

Oberlin College Mathematics Department Newsletter

Spring 2015

Faculty News

We are excited to welcome a new department member next fall: **Colin Dawson** comes to us from the University of Arizona, where he earned **two** Ph.D.s (!), in Statistics and Cognitive Psychology. His research uses Bayesian statistics to study human cognition. Prior to graduate school, Colin earned a B.A. in cognitive science from Yale University. He will be an Assistant Professor starting in Fall 2015.

We also welcomed two new department members during the 2014-2015 academic year: **Chris Marx** is a new Assistant Professor of Mathematics. He earned his Ph.D. in mathematical physics at UC Irvine and subsequently spent two years as a Bateman postdoctoral fellow at Cal Tech before arriving at Oberlin. **Sarah Bocking-Conrad** is a new Visiting Assistant Professor of Mathematics. She completed her Ph.D. at the University of Wisconsin – Madison in algebraic combinatorics.

We are very proud to announce that **Jack Calcult** was awarded tenure this year. Congratulations, Jack!

It is with great sadness that we bid farewell to two of our wonderful colleagues, **Michael Raney** and **Sarah Bocking-Conrad**. They have both contributed so much to the department and they will be greatly missed. We are also heartbroken that our longtime departmental Administrative Assistant, **Cathy Murillo**, will retire at the end of this academic year. Cathy has been the glue that holds the department together for the past 17 years. We are all having great difficulty imagining next year without her.

Faculty Updates

Sarah Bocking-Conrad has thoroughly enjoyed her year as a Visiting Assistant Professor at Oberlin. She has loved being a member of the Oberlin faculty and getting to know all of the students. This year, Sarah traveled to the Joint Mathematics Meetings in San Antonio, TX and to the Ohio Section Meeting of the MAA (which actually took place in West Virginia!). She also gave invited talks at Kent State University and at the University of Akron. She is looking forward to joining the Mathematics Department faculty at DePaul University in September.

Bob Bosch spent the 2014-15 academic year on a Research Status appointment, working on a book on optimization and the visual arts. His paper "Designing Game of Life Mosaics with Integer Programming," with Julia Olivieri '16, was published in the Journal of Mathematics and the Arts. The article (and accompanying artwork) are available as a free PDF at <http://www.tandfonline.com/doi/full/10.1080/17513472.2014.982483>

Jack Calcult had an honors student in low-dimensional topology (Jules Metcalf-Burton '15). They wrote a paper proving a folk-lore result of the late Bill Thurston. Jack spoke at an annual workshop on geometric topology at the University of Wisconsin-Milwaukee, and at the Ohio State University. Jack submitted a paper on polygons in hyperbolic space and a joint paper on three-dimensional manifolds. He also received tenure this year.

Susan Colley had a relatively quiet 2014-15 year, spent mostly in recovery from her now-expired term as department chair. Her paper, joint with Gary Kennedy of Ohio State and Florian Block of (at the time) UC Berkeley, "Computing Severi degrees with long-edge graphs," appeared in December in a special issue of the Bulletin of the Brazilian Mathematical Society commemorating the 70th birthdays of Steven Kleiman (her doctoral adviser) and Aron Simis. Throughout the year, Susan supervised the Honors work of Drew Wise, who learned all about tropical algebra and tropical geometry, an exciting new field of mathematics. Otherwise, Susan served as the Presiding Officer of the College Faculty for calendar 2014 and she was recently elected to a four-year term on the Nominating Committee of the Mathematical Association of America.

Chris Marx gave one of seven mini courses at the introductory workshop to a six month program at the Isaac Newton Institute in Cambridge, UK, on Periodic and Ergodic Spectral Problems. His 6 lectures focused on Artur Avilas "Global theory of quasi-periodic Schrödinger operators, an important aspect in Avila's Fields medal in 2014. At Cambridge, Chris also came to realize that after only a few months at Oberlin, he had already gotten so used to the fancy, high-quality chalk that the Oberlin Math Department prides itself on (and rightly so!), that it is almost impossible and painful to use anything else. Chris published one paper in the dynamical systems journal *Nonlinearity*. Jointly with Svetlana

Jitomirskaya, he wrote an invited review article for Ergodic Theory and Dynamical Systems, surveying the results and developments in the Spectral Theory of Quasiperiodic Schrödinger-type Operators in the last decade.

