Department of Mathematics Annual Report

Drexel University

College of Arts & Sciences

2009 – 2010

Message From the Department Head

Dear Alumni and Friends,

It is my pleasure to welcome you to our department's annual report which highlights and documents many of the wonderful events and accomplishments of our faculty and students.

Again, the department has enjoyed recognition by awards to our faculty and students. Professor R. Andrew Hicks, won the Drexel University Research Achievement Award for his groundbreaking work in geometry and applications, among other in the design of mirrors**.** Assistant Professor David Ambrose won the Antelo Deveraux Award for Young Faculty of his research in theoretical fluid. Our teaching assistant Caroline Shapcott was honored on two occasions: The Society for Industrial and Applied Mathematics (SIAM) gave her recognition for her outstanding efforts for Drexel's SIAM Student Chapter, and her research poster received the University Research Day Best Graduate Poster Presentation - Research in Computation and Modeling.

The accomplishments of our undergraduates also deserve special recognition. At the annual honors day last spring, Valerie T. Banas and Elizabeth Lilley won the Robert J. Bickel Award; Sean Ballentine, Binoy Bhatt, Alexander Youcis and Huey Wong won the Harry Muchnic award; and Erin Hamalainen won the Frank Williams prize.

Our department continues to grow in size as well. This year Assistant Professor Bo Dong joined the department. She is an expert in Numerical analysis and scientific computing, complementing well to the departmental research environment. Our undergraduate teaching mission received fresh support from two new teaching faculty members: Andrey Melnikov and Vailshalee Thubrikar.

This year's distinguished lecture series brought to campus Professor Simon Gindikin, Board of Governors Professor of Mathematics at Rutgers University. He gave a lecture dedicated to the memory of Israel M. Gelfand (1913-2009), focusing on one of Gelfand's discoveries—integral geometry.

Our Mathematical Resource Center continues to grow exponentially, playing a central role in our beginning undergraduate courses. Again we saw a substantial increase in attendance from the previous academic year, leaving us to wonder how much more we can handle!

For me personally this year was a special year, as I had the opportunity to spend a half year sabbatical at Princeton University, delving into the rising area of compressed sensing. In addition, it gave me the time to finish my joint book with Mihaly Bakonyi (1962-2010), which should be available in print from Princeton University Press in the spring of 2011. During my absence, Professor Robert Boyer acted as interim Department Head, and together with Teaching Professor Patricia Henry Russell kept everything running.

We hope that you are as excited about our department as we are. We greatly appreciate your feedback and your involvement as it greatly helps in accomplishing our mission of excellence in research and education.

Thank you and Best Wishes,

Dr. Hugo J. Woerdeman
Professor and Department Head

Tenured / Tenure-Track Faculty

David M. Ambrose, Ph.D. (Duke University) Assistant Professor. Applied analysis and scientific computing for nonlinear systems of partial differential equations, especially free-surface problems in fluid dynamics.

Robert P. Boyer, Ph.D. (University of Pennsylvania) Professor. Functional analysis, C*-algebras and the theory of group representations.

Bo Dong, Ph.D. (University of Minnesota) Assistant Professor. Numerical analysis and scientific computing, in particular, discontinuous Galerkin methods, hybridizable finite element methods, and mixed finite element methods.

Pavel Grinfeld, Ph.D. (Massachusetts Institute of Technology) Assistant Professor. Intersection of physics, engineering, applied mathematics and computational science.

Yixin Guo, Ph.D. (University of Pittsburgh) Assistant Professor. Biomathematics, dynamical systems, ordinary and partial differential equations and math education.

R. Andrew Hicks, Ph.D. (University of Pennsylvania) Associate Professor. Robotics, computer vision, catadioptics.

Pawel Hitczenko, Ph.D. (Warsaw University) Professor. Probability theory and its applications to analysis, combinatorics, wavelets, and the analysis of algorithms.

Dmitry Kalyuzhnyi-Verbovetskyi, Ph.D. (Kharkov National University) Assistant Professor. Operator theory, systems theory, complex analysis, C*-algebras and harmonic analysis.

Georgi S. Medvedev, Ph.D. (Boston University) Assistant Professor. Applied mathematics, nonlinear diffusion equations, mathematical biology, dynamical systems, numerical methods.

Jennifer Morse, Ph.D. (University of California, San Diego) Associate Professor. Algebraic and tableaux combinatorics, discrete math, symmetric and special functions, basic hypergeometric series.

Tenured / Tenure-Track Faculty

Shari Moskow, Ph.D. (Rutgers University) Associate Professor. Applied PDEs and numerical analysis, in particular homogenization theory, inverse problems, and related asymptotic and numerical methods.

