DREXEL UNIVERSITY
College of
Arts and Sciences
Mathematics Department



Annual Report 2022-23

Content Collected by:

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Designed by:

Momo Jawwad

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Tenure Stream Faculty



David Ambrose
Associate Department Head, Graduate Advisor and Professor
PhD (Duke University)



Jonah Blasiak
Associate Professor
PhD (University of California, Berkeley)



Darij Grinberg
Assistant Professor
PhD (Massachussets Institute of Technology)



Pavel Grinfeld
Associate Professor
PhD (Massachussets Institute of Technology)



Yixin Guo
Associate Professor
PhD (University of Pittsburgh)



R. Andrew Hicks
Undergraduate Advisor, Professor
PhD (University of Pennsylvania)



Pawel Hitczenko
Professor
PhD (Warsaw University)



Georgi Medvedev
Professor
PhD (Boston University)



Cecilia Mondaini
Assistant Professor
PhD (Federal University of Rio de Janeiro)



Shari Moskow
Professor
PhD (Rutgers University)



James E. Pascoe
Assistant Professor
PhD (University of California, San Diego)



Ronald Perline
Associate Professor
PhD (University of California, Berkeley)



Eric Schmutz
Professor
PhD (University of Pennsylvania)



Li Sheng
Associate Professor
PhD (Rutgers University)



Gideon Simpson
Associate Professor
PhD (Columbia University)



Xiaoming Song
Associate Professor
PhD (University of Kansas)



Jurij Volčič
Assistant Professor
PhD (University of Auckland)



Hugo J. Woerdeman
Professor
PhD (Vrije University, Amsterdam)



J. Douglas Wright
Department Head, Professor
PhD (Boston University)



Jingni Xiao
Assistant Professor
PhD (Hong Kong Baptist University)



Thomas Pok-Yin Yu
Professor
PhD (Stanford University)

Teaching Faculty



Jason Aran
Associate Department Head and Associate Teaching Professor
MS (Drexel University)



Patricia D. Bobo
Assistant Teaching Professor
MA in Actuarial Science (Temple University)



Fernando Carreon
Teaching Professor
PhD (University of Texas, Austin)



Daryl Falco
Associate Teaching Professor
MS (Drexel University)



Raymond Favocci
Associate Teaching Professor
MS (Drexel University)



Anatolii Grinshpan
Associate Teaching Professor
PhD (University of California, Berkeley)



Andrew Klimas
Assistant Teaching Professor
DA (Idaho State University)



Caitlin Klimas
Assistant Teaching Professor
DA (Idaho State University)



Jeffrey LaComb
Assistant Teaching Professor
PhD (Duke University)



Oksana Odintsova
Teaching Professor
PhD (Omsk State University)



Dimitrios Papadopoulos
Assistant Teaching Professor
EdD (Drexel University)



Joel Pereira
Assistant Teaching Professor
PhD (University of North Carolina)



Adam Rickert
Associate Teaching Professor
MS (Drexel University)



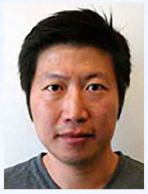
Jeanne Steuber
Associate Teaching Professor
MS (Boston University)



K. Shwetketu Virbhadra
Instructor
PhD (Physical Research Laboratory, India)



Richard White
Assistant Teaching Professor
MS (St. Joseph's University)



Dennis Yang
Associate Teaching Professor
PhD (Cornell University)



Matthew Ziemke
Assistant Teaching Professor
PhD (University of South Carolina)

Adjunct Faculty



Jeremy Cooper
Adjunct Instructor
MA (Relay Graduate School of Education)



John Coppola
Adjunct Instructor
MS (Widener University)



Anthony J. D'Alesandro
Adjunct Instructor
MS (Rutgers University)



Ramesh Garimella
Adjunct Instructor
PhD (University of Toledo)



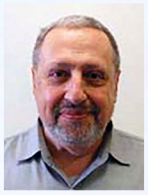
June Gordon
Adjunct Instructor
MS (Drexel University)



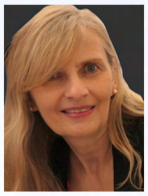
Benjamin Irwin
Adjunct Instructor
PhD (Drexel University)



Rolando Jimenez
Adjunct Instructor
PhD in Physics (Federal University of São Carlos)



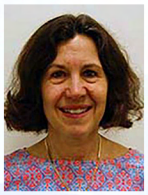
Boris Kheyfets
Adjunct Instructor
PhD (Drexel University)



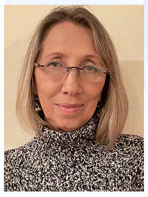
Susanne Kriete
Adjunct Instructor
MS (University of Stuttgart, Germany)



Brianna Pezzato
Adjunct Instructor
MEd (Millersville University)



Valerie Sarris
Adjunct Instructor
PhD in Economics (Yale University)

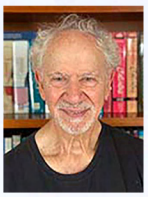


Olga Trubina
Adjunct Instructor
PhD (Moscow State Pedagogical University)



Sergio Zefelippo
Adjunct Instructor
MA (Villanova University)

Emeriti Faculty



Howard Anton
Professor Emeritus
PhD (Polytechnic Institute of Brooklyn)



Loren Argabright
Professor Emeritus
PhD (University of Washington)



Robert Boyer
Professor Emeritus
PhD (University of Pennsylvania)



Robert Busby
Professor Emeritus
PhD (University of Pennsylvania)



William Goh
Associate Professor Emeritus
PhD (Ohio State University)



Marci Perlstadt
Associate Professor Emerita
PhD (University of California, Berkeley)



Chris Rorres
Professor Emeritus
PhD (Courant Institute, New York University)



Patricia Russell
Teaching Professor Emerita
MS (Drexel University)



Justin Smith
Professor Emeritus
PhD (Courant Institute, New York University)



Jet Wimp
Professor Emeritus
PhD (University of Edinburgh)

Staff



Paige Chmielewski
Academic Advisor



Aszuré Dunbar
Mathematics Resource Center Program Assistant



Kenneth Hemphill
Department Administrator



Sobha Philip
Graduate Program Manager

New Department Members



Patricia Bobo

Assistant Teaching Professor

Patricia Bobo earned her Master's degree in Actuarial Science from the Temple University Fox School of Business in 1988 and her undergraduate degree in Mathematics from Lincoln University in 1978. She earned her ASA, Associate of the Society of Actuaries in 1988. She worked as an actuary at the Equitable Life Assurance Society in New York City and Penn Mutual in Philadelphia. Before working at Drexel University, she worked as a visiting professor at Saint Joseph's University for over 20 years - where she was the course coordinator for an applied mathematics course and constructed the first on-line mathematics course in 2006.

Ms. Bobo is passionate about helping her students build a strong foundation in mathematics. She strives to make a difference by demonstrating to her students her love for mathematics.



Aszuré Dunbar

Mathematics Resource Center Program Assistant

Aszuré Dunbar earned her bachelor's degree in mathematics from the University at Albany. She has a strong passion for mathematics education and wishes to pursue both her masters and PhD within the secondary education field.



Andrew Klimas

Assistant Teaching Professor

Andrew Klimas earned his Doctorate of Arts in Mathematics from Idaho State University in 2010. He was a visiting assistant professor and then assistant professor at Xavier University of Louisiana in New Orleans starting in 2010. He started as an assistant teaching professor at Drexel University in Fall 2022.



Caitlin Klimas

Assistant Teaching Professor

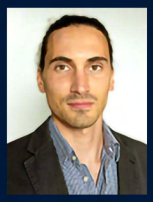
Caitlin Klimas earned her Doctorate of Arts in Mathematics from Idaho State University in 2017. She was an assistant professor at Xavier University of Louisiana in New Orleans starting in 2010. She started as an assistant teaching professor at Drexel University in Fall 2022.



James Pascoe

Tenure Stream Assistant Professor

James Pascoe, PhD, is interested in a wide variety of subjects at the intersection of linear algebra and complex analysis. Assistant Professor Pascoe is passionate about sharing his love of mathematics with others. He mentors students across all levels of scholarship to help them to go beyond and develop new mathematical knowledge. In his free time, he enjoys playing bridge.



Jurij Volčič

Tenure Stream Assistant Professor

Jurij Volčič obtained his PhD from the University of Auckland in 2018. Afterwards, he held postdoctoral positions at Ben-Gurion University of the Negev, Texas A&M University and University of Copenhagen. His research pertains to noncommutative algebra, real algebraic geometry, free analysis, invariant theory, quantum information, and polynomial optimization.



Jingni Xiao

Tenure Stream Assistant Professor

Jingni Xiao, PhD, received her master's degree (equivalent to MPhil in the US) in Mathematics from Central South University in 2015 and her PhD from the Hong Kong Baptist University in 2018. Prior to joining Drexel, she held the position of Hill Assistant Professor at Rutgers University – New Brunswick, for four years. Her research interests include inverse problems, partial differential equations, scattering theory and nonlocal operators.

Teaching & Research Assistants



Sultan Aitzhan



Udoh Akpan



Adam Baurkot



Mikey Becht



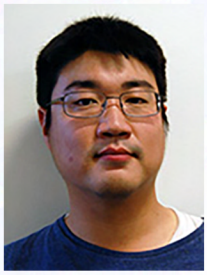
Patrick Bray



Luke Brown



Julian Bushelli



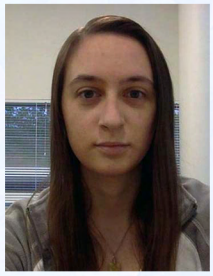
Wonsang Cho



Juliane Dalben



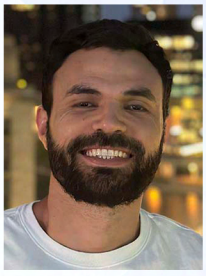
Liam Doherty



Sarah Gift



Anish Gosh



Ricardo Guimaraes



Abdellah Islam



Amanda Johnson



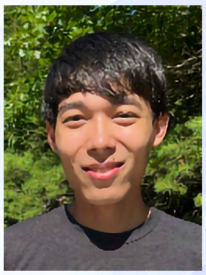
Emily Kelting



Hyeju Kim



Ishan Lokuge



Peter Mao



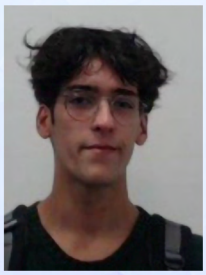
Joshua McGinnis



Kayode Oluwasegun



Anya Pant



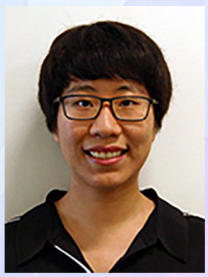
Hayden Ruff



Hunter Wages



Isaac Woods



Yaqi Zhang

Faculty Publications

Publications from the calendar year 2022. Names in bold are associated with Drexel Math Department

Hüseyin Acan, S. Chakraborty, S. Jo, K. Nakashima, K. Sadakane, and S.R. Satti,
"Succinct navigational oracles for families of intersection graphs on a circle,"
Theoretical Computer Science, 928, pp. 151-166, 2022.

