



DEPARTMENT OF MATHEMATICS

AT FLORIDA STATE UNIVERSITY

DECEMBER 2016 • WWW.MATH.FSU.EDU

Letter from the Mathematics Department Chair

Dear Friends of the FSU Department of Mathematics,

Three new tenure-track faculty members, one postdoctoral fellow, and two specialized faculty members have joined us since 2015. Dr. Linjiong (Ling) Zhu became an Assistant Professor in Mathematics in August 2015. He is a highly regarded expert on probability theory and financial mathematics. Indeed, he has already succeeded in securing a research grant from the National Science Foundation, an extraordinary accomplishment. Drs. Sam Ballas and Martin Bauer joined our department in August 2016. Sam is an expert on low dimensional topology and geometry whose research focuses on the understanding of various types of geometric structures on manifolds. Martin's expertise is infinite-dimensional Riemannian geometry with applications to shape analysis. Dr. Shu Gu joined the department in August as a teaching postdoc. He is an expert on homogenization theory. Another postdoc, Jakob Moeller-Anderson will join us in January. Also, we are in the process

of hiring three additional tenure-track faculty members this year. Moreover, Diane Maltby and Leah Hollingsworth have joined the department as Teaching Faculty I. The hiring of new faculty is a crucial part of our effort in becoming a top twenty-five program among public universities in the nation. Furthermore, Monica Hurdal and Ziad Musslimani have been promoted to Full Professor, Richard Oberlin has been promoted to Associate Professor with Tenure, and Brian Ewald has been promoted to Teaching Faculty II.

Dan Oberlin and Eko Hironaka retired last summer. Both Dan and Eko enjoyed a distinguished career at FSU. Eko has started a new career as a senior book editor with the American Mathematical Society.

There are some changes to the staff situation as well. Lisa VanMiddlesworth became our Accounting Specialist last year,



Xiaoming Wang, Chair

Kari Aime is now the Graduate Advisor, and Danielle Lewis joined us as our Undergraduate Advisor. Jennifer Anderson is our new Administrative Assistant. Elizabeth Scott from Advising First is helping out with our lower division students.

Faculty and students have received numerous honors. Ziad Muslimani won another German Academic Exchange Services (DAAD) award. David Kopriva was also presented with a DAAD visiting stay award. Giray Okten was granted a prestigious Fulbright award to teach and research in Turkey in Fall 2015. Now, twenty-five of our faculty members enjoy some external research support. This is a historical high! These external grants illustrate the recognition among the peers enjoyed by our fine faculty, and bring in much needed additional resources to the individual faculty, graduate students, and the department. The

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Faculty Awards: Kopriva, Musslimani, Okten Receive Prestigious Awards

Faculty in the Department of Mathematics continue to excel in their research and Professors Kopriva, Musslimani, and Okten have received prestigious awards.

Professor David Kopriva and Professor Ziad Musslimani each received an award from the German Academic Exchange Service (Deutscher Akademischer Austauschdienst or DAAD), which is to support research visits to universities in Germany. This award is considered a prestigious award by FSU. Kopriva received his award in 2015 and Musslimani received his award in 2016. More details about Musslimani's research can be found in this newsletter in the article about Faculty Research.



David Kopriva

Kopriva used his award during his sabbatical in September 2015 to visit Gregor Gassner and former FSU student and now postdoc Andrew Winters at the Mathematical Institute of the University of Cologne and Claus-Dieter Munz at the Institute for Aerodynamics and Gasdynamics at the University of Stuttgart. At the University of Cologne they developed the first provably stable moving mesh spectral element method that would allow flows to be approximated around objects that move in time or change their shape. At the University of Stuttgart, they looked at an issue in their open source fluid dynamics code related to approximation accuracy and curved elements when local refining a mesh.

The work in Cologne led to a paper in a special issue of *Computers and Fluids* (vol. 139, no. 1, 2016) that was put together in Kopriva's honor. Gregor Gassner visited FSU (on the last flight before the airport closed) during hurricane Hermine to continue the collaboration. His colloquium was cancelled, but they worked out their next paper on provable stability for a spectral element approximation of the compressible Navier-Stokes equations in the breakfast area of a hotel in Dothan Alabama, which had



Fulbright Award Recipients in Turkey. Giray Okten is in the back row, center.

power. Gassner thought it was an adventure!

The work in Stuttgart led to the three month visit during the summer of 2016 of Christoph Muller, who is a student there, to work with Kopriva on his masters project related to high order computation of particle and droplet laden flows.

Professor Giray Okten received a Fulbright US Scholar award for Fall 2015. As a part of this award, he visited Bogazici University, in Istanbul, Turkey and taught a class on Monte Carlo methods in com-

putational finance. This class was based on a similarly titled capstone course in the Financial Mathematics program. Okten had a diverse mix of undergraduate and graduate students majoring in Mathematics, Economics, and Engineering.

Okten also worked on a graduate textbook based on his lecture notes for the course he taught in his host university. Although there is still more work to do, the Fulbright grant helped him make significant progress on this project.

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New Faculty

Dr. Lingjiong Zhu joined the Department in August 2015 as a tenure-track Associate Professor. Dr. Zhu's research interests include applied probability and financial mathematics. He's been working on point processes, random graphs, limit order books, credit risk, operational risk, option pricing and other miscellaneous topics with collaborators from NYU, Johns Hopkins University, Colorado State University, University of Denver, Stevens Institute of Technology, CUHK, Sun Yat-sen University, University of Minnesota, UC Berkeley, Morgan Stanley and JP Morgan.

One of his interests, Hawkes processes, are "used to model those complex systems in the world where yesterday's events will have an impact on what will happen tomorrow. There is a time dependence, but what happened ten years ago would have little impact on what happens tomorrow, so the dependence decays over time." He primarily works on the theoretical aspects with large time asymptotics for this particular process, but now he is also collaborating with researchers in Hong Kong on large initial intensity asymptotics. During a talk about the Hawkes process at a SIAM Conference in Financial Math and Engineering in Chicago, Dr. Zhu was asked afterward if he could send all of his papers to one of the gentlemen in his audience. "I asked him why he was interested, and he told me that he was A.G. Hawkes! He's the guy who invented



Lingjiong Zhu

that model and in fact he told me that 40 years ago when he invented the model, he had very few citations. However, there has recently been a large collection of literature on financial applications of his model now that his original 1971 paper has become very popular; he has roughly 100 citations every year on that single paper. So then he told me that if I don't have many citations yet, don't get frustrated, just wait about thirty years!"

To potential graduate students, especially those interested in financial mathematics, Dr. Zhu recommends taking as many courses as possible related to probability. Stochastic analysis, limit theorems, large deviations, stochastic optimal controls are very useful tools in financial mathematics, actuarial science and operations research. In particular, Dr. Zhu is interested in self-exciting point processes that have clustering and

NEW FACULTY, Continued on page 4

Letter, from pg. 1

Dean appointed Richard Bertram as the third Brennan Professor of Mathematics last year. Mark van Hoeij was selected as the second Math Fellow of the Department. Our faculty and students have been invited to give presentations at numerous conferences and workshops.

The Department's productivity remains high. The number of undergraduate majors reached another high at 456. This is the third year our number of majors is above 400. We have awarded 16 doctor-

al degrees, 17 master degrees, and 131 bachelor degrees. We will be soon be classified as a "Group I Public" department by the American Mathematical Society joining many elite departments (who have much more resources than we do).

The Department has organized quite a few activities for the last year. This year's Math Fun Day is another smashing success with more than 800 participants and over 100 volunteers. Our 18th Financial Mathematics Festival is yet another success. The Department will host the SIAM's Southeastern Atlantic

Sectional meeting (SIAM-SEAS 2017) in March of 2017.

I am extremely proud of our faculty, staff, students and alumni's accomplishments. I am also very grateful for the support that the Department has received during the past year. I want to thank our faculty, staff, and students for their hard work and your support!

I wish you and your loved ones a great holiday season and a jubilant new year!

Xiaoming Wang,
Chair

New Faculty, from pg. 3

contagion effects, and the asymptotic structure of exponential random graphs, and directed graphs, and their applications to finance, and social networks. He is also interested in nonparametric structural models in credit risk, dynamic budget allocations in operational risk management, short maturity asymptotics for Asian options, phase transitions in stochastic volatility models, dynamics of order positions in limit order books, transform analysis of Markov processes for option pricing, and optimal investment in dual risk models.

Dr. Zhu grew up in Shanghai and graduated from Shanghai High School in 2005. His mathematical career started at University of Cambridge (BA 2008), and then New York University's Courant Institute of Mathematical Sciences (PhD 2013), where he studied with Professor S. R. S. Varadhan. After a stint at Morgan Stanley, he spent a year and half as the Dunham Jackson Assistant Professor at University of Minnesota before joining Florida State University.



Sam Ballas

In 2016, Drs. Sam Ballas and Martin Bauer also joined the Department as tenure-track Associate Professors. The research interests of Dr. Ballas involve the interplay of geometry, topology, algebra, and dynamics arising from geometric structures on manifolds, while those of Dr. Bauer lie within the field of infinite dimensional Riemannian geometry.

