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NEWSLETTER

**DEPARTMENT
OF MATHEMATICS**

UNIVERSITY *of* WASHINGTON



This newsletter is published annually for alumni & friends of Mathematics at the University of Washington

Message from the Chair

As I approach the halfway point of my term as chair, I continue to delight in the successes of our students and faculty. You will learn about these stories in the pages that follow. Let me preview some of them here.

For the sixth year in a row and the twelfth year in the past fourteen, one of our math majors received the Dean's Medal in the Natural Sciences. I imagined that our streak couldn't continue, but that was before I received letters of support for David Jekel from faculty in both Math and Classics, his other major. I knew then that we had a winner, given that the Classics faculty were as in awe of David's talents as our own. He is now off to UCLA to continue his mathematical studies.

Our department has been fortunate to see four of our faculty receive the university's distinguished teaching award, but until last spring none of our graduate students had received the parallel excellence in teaching award. As with David, I was thrilled to learn about Matt Junge in preparing his nomination file. I knew he was a strong graduate student, but had no idea how exceptional a teacher he was until reviewing support letters from a wide range of people who work with him. As a TA, a mentor to other TAs, a classroom instructor, and an inspiring teacher at the Washington Corrections Center for Women, he has had huge impact on a diverse mix of students and colleagues. Another of our graduate students, Cris Negron, completed his PhD with James Zhang last year and received an NSF postdoctoral fellowship, which he is using to continue his research this year at Louisiana State University before taking a position next year at MIT.

Three of our faculty had successful promotion cases last year, their promotions taking effect this past September. Andy Loveless and Jenni Taggart moved from senior lecturer to principal lecturer. Max Lieblich moved from associate professor to professor. They are all immensely talented and valued members of the department, with other talents to spare. Andy is a top-notch tennis player, Jenni a breathtakingly good actor, singer, and director, Max a jack-of-all-trades whose research is expanding from algebraic geometry to machine learning and computer vision, and who is taking the lead in using technology to teach calculus. I learn so much from all three of them.

Two of our newest faculty received major early career awards last year. The Air Force Office of Scientific Research granted Dima Drusvyatskiy one of its Young Investigator awards, while Thomas Rothvoss received a Sloan Research Fellowship from the Alfred P. Sloan Foundation. Both do work that cuts across disciplines. In Thomas's case, his research in theoretical computer science is such a natural fit with the work done by faculty in UW's Department of Computer Science and Engineering that earlier this year he received a regular faculty appointment in their department too. One of our senior faculty, Tatiana Toro, received a prestigious mid-career award, a Guggenheim Fellowship from the John Simon Guggenheim Foundation. In addition to her strong research program, she organized the first Latinos in the Mathematical Sciences conference, held last April at the Institute for Pure and Applied Mathematics at UCLA.

Our newest faculty member is Jayadev Athreya, whom we successfully recruited to join us from the University of Illinois

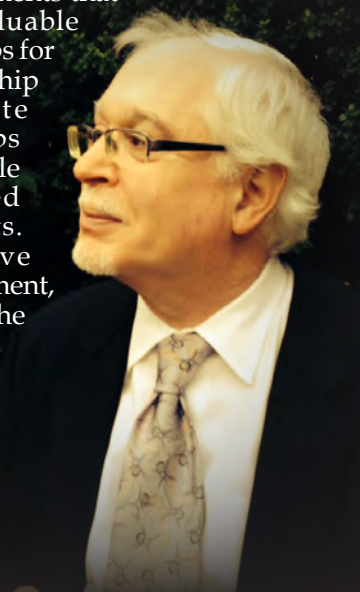
as an associate professor. In addition to his outstanding research and teaching, Jayadev founded and ran the Illinois Geometry Lab, which brought faculty and graduate students together with undergraduates to foster undergraduate research. In addition, it engaged community members across the state with activities from Urbana-Champaign to Chicago. Jayadev has begun to establish a similar program—the Washington Experimental Mathematics Lab—here. I can't wait to see the results.

Inevitably, in parallel with the arrival of the new comes the departure of others. This year, we lost Albert Nijenhuis, a member of our faculty from 1956 to 1964 before moving to the University of Pennsylvania, and then an affiliate faculty member upon retirement, when he and his wife returned to Seattle. His name is well known from his early work in differential geometry, but in mid-career he switched his focus to combinatorics, and he was an active member of our combinatorics seminar on his return.

An early highlight this year was the arrival of Laure Saint-Raymond from Paris to give our Milliman Lecture series. She is an exceptional mathematician. Moreover, she is only the second woman to speak in the series since its start in 1984, the first since Ingrid Daubechies spoke eighteen years ago. We will not have to wait long for our third woman. Fan Chung from UC San Diego has agreed to be a Milliman Lecturer next year, with Curt McMullen of Harvard coming this May.