Hüseyin Acan, A. Frieze, and B. Pittel,
"Giant descendant trees, matchings, and independent sets in age-biased attachment graphs,"
Journal of Applied Probability, 59 (2), pp. 299–324, 2022.

S. L. Adler and **Kumar S. Virbhadra**,
"Cosmological constant corrections to the photon sphere and black hole shadow radii,"
General Relativity and Gravitation, 54 (8), paper no. 93, 5 pp., 2022.

K. Aguilar, Á. Chávez, S.R. Garcia, and **Jurij Volčič**,
"Norms on complex matrices induced by complete homogeneous symmetric polynomials,"
Bulletin of the London Mathematical Society, 54 (6), pp. 2078–2100, 2022.

J. Akahori, **Xiaoming Song** and T-H. Wang,
"Probability density of lognormal fractional SABR model," Risks, 10, 156, 2022.

David M. Ambrose,
"Existence theory for non-separable mean field games in Sobolev spaces,"
Indiana University Mathematics Journal, 71 (2), pp. 611–647, 2022.

David M. Ambrose, F. Cakoni, and Shari Moskow,
"A perturbation problem for transmission eigenvalues,"
Research in the Mathematical Sciences, 9 (1), paper no. 11, 16 pp., 2022.

David M. Ambrose, R. Camassa, J. L. Marzuola, R. M. McLaughlin, Q. Robinson, and J. Wilkening,
"Numerical algorithms for water waves with background flow over obstacles and topography,"
Advances in Computational Mathematics, 48 (4), paper no. 46, 62 pp., 2022.

David M. Ambrose and Jacob Woods,
"Well-posedness and ill-posedness for linear fifth-order dispersive equations in the presence of backwards diffusion," Journal of Dynamics and Differential Equations, 34 (2), pp. 897–917, 2022.

R. M. Aron, M. S. Moslehian, I. M. Spitkovsky, and **Hugo J. Woerdeman (Eds.)**,
"Operator and Norm Inequalities and Related Topics," in:
Trends in Mathematics, Birkhäuser, Springer Nature Switzerland AG, xiii+822 pages, 2022.

K. Bickel and **James E. Pascoe**, A. Sola,
"Singularities of rational inner functions in higher dimensions,"
American Journal of Mathematics, 144 (4), pp. 1115–1157, 2022.

Jonah Blasiak, J. Morse, and G. H. Seelinger,
"K-theoretic Catalan functions," Advances in Mathematics, 404, part B, paper no. 108421, 39 pp., 2022.

H. Chiba and **Georgi S. Medvedev**,
"Stability and bifurcation of mixing in the Kuramoto model with inertia,"
SIAM Journal on Mathematical Analysis, 54 (2), pp. 1797–1819, 2022.

H.Chiba, **Georgi S. Medvedev**, and M. S. Mizuhara
"Instability of mixing in the Kuramoto model: from bifurcations to patterns,"
Pure and Applied Functional Analysis, 7 (4), pp. 1159–1172, 2022

Kennett L. Dela Rosa and Hugo J. Woerdeman,
"Completing an operator matrix and the free joint numerical radius,"
Complex Analysis and Operator Theory 16 (8), paper no. 114, 34 pp., 2022.

V. Druskin, **Shari Moskow**, and M. Zaslavsky,
"On extension of the data driven ROM inverse scattering framework to partially nonreciprocal arrays,"
Inverse Problems, 38 (8), paper no. 084002, 16 pp., 2022.

P. Dupuis and **Georgi S. Medvedev**,
"The large deviation principle for interacting dynamical systems on random graphs,"
Communications in Mathematical Physics, 390 (2), pp. 545–575, 2022.

Omesh D. Dwivedi and Darij Grinberg,
"On the rank of Hankel matrices over finite fields,"
Linear Algebra and Applications, 641, pp. 156–181, 2022.

N. E. Glatt-Holtz and **Cecilia F. Mondaini**,
"Mixing rates for Hamiltonian Monte Carlo algorithms in finite and infinite dimensions,"
Stochastic Partial Differential Equations: Analysis and Computations, 10 (4), pp. 1318–1391, 2022.

Raúl Gouet, **Pawel Hitczenko** and Jacek Wesołowski,
"Asymptotics of the overflow in urn models," Journal of Applied Probability, 59, pp. 797--824, 2022.

Darij Grinberg,
"Petrie symmetric functions," Algebraic Combinatorics, 5 (5), pp. 947–1013, 2022.

Darij Grinberg and E. A. Vassilieva,
"A q-deformation of enriched P-partitions,"
Séminaire Lotharingien de Combinatoire, 86B, Art. 78, 12 pp., 2022.

J. W. Helton, I. Klep, and **Jurij Volčič**,
"Factorization of noncommutative polynomials and Nullstellensätze for the free algebra,"
International Mathematics Research Notices, 1, pp. 343–372, 2022.

F. Huber, I. Klep, V. Magron, and **Jurij Volčič**,
"Dimension-free entanglement detection in multipartite Werner states,"
Communications in Mathematical Physics, 396 (3), pp. 1051–1070, 2022.

Joshua D. Jackson and Hugo J. Woerdeman,
"Minimal realizations and determinantal representations in the indefinite setting,"
Integral Equations and Operator Theory, 94 (2), paper no. 18, 13 pp., 2022.

M. Jury, I. Klep, M. E. Mancuso, S. McCullough, and **James E. Pascoe**,
"Noncommutative partially convex rational functions,"
Revista Matemática Iberoamericana, 38 (3), pp. 731–759, 2022.

Dmitry Kaliuzhnyi-Verbovetskyi and Georgi S. Medvedev,
"Sparse Monte Carlo method for nonlocal diffusion problems,"
SIAM Journal of Numerical Analysis, 60 (6), pp. 3001–3028, 2022.

Hyeju Kim and David M. Ambrose,
"Well-posedness, ill-posedness, and traveling waves for models of pulsatile flow in viscoelastic vessels,"
Zeitschrift für Angewandte Mathematik und Physik, 73 (6), paper no. 247, 26 pp., 2022.

I. Klep, V. Magron, and **Jurij Volčič**,
"Optimization over trace polynomials," Annales Henri Poincaré, 23 (1), pp. 67–100, 2022.

Joshua A. McGinnis and J. Douglas Wright,
"Using random walks to establish wavelike behavior in a linear FPUT system with random coefficients,"
Discrete and Continuous Dynamical Systems - Series S, 15 (9), pp. 2581–2607, 2022.

Georgi S. Medvedev and M. S. Mizuhara,
"Chimeras unfolded," Journal of Statistical Physics, 186 (3), paper no. 46, 19 pp. , 2022.

Georgi S. Medvedev, M. S. Mizuhara, and A. Phillips,
"A global bifurcation organizing rhythmic activity in a coupled network,"
Chaos, 32 (8), paper no. 083116, 13 pp., 2022.

Georgi S. Medvedev and Gideon Simpson,
"A numerical method for a nonlocal diffusion equation with additive noise," Stoch PDE: Anal Comp (2022).

James E. Pascoe and R. Tully-Doyle,
"The royal road to automatic noncommutative real analyticity, monotonicity, and convexity,"
Advances in Mathematics, 407, paper no. 108548, 24 pp., 2022.

James E. Pascoe and R. Tully-Doyle,
"Monotonicity of the principal pivot transform," Linear Algebra and Applications, 643, pp. 161–165, 2022.

James E. Pascoe and T. Yadav,
"Macroscale behavior of random lower triangular matrices,"
Analysis and Mathematical Physics, 12 (1), paper no. 12, 11 pp., 2022.

P. Plecháč, **Gideon Simpson**, and J. R. Troy,
"Well-posedness of a random coefficient damage mechanics model,"
Applicable Analysis, 101 (11), pp. 3858–3885, 2022.

E. Poon, I. M. Spitkovsky, and **Hugo J. Woerdeman**,
"Factorization of singular matrix polynomials and matrices with circular higher rank numerical ranges,"
SIAM Journal on Matrix Analysis and Applications, 43 (3), pp. 1423–1439, 2022.

S. Saeedi, M. Serrano, **Dennis G. Yang**, J. P. Brooks, G. A. Buck, and T. Arodz,
"Group testing matrix design for PCR screening with real-valued measurements,"
Journal of Computational Biology, 29 (12), pp. 1397–1411, 2022.

Kumar S. Virbhadra,
"Distortions of images of Schwarzschild lensing," Physical Review D, 106 (6), paper no. 064038, 13 pp., 2022.

H. Wang, **Li Sheng**, S. Xu, et al.,
"Develop a diagnostic tool for dementia using machine learning and non-imaging features,"
Frontiers in Aging Neuroscience, 14, paper no. 945274, 2022.

J. Douglas Wright,
"A simple model of radiating solitary waves," Wave Motion, 114, paper no. 102971, 15 pp., 2022.

Jingni Xiao,
"A new type of CGO solutions and its applications in corner scattering,"
Inverse Problems, 38 (3), paper no. 034001, 23 pp., 2022.

Thomas Yu and Jingmin Chen,
"Uniqueness of Clifford torus with prescribed isoperimetric ratio,"
Proceedings of the American Mathematical Society, 150 (4), pp. 1749–1765, 2022.

Faculty Presentations

David Ambrose,
"Existence theory for models of fluid flow in viscoelastic vessels,"
SIAM Conference on Nonlinear Waves, Minisymposium on Traveling Waves,
Bremen, Germany, September 2022.

David Ambrose,
"*Stationary and quasistationary solutions of some mean field games models,"*
Special Session on Hamilton-Jacobi Equations, 2023 Joint Mathematics Meetings,
Boston, MA, January 2023.

David Ambrose,
"Dependence on the domain in parabolic dynamics,"
Colloquium, Online Nonlinear Waves and Coherent Structures, February 2023.

David Ambrose,
"Global existence results for the 2D Kuramoto-Sivashinsky equation,"
Special Session on Nonlinear PDE, AMS Southeastern Section Meeting, Atlanta, GA, March 2023.

David Ambrose,
"Some existence results for mean field games"
Seminar talk, New York University Abu Dhabi, United Arab Emirates, April 2023.

David Ambrose,
"Convergence of boundary integral methods for interfacial Stokes and Darcy flow with surface tension,"
Minisymposium "Recent Advances of Modeling and Computation of Moving Boundary Problems",
International Congress on Industrial and Applied Mathematics (ICIAM), Tokyo, Japan, August 2023.

Jonah Blasiak,
"Demazure crystals and the Schur positivity of Catalan functions,"
Algebra seminar, University of Virginia, Charlottesville, VA, March 2023.

Jonah Blasiak,
"Catalania," Plenary Lecture, Formal Power Series and Algebraic Combinatorics (FPSAC) Conference, University of California, Davis, July 2023.