Dr. Ballas is particularly interested in questions addressing different ways

of putting geometry on an object with fixed topology as well as how these different geometries can be described. Says Ballas, "Here is a simple motivating example that illustrates the interaction of these ideas. There are infinitely many rectangles that live in the plane. We reduce the number of rectangles by declaring two rectangles to be the same if one can be obtained from the other by rotating and translating in the plane. After these identifications, there are still infinitely many rectangles but we can describe the space of rectangles by observing that two rectangles are identified if and only if they have the same length and width. In this way we are able to describe all possible Euclidean geometries on a rectangle (a fixed topology)."

Currently, Dr. Ballas' research primarily focuses on understanding convex projective structures on manifolds. Convex projective structures are flexible generalizations of hyperbolic structures. These structures tend to be much less homogenous than their hyperbolic counterparts (i.e. what the geometry looks like depends on the point you are at and the direction in which you are looking). This makes convex projective structures more difficult to understand, but in this less homogenous setting rigidity results such as Mostow-Prasad rigidity break down which allows one to produce interesting deformations that do not exist in the hyperbolic category.

Dr. Ballas was born in Baltimore, Maryland in 1985, but grew up primarily in the Northeastern Ohio city of Youngstown. He attended college at Emory University in Atlanta, Georgia where he received his BS in mathematics (summa cum laude) in 2007. While at Emory he met his wife Nicole. Together, they moved to University of Texas Austin, Texas where Ballas was a graduate student. He received his MA in Mathematics in 2010 and his PhD in 2013. They then moved to Santa Barbara, CA where he was a postdoc at UCSB until he joined the Department of Mathematics at FSU this fall.

Our other new faculty member, Dr. Bauer, joins the Department from Austria.



Martin Bauer

He was at the Technische Universität Wien, Austria from 2003-2008 where he received his Master of Science in Mathematics. He then attended the University of Vienna from 2008-2010 where he received his PhD in Mathematics. Bauer is interested in the study of manifolds of mappings, shape spaces, and diffeomorphism groups. Although his scientific background can be found in these rather pure fields, he enjoys applying the developed theories to problems in fields as medical imaging, computer graphics or mathematical physics. This mix of applied and pure mathematics is an important source of motivation for his scientific direction.

Diane Maltby and Leah Hollingsworth also joined the Department as Teaching Faculty. Ms. Maltby joined the Department in 2015 and Ms. Hollingsworth joined in 2016. They teach courses such as precalculus algebra and college algebra.

New Staff

Undergraduate students are seeing some new, friendly, and helpful faces around the Math Department with the recent addition of two new Math Advisors. Elizabeth Scott joined the Math Department in August 2015 as an Academic Advisor for Freshmen and Sophomores. She is part of the Advising First Team through the Division of Undergraduate Studies and helps students enter their major, take the appropriate coursework, and get engaged in the department and across campus.



Elizabeth Scott

Danielle Lewis joined the Department in March 2016 as an Academic Program Specialist in Mathematics. Her responsibilities are largely advising and helping the undergraduate students complete their major and graduate. Lewis says “I wear many hats in a typical day, some of which are event planning and coordinating with employers to conduct interviews with current students. I serve as the student affairs coordinator for the Math Department, and help our



Danielle Lewis

students be successful and reach their highest potential.”

Ms. Lewis replaced the previous math advisor, Pamela Andrews, who took a new position as a faculty librarian with the University of North Texas where she serves as the Repository Librarian for Scholarly Works. In her new position, she works with faculty to make their scholarship more accessible through their library collection. It involves working

with publishers to negotiate copyright licensing to make articles open-access, and preserving older scholarship so that their entire legacy can stay accessible to others.

Ms. Andrews said she has many fond memories of the Math Department. She said, “It’s incredibly gratifying to help a student look toward their future and put together a plan for job or graduate school applications. I enjoyed being able to encourage their excitement about classes, and about their futures in mathematics. At the same time, I have a great appreciation for the faculty within the Math Department. I consider myself fortunate to have been part of the department, and I learned a lot from their dedication to student success. I think that most of all, I miss my afternoon chats with Dr. Bellenot, and the subsequent office “parties” as passing faculty/ staff would stop by and join in the conversation and laughter.

We wish Pamela well in her new career!



Math Puzzler

In this issue we present a Math Puzzler. The question comes from the FSU High School Math Contest. A prize* will be awarded for the best solution with the clearest explanation submitted by **March 31, 2017**. Solutions can be submitted to newsletter@math.fsu.edu. We hope you are challenged by this Puzzler!

An equilateral triangle is inscribed in a unit square and shares one vertex with the square. Find the length of the side of the triangle.

**FSU Mathematics faculty and their families, and those affiliated with the FSU High School Math Contest (sponsors, participants, math club members, etc.) are not eligible for the prize. The newsletter editor and staff will determine prize eligibility.*



Ziad Musslimani

Faculty Research: Professor Ziad Musslimani

By Dr. Ziad Musslimani

Dr. Ziad Musslimani joined the faculty in the Department of Mathematics at FSU in 2005 and he was promoted to full professor in August 2016. He has achieved a considerable number of highly recognized discoveries in the fields of applied mathematics and theoretical physics with a large impact on mathematical modeling of optical wave propagation in complex media with imposed space-time reflection symmetry.

Professor Ziad Musslimani grew up in a small town north of Israel,

where he attended the Terra-Santa high school. During that time he developed interests and passions for mathematics, especially as it applied to problems related to real life.

When he finished high school, he went on to study Physics at the Technion-Israel Institute of Technology. Soon thereafter, he attended graduate school and majored in quantum optics. After publishing two papers on the subject, he decided to change majors and study applied mathematics. Upon completion of a new BA degree in ap-

plied and computational mathematics, he accepted a fellowship from the Israeli Ministry of Education (the Eshkol Fellowship) to join the graduate school at the Israel Institute of Technology. Together with his thesis advisor Professor Mordechai Segev (a foreign member of the USA National Academy of Sciences), Musslimani wrote several papers on optical vortices. He defended his Ph.D. thesis in 2000. In recognition for his outstanding thesis, Musslimani received the prestigious Rothschild Fellowship which he used for a three year postdoctoral position

at the University of Colorado Boulder, working under the supervision of Professor Mark J. Ablowitz. Three years later, he assumed a tenure-track position in the Mathematics Department at the University of Central Florida, and in 2005, Musslimani moved to Florida State University.

The primary research area of Professor Musslimani is applied and computational mathematics. In particular, he uses mathematical modeling, computational methods and mathematical analysis to study problems related to the physical sciences such as nonlinear optics, fluid mechanics, Bose-Einstein condensation and integrable evolution equations. His theoretical work has been inspired to a large extent by results from laboratory experiments. Moreover, some of the results that were predicted by his models have also been verified by laboratory experiments and featured in popular news magazines. The focus of his research work is on the study of optical wave propagation in nonlinear periodic structures, integrable nonlocal nonlinear partial differential equations and localization in random nonlinear media. He has also been involved in other research topics such as water waves and computational fixed point methods. A unifying theme between these physically unrelated fields is the formation of nonlinear coherent structures such as solitary waves.

While at FSU, Dr. Musslimani together with the group of Professor Demetrios Christodoulides from the University of Central Florida, made major contributions in the area known today as parity-time symmetric optics. It is known in quantum theory that physical observables are associated with self-adjoint operators such as the Hamiltonian (which is the operator that corresponds to energy). This is because the spectra of self-adjoint operators are real. The question that many scientists have been asking for several years is what happens to Hamiltonians that are

not self-adjoint? Do they still describe physical reality? Are their spectra real? It was recently demonstrated that the answer is yes, provided that the operator has parity-time (PT) symmetry. By definition, a Hamiltonian belongs to this class as long as it shares a common set of eigenfunctions with the PT operator. In general, the action of the parity operator P is defined by a reflection whereas that of the time operator T by time reversal (by reversing the arrow of time). Most of the theoretical work on PT related-ideas was done outside the optics domain (mainly in the context of quantum mechanics), making it very difficult to experimentally verify any predictions made by existing PT models.

“The primary research area of Professor Musslimani is applied and computational mathematics. In particular, he uses mathematical modeling, computational methods and mathematical analysis to study problems related to the physical sciences such as nonlinear optics, fluid mechanics, Bose-Einstein condensation and integrable evolution equations.”

Dr. Musslimani, in collaboration with Professor Christodoulides' research group, has written several papers on this topic where a new mathematical model, called the PT symmetric nonlinear Schrodinger equation was put forward that describes wave propagation in PT symmetric optical media. Several predictions have been made based on this model such as double refraction, power oscillations, and eigenfunction unfolding, as well as nonreciprocal diffraction patterns.

