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**DREXEL UNIVERSITY**

**DEPARTMENT OF MATHEMATICS**

*Annual Report*

*2016-2017*

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# DEPARTMENT DIRECTORY

*Department Leadership*  
*Administration*  
*Faculty*  
*Visiting Faculty*  
*Adjunct Faculty*  
*Teaching Assistants and Research Assistants*

## **DEPARTMENT LEADERSHIP**



*Shari Moskow, PhD Department Head; Professor of Mathematics*

*J. Douglas Wright, PhD Associate Department Head; Associate Professor of Mathematics*

*Ronald Perline, PhD Associate Department Head; Associate Professor of Mathematics*

## **ADMINISTRATION**



*Paige Chmielewski, Undergraduate Program Coordinator*

*Kenneth Hemphill, Budget Coordinator*

*Gene Phan, Computer Specialist*

*Sobha Philip, Graduate Program Manager (Math Resource Center)*

*Amy Tiernan, Program Assistant (Math Resource Center)*

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## FACULTY MEMBERS



*Left to Right:*

*David Ambrose, PhD (Duke University)*

*Jason Aran, MS (Drexel University)*

*Jonah Blasiak, PhD (University of California, Berkley)*

*Robert Boyer, PhD (University of Pennsylvania)*



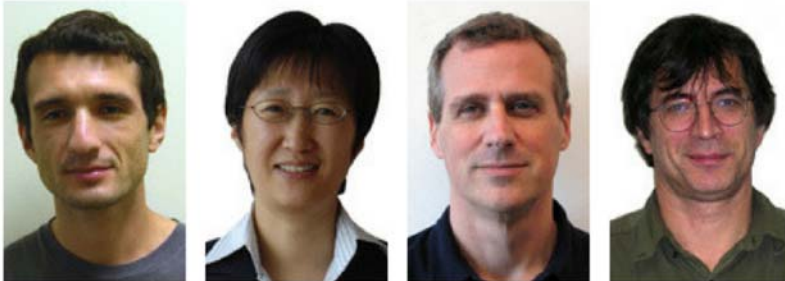
*Left to Right:*

*Patrick Clarke, PhD (University of Miami)*

*Daryl Falco, MS (Drexel University)*

*Raymond Favocci, MS (Drexel University)*

*Pavel Grinfeld, PhD (Massachusetts Institute of Technology)*



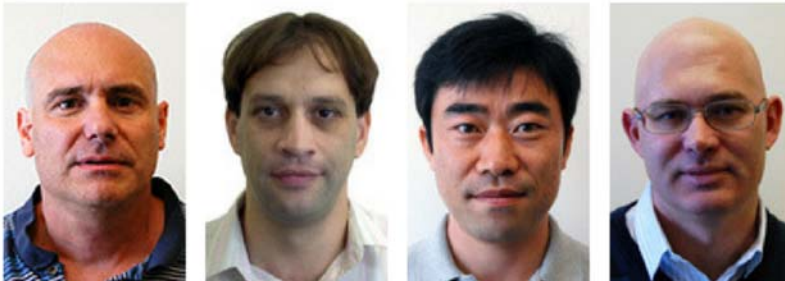
*Left to Right:*

*Anatolii Grinshpan, PhD (University of California, Berkley)*

*Yixin Guo, PhD (University of Pittsburgh)*

*Andrew Hicks, PhD (University of Pennsylvania)*

*Pawel Hitczenko, PhD (Warsaw University)*



*Left to Right:*

*Robert Immordino, MS (Drexel University)*

*Dmitry Kaliuzhnyi-Verbovetskyi, PhD (Kharkov National University)*

*Hwanyong Lee, PhD (University of Utah)*

*Georgi Medvedev, PhD (Boston University)*



*Left to Right:*

*Jennifer Morse, PhD (University of California, San Diego)*

*Marna Mozeff, MS (Drexel University)*

*Oksana Odintsova, PhD (Omsk State University)*

*Dimitri Papdopoulos, Ed.D. (Drexel University)*



*Left to Right:*

*Joel Pereira, PhD (University of North Carolina)*

*Marci Perlstadt, PhD (University of California, Berkley)*

*Adam Rickert, MS (Drexel University)*

*Eric Schmutz, PhD (University of Pennsylvania)*



## FACULTY MEMBERS

*Left to Right:*

*Li Sheng, PhD (Rutgers University)  
Gideon Simpson, PhD (Columbia University)  
Xiaoming Song, PhD (University of Kansas)  
Jeanne Steuber, MS (Boston University)*



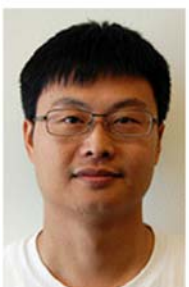
*Left to Right:*

*Kenneth Swartz, PhD (Harvard University)  
Vaishalee Wadke, MS (Columbia University)  
Richard White, MS (St. Joseph's University)  
Hugo Woerdeman, PhD (Vrije University, Amsterdam)*



*Left to Right:*

*Dennis Yang, PhD (Cornell University)  
Thomas Yu, PhD (Stanford University)  
Matthew Ziemke, PhD (University of South Carolina)*



## VISITING FACULTY MEMBERS

*Left to Right:*

*Ilker Colak, PhD, (Universitat Autònoma de Barcelona)  
Anna Pun, PhD (University of Pennsylvania)  
Jian Song, PhD*



## ADJUNCT FACULTY

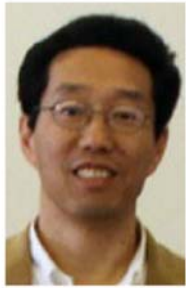
*Left to Right:*

*John Coppola, MS (Widener University)  
Harold Gilman, MS (Temple University)  
June Gordon, MS (Drexel University)  
Boris Kheyfets, PhD (Drexel University)*