I will close with some comments on the university's budget. A few years ago, just as the state was cutting its direct funding to UW and the university was compensating with large tuition increases, the university moved to a new budget model that sent the increased tuition funds to colleges based on student enrollments. This favored our college, Arts and Sciences, and indirectly our department as well. At the end of last June, with the biennial legislative session going down to the wire as it did two years earlier, the Legislature agreed to a two-stage cut of 15% in resident undergraduate tuition, with lost funding to be replaced (in large part, but not completely) by an increased state allocation to the university. As welcome as a tuition reduction is, this is likely to have a negative impact on the college's operations, and ultimately on our own. As the state-funded portion of our budget waxes and wanes, the private gifts and endowments that we receive provide valuable stability, with scholarships for undergraduates, fellowship support for graduate students, professorships for our faculty, and flexible funds that can be used to support their efforts. To all of you who have contributed to the department, on behalf of all of us in the department, thank you. Your generosity makes such a difference in the work we do.

-RON IRVING



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CUTTING a WIDE SWATH with MATH and CLASSICS

This article appeared originally in the June 2015 issue of *Perspectives*, a publication of the College of Arts and Sciences.
Story by Nancy Joseph, photo by Isaiah Brookshire

WHEN David Jekel was looking at colleges, he had in mind a small Christian school, similar to his high school. Then he visited the University of Washington. “I realized that it would be a good idea to have a bigger, more diverse group of people to interact with,” he recalls. “I thought it would be a good mind-broadening experience.”

Evidently so. Jekel thrived at the UW and was recently selected as the College of Arts & Sciences 2015 Dean’s Medalist in the Natural Sciences. He graduated this month with bachelor’s degrees in mathematics and classics—an unusual combination that makes perfect sense to him.

“I am majoring in both math and classics because I want a multidisciplinary understanding of the world,” he explained in an honors essay about his educational goals. “I cannot study everything, but these two disciplines cut a wide swath across the field of human knowledge. Mathematics reveals nature, classics [reveals] human nature.”

Jekel excelled at math from an early age. His small high school had few options in advanced mathematics, so he studied independently from books. That changed dramatically at the UW, where he had opportunities to take graduate courses, pursue research, compete in international math challenges, and serve as a teaching assistant.

“I didn’t really understand what math was until I was a sophomore or junior here,” he says. “It’s one thing to be able to compute things and do some algebra and trigonometry, but when you begin to rigorously prove things and get to some deeper and higher-level results, that is something totally different and much more interesting.”

After his sophomore year, Jekel participated in the Mathematics Department’s Research Experiences for Undergraduates (REU) summer program, which attracts top students from across the country. The students tackle math problems individually or in small teams. “These are open problems, things people haven’t done before,” explains Jekel. “It wasn’t like a math class. It was more like a warm-up for doing research.”

He took his first graduate course the following year and two more his senior year, proving to be “better than our very best graduate students,” according to his professors. Fortunately for the department, Jekel has shared his talents, serving as a teaching assistant for the honors calculus sequences and for the REU summer program.



Jekel has taught his professors a thing or two as well. “He is doing so well I cannot keep up with him,” admits James Morrow, Barbara Sando and Vaho Rebassoo Term Professor of Mathematics, who invited Jekel to work with him on inverse problems for electrical networks. “Each week he comes in with a new set of results. I have never supplied any of his ideas. They are all his own and they are brilliant.”

Classics professors have been equally wowed by Jekel’s intellect. Professor James Clauss can tick off half a dozen areas in which Jekel has done graduate level work, describing him as “scary-smart.” Jekel has twice received the Classic Department’s Jim Greenfield Undergraduate Scholarship in addition to awards in mathematics.

Jekel began studying Latin and ancient Greek in high school, the latter to read the New Testament as originally written. At the UW, he discovered that classics is much more than religious texts. “I realized that there were aspects of the classical sources that I hadn’t been exposed to in my Christian high school,” he says. “There is quite a diversity of ideas in Greek and Roman literature.” A favorite of his is Plato, despite recognizing that Plato doesn’t prove his philosophical theories rigorously. “You can’t read Plato’s writing and not be inspired by it, even if you think he’s wrong,” says Jekel. “It stimulates your thinking in a lot of ways—something it has in common with math. They are both about powerful ideas that changed the world.”