Among the most fascinating outcome of this newly emerging field of PT sym-

metric optics is the so-called Non-Hermitian invisibility cloaks. When an optical plane wave propagates in free space, its intensity remains uniform throughout propagation. If on the other hand, if this same wave encounters an obstacle, it will scatter. This scattering process causes the wave front to drastically deform and in turn forces the intensity pattern to vary in space. As a result, the wave after the scatter is no longer uniform and therefore can be detected. At this point the question arises: is there a way to devise a setting in which a constant intensity wave can propagate in a highly inhomogeneous environment without scattering and revealing the object itself? In a recent paper, it was shown that light can propagate through a complex medium while retaining a uniform intensity profile. This is achieved by using a new class of synthetic materials that can locally amplify and absorb light in such a way that the entire PT symmetry of the system is preserved. This engineered material fabric allows constant intensity waves with appropriately chosen phase patterns to propagate in highly inhomogeneous media without deformation. As a result, the object remains invisible in spite of the fact that it contains regions of index contrast and domains where light can be attenuated. This process can be utilized to realize an invisibility cloak.

Dr. Musslimani has received several awards for his contributions to integrable systems, optical PT symmetric solutions, and computational modeling of wave propagation in complex media. During 2016 he received the following prizes: Lady Davis Visiting Professorship Award, Lady-Davis Trust, Israel; CRC – COFRS Award, Florida State University, Non-Hermitian Invisibility Cloaks, USA; DFG (German Science Foundation) Research Award, Germany; DAAD Research stays for University Academics and Scientists, Germany which is recognized by Florida State University Rector as a highly prestigious award.

Recent Biomath Graduate Sarah Kim

Sarah Kim is originally from South Korea where she attended Hanyang University on an academic scholarship because she received the highest entrance exam score. Dr. Kim graduated summa cum laude in 2008 with president's honor and a B.A. in applied mathematics. She continued at Hanyang University and received a Masters in applied mathematics in 2010 under the advisement of Dr. Do Wan Kim. She received graduate research fellowships with LG Corporation Foundation and full conference travel grants from National Research Foundation of Korea.

While volunteering with a medical service team in 2006, she pondered how she could contribute to improving people's health using applied mathematics. This led her to Florida State University where she is now studying Biomathematics. Her desire is to be at the crossroads of mathematics and biology, and she believed the FSU Department of Mathematics could be the right program for her dream.

Dr. Kim received her Ph.D. and graduated in Fall of 2015. Her dissertation work was to develop a mathematical model of the cerebral cortical folding based on a biomechanical hypothesis. Her Ph.D. advisor was Dr. Monica Hurdal.

In their model, deformations of a 2-dimensional model cortex due to pulling axonal tension forces were analyzed through the theory of elasticity. The governing coupled PDEs were implemented computationally using a finite element method. Dr. Kim made a connection to previous biochemical models using Turing systems to explain the previous stages in the development of the

brain before the axons were formed. Dr. Kim was thankful to be able to research on the development of the fetal brain while she herself was pregnant.

About her advisor, Dr. Kim stated, "She [Hurdal] was a tremendous mentor and supporter for me. She always opened the door to listen to my ideas, and being able to meet with her in and out of her office (sometimes at her house) always inspired me. She helped me to navigate the various and unfamiliar territories I experienced when conducting my research, which will be a great asset for my future career."

During her time at Florida State University, Dr. Kim married a tall guy with a great sense of humor and now is the mother of two kids: a toddler girl who loves singing and an infant boy who has

lots of hair. Dr. Kim believes that Florida State University provided her with a wonderful background and training during her Ph.D. There were two particular sequences of course work that she believes helped her the most. The first was Dr. Xiaoming Wang's partial differential equation classes, which helped her to clearly understand what she had done for her Master's thesis in Korea, which at the time she could not thoroughly understand.

The second was Dr. Richard Bertram's Methods of Applied Math 1 (MAM1), which was a great asset for her future research.

While at FSU Dr. Kim had the opportunity to teach mathematics as an instructor as well as a Teaching Assistant. She believes the systematic FSU Math teacher training program contributed to her improvement as a math instructor. She



Sarah Kim
FSU Mathematics Alumna

appreciates the efforts of the FSU Math faculty, including Dr. Penelope Kirby, for improving her teaching skills. While teaching Bio-Calculus programming courses Dr. Kim formed new dreams to develop new math courses for people in medical sciences. Finally, FSU Math gave her an opportunity to meet friends from all over the world who were sweet, willing to help, caring and very smart people. She stated, "I am so blessed to have them as my friends for life."

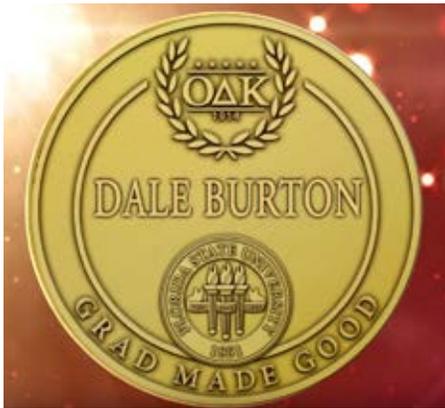
In November of 2015, Dr. Kim joined the Center for Pharmacometrics & Systems Pharmacology (CPSP) in the College of Pharmacy at University of Florida located at Lake Nona. She is working under the supervision of Dr. Lawrence Lesko and Dr. Mirjam Trame on projects involving systems pharmacology modeling to improve drug safety. Specifically, her first project at CPSP focuses on the mechanistic investigation of an adverse drug event (side effect) as a result of drug-drug interactions of targeted therapy drugs in oncology. For her work on this project Dr. Kim was chosen to receive the Presidential Trainee Award at the American Society for Clinical Pharmacology and Therapeutics (ASCPT) 2017 Annual Meeting.

Alumni In The News

Dale Burton

Math Alumnus Dale Burton Receives the 2015 FSU Grad Made Good Award

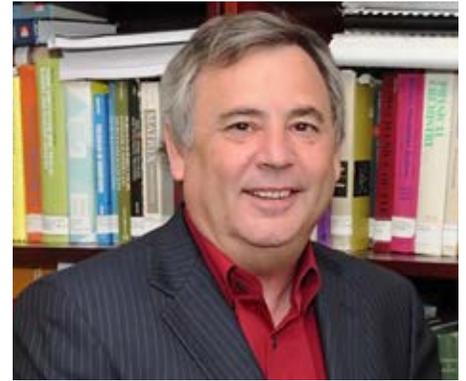
Alumnus Dale Burton (PhD 1981, Tam) was honored as one of FSU's 2015 Grads Made Good by the FSU Alumni Association, recognizing the accomplishments of notable alumni and faculty who have secured their place in the history of FSU by pushing boundaries and redefining standards within their respective fields. Dr. Burton is a member of the National Academy of Engineering



and the Vice President of Research and Technology and Chief Technology Officer of Northrup Grumman Aerospace Systems.

During his visit to FSU for the award ceremony, Dr. Burton spoke with our graduate students about his time working on his PhD under Dr. Christopher Tam's supervision, and his experiences as an applied mathematician after graduation. During his talk, Dr. Burton emphasized the need to be able to communicate your plans and vision with multiple collaborators and stakeholders. You may not like a team member, but you must be able to communicate and work with them to achieve your overall goal. For improving your writing, Dr. Burton recommended the works of Sherlock Holmes in addition to technical writing guides.

Dr. Burton joined Northrup Grumman as a lead engineer and was promoted to chief system engineer the next year, quickly rising to serve as Vice President and Integrated Product Team Leader



Dale Burton
FSU Mathematics Alumnus

for the US Air Force E-8C Joint Surveillance target Attack Radar System (Joint STARS), an airborne ground surveillance, targeting, and battle management system. During its deployment in Desert Storm, Dr. Burton was the only civilian to fly all 37 combat missions and was honored with an Air Medal from the US Air Force's Chief of Staff. Over the next five years, Dr. Burton advanced through the company as department manager of Engineering, Technology and Integrated Logistics Support, and then as Vice President for Advanced Architectures before becoming the sector's Chief technology Officer. In 2007, Dr. Burton was elected to the National Academy of Engineering in recognition of his innovation and leadership.

Alumni In The News

Edward Qian

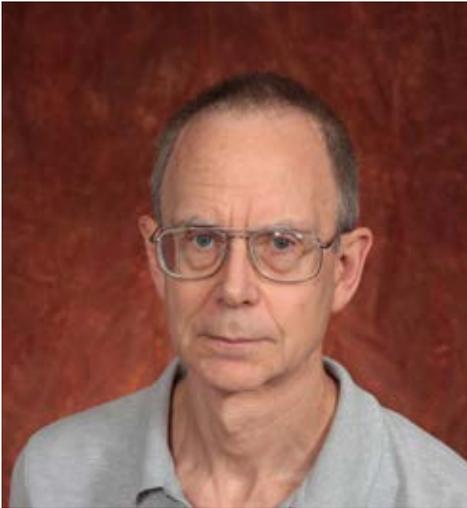
Featured in Bloomberg News

Alumnus Edward Qian (PhD 1993, Hunter) was featured in the September 29, 2016 issue of Bloomberg News (see www.bloomberg.com/news/articles/2016-09-29/quant-who-coined-risk-parity-says-wall-street-has-it-all-wrong) for his cutting edge research and contributions to investment strategies and quantitative equity portfolio management. Dr. Qian is a quantitative analyst with PanAgora Asset Management. He is the Chief Investment Officer and Head of Research, Multi Asset for

the firm. Originally from Hai'an, China, he earned a BS in mathematics from Peking University, his MS from The Chinese Science Academy and his PhD in applied mathematics from Florida State University. He also completed a National Science Foundation Fellow at MIT. Dr. Qian is also the author of a book on "Risk Parity Fundamentals" (CRC Press, 2016) and co-author of the book "Quantitative Equity Portfolio Management: Modern Techniques and Applications" (Chapman and Hall/CRC Financial Mathematics Series, 2007).