Michael Raney coordinated the review sessions for the 2014 Putnam Exam, leading our students to an extremely impressive showing on a difficult national mathematics contest (for more information, see the Student News section below). He has been hired for the 2015-2016 academic year as an Assistant Teaching Professor in the Department of Mathematics and Statistics at Georgetown University. Michael is filled to the brim with gratitude for the wonderful support that he has received from his colleagues at Oberlin during his six years of service. He will miss the department tremendously.

Lola Thompson received an AMS-Simons Travel Grant to travel to work with her research collaborators. She recently co-authored a paper on “Systoles of arithmetic hyperbolic surfaces and 3-manifolds.” This year, she organized two major number theory conferences and founded the Cleveland Area Number Theory Seminar (along with faculty from Kent State University and Kenyon College). She has given several talks on her research over the past year, including an invited hour-long lecture at the American Institute of Mathematics. On the teaching side, Lola was thrilled to have the opportunity to develop an inquiry-based course in Group Theory, which she taught in Spring 2015. Lola has also been heavily involved in activities that promote undergraduate women in mathematics. This year, she gave a plenary talk at the Southeastern Conference for Undergraduate Women in Mathematics and served as an invited panelist at the Nebraska Conference for Undergraduate Women in Mathematics.

Jim Walsh received a Curriculum Development Fellowship to design a new course on The Mathematics of Climate Modeling, which was taught for the first time this spring. He also mentored an honors student, Jess Banks, whose project is titled “Learning in discrete-time neural networks.” Jim is staying active in his field of research by attending numerous conferences and co-organizing the MCRN’s weekly PaleoSeminar webinar. He gave an invited talk in the Special Session on Conceptual Mathematical Models in Climate Science at the AMS Northeastern Sectional Meeting in Washington DC. His paper, “On the Budyko-Sellers energy balance climate model with ice line coupling,” coauthored with C. Rackauckas OC ‘13, has recently been accepted for publication in the journal *Discrete and Continuous Dynamical Systems - Series B*.

Elizabeth Wilmer is completing her first year as the Mathematics Department Chair. She recently published a paper on hypergraphs with Alex Scott (Oxford University), who was the Distinguished Visitor in her Combinatorics class this spring.

Jeff Witmer developed a new course, Statistics and Modeling, and offered it for the first time in the fall. He attended the International Conference on Teaching Statistics in Flagstaff, AZ in July. The fifth edition of his book, “Statistics for the Life Sciences,” was published this winter. He is continuing to do consulting work on Medicare and Medicaid fraud cases. (In October, this took him to Santa Fe, NM to testify at a hearing.) On a lighter note, Jeff was the champion of the Math Department’s World Cup Soccer Pool last summer.

Kevin Woods published the paper “Presburger arithmetic, rational generating functions, and quasipolynomials” in the *Journal of Symbolic Logic*; he wonders how obvious it will be to readers that he knows very little about Logic. He also enjoyed teaching a First Year Seminar on game theory and cooperation.

Robert Young continues to do research for a textbook on “Infinity.” The pace is slow but the progress is clearly visible. He’s now up to the number 6.

Student News

Honors Students. This year, three Oberlin students wrote Honors theses in mathematics:

- **Jess Banks** worked under the direction of Jim Walsh. Their thesis is titled “Learning in discrete-time neural networks.”
- **Jules Metcalf-Burton** worked under the direction of Jack Calcut. His thesis is titled “Theta Curves and Dehn’s Lemma.”
- **Drew Wise** worked under the direction of Susan Colley. His thesis is titled “Tropical Linear Algebra: Notions of Rank over the Tropical Semiring.”

Putnam Exam. This year, 13 Oberlin students took the Putnam Exam, a notoriously difficult national college-level mathematics contest in which the median score across all test-takers is a 1 (out of 120 possible points). Second-year student Nathan Paige earned the top score among all of the students at Oberlin. Nathan placed in the top 500 students nationally! In addition, 6 of the 13 Oberlin students who took the exam this year scored in the double digits.

