 students, and more students are choosing the applied math concentration with another 40 students.

Every year brings changes in faculty and staff. After 42 years, Jean Chan retired at the end of the Fall 2015 semester and we will celebrate her long and distinguished career on April 29 from 3-6 pm at Prelude at the Green Music Center. Jean came to SSU in 1973 and saw over 740 students graduate with degrees in mathematics and statistics. She was instrumental in shaping the department, making it the welcoming and supportive place it is today. In Fall 2016, Martha Byrne will join the department as a new math education professor. She is currently a visiting professor at Earlham College in Indiana and brings several years high school teaching experience and an expertise in students’ understanding of proof to our programs. Also new to the department is Dena Peacock who is joining the front office as our new administrative coordinator.

Last year’s Math Festival 2015 brought a record number of students and alumni to Schroeder Hall for a special colloquium talk by David Kung on Mathematics and Music, followed by the annual awards dinner at Prelude. Last year set a high standard and we are planning a strong follow-up this year on April 20 in Ballroom A of the student center. Our colloquium speaker is math celebrity Dan Meyer from Desmos and we hope many students, alumni, and friends will join us for the talk and dinner right afterwards.

Our students have been organizing and participating in many academic, social and sometimes social-academic events this year. A big group of students and faculty went “math camping” at Whiskeytown in October and attended the MAA section meeting at UC Davis in February. Students took the Putnam and actuarial exams, and participated in the Math Modeling competition. The math and stats clubs are also very active: they took 2nd place in Geek Week competing with other SST clubs, they organized Pi day, volunteered at Expanding Your Horizons and are getting ready for the upcoming integration bee on April 26.

We always love it when alumni come to visit, as they often do during their vacations. This year in particular we are asking for your help in evaluating and revising our programs as part of our periodic program review. Please fill out the alumni survey www.sonoma.edu/math/alumnisurvey to tell us what works and what we can improve to best support our students and community.
Math Festival 2016

The Math and Stats Department will celebrate its annual Math Festival on April 20, 2016. The day will kick off with a poster and puzzle session over the lunch hour in the Darwin Lobby.

The highlight of the day will be a special colloquium talk by math celebrity Dan Meyer followed by the awards dinner for students and alums.

The talk will be in Ballroom A of the student center and it is open to the public – all are welcome!

**Speaker:** Dan Meyer, Desmos

**Title:** Math is Power not Punishment

**Time and Location:** April 20, 2016 at 4 pm – Student Center, Ballroom A

**Abstract:** We often offer students shortcuts, strategies, and skills before students understand their origin, their value, and the millions of hours of work they’ve saved mathematicians throughout history. We’ll look at techniques for putting students in a position to need these challenging skills so they feel like power, not punishment.

**Speaker Bio:** Dan Meyer taught high school math to students who didn’t like high school math. He has advocated for better math instruction on CNN, Good Morning America, Everyday With Rachel Ray, and TED.com. He earned his doctorate from Stanford University in math education and is the Chief Academic Officer at Desmos where he explores the future of math textbooks. He speaks internationally and was named one of Tech & Learning’s 30 Leaders of the Future. He lives in Mountain View, CA.

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2015 Emeritus Dinner

In 2014, five long-term faculty members retired from the Math and Stats department at SSU: Bill Barnier, Julie Bonds, Sharon Cabaniss, Edie Mendez, and Rick Luttmann. In fall 2015, they were awarded emeritus status by the Faculty Senate. On March 26, 2015 friends and colleagues joined the honorees to toast their contributions to the university at the annual emeritus dinner. Provost Rogerson recalled the accomplishments of Bill, Edie, and Rick, and the other new emeriti who were present at the dinner. After the official remarks many of the guests shared anecdotes and memories of the new emeriti.
Two Sonoma State math students, Ericka Chavez and Travis Hayes, spent six weeks in Chiang Mai, Thailand working on research projects this summer. Their trip was made possible by the CSU Louis Stokes Alliance for Minority Participation (LSAMP) Global Awareness Program, an NSF-supported program that sends 8 CSU students to study abroad in Thailand. The program pairs each participant with a faculty mentor at Chiang Mai University to conduct a mini-research project in the student’s field of interest. At the end of the six-week program, the students present their results to a general science audience at the university.