Edward Qian
FSU Mathematics Alumnus



Dan Oberlin



Eriko Hironaka

Faculty Retirements

During 2016, two distinguished faculty members retired from the Department of Mathematics.

Professor Dan Oberlin retired after a career of more than 40 years in the Department. He came to FSU in 1974 after receiving his PhD from the University of Maryland. His undergraduate degree was from the University of Tulsa. He was promoted to Associate Professor with tenure in 1978 and promoted to Full Professor in 1983. He has had an enviable career with more than 90 refereed journal articles and essentially continuous support from the National Science Foundation since 1974. He has supervised three PhD students and estimates are that he taught over 5000 students! He was a recipient of a FSU Teaching Incentive Program Award and an FSU Professional Excellence Program Award. His research has to do with spaces of analytic functions, abstract and Euclidean harmonic analysis, and geometric measure theory. His fondest memories of the Math Department are his excellent colleagues, both personally and professionally. In his retirement, he is enjoying music, cycling and traveling.

Professor Eriko (Eko) Hironaka took early retirement from the Department of Mathematics to begin a new career as a Senior Editor at the American Mathematical Society (AMS) Book Program in Boston, MA. The AMS is a non-profit organization of mathematicians that,

among other things, organizes meetings around the country, fund outreach and travel grants, runs many committees that support the math community, lobbies congress on behalf of mathematicians and publishes journals and books. She spends most of her time writing emails, traveling to meetings, talking to book authors, writing reviews, and being on editorial committees. She also writes a blog called "bookends" about books, authors and the evolving world publishing.

Dr. Hironaka was a faculty member in the Department for 19 years. She received her BA at Harvard/Radcliffe College in 1984 and her PhD at Brown University in 1990. She completed two post-docs, one under Szego as an assistant professor at Stanford University and another as a CLTA assistant professor at the University of Toronto. She moved to Tallahassee from Toronto in 1997 after she was hired by Florida State University as an Assistant Professor.

When Dr. Hironaka was hired at FSU she was transitioning from research on topology of algebraic varieties to working on interactions between topology and number theory. This eventually led her to moduli spaces and mapping class groups for Riemann surfaces. She described this transition between focuses as a radical switch from one field to another. She also believes it was a fruitful journey and she is still involved in many research projects

that are informed by all of her past work.

During her time at FSU, Dr. Hironaka participated in a multitude of university and departmental activities and had many responsibilities. She was the Director of Pure Mathematics and took an active role in mentoring students. She was very interested in innovative teaching. Within her classes she gravitated toward a conversational style class, utilizing group discussions. She loved to see students take leadership roles in the classroom, thinking on their feet, asking questions and encouraging others. She had six graduate students: two graduated with a PhD and two are scheduled to receive a PhD this academic year. She estimates she taught over 1000 students at FSU. In 2014 her colleagues in the Department recognized her scholarship by appointing her as the Marion Brennan Professor of Mathematics, which supports an internationally known scholar in the field of mathematics, with a proven track record in research, teaching, and especially mentoring undergraduate and graduate students.

As her positions in the department became more senior she became more involved in discussions of overall issues of the Math Department. She worked on increasing the visibility of the department within the university and the public. She was able to do this by featuring student and faculty achievements on the department website and in the newsletter. One of her proudest achievements at FSU was helping to create and mold the departments yearly outreach event, FSU Math Fun Day.

Some of the fondest memories Dr. Hironaka has include getting to know many of the wonderful people within the Department. She says, "The Department has been like a family to me and supported me throughout the 19 years I spent at FSU. I remember great musical get-togethers and department parties at the FSU reservoir. I remember getting giggles with colleagues during long meetings and taking long walks through campus admiring the trees, plants and deep blue sky." She hopes to visit frequently.

We wish Dan and Eko well in their new paths!

Faculty Promotions

In Fall 2016 the Department was proud to announce the promotions of three of its faculty members: Dr. Richard Oberlin, Dr. Monica Hurdal, and Dr. Ziad Musslimani.



Richard Oberlin,
Associate Professor

Dr. Oberlin works in the area of harmonic analysis. His main interests are in generalized Radon transforms (including the Kakeya problem), time-frequency analysis, and related topics. He received his PhD from the University of Wisconsin in 2007. He was then a VIGRE Assistant Adjunct Professor in the Department of Mathematics at the University of California, Los Angeles until 2010 and an Assistant Professor in Mathematics at Louisiana State University. Oberlin joined the Department of Mathematics in 2013 and was promoted to Associate Professor with tenure this fall.

Dr. Hurdal was promoted to Full Professor. Her research interests lie in the area of computational medicine and imaging and involve using mathematical approaches to investigate, model and visualize information related to the way the human brain functions. She has been working on developing

mathematical models of the developing brain using Turing systems as the basis for pattern formation of the sulci (valleys) and gyri (folds) of the brain. This work uses a coupled system of nonlinear, time-dependent partial differential equations. Her research on creating quasi-conformal “flat” maps of the human brain is also well known within the neuroscience community. She uses methods from topology, conformal mapping, differential geometry, and scientific visualization to create maps of the human brain.



Monica Hurdal,
Full Professor

Dr. Hurdal received a BMath with Honors from the University of Waterloo in Canada in 1991. She worked in industry as a computer programmer for two years until she moved to Australia to complete her MSci in Mathematics and Psychology from the University of Newcastle in 1994 and her PhD in Applied Mathematics from Queensland University of Technology, in Brisbane in 1999. She then moved to the United States to be a postdoctoral research associate at Florida State University, followed by a research scientist position at Johns

Hopkins University. Hurdal joined FSU as faculty in 2001 as an Assistant Professor when she was one of the initial hires for the newly formed graduate program in Biomathematics. She was promoted to Associate Professor with tenure in 2007 and was promoted to Full Professor this past fall.

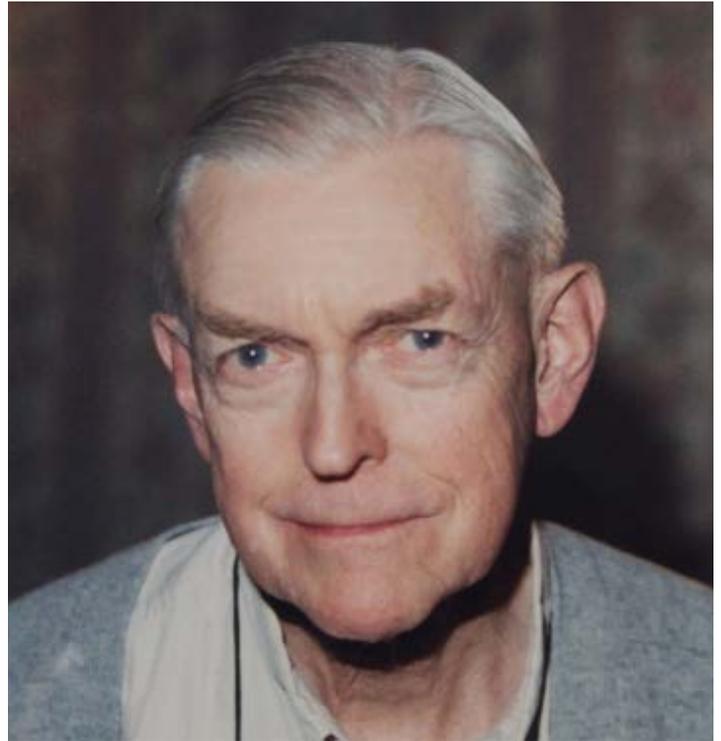


Ziad Musslimani,
Full Professor

Dr. Ziad Musslimani was also promoted to Full Professor this fall. He received his PhD in 2000 from the Technion-Israel Institute of Technology, Haifa, Israel. He was then a postdoctoral research associate at the University of Colorado, Boulder followed by an Assistant Professor at the University of Central Florida. He joined the FSU Department of Mathematics as an Assistant Professor in 2005 and was promoted with tenure to Associate Professor in 2009, followed by his promotion to full professor this fall. The main focus of his research is on linear and nonlinear wave propagation in dispersive media. In particular, he is interested in the formation of coherent structures in nonlinear optical media and Bose-Einstein condensation.



Mika Seppälä



Louis Howard

In Memoriam

In 2015, the FSU Mathematics family lost two great mathematicians: Professor Mika Seppälä and McKenzie Emeritus Professor Louis Howard.