Darij Grinberg,
"Noncommutative birational rowmotion on a rectangle: A case study in noncommutative dynamics," Combinatorics Seminar, Massachusetts Institute of Technology, December 2022.

Darij Grinberg,
"Noncommutative birational rowmotion on a rectangle: A case study in noncommutative dynamics," Combinatorics Seminar, Kungliga Tekniska Högskolan, Stockholm, March 2023.

Darij Grinberg,
"Chromatic symmetric functions and broken circuits,"
Algebraic and Combinatorial Perspectives in the Mathematical Sciences (online seminar), April 2023.

Darij Grinberg,
"Natural endomorphisms of connected graded bialgebras",
Category Theory at Work in Computational Mathematics and Theoretical Informatics (CATMI 2023), Bergen, Norway, June 2023

Darij Grinberg and Ekaterina A. Vassilieva,
"The algebra of extended peaks,"
Poster, Formal Power Series and Algebraic Combinatorics (FPSAC) Conference, University of California, Davis, July 2023.

Darij Grinberg and Tom Roby,
"Birational rowmotion over noncommutative rings,"
Poster, Formal Power Series and Algebraic Combinatorics (FPSAC) Conference, University of California, Davis, July 2023.

Yixin Guo,
"Traveling Front Solution Stability in a Lateral Inhibition Network in the Neural Field Model,"
The 13th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Wilmington, NC, June, 2023

Pawel Hitczenko,
"Asymptotics of the Overflow in Urn Models,"
4th International Conference on Statistical Distributions and Applications (ICOSDA), Huntington, WV, October 2022.

Pawel Hitczenko ,
"Chromatic symmetric functions and broken circuits,"
BIRS Workshop on Probabilistic and Analytic Combinatorics, Banff, Canada, November 2022.

Pawel Hitczenko,
"On a class of polynomial recurrences resulting in the $(n/\log n, n/\log^2 n)$-asymptotic normality,"
21st International Conference: Random Structures and Algorithms, Pittsburgh, PA, June, 2023.

Georgi Medvedev,
"Graphon Dynamical Systems: the Law of Large Numbers, Large Deviations, and Metastability,"
SIAM Conference on Nonlinear Waves and Coherent Structures, Bremen, Germany, September 2022.

Georgi Medvedev,
"Graphon Dynamical Systems: the Law of Large Numbers, Large Deviations, and Metastability,"
Workshop on Modern Topics in Probability, University of Maryland, October 2022.

Georgi Medvedev,
"Galerkin Approximation of Nonlocal Diffusion Equation on Euclidean and Fractal Domains,"
Inverse Problems and Analysis Seminar, University of Delaware, April 2023.

Georgi Medvedev,
"Instability of mixing in the Kuramoto model,"
SIAM Conference on Applications of Dynamical Systems, Portland, OR, May 2023.

Cecilia Mondaini,
"An involution framework for Metropolis-Hastings algorithms on general state spaces,"
INI Satellite programme "Geophysical fluid dynamics; from mathematical theory to operational prediction",
University of Reading, UK, September 2022.

Cecilia Mondaini,
"Noncommutative birational rowmotion on a rectangle: A case study in noncommutative dynamics,"
Combinatorics Seminar, Kungliga Tekniska Högskolan, Stockholm, March 2023.

Cecilia Mondaini,
"An involution framework for Metropolis-Hastings algorithms on general state spaces,"
AMS Fall Southeastern Sectional Meeting,
Special Session "Deterministic and Stochastic PDEs: Theoretical and Numerical Analyses",
University of Tennessee at Chattanooga, TN, October 2022.

Cecilia Mondaini,
"An involution framework for Metropolis-Hastings algorithms on general state spaces,"
AMS Fall Western Sectional Meeting, Special Session "Recent Advances in the Theory of Fluid Dynamics",
University of Utah, UT, October 2022.

Cecilia Mondaini,
"Uniform-in-time numerical approximation of SPDEs: general result and application,"
AMS Spring Southeastern Sectional Meeting, Special Session "Stochastic Analysis and its Applications",
Georgia Tech, Atlanta, GA, March 2023.

Cecilia Mondaini,
"On the locally self-similar blowup for the generalized SQG equation,"
AMS Spring Southeastern Sectional Meeting,
Special Session "Qualitative Aspects of Nonlinear PDEs: Well-posedness and Asymptotics",
Georgia Tech, Atlanta, GA, March 2023.

Cecilia Mondaini,
"Long-time statistics of SPDEs: mixing and numerical approximation,"
Second Drexel Waves Workshop, Drexel University, Philadelphia, PA, March 2023.

Cecilia Mondaini,
"Uniform-in-time numerical approximation of SPDEs: general result and application,"
AMS Spring Central Sectional Meeting,
Special Session "Recent Developments in the Study of Fluid flows, Turbulence, and its Applications",
University of Cincinnati, Cincinnati, OH, April 2023.

Cecilia Mondaini,
"Long-time statistics of SPDEs: mixing and numerical approximation,"
48th Annual Spring Lecture Series - Transport, Mixing, and Fluids; University of Arkansas, AK, May 2023.

Cecilia Mondaini,
"A general involution framework for Metropolis-Hastings algorithms and applications to Bayesian inverse problems," SIAM DS23,
Special Session on "Rigorous and Computational Studies of Data Assimilation and Parameter Estimation",
Portland, OR, May 2023.

Cecilia Mondaini,
"An involution framework for Metropolis-Hastings algorithms on general state spaces,"
FoCM 2023, Workshop "Mathematical Foundations of Data Assimilation and Inverse Problems",
Paris, France, June 2023.

Cecilia Mondaini,
"A general involution framework for Metropolis-Hastings algorithms and applications to Bayesian inverse problems," International Congress on Industrial and Applied Mathematics (ICIAM),
Tokyo, Japan, August 2023.

Shari Moskow,
"The Lippmann Schwinger Lanczos Algorithm for Inverse Scattering Problems,"
Special Semester on Tomography Across the Scales 2022, Workshop 2 "Inverse Problems on Small Scales",
in Linz, Austria at Radon Institute of the Austrian Academy of Sciences (RICAM), October 2022.

Shari Moskow,
"The Lippmann Schwinger Lanczos Algorithm for Inverse Scattering Problems,"
Spectral and Scattering Seminar, Purdue University, December 2022.

Shari Moskow,
"The Lippmann Schwinger Lanczos Algorithm for Inverse Scattering Problems,"
Inverse Problems in the Desert Workshop, NYU Abu Dhabi, The United Arab Emirates, December 2022.

Shari Moskow,
"The Lippmann Schwinger Lanczos Algorithm for Inverse Scattering Problems,"
SIAM Conference on Computational Science and Engineering, Amsterdam, The Netherlands, March 2023

Shari Moskow,
"The Lippmann Schwinger Lanczos Algorithm for Inverse Scattering Problems,"
Applied Mathematics and Mathematical Medicine and Biology Seminar, University of Delaware, April 2023.

Shari Moskow,
"The Lippmann Schwinger Lanczos Algorithm for Inverse Scattering Problems,"
AWM Workshop: Women in Inverse Problems, Seattle, WA, June 2023.

Shari Moskow,
"The Lippmann Schwinger Lanczos Algorithm for Inverse Scattering Problems,"
Workshop on Mathematical Trends in Medical Imaging, University of Chicago, Chicago, IL, August 2023.

Shari Moskow,
"The Lippmann Schwinger Lanczos Algorithm for Inverse Scattering Problems,"
Minisymposium "Recent Advances in Direct and Inverse Problems in Mathematical Materials Science",
International Congress on Industrial and Applied Mathematics (ICIAM), Tokyo, Japan, August 2023

James E. Pascoe,
"Geometric dilation theory on the annulus,"
Semi-plenary talk, International Workshop Operator Theory and its Applications (IWOTA),
Kraków, Poland, September 2022.

James E. Pascoe,
"Free Wittstock decomposition,"
Session "Noncommuative probability, operator algebra and operator theory",
International Workshop Operator Theory and its Applications (IWOTA), Kraków, Poland, September 2022.

James E. Pascoe,
"The inverse problem for kernel means,"
Inverse Problems and Analysis Seminar, University of Delaware, March 2023.

James E. Pascoe,
"Germination phenomena,"
2023 SIAM Conference on Applied Algebraic Geometry, Eindhoven, The Netherlands, July 2023.

James E. Pascoe,
"The inverse problem for kernel means,"
International Workshop Operator Theory and its Applications (IWOTA), Helsinki, Finland, August 2023.

Gideon Simpson,
"Continuum Limits of Stochastically Forced Kuramoto Systems,"
2023 SIAM Conference on Dynamical Systems, Portland, OR, May 2023.

Gideon Simpson,
"Infinite Dimensional Nonlocal Diffusions with Additive Noise,"
14th International Conference on Monte Carlo Methods and Applications (MCM), Paris, June 2023.

Gideon Simpson,
"Uncertainty Quantification for Stochastic Models of Damage Mechanics,"
17th U. S. National Congress on Computational Mechanics, Albuquerque, NM, July 2023.

Gideon Simpson,
"Learning Energy Landscapes with Random Fourier Features,"
17th U. S. National Congress on Computational Mechanics, Albuquerque, NM, July 2023.

Xiaoming Song,
"Probability density of lognormal fractional SABR model,"
The 2023 Joint Mathematics Meetings, AMS Special Session on Stochastic Analysis and Applications,
Boston, MA, January 2023.

Xiaoming Song,
"Fractional stochastic wave equation driven by Gaussian noise rough in space,"
Probability and Mathematical Finance Seminar, Ritsumeikan University, Japan, March 2023.

Xiaoming Song,
"Spatial averages for the parabolic Anderson model driven by rough noise,"
AMS Central Sectional Meeting, Special Session on Stochastic Analysis and its Applications,
Cincinnatti, OH, April 2023.

Xiaoming Song,
"Stochastic fractional diffusion equations with noise rough in space,"
International Conference on Malliavin Calculus and Related Topics, Luxembourg, June 2023.

Xiaoming Song,
"Spatial averages for the parabolic Anderson model driven by rough noise,"
43rd Conference on Stochastic Processes and their Applications, Lisbon, Protugal, July 2023.

Jurij Volčič,
"Symmetries in free variables,"
Mathematics of Quantum Theory seminar, University of Copenhagen, Denmark, January 2022.

Jurij Volčič,
"Separating invariants for matrix tuples up to similarity,"
Mathematical Theory of Networks and Systems, Bayreuth, Germany, September 2022.

Jurij Volčič,
"Globally positive trace polynomials,"
Mathematical Theory of Networks and Systems, Bayreuth, Germany, September 2022.

Jurij Volčič
"State polynomials: positivity and applications,"
Real Algebraic Geometry with a View toward Koopman Operator Methods
Oberwolfach, Germany, March 2023

Jurij Volčič,
"Positivity of state polynomials with applications,"
International Linear Algebra Society, Madrid, Spain, June 2023.