Ronald K. Perline, Ph.D. (University of California at Berkeley) Associate Professor. Applied mathematics, numerical analysis, symbolic computation, differential geometry, mathematical physics.

Marci A. Perlstadt, Ph.D. (University of California at Berkeley) Associate Professor. Applied mathematics, computed tomography, numerical analysis of function reconstruction, signal processing, combinatorics.

Eric Schmutz, Ph.D. (University of Pennsylvania) Associate Professor. Probability, combinatorial optimization.

Li Sheng, Ph.D. (Rutgers University) Associate Professor. Discrete optimization, probabilistic methods in combinatorics, operations research, graph theory and its application in molecular biology, social sciences and communication networks, biostatistics, computer science.

Justin R. Smith, Ph.D. (Courant Institute, New York University) Professor. Homotopy theory, operad theory, quantum mechanics, quantum computing.

Hugo J. Woerdeman, Ph.D. (Vrije Universiteit, Amsterdam) Department Head, Department of Mathematics, Professor. Matrix and operator theory, systems theory, signal and image processing, and harmonic analysis.

J. Douglas Wright, Ph.D. (Boston University) Assistant Professor. Partial differential equations, particularly the behavior of nonlinear waves in systems arising in hydrodynamics, optics and cell biology.

Thomas Yu, Ph.D. (Stanford University) Associate Professor. Multiscale mathematics, wavelets, applied harmonic analysis, subdivision algorithms, nonlinear analysis, applied differential geometry and data analysis

Teaching Faculty

Jason Aran, M.S. (Drexel University) Instructor.

Michael Daniel, Ph.D. (University of Colorado) Assistant Teaching Professor. Number Theorist specializing in Modular Forms and Function Fields.

Alexander Dolgopolsky, Ph.D. (Case Western Reserve University) Associate Teaching Professor. Applied mathematics.

James W. Donnelly, M.S. (Drexel University) Associate Teaching Professor. Math foundations of engineering.

Abed Elhashash, Ph.D. (Temple University) Assistant Teaching Professor.

Daryl Falco, M.S. (Drexel University) Instructor. Discrete mathematics and automata theory.

Raymond J. Favocci, III, M.S. (Drexel University) Instructor.

Anatolii Grinshpan, **Ph.D.** (University of California, Berkeley) Assistant Teaching Professor. Function Theory and Operator Theory, Harmonic Analysis, Potential Theory

Robert Immordino, M.S. (Drexel University) Instructor.

Teaching Faculty

William Keith, Ph.D. (Pennsylvania State University) Assistant Teaching Professor.

Taylor Kingsbury, M.S. (Drexel University) Instructor.

Elaine Kyriacou, M.S. (Rutgers University) Instructor. Mathematics curriculum content and methods of instruction.

Andrey Melnikov, Ph.D. (Ben Gurion University) Assistant Teaching Professor

Marna A. Mozeff, M.S. (Drexel University) Undergraduate Advisor, Associate Teaching Professor.

Gregory L. Naber, D.A. (Carnegie-Mellon University) Teaching Professor. Topology, differential geometry, and mathematical physics, particularly relativity and gauge theory.

Adam C. Rickert, M.S. (Drexel University) Associate Teaching Professor.

Oksana P. Odintsova, Ph.D. (Omsk State University) Assistant Teaching Professor. Math education.

Patricia Henry Russell, M.S. (Drexel University) Associate Department Head, Teaching Professor. Probability and statistics.

Teaching Faculty

Judy T. Smith, M.A. (West Chester University) Instructor.

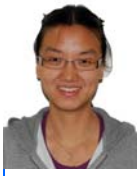
Jeanne Steuber, M.S. (Boston University) Instructor.

Kenneth Swartz, Ph.D. (Harvard University) Assistant Teaching Professor.
Applied Probability and Statistics

Vaishalee Thrubrikar, M.S. (Columbia University) Instructor.

Richard White, M.S. (St. Joseph's University) Instructor.

Post Doctoral Associates



Huilan Li, Ph.D., (York University) Algebraic Combinatorics

Adjunct Faculty

John Coppola, M.S. (Widener University)
Harold Gilman, M.S. (Temple University)
June Gordon, M.S. (Drexel University)
Boris Kheyfets Ph.D. (Drexel University)
Elana Koublanova, Ph.D. (Leningrad State University)
Wanda Kunkle, M.S. (Drexel University)
Leo Lampone, Ph.D. (Drexel University)
Richard Owens, B.S. (St. Joseph's University) & **FSA, CFA**
Kathy Yang, B.S. (HaiNan University , Western Sydney University)
Sergio Zefillipo, M.A. (Villanova University)