Mika Seppälä joined FSU in 1995 with an initial interest in the study of Riemann surfaces, algebraic curves, and their moduli spaces. He received his Master's degree in 1972 and his Ph.D. in 1978 from the University of Helsinki in Finland. He was involved in teaching and research in Europe prior to joining FSU. During his time at FSU, he maintained multiple international collaborations with the University of Helsinki, including the development of mathematics instruction in Nicaragua and Zimbabwe, and the US-Finnish Science Across Virtual Institutes (SAVI) collaboration with NSF and Finnish funding agencies. Through SAVI, Seppälä authored FSU's Calculus Massive Open Online Course through Word Education Portals (WEPS) and developed learning analytics for its evaluation. As his research increasingly involved big data, Seppälä was also creating a seminar on the "shape of data." He taught more than 50 courses at both the un-

dergraduate and graduate levels in his career at FSU and he was the advisor of several graduate students. Seppälä's last student, Yahya Almalki, is expected to defend his dissertation this academic year under the supervision of Dr. Craig Nolder. Seppälä passed away on January 23, 2015. A celebration of his life was held at Florida State University on Thursday, February 5, 2015. His smiling face and jovial nature are missed by everyone in the Department. His obituary can be found at

www.legacy.com/obituaries/tallahassee/obituary.aspx?page=lifestory&pid=174071147.

Lou Howard, joined Florida State University in 1981 during Dr. John Bryant's term as Chair. He received his MA and PhD in mathematical physics from Princeton in 1952 and 1953, respectively and joined the MIT mathematics faculty in 1955. Coming to FSU from MIT, Howard had already been named a fellow of the American Academy of Arts and Sciences in 1965, and elected to the National Academy of Sciences in 1977. While at FSU, he was named a

fellow of the American Physical Society in 1984. In 1997, he received the Fluid Dynamics Prize of the American Physical Society for "seminal theoretical concepts in the theory of turbulence, stability, rotating and stratified fluid flows, and other fluid dynamical problems, including upper bounding theory of statistically stationary turbulence, semicircle theorems for the stability of geophysical flows, the spin-up problem, and reaction-diffusion and double-diffusion problems." Howard also served as one of the original steering committee members and "founding fathers" for the Woods Hole Oceanographic Institution Geophysical Fluid Dynamics Summer Fellowship Program. At FSU, Howard was the only math professor at that time that had a laboratory, engaging in both experiments and theory. He was known as a willing collaborator; he could listen to any mathematical talk and have an interesting question to ask the speaker afterward. He retired in 1996 but remained an active research long after his retirement. Howard passed away on June 28, 2015 at the age of 86.



Betty Anne Case and Steve Paris after a successful session at Seattle JMM 2016

National Visibility

FSU Math has National Visibility in Actuarial Science Education

By Dr. Bettye Anne Case and Dr. Steve Paris

FSU Mathematics faculty and an alumna joined forces to represent three members of the organizing committee for sessions about teaching actuarial science at the annual national Joint Mathematics Meetings (JMM): Dr. Steve Paris, FSU's Director of Actuarial Science, Dr. Bettye Anne Case, FSU Math Emerita and the founding director of both FSU's actuarial science and financial mathematics programs, and Dr. Michelle Guan, Assistant Professor at Indiana University Northwest. Guan worked as an actuarial teaching assistant with Paris while earning her PhD in the area of Financial Mathematics under the direction of Alec Kercheval and Paul Beaumont. She is well prepared to build Indiana University's fledgling actuarial program. Both Paris and Guan have earned the professional credential Associate Society of Actuaries.

For JMM 2017, the committee now has a program in place that includes recognition of the 25th anniversary of this series of sessions, and of the founding organizer James Daniel, University of Texas. Along with Daniel, some of those who were active in the early days of planning these sessions were Robert Buck (Slippery Rock University, of the current committee), Matt Hassett (Arizona State University), Brian Hearsey (Lebanon Valley College), and Krzys Ostaszewski

(Illinois State University).

When an organizer wants to be replaced, a new committee member is tapped from series audiences. Ostaszewski tapped Case over a dozen years ago. Buck and Paris joined her; they recruited others, forming the current group that includes Patrick Brewer, Lebanon Valley College, Kevin Charlowood, Washburn University, Sue Staples, Texas Christian University, and Guan. Each April, all the members exchange lively emails to identify ideas that are new or urgent, and to find good speakers on those topics. They look for working actuaries local to the JMM site – former students or actuaries of their acquaintance, and include representatives of the actuarial societies. The resulting plan is submitted to the MAA for approval and scheduling at the meeting. The series goal is to give the most recent curriculum and career information to faculty who teach actuarial science so they can best help their students qualify for good careers in the area. Camaraderie develops quickly among session participants (snacks – sometimes with adult beverages – are contributed by credentialing societies and actuarial publishers). Late afternoon scheduling does not conflict with research sessions, and is also most convenient for the local actuaries.

Because of the usual deliberative academic pace for curriculum change, faculty need advanced warning about upcoming credentialing changes. The arduous credentialing process – passing exams and other requirements – is begun in college and typically takes five to ten years after graduation; regular updates are critical for faculty so they can buffer major exam changes for their students. To get information as early as possible, the committee counts on regular communications with representatives of the credentialing societies, mathematical societies, and publishers. The session title in 2016 put the spotlight on this process: “Actuarial Science: Change Is the Norm!”

Members of the organizing committee are well versed in running actuarial programs of all sizes and types. Each year one or two members – often located near that year's JMM site - arrange and moderate the program. Some of the organizers may participate in the program: Paris in 2016 talked about demands on faculty and credentialing and tenure consequences; in 2015, Case (with contributions from Guan) discussed needs of international students in actuarial programs. Buck organized (in 2013 with T. Wakefield) an MAA paper session; he then edited (with M. Huber) a volume of peer-reviewed papers for the journal PRIMUS: Special Issue on Actuarial Education, to which Case, Guan and Paris were contributing authors: Case, Guan, and Paris: “Recruiting and Advising Challenges in Actuarial Science”, PRIMUS Vol 24, Issue 9-10, 2014, 891-903.

For JMM 2017, Paris and Case, living relatively close to Atlanta, were drafted as lead organizers. They have drawn on regional contacts and former students to fill out the speakers. Paris, with two Atlanta actuaries, will describe a current pilot effort at FSU to better support ethnic diversity among actuaries; this is under development with help from the International Association for Black Actuaries. Talks about structural as well as exam-content changes will be given by credentialing society representatives. Case is especially proud that Courtney White, now Principal and Consulting Actuary at Milliman, will talk in Atlanta. With his wife, Shari White, he set up an undergraduate actuarial scholarship awarded yearly at FSU Math Honors Day. FSU Math claims Courtney White, BS Mathematics 1992, as our first actuarial science graduate (in the program's pilot phase he was an advisee of Sam Huckaba, now FSU Dean of Arts and Sciences).



Photo credit goes to FSView, Monica Hurdal and Brian Watts. October 8, 2016

FSU 4th Annual Math Fun Day

On October 8, 2016 faculty, staff and many volunteers came out to create a day of math fun for the local K-12 community and their families. We had 95 faculty, staff and students volunteer to help organize the event and run the activities. Over 700 people came to enjoy the Math Fun Day activities, puzzles, lectures and workshops, in an engaging and informative mathematics atmosphere.

The purpose of Math Fun Day is to cultivate and stimulate mathematics among K-12 school students through fun-filled activities, exciting demonstrations and enriching workshops. There were six classrooms dedicated to themes on Fractals, Mathematical Videos Mathematical Games & Their Strategies, Symmetries and Patterns, Geometric Constructions, and Women in Math. Each room had unique and engaging activities.

Throughout the day there were 12 different workshops and demonstrations. Some of the more popular workshops were Secret Codes, The Game of Chance, Math Modeling Contest, Whose Footprint and Math of Real Estate.

As Math fun Day was coming to an end many people attended a special public lecture on The Marriage Between Math and Experimental Biology, by FSU's very own Dr. Bertram. This special presentation closed out a great day of fun learning!

“Our Department of Mathematics made a wonderful, positive impact on the community with its efforts and contributions to math outreach and community service.”

Dr. Monica Hurdal



Special thanks to all the faculty, staff, and students that gave their time.

Presenters:

Dr. Monica Hurdal

Event Director and Professor of Mathematics, FSU

Dr. Jon Ahlquist

Associate Professor of Meteorology, FSU

Dr. Christine Andrews-Larson

Assistant Professor of Mathematics Education, FSU

Dr. Richard Bertram

Professor of Mathematics, FSU

Dr. Giray Okten

Professor of Mathematics, FSU

Dr. Ben Fusaro

Adjunct Professor of Mathematics, FSU

Dr. Arash Fahim

Assistant Professor of Mathematics, FSU

Dr. Lingjiong Zhu

Assistant Professor of Mathematics, FSU

Dr. Ian Whitacre

Assistant Professor of Elementary Mathematics Education, FSU

Sigrun Ahlquist

Computer Science Graduate Student

Sebnem Atabas

Graduate Student in Curriculum & Instruction

Cihan Can

Mathematics Education Graduate Student

David Mendel

Mathematics Graduate Student

Activity Room Organizers:

Inma Sorribes, Johnna Barnby, and Atanaska Dobreva,

Women in Mathematics Room

Lydia Eldridge and Meng-Chieh (Cindy) Lee,

Patterns and Symmetries Room

John Bikowitz and Leona Sparaco,

Mathematical Games Room.