Chavez and Hayes worked under the same faculty mentor, Ajahn Nattapol Ploymaklam, but pursued fairly different topics. Chavez identified a way to compute high powers of conjugate numbers using recursive sequences (such as the Fibonacci sequence), whereas Hayes developed an algorithm that partitions a graph into two disjoint graphs by removing a set of edges with maximal weight (known as the Max-Cut problem). They presented their research progress to a general science audience at Chiang Mai University at the end of the six-week study period.

In addition to their math research, the two took advantage of weekend sightseeing trips, night bazaars, and interactions with Thai students in order to learn more about the country and its culture. Highlights from the summer include a visit to an elephant sanctuary and a hike to the highest peak in Thailand.

Additional information about the LSAMP chapter at SSU can be found at [https://www.sonoma.edu/math/lsamp/](https://www.sonoma.edu/math/lsamp/).
Dr. Martha Shott from the Department of Mathematics and Statistics is the recipient of the 2016 Mathematical Association of America (MAA) Golden Section Alder Award for Distinguished Teaching by a beginning college or university mathematics faculty member. The award was presented on February 27 at the MAA Section Meeting at UC Davis, which incidentally, is her alma mater. A group of 12 faculty and students from SSU attended the conference and cheered as Ed Keppelmann from University of Nevada, Reno, read the award citation.

Dr. Shott is receiving this award because her “teaching has been extraordinarily successful” and her “effectiveness in teaching undergraduate mathematics is shown to have influence beyond her own classrooms”.

Martha Shott joined the SSU Math and Stats Department in 2012. Since her arrival at SSU, she has built an impressive reputation as an excellent teacher. She has taught a wide variety of courses from Calculus to Statistics to Mathematical Modeling and Numerical Analysis. For three years, she has taught the innovative STEM Freshmen Year Experience Course combining Precalculus, Biology, and Critical Thinking content as part of an interdisciplinary teaching team. For each level of student, Dr. Shott employs different strategies, but in all her classes she expects and enables her students to actively participate in their own learning. She succeeds in making mathematics accessible to her general education students and instilling “a sense of enthusiasm and appreciation for the inherent beauty” of mathematics to her lower division math majors. Her upper division students rave about the experiences they have in Dr. Shott’s classes that emphasize application and context.

Front row: Martha Shott, Terris Becker, Robert Lattimer.
Rick Luttmann (Emeritus)

- Lots of traveling -- Alaska and Hawai‘i in January, a Mediterranean cruise in March
- Volunteer math tutor at Roseland University Prep HS
- Continuing as Associate Editor of American Mathematical Monthly (since 1977)
- Speaking at Humboldt State Colloquium 7 April on "Chaos from Simple Trig"
- Speaking at CMC^3 conference 23 April in Lake Tahoe on "The Eternal Triangle"
- Continue to attend conferences, e.g., MAA Golden Section at U C Davis on 27 February, State of Jefferson Congress at Whiskeytown Lake last October
- Active member of Living Wage Coalition and North Bay Jobs with Justice, also Workers Rights Board of Sonoma County
- Volunteer election official

Julie Bonds (Emerita)

“For the last 2 years, I have been teaching part-time at Portland Community College. I work at the Cascade campus and I really enjoy the diverse population of students.

Right now, we are in the middle of finals week. It’s quite a change to work within the quarter system, but I have adjusted. One of the big advantages is that I will be taking the spring quarter off and then teaching 2 classes during the summer term. So, as soon as grades are posted, I’m on a nice long break.

In May, I will be flying to Chicago, renting a car, and driving Route 66 (at least what remains of it). I will be joined by friends and family for certain segments of the trip. One of the instructors in our department goes around singing, “Get your kicks on route 66”...”