Emeritus Faculty

Loren N. Argabright, Ph.D. (University of Washington) Professor Emeritus
Robert C. Busby, Ph.D. (University of Pennsylvania) Professor Emeritus
Ewaugh F. Fields, Ed.D. (Temple University) Dean Emeritus, Professor Emeritus
William M.Y. Goh, Ph.D. (Ohio State University) Associate Professor Emeritus
Charles J. Mode, Ph.D. (University of California at Davis) Professor Emeritus
Chris Rorres, Ph.D. (Courant Institute, New York University) Professor Emeritus
Jet Wimp, Ph.D. (University of Edinburgh) Professor Emeritus

Staff

Byron Greene
Administrative Assistant

David Shen
Math Resource Center Manager

Margaret A. Mecer
Budget Coordinator
(Until May 2010)

Kenneth Hemphill
Budget Coordinator
(Started June 2010)

C. Gene Phan
Computer Specialist

Malinda Gilchrist
Graduate Program Coordinator

Teaching Assistants and Research Assistants

Gulnara Abduvalieva

Jeffrey Armstrong

Lei Cao

Avinash Dalal

Lingqiong Guo

Derek Heilman

Dan Jordan

Kimberly Kilgore

Teaching Assistants and Research Assistants

David Kimsey

Selcuk Koyuncu

Timor Milgrom

Dmitrios Papadopolous

Min Rong

Caroline Shapcott

Jonah Smith

Yun Yoo

Le Yu

Svitlana Zhuravytska

New Faculty Profiles

Bo Dong

Bo Dong received her Ph.D. in Mathematics from the University of Minnesota in 2007. She was a Prager Assistant Professor in the Division of Applied Mathematics at Brown University before joining Drexel University in 2009. Her research areas are numerical analysis and scientific computing, in particular, finite element methods for solving partial differential equations.

Andrey Melnikov

Andrey Melnikov received his MS degree in electrical and computer engineering in 2003, and his PhD degree in mathematics in 2009, both from Ben Gurion University (Israel). He joined Drexel University in fall 2009 as a Teaching Assistant Professor. Research interests: System/Operator theory (especially theory of Vessels) and its applications to linear and nonlinear differential equations, Scattering theory, Differential rings theory.

Vaishalee Thubrikar

Ms. Thubrikar earned a Master of Science degree in Operations Research from Columbia University in 2003 and a Bachelor of Science degree in Mathematics from The University of North Carolina at Chapel Hill in 2000. She also worked on a doctorate degree in Mathematics at The University of California at Irvine. Ms. Thubrikar has professional experience in the financial markets, including portfolio risk management, quantitative modeling of derivatives and structured products, and management consulting. Prior to joining Drexel University, she worked for ACA Capital Holdings in New York where she modeled risk and analyzed the firm's proprietary structured credit portfolio.
Her future research interests are in mathematical applications to finance.

New Staff Profiles

Kenneth Hemphill

Kenneth Hemphill recently earned his MBA with a concentration in Finance from Strayer University. He is presently pursuing candidacy for a Ph. D. in Finance. Upon the completion of that program he would like to teach college level courses. He stays actively involved in social and community related programs and activities. In his spare time he attempts to play the game of chess.

Department of Mathematics

Top Row: Ronald Perline, J. Doug Wright, Andrey Melnikov, Hugo Woerdeman, Robert Immordino, David Ambrose, Richard Owens, Jason Aran

Standing Row: Byron Greene, Alex Dolgolpolsky, Richard White, Jim Donnelly, Robert Boyer, Andrew Hicks, William Keith, Bo Dong, Patricia Russell, Timur Milgrom, Michael Daniel, Dmitry Kaliuzhnyi-Verbovetskyi, Derek Heilman, Malinda Gilchrist, Svitlana Zhuravytska, Taylor Kingsbury, Eric Schmutz

Sitting: Anatolii Grinshpan, Kenneth Swartz, Shari Moskow, Marna Mozeff, Margaret Mercer, Jeanne Steuber, Justin Smith, Raymond Favocci, Oksana Odinstova, Gene Phan

Floor: Daryl Falco, Adam Rickert, David Shen, Avinash Dalal, Jonah Smith, Caroline Shapcott, Le Yu, Jeffrey Armstrong, Dimitrios Papadopoulos, David Kimsey

Renovation

The front office of the department received a renovation in June 2010. An additional office was added to make room for Associate Department Head Shari Moskow. New furniture was provided for the front office staff.

Faculty Awards

David Ambrose was awarded the 2009-2010 Antelo Deveraux Award for Young Faculty.

David Ambrose won the Antelo Deveraux Award for Young Faculty for 2009-2010. He received the award during the Faculty Awards Dinner on Wednesday, June 2, 2010. The Devereux Award was given for Dr. Ambrose's project, "Simulation, Modeling, and Mathematical Analysis of Water Waves." This includes developing computational methods and performing analysis for the equations that describe waves in the ocean, including studying breaking waves and time-periodic waves.