This year Jekel made his own small contribution to changing the world. After taking a UW Honors class about the role of post-secondary education in prison, with prisoners as classmates, he joined HOPE (Huskies for Opportunities in Prison Education), a UW registered student organization that works to provide sustainable and inexpensive educational opportunities to prisoners and educates citizens about the need for prison reform. One recent project was an exhibition held on the UW Quad in May 2015, which featured art by inmates and information about the criminal justice system. Jekel built a model prison cell for the exhibit using PVC pipe, to provide a visceral sense of prisoners’ cramped quarters.

This fall, Jekel will enter a PhD program in mathematics at UCLA, with plans for an academic career as a mathematician. At the UW he tempered his academics with other interests, including church and weekly swing dance sessions; he expects a similar balance in L.A. He also plans to study German and attend a Latin conference in Southern California, and he would like to master three or four more languages. “I can sometimes have overambitious desires,” he says.

Overambitious? Maybe not. As his professors have learned, for David Jekel almost anything’s possible.

To read more about David Jekel, visit his website at davidjekel.com.

UW EXCELLENCE in TEACHING AWARD

Matthew Junge, a Ph.D. candidate, received the 2015 University of Washington Excellence in Teaching Award. This is a campus-wide award given each year to just two of the more than 13,000 graduate students at UW. Of the 68 past recipients, he is the first from the Mathematics Department. Matt has also received the department’s Excellence in Teaching Award and the R. Tyrrel Rockefeller Fellowship for Research Excellence. His research is in discrete probability, with Chris Hoffman serving as his advisor.

Matt is involved with many aspects of teaching at UW. As the department’s Lead TA, he was responsible for training and overseeing all of the incoming graduate students in their teaching. His website, mathjunge.com, is widely used by grads and undergrads for calculus materials. It includes a blog, MathVan, about living in his van while traveling the country speaking about his research. Matt was also involved in the development of the department’s online calculus course. Currently, as the department’s Graduate Student Representative, he speaks to faculty on behalf of the graduate students and promotes community in the department.

Undergraduate research is another priority. Matt has devised and led six projects for the department’s summer Research Experiences for Undergraduates. This year he is leading a probability research group of four talented undergraduates. He cites Jim Morrow as very influential in his approach to creating meaningful research opportunities for students. Matt also looks for opportunities to engage the community. He has performed mathematical card tricks at the annual UW Mathday for high school students, at the Seattle University Colloquium, at various math clubs, and at Washington Correctional Center for Women (WCCW).

At WCCW, Matt helped design and teach a curriculum that starts with arithmetic and culminates in a “Math in Society” course on discrete mathematics. This was the first college-accredited math course offered at WCCW. Junge got involved out of a desire to reach a more diverse population. “I want to change their perception of math, both for their future success and for the potential impact it will have when they reenter their communities.” The experience altered Matt’s priorities. “Prison education is part of my life. Everyone deserves the empowerment of education.” He will again teach Math in Society this winter.

Besides mathematics, Matt enjoys playing guitar, writing lyrics and poetry, photography, triathlons, and fostering rescue dogs. He won Seattle’s first barefoot race (5:11 mile), and also a Valentine’s Day haiku contest: *ducks are romantic // with a loaf of bread nearby // and a hand to hold*. This year he is applying for postdoctoral positions and tenure-track jobs. His ultimate goal is to be a professor at a liberal arts college.



GUGGENHEIM FOUNDATION honors UW Mathematician TATIANA TORO

Originally written by Hannah Hickey for UW Today



Tatiana Toro, a University of Washington professor and the department's associate chair, is among 175 new fellows from the U.S. and Canada recognized this year by the Guggenheim Foundation. Winners, chosen from more than 3,100 applicants, receive grants of varying amounts that allow them to pursue creative projects of six to 12 months in the fields of science, academic scholarship, and the arts.

Toro, who holds the Robert R. and Elaine F. Phelps endowed professorship, earned her doctorate at Stanford University in 1992. She held postdoctoral positions at Princeton University and the University of California, Berkeley, and was assistant professor at the University of Chicago before joining the UW faculty in 1996. Her research focuses on mathematical analysis and geometric measure theory. Toro's previous awards include an Alfred P. Sloan Research Fellowship in 1996 and a Simons Foundation Fellowship in 2012. She is an editor for geometrical analysis publications in the Proceedings of the American Mathematical Society, and has held leadership positions with the Pacific Institute for the Mathematical Sciences and the Los Angeles-based Institute for Pure & Applied Mathematics. Her project for the fellowship is titled "Regularity for Almost Minimizers with Free Boundary."

Other local honorees were Rick Araluce, a Seattle multimedia artist who works in miniatures; Karin Davie, a Kirkland multimedia artist; and Zoe Scofield, a Seattle choreographer.