Carolyn Drobak, Erdal Imamoglu and

undergraduate Jackie White,
Fractal Room.

Aixa de Jesus Espinosa

Video Room

John Bergschneider,

Math Constructions Room

Dr. Kyounghee Kim and Dr. Mark van Hoeij, *Mathematics Faculty assisted with running activities.*



Thank you to:

The generous financial support of the College of Arts and Sciences, The Department of Mathematics, The Brennan Professorship of Mathematics, and Friends of FSU Math. Math Fun Day is made possible through all your help and support.

For more information on Math Fun Day, or to find out about next year's event:

 math.fsu.edu/MathFunDay

 [/FSUMathFunDay](https://www.facebook.com/FSUMathFunDay)

 mathfunday@math.fsu.edu

 youtu.be/JQUuBROkXZ8



2015 FSU Mathematics PhD Recipients

Spring 2015

| NAME | AREA | ADVISOR | THESIS TITLE |
|--------------------------|----------------|-------------------------------|---|
| Russell Waller | Pure Math | Sergio Fenley | Periodic Pieces of Pseudo-Anosov Flows in Graph Manifolds |
| Qiuping Xu | Bio Math | Washington Mio | Keeping Pace with the Times: Quantifying Variation of Newly Emerging Biological Shape Data |
| John Emanuello | Pure Math | Craig Nolder | Optimization Algorithms on Riemannian Manifolds with Applications |
| Tugha Yildirim Karabiyik | Bio Math | Mike Mesterton-Gibbons | A Game-Theoretic Analysis of Competition over Indivisible Resources |
| Anthony Wills | Financial Math | Brian Ewald & Xiaoming Wang | Analysis of Regularity and Convergence of Discretization Methods for the Stochastic Heat Equation Forced by Space-Time White Noise. |
| Xin Li | Pure Math | Mika Seppala & Mark Van Hoeij | Myrberg's Numerical Uniformization |

Summer 2015

| NAME | AREA | ADVISOR | THESIS TITLE |
|------------------|-----------------------|---------------------------------------|---|
| Guifang Zhou | Applied/Computational | Kyle Gallivan & Paul van Dooren | Rank-Constrained Optimization: A Riemannian Manifold Approach |
| Dong Sun | Applied/Computational | Xiaoming Wang & Max Gunzberger | High Order Long-Time Accurate Methods for Stokes-Darcy System and Uncertainty Quantification of Contaminant Transport |
| Dawna Jones | Pure Math | Alec Kercheval & Paul Beaumont | Asset Pricing Equilibria for Heterogeneous, Limited-Information Agents |
| Patrick Fletcher | Bio Math | Richard Bertram & Joel Tabak-Sznajder | Theoretical, Computational, and Experimental Topics in Anterior Pituitary Cell Signaling |
| Wei Yuan | Financial Math | Giray Okten & Kyo-unghee Kim | Estimating Sensitivities of Exotic Options using Monte Carlo Methods |
| Bill Adams | Pure Math | Paolo Aluffi | Lagrangian Specialization via Log Resolution and Schwartz Macpherson Chern Classes |
| Daozhi Han | Applied/Computational | Xiaoming Wang | Diffuse Interface Method for Two-phase Incompressible Flows |
| Linlin Xu | Financial Math | Giray Okten | GPU Computing in Financial Engineering |

2015-16 FSU Mathematics PhD Recipients

Fall 2015

| NAME | AREA | ADVISOR | THESIS TITLE |
|----------------|-----------------------|---------------|---|
| Sarah Kim | Bio Math | Monica Hurdal | A Mathematical Model of Cerebral Cortical Folding Development Based on a Biomechanical Hypothesis |
| Celes Woodruff | Applied/Computational | Xiaoming Wang | Efficient and Accurate Numerical Schemes for Long Time Statistical Properties of the Infinite Prandtl Number Model for Convection |

Spring 2016

| NAME | AREA | ADVISOR | THESIS TITLE |
|---------------------------|-----------------------|--------------------------------|---|
| Brendon Ballenger-Fazzone | Pure Math | Craig Nolder | An Analysis of Conjugate Harmonic Components of Monogenic Functions and Lambda Harmonic Functions |
| Justin Cole | Applied/Computational | Ziad Musslimani | Non-linear Schrodinger-type Systems: Complex Lattices and Non-Paraxiality |
| Diego Diaz Martinez | Bio Math | Washington Mio | Multiscale Summaries of Probability Measures with Applications to Plant and Microbiome Data |
| David Ekrut | Bio Math | Nick Cogan | Symmetry Solutions of the Multiphase Model with Biological Applications |
| Angela Smith Jarrett | Bio Math | Nick Cogan, & Youseff Hussaini | Investigating Persistent Infections Using Mathematical Modeling and Analyses |
| Mao Li | Bio Math | Washington Mio | Quantifying Phenotypic Variation Through Local Persistent Homology and Imaging |

Summer 2016

| NAME | AREA | ADVISOR | THESIS TITLE |
|------------------|-----------------------|--------------|--|
| Justin Eilersten | Applied/Computational | Jerry Magnan | Local and Global Bifurcations in Finite-Dimensional Center Manifold Equations of Double-Diffusive Convection |
| Dane Mayhook | Pure Math | Phil Bowers | Conformal Tilings and Type |

2016 FSU Mathematics PhD Recipients

Fall 2016

| NAME | AREA | ADVISOR | THESIS TITLE |
|------------------------|-----------------------|--------------------------------------|--|
| Fangxi Gu | Financial Mathematics | Craig Nolder | Exponential Convergence Fourier Method and Its Application on Option Pricing with Levy Processes. |
| Chun-Yuan Chiu | Mathematics | Alec Kercheval | Modeling Credit Risk in the Default Threshold Framework |
| Robert Brantley Billet | Financial Mathematics | Eriko Hironaka | Flow Equivalence Classes of Pseudo-Anosov Surface Homeomorphisms |
| Kouadio David Yao | Financial Mathematics | Victor Patrangenaru & Alec Kercheval | Statistical Analysis on Object Spaces with Application to 3D Face Analysis and Exchange Rates Data |

Department News

Alumni News

Angela Jarrett (*PhD 2016, Cogan & Hussaini*) is the Peter O'Donnell Post-doctoral Fellow at the Center for Computational Oncology and Institute for Computational Engineering and Science (ICES) at the University of Texas at Austin.

Candace Ohm (*PhD 2013, Mesterton-Gibbons*) Business Analyst for Spiceworks, Austin, Texas.

David Ekrut (*PhD 2016, Cogan*) is in Arkansas working for SnapOn corporation in the R&D Department.

Justin Cole (*PhD 2016, Musslimani*) is a postdoctoral research associate at the department of applied mathematics at the University of Colorado Boulder.

Patrick Fletcher (*PhD 2015, Bertram*) took a position as a Postdoctoral Fellow at the Laboratory of Biological Modeling, National Institutes of Health Bethesda, MD.

Sarah Kim (*PhD 2015, Hurdal*) is a post-doctoral fellow at the Center for Pharmacometrics & Systems Pharmacology (CPSP) in the College of Pharmacy at University of Florida, Lake Nona.

Tugba Karabiyik (*PhD 2015, Mesterton-Gibbons*) is now a Visiting Assistant Professor of Mathematics at Sam Houston State University in Huntsville, Texas. Tugba has also co-authored two papers.

Wei Yuan (*PhD 2015, Okten & Kim*) works for Wells Fargo.

Linlin Xu (*PhD 2015, Okten*) works at Barclays.

Candace Ohm (*PhD 2013, Mesterton-Gibbons*) is now Growth Product Manager for Vast.com in Austin, Texas.

Mark Whidden (*PhD 2013, Cogan*) is a Senior Scientist at Trovagene.

Wondimu Teka (*PhD 2012, Bertram*) took a position at the Food and Drug Administration in Washington DC.

Margaret Watts (*PhD 2011, Bertram*) took a position as an assistant Professor of Mathematics at Doana College, Nebraska.

Marial Vazquez (*PhD 2000, Summers*) was awarded the Blackwell-Tapia prize at the National Institute for Mathematical and Biological Synthesis (NIMBIO) in Knoxville.

Dale Burton (*PhD 1981, Tam*) received the 2015 FSU Grade Made Good Award which recognizes the accomplishments of notable alumni and faculty who have secured their place in the history of FSU by pushing boundaries and redefining standards within their respective fields.

Graduate Student News

Serdar Cellat attended and gave presentations at two conferences: SIAM Imaging Science Conference'16 in Albuquerque, NM, poster presentation: Learning Metrics for Shape Classification. MCQMC Conference'16 Stanford,

CA, talk: Enhancing Morphological Categorization via Monte Carlo Optimization

Joe McKenna, with major professor *Richard Bertram*, published three peer-reviewed articles this year, two in *Bio-physical Journal* and one in *PLoS Computational Biology*.