Provost Mark Greenberg, David Ambrose, Dean Donna Murasko

R. Andrew Hicks was awarded the 2009-2010 Drexel Research/Scholarship Award.

Dr. R. Andrew Hicks won the Drexel University Research Achievement Award**.** He received the award during the Faculty Awards Dinner on Wednesday, June 2, 2010. A major focus of his research is the development of generating mirrors and lenses that depict the world in a given prescribed way. Dr. Hicks's record includes strong publications in the top journals and external funding from government and industry. Dr. Hicks received a great deal of media attention for a design of a driver-side mirror of an automobile, among others from The Philadelphia Inquirer, the New Scientist, Scientific American, and BBC radio.

R. Andrew Hicks, Vice-Provost Kenny Simansky, Provost Mark Greenberg

The Drexel University Employee Service Awards Ceremony was held on Wednesday, December 16, 2009. The following members of the Drexel Mathematics department were recognized for their service at Drexel University.

Fifteen Year Award Recipient
Marna Mozeff, Undergraduate Advisor, Associate Teaching Professor

Ten Year Award Recipients
R. Andrew Hicks, Associate Professor
Pawel Hitczenko, Professor

Five Year Award Recipients
Gregory Naber, Teaching Professor
Gene Phan, Computer Specialist
Hugo Woerdeman, Professor and Department Head

Faculty Grants

David Ambrose, National Science Foundation, DMS 0926378, Long Time Behavior In Free Surface Problems in Fluid Dynamics, 2009-2010, $40,805

David Ambrose, National Science Foundation, DMS-1008387, Dispersive PDE and Interfacial Fluid Dynamics. 2010-2013, $159,000.00

David Ambrose (PI), National Science Foundation, DMS-1016267, Collaborative Research: Efficient Surface-Based Numerical Methods for 3D Interfacial Flow with Surface Tension, 2010 -2013, $269,989.00

Anatolii Grinshpan, (co-PI), National Science Foundation, DMS 0901628, Decomposition for Multivariable Schur-Class Functions, Christoffel-Darboux Type Formulas, and Related Problems, 2009-2012, $475,578

R. Andrew Hicks, ACIN, 9.12 Biometrics, 2009-2010, $5,000

R. Andrew Hicks, (PI), National Science Foundation, DMS 0908299, Distributions of Optical Design, 2009-2011, $264,000

Pawel Hitczenko, National Security Agency, H98230-09-1-0062, Probabilistic Properties of Permutation Tableaux and Other Combinatorial Structures, 2009-2011, $66,506

Dmitry Kaliuzhnyi-Verbovetskyi, (co-PI), National Science Foundation, DMS 0901628, Decomposition for Multivariable Schur-Class Functions, Christoffel-Darboux Type Formulas, and Related Problems, 2009-2012, $475,578

Jennifer Morse, Anne Schilling, Mark Shimozono, National Science Foundation, DMS 0652641 FRG: Collaborative Research: Affine Schubert Calculus: Combinatorial, Geometric, Physical, and Computational Aspects, 2007-2010, $671,270

Jennifer Morse, National Science Foundation, DMS 0652668, FRG: Affine Schubert Calculus: Combinatorial, Geometric, Physical, and Computational Aspects, 2007-2010, $103,528

Jennifer Morse, National Science Foundation, DMS 1001898, Combinatorics of Affine Schubert, 2010-2013, $150,000

Shari Moskow, National Science Foundation, DMS 0749396, Asymptotic at Resonant Scales: Applications to Inhomogeneous Material Simulation, Discretization and Inversion, 2006-2009, $192,451

Hugo J. Woerdeman, (PI), National Science Foundation, DMS 0901628, Decomposition for Multivariable Schur-Class Functions, Christoffel-Darboux Type Formulas, and Related Problems, 2009-2012, $475,578

J. Douglas Wright, National Science Foundation, DMS 0908299, Distributions of Optical Design, 2009-2011, $264,000

J. Douglas Wright, (co-PI), National Science, Foundation, DMS 0807738, Dynamics and Interactions of Free Fluid Interfaces, 2008-2011, $110,000

Thomas Yu, National Science Foundation, DMS 0542237, Multiscale Data Representatives in Geometric and Nonlinear Settings, 2005-2009, $149,982

Faculty Appointments / Conference Organizations

Ambrose, David, Co-organizer (with **J. Douglas Wright** and **Shari Moskow**) of the Applied Math/PDE Seminar, Drexel University, Philadelphia, PA, 2009

