



## Math & Stats Fall 2021 Newsletter

### A Note from the Chair

Dear Friends of UVM Mathematics & Statistics,

I hope this note finds you well in these unprecedented times. The past academic year witnessed tremendous changes to our modes of instruction due to the COVID19 pandemic. Most of our classes were taught remotely, online, or in mixed modality (where a portion of the students attended in-person and the rest attended remotely). These new modes of instruction required our faculty to quickly adapt to remote and online teaching technologies and find effective ways to deliver the course materials. There were some advantages! For example, these new modes of instruction allowed us to record our lectures and notes and post them online, so that students could revisit those lectures and notes after class should they have missed anything. Our students have shown remarkable flexibility and resilience in this new reality as well. Due to the diligent efforts by our faculty and students, course evaluations of our classes in the past pandemic year were actually higher than in pre-pandemic times, which is incredible. Starting this fall semester, our classes became in-person again, with masks required. The campus life returned to some kind of normalcy, but we are not completely there yet.



This newsletter will share more of our recent successes in teaching, research, and service.

At the beginning of this academic year, the department's leadership also changed. Professors Jeff Buzas and Greg Warrington stepped down as Chair and Associate Chair after 7 years of distinguished service, and Prof. Helen Read and I have become the new Vice Chair and Chair (Jeff remains the Statistics Program Director). Both Helen and I have worked in the department for many years and have developed a deep bond with the department. We are honored to have this opportunity to work with our colleagues and bring the department to new heights.

As the new Chair, I have a number of initiatives. One of them is the strengthening of our Math MS program. Our Math Graduate Teaching Assistantships (GTAs) go to PhD students, leaving our MS students without support. The MS program, however, is important for us, not only because we want to train mathematically talented MS students for industry and academia, but also because we need a sufficient number of MS students in order to offer certain graduate-level math courses. To support our MS students, we are hoping to offer them some scholarships. Both current use funds and endowed scholarships would be of great value. Please reach out if you are able to donate to our MS scholarship funds.

I hope you enjoy this newsletter on what is happening in the department, and on the successes of our faculty, students, and alumni! Please keep us updated with your own exciting news (you can write to me, [jxyang@uvm.edu](mailto:jxyang@uvm.edu), or to our department staff at [mathstat@uvm.edu](mailto:mathstat@uvm.edu)).

Warm regards,

**Jianke Yang**

**Professor & Chair, Department of Mathematics and Statistics**

## New Math and Stats Faculty

This semester, we welcome the following faculty members to the Mathematics and Statistics Department:



**Jean-Gabriel Young**, Tenure-track Assistant Professor in Statistics

Jean-Gabriel received his PhD from Université Laval in Quebec in 2018, and joined UVM in 2020 after spending two years as a James S. McDonnell Foundation Fellow at the Center for the Study of Complex Systems of the University of Michigan. He studies computational and statistical aspects of complex systems and infectious disease epidemiology, as well as data science more broadly.



**Alice Patania**, Research Assistant Professor in Mathematics

Alice obtained her Ph.D in Applied Mathematics at Politecnico di Torino (Italy) in 2017. She then worked as an Assistant Research Scientist at Indiana University Network Science Institute for three years before joining UVM. Her research focuses on developing and applying new topological approaches to study complex systems.



**David Rockoff**, Lecturer in Statistics

David obtained his PhD from University of Arizona in 2018. He then worked as a Visiting Assistant Professor at Smith College and an Adjunct Lecturer at American University before joining UVM. His area of expertise is Statistics and Data Science Education.

## Promotions

Congratulations to the following faculty members on their recent promotions:



**Dr. Paramita Saha Chaudhuri** was promoted to Associate Professor with tenure. Paramita obtained her PhD in biostatistics from University of Washington in 2009 and joined UVM as an Assistant Professor of Statistics in 2020.



**Dr. Francois Dorais** was promoted to Sr. Lecturer. He joined UVM as a lecturer of mathematics in 2015.



**Dr. Jacob Martin** was promoted to Sr. Lecturer. He joined UVM as a lecturer of statistics in 2016.

## Awards



Assistant Professor **Jean-Gabriel Young** (left) and Associate Professor **Jim Bagrow** (right) won the “Free Open Source Software (FOSS) Impact paper” award at the 2021 Mining Software Repositories (MSR) conference. The award recognizes papers that show outstanding contributions to the FOSS community.