Jurij Volčič,
"Ranks of linear pencils separate matrix similarity orbits,"
International Linear Algebra Society, Madrid, Spain, June 2023.

Jurij Volčič,
"Determinantal zeros and factorization of noncommutative polynomials"
Rings and Factorizations, Graz, Austria, July 2023.

Hugo J. Woerdeman,
"Ritz values and numerical ranges,"
Plenary lecture, International Workshop Operator Theory and its Applications (IWOTA),
Kraków, Poland, September 2022

Hugo J. Woerdeman,
"Completing an Operator Matrix and the Free Joint Numerical Radius,"
Mathematical Theory of Networks and Systems, Bayreuth, Germany, September 2022.

Hugo J. Woerdeman,
"Factorization of singular matrix polynomials and matrices with circular higher rank numerical ranges,"
Online Seminar on Linear algebra and Operator Theory (OSELOT), November 2022.

Hugo J. Woerdeman,
"Polynomially-defined domains: realizations for rational Schur-Agler functions and determinantal representations for stable polynomials,"
BIRS-JP Workshop: Differential-Algebraic Equations and Operator Pencils, Banff, Canada, April 2023.

Hugo J. Woerdeman,
"Error Bounds and Singularity Degree in Semidefinite Programming,"
2023 SIAM Conference on Applied Algebraic Geometry, Eindhoven, The Netherlands, July 2023.

Hugo J. Woerdeman,
"Completing an Operator Matrix and the Free Joint Numerical Radius,"
International Workshop Operator Theory and its Applications (IWOTA), Helsinki, Finland, August 2023.

J. Douglas Wright,
"A simple model for radiating solitary waves,"
Second Drexel Waves Workshop, Philadelphia, PA, March 2023.

J. Douglas Wright,
"Random FPUT Chains," 2023 Spring AMS Central Sectional Meeting, Cincinnati, OH. April 2023.

Jingni Xiao,
"On Nonscattering Anisotropic Inhomogeneities,"
Scattering and Inverse Scattering Workshop,
Johann Radon Institute for Computational and Applied Mathematics (RICAM),
Linz, Austria, November 2022
.

Jingni Xiao,
"On Nonscattering Anisotropic Inhomogeneities,"
Inverse Problems in the Desert Workshop, NYU Abu Dhabi, The United Arab Emirates, December 2022.

Jingni Xiao,
"On Nonscattering Anisotropic Inhomogeneities,"
Synergistic Workshop on Rich and Nonlinear Tomography,
The Isaac Newton Institute, Cambridge, UK, June 2023.

Jingni Xiao,
"On the Regularity of Nonscattering Inhomogeneities,"
Special session on Inverse Problems,
29th Nordic Congress of Mathematicians with European Mathematical Society (EMS),
Aalborg, Denmark, July 2023.

Thomas Yu,
"Conforming Subdivision Methods vs Non-conforming PL Methods for geometric variational problems,"
SIAM Conference on Computational Geometric Design (GD23), Genoa, Italy, June 2023.

Thomas Yu,
"Hirotugu Akaike's Analysis of Gradient Descent: 70 years later,"
International Congress on Industrial and Applied Mathematics (ICIAM), Tokyo, Japan, August 2023.

Faculty Grants

David Ambrose, PI, National Science Foundation, DMS 1907684,
Partial Differential Equation Methods for Mean Field Games, 2019-2023, $316,981

David Ambrose, PI, National Science Foundation, DMS 2307638,
Well-Posedness and Singularity Formation in Applied Free Boundary Problems, 2023-2026, $300,000

David Ambrose, PI, National Science Foundation, DMS 2247694,
Conference: Second Drexel Waves Workshop, 2023-2024, $10,800

Jonah Blasiak, PI, National Science Foundation, DMS 2154282,
Collaborative Research: Special Functions for Diagonal Harmonics and Schubert Calculus, 2022-2025, $170,236

Jonah Blasiak, PI, National Science Foundation, DMS 1855784,
Collaborative Research: Catalan Function and Schubert Calculus, 2019-2023, $179,816

Georgi Medvedev, PI, National Science Foundation, DMS 2009233,
Large Deviations and Metastability in Dynamical Networks, 2020-2023, $226,397

Cecilia Mondaini, PI, National Science Foundation, DMS 2009859,
Determining Degrees of Freedom in Nonlinear Complex Systems: Deterministic and Stochastic Applications, 2020-2023, $206,895

Cecilia Mondaini, PI, National Science Foundation, DMS 2239325,
CAREER: Analysis of uncertainty, long-time statistics and singularity formation in fluid flow models, 2023-2028, $481,439

Shari Moskow, PI, National Science Foundation, DMS 2008441,
Novel Image Reconstruction Methods in the Frequency Domain, 2020-2023,$324,988

Shari Moskow, Co-PI, National Science Foundation, DUE 1758345,
Preparing Mathematics and Science Teachers for Middle School, 2018-2023, $1,199,374

James Pascoe, PI, National Science Foundation, DMS 2319010,
Matrix Analysis for the 21st Century, 2020-2024, $133,158

Gideon Simpson, PI, National Science Foundation, DMS 2111278,
Collaborative Research: Particles and Proxies for Sampling, 2021-2024, $149,687

Gideon Simpson, Cooperative agreement (jointly with Petr Plechac),
Army Research Laboratory, September 2022-August 2023, Drexel funds $36,254

Jurij Volčič, Original PI, National Science Foundation, DMS 1954709,
Noncommutative Rational Functions in Free Analysis, 2020-2024, **$113,864**

Hugo Woerdeman, PI, National Science Foundation, DMS 2000037,
Modern Aspects of Multivariable Operator Theory and Matrix Analysis, 2020-2023, **$249,000**

J. Douglas Wright, PI, National Science Foundation, DMS 2006172,
Singular and Spatially Heterogeneous Perturbations of Solitary Waves, 2020-2023, **$165,000**

Jingni Xiao, PI, National Science Foundation, DMS 2307737,
Nonscattering Phenomena and Inverse Scattering, 2023-2026, **$270,000**

Thomas Yu, PI, National Science Foundation, DMS 1913038,
Geometric Approximation and Variational Problems, 2019-2023, **$299,999**

Faculty Appointments

David Ambrose and **J. Douglas Wright,** Organizers,
Second Drexel Waves Workshop, Philadelphia, PA, March 2023.

David Ambrose, Organizer,
Special Session, "*Progress in Nonlinear Waves*", AMS Central Section Meeting, Omaha, NE, October 2023.

David Ambrose, Member,
Scientific Committee for the VI Workshop on Fluids and Partial Differential Equations,
University of Campinas, Brazil, October 2023.

David Ambrose, Member,
Organizing Committee of the 2024 SIAM Annual Meeting, Spokane, WA, July 2024.

Jonah Blasiak, Member,
of the Scientific Committee for the Mid-Atlantic Algebraic Geometry and Combinatorics Workshop.

Georgi Medvedev, Co-organizer (jointly with Matthew Mizuhara),
Minisymposium "*Graphon Dynamical Systems: Patterns, Signals, and Games,*"
SIAM Conference on Applications of Dynamical Systems, Portland, OR, May 2023.

Shari Moskow, Co-organizer (jointly with I. Mitrea),
Special Session "I*ntegral Equations and Applications,*"
Joint Mathematics Meeting, Boston, January 2023.

Shari Moskow, Co-organizer (jointly with Romina Gaburro and Simon Arridge),
Workshop "*Synergistic workshop on rich and nonlinear tomography,*"
Isaac Newton Institute, Cambridge, England, June 2023.

James Pascoe and **Jurij Volčič**, Organizers,
Special Session "*Noncommutative real algebraic geometry and function theory,*"
International Workshop on Operator Theory and its Applications, Kraków, Poland, September 2022.

James Pascoe, Co-organizer (with William Helton and Igor Klep),
Special Session "*Matrix variables and matrix inequalities,*"
25th International Symposium on Mathematical Theory of Networks and Systems (MTNS 2022),
Bayreuth, Germany, September 2022.

James Pascoe, Co-organizer (with Kelly Bickel and Ryan Tully-Doyle),
Minisymposium "*Realization formulas, rational inner functions, and real algebraic geometry,*"
25th Conference of the International Linear Algebra Society (ILAS 2023), Madrid, Spain, June 2023.

James Pascoe, Visitor, Bucknell's Distinguished Visitor Program, Lewisburg, PA, February 2023.

James Pascoe, Participant,
Workshop "*Real Algebraic Geometry with a View toward Koopman Operator Methods,*"
Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany, March 2023.

James Pascoe, Co-organizer (with Kelly Bickel and Ryan Tully-Doyle),
AMS Special Session "*Complex Analysis, Operator Theory, and Real Algebraic Geometry,*"
Joint Mathematics Meetings, San Francisco, CA, January 2024.

James Pascoe, PhD Advisor and Member,
PhD Defense Committee for Tapesh Yadav, University of Florida, Gainesville, FL, April 2023.

Gideon Simpson, Organizer,
Minisymposium "*Learning, Uncertainty, and Materials,*" 11th Annual Mach Conference,
Baltimore, MD, April 2023.

Jurij Volčič, Co-organizer (jointly with V. Makam),
Special Session "*Symmetries, Positivity and Representations,*"
International Workshop on Operator Theory and its Applications, Helsinki, Finland, July 2023.

Hugo Woerdeman, Past Vice President and Executive Board Member,
International Linear Algebra Society (ILAS).

Hugo Woerdeman, Board Member,
of the International Research Center for Tensor and Matrix Theory of Shanghai University.

Hugo Woerdeman, Vice President,
International Workshop Operator Theory and Analysis (IWOTA) Steering Committee.

Hugo Woerdeman, Co-organizer (jointly with Edward Poon),
Special Session "*Matrix Analysis and Applications,*" Joint Mathematics Meeting, Boston, January 2023.

J. Douglas Wright, Member,
Scientific Committee, 2023 Annual Meeting of the New York-New Jersey-Pennsylvania Section of the
Society for Industrial and Applied Mathematics (SIAM-NNP), Newark, NJ, October 2023

Several faculty members also serve on review panels, primarily for the National Science Foundation.
However, we do not provide specifics as these assignments are confidential.