Ambrose, David, Member of organizing committee for FAN 2010: Fluid Dynamics, Analysis, and Numerics, Duke University, Durham, N.C., June 2010

Ambrose, David, Co-organized, with J. Douglas Wright, a minisymposium at the SIAM Nonlinear Waves and Coherent Structures conference, Philadelphia, PA, August 2010

Ambrose, David, Co-organized, with **J. Douglas Wright**, Diane Henderson, and Bernard Deconinck, a special session at the AMS Eastern Section Meeting, Pennsylvania State University, State College, PA, October 2009

Boyer, Robert, MAA Eastern Pennsylvania and Delaware Section: Executive Board, University of the Sciences, Philadelphia, PA, 2009

Kaliuzhnyi-Verbovetskyi, Dmitry, Research in Teams workshop “Theory of functions of noncommuting variables and its applications”**, (**with Victor Vinnikov), Banff International Research Station (BIRS), Banff, Alberta, Canada February 21-28, 2010

Kaliuzhnyi-Verbovetskyi, Dmitry, Research in Pairs workshop “Noncommutative Function Theory” (with Victor Vinnikov), Mathematisches Forschungsinstitut Oberwolfach, Germany, May 2-15, 2010

Kaliuzhnyi-Verbovetskyi, Dmitry, Minicourse “Noncommutative rational functions and noncommutative convexity” (with J. W. Helton, I. Klep, and V. Vinnikov) at the 19th International Symposium MTNS-2010, Budapest, Hungary, July 5-9, 2010

Morse, Jennifer, Formal Power Series and Algebraic Combinatorics, Executive Officer on Permanent Program Committee: Reykjavik, Iceland, 2011 and San Francisco, CA, 2010

Moskow, Shari, Organizing Mini-symposium for ICIAM 2011, “Composites and Inversion: Asymptotoic and Computational Methods”, mini-symposium proposal accepted, Vancouver, British Columbia, Canada, 2011

Moskow, Shari, Organizer for Connections for Women in Inverse Problems, MSRI, Berkley, CA, August 19-20, 2010

Naber, Gregory, Standing Committee for the Eleventh Annual Conference on Geometry, Integrability and Quantization, Varna, Bulgaria, 2010

Sheng, Li, Program Committee Member, The Eighth International Conference on Machine Learning and Applications (ICMLA 2009), Miami Beach, Florida, Dec 13-15, 2009

Yu, Thomas, Organized a minisymposium in the 2009 SIAM/ACM Joint Conference on Geometric and Physical Modeling, San Francisco, CA, 2009

Faculty Publications

Ambrose, D. M., and Wilkening, J., Computation of Time-Periodic solutions of the Benjamin-Ono Equation, *Journal of Nonlinear Science*, 20:277-308, 2010.

Ambrose, D. M., and Wilkening, J., Computation of Symmetric, Time-Periodic Solutions of the Vortex Sheet with Surface Tension, *Proceedings of the National Academy of Sciences of the USA*, 107:3361-3366, 2010.

Ambrose, D. M., Lopes Filho, M., Nussenzveig Lopes, H., and W. Strauss, Transport of Interfaces with Surface Tension by 2D Viscous Flows, *Interfaces and Free Boundaries*, 12:23-44, 2010.

Ambrose, D. M., and **Wright, J.D.**, Preservation of Support and Positivity for Solutions of Degenerate Evolution Equations, *Nonlinearity*, 23:607-620, 2010.

Ambrose, D. M., and Wilkening, J., Global Paths of Time-Periodic Solutions of the Benjamin-Ono Equation Connecting Pairs of Traveling Waves, *Communications in Applied Mathematics and Computational Science*, 4:177-215, 2009.

Boyer, R. P., and **Goh. W.**, Appell Polynomials and Their Zero Attractors, *Contemporary Mathematics*, Volume 517: 69-96, 2010.

Dong, B., and Shu, C., Analysis of a Local Discontinuous Galerkin method for Linear Time-Dependent Fourth-Order Problems, *SIAM J. Numer. Anal. 47*, no. 5, 3240-3268, 2009.

Cockburn, B., **Dong, B.**, Guzman, J., Restelli, M., and R. Sacco, A Hybridizable Discontinuous Galerkin Method for Steady-State Convection-Diffusion-Reaction Problems, *SIAM J. Sci. Comput. 31*, no. 5, 3827-3846, 2009.

Cockburn, B., **Dong, B.**, Guzman, J., Restelli, M., and R. Sacco, Optimal Convergence of the Original DG Method on Special Meshes for Variable Transport Velocity, *SIAM J. Numer. Anal.48*, no. 1, 133-146, 2010.