*Left to Right:*

*Elana Koublanova, PhD (Leningrad State University)  
Leo Lampone, PhD (Drexel University)  
Brianna Pezzato, MEd (Millersville University)  
Patricia Henry Russell, MS (Drexel University)*



**ADJUNCT FACULTY**

*Left to Right:*

*Valerie Sarris,*

*Yun Yoo, PhD (Drexel University)*

*Sergio Zefelippo, MA (Villanova University)*

*Yihong Zhang, PhD (University of Alabama)*



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**TEACHING ASSISTANTS AND RESEARCH ASSISTANTS**



*Left to Right:  
Myles Akin, Nathan Anderson-Stahl, Charles Burnette,  
Joshua Carmichael*



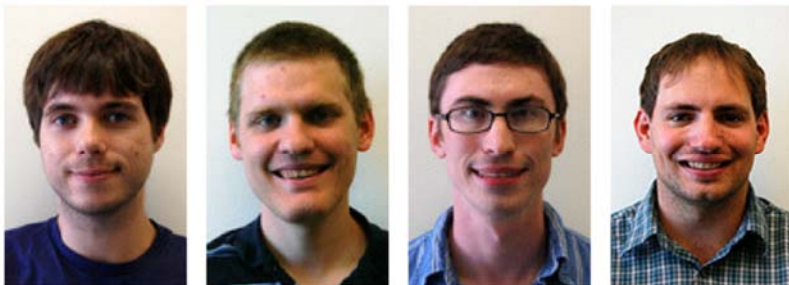
*Left to Right:  
Paul Reine Kennett Dela Rosa, Timothy Faver, Zachary  
Gaskill, Benjamin Grossmann*



*Left to Right:  
Benjamin Irwin, Joshua Jackson, Elisabeth Johnson, Felix  
Jones*



*Left to Right:  
Amanda Lohss, Alexander Onderdonk, Taylor Pangburn,  
Sarah Rody*



*Left to Right:  
Patrick Shields, Leonard Stevenson, David Sulon, Daniel  
Summers*



*Left to Right:  
James Thomas, Aleksandr Yaroslavskiy*

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**DEPARTMENT OF MATHEMATICS TENURE,**  
**PROMOTION AND AWARDS**

**Tenure and Promotion to Associate Professor**

*Patrick Clarke, PhD, Department of Mathematics*

**Promotion to Professor**

*Dmitry Kaliuzhnyi-Verbovetskyi, PhD, Department of  
Mathematics*

*Georgi Medvedev, PhD, Department of Mathematics*

**Promotion to Teaching Professor**

*Oksana Odintsova, PhD, Department of Mathematics*

**Promotion to Associate Teaching Professor**

*Raymond Favocci, Department of Mathematics*

*Hwan Yong Lee, PhD, Department of Mathematics*

*Jeanne Steuber, Department of Mathematics*

**Promotion to Assistant Teaching Professor**

*Dimitrios Papadopoulos, Department of Mathematics*

**2017 SERVICE RECOGNITION HONOREES**

*DR. GEORGI MEDVEDEV - 15 YEARS*

*DR. MARCJ PERLSTADT—35 YEARS*

*DR. DOUG WRIGHT—10 YEARS*

*PAIGE CHMIELEWSKI - 10 YEARS*

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## FACULTY GRANTS

**Ambrose, David**, National Science Foundation, DMS 1515849, Dynamics of Dispersive PDE, 2015-2018, \$269,987

**Ambrose, David**, PI, and Co-PIs **Shari Moskow**, **Gideon Simpson**, **Xiaoming Song**, and **J. Douglas Wright**, National Science Foundation, DMS 1613965, 2016 Gene Golub Summer School at Drexel University, 2016-2017, \$95,000

**Blasiak, Jonah**, National Science Foundation Grant, DMS 1600391, Tools for Positivity, 2016-2019, \$195,000

**Guo, Yixin**, National Science Foundation, DMS 1226180, Closed-loop Deep Brain Stimulation, Synchrony breaking and Chimera State, 2012-2016, \$164,996

**Hitczenko, Pawel**, Simons Foundation, Collaborative research in Combinatorics and Probability, 2011–2016, \$35,000

**Hitczenko, Pawel**, Drexel Scholarly and Creative Award, 2016-2017, \$4,060

**Medvedev, Georgi**, National Science Foundation, DMS 1412096, Dynamics of Large Networks, 2014-2017, \$150,000

**Morse, Jennifer**, National Science Foundation, Combinatorics in algebra, geometry, and physics, 2013-2016, \$290,000

**Morse, Jennifer**, National Science Foundation, Combinatorics of Macdonald polynomials and Schubert calculus, 2016-2019, \$285,000

**Moskow, Shari**, National Science Foundation, Heterogeneous Optical Media: Boundary Effects, Spectral Properties and Inversion, 2017-2020, \$339,999

**Moskow, Shari**, National Science Foundation, DMS 1411721, Nonlinear spectral problems in electromagnetics: asymptotics and inversion, 2014-2017, \$191,670

**Moskow, Shari**, National Science Foundation DMS: SIAM Optics and Photonics Workshop, 2016-2017, \$31,200.



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## FACULTY GRANTS

**Moskow, Shari**, Timed for a Successful Career: NSF/AWM Travel Grants for Women in the Mathematical Sciences 2016-2019, \$432,687