SLOAN RESEARCH FELLOW: Thomas Rothvoss

Last February, the Alfred P. Sloan Foundation announced that Thomas Rothvoss was one of the recipients of a prestigious Sloan Research Fellowship, along with 125 other early-career faculty members in science and mathematics.

Rothvoss's field, optimization, pervades all aspects of mathematical, social, and life sciences, from designing optimal financial portfolios to medical imaging to how one's phone gives driving directions. Rothvoss works at the interface of discrete optimization and theoretical computer science. Much work in discrete optimization has an interdisciplinary character, because one must understand the underlying mathematics of a problem, then develop algorithms that solve or approximate the problem. For example, Rothvoss has designed provably efficient approximation algorithms for classical problems such as the bin packing and Steiner tree problems. He also gave a proof that the solution space for the perfect matching problem cannot be represented as a small linear program, a question in combinatorial optimization that had been open for three decades.

Rothvoss joined the department in January 2014 as an assistant professor. That month, he received the best paper award at the annual Symposium on Theory of Computing for his paper "The Matching Polytope has Exponential Extension Complexity," work described by Lance Fortnow of Georgia Tech as the "complexity result of the year." Just months later, he and Michel Goemans received the best paper award at the Symposium on Discrete Algorithms for "Polynomiality for Bin Packing with a Constant Number of Item Types." In recognition of Thomas's outstanding contributions to computer science, UW's Department of Computer Science & Engineering added him to their faculty earlier this year. This joint appointment establishes an invaluable bridge between our two departments, with Thomas teaching courses and advising students in both.



ASSOCIATE PROFESSOR Jayadev Athreya

by Douglas Lind

"Math isn't just about solving for x," said our newest faculty member, Jayadev Athreya. "We need to inspire students at all levels about the excitement and adventure of mathematical ideas and their discovery."

In his five years at the University of Illinois before arriving in Seattle, Athreya initiated the Illinois Geometry Lab (IGL) to involve undergraduates in small teams coupled with graduate students and faculty to work on research projects. This approach complements the highly successful NSF-funded Research Experiences for Undergraduates that Jim Morrow has been running at the UW. Instead of an eight-week summer program with students from all over the country, the IGL focuses on students at Illinois with semester-long projects. A typical project includes three or four undergraduates, a graduate student, and a faculty member who has overall responsibility. Each semester the IGL involves about 40 undergraduates together with a dozen graduate students and an equal number of faculty. Illinois thought so highly of this idea that they are continuing it with added resources.

Athreya will be initiating a similar idea at the UW, called the Washington Experimental Math Lab (WXML). Teams of undergraduates, graduate students, and faculty will explore problems and ideas both experimentally and computationally. They will be using the freely available SAGE mathematical software package developed at the UW by William Stein. An exciting new twist will be the availability of a 3D laser printer, made by the local Seattle company Glowforge, to create physical objects corresponding to computational results, allowing theory to come alive.

This idea is flexible, extensible, and proven! It will provide our undergraduates with valuable experience and insights into the nature of mathematical discovery, as well as give our graduate students training in mentoring students. The Mathematics Department and the College of Arts and Sciences will provide start-up support and space for WXML, and there are exciting possibilities for corporate support to nurture the kind of talent they want. Jonah Ostroff, a lecturer in the department, will add his own enthusiasm to WXML as Associate Director. One alumnus of the Illinois program, now a graduate student in the UW Physics Department, was so influenced by IGL that he has offered to help set up WXML. Building on the strong connections we already have with local schools, WXML will enrich our outreach activities in the region.

His strong sense of public engagement led Athreya to teach a course in non-Euclidean geometry to a group of inmates at the Danville Correctional Center, about a 45-minute drive from the Illinois campus. "These were the most respectful, self-motivated students I've ever taught," he said. He plans similar outreach here through a program called "University Beyond Bars" at the Monroe Correctional Facility.

Equally important is the exceptionally strong research record Athreya brings to the UW. He has done groundbreaking work in homogeneous dynamics, billiard dynamics, and Teichmüller theory, and is described by one expert as the best of his generation.

Having Athreya join our faculty is a particular pleasure for me, since we shared the academic year 2009-10 at Yale, and I got to know him well through the graduate courses we taught and many other interactions. One remarkable feature of his work is the large number of collaborations he is involved in, partly a consequence of a charm and warmth that is nearly irresistible.



ACTING ASSISTANT Professors



Jeremy Leach

PhD, Stanford University
Research area:
Differential Geometry and
Mathematical General
Relativity



Francisco Munoz

PhD, Yale University
Research area:
Representation theory of
Lie groups



Vasu Tewari

PhD, University of British
Columbia
Research area: Algebraic
combinatorics and
Representation theory



Zhenan Wang

PhD, Northwestern
University
Research area: Probability,
stochastic analysis,
stochastic partial
differential equations

NEW STAFF



Pamela Kelley Elend

Pamela joined the
administrative office in
November 2015 as a
Fiscal Specialist.