Faculty Editorial Positions

David Ambrose, Division Editor,
Journal of Mathematical Analysis and Applications

Pawel Hitczenko, Editorial Board Member,
Open Journal of Discrete Mathematics

Georgi S. Medvedev, Associate Editor,
Discrete and Continuous Dynamical Systems - B

Georgi S. Medvedev, Associate Editor,
Networks and Heterogeneous Media

Shari Moskow, Associate Editor,
SIAM Journal on Applied Mathematics

James E. Pascoe, Associate Editor,
Complex Analysis and Operator Theory

Hugo J. Woerdeman, Associate Editor,
Annals of Functional Analysis

Hugo J. Woerdeman, Editor-in-Chief,
Operators and Matrices

J. Douglas Wright, Associate Editor,
Communications in Analysis and Mechanics

Special Topic Courses

Winter Term **Spring Term**

MATH T480:
Computability & Hilbert's Tenth Problem
R. Andrew Hicks

MATH T480: Mathematical Biology
Georgi Medvedev

MATH T680:
Tensor Analysis in Euclidean and Riemannian Spaces
Pavel Grinfeld

MATH T880:
Stochastic Differential Equations
Cecilia Mondaini

Undergraduate Research Projects

David Ambrose, Luke Brown, John Bonnes and **Joshua Sin,**
research co-op: *Existence and computation of stationary solutions for congestion-type mean field games via bifurcation theory and forward-forward problems*

Georgi Medvedev, Matthew Mizuhara (The College of New Jersey), and **Cassandra Carey,**
research co-op: *Collective dynamics in excitable systems*

Cecilia Mondaini and **Jonathan Parlett,**
research co-op: *Bayesian Inverse Problems and Markov Chain Monte Carlo Algorithms*

Hugo Woerdeman and **Osamah Alhendi,**
research co-op: *A study of spectrahedra and spectraballs*

Thomas Yu and **Trent Huber,**
research co-op: *The Exact Line-Search Gradient Descent Method and Polynomial Optimization Problems*

Independent Studies

Fall Term **Winter Term** **Spring Term** **Summer Term**

Math I299: Proofs from the book
Eric Schmutz

Math I399: Differential Geometry I
K. Shwetketu Virbhadra

Math I399: Computational PDE
David Ambrose

Math I399: Fractal Geometry
Matthew Ziemke

Departmental Service Assignments 2022-23

Committees

Graduate Program

Chair: Pawel Hitczenko
Darij Grinberg
Jonah Blasiak
David Ambrose
Cecilia Mondaini

Graduate Admissions

Chair: Jonah Blasiak
Georgi Medvedev
Eric Schmutz
Jurij Volčič

Qualifying Exam

Eric Schmutz
Hugo Woerdeman

Major Grants

Chair: Georgi Medvedev
Thomas Yu
Gideon Simpson
Xiaoming Song (Fall)

Undergraduate Program

Chair: David Ambrose
Raymond Favocci
Deputy Chair: Fernando Carreon
Jason Aran
Jeffrey LaComb
R. Andrew Hicks
Matthew Ziemke
Shari Moskow (Fall)

Undergraduate Recruitment

Chair: Dimitrios Papadopoulos
James Pascoe
J. Douglas Wright
Xiaoming Song (Fall)
Pavel Grinfeld

Teaching Faculty Promotion

Chair: Fernando Carreon
Anatolii Grinshpan
Jason Aran
Oksana Odintsova
Daryl Falco

Tenure & Promotion

Chair: Thomas Yu
All tenured faculty

Tenure Track Search

Chair: Gideon Simpson
Eric Schmutz
Pawel Hitczenko
Shari Moskow (Fall)
Cecilia Mondaini

Diversity, Equity, & Inclusion

Chair: Thomas Yu
Oksana Odintsova
K.S. Virbhadra
Jurij Volčič

Annual Report

Chair: Hugo Woerdeman
Anatolii Grinshpan

Awards

Chair: Fernando Carreon
Oksana Odintsova
Jeffrey LaComb
Eric Schmutz
Matthew Ziemke
Hugo Woerdeman

Coffee Break

Chair: Li Sheng
Dennis Yang
Joel Pereira

Coordinators & Advisors

Assessment

Matthew Ziemke

Transfer Credits

Li Sheng

Colloquium

Darij Grinberg

Analysis Seminar

Hugo Woerdeman
Anatolii Grinshpan

CAGE Seminar

Jonah Blasiak
Darij Grinberg

PDE|Applied Math Seminar

Cecilia Mondaini
Jingni Xiao

Distinguished Speaker

Thomas Yu

Math Competition

James Pascoe
Jeffrey LaComb

Pi Day

Adam Rickert
K. S. Virbhadra
Daryl Falco
Anatolii Grinshpan

Placement Exam

Raymond Favocci

MSO Faculty Advisor

Pavel Grinfeld

Actuarial Society Faculty Advisor

Jason Aran

Bulletin Board Wrangle

K. S. Virbhadra

Library Liason

R. Andrew Hicks

Course Coordinators

Fall:

MATH100: Jeanne Steuber
MATH101: Daryl Falco
MATH105: Jason Aran
MATH116: Raymond Favocci
MATH121: Fernando Carreon, Dimitrios Papadopoulos

Winter:

MATH101: Daryl Falco
MATH102: Adam Rickert, Jeanne Steuber
MATH117: Raymond Favocci, Caitlin Klimas
MATH121: Dennis Yang
MATH122: Dimitrios Papadopoulos
MATH123: Anatolii Grinshpan
MATH200: Jason Aran

Spring:

MATH101: Oksana Odintsova
MATH102: Raymond Favocci
MATH119: Adam Rickert
MATH122: Dennis Yang
MATH200: Dimitrios Papadopoulos

University Service Assignments 2022-23

Jason Aran, Senator,
Faculty Senate

Fernando Carreon, Member,
CoAS Curriculum Committee

Pavel Grinfeld, Member,
Marketing Committee for CoAS

R. Andrew Hicks, Lecturer,
at Drexel Welcome Week "*Mathematics of Reflectors*"

Pawel Hitczenko, Member,
Provost Advisory Committee for Promotion and Tenure

Gideon Simpson, Alternate Senator,
Faculty Senate

Gideon Simpson, Member,
CoAS Strategic Staffing Initiative Committee

Oksana Odintsova, Member
TA Excellence Committee

Dimitrios Papadopoulos, Organizer,
Math, Music and Coding Camp held July 10-14, 2023

Hugo J. Woerdeman, Flag Bearer,
at *Commencement of the College of Arts and Sciences*

Faculty Promotions



Dimitrios Papadopoulos
Promotion to
Assosciate Teaching Professor



K. Shwetketu Virbhadra
Promotion to
Assistant Teaching Professor

Faculty Awards & Recognition

2023 Provost Award for Undergraduate Teaching Impact
This award recognizes full-time faculty at Drexel who have made a distinctive impact through excellence in teaching primarily at the first- or second-year undergraduate level.

Awarded to **Dimitrios Papadopoulos** with Provost Paul Jensen (right) and Senior Vice Provost Erin McNamara Horvat (left)



Service Recognition

20 Years



Georgi Medvedev

15 Years



Shari Moskow



J. Douglas Wright

5 Years



K. Shwetketu Virbhadra

Graduate Student Accomplishments

Publications

Publications co-authored with a Drexel Faculty Member appear under 'Faculty Publications'

Sultan Aitzhan, Sambhav Bhandari, David A. Smith,
Fokas diagonalization of piecewise constant coefficient linear differential operators on finite intervals and networks. Acta Appl. Math. 177 (2022), Paper No. 2, 69 pp.

Lanre Akinyemi, Mehmet Şenol, Emad Az-Zo'bi, P. Veeresha, **Udoh Akpan,**
Novel soliton solutions of four sets of generalized (2+1)-dimensional Boussinesq-Kadomtsev-Petviashvili-like equations. Modern Phys. Lett. B 36 (2022), no. 1, Paper No. 2150530, 30 pp.

Luke C. Brown, William J. Martin, and Duncan Wright,
Continuous time quantum walks on graphs: Group state transfer. Discrete Appl. Math. 337 (2023), 68–80.

Leslie Hogben, Mark Hunnell, Kevin Liu, Houston Schuerger, Ben Small, **Yaqi Zhang,**
Upper bounds for positive semidefinite propagation time.
Discrete Math. 345 (2022), no. 9, Paper No. 112967, 11 pp.

Pundikala Veeresha, Lanre Akinyemi, **Kayode Oluwasegun,** Mehmet Şenol, Bismark Oduro,
Numerical surfaces of fractional Zika virus model with diffusion effect of mosquito-borne and sexually transmitted disease. Math. Methods Appl. Sci. 45 (2022), no. 5, 2994–3013.

Presentations

Joshua McGinnis,
"Rigorous justification for macroscopic waves in a two-dimensional lattice with random masses,"
Online: Analysis and Applied Mathematics (AAM) Seminar, Kennesaw State University, November 2, 2022

Isaac Woods,
Inverse Problems and Magneto-Acoustic Tomography with Magnetic Induction,
CNU Mathematics Colloquium, Christopher Newport University, Newport News, VA, March 2, 2023

Ricardo Guimaraes,
"*On the self-similar blowup for the 2D generalized SQG equation*" (Poster),
Summer school and conference "Recent advances in mathematical fluid dynamics",
Duke University, Durham, NC, May 16 - 24, 2023.

Conference Participations

Liam Doherty and **Amanda Johnson,**
Group Project Workshop, Internship Network in the Mathematical Sciences (INMAS),
Baltimore, MD, February 2023.

Liam Doherty,
2023 SIAM Conference on Computational Science and Engineering,
Amsterdam, The Netherlands, March 2023

Joshua McGinnis and **Udoh Akpan,**
2023 SIAM Conference on Applications of Dynamical Systems, Portland, Oregon, May 2023

Student Awards: Graduates

Albert Herr Award for Teaching Assistant Excellence

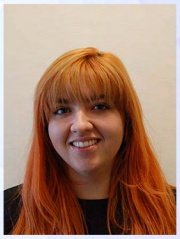
The Albert Herr Teaching Assistant Award is given annually to teaching assistants who have excelled in the classroom. The award was established in memory of Al Herr, a distinguished and much-admired faculty member of the Department of Mathematics, who retired in 1993 after 36 years of service in the department. The award was established after his death in 1995 and the first award was presented in the spring of 1997.

The 2023 Albert Herr Teaching Assistant Awardees are:





Sultan Aitzhan



Juliane Dalben



Amanda Johnson



Hyeju Kim

Continuing Excellence in Teaching Assistance Award

Teaching Assistant Excellence Awards are presented to graduate and professional students (master's and/or doctoral level) who serve as Teaching Assistants or Teaching Fellows (TAs/TFs) and who exhibit exemplary commitment to student learning through reflective teaching practices, creative and innovative teaching methods, academic support, leadership and a commitment to their own professional growth and development as an educator.

This year's nominees were:



Sultan Aitzhan



Juliane Dalben



Mikey Becht

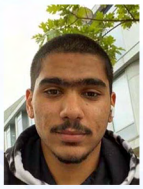
Student Awards: Honors Day

The Robert J. Bickel Endowed Scholarship

Presented in honor of Robert J. Bickel, who was a member of the Mathematics Department from 1946 to 1987.
Recipients denoted below



Grace Abbonizio is a junior majoring in mathematics with an Actuarial Science minor at Pennoni Honors College. She is on the Drexel Varsity Softball Team. She is also a math tutor at the Math Resource Center. Currently, she is in a co-op working at MetLife.



Osamah Alhendi is a senior majoring in mathematics. He is a math tutor at the MRC. Currently, he is working as an Undergraduate Research Assistant in the math department under the leadership of Dr. Hugo Woerdeman.