**Simpson, Gideon**, National Science Foundation, DMS 1409018, Computational and Analytical Challenges in Nonlinear Dispersive Wave Equations, 2014-2017, \$146,118

**Simpson, Gideon**, United States Department of Energy, DE-SC0012733, Theory and Computation for Mesoscopic Materials Modeling, 2014-2017, \$88,715.20

**Woerdeman, Hugo**, Simons Foundation, Collaborative grant, The multivariable Schur class and determinantal representations, 2015-2020, \$35,000

**Wright, J. Douglas**, National Science Foundation, DMS Applied Mathematics, Wave propagation in heterogeneous nonlinear dispersive systems, 2015-2018, \$340,446

**Yu, Pok Yin Thomas**, National Science Foundation, DMS 1522337, New Developments in Geometric and Multiscale Numerical Methods, \$230,000, 2015-2018

## FACULTY PUBLICATIONS

Acan, H. and **Pawel Hitczenko**, On random trees obtained from permutation graphs, *Discrete Mathematics*, 339, p. 2871-2883, 2016

Acan, H. and **Pawel Hitczenko**, On a memory game and preferential attachment graphs, *Advances in Applied Probability*, 48, p. 585-609, 2016

**Akin, Myles**, R. Dzakpasu, **Yixin Guo**, and **Alex Onderdonk** Functional Reconstruction of Dyadic and Triadic Subgraphs in Spiking Neural Network Models, Springer, 2016

**Ambrose, David** and **J. Douglas Wright**, Nonexistence of small doubly periodic solutions for dispersive equations, *Analysis & PDE*, 9, p. 15-42, 2016

Akers, B.F., **David Ambrose**, K. Pond, and **J. Douglas Wright**, Overturned internal capillary-gravity waves, *European Journal of Mechanics - B/Fluids*, 57, p. 143-151, 2016

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## FACULTY PUBLICATIONS

Alvarado, E., S. Beres, V. Coufal, K. Hlavacek, **Joel Pereira**, and B. Reeves, Klein links and related torus links, *Involve*, 9(2), 347–359, 2016

Aristoff, D., S.T. Chill, **Gideon Simpson**. Analysis of estimators for adaptive Kinetic Monte Carlo, *Communications in Applied Mathematics and Computational Science*, 11(2), p. 171-186, 2016

**Ambrose, David**, Small strong solutions for time-dependent mean field games with local coupling. *Comptes Rendus Mathématique Academie des Sciences, Paris*, 354, p. 589-594, 2016

**Ambrose David.**, W.A. Strauss, and **J. Douglas Wright**. Global bifurcation theory for periodic traveling interfacial gravity-capillary waves. *Annales de l'Institut Henri Poincaré C, Analyse non linéaire*, 33, p. 1081-1101, 2016

**Blasiak, Jonah**, Haglund's conjecture on 3-column Macdonald polynomials, *Mathematische Zeitschrift*, 283, p. 601–628, 2016

**Blasiak, Jonah**, What makes a  $D_0$  graph Schur positive?, *Journal of Algebraic Combinatorics*, p. 1–51, 2016

**Blasiak, Jonah**, R. Liu, and K. Mészáros. Subalgebras of the Fomin-Kirillov algebra. *J. Algebraic Combin.*, 1–45, 2016

**Blasiak, Jonah**, S. Fomin. Noncommutative Schur functions, switchboards, and Schur positivity, *Selecta Mathematica*, p. 1-40, 2016

**Bouchot, Jean-Luc, Simon Foucart**, and **Pawel Hitczenko**, Hard Thresholding Pursuit and variations: the number of iterations, *Applied and Computational Harmonic Analysis*, 41, p. 412-435, 2016

**Burnette, Charles** and **Eric Schmutz**, *Representing random permutations as the product of two involutions*, *Online Journal of Analytic Combinatorics*, 11(6), 2016

Chen, D., D.E. Henson, M.T. Hueman, A.M. Schwartz, **Li Sheng**, and H. Wang, Clustering Cancer Data by Areas between Survival Curves. *Proceedings of 2016 IEEE First Conference on Connected Health: Applications, Systems and Engineering Technologies*, p. 61-66, 2016

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## FACULTY PUBLICATIONS

Chen, D., D.E. Henson, M.T. Hueman, A.M. Schwartz, **Li Sheng**, and H. Wang, An Algorithm for Creating Prognostic Systems for Cancer, *Journal of Medical Systems*, 40(7), p. 1-10, 2016

**Clarke, Patrick**, Dual fans and mirror symmetry, *Advances in Mathematics*, p. 902-933, 2016

Grinfeld, M., **Pavel Grinfeld**, The Gibbs method in thermodynamics of heterogeneous substances carrying electric charges, *Results in Physics* 6, p. 194–195, 2016

Grinfeld, M., **Pavel Grinfeld**, J. Niederhaus, A. Porwitzky, ALEGRA Based Computation of Magnetostatic Configurations, *Aces Express Journal*, 1(2), p. 40-43, 2016

M. Grinfeld, **Pavel Grinfeld**, A rigorous framework for the Landau-Lifshitz approach to Thomson Electrostatics, *Journal of Geometry and Symmetry in Physics*, 41, p. 69-75, 2016

**Grinshpan, Anatolii, Dmitry Kaliuzhnyi-Verbovetskyi**, V. Vinnikov, **Hugo J. Woerdeman**, Contractive determinantal representations of stable polynomials on a matrix polyball, *Mathematische Zeitschrift*, 283(1–2), p. 25–37, 2016

**Grinshpan, Anatolii, Dmitry Kaliuzhnyi-Verbovetskyi**, V. Vinnikov, **Hugo J. Woerdeman**, Stable and real-zero polynomials in two variables, *Multidimensional Systems and Signal Processing*. 27(1), p. 1–26, 2016