Ryan Koza

Ryan joined the student
services office in May
2015 as an Academic
Counselor.

2015 MILLIMAN SPEAKER:

LAURE
SAINT-RAYMOND
PROFESSOR OF MATHEMATICS

UNIVERSITY OF PARIS and
ÉCOLE NORMALE SUPÉRIEURE



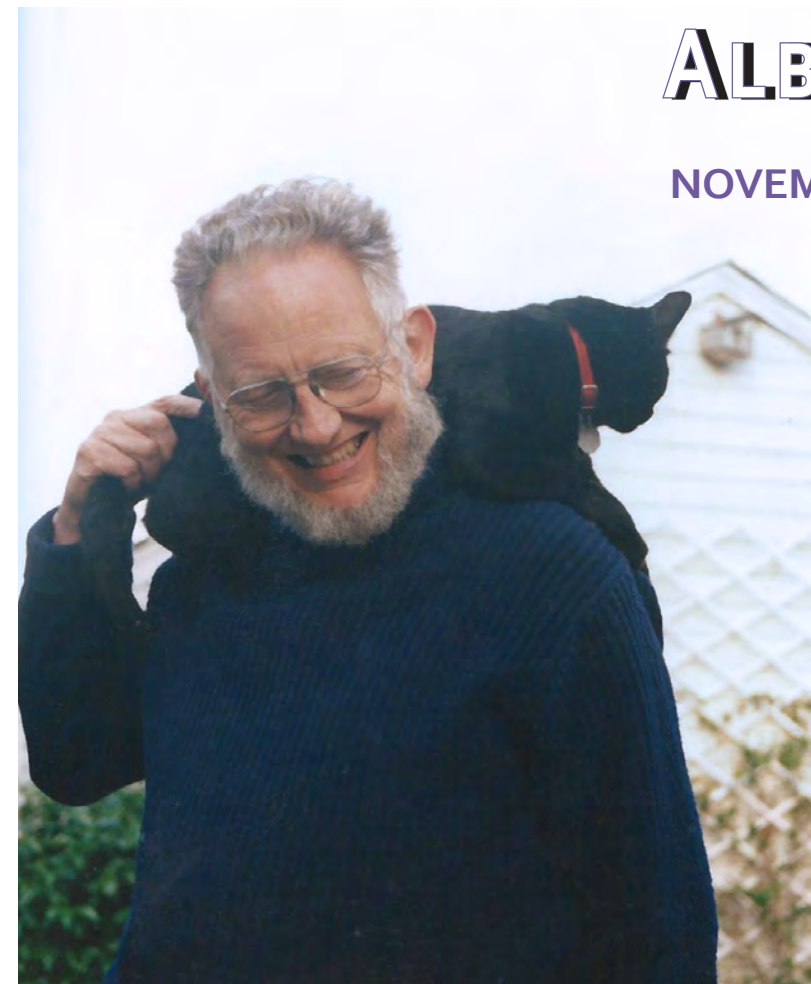
In 1983, Grace Milliman Pollock and her husband S. Wilson Pollock established the Wendell Alfred Milliman Endowed Fund to honor her brother Wendell, who received his mathematics degree from us in 1926. Wendell would go on to a successful actuarial career, founding in 1947 what is now one of the largest actuarial consulting firms in the world. The Milliman fund allows us to bring a distinguished mathematician to campus each year to give a series of lectures. Our latest Milliman speaker, this past October, was Laure Saint-Raymond of the University of Paris and the École Normale Supérieure, whose work in partial differential equations and statistical

mechanics has had a large impact. Her lecture series was titled "From Particle Systems to Kinetic Equations."

Professor Saint-Raymond has received many honors, including the European Mathematical Society Prize and the American Mathematical Society's Ruth Lyttle Satter Prize. In 2013, she was elected the youngest member of the French Academy of Sciences, and in 2014 she was an invited speaker at the International Congress of Mathematicians in Seoul. She is also an accomplished cellist, who shares her passion for music and mountains with her husband and six children.

ALBERT NIJENHUIS

NOVEMBER 21, 1926 - FEBRUARY 13, 2015



was Chair, and was pushing to build up the department's strength in differential geometry. He was a Professor when I arrived as a naïve Assistant Professor here in 1962. I was becoming interested in analysis on symmetric spaces at that time. When I started in this direction, I began to feel keenly that I knew very little differential geometry and algebra, both of which were essential to where I wanted to go. Albert was on a Guggenheim Fellowship then, and was spending the second year of the fellowship in Seattle. He was running a seminar on Differential Geometry that I attended and he attended a seminar on Lie algebras that I started in order to study Harish-Chandra's work, and we became friends.