Julie Corrigan (2013)

“I spent a year teaching at a small charter school in Austin, Texas. I am now preparing to return to San Diego, Ca to prepare for attending law school. The goal is to obtain my LLM in International Trade Law so that I can find a career in Trade Compliance.”

Alex Conner (2010)

“In the summer my wife daughter and I moved back to Santa Rosa. I am currently working at Montgomery High School teaching 3 sections of geometry and 2 sections of Algebra 1. We love being back in Sonoma County close to friends and family.”

Julie Bonds (Emerita)

“...”

Tom Nelson (Emeritus)

“I spend a lot of time reading. I am currently reading a best seller called "A Doubter's Almanac." The main character is an alcoholic mathematician. It doesn't happen very often in fiction that the main character is a mathematician. I also go to the gym and tutor in the Adult Literacy Program of the Sonoma County Library. Most of the students were born in another country and need to learn English.”

Richard Lund (1967)

“I have been living in Oregon for the past 12.5 years.”

Martine MillerE (2014)

“I am working for Dow Pharmaceutical Laboratory in the Analytical Sciences Department as a Technical Administrator. My responsibilities include cleaning and organizing data, creating excel templates, preliminary analysis, and identification of unusual patterns within data. This position is experimental within the company, so I have the unique and exciting opportunity of creating my own job description and educating my supervisors about the extent of my skills. I am also applying to masters programs in statistics and hope to start working towards my graduate degree this fall.”

Gratitude

Jean Bee Chan

I am grateful that I have enjoyed a most satisfying career as a mathematics faculty at SSU during 1973-2015. Interacting with students and encouraging them to fulfill their maximal potential has been my greatest joy. Learning and teaching among wonderful colleagues have been very rewarding experiences. It also has been enjoyable to write and conduct research with fellow mathematicians, both here and elsewhere. Further, serving and thriving in the mathematical community at the local and national levels has been most interesting. Finally, being able to contribute to SSU, the Mathematical Association of America, and other programs has been a real plus. Thank you very much for your support and friendship.
Visiting Assistant Professor Jeffrey McLean defended his dissertation at Syracuse University in September, completing his Ph.D. in mathematics education with a research focus on the development of informal inferential reasoning via resampling. He has accepted a Teaching Postdoc in Statistics at St. Lawrence University in upstate New York beginning in Fall 2016.

Professor Elaine Newman served on the SSU Presidential Search Advisory Committee this academic year and continues her role as President of the SSU chapter of the California Faculty Association. This was an eventful time to have that job, since the faculty were preparing for a strike—which would have been the largest higher education strike in US history. Thankfully, a tentative agreement avoided a strike in the nick of time.

Professor Sunil Tiwari is heading up the Department’s implementation of WebWork, an open source online homework system. By replacing systems offered by publishers, we reduce costs to students and make a much bigger assortment of problems open for instructor use.

In addition to serving as the faculty lead for the California Mathematics Project: North Coast (see article), Professor Ben Ford has recently been elected by the SSU faculty to serve as Chair of the Faculty for the 2016-17 academic year. Most people think this demonstrates his questionable judgment; but, based on his experience as a member of the Presidential Search Advisory Committee, he is excited to work with SSU’s new president, Judy Sakaki, during her first year here.

Professor Brigitte Lahme continues to work with Illustrative Mathematics on different projects. Recently this has involved writing and reviewing assessment items, and she is about to join their new project writing open source resource curriculum materials for middle school. She collaborates with other math ed faculty at SSU in Project Make the Way with the Santa Rosa City Schools (see Math Ed article). She continues to be active in the MAA, participating in two panel discussions at JMM 2016 in Seattle and serving on the MAA Committee on Teaching of Undergraduate Mathematics.

Professor Sam Brannen continues to be the advisor for Pi Mu Epsilon and the Putnam Exam, and advises students in the pure math concentration. He also continues to serve as the Louis Stokes Alliance for Minority Participation (LSAMP) campus coordinator, and he is now part of LSAMP’s statewide Program Oversight Committee. He still serves on the Academic Senate and the Executive Committee of the Academic Senate, and this year he served on the School of Science and Technology’s Reappointment Tenure, and Promotion committee. For the past year he has been leading a group of math/stats faculty in a reevaluation of the courses in the calculus sequence.