**Grinshpan, Anatolii, Dmitry Kaliuzhnyi-Verbovetskyi**, V. Vinnikov, **Hugo J. Woerdeman**, Matrix-valued Hermitian positivstellensatz, lurking contractions, and contractive determinantal representations of stable polynomials, *Operator Theory: Advanced Applications*, 255, p. 123–136, 2016

**Guo, Yixin and Kelly Toppin**, Multi-site delayed feedback stimulation in parkinsonian networks, *BMC Neuroscience* 2016, 17(1), p. 151, 2016

**Guo, Yixin and Aijun Zhang**, Existence and Nonexistence of Traveling Pulses in a Lateral Inhibition Neural Network. *Discrete and Continuous Dynamical Systems - Series B*, 21(6), 2016

**Li, Huilan, Jennifer Morse, and Patrick Shields**, Structure constants for K-theory of Grassmannians, revisited. *Journal of Combinatorial Theory, Series A*, p. 306-325, 2016

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## FACULTY PUBLICATIONS

**Li, Huilan, Jennifer Morse, and Patrick Shields**, A dual approach to structure constants for K-theory of Grassmannians, *Discrete Mathematics & Theoretical Computer Science*, p. 767-778, 2016

**Hitczenko, Pawel and Amanda Lohss**, Probabilistic consequences of some polynomial recurrences, *Proceedings of the 27th International Conference on the Probabilistic, Combinatorial, and Asymptotic Methods for the Analysis of Algorithms*, 2016

**Hitczenko, Pawel and Amanda Lohss**, Corners in tree-like tableaux, *Proceedings of the 27th International Conference on the Probabilistic, Combinatorial, and Asymptotic Methods for the Analysis of Algorithms*, 2016

**Hitczenko, Pawel and Amanda Lohss**, On the asymptotic distribution of the parameters in weighted random staircase tableaux, *Journal of Combinatorics*, 17, p. 643-670, 2016

**Hitczenko, Pawel and Amanda Lohss**, Corners in tree-like tableaux, *Electronic Journal of Combinatorics*, 24, p. 4.26, 2016

Luskin, M., **Gideon Simpson**, and D.J. Srolovitz. A Theoretical Examination of Diffusive Molecular Dynamics, *SIAM Journal on Applied Mathematics*, 76(6), p. 2176-2196, 2016

**Shari Moskow, David M. Ambrose**, Jayadeep Gopalakrishnan, and Scott Rome. Scattering of electromagnetic waves by thin high contrast dielectrics ii: asymptotics of the electric field and a method for inversion. *Commun. Math. Sci.*, 15(4):1041–1053, 2017.

Kimberly Kilgore, **Shari Moskow**, and John C. Schotland. Convergence of the born series for electromagnetic waves. *Appl. Anal.*, 96(10), 2017.

**Perline, Ronald**, Y. Starosvetsky, A. Vainchtein, and **J. Douglas Wright**, Solitary Waves in Diatomic Lattices, *Physical Review E*, 93(4), 2016

Perline, R. and **Ronald Perline**, Two Universality Properties Associated with the Monkey Model of Zipf's Law, *Entropy*, 18(3), p. 89, 2016

**Woerdeman, Hugo J.**, *Advanced Linear Algebra*. Boca Raton, Florida: CRC Press, 2016. Print.

Grohs, P., M. Sprecher, and **Pok Yin Thomas Yu**, Scattered Manifold-Valued Data Approximation, *Numerische Mathematik*, 2016

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## *FACULTY PRESENTATIONS*

**Ambrose, David**, “Sufficiently strong dispersion removes ill-posedness in truncated series models of water waves,” BIRS Workshop on Theoretical and Computational Aspects of Nonlinear Surface Waves, Banff International Research Station for Mathematical Innovation and Discovery, Banff, Alberta, November 2016, Invited

**Ambrose, David**, “On vortex sheets and mean field games,” Oregon State University, Corvallis, Oregon, November 2016. Invited

**Ambrose, David**, “Traveling waves in interfacial fluid dynamics with multi-valued height,” 13<sup>th</sup> Franco-Romanian Colloquium on Applied Mathematics, Special Session of Free Boundary Problems, August 2016, Invited

**Ambrose, David**, “Convergence of a boundary integral method for 3D interfacial flow with surface tension,” SIAM Annual Meeting, Minisymposium on High-Fidelity Modeling for Cellular Flows, Boston, MA, July 2016, Invited

**Ambrose, David**, “Convergence of a boundary integral method for 3D interfacial flow with surface tension,” International Conference on Scientific Computing and Applications, Session on Scientific and High-Performance Computing, Toronto, Canada, June 2016, Invited

**Ambrose, David**, “On vortex sheets and mean field games,” Analysis of Partial Differential Equations Using Dynamical Systems Techniques conference, Boston, MA, June 2016, Invited

**Ambrose, David**, “Convergence of a boundary integral method for 3D interfacial flow with surface tension,” CSCAMM Workshop on Mixing and Mixtures in Geo- and Biophysical Flows, University of Maryland, College Park, MD, May 2016, Invited

**Ambrose, David**, “Ill-Posedness of truncated series models of water waves,” 2<sup>nd</sup> KUMU Conference on PDE, Dynamical Systems, and Applications, University of Missouri, Columbia, MO, April 2016, Invited

**Ambrose, David**, “Traveling waves in interfacial fluid dynamics with multi-valued height,” PDE & Analysis Seminar, University of Pittsburgh, Pittsburgh, PA, April 2016, Invited