Jeevesh Attri is a sophomore double–majoring in mathematics and Computer science. He has also received the Founder's scholarship. He volunteers as a CoAS ambassador and has also had experience working with his fellow students as a mathematics tutor. Currently, he is working as an intern embedded software engineer at Cornelis Networks.



Sarah Colalilo is a junior majoring in mathematics. She is a math tutor at the Math Resource Center. Currently, she is in a co-op working at Cobham Advanced Electronic Solutions (CAES) as a Finance/Pricing Analyst.



Linus Cook is a senior majoring in both Mathematics and Electrical Engineering with a CS minor. Currently, he is in a coop at Comcast working as a Software Developer. Also, he was a Network Engineering at V-COMM, LLC, and did an Engineering Intern at ONExia Inc.



Dat Do is a junior majoring in mathematics. Currently, he is in a co-op at Ormat Energy Storage Solutions as a Data Engineer.



Chelsea Gravereaux is a senior majoring in Mathematics with minors in Computer Science and STEM Education. She is a tutor at the Math Resource Center, part of Drexel's Swimming & Diving team, and was named captain for the 2022-2023 season. She is currently completing her third co-op with the Data Engineering team at FS Investments.



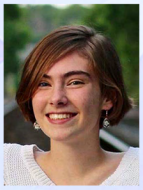
Ariel Hiterer is a senior majoring in mathematics and minoring in Data Science. He is a math tutor at the Math Resource Center. He is currently in the co-op at JPMorgan as a Business Intelligence Developer. Also he was an Optimization Analyst at Independence Blue Cross and he serves as the President of Alpha Epsilon Pi.



Kayla Kaeppel is a senior majoring in mathematics with an Actuarial Science minor. Currently, she is on co-op at Venerable as an Actuarial co-op. Also, she did a Financial Planning and Analysis Co-op at Cozen O'Connor, and she was an intern at Northampton County Archives. Finally, she plays in the percussion ensemble of the concert band at Every Nation Campus Ministry.



Isabella Lazzaro is a junior majoring in mathematics. She is currently working at Glenmede as a Quantitative Research Group coop. Also, she did an Insights Co-op at the Health Union and she serves as the treasurer of Alpha Omega Epsilon Beta Mu.



Sarah Midla is a junior majoring in mathematics. She is a math tutor at the Math Resource Center. She is currently working at Philly Office Retail as a Program Management coop.



Sameen Rouf is a pre-junior majoring in mathematics. He is working at Philly Office Retail as an Accounting-Bookkeeping Assosciate co-op. In addition, he was a Fitness Floor Assistant and a Student Ambassador, and he is active in the Drexel Table Tennis Club.

Student Awards: Honors Day

Dr. Robert C. Busby Endowed Award

Presented to a high achieving Mathematics student who volunteers as a mentor or tutor



Rachelle Pena is a sophomore double majoring in mathematics and computer science at Pennoni Honors College. She is a math tutor at the Math Resource Center and is currently on co-op working as a programmer analyst at the University of Pennsylvania. She is also treasurer of the Drexel Track Club

Dr. Richard and Professor Dorothy Sasin Endowed Scholarship Fund

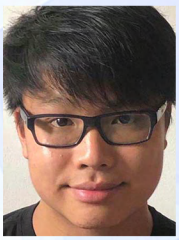
Presented to a freshman or sophomore student of mathematics and chemistry for academic excellence



David O'Hara is a sophomore majoring in mathematics with a high GPA and was bestowed with Dr. Richard and Prof. D Sasin scholarships. After struggling to find an academic passion, he found his spot in math

Frank H. M. Williams Endowed Prize

Presented annually in recognition of academic achievement in mathematics



Zhuxin Ken Deng is a senior majoring in mathematics with an Actuarial Science minor. He worked at the Math Resource Center as a front desk assistant and is currently working at Susquehanna International Group as an Equity Option Operations coop

Yilin Yang Outstanding Undergraduate Research Award

Presented to an undergraduate Mathematics major who has conducted outstanding research in the field



John Bonnes is a mathematics BS/MS student, also majoring in Computer Science, graduating in the spring 2023 term. He did exceptional research work in the math department during coop under the leadership of Dr. David Ambrose. In addition, he was R&D Engineer Intern at Penn State's Applied Research Laboratory and a Research Aide at Argonne National Laboratory

Graduating Class of 2022-23

Mathematics Undergraduate Majors

Bachelor of Art

Sadia Afrin, *Magna Cum Laude*
Rayhona Aliakbarova, *Magna Cum Laude*
Ajay Dev Bordoloi, *Magna Cum Laude*
Justin S Gliksman, *Summa Cum Laude*
Adam Jacob Hess-Dunlop, *Cum Laude*
Aditya Jaiswal
Justin Kalan
Tongtong Liu
Grace Elizabeth Majkut, *Magnu Cum Laude*
Hiep Chan Nguyen
Helen Rosenbrien, *Cum Laude*
Ziyi Shi
Aaryaman Vyas, *Magna Cum Laude*
Nankai Ye, *Magna Cum Laude*
Zhangerjiao Yuan, *Cum Laude*
Alaina M Zaki, *Magna Cum Laude*

Bachelor of Science

Talin Elizabeth Bedonian, *Summa Cum Laude*
John Wrigley Bonnes, *Magna Cum Laude*
Daniel Carvente
Benjamin C Castle
Lily Danielle Dunbar, *Summa Cum Laude*
Nuobing Fan
Luke Francesco Ingram
Benjamin Ryan Keller, *Cum Laude*
Sopheap Kim, *Magna Cum Laude*
Sundy Liu
Dorothy Ann McCafferty, *Magna Cum Laude*
Bronwyn M Sayre, *Magna Cum Laude*
Mary Elizabeth Sullivan, *Magna Cum Laude*
Yonatan Wiese-Namir, *Summa Cum Laude*
Gustav Wogen, *Cum Laude*

Minor in Mathematics

Zachary L Acosta
Melanie Agne
Amirsina Ahmadi
Badrudin Noor Sheikh Ali
Victoria Eleanor Allen
Caleigh Marie Anderson
Alisha Isabelle Augustin
Viacheslav Beliaev
Gary J Benjamin
Pranav Bhogal
Sujoy Bose
Cassandra Erin Carey
Andy Chen Chek
Justin Lorins Culp
Manav Prakash Datwani
Ziyan Di
Daniel David Dinu
Hung N Do
Dimitrios Nicholas Dogias
Oroghene A Emudainohwo
Mark W Gellar
Tajung Yasumasa Jang
Matthew Brian Knoebel
YunSang Lee
Anthony Samuel Long
Soukayna Mardas
Trevor Vincent McCaffrey
Ryan James McNamara
Christina Marie Morris
Alina Muldagaliyeva
Benjamin James Pochet
Michael David Quillen
James F Ralph
Mohammad Monkasir Saber
Andrew Michael Senin
Jiacheng Shen
Hovni Singh
Quan Minh Ta
Himanshu P Umare
Hruday Vairagade
Quoc Thinh Vo
Truong Quang Vo
Jared Michael Wallace
William Y Wu
Jackie Yang
Joshua Yang
Caraline Rose Young
Sean Enwei Zhang

Minor in Actuarial Science

Sadia Afrin
Talin Elizabeth Bedonian
Lily Danielle Dunbar
Nuobing Fan
Sopheap Kim
Grace Elizabeth Majkut
Dorothy Ann McCafferty
Bronwyn M Sayre

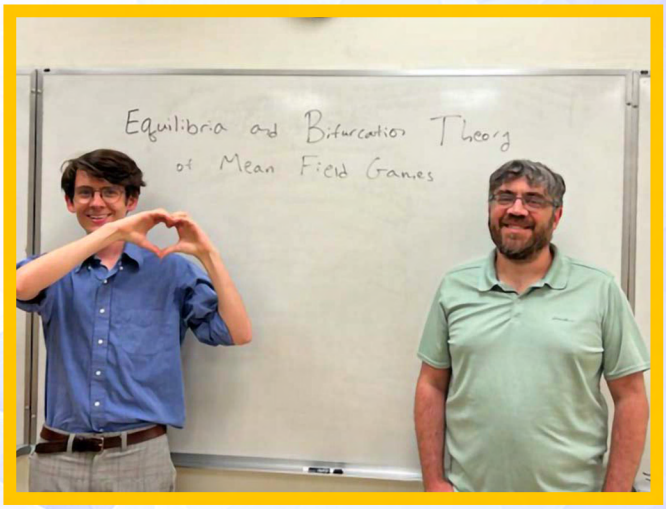
Master of Science

Adam Baurkot
John Wrigley Bonnes
Patrick Francis Bray
Ulrich Quyn

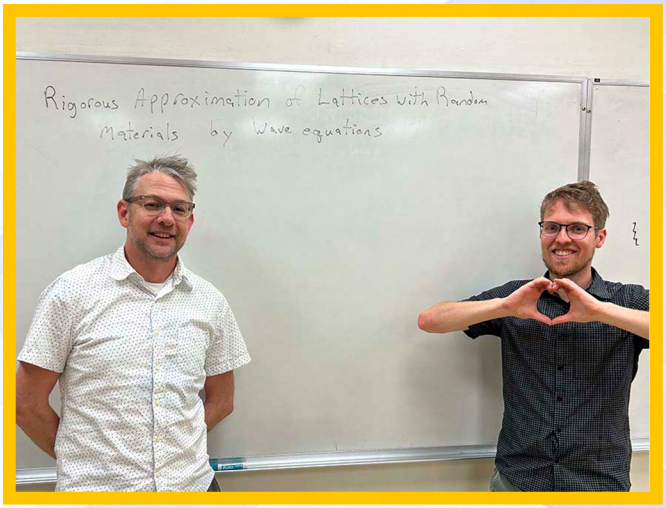
PHD in Mathematics



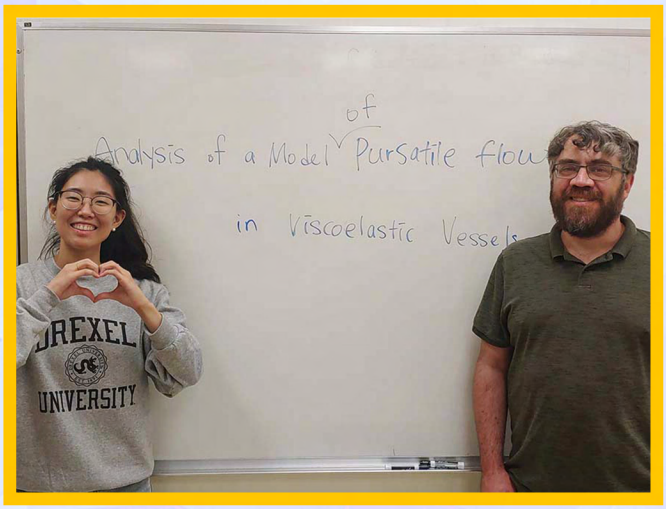
On May 16, **Yaqi Zhang** successfully defended her thesis, *Upper Bounds for PSD Propagation Time and Zero Forcing in Shadow Graphs*, written under the supervision of **Dr. Hugo J. Woerdeman**



On May 23, **Luke Brown** successfully defended his thesis, *Equilibria and Bifurcation Theory of Mean Field Games*, written under the supervision of **Dr. David Ambrose.**



On June 6, **Josh McGinnis** successfully defended his thesis, *Rigorous Approximation of Lattices with Random Materials by Wave Equations*, written under the supervision of **Dr. J. Douglas Wright**.