Fiore, A. and **Grinfeld, P.**, The Calculus of Moving Surfaces And Laplace Eigenvalues on an Ellipse with Low Eccentricity, *Numer. Funct. Anal. Optim.* 31 (6), 679-690, 2010.

Grinfeld, P., Morphological Instability of the Dielectric Thomson Nuclei, *Phys. Rev. B*. 81 (18), 184110, 2010.

Grinfeld, P., Hadamard's Formula Inside and Out, *J. Optim. Theory Appl.* 146(3), 654-690, 2010.

Grinfeld, P., Clausius-Clapeyron relations for the evaporating solid conductor, Z. Angew. Math. Mech. 90 (7-8), 633-640, 2010.

Grinfeld, P., Exact Nonlinear Equations for Fluid Films And Proper Adaptations of Conservation Theorems from Classical Hydrodynamics, *J. Geom. Sym. Phys* 16, 1-21, 2009.

Grinfeld, P., and Wisdom, J., The Effect of Phase Transformations at the Inner Core Boundary on the Slichter Modes, *Phys. Earth Planet. In.,* 178 (3-4), 183-188, 2010.

Faculty Publications

Hitczenko, P., and Wesolowski, J., Perpetuities with Thin Tails, *Annals of Applied Probability*, 19, 2080-2101, 2009.

Hitczenko, P., and Gruebel, R., Gaps in Discrete Random Samples, *Journal of Applied Probability*, 46, 1038-1051, 2009.

Kaliuzhnyi-Verbovetskyi, D. S., Corrigendum to ``Caratheodory interpolation on the noncommutative polydisk" [J. Funct. Anal., 229(2) (2005) 241--276]. J. Funct. Anal. 258 (2010), no. 3, pp. 1066--1067.

Kaliuzhnyi-Verbovetskyi, D. S., Multievolution scattering systems and the multivariable Schur class, in G. Michaletzky, L. Gerencser, and A. Edelmayer, Eds., Proceedings CD of the Nineteenth International Symposium of Mathematical Theory of Networks and Systems (MTNS 2010), July 5-9, 2010, Budapest, Hungary, pp. 2237--2238.

Bergeron, N. and **Li, Huilan**, Algebraic Structures on Grothendieck Groups of a Tower of Algebras, Journal of Algebra 321 (2009), 20682084.

Bergeron, N., Lam, T., and **Li**, **Huilan**, Combinatorial Hopf algebras and Towers of Algebras Dimension, Quantization and Functoriality, Algebras and Representation Theory, DOI: 10.1007/s10468-010-9258-y.

Aval, J., Bergeron, N., and **Li**, **Huilan**, On Noncommutative Combinatorial Inverse System, International Journal of Algebra, Vol. 4, 2010, no. 21, 10031020.

Morse, J., Lam, T., Lapointe, L., and M. Shimozono. Affine Insertion and Pieri Rules for the Affine Grassmannian, *Memoirs of the AMS*, 208, no. 977, 88 pages, 2010

Moskow, S and Schotland, J., Numerical Studies of the Inverse Born Series for Diffuse Waves, *Inverse Problems,* 25, no. 9, 095007, 18 pp., 2009.

Naber, Gregory, Topology, Geometry and Gauge Fields: Foundations, Second Edition, *Applied Mathematics*, 25, Springer, New York, 2010

Chen, D., Liu, Z., **Sheng, L.**, Tan, M., and M. Tang, Efficient Support Vector Machine Method for Survival Prediction with SEER Data, *Advances in Computational Biology Series: Advances in Experimental Medicine and Biology*, Vol. 680 (1st Edition), 2010.

Chu, D., Hung, Y.S., and **H.J. Woerdeman**, Inertia and Rank Characterizations of Some Matrix Expressions, *SIAM J. Matrix Anal*.31 (3), 1187-1226, 2009

Kaliuznyi-Verbovetsky, D. S., Spitkovsky, I.M., and **H. J. Woerdeman**, Matrices with Normal Defect One, *Operators and Matrices*, 3 (3), 401-438, 2009

Woerdeman H. J., A General Christoffel-Darboux Type Formula, *Integral Equations and Operator Theory*, 67 (2), 203-213, 2010

Faculty Publications

Wright, J. D., and Spirn, D., Linear Dispersive Decay Estimates for Vortex Sheets with Surface Tension, *Communications in Mathematical Sciences*, v. 7, no. 3, 521-547, 2009.

Wright, J. D., Interactions Manifolds for Reaction-Diffusion Equations in 2D, *SIAM Journal of Applied Dynamical Systems.* v. 9, pp 734-768, 2010.

Wright. J. D., and **Ambrose, D. M.**, Preservation of Support and Positivity for Solutions of Degenerate Evolution Equations. *Nonlinearity,* v. 23, 607-620, 2010.