**Ambrose, David**, “A convergent boundary integral method for 3D interfacial flow with surface tension,” Analysis and Applied Mathematics Seminar, University of Illinois at Chicago, Chicago, IL, April 2016, Invited

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## FACULTY PRESENTATIONS

**Blasiak, Jonah**, “Kronecker coefficients and noncommutative super Schur functions,” Fall Eastern AMS Sectional Meeting, Bowdoin College, Brunswick, ME, September 2016, Invited

**Grinshpan, Anatolii**, “Nested subclasses of the Schur class,” International Workshop on Operator Theory and Applications, St Louis, MO, July 2016

**Grinshpan, Anatolii**, “Determinantal representations of stable polynomials,” Southeastern Analysis Meeting, Tampa, FL, March 2016

**Hitzenko, Pawel**, “On the game of memory,” Workshop on Probabilistic and Analytic Combinatorics held at the BIRS Center, Banff, Canada, October 2016, Invited

**Kaliuzhnyi-Verbovetskyi**, “Contractive determinantal representations of stable polynomials on a matrix polyball,” Workshop in Noncommutative Analysis, The University of Iowa, Iowa City, IA, June 2016

**Kaliuzhnyi-Verbovetskyi**, Rational inner functions on a square-matrix polyball,” special session Multivariable Operator Theory of the IWOTA 2016 conference, Washington University, St. Louis, MO, July 2016

**Kaliuzhnyi-Verbovetskyi**, “Integrability of Free Noncommutative Functions,” CIMI workshop on noncommutative functions and complex analysis, University of Toulouse, France, October 2016

**Morse, Jennifer**, “Discrete affairs with Macdonald and Gromov-Witten,” Formal Power Series and Algebraic Combinatorics, Vancouver, Canada, July 2016

**Morse, Jennifer**, “Combinatorics of affine Schubert calculus,” Southeastern Lie Theory Workshop, Charlottesville, VA May 2016

**Odintsova, Oksana**, “Technology in Teaching Mathematics,” International conference Krasnoyarsk, Russia, November 2016

**Medvedev, Georgi**, Gene Golub SIAM Summer School on Stochastic Differential Equations, Drexel University, Philadelphia, PA, July 2016 Invited

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## FACULTY PRESENTATIONS

**Medvedev, Georgi**, Workshop on Synchronization and Oscillators with Generalized Coupling, University of Exeter, Exeter, UK, April 2016, Invited

**Medvedev, Georgi**, MBI Workshop on Generalized Network Structures and Dynamics, Ohio State University, March 2016, Invited

**Medvedev, Georgi**, MBI Workshop on Dynamics in Networks with Special Properties, Ohio State University, January 2016, Invited

**Moskow, Shari**, Invited minisymposium speaker, "Equivalence of Galerkin methods and spectrally matched grids.", Model Reduction in Inverse Problems, SIAM Annual meeting, Boston, MA, July 2016.

**Moskow, Shari**, "Homogenization of a Transmission Problem," Oberwolfach Workshop on Inverse Scattering, Oberwolfach, Germany, September 2016, Invited

**Moskow, Shari**, "Homogenization of a Transmission Problem," Workshop on homogenization theory, Corsica, France, November 2016, Invited

**Moskow, Shari**, "Inverse Problems: Determining the Equation from the Solution," Haverford College, Haverford, PA, November 2016, Invited

**Pok Yin Thomas Yu** "Subdivision Methods of Biomembranes"- SIAM Conference on Industrial and Applied Geometry, Pittsburg, PA, July 2017

**Pok Yin Thomas Yu** "Numerical Solution and Uniqueness of the Canham-Evans-Helfrich Model for Biomembranes", European Conference on Numerical Mathematics and Advanced Applications, Voss, Norway, September 2017

**Simpson, Gideon**, "Mathematical Formalisms for Molecular Dynamics" colloquium at University of Pennsylvania, Philadelphia, PA, March 2016

**Simpson, Gideon**, "Application to McKenzie model," workshop on "From the Grain to the Continuum: Two Phase Dynamics of a Partially Molten, Polycrystalline Aggregate," Isaac Newton Institute for Mathematical Sciences, University of Cambridge, Cambridge, UK, April 2016

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## FACULTY PRESENTATIONS

**Simpson, Gideon**, “Stochastic Processes and Diffusive Molecular Dynamics” SIAM Conference on Mathematical Aspects of Materials Science minisymposium on Computational Methods for Materials Science, Philadelphia, PA, May 2016

**Simpson, Gideon**, “Stochastic Processes and Diffusive Molecular Dynamics,” Frontiers in Applied and Computational Mathematics, New Jersey Institute of Technology, Newark, NJ, June 2016

**Woerdeman, Hugo**, “Rational Schur-Agler functions on polynomially-defined domains,” International Workshop Operator Theory and Analysis, St. Louis, MO July 2016, Invited

**Woerdeman, Hugo**, “Rational Schur-Agler functions on polynomially-defined domains,” Analysis Seminar, Department of Pure Mathematics, University of Waterloo, Waterloo, ON, Canada, September 2016

**Woerdeman, Hugo**, “The 2xM separability problem investigated via semidefinite programming and normal completions,” Quantum Information and Computation Theory Seminar, Institute for Quantum Computing, University of Waterloo, Waterloo, ON, Canada, December 2016

**Wright, J. Douglas**, “Overhanging traveling gravity capillary waves,” Joint Mathematical Meetings, Seattle, WA, January 2016

**Wright, J. Douglas**, “Traveling waves for diatomic FPUT lattices,” SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA, August 2016