On June 13, **Hyeju Kim** successfully defended her thesis, *Well-Posedness, Ill-Posedness, and Traveling Waves for Models of Pulsatile Flow in Viscoelastic Vessels*, written under the supervision of **Dr. David Ambrose.**

Co-Op Employers 2022-23

CAES – Pioneering Advanced Electronics
CHUBB (formerly ACE USA)
College Ave Student Loans LLC
Comcast Corporation
Cornelis Networks
Drexel University
Exelon
FS Investments
Glenmede
Independence Blue Cross
JPMorgan Chase & Co
Larkos
Macquarie Investment Management
MetLife
Ormat Energy Storage Solutions
Penn State University
Philly Office Retail
PJM Interconnection (DZConneX)
SAP America
SEPTA (Southeastern Pennsylvania Transportation Authority)
Silver Management Group of Companies
SRI International
Susquehanna Int'l Group LLP
The Lexington at Jackson Hole Hotel & Suites
University of Pennsylvania
Venerable

Colloquium and Seminars

Colloquium | Analysis Seminar | CAGE Seminar | PDE Seminar

10/19/22: **Marcelo Aguiar (Cornell University):**
Lie theory relative to a hyperplane arrangement

11/09/22: **Jaclyn Lang (Temple University):**
Reasoning with irrationality: factorization with $19^{1/5}$

02/15/23: **Tapesh Yadav (University of Florida):**
Asymptotic Moments of Patterned Random Matrices

03/08/23: **William J. Keith (Michigan Tech University):**
Ramanujan-Kolberg identities, regular partitions, and multipartitions

03/23/23: **B. Cooper Boniece (University of Utah):**
On optimal estimation of integrated variance

04/12/23: **Dmitry Pelinovsky (McMaster University):**
Existence and stability of singular nonlinear waves in mathematical models of nonlinear optics

04/19/23: **Randall Kamien (University of Pennsylvania):**
Knitting Scaffolds and Other Tricks with Minimal(ish) Surfaces

05/03/23: **Gunther Uhlmann (University of Washington):**
Invisibility via Transformation Optics

05/31/23: **Oleh Omel'chenko (University of Potsdam):**
Nonstationary synchronization patterns in discrete oscillatory media

09/30/22: **Jurij Volčič (Drexel University):**
Free Bertini's theorem and isospectral noncommutative polynomials"

10/07/22: **Hein van der Holst (Georgia State University):**
The Strong Maximum Nullity of Directed Graphs

10/14/22: **James Pascoe (Drexel University):**
Germination phenomena in several complex variables

10/21/22: **Hugo Woerdeman (Drexel University):**
On the Gau-Wang-Wu conjecture

10/28/22: **Ramesh Garimella (University of Central Arkansas):**
On the Spectrum of the Absolute Norm Attaining Positive Operators

11/04/22: **Yaqi Zhang (Drexel University):**
Cops and Robber Game in Zero Forcing

11/11/22: **Omesh Dwivedi (Drexel University):**
Jacobi-Trudi Determinants in Finite Fields

11/18/22: **Anatolii Grinshpan (Drexel University):**
Singularity of zero/one matrices

12/02/22: **Jakob Moosbauer (Johannes Kepler University, Austria):**
Flip Graphs for Matrix Multiplication (remote talk)

01/13/23: **Abdellah Islam (Drexel University):**
Spectrahedra

01/20/23: **Matthew Ziemke (Drexel University):**
Properties of spectrahedra

01/27/23: **Sarah Gift (Drexel University):**
Hyperbolic polynomials, definite representations, and interlacing

02/03/23: **James Pascoe (Drexel University):**
Hyperbolic curves and the Helton-Vinnikov theorem

02/10/23: **Jurij Volčič (Drexel University):**
Hyperbolic polynomials from graphs

02/17/23: **Anatolii Grinshpan (Drexel University):**
Derivative cones

02/24/23: **Anatolii Grinshpan (Drexel University):**
Free spectrahedra

03/03/23: **Hugo Woerdeman (Drexel University):**
Spectrahedral shadows

03/10/23: **Hugo Woerdeman (Drexel University):**
Lasserre-Parrilo relaxation

04/28/23: **Thomas Yu (Drexel University):**
The Exact Line-Search Gradient Descent Method and Polynomial Optimization Problems

05/05/23: **Jeffrey Zhang (Carnegie Mellon University):**
On Local Minima of Cubic Polynomials

05/12/23: **Yaqi Zhang (Drexel University):**
Spark of a graph and minimum number of distinct eigenvalues of a tree

05/19/23: **Jurij Volčič (Drexel University):**
State polynomials: positivity and applications

05/26/23: **Sarah Gift (Drexel University):**
Real Factorization of Positive Semidefinite Matrix Polynomials

06/02/23: **Austin Jacobs (University of Florida):**
The geometry of inconvenience and perverse equilibria in trade networks

06/09/23: **James Pascoe (Drexel University):**
Matrix convex verbatim enumeration functions are graphical

10/13/22: **Daniel Soskin (University of Notre Dame):**
Determinantal inequalities for totally positive matrices

10/18/22: **Fan Wei (Princeton University):**
Graph limits and graph homomorphism density inequalities

10/19/22: **Marcelo Aguiar (Cornell University):**
Lie theory relative to a hyperplane arrangement

10/27/22: **Tianyuan Xu (Haverford College):**
2-roots for simply laced Weyl groups

11/03/22: **Mark Skandera (Lehigh University):**
Combinatorial evaluation of hyperoctahedral group characters

11/10/22: **Raymond Chou (University of California, Davis):**
A Descent Basis for the Garsia-Procesi Module

11/17/22: **Jessica Striker (North Dakota State University):**
P-strict promotion and Q-partition rowmotion

12/01/22: **Matteo Parisi (Institute for Advanced Study and Harvard CMSA):**
From Polytopes to Grassmannians: the Hypersimplex VS the Amplituhedron

12/08/22: **Holden Eriksson (Drexel University):**
The Arrow Algebra and the Stanley-Stembridge Conjecture

02/02/23: **Joel Brewster Lewis (George Washington University):**
Hurwitz numbers for reflection groups

02/23/23: **Mark Skandera (Lehigh University):**
Chromatic symmetric functions

03/02/23: **Jianping Pan (North Carolina State University):**
K-Kohnert rule for Lascoux polynomials and connection to Castelnuovo–Mumford polynomials

03/16/23: **Swee Hong Chan (Rutgers University):**
Combinatorial Atlas for Log-concave Inequalities

04/06/23: **Petra Schwer (University of Magdeburg):**
Reflection length in Coxeter groups

04/13/23: **Mahir Bilen Can (Tulane University):**
Generalizing the Wilf Conjecture via Unipotent Algebraic Groups

09/30/22: **Dmitri Vainchtein (Nyheim Plasma Institute, Drexel University):**
The nonlinear resonant wave-particle interaction in magnetosphere: a journey from data science to dynamical systems and back

10/21/22: **Alexander Watson (University of Minnesota, Twin Cities):**
Moiré-scale PDE models of twisted bilayer graphene

11/04/22: **Donsub Rim (Washington University, St Louis):**
Early Tsunami Warning using Convolutional Neural Networks

11/18/22: **Yoichiro Mori (University of Pennsylvania):**
Mathematical Theory of the Swimming Thin Filaments

02/10/23: **Chen-Chih Lai (Columbia University):**
Free boundary problem for a spherical gas bubble in a liquid with thermal effect

02/24/23: **Diane Guignard (University of Ottawa):**
Numerical approximation of the deformation of thin plates

03/01/23: **Eric Stachura (Kennesaw State University):**
Mathematical methods for optical refraction problems in exotic media

03/10/23: **Narek Hovsepyan (Rutgers University):**
Far field broadband approximate cloaking for the Helmholtz equation with a Drude-Lorentz refractive index

03/17/23: **Lanre Akinyemi (Lafayette College):**
Shallow-ocean soliton and localized waves in extended (2+1)-dimensional nonlinear evolution equations

04/07/23: **Justin Webster (University of Maryland, Baltimore County):**
To Flutter or Not: Mathematical Aeroelasticity

04/21/23: **Dallas Albritton (Princeton University):**
Non-uniqueness of Leray solutions to the forced Navier-Stokes equations

04/28/23: **Atilla Yilmaz (Temple University):**
Stochastic homogenization of nonconvex viscous Hamilton-Jacobi equations in one space dimension

05/26/23: **Bowen Li (Duke University):**
Interpolation between modified logarithmic Sobolev and Poincaré inequalities for quantum Markovian dynamics

06/02/23: **R. Andrew Hicks (Drexel University):**
The Eigenmirror Problem and First Integrals for Lotka-Volterra Systems

06/09/23: **Sonia Mahmoudi (Center for Functional Fabrics, Drexel University):**
Topological model of weaves and links in the thickened torus"

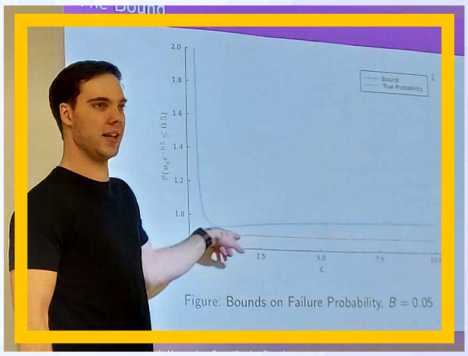
SIAM Seminar

10/12/22: **Amanda Johnson:**
Analyzing Models of Thalamocortical Neurons

10/24/22: **Sultan Aitzhan:**
Bourgain method for KdV equation with quasiperiodic initial data

11/07/22: **Emily Kelting:**
Energy Estimates for a Special Non-Linear KdV

11/14/22: **Liam Doherty:**
Information-Theoretic Uncertainty Quantification Bounds --->



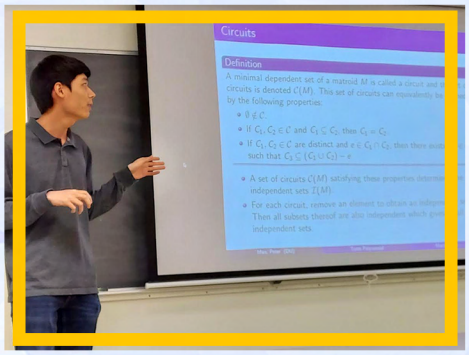
01/30/23: **Liam Doherty:**
Kammonen et. al. Adaptive Random Fourier Features Paper