Joe McKenna participated at the Integrated Mathematical Oncology Annual Workshop at the Moffitt Cancer Center in Tampa, FL and the workshop on Dynamical Systems and Data Analysis in Neuroscience at the Mathematical Biosciences Institute in Columbus, OH. He also gave a talk at the SIAM Annual Conference in Boston, MA and presented a poster at the Biology and Medicine through Mathematics Conference in Richmond, VA

Diana Flores, Danny Galvis, Daniel Weingard, and Joe McKenna presented posters or talks at the SIAM Conference on the Life Sciences 2016, Boston MA.

Vehpi Yildirim presented a poster and a talk at the Annual Meeting of the Society for Mathematical Biology.

Diana Flores and Danny Galvis presented posters at the 2016 Annual Meeting of the Society for Neuroscience.

Yao Dai was selected to participate in the NIMBioS Tutorial "Game Theoretical Modeling of Evolution in Structured Populations" in April, 2016. Yao has also co-authored two papers.

Mahmet Aktas published an article in *Silico Biology Journal* and he was also invited to talk at the 2017 Joint Mathematics Meetings in Atlanta.

Carolyn Drobak was invited to speak at a mini-symposium Mathematical Neurology and Psychiatry for the SIAM Life Sciences 2016 conference in Boston, MA.

Atanaska Dobрева was invited to speak at the 2016 European Conference on Mathematical and Theoretical Biology and Society for Mathematical Biology

Annual Meeting in Nottingham, UK. She also presented in the Biomathematics and Scientific Computations Seminar at the Bulgarian Academy of Sciences in Sofia, Bulgaria.

Zihao Wang Presented at the MAA Mathfest Conference.

Matthew Hancock co-authored two papers with his PhD advisor Jerry Magan. One was published in the *Journal of Medical Imaging* (vol. 3, no. 4, 2016) and one will be presented in the Computer-Aided Diagnosis Conference, SPIE Medical Imaging Symposium in Feb. 2017.

Graduate Student Awards

Serdar Cellat received a SIAM Student Travel Award and SAMSI Travel Grant.

Thanittha Kowan was granted a full Thai scholarship from the Development and Promotion of Science and Technology Talents Project (DPST) pure science to work on her thesis on Zero-Mean Functional Equation on Hyper-parallelepiped.

Atanaska Dobрева was awarded a Ermine M. Owenby, Jr. Scholarship to Promote Excellence from the FSU College of Arts and Sciences.

Faculty Awards

Nick Cogan won the FSU Graduate Mentor Award in 2016.

Monica Hurdal received a Simons Foundation Collaboration grant for "Mathematical Models of Cortical Folding in Development, Aging and Disease."

Kate Petersen received a Simons Foundation Collaboration grant for "Geometric Aspects of Number Theory and Representations of 3-manifold Groups."

De Witt Sumners received the Simons Foundation Collaboration Grant, "Interdisciplinary Collaboration in Mathemat-

ics, Biology and Physics."

Richard Bertram was awarded a NSF grant on "Analysis and Extension of a Model for Oscillatory Islet Activity."

Lingjiong Zhu was awarded a NSF grant on "Self-exciting processes and their applications."

Mark van Hoeij was awarded a NSF grant for "A-Hypergeometric Solutions of Linear Differential Equations."

Giray Okten received a prestigious Fulbright US Scholar Award for Fall 2015 which he used to teach and do research in Turkey.

David Kopriva received a prestigious DAAD (Deutscher Akademischer Austauschdienst) Award from the German Academic Exchange Service which he used to visit the University Cologne and the University of Stuttgart.

Ziad Muslimani has received several awards for his research, including Lady Davis Visiting Professorship Award, Lady-Davis Trust, Israel; CRC – COFRS Award, Florida State University; DFG (German Science Foundation) Research Award; and a prestigious DAAD Research stays for University Academics and Scientists, Germany, 2016.

Faculty News

Monica Hurdal was an invited speaker in the mini-symposium on Mathematical Neurology and Psychology at the SIAM Conference on the Life Sciences, held July 11-16, 2016 in Boston, MA and she spoke on "A Turing Pattern Formation Model of Cortical Folding".

Nick Cogan was a keynote speaker at the Scientific Computing Around Louisiana (SCALA) Workshop 2016, February 12-13, 2016. He also published five papers.

Wolfgang Heil was invited to talk about "A classification of trivalent simply con-

nected 2- stratifols” at the December Session of ATD and Related topics at CIMAT-Guanajuato. Mexico. He has also had two publications.

Alec Kercheval gave a talk on “Forecasting high frequency stock price movements” at a Colloquium of the Department of Mathematics, North Dakota State University, in September 20, 2016. Kercheval was also involved in organizing a few committees and events listed below:

- Member of Scientific Committee, Conference on Statistical Methods in Finance 2016, Chennai Mathematical Institute, Chennai, India, Dec. 19-22, 2016.
- Co-organizer, Special Session on Financial Mathematics, AMS South-eastern Section meeting, Athens, GA, March 2016.
- Organizer, Financial Math Quant Symposium, Feb 2016
- Organizer, FSU HS Math Contest, Oct 2016

Kate Petersen was a co-leader of a project entitled “Heights of Algebraic Integers” at the Women in Numbers workshop held Fall 2016 at the Lorentz Center in Leiden the Netherlands.

De Witt Sumners presented at the Higgs Centre Colloquium at University of Edinburgh in April 2016 on Site-Specific DNA Recombination and Fluid Vortex Reconnection. In April 2016 he also presented on the Knotted Strands of Life at Edinburgh International Science Festival.

Nick Moore, with Xiaoming Wang and Mark Sussman, co-organized a minisymposium on “Fluids: modeling, analysis and simulation” at the SIAM Southeastern Atlantic Section Conference held in Athens, GA 2016. Moore also gave invited lectures at the Woods Hole Oceanographic Institute Geophysical Fluid Dynamics Workshop, at Duke University, and the University of Wisconsin, Madison.

Xiaoming Wang spoke at the MFO Workshop on Multiscale Interactions in Geophysical Fluids in Oberwolfach,

Germany, Aug. 15-19, 2016. He also participated at the 10th International Conference on Scientific Computing and Application, June 6-10, 2016, at Fields Institute in Toronto, Canada. He also co-authored a published paper.

Lingjiong Zhu gave invited seminar talks at University of Central Florida, Stevens Institute of Technology, Chinese University of Hong Kong, Sun Yat-sen University, South China University of Technology, Shanghai University of Finance and Economics, Wuhan University, Xiamen University, Rutgers University and New York University. He also presented at INFORMS Annual Meeting and the SIAM Conference on Financial Mathematics and Engineering. He has also had publications in the past year including, SIAM Journal on Financial Mathematics, Insurance: Mathematics and Economics, Operations Research Letters, Physica A, Quarterly Journal of Mathematics, Stochastic Models, Mathematical Proceedings of Cambridge Philosophical Society, Market Microstructure and Liquidity.

Giray Okten became a member of the editorial board for the journal Monte Carlo Methods and Applications, De Gruyter. He has also written a book with his daughter with planned publication before the end of the year: Ökten, Giray, & Ökten, Arya. Little Big Thinkers and the Mathematical Adventures of Mr. O and his Assistant Arya. Royal Fireworks Press. He published four papers, each one of with a former Ph.D. student as a coauthor.

Eric Klassen has co-authored a book on Functional Shape Data Analysis, which is published by Springer.

Monica Hurdal co-authored a poster presentation with Sarah Kim for the 2016 International Conference for the Organization for Human Brain Mapping, held June 26-30, 2016 in Geneva, Switzerland. Hurdal was also a prestigious invited speaker at the 2015 International Conference for the Organization for Human Brain Mapping, held June 14-18, 2015 in Honolulu, HI where she spoke

on “A Dynamically Growing Domain Model of Cortical Folding Pattern Formation”. Submission to this meeting is only by contributed poster and less than 0.5% of contributed posters are invited for oral presentations.

Monica Hurdal was the director of FSU Math Fun Day, a mathematics outreach event for the general public, which attracted over 800 participants this year.

Sam Ballas has been invited to speak at the 2017 Joint Mathematics Meeting, a conference on “Dynamics on Character Varieties”, in Rennes, France, in June 2017, and the GEAR network senior retreat, Stanford University, Aug 2017. He is also an organizer for the GEAR network junior retreat and has published 2 papers.

Martin Bauer was the guest editor for a special issue on Infinite Dimensional Riemannian Geometry in the Journal of Geometric Mechanics. He is also a member of the program committee on differential geometry and imaging for the conferences GSI (2015 - present), and DIFF-CVML 2016. He also gave an eight-hour tutorial on “Infinite Dimensional Riemannian Geometry”, with M. Bruveris, at the Institute for Mathematical Sciences of the National University of Singapore, 2016.

David Kopriva was honored with a special issue of the journal Computers and Fluids (vol. 139, no. 1, 2016) to celebrate his 60th birthday.

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Mathematics Honors Day 2016

Every year in the spring, the Department of Mathematics recognizes graduate and undergraduate students for their teaching, academic, or service achievements. The following are the award winners from the Annual Honors Day event in Spring 2016.

Dwight B. Goodner Mathematics Fellowship

Millie and Dwight Goodner established this award to recognize teaching excellence in mathematics by graduate students.