Mathematics Department Tea. Earlier this year, a few eager students approached us about organizing a weekly Mathematics Department Tea. The Mathematics Department Tea has been a smashing success. Every week, students turn out in droves to feast on cookies and socialize with other math majors. The event is completely student-driven (but there is strong attendance on the faculty side as well). We hope that the Math Department Tea will help to foster a greater sense of community among the math majors.

Student Awards. This year, several of our mathematics majors were recognized for their outstanding academic achievements. Third-year student Julia Olivieri was awarded a prestigious Goldwater Fellowship. Second-year student Andrea Allen received a Claire Boothe Luce Fellowship. Third-year student Bobby Dorward received an award for giving one of the best undergraduate talks at MathFest. Fourth-year student Jules Metcalf-Burton was this year's Orr Prize winner.

Department Activities

The Math Department hosted four high-profile speakers who delivered our annual named lectures:

Frank A. Farris (Santa Clara University) gave the Tamura/Lilly Lecture on "Seeing Symmetry: A Talk about a Mathematical Art Show."

Alex Castro (Pontificia Universidade Catolica do Rio de Janeiro and Imperial College) gave the Lenora Lecture on "Flat but not Bland, or some Surprises from Linear Algebra."

Alex Scott (University of Oxford) was this year's Distinguished Visitor. He gave a series of lectures in Elizabeth Wilmer's Combinatorics course. In addition, he gave the Fuzzy Vance Lecture on "Colouring graphs."

Gary Kennedy (Ohio State Mansfield) was this year's Honors examiner. He gave a talk entitled "Bend, Pinch, Break, and Count."

We were fortunate to have several additional visitors who gave talks for our students:

- **Susan Margulies (US Naval Academy)** – "Hilbert's Nullstellensatz, Linear Algebra and Combinatorial Problems."
- **Judy Holdener (Kenyon College)** – "When Thue-Morse meets Koch."
- **Amber Russell (University of Georgia)** – "Necklaces, Symmetries, and Young Diagrams: An Introduction to Representation Theory."
- **Noah Aydin (Kenyon College)** – "The Legacy of Medieval Islamic Math and Science: A Few Examples."
- **Paul Pollack (University of Georgia)** – "Summing Divisors: A Status Report on the First 2000 Years."

Alumni Updates

Joseph Soloman, '49 Sadly, I never pursued my undistinguished mathematics work at Oberlin and was confined to business arithmetic. I do look forward with pleasure to this last reunion. Thank you for asking.

Denny Gulick, '58 For me life is much the same as during the past years. I continue to teach mathematics at the University of Maryland, and to put together the teaching schedules for nearly 100 colleagues in the Mathematics Department. I continue to be much interested in issues related to teaching and learning mathematics, and am on a number of statewide committees. My wife Frances and I continue to send friendship dolls to Japanese elementary schools, and we are invited nearly every summer by Japanese to visit schools receiving these friendship dolls, whose goal is to help children appreciate people of other cultures. I also play the cello when I get time.

Neil Richards, '60 We continue to hide from Upstate NY winters by spending 4-5 months here in our place in Tucson... howe'er I am back in the consulting/insulting game, & so did a brief re-tool of my CV... the ironic aspect of all this is that virtually the only significant business that Kodak still has, in its own right, addresses this digitization of the printing industry. While I personally find these printing industry dynamics intriguing & fascinating, I am also quite sure that virtually everyone else will cross their eyes & sigh... Neil Richards, class of '60 & the era of "Fuzzy" Vance... Back when we did not have computers, nor as topologists, could we tell the difference between our coffee cups & our doughnuts...

David Kraines, '62 I am in the penultimate year of my "phased retirement": teaching one course per term, advising the math club, and supervising the math competition teams and the summer research students. While I will be giving up teaching - and salary - in a year, I expect to continue with the other activities as long as I am physically and mentally able.