02/06/22: **INMAS Presentations**
Liam Doherty:
Mathematical modeling of snow removal prices
Amanda Johnson:
Estimating parameters of Lotka-Volterra competition equation

02/13/23: **Hunter Wages:**
Stochastic Deep-Ritz for Parametric Uncertainty Quantification

02/20/23: **Isaac Woods:**
Inverse Problems and the MAT-MI Algorithm

03/06/22: **Epsilon Day Part 1**
Peter Mao:
An introduction to the Tutte polynomial ---------->



Abdellah Islam:
Homology of Toric Varieties

03/13/23: **Epsilon Day Part 2**
Julian Bushelli:
Gödel Numbers
Michael Becht:
Frobenius Numbers

04/10/23: **Sarah Gift:**
Real Factorization of PSD Matrix Polynomials

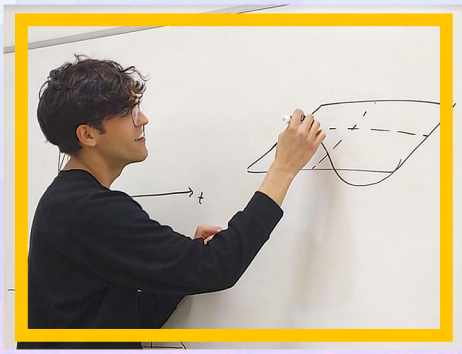
04/17/23: **Sultan Aitzhan:**
Convex Integration and Onsager's Conjecture

04/24/23: **Juliane Baiochi:**
Exploring the SDEs World

05/01/23: **Liam Doherty:**
An Overview of Neural SDE

05/08/23: **Hunter Wages:**
Adaptive Fourier Features with Metropolis Sampling

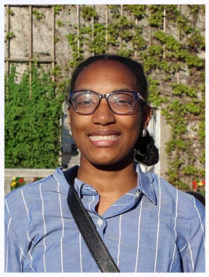
05/15/23: **Hayden Ruff:**
Can One Hear the Shape of a Drum? ---------->



05/22/23: **Josh McGinnis:**
Macroscopic Wave Propagation for Lattices with Random Material Coefficients

Math Student Organization

Board Members



Alisha Augustin
President



Mihir Rao
Vice President



Siddhanth Agrawal
Treasurer

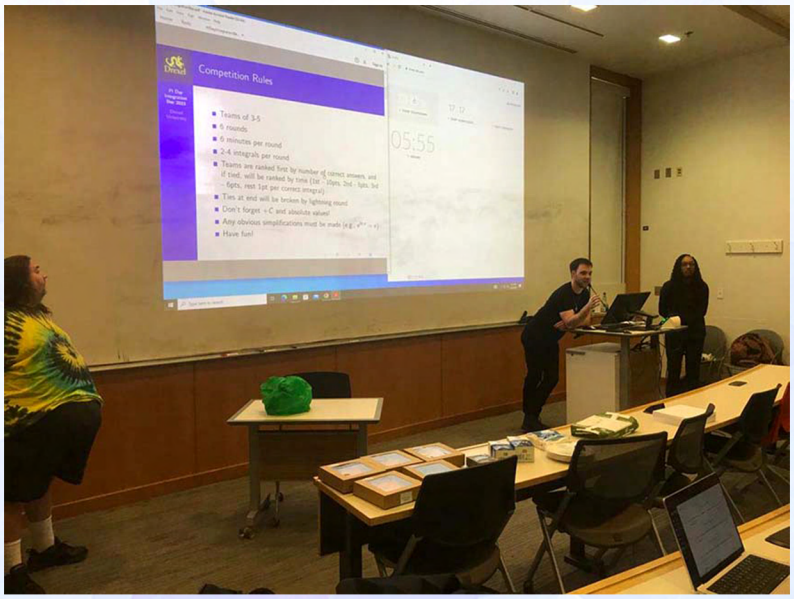


Kayne Galie
Event Coordinator

Events Hosted

Activities included helping with the 2023 Pi Day, in particular with the Integration Bee.

Start of the Integration Bee. From left to right: Adam Rickert, Liam Doherty and Alisha Augustin.



Clubs

Math Bytes



Emily Kelting
President



Isaac Woods
Vice President

SIAM Chapter



Liam Doherty
President



Amanda Johnson
Vice President



Hunter Wages
Treasurer



Juliane Dalben
Secretary

10/03/22: Liam Doherty:
Workshop on creating a personal website using the Julia programming language and GitHub

10/05/22: Making posters for the math center:





10/31/22: ***Halloween Party:***
One chess game, twelve people,
no discussing with your team

11/21/22: ***Thanksgiving Party***

11/28/22: ***Christmas Party***

Playing Spelling Bee during weakly teas on Mondays:





01/07/23: Hang out for new semester

02/27/23: ***Math Game Day:***
The shirts came in!
And Andy walked by as we were taking pictures.

06/05/23: ***Elections***

Pi Day

The Pi Day event took place on March 14, 2023. The turnout was great and the atmosphere was cheerful.

Liam Doherty was the host and chief organizer (pictured next to laptop)



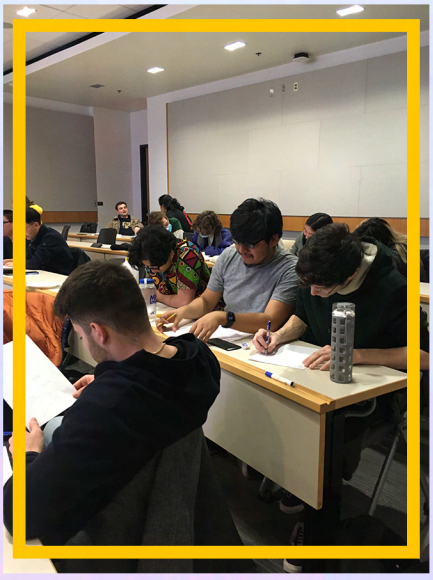


Eight teams took part in the Integration Bee contest.
There were a total of six 6-minute rounds and one bonus round.

The panel included:
Alisha Augustin, Anatolii Grinshpan, Shari Moskow, Adam Rickert, and Shwetketu Virbhadra.







The final results were announced by Adam Rickert.

First Place, with 15 points: Team Name of Daniel Carvente, Trent Huber, Petyo Manev, and Jasper Ty. (pictured below)

Second Place, with 9 points: Team Ultimate Trio of Dat Do, Wen Liu, and Henry Nguyen.

Third Place, with 7 points: Team Hf(x)potenuse l'Hop of Kiana Ahmari, Abby Choy, and Madelyn Li.



The Integration Bee was followed by a Pie Eating Competition.

Five braves took the challenge. Abdul Wahab finished his pie first in a blistering 30 seconds. Hunter Wages promised to win this challenge next year.



Math Resource Center

Mission

The Math Resource Center (MRC) is open to provide Drexel students with Mathematics help. The center helps those enrolled in courses offered by the Department of Mathematics. The MRC is open **Monday – Thursday, 10:00 am – 7:00 pm, and 10:00 am – 4:00 pm on Friday**. The center provides face-to-face and remote help during the hours of operation. The center, located in **Korman 207**, opens the first week of the quarter and closes at the completion of final exams.

Changes

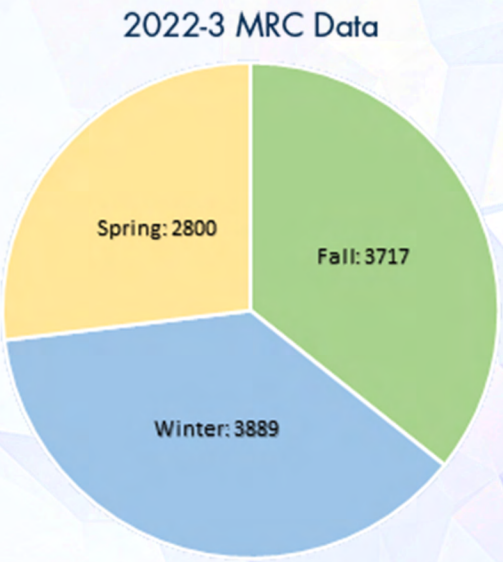
We started this year with a renovated space thanks to the generous donations of **Ms. Carol Sangtinette**. A *new glass door was installed* (image below), making for a more welcoming entrance. In addition, the old white boards were replaced with new glass dry-erase boards and, with the space repainted, we were able to start totally fresh! We thank Ms. Sangtinette very much for making this possible!

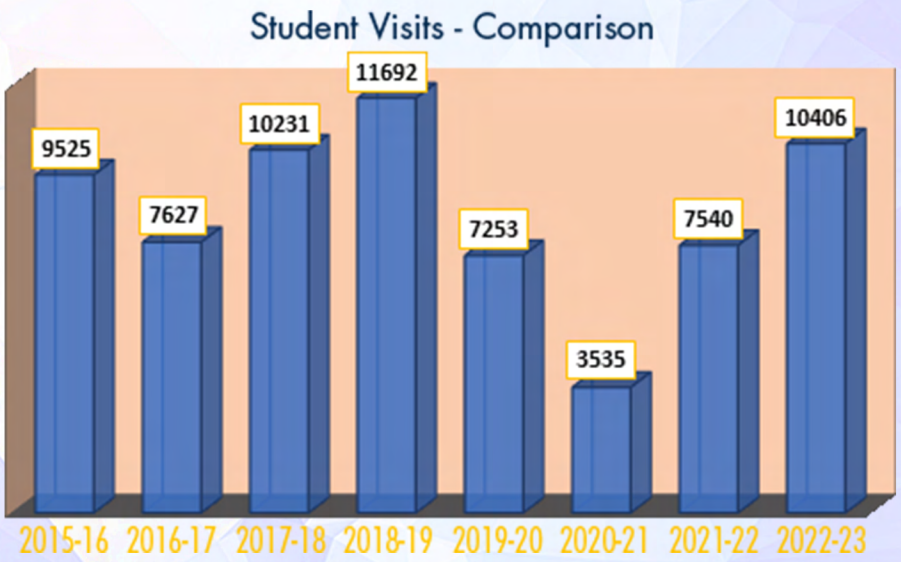
In addition, a new Program Assistant, **Aszuré Dunbar**, joined the MRC this academic year. Aszuré graduated from SUNY, Albany, with a math major.



Visits and Outreach

A total of 10406 student visits were recorded in the fall, winter, and spring quarters. This is a significant increase from last year, bringing us back to pre-pandemic levels.





The MRC, which is now part of the university-wide Academic Resource Center (ARC), expanded the outreach resources this academic year to seven residence halls in the Winter and Spring quarter and organized *Study Booster and Study Squad sessions* (images below). The MRC is staffed with Math Department Faculty, Graduate and Undergraduate students.





Social Events

We had weekly teas on Mondays with a nice variety of cookies and fruit.
Thanks are due to **Li Sheng, Dennis Yang and Joel Pereira** for arranging all these goodies.







In addition, on *Friday December 9th* we had an end of quarter/start of holiday departmental get-together with some great hoagies.