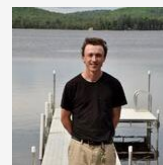
Their award paper is titled “Which Contributions Count? Analysis of Attribution in Open Source”. The paper examines the various ways in which people are given credit for their work on Open Source Software, and identifies areas where existing methods of attribution could be improved.

Senior Lecturer **Karen Benway** won the 2021 CEMS Innovation in Teaching Award. The award is given to a CEMS faculty member who has exhibited innovation and excellence in the classroom as measured by student evaluations and external grant proposals or external awards.



Staff member **Kiki Reno** won the 2021 CEMS Staff Award for Innovation and Creativity. The award is given to a staff member who has been particularly creative or innovative in developing more efficient processes, or new facilities, or improved advising, or other key components of CEMS.

**Calum Buchanan** (a PhD student supervised by Assistant Professor **Puck Rombach**) was selected as the Graduate College 2020-2021 Graduate Teaching Assistant (GTA) of the Year in the Lecture Instruction category.



**Jo Martin** (a MS student supervised by Assistant Professor **Puck Rombach**) received the Graduate College Outstanding Master's Thesis Award for the academic year 2020-2021.

Williams Professor of Mathematics and Department Chair **Jianke (Jackie) Yang** was selected as University Distinguished Professor -- the highest academic honor that UVM can bestow on a member of the faculty. Holders of this title are recognized as not only having achieved international eminence within their respective fields of study but for the truly transformative nature of their contributions to the advancement of knowledge. These faculty members are considered top scholars who have excelled in their disciplines.



## News about our faculty and their students

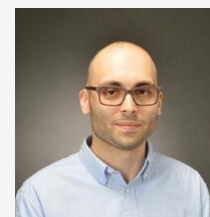
Research Assistant Professor **Abigail Crocker** received a large grant to establish a National Center on Restorative Justice (a Leahy championed initiative). This Center is a partnership between the Vermont Law School (host institution), University of San Diego, and UVM (research core of the National Center). The objective of the Center is to improve criminal justice practice and policy in the US, through education and training, and research on social disparities. Prof. Crocker is the PI on the UVM subawards (a colleague in UVM College of Arts and Sciences is co-PI). The UVM portion of this grant is over 3 million dollars (over a five-year period).



Professor **Jeff Buzas**, Director of Statistics, received a subaward for an NIH (National Institutes of Health) R01 grant with University of South Carolina. This grant is titled "Hospital Quality, Medicaid Expansion and Racial/Ethnic Disparities in Maternal Mortality and Morbidity." Professor Buzas will be working with PhD student Lucy Greenberg on this project.



The UVM-Google "Open Source Complex Ecosystems And Networks (OCEAN)" project, funded by a \$1M gift from Google Open Source in 2020 with Associate Professor of Mathematics **Jim Bagrow** and Assistant Professor of Computer Science **Laurent Hébert-Dufresne** as PIs, has led to a funded DARPA project called 'LAGOON (Leveraging AI to Guard Online Open Source). LAGOON is led overall by **David Darais** at Galois, while the UVM team is led by **Nick Cheney** in Computer Science. The OCEAN PIs (Jim Bagrow and Laurent Hébert-Dufresne) serve as key personnel. The UVM subcontract is \$166k for phase 1 (June-September 2021), and \$174k for phase 2 (if approved, Sep. 2021 – Mar. 2022).



Prof. Jim Bagrow also published a reader response in Nature titled "How Well Do Machines Summarize Our Work?", Nature 590, 36 (2021).

Professor **Jun Yu** wrote a collaborative paper with Associate Professor Michael Tomas III of UVM Grossman School of Business, which was published in the MDPI journal "Mathematics" (open access journal with Impact Factor 2.258). The paper is titled "An Asymptotic Solution for Call Options on Zero-Coupon Bonds". This is Prof. Yu's first paper in the new research direction of financial mathematics. In this work, Prof. Yu and his collaborator studied stochastic processes for the option price on bonds and derived a PDE model that is an extension of the celebrated Black and Scholes model.



Assistant Professor **Jean-Gabriel Young** coauthored the following two papers in Physical Review Letters and Nature Communications (both are very prestigious journals): “Inference, model selection and the combinatorics of growing trees”, Phys. Rev. Lett. 126, 038301 (2021). “Reconstruction of plant–pollinator networks from observational data”, Nature Commun. 12, 3911 (2021).