**Xiaoming Song** “Admission Control for Multidimensional Workload Input with Heavy Tails and Fractional Ornstein-Uhlenbeck Process” - Poster Presentation & Seminar on “Stochastic Processes”, University of Maryland, March 2016

**Xiaoming Song** “A Mathematical Model of file Uploads and Download”-Dean’s Seminar, Drexel University, April 2016

**Xiaoming Song** “An Implicit Numerical Scheme for a Class of BDSDEs”- SIAM Conference on Control and its Applications, July 2017



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## *EDITORIAL POSITIONS*

**Ambrose** Division Editor of Journal of Mathematical Analysis and Applications

**Hitzenko, Pawel**, Editorial Board Member, Open Journal of Discrete Mathematics

**Kaliuzhnyi-Verbovetskyi, Dmitry**, Associate Editor, Journal Complex Analysis and Operator Theory

**Morse, Jennifer**, Managing editor, Journal of Combinatorics

**Woerdeman, Hugo J.**, Associate Editor, Indagationes Mathematicae

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

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## FACULTY APPOINTMENTS & CONFERENCE ORGANIZATIONS

**Ambrose, David** and **Gideon Simpson**, co-organizer of session, "Analysis of numerical methods for dispersive and fluid equations", The Tenth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, March -April 2017

**Ambrose, David**, co-organizer, Summer school on Mean Field Games and Applications, University of California, Los Angeles, Los Angeles, CA, June 2018

**Blasiak, Jonah**, scientific committee member, Mid-Atlantic Algebraic Geometry and Combinatorics Workshop, Drexel University, Philadelphia, PA, April 2016

**Hitzenko, Pawel**, program committee member, Meeting on Analytic Algorithmics and Combinatorics, New Orleans, LA, January 2018

**Morse, Jennifer**, executive officer, Formal Power Series and Algebraic Combinatorics, Vancouver, Canada, July 2016

**Morse, Jennifer**, scientific committee member, Mid-Atlantic Geometry & Combinatorics Conference, Drexel University, Philadelphia, PA, May 2016

**Morse, Jennifer**, organizer, Formal Power Series and Algebraic Combinatorics, London, England, July 2017

**Simpson, Gideon**, organizer of minisymposium, on "Materials Science," Frontiers in Applied and Computational Mathematics, New Jersey Institute of Technology, Newark, NJ, June 2016

**Simpson, Gideon**, co-organizer of workshop, "From the Grain to the Continuum: Two Phase Dynamics of a Partially Molten, Polycrystalline Aggregate," Isaac Newton Institute for Mathematical Sciences, University of Cambridge, Cambridge, UK, April 2016

**Song, Xiaoming, David Ambrose, Shari Moskow, Gideon Simpson, J. Douglas Wright**, co-organizer, "Gene Golub Summer School on Stochastic Differential Equations and Wave Propagation." Drexel University, Philadelphia, PA, July-August 2016

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## FACULTY PAPPPOINTMENTS & CONFERENCE ORGANIZATIONS

**Woerdeman, Hugo J.**, member of the scientific organizing committee, 2016 International Linear Algebra Society (ILAS) meeting, Leuven, Belgium, July 2016

**Woerdeman, Hugo J.**, organizer of a minisymposium, “Multivariable Operator Theory,” 2016 International Workshop on Operator Theory and its Applications, St. Louis, MO, July 2016

**Woerdeman, Hugo J.**, Member of the International Program Committee, 2016 International Symposium on the Mathematical Theory of Networks and Systems (MTNS), Minneapolis, MN July 2016

**Wright, J. Douglas**, co-organizer, Conference on the Analysis of Partial Differential Equations using Dynamical Systems Techniques, Gene Wayne’s 60th Birthday Conference, Boston University, Boston, MA, June 2016

**Wright, J. Douglas**, co-organizer of minisymposium, Lattice Dynamics: Wave Propagation and Continuum Approximation at SIAM Conference on Nonlinear Waves and Coherent Structures in Philadelphia, PA. August 2016

**Woerdeman, Hugo J.**, board member, International Research Center for Tensor and Matrix Theory of Shanghai University

**Woerdeman, Hugo J.**, vice president, Steering Committee, International Workshop on Operator Theory and its Applications

**Woerdeman, Hugo J.**, vice president, International Linear Algebra Society

**Woerdeman, Hugo J.**, Organizer of the mini-symposium ‘Multivariable Operator Theory’ at the International Workshop on Operator Theory and its Applications, St. Louis, July 2016

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## PHD DEGREES AWARDED

Shunlian Liu: Well-Posedness of Hydroelastic waves and their truncated series models—Advisor: Dr. David Ambrose

Amanda Lohss: *Tableaux and Asymmetric Simple Exclusion Process*—Advisor: Dr. Pawel Hitczenko

Charles Burnette: *Factoring Permutations into the Product of Two Involutions: A Probabilistic, Combinational, and Analytic Approach*. Advisor: Eric Schmutz

Sarah Rody: *Vector Fields, Eigen surfaces, and Prescribed Curvature in Optical Design*—Advisor: Dr. Andy Hicks

## TEACHING AWARDS



Teaching Assistant Excellence, Honorable Mention, Charles Davis Burnette, Jr.,  
PhD, Mathematics, College of Arts and Sciences