Faculty Presentations

Ambrose, David, Computation of Time-Periodic Interfacial Fluid Flows, AMS Western Section Meeting, Riverside, CA, November 2009

Ambrose, David, Weak Solutions and Traveling Waves for Some Equations with Nonlinear Dispersion, AMS Southeastern Section Meeting, Lexington, KY, March 2010

Ambrose, David, Existence Problems in Interfacial Fluid Dynamics, Fluid Dynamics, Analysis, and Numerics 2010, Durham, NC, June 2010

Ambrose, David, Time-Periodic Solutions of Nonlinear Dispersive Equations, SIAM Nonlinear Waves and Coherent Structures Conference, Philadelphia, PA, August 2010

Ambrose, David, A Boundary Integral Method for the Irrotational Water Wave, SIAM Nonlinear Waves and Coherent Structures Conference, Philadelphia, PA, August 2010

Ambrose, David, Time-Periodic Interfacial Fluid Flows, 13th International Conference on Hyperbolic Problems: Theory, Numerics, Applications, Beijing, China, June 2010

Ambrose, David, Free Surface Problems in Fluid Dynamics, University of Cincinnati, Department of Mathematics, Cincinnati, OH, October 2009

Ambrose, David, Free Surface Problems in Fluid Dynamics, University of Maryland, Department of Mathematics, College Park, MD, October 29, 2009,

Ambrose, David, Free Surface Problems in Irrotational Fluids, Florida State University, Department of Scientific Computing, Tallahassee, FL, December 4, 2009

Ambrose, David, Some Analytical Results for Equations with Nonlinear Dispersion, University of Illinois-Chicago, Department of Mathematics, Chicago, IL, March 2010

Ambrose, David, Two Problems in Interfacial Fluid Dynamics., Indiana University, Department of Mathematics, Bloomington, IN, April 2010

Ambrose, David, Some Analytical Results for Equations with Nonlinear Dispersion, University of California, Davis, Department of Mathematics, Davis, CA, May 2010

Faculty Presentations

Ambrose, David, Some Existence Problems in Interfacial Fluid Dynamics, Second Franco-Brazilian Fluids Summer School, Lyon, France, July 2010

Dong, Bo, Optimal Convergence of the Original DG Method on Special Meshes for Variable Transport Velocity, The Fall 2009 Finite Element Circus, Knoxville, TN, October 2009

Dong, Bo, A Hybridizable and Superconvergent Discontinuous Galerkin Method for Elliptic Problems, Applied Mathematics and Scientific Computing Seminar, Temple University, Philadelphia, PA, February 2010

Dong, Bo, A Hybridizable Discontinuous Galerkin Method for Elliptic Problems, Department of Mathematics, University of Massachusetts, Dartmouth, MA, April 2010

Grinfeld, Pavel, Exact Hamiltonian Equations for Fluid Films**,** SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA, August 2010

Grinfeld, Pavel, The Calculus of Moving Surfaces and Solution of Near-Symmetrical Eigenvalue Problems, Eighth International Workshop on Accurate Solution of Eigenvalue Problems, Berlin, Germany, June 2010

Grinfeld, Pavel, Novel Exact Equations for Fluid Films: Key Features Inherited from Classical Fluid Dynamics , SIAM PDE Conference, Miami, FL, December 2009

Hitczenko, Pawel, Electronic Notes in Discrete Mathematics, Latin American Graphs and Optimization Symposium 2009, Gramado, Brasil, November 2009

Hitczenko, Pawel, Tails of Perpetuties, Probability and Combinatorics Seminar, Philadelphia, PA, February 2010

Hitczenko, Pawel, Restricted Compositions with Same Number of Parts , CALIN Seminar at LIPN, Universite Paris Nord, Paris, France July 2010

Hitczenko, Pawel, Overview of Probability, Multitech Business Institute, Kampala, Uganda, August 2010

Hitczenko, Pawel, Sequences, Recurrences, and their Applications to Finance, Management Training Advisory Centre, Kampala, Uganda, August 2010

Hitczenko, Pawel, Recurrences and their Applications in Finances, Uganda Martyrs University, Entebbe, Uganda, August 2010

Li, Huilan, Combinatorial Hopf Algebras and Towers of Algebras Dimension, Quantization and Functoriality, CMS/CSHPM Summer Meeting, St. Johns, New Foundland, June 2009

Kaliuzhnyi-Verbovetskyi, Dmitry, The Multivariable Schur Class and von Neumann's Inequality, Operator Algebras/Operator Theory Seminar, Haifa, Israel, December 2009

Faculty Presentations

Kaliuzhnyi-Verbovetskyi, Dmitry, Multievolution Scattering Systems and Multivariable Schur class, 19th International Symposium MTNS-2010, Budapest, Hungary, July 2010