Tom Gregory, '67 Just at present, I am teaching a first-semester calculus course at The Ohio State University at Mansfield, from which I retired in 2011. The class meets Mondays, Wednesdays, and Fridays from 8:05 a.m. to 9:35 a.m. This academic year, I am also teaching every other school day from about 11:30 a.m. to about 1:40 p.m. at St. Peter's High School. There I teach two juniors who are on the class list of the course I am teaching at OSU-M. The two juniors had taken all the regular math courses they could take at St. Peter's. In December, my colleague Michael Kuznetsov visited Mansfield from Nizhny Novgorod (formerly Gorky) Russia to visit his son (who came from Colorado) and talk with me about a paper we have been working on for over a decade. Last year I published three papers that had been disparaged elsewhere in a Hong Kong (I think) journal where one pays to get ones papers published.

Deborah Gray, '72 Starting in 201415, I've dropped to 3/4-time (teaching one math class each semester, along with continuing to do the academic scheduling) at Concord Academy in Concord, Mass. For the last decade, I've been enjoying using voting questions and clickers to motivate critical thinking and discussion in class. With

students and technology ever changing, there's always something new and interesting happening, for which I'm thankful each day.

Alan Frank, '79 I'm married, with two teenage kids. I've started talking with the older one about college and was hoping to come out to my reunion with him, but he has a "college showcase" soccer tournament the same weekend. After a year of grad school at Brown, I went into the computer business, and have spent the last 30 years with a company which develops software for anatomic pathology laboratories. Some of the thought processes are similar to math, but very little actual math. My main contribution on the math front seems to have been the "muffin problem" (<http://wordplay.blogs.nytimes.com/2013/08/19>), which I shared with a friend by e-mail several years ago and has been slowly diffusing through the community.

Christl Donnelly, '88 Since August 2014, I have been working with colleagues at Imperial College London at part of the World Health Organization (WHO) Ebola Response Team. We have analysed epidemiological data to inform policy decisions on, for example, the duration of contact tracing and to evaluate the impact of disease control efforts on disease transmission. It has been a hectic time, but it has been extremely rewarding to be able to contribute to WHO's response to this international crisis. See <http://www.nejm.org/doi/full/10.1056/NEJMoa1411100> and <http://www.nejm.org/doi/full/10.1056/NEJMc1414992>

Bram Boroson, '89 B.A.s in Mathematics and Physics—recently received tenure at Clayton State University in Georgia where I teach astronomy and physics.

Rachel Levy, '89 An Associate Professor of Mathematics at Harvey Mudd College, has begun serving as the Vice President of Education for the Society of Industrial and Applied Mathematics (SIAM). She has been working on mathematical modeling in K-16 and connecting mathematics students to industrial internships. If any mathematics folks are looking for ways to get involved, they could consider serving as a judge for the Moody's Mega Math Challenge, a modeling competition for high school students. The challenge will be going nationwide in the US next year, and soon international!

Carey McDougall, '91 Carey McDougall was named director of academic affairs and associate professor of art at Penn State Beaver in July, 2014 where she is responsible for curriculum development and review; faculty development, hiring, and promotion and tenure, and faculty integration of research and service. She oversees academic assessment, internships, budget management, academic policy and practice, academic standards, and overall representation of the academic interests of the campus. McDougall came to Penn State from Kent State

University (KSU) at Stark as an associate professor of art. At Kent she also served as assistant professor of art; graduate faculty member in the College of the Arts; coordinator of service-learning; Faculty Council chair; Provost Fellow; coordinator of the Womens Studies minor; and regional campus adviser for the Womens Studies program.

Rob Levy, '94 After working as a contractor since 1998, I was officially hired in 2013 as a Civil Servant within NASA's Goddard Space Flight Center (in Greenbelt, Maryland). My work is mainly about using satellites to help characterize and monitor atmospheric aerosols around the globe, as well as to understand aerosol impacts on clouds, weather, climate, and air quality. I live in Silver Spring, where my wife Deborah and I are responsible for 16 legs (kids + pets). I realized how much I miss Oberlin, after attending the 20th cluster reunion last May, and would use any excuse offered by the Department of Math to come visit again!