## DREXEL MATH GRADUATE SIAM PRESENTATIONS

### DREXEL STUDENT CHAPTER OFFICERS

**President** - Leonard Stevenson

**Treasurer** - Dan Summers

**Vice President** - Joshua Jackson

**Secretary** - Shunlian Liu

### FALL 2016

- September 30, 2016: Leonard Stevenson Drexel University *Integrating First Order NC Functions*
- October 14, 2016: Ben Grossman Drexel University *Geometry and Topology of 2x2 and 3x3 Matrices*
- October 28, 2016: Ben Grossman Drexel University *Random Matrix Theory Over Finite Fields*
- November 4, 2016: Kennett Dela Rosa Drexel University *Jordan Canonical Form of an S-orthogonal Matrix Based on the Properties of its Householder Vectors*
- November 11, 2016: Timothy Faver Drexel University *Elements of the Mathematical Theory of Waves*
- November 18, 2016: Dan Summers Drexel University *Quiver Representations and the Path Algebra of a Quiver*
- December 2, 2016: Leonard Stevenson Drexel University *Generation of NC Functions*

### WINTER 2017

- January 20, 2017: Leonard Stevenson Drexel University *Generation of NC Functions*
- February 24, 2017: Matthew S. Mizuhara Pennsylvania State University *Well-Posedness and Traveling Waves in a Geometric Evolution Law Modeling Cell Motility*

### SPRING 2017

- April 19, 2017: Ben Grossman Drexel University *Fractional Minimal Rank of Matrices*
- April 26, 2017: Epsilon Talks: Benjamin Irwin / Nathan Anderson-Stahl Drexel University *Moore Smith Convergence / Baire Category Theorem*
- May 3, 2017: Epsilon Talks: Kennett Dela Rosa / Zachary Gaskill Drexel University *Commutators of Group Elements / The Arithmetic Derivative*