Justin Eilersten
Justin Thomas Cole
Kerr Ballenger-Fazzone

Kenneth G. Boback Award

This award is presented to an outstanding senior undergraduate majoring in Mathematics.

Zachary Herbert

Betty Anne Case Actuarial Science Award

This award is presented to an outstanding undergraduate student majoring in Actuarial Science. This award was established by Courtney and Shari White.

Kenny Alexis

Bettina Zoeller Richmond Award

This award is presented to two graduate students for outstanding service to the Department.

Angela Jarrett
Yunyi Shen

Distinguished Teaching Assistants

The Department recognizes graduate students who have demonstrated several semesters as successful teaching assistants and are in good standing in the Mathematics Department.

Kouadio David Yao
Diana Lissett Flores Diaz
Daniel Weingard
John Maxwell Wyse
Liang-Hsuan Tai
Joseph P. McKenna
Mehmet Emin Aktas
Robert Billet
Leona Sparaco
Yuanda Chen
Atanaska Dobрева

Financial Math Festival Poster Competition Winners

1st Place: **Yuanda Chen**
2nd Place: **Chun-Yuan Chiu**
3rd Place: **David Mandel**

Graduate Student Poster Contest Winners

Diego Hernan Diaz-Martinez
Mehmet Aktas
Joseph McKenna
Yuanda Chen

Evelyn and John Baugh Undergraduate Scholarship

This award is presented to students for excellence in the area of actuarial science as demonstrated by passing actuarial exams.

Tom Behrend
Marshall Bell
Quinn Gornto
Brittini Gunnoe
Jeffrey Hawkins
Corey Blanco
Crystal Maragh
Joshua Clark
Jeremiah Pack
Joseph Dumas
Raul Rodriguez
Caitlin Dunn
Leah Rumancik

Other Honors

- **29 students** were inducted into the Florida Beta Chapter of Pi Mu Epsilon, an academic, national scholarly society in mathematics
- **23 students** received SOA/CAS exam reimbursements for Exam P/1
- **45 students** received SOA/CAS exam reimbursements for Exam FM/2
- **1 student** received SOA/CAS exam reimbursements for Exam MLC
- **6 students** received SOA/CAS exam reimbursements for Exam MFE



Members of the AWM FSU Student Chapter

Student Math Societies

AWM FSU Student Chapter

This year, a group of mathematics graduate students formed a FSU student chapter of the Association for Women in Mathematics (AWM). While attending the 2016 SIAM Life Sciences conference this summer, biomathematics graduate students Inma Sorribes, Atanaska Dobрева de Cuba, and Johnna Barnaby discovered that FSU is an institutional member of AWM, but FSU didn't have a student chapter. They found this very surprising since the Math Department at FSU is very active and a friendly community. When they returned to Department of Mathematics at FSU, they approached Dr. Monica Hurdal to be the faculty sponsor, and together, they formed the AWM FSU student chapter with Sorribes becoming the president, Dobрева becoming the vice president, and Barnaby becoming the secretary. They already have 34 members, with approximately half the members being undergraduate students and half being graduate stu-

dents. Both men and women are members of the chapter.

The AWM FSU student chapter is a student organization, open to all undergraduate and graduate students. They hope to encourage women and girls to study and to have active careers in the mathematical sciences, and to promote equal opportunity and the equal treatment of women and girls in the mathematical sciences.

For their first semester, the chapter is already very active! They hold monthly



This is the logo for the FSU AWM Club.

meetings where they invite female faculty to present their research as well as talk about their careers. The chapter also discusses activities and future directions. In October they sponsored and organized an activity room for FSU Math Fun Day, the annual major public outreach event hosted by the Department of Mathematics. Their activity room was on Women in Math and they made activities related to the research of famous female mathematicians. The room was

a huge success, with often over 40 kids, many of whom were young girls, participating in the activities. Other activities the chapter has hosted include streaming an online colloquium from the Mathematical Biosciences Institute and hosting an end of the semester potluck.

The future plans of the AWM FSU student chapter include hosting more activities in the community, such as giving talks about women in math at high schools and to undergraduates. They would also like to set up study groups, coffee/tea discussions, contests, and other social events.

Having an AWM student chapter provides many benefits to the mathematics community at FSU, such as free AWM membership for all its members, grant and award opportunities, funding for conferences, etc. Inma Sorribes said the response from students and the Math Department has been great: "We got a lot of help from Dr. Hurdal and the Math Department was happy to support us too. We are now in the process of getting recognized by FSU and we will be able to do more activities."

FSU Math Society

The purpose of the Math Society is to bring together undergraduate and graduate students who are majoring in a math field or who have a keen interest in the subject. Anyone majoring in math or interested in the field is encouraged to join! The FSU Math Society holds regular meetings, they have had multiple guest speakers at their events, and they help members construct and give talks of their own!

The FSU Math Society also volunteered at FSU Math Fun Day, the Math Department's big volunteer outreach event of the fall semester, by helping to run hands-on activities during the event. The Math Society also plans fun, social activities, including a kayaking day at the FSU reservation. They organize study groups for finals and during the spring semester they will be attending two mathematics conferences occurring in February. They will be going to Kennesaw, GA to participate in an undergraduate mathematics conference and they also plan on attending the University of Texas Topol-



FSU AWM chapter members who organized the Women In Math activity room at FSU Math Fun Day

ogy and Algebraic Geometry (TEX-TAG) conference.

The club wouldn't be possible without the help of their executive board. Christina Baldacci is the club's president, Ap-

ple Levine is the social media marketer, Jennifer Yarboro is the treasurer, Mackenzie Vecchio is the secretary, and Harrison Scott is the vice president. The club currently has twenty active members for this semester.

Club president Christina Baldacci says "I joined the Math Society in January of my sophomore year (2015). I wasn't an active member of the FSU community. I was thinking about heading back home and finishing my degree at a local college, but my mom encouraged me to get out there and join clubs. I was a computer science major at the time but I had always been interested in math, so I finally went to a meeting. The people were very welcoming, and low and behold I met my best friends by joining the club. Up to this day I am still very close with the current and previous members of the Math Society, and I even switched my major to actuarial science in my junior year! The Math Society really helped make my FSU experience that much greater, and I know it can do the same for others."

FSU High School Math Contest

The Department of Mathematics is pleased to announce the winners of the FSU High School Mathematics Contest. The contest is held in October every year and is a three-hour written exam consisting of 6-10 questions requiring problem solving skills, mathematical ingenuity, and explanations of solutions. There are two different exams – a junior division exam for the 9th and 10th graders, and a senior division exam for the 11th and 12th graders. Approximately 50-60 students from all 6 Leon County high schools have been participating in the contest each year. Congratulations to all participants, and particularly the first and second place winners and honorable mentions. More information about the contest can be found at www.math.fsu.edu/~kercheva/outreach/contest.math



4TH ANNUAL MATH CONTEST FALL 2015 RESULTS

Junior Division Grades 9-10

1st Place
Graham O'Donnell
(Lincoln)

2nd Place
Andrew Yuan
(Chiles)

Honorable Mentions:
Victoria Yang, (Chiles), Cynthia Wang, (Chiles) and Carson Jones, (Rickards)

Senior Division Grades 11-12

1st Place
Jasmine Zou
(Rickards)

2nd Place
Aditya Hota
(Rickards)

Honorable Mentions:
Justin Chen, (Chiles), Jason Kang, (Chiles) and Chamara Gunaratne, (Chiles)

5TH ANNUAL MATH CONTEST FALL 2016 RESULTS

Junior Division Grades 9-10

1st Place
Andrew Yuan
(Chiles)

2nd Place
Sri Donthineni
(Rickards)

Honorable Mentions:
Victoria Yang, (Chiles), Brandon Chyi (Chiles), Jennifer Wen (Chiles), Jessica Cao, (Rickards) and Leon Kwan, (Chiles)

Senior Division Grades 11-12

1st Place
Graham O'Donnell
(Lincoln)

2nd Place
Carson Jones
(Rickards)

Honorable Mentions:
Cynthia Wang, (Chiles), Alan Van Etten, (Chiles), Quintus Lamar, (Lincoln) and Dylan Swart, (Lincoln)

Become a friend of **FSU Math** in 2017!

Community members are invited to become a **Friend of FSU Math** by donating to the Florida State University Foundation. Any amount will be truly appreciated, and will help us achieve our department goals in teaching and service to the community.

Your past gifts have been used in a variety of ways to support FSU Math. These include alumni networking efforts, such as the newsletter and social media, awards for excellence in teaching and service for graduate students and faculty, research training and support, distinguished visitors and guest lectures, and community outreach programs like Math Fun Day and the FSU High School Mathematics Contest. Your generosity will help us continue to offer a strong academic program, foster connections to the community, and create opportunities for life and career after graduation for our students.

For information about donations with special targets like outreach, named awards, or lecture series, please contact chair@math.fsu.edu.

You can send your tax-deductible gift to
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1017 Academic Way
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If you prefer to give online, please follow the links from www.math.fsu.edu/donate
Thank You!



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AT FLORIDA STATE UNIVERSITY

Season's Greetings from the *Department of Math*