Very soon afterwards, in 1963, Albert received an offer from the University of Pennsylvania which he accepted. Richard Kadison had moved there from Chicago and was charged with refreshing the luster of the Math department's ivy. He conducted several raids (some friends began to call him the Viking), and we suffered by losing both Albert Nijenhuis and Michael Fell, who were recruited by him. Fortunately, although Albert accepted the Penn appointment as of Fall 1963, he stayed on in Seattle, on leave from Penn, until 1964, which enabled me to continue our seminar for another year. Michael Fell left two years later in 1966. I felt their

loss keenly, but of course, one survives.

Earlier this year, in February, we lost another colleague, Albert Nijenhuis, at the age of 88. His early history is very interesting. He was born in Arnhem, Holland, and was schooled there. During his middle school and high school years Holland was engulfed by World War II, and these were years of great distress and privation for his family. During his last year of high school, the Nazis occupied Arnhem, and Albert spent that year at his grandparents' farm, studying for the State examinations completely on his own. He passed those in 1945, and entered the University of Amsterdam the same year. Clearly, the stresses of the war had no effect on his intellectual acumen, as his career at the University shows: Candidat (= a Bachelor's degree) in 1947, Doctorandus (= a candidature for a doctorate) in 1950, and Ph. D. in 1952. Albert then came to Princeton University as a Fulbright Fellow. D. C. Spencer had just joined Princeton in 1950, and (naturally) Albert became interested in deformation theory at that time. Albert was a student of Jan Schouten in Amsterdam, and although his training there must have been largely in the fashion of local differential geometry, which was the ruling genre there, he was among the first to see the need to use much more Algebra in the study of Differential Geometry in order to understand global properties. No doubt the milieu in Princeton played a role in this. Early in his studies, in 1951, he had discovered the Nijenhuis Tensor, which was later to play a role in the integrability of almost complex structures on a manifold (in the Newlander-Nirenberg Theorem). But, as he told me once, his point of view till he came to Princeton was "local index pulling" and "coordinate transformations". It was there that he began to develop his interest in algebraic methods (via cohomology) in the study of deformation, a field to which he made significant contributions.

Albert's association with our department goes back to 1956, when he joined the department as an Assistant Professor. This was when Carl Allendoerfer

After his departure for Penn, Albert continued his work on deformations for some years, but his interests slowly shifted towards combinatorics, a field in which he worked closely with Herbert Wilf. For several years after his departure for Penn, Albert and his wife Marianne visited Seattle off and on during the summer and kept in touch with friends. Although those visits suffered a lull after some time, their love for Seattle never diminished, and they promptly moved back here after Albert retired in 1987. Of course, they resumed their old friendships and made new ones. Albert became an Affiliate Professor in our department and participated in several ways in its life. During these years, I became aware of the non-mathematical side of his personality. He had a breadth of education that is typical of the European system of the nineteen thirties and forties, and also had an impressive adeptness at mechanical tasks - (impressive to me anyway, brought up as I was as a mechanical incompetent). He was very good at woodworking and putting together all sorts of gadgets. He was a self-taught electrician, a very competent plumber, and a general Johnny-come-handy. He was greatly fond of maps, and knew a lot about them. He read widely, and retained a lot of it. He enjoyed food and wine, and above all conversation and laughter. Marianne had established a sort of tradition of hosting their many friends at an annual Rijstafel of Indonesian food, and we spent many wonderful evenings at these gatherings, and of course on other occasions also.

In the last couple of years, Albert's health was failing, but he managed to keep his cheerfulness. Most people in the department may not have known him. This is but natural, given the context. But those of us who did were privileged to have known a most enjoyable personality.

-Ramesh Gangolli

STUDENT HONORS

GRADUATE AWARDS

Academic Excellence Awards

Yifan Chang, Alex Voet, Liang Ze Wong

Excellence in Teaching Awards

Christian Rudnick and Amy Wiebe

Gerald B. Folland Fellowship

Jair Taylor

McKibben and Merner Fellows

Daiwei He and Yue Zhao

R. Tyrrel Rockafellar Fellowship

Matthew Junge

Tanzi-Egerton Fellow

Jessica Merhej

Thomas and Grace Tseng Fellowship

José Alejandro Samper

NSF POSTDOCTORAL FELLOW

Cris Negron received the 2015 *Mathematical Sciences Postdoctoral Research Fellowship* from the *National Science Foundation*. Already the recipient of a National Science Foundation Graduate Research Fellowship, Cris worked on noncommutative algebra and noncommutative algebraic geometry under the supervision of James Zhang. He is continuing his research this year at Louisiana State University, and will move to Massachusetts Institute of Technology next year.