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# COLLOQUIA

## **Hermite Interpolation and Approximation in Manifolds**

*November 14, 2016*

*Speaker: Caroline Moosmüller, Institute of Geometry, TU Graz*

## **Finite Element Scheme For Ericksen Model w/ Colloidal Effects and External Fields**

*February 6, 2017*

*Speaker: Shawn Walker, PhD, Louisiana State University*

## **Graphs, Groups, and the Cantor Set**

*May 1, 2017*

*Speaker: Katie Haymaker, Villanova*

## **Flat Curves**

*May 14, 2017*

*Speaker: Joel Langer, Case Western Reserve University*

## **The Space of Soap Bubbles**

*May 22, 2017*

*Speaker: Rob Kusner, U Mass Amherst*

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# COMBINATORICS & ALGEBRA GEOMETRY SEMINARS

## Combinatorial stability and representation stability

*September 22, 2016*

Thomas Church, IAS/Stanford

## Applying Representation Theory to Random Walks

*September 29, 2016*

Angela Hicks, Lehigh University

## Using Grassmann (or anti-commuting) variables in Combinatorics: Lindstrom-Gessel-Viennot lemma and Schur functions

*October 13, 2016*

Adrian Tanasa, University of Bordeaux

## Peak and descent polynomials

*October 27, 2016*

Alexander Diaz-Lopez, Swarthmore College

## A Grassmann Algebra for Matroids

*November 3, 2016*

Noah Giansiracusa, Swarthmore College

## K-Theory and Monodromy of Schubert Curves

*November 10, 2016*

Jake Levinson, Michigan

## Splines, GKM theory, and non-GKM spaces

*November 17, 2016*

Elizabeth Drellich, Swarthmore College

## An Introduction to Symplectic Duality

*December 1, 2016*

Justin Hilburn, Penn

## Decompositions of Grothendieck polynomials

*January 26, 2017*

Oliver Pechenik, Rutgers University

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# COMBINATORICS & ALGEBRA GEOMETRY SEMINARS

## Kohnert tableaux and quasi-key polynomials

*February 2, 2017*

Dominic Searles, USC

## Rook and Wilf equivalence of integer partitions

*February 16, 2017*

Jonathan Bloom, Lafayette College

## Colorings and Positivity

*February 28, 2017*

Per Alexandersson, Penn and KTH

## Stable bases and q-Fock space

*March 2, 2017*

Eugene Gorsky, UC Davis

## Quantum cohomology of Grassmannians via Landau-Ginzburg potentials and combinatorics

*March 16, 2017*

Kaisa Taipale, Univ. of Minnesota

## Conjugacy Growth Series for Wreath Products of Finitary Permutation Groups

*March 30, 2017*

Madeline Locus, Emory

## Genus Two analogue of A<sub>1</sub> spherical DAHA

*April 13, 2017*

Semeon Artamonov, Rutgers University

## Puzzles and Cohomology of the Cotangent Bundle on Projective Space

*April 20, 2017*

Voula Collins, University of Connecticut

## Noncommutative Schur functions

*May 5, 2017*

Sergey Fomin, University of Michigan

## Equivariant Pieri Rules for Isotropic Grassmannians

*May 11, 2017*

Vijay Ravikumar, Chennai Mathematical Institute

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# ANALYSIS SEMINAR

## Universality of the Stochastic Bessel Operator

*September 30, 2016*

Patrick Waters, Temple University

## Antiderivatives of First Order NC Functions, Part I

*October 14, 2016*

Leonard Stevenson, Drexel University

## Antiderivatives of First Order NC Functions, Part II

*October 22, 2016*

Leonard Stevenson, Drexel University

## Zeros of Linear Combinations of Partial Sums of the Exponential Function I

*October 28, 2016*

Joe Erickson, Drexel University

## Sharp estimates for some multilinear oscillatory integrals.

*November 11, 2016*

Lechao Xiao, U Penn

## Volumes of Projections of Parallelotopes

*November 18, 2016*

Anatolii Grinshpan, Drexel University

## Zeros of Linear Combinations of Partial Sums of the Exponential Function II

*December 2, 2016*

Joe Erickson, Drexel University

## Spencer's "Six Standard Deviations" Theorem

*January 27, 2017*

Anatolii Grinshpan, Drexel University

## Generation of NC Functions

*February 3, 2017*

Leonard Stevenson, Drexel University

## Quantum Markov Semigroups and their Generators

*February 10, 2017*

Matthew Ziemke, Drexel University



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# ANALYSIS SEMINAR

## Determinant Theory in Finite Factors and Extensions of Hadamard's Inequality

*April 14, 2017*

Soumyashant Nayak, UPenn

## Complete Spectral Sets and Numerical Range

*April 21, 2017*

Hugo Woerdeman, Drexel University

## Fractional Minimal Rank

*April 28, 2017*

Ben Grossman, Drexel University

## Traveling Waves in Mass and Spring Dimer FPUT Lattices

*May 5, 2017*

Tim Faver, Drexel University

## Quantum Algorithm for Multivariate Polynomial Interpolation

*May 12, 2017*

Jianxin Chen, University of Maryland

## The Mean Field Limit of the Kuramoto Model on Random Graphs

*May 19, 2017*

Georgi Medvedev, Drexel University

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# PDE & APPLIED MATHEMATICS SEMINAR

## Estimating Discrete Corrections to a Mesoscale, Free-Boundary Model of Crystal Growth

*November 17, 2016*

Joshua Schneider, UCLA

## Approximate Global Minimizers to Pairwise Interaction Problems by a Convex/Non-Convex Energy Decomposition

*October 20, 2016*

David Shirokoff, NJIT

## Modeling Waves: Towards Understanding the Role of Nonlinearity

*October 27, 2016*

Katie Oliveras, Seattle University

## Examining Androgen-Mediated Disruption of the Ovulatory Cycle Through Mathematical Modeling

*October 6, 2017*

Erica J. Graham, Bryn Mawr

## Phantom Traffic Jams, Autonomous Vehicles, and the Future of Traffic Modeling

*October 22, 2017*

Benjamin Seibold, Temple University

## Can I Borrow a Feeling?

*November 3, 2017*

Scott Rome, Cadent

*November 16, 2017*

Quinn Morris, Swarthmore

*December 1, 2017*

Georgi Medvedev, Drexel University

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# PDE & APPLIED MATHEMATICS SEMINAR

## Accelerated Sampling and Sensitivity Analysis of Multiscale Reaction Networks

*January 19, 2017*

Ting Wang, University of Delaware

## Existence of Propagators for Coulomb-Like Potentials in Density Functional Theory

*February 23, 2017*

Eric Stachura, Haverford College

## Almost Sure Scattering for the 4D Energy-Critical Defocusing Nonlinear Wave Equation with Radial Data

*April 6, 2017*

Ben Dodson, John Hopkins University

## Transform Analysis for Markov Processes and its Applications in Finance

*April 13, 2017*

Chihoon Lee, Stevens Institute of Technology

## Path-Differentiability BSDE driven by a Continuous Martingale

*April 20, 2017*

Kihun Nam, Rutgers University

## High-Order Finite-Difference Time-Domain Simulation of Electromagnetic Waves at Complex Interfaces Between Linear Dispersive Media

*May 4, 2017*

Michael Jenkinson, RPI

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# HONORS DAY

## Robert J. Bickel Scholarship

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

Patrick Brogan

Yassine Terrab

Bradford Green

Sanjana Venkat

Patrick Lombardo

Jadzia Lynn Watsey

Preetham Mohan

Jacob Woods

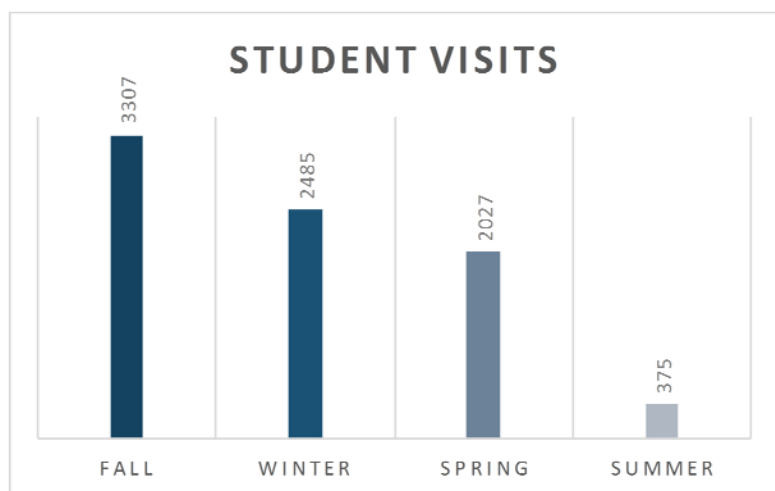
## Frank H. M. Williams Prize in Mathematics

Presented annually in recognition of academic achievement in mathematics.

Yilin Yang

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## MATH RESOURCE CENTER



The mission of the Math Resource Center is to assist the undergraduate students currently enrolled in courses offered by the Department of Mathematics.

The Student Visits graph illustrates the visits to the MRC over the different terms during the year for a total of 8,194.

The Math 102 students visited the center the most and was followed by MATH 122.

#

The Math Resource Center moved to the Library Learning Terrace in the winter quarter due to construction in the Korman Center. The Learning Terrace is located on 33rd and Race Street under Race Hall. Over the course of the year the MRC is always available to students currently enrolled in a mathematics course, however the hours of operation can vary. During Fall, Winter, and Spring terms the MRC is open Monday to Thursday from 10am-7pm and on Fridays from 10am-4pm. Over the Summer the MRC is open Monday to Thursday from 12pm-5pm. The MRC is also open during Finals Weeks.