Senior Lecturer **Dan Hathaway** published three papers on logic, one of them being “Perfect Tree Forcings for Singular Cardinals” with N. Dobrinen and K. Prikry, Annals of Pure and Applied Logic, 171, 102827 (2020). This is impressive, especially because research is not part of Dr. Hathaway’s workload.



Professor **Chris Danforth** (PI), together with four other UVM co-PIs (H. Garavan, J. Li, J.P. O’Neil-Dunne, M.T. Niles), was awarded a large NSF MRI (Major Research Instrumentation) two-year grant for a project titled “Acquisition of a Massive Database to Accelerate Data Science Discovery”. The NSF portion of the grant is \$725,016, and UVM cost share is \$310,721.

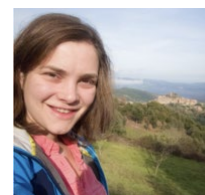


Prof. Danforth’s PhD student **Thayer Alshaabi** in Complex Systems and Data Science published the final chapter of his thesis in the journal “Science Advances”. The paper is titled “Storywrangler: A massive exploratorium for sociolinguistic, cultural, socioeconomic, and political timelines using Twitter”. Thayer is now a Postdoctoral Research Scientist at the Advanced Bioimaging Center, UC Berkeley, working with a Nobel Prize winning Chemist on machine learning for 3D image processing of cells.

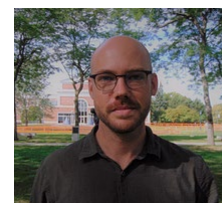
Prof. Danforth’s Postdoc Mikaela Fudolig (co-supervised by Prof. Peter Dodds of Computer Science) was featured in the UVM Graduate College’s website for her work on Ousiometrics and Telegnomics, which are defined to be the study of the essence of meaning and remotely sensed knowledge, respectively.

Prof. Danforth’s StoryLab hosted Henry Wu for a gap year research project following his Essex High School graduation. The project brought together experts on activism from Northeastern University, and Philosopher Randall Harp from UVM to produce a manuscript now in review: “Say Their Names: Resurgence in the collective attention toward Black victims of fatal police violence following the death of George Floyd”. Henry is now a first-year undergraduate student at Harvard.

Assistant Professor **Puck Rombach**’s PhD student **Hunter Rehm** worked as an intern at NASA over the summer and is continuing in this role during the fall. His team uses graph theoretic techniques to determine a risk metric for a variety of medical conditions, to aid in making health-based decisions for astronauts.



Assistant Professor **Spencer Backman** received a Simons Foundation Collaboration Grant titled “Algebra, Geometry, and Combinatorics of Matroids”. The total budget of this grant is \$42,000 over a five-year period. Significantly, \$6,000 of this budget is discretionary funds for the Chair of our department to promote research atmosphere within the department!





Four math majors, **Izzy Schmitt** (above, left), **Veronika Potter** (above, center), **Reese Green** (above, right), and **Maddie Burke** (not pictured) were elected to Phi Beta Kappa! The **Phi Beta Kappa Society** is the oldest academic honor society in the United States, and the most prestigious, due in part to its long history and academic selectivity. Phi Beta Kappa aims to promote and advocate excellence in the liberal arts and sciences, and to induct the most outstanding students of arts and sciences at only select American colleges and universities.

## News of our latest graduates



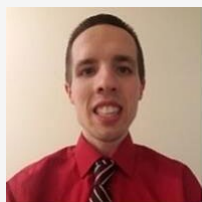
**Sophie Gonet**, who completed her PhD in May 2021 under the supervision of Professors Jonathan Sands and Richard Foote (with additional help from Professor Greg Warrington and Assistant Professor Spencer Backman), went on to join the Rutgers University's math faculty as an Assistant Teaching Professor. In her PhD thesis, Sophie obtained a significant result in algebraic graph theory.



**Marcus Elias**, who completed his PhD in May 2021 under the supervision of Assistant Professor Christelle Vincent, is now working as an R&D Engineer for the exciting start-up AI tech firm, Geopipe. This company develops virtual models of real-life buildings and spaces. For example during COVID some universities had virtual copies of the campus made for students and faculty to visit.