UNDERGRADUATE AWARDS

Gullicksen Award for Outstanding Junior

Collin Litterell

First Year Honors Calculus Award

Jasper Hugunin

Second Year Honors Calculus Award

William Dana

Outstanding Graduating ACMS Major

Natalie Chow

Outstanding Graduating Senior

(B.S. Comprehensive Major)

David Jekel and Nikolay Malkin

Outstanding Graduating Senior

(B.S. Standard Major)

Sunjay Cauligi

Outstanding Graduating Senior

(B.A. Standard Major)

Chris Alfino

Outstanding Graduating Senior

(B.A. Teacher Preparation)

Adam Wagener

Putnam Exam Outstanding UW Score

Jasper Hugunin and William Dana

GRADUATING CLASS: 2014-2015

DOCTORATE:

Yajun An (Ken Bube, advisor)

"Finite-Difference Methods for Second-Order Wave Equations with Reduced Dispersion Errors"

Yajun is currently a visiting assistant professor at Pacific Lutheran University.

Camil Aponte Román (John Palmieri, advisor)

"Graded Group Schemes"

Joel Barnes (Steffen Rohde, advisor)

"Conformal Welding of Uniform Random Trees"

Joel is currently an Associate at Goldman Sachs.

Peter Caday (Gunther Uhlmann, advisor)

"On Numerics and Inverse Problems"

Peter is currently a postdoc at Rice University.

Alberto Chiecchio (Sándor Kovács, advisor)

"Towards a non-Q-Gorenstein Minimal Model Program"

Alberto is currently a visiting assistant professor at the University of Arkansas.

Lindsay Erickson (Sándor Kovács, advisor)

"Deformation Invariance of Rational Pairs"

Lindsay is currently a software engineer at Google.

Christopher Jordan-Squire (James Burke, advisor)

"Convex Optimization Over Probability Measures"

Christopher is currently a Research Scientist at Amazon.

Ru-Yu Lai (Gunther Uhlmann, advisor)

"Inverse Problems for Scalar Elliptic Equations and Systems"

Ru-Yu is currently an assistant professor at the University of Minnesota.

Stephen Lewis (Tatiana Toro, advisor)

"Local Set Approximation: Infinitesimal to Local Theorems and Applications"

Stephen is currently a software engineer at Panopto.

Kaloyan Marinov (Gunther Uhlmann, advisor)

"Inverse Boundary-Value Problems on an Infinite Slab"

Kaloyan is currently a postdoc at the Technical University of Denmark.

Brendan Pawlowski (Sara Billey, advisor)

"Permutation Diagrams in Symmetric Function Theory and Schubert Calculus"

Brendan is currently a postdoc at the University of Michigan.

Richard Robinson (Rehka Thomas, advisor)

"The Positive Semidefinite Rank of Matrices and Polytopes"

Richard is currently a software engineer at Microsoft.

Andrey Sarantsev (Soumik Pal, advisor)

"Competing Brownian Particles"

Andrey is currently an acting assistant professor at the University of California, Santa Barbara.

Simon Spicer (William Stein, advisor)

"The Zeros of Elliptic Curve L-functions: Analytic Algorithms with Explicit Time Complexity"

Simon is currently a data scientist at Facebook.

Tvrtko Tadić (Krzysztof Burdzy, advisor)

"Time-like Graphical Models"

Tvrtko is currently a software engineer at Microsoft.

Xingting Wang (James Zhang, advisor)

"Classification of Connected Hopf Algebras up to Prime-Cube Dimension"

Xingting is currently a visiting lecturer at the University of California, San Diego.

Yang Yang (Gunther Uhlmann, advisor)

"Three Elliptic Inverse Problems"

Yang is currently a visiting assistant professor at Purdue University.

Pal Zsamboki (Max Lieblich, advisor)

"Toward the Compactification of the Stack of Lie(G)-forms Using Perfect Complexes"

Pal is currently a postdoctoral fellow at the University of Western Ontario.