Elizabeth Tucker, '94 I recently celebrated my 10th year anniversary as a Quantitative Analyst at Google. My kids (12 and 9 years old) are wonderful but growing up too fast. My husband and I are busy and having fun with work and kids and are in constant pursuit of that elusive work-life balance. As a side note, my team is always looking to hire. We mainly hire stats masters and stats PhD's though the position is more of a data science position and other areas of specialty are also acceptable (pure math, applied math, etc). Does Oberlin have "data science" type classes now in the math department? It's a super fun area, I have a great job, and I'd love to encourage Oberlin math majors in that direction. Data analysis is a great way to change the world!

Andreas Pape, '98 I am now a tenured member of the Economics department at Binghamton University. Of particular interest to mathematicians, my work has appeared in *Games and Economic Behavior*, a game theory journal, and *The Journal of Mathematical Psychology*.

Andreas Orphanides, '99 Not sure of the last time I wrote to the newsletter, so here's a quick summary. I'm a librarian now. I make a much better librarian than I ever did a high school math teacher. I work at NC State University, doing instructional design, reference, web development, and some user interface stuff. I also started my first semester in the Master of Computer Science program at State, which will be a nice way to scratch the math itch. I live in Durham with my fellow-librarian wife Gillian, a dog (Camille), six cats (Island Princess, Oregano, Jeremy, Kweku, Ore, Fluffernutter), a tortoise (Aeschylus), three fish, four chickens, eight ducks, and about 150,000 honey bees. Sadly, I probably won't make it to reunion this year, but I'll be thinking of all my Obie friends on commencement weekend!

Laurel Paget-Seekins, '01 Director of Research and Analysis for the Massachusetts Bay Transportation Authority in Boston. It is a learning experience working in the public sector. I also edited a book titled Restructuring Public Transport through Bus Rapid Transit which is due out by Policy Press at the end of 2015.

Shaun Van Ault, '02 I've been an Assistant Professor in the Department of Mathematics Computer Science at Valdosta State University since 2012. Among various notable activities, I've developed an undergraduate Topology course (such a course had not been taught at VSU for over a decade, and not in the format I've developed), and have starting compiling my lecture notes into a Topology textbook. My colleague Sudhir Goel and I have recently been awarded an Affordable Learning Georgia Grant to pursue no-cost options for Calculus courses at VSU. Recent publications include Bott periodicity in the Hit Problem, and Counting paths in corridors using circular Pascal arrays (co-authored with Charles Kicey). Dr. Kicey and I have another paper in the works, and we are in process of writing a monograph on the use of discrete Fourier transforms in various lattice-path combinatorics applications.

Behrad Mahdi, '04 Behrad is working for management consulting firm in Washington, DC focused on public sector organizations. He thinks often of Professor Young his huge, ginormous depictions of points on a plane. This many years later, they still seem egregious. If you're in DC, please reach out: behradmahdi@gmail.com

Daniel Beder, '05 Daniel Beder ('05) teaches high school and middle school orchestra in the suburban DC part of Virginia. He tries the Virginia Math League problems with his high schoolers every month and practices cello regularly, sometimes to the consternation of his cats.

Elaine Hill, '05 I graduated in 2005 with a double major in Applied Mathematics and Economics. Bob Bosch was my rock through the math major and I couldn't have pursued my dream job without it! I was married to Sudhir Singh in June 2013 and I finished my PhD from Cornell University in Applied Economics in May. I recently joined the University of Rochester as an Assistant Professor and Health Economist.

Gary Cohen, '11 I don't have much to share, but I'm an '11 alum and right now I'm in my fourth year of a PhD in Economics at Cornell University.

Jessie Douglas, '12 I moved to the New York area in August, and have recently started working as a software engineer at Google.

Brook Luers, '12 In May I will complete my M.S. in statistics at the University of Wisconsin-Madison. I recently accepted an offer to pursue my Ph.D. in statistics

at the University of Michigan, and I am excited to move to Ann Arbor at the end of the summer. This spring my brother, Dylan Luers '09, was married to Asaki Toda '11, and I attended their ceremonies in Kyoto and in Oberlin.

Samsun Knight, '14 I'm currently a research assistant ("senior research specialist") at Princeton, in their Industrial Relations and Education Research section.

Save The Date!

Next year's Commencement and Reunion Weekend will take place May 20 - 23, 2016. That's the weekend *before* Memorial Day. We hope to see many of you there!