**Bo Yang**, who completed his three-year postdoc in September 2021 under the supervision of Professor Jianke (Jackie) Yang, accepted an Associate Professor position in the Math Department of Ningbo University (China). This university has a strong applied math program, and several of its faculty members are nationally and internationally known. Bo obtained his PhD from East China Normal University in 2018. During his postdoc-ship at UVM, Bo obtained significant results on nonlinear wave patterns in physical PDE models. He has published 8 papers in leading applied math journals, with a couple more papers under preparation.



**Tyson Pond**, who completed a Masters of Science in Math with Associate Professor Jim Bagrow in 2020, started a new job as a data analyst with MediaAlpha in Los Angeles.



**Oliver Waite**, who graduated from our Accelerated Masters Program in Mathematics in 2020, is now a Lecturer in the Mathematical Sciences department at Bentley College in Massachusetts.

## Department Events

### Math Bee Contest



On Oct. 26, 2021, the undergraduate Math Club (supervised by Senior Lecturers **Dan Hathaway**, **Francois Dorais** and Assistant Professor **Christelle Vincent**) hosted the fall Math Bee --- a friendly math competition of students against the faculty. Twenty students comprised the Student Team, and five faculty members (**Dan Hathaway**, **Karla Karstens**, **Laura Marthaler**, **Joan Rosebush** and **Dan Velleman**) comprised the Faculty Team. Senior Lecturer **Joe Kudrle** was the Master of Ceremony. It was a close competition, and eventually the Student Team won!

### Sheila Weaver's Retirement

**Sheila Weaver** (Senior Lecturer) will be retiring in December after 36 years of distinctive service in our department. During her long career, Sheila has taught a wide range of statistics courses, many of which she developed herself, such as Stat/CS 087 (Introduction to Data Science). She has won a number of teaching awards, such as the Kroepsch-Maurice Award for Teaching Excellence, and College of Engineering and Mathematics Teaching Award. Sheila has also had a distinctive service record. For example, she served as Program Director of the Governor's Institute in Mathematical Sciences from 2008 to 2015. For her service, she won College of Engineering and Mathematics Service Award in 2013. Sheila is the best embodiment of teaching and service excellence. She is also an exemplary department citizen. A retirement party will be held for Sheila in late Spring.



## Alumni News



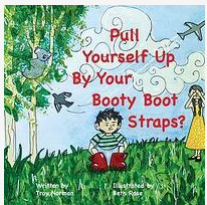
**Michael Klug** -- an Accelerated Masters Program Graduate of ours in 2013, completed his PhD at UC Berkeley this past summer. He then took an L.E. Dickson Instructor position at University of Chicago this fall. During his time at UVM, Michael wrote a MS thesis with the former faculty member John Voight. In addition, he wrote a paper with Associate Professor Jim Bagrow, which became the foundation of the UVM-Google "OCEAN" project. Michael's current research is in low dimensional topology.



**Sam Schiavone** --- a MS graduate of ours in 2013, received his PhD from Dartmouth in 2019, and is now a research scientist in the mathematics department at MIT. He studies arithmetic geometry from a computational perspective, with a current focus on Hilbert modular varieties and gluing algebraic curves along their torsion.



**Shauna (Simeone) Revay** --- a MS graduate of ours in 2014, obtained her PhD from George Mason University in 2018, with a thesis on non-harmonic Fourier analysis. After PhD, she worked at the Naval Research Laboratory. Now she is the Director of Applied Machine Learning at Novetta, where she leads its Machine Learning Center of Excellence. Novetta is an analytics company. The Machine Learning Center of Excellence is the internal research and development hub at the company which focuses on machine learning and artificial intelligence. Some of the areas that Shauna works in include natural language processing, computer vision, graph analytics, and cyber analytics.



**Troy Norman** (former advisee of Senior Lecturer **Joan Rosebush**), who graduated in fall 2012 with a BS in Mathematics, published a children's book: "Pull Yourself Up By Your Booty Boot Straps?" The book is about a child who wonders what the phrase means. He eventually learns that the only way to "pull yourself up" is with family and friends who are always there when needed. This heartwarming book affirms over and over that your family and friends are always there to lend a helping hand.

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We want to hear how you're doing! Email [mathstat@uvm.edu](mailto:mathstat@uvm.edu) with your latest achievements so we may consider including them in the next newsletter.

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