Professor Susan Herring has been taking a leadership role in helping Sonoma County high schools implement new content standards in probability and statistics, leading a series of multi-day workshops for secondary teachers (offered through the California Mathematics Project: North Coast). The workshops have been very well received and we hope to reap the benefits when today’s high school students enter SSU!

In addition to winning a major teaching award and traveling to Thailand with students (see separate articles), Professor Martha Shott continues to be a key leader for the School of Science and Technology’s Freshman Learning Community “A Watershed Year.” Incoming freshmen learn introductory biology, critical thinking, and mathematics in an integrated course based on topics arising from the watershed of Copeland Creek, which flows through campus.

Lecturer Nick Dowdall has worked with student Travis Hayes for the last year to revise materials used in our general education-level geometry course (Math 150, serving many future elementary teachers), and Nick Dowdall and Ben Ford will attend a week-long workshop on Inquiry Based Learning at Cal Poly-San Luis Obispo this summer with a focus on that course. Additionally, Nick is revising both math 103 (Ethno mathematics) and math 111 (Symmetry in art and science) and is soliciting input from past instructors.

Professor Jerry Morris continues his work with the Math Consortium Working Group, a group of mathematics textbook authors. This year, the focus has been on preparing new editions for the calculus and multivariable calculus textbooks.
Martha Byrne is coming!

A clear pattern is emerging—for the second hire in a row, the Department selected a Martha as our next tenure track faculty member. Dr. Martha Byrne is joining the department beginning Fall 2016, as the result of a nationwide search for a mathematics educator. She’ll join the very active mathematics education group and be a leader for the secondary education concentration in the math major.

Martha’s research is in undergraduate mathematics education, specifically focused on understanding and easing the transition from computation-based mathematics courses (e.g. the calculus sequence) to proof-based mathematics. Her Ph.D. is from the University of New Mexico, and she comes to us from a Visiting Assistant Professor position at Earlham College in Indiana. She and her family are excited for the move to Sonoma County!

Harmonious Equations: A Mathematical Exploration of Music

In April 2015, Dave Kung from St. Mary’s College of Maryland was the Math Festival Colloquium speaker. Working with SSU’s musicians in residence Saeunn Thorsteinsdottir (cello) and Elizabeth Roe (piano), Dr. Kung orchestrated a talk and performance in three movements—each movement illustrated by musical examples played by the musicians and followed by a movement of Beethoven’s Ghost Trio. The performance was held in SSU’s new Schroeder performance hall (named after the pianist in the Peanuts comic strip), and was supported by a Green Music Center Academic Integration Grant.

Movement 1 discussed the mathematics of vibrating strings and columns of air—the same mathematics in both cases, which explains overtones and our notions of what notes sound good together; the Allegro movement of the trio followed. The second movement explored resonance, which explains both the sound of a violin and tides in the Bay of Fundy; it was followed by the Largo movement of the Beethoven. The final movement of Dave’s talk discussed symmetry in Bach’s fugues, presaging group theory which wasn’t developed until decades after Bach’s death. The final Presto movement of the Beethoven trio concluded the outstanding event.
Math, Stats, and Pi Mu Epsilon Clubs

Our department student clubs have been busy with various events this academic year. Some of the highlights include:

Piner High STEM day – as part of the School of Science and Technology’s partnership with Piner High School in Santa Rosa, Piner students visit campus during spring semester to see SST’s various programs in action. The math club hosted a lively group of about 30 high school students, during which time club members demonstrated a few of the Mathematica programs that our Math 180: Computing for Mathematics students created during Fall 2015. The programs allowed the students to play card games against the computer, gain information about managing an animal population of their choice, and determine an approximate time of death given the temperature of a discovered body at two distinct times. The high school students were highly engaged in the demonstrations and seemed to appreciate the opportunity to see an application of mathematics involving technology.