MASTER'S:

Tim Carrell (Thomas Duchamp)

Kyle Curlett (James Morrow)

Joanna Gaski (William Stein)

Sean McCurdy (Tatiana Toro)

Joshua Swanson (Sara Billey)

Hanchao Wang (Zhenqing Chen)

BACHELOR'S:

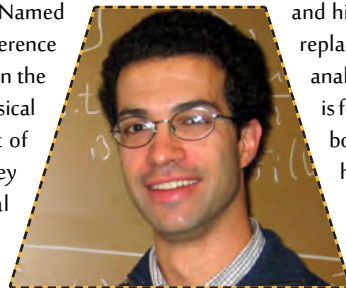
181 in Mathematics

71 in Applied & Computational Mathematical Sciences

FACULTY PROMOTIONS

Professor **MAX LIEBLICH** surfaces in positive characteristic lay mostly dormant until 2011, when

works primarily in algebraic geometry, a field that studies the delicate interface between algebra and geometry. In the last several years, he has focused on phenomena attached to certain objects called K3 surfaces. Named after Kaehler, Kodaira, and Kummer (and a sly reference to the mountain K2), these surfaces are perched on the edge of our understanding. Like Abelian varieties, classical K3 surfaces are controlled by lattices, but the weight of the lattice is higher, adding a rich layer of complexity. They appear in number theory, cryptography, mathematical physics, and dynamics.



Lieblich, his collaborators, and several others started working on them again. In the last five years, the major questions have been settled. Lieblich, his collaborators, and his students have also worked on precisely how to replace the lattices attached to classical K3 surfaces with analogous objects in positive characteristic; their approach is focused on the derived category, an object that is central to both mathematics and physics. This recent explosion of activity has led to a new round of interesting questions about K3 surfaces and related structures in positive characteristic geometry.

Several of the central open questions about K3 surfaces revolve around their properties in a domain known as "positive characteristic", a strange non-classical world where a positive prime (such as 5) is set equal to 0. This is precisely the domain that is of central importance to number theory and cryptography, and it happens to house a zoo of wonderful and exotic phenomena. After a burst of activity in the 1970s and 1980s, the central questions about K3

In addition to his work in pure algebraic geometry, Lieblich has been expanding his interests toward computer vision and data analysis. He has been working with collaborators at UW and Google to bring new techniques from algebraic geometry into computer vision. He has also been working with collaborators at the UW School of Public Health and in UW Computer Science on a project related to automated human pose detection for the purpose of workplace safety analysis.

Principal Lecturer **ANDREW LOVELESS**

cares deeply about all students at the University of Washington: the exceptional, the struggling, and those in-between. Many of the entry-level classes he teaches involve students who have weak math backgrounds or strong negative feelings about math. The challenge in these classes is to motivate students, change their attitudes, and get them to learn the material all at the same time. Despite their initial attitude, Andy continues to receive some of the highest student teaching evaluations across UW.

Andy's success relies on aggressively and repeatedly putting the material in front of the students' faces, from the two or three additional review and practice problem sheets he provides each week to the newsletters and emails he sends out with general advice about studying and practice exam problems. His office hours are typically overflowing with students. Andy wishes to make UW a better place for all students. He has collected information on the best ways for students to gain entry into various competitive majors in order to better advise his students, helping them find pathways to success. His materials, passion, and energy often provide the spark our students need.



Andy's efforts have been recognized through several awards from the UW Greek community, the Honors Program's Excellence in Teaching award, and UW's 2012 Distinguished Teaching Award. In addition, Andy has mentored faculty, TAs, and tutors across campus. He oversees the Math 125 calculus TAs during the academic year and graduate students teaching their own courses for the first time in summer. For the past two years, he has served as a facilitator in the Faculty Fellows orientation program for new UW faculty.

Andy was an all-conference collegiate tennis player at the University of Puget Sound and still competes locally in tournaments and leagues. He spends most of his free time helping coach his children's many sports teams. He says he is a long suffering Mariners fan, desperately yearning for a World Series to come to town.

Principal Lecturer **JENNIFER TAGGART**

joined the UW Math Department in 2001 and has since taught more than 16,000 students in courses from the Business Calculus sequence (Math 111/112) to Introductory Real Analysis (Math 327/328). She was promoted to the rank of Principal Lecturer this September in recognition of her contributions to UW in the classroom and in shared governance. In the Math Department, Jenni has recently served on the Undergraduate Program, Math Services, and Diversity Committees and has coordinated Math 111/112 and Math 126. She served for six years on the Faculty Council on Academic Standards and acted as the chair of that council's subcommittee for academic programs, which oversees changes to degree programs throughout the Seattle campus. She continues to serve the university on its Faculty Council for Teaching and Learning and chairs its subcommittee on on-line courses.



Outside of her work at UW, Jenni is an active theatre artist. She recently appeared as Molly Sweeney in KTO Productions' Molly Sweeney by Brian Friel at Seattle Center Theatre 4 and directed As a Beaver and an Artist, an original bizarre performance art play that explored the absurdity of human suffering. She will next direct Love Song by John Kolvenbach for KTO Productions, opening in January.

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