Pi Day – once again, the SSU community was invited to throw a pie at their professors and club officers to raise money for the department clubs. This year’s event ended up taking place during Geek Week.

Seawolf Decision Day – the club members continue to represent our math department with their smiling faces and puzzle table during Seawolf Decision Day, which was held on Saturday, April 9th this year.

Integration Bee – last year’s first-ever Integration Bee was such a resounding success that the clubs have decided to host another one this spring. Mark your calendars for Tuesday, April 26th from 6-8 pm. Students, faculty, alumni, and guests are all welcome to show off their integrating skills!

Geek Week

An event supported by the math and science clubs of Sonoma State University to bring together and unite the geeks. Now in its sixth year, the event had participation by all but two of the SST clubs. Daily events and tabling by each club occurred during the week. The games are included as part of the Darwin Cup, and each year’s winner gets the Official Darwin Cup Trophy engraved with their club’s name to display in their respective display case!

The Math and Stats Clubs once again participated in this amazing event, placing second overall for the entire week. The clubs’ standout events were Tug of War, Egg Drop, and Symbol Hunt where we placed second, first, and second respectively – way to go, math and stats majors!
Putnam Competition Report

The 76th annual William Lowell Putnam Mathematical Competition was held on December 5, 2015. There were a total of 4,275 participants from 554 institutions across the United States and Canada. Sonoma State's Mathematics Department fielded a team, as usual. The nine SSU participants were Caryn Shreve, Megan Lovejoy, Scott Williams, Elizabeth Hooker, Megan Mueller, Kelsey Rothwell, Riley Conlon, Suzanne Gallegos, and Arielle Foley. Out of a possible 120 points, the median score for all 4,275 participants was zero! This year all nine SSU participants received the median score. All SSU participants will be awarded a silk-screened T-shirt at the annual Awards Ceremony — with the Hindu "behold" proof of the Pythagorean Theorem stenciled on the front.

The William Lowell Putnam Mathematical Competition has been held every year since 1937 (except for a few World War II years) under the auspices of the Mathematical Association of America. William Lowell Putnam, a member of an old established family from Boston, studied mathematics at Harvard. The Competition was established by his heirs to honor him by furthering intellectual competition among universities in North America. The Competition stresses creativity in problem-solving rather than rote knowledge of mathematics.

California Mathematics Project: North Coast

The Department is very active with K-12 schools in Northern California. The California Math Project: North Coast is a partnership between the Math and Stats Department, the SSU School of Education, and the Sonoma County Office of Education whose role is to coordinate professional development for teachers in the region. Ben Ford is the lead faculty member, and many others participate in planning and leading various projects. Brigitte Lahme, Susan Herring, Nick Dowdall, and Carol Keig have all been busy this year.

One of our major projects for 2015-18 is Project Make the Way with the Santa Rosa City Schools. Working with a group of 65 grades K-8 teachers, we’re designing maker challenges to motivate some of the major mathematical work of the grades—for instance, building cars to roll down a ramp, then exploring the relationship between changing weight and distance the car rolls, then using those data to learn about linear functions and the limits of models. If you’re interested, check out the project’s website at https://sites.google.com/a/srcs.k12.ca.us/maketheway/home or follow us on Twitter @SRCSmaketheway

New Staff

Welcome to Dena Peacock, Administrative Coordinator I for Math and Statistics. Dena is back at SSU after a decade stint in the Nonprofit world. Stop by Darwin 114 and say Hello!

Congratulations Class of 2015!
Once again faculty and students had a great turnout at the State of Jefferson Mathematics Congress. Held on the weekend of Oct 2-4, 2015 at the Whiskeytown National Recreation Area near Redding, the math conference provides great opportunity for adventure: cool math, rustic camping, kayaking, swimming and hiking, and a celebratory campfire party.

This year, professors Rick Luttmann, Elaine Newman, Jeff McLean and Nick Franceschine attended along with eight Sonoma State math students. Jeff McLean, our visiting professor for the year, led the afternoon discussion with a hands-on demonstration of simulation techniques in statistics. His talk was titled “Re-randomization Under the Oaks: a New Tool for an Old Test.” Other math talks that day were on solution techniques for the wave equation, and a fresh look at series in calculus.

Food and fun are also essential to any Whiskeytown event. Nick made a much-appreciated bottomless stack of pancakes for breakfast. Our Sonoma group organized a taco-bar potluck dinner. Many folks took advantage of the warm afternoon to hike, swim or kayak.

The State of Jefferson Mathematics Congress is held each year on the first weekend in October. The 2016 Congress will be held Sept 30 through Oct 2. You can find many photos of past events and information about upcoming programs at http://www2.humboldt.edu/sojmc/index.html.
Consider a person who fills a bathtub with water of a certain temperature and steps in to take a bath. After a time, the bath water cools and is no longer comfortable for bathing. To remedy this, the person might turn on the faucet to begin replenishing the hot water in the tub, allowing for more time to relax and cleanse. What is the person's best strategy for keeping the temperature even throughout the tub, and as close as possible to the initial temperature without wasting too much water?

This problem was one of six posed for the 2016 Mathematical Contest in Modeling (MCM), hosted by the Consortium for Mathematics and Its Applications (COMAP). This international competition for undergraduate students challenges teams of up to three students to research, analyze, and report solutions to open-ended problems in applied mathematics over the course of four intensive days. In prior years Sonoma State has consistently had one or more teams participate in the MCM and this year was no exception.

Amy Hammer, Bethany Johnson, and Alexandria (Ali) Williams represented our SSU Math Department in the 2016 contest. The three developed a model to describe how the water in the tub initially cools before the person turns on the stream of hot water, and how it heats after turning on the faucet. They used discrete time steps of sixty seconds in order to approximate the continuous change; in each step, the team calculated the total change in the internal thermal energy of the water and determined the new temperature. These time steps were calculated recursively so that the temperature of the previous time step is used to compute the change in heat and the subsequent temperature for the next step.

The team’s model accounted for heat lost through the water’s surface by thermal radiation, as well as through the tub walls and floor by thermal conduction. The only source of added heat was the contribution from the hot water faucet. To regain the temperature that was lost during cooling, the three students considered different water temperatures and flow rates from the hot water faucet in order to identify the most satisfying bath experience. Their solution takes into account that bathtubs vary in size and materials, and that the water will cool at different rates depending on the weight and size of the person in the tub. Their final results proposed two methods to maintain the initial bath temperature: for those who enjoy a short bath, they suggest using very hot water at a high rate for a short time before reducing the flow and setting the temperature to the desired steady-state temperature; if a longer bath is more suitable, then it is sufficient to run the water at its highest temperature but at a low flow. Their analysis measured the efficiency of these methods by comparing the volume of water lost, and also considers any change affected by adding bubble bath.

COMAP will release the team’s designation of Outstanding, Meritorious, Honorable Mention, Successful Participant, or Unsatisfactory Participant by April 29th. We will report the team’s designation in next year’s newsletter, but if you are unable to stand the suspense (and who would be?), the results will be available to view through COMAP’s website (www.comap.com/undergraduate/contests) on and after that date.

For those keeping track, last year’s MCM team, comprised of Travis Hayes, Ross Jacobs, and Megan Lovejoy, received the designation Successful Participant for the model they developed to determine the best vaccination strategy to control the spread of a disease.
Supporting student and faculty activities

This newsletter is full of articles about student activities and accomplishments – traveling to and presenting at conferences, participating in the Putnam exam and the math modeling competition, etc. All activities are made possible by private donations, mostly from alumni and faculty. A $30 donation helps to pay for a student membership in the AMS. $100 enables a 3-student team to participate in the math modeling competition. A great investment in our students’ future.

If you would like to support our faculty and students in important extra curricular activities, please make your tax deductible donation by going to the department website www.sonoma.edu/math. Any amount would be greatly appreciated.

Does your employer match charitable donations? Check it out and possibly double your impact!