Kaliuzhnyi-Verbovetskyi, Dmitry, Noncommutative Functions: Algebraic and Analytic Results, International Workshop IWOTA-2010, Berlin, Germany, July 2010

Kaliuzhnyi-Verbovetskyi, Dmitry, Realization theory of Noncommutative Rational Functions, 19th International Symposium MTNS-2010, Budapest, Hungary, July 2010

Medvedev, Georgi, Synchronization of coupled limit cycles, American Institute of Mathematics' Eighth International Conference on Dyn. Systems, Diff. Equations and Applications, Dresden, Germany, May 2010

Medvedev, Georgi, Synchronization of coupled limit cycles, AMS meeting, NJIT, Newark, NJ, May 2010

Morse, Jennifer, Affine Combinatorial Refinement of Schur Functions, Fields Institute, Toronto, Canada, July 2010

Morse, Jennifer, A Tableaux Rasa Talk on Affine Schubert Calculus and MacDonald Polynomials, MAA MathFest, Pittsburgh, PA August 2010

Morse, Jennifer, Affine Schubert Calculus and k-Theory, Algebraic Combinatorics meets Combinatorial Algebra, Kingston, Canada, January 2010

Morse, Jennifer, Affine Insertion and Pieri Rules for the Affine Grassmannian, American Mathematical Society, University Park, PA, October 2009

Morse, Jennifer, Enumerative Combinatorics, SIAM Conference on Discrete Mathematics, Austin, TX, June 2010

Moskow, Shari, Scattering and Resonances of Thin Structures, Banff International Research, Alberta, Canada, February 2010

Moskow, Shari, The Inverse Born Series for Diffuse Waves, Banff International Research Station, Alberta, Canada, October 2009.

Moskow, Shari, The Inverse Born Series for EIT, Canadian Mathematical Society, New Brunswick, Canada, June 2010

Moskow, Shari, Optimal Grids for Anisotropic Problems, Electromagnetics Research Symposium, Boston, MA, July 2010

Moskow, Shari, Asymptotic Expansions for Small Inhomogeneities in EIT and Related Problems, MSRI program on Inverse Problems and Applications, August 2010

Moskow, Shari, The Inverse Born Series for Diffuse Waves, speaker, Columbia University, Department of Applied Mathematics and Physics, New York, NY, October 2009

Faculty Presentations

Perline, Ronald, A Class of Vortex Filament Solitons in Fluids, Plasmas and Superconductors, SIAM Nonlinear Waves and Coherent Structures, Philadelphia, PA, August 2010

Woerdeman, Hugo, A New Sparsity-Targeting Iterative Thresholding Algorithm for Inverse Problems, SIAM Annual Meeting, Pittsburgh, PA July 2010

Wright, J. Douglas, Analytical Results for Equations with Degenerate Dispersion, SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA, August 2010

Wright, J. Douglas, Emerging Topics in Dynamical Systems and Partial Differential Equations, DSPDE's 2010 Barcelona, Spain, May 2010

Wright, J. Douglas, Differential Equations and Applications, AIMS International Conference on Dynamical Systems, Dresden, Germany, May 2010.

Wright, J. Douglas, Well-Posedness Issues for Degenerate Dispersive Equations, SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA, August 2010

Wright, J. Douglas, Motivating the Unmotivated: Getting Students to Buy into your Course, the Next Course, and the Math Major, Project NeXT, Pittsburgh, PA, August 2010

Wright, J. Douglas, Nonlinear Waves: Where Do They Come From? What Do They Do?, Bryn Mawr College Mathematics Biology Colloquium, Bryn Mawr, PA, January 2010

Wright, J. Douglas, The Shooting Manifold for Reaction-Diffusion Equations in d-Dimensional Space, University of Pennsylvania Analysis Seminar, Philadelphia, PA, October 2009

Wright, J. Douglas, The Shooting Manifold for Reaction-Diffusion Equations in d-Dimensional Space, Brown University PDE Seminar, Providence, RI, October 2009

Wright, J. Douglas, Interaction Manifolds in Reaction Diffusion Systems, NJIT Waves Seminar, Newark, NJ, March 2010

Wright, J. Douglas, Interaction Manifolds in Reaction Diffusion Systems, SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA, August 2010

Editorial Positions

Ambrose, David, Guest Editor, *Mathematics and Computers in Simulation*

Medvedev, Georgi, Associate Editor, *Discrete and Continuous Dynamical Systems B*

Naber, Gregory, Associate Editor, *Journal of Geometry and Symmetry in Physics* and *Journal of Dynamical Systems and Geometric Theories*

Woerdeman, Hugo, Associate Editor, *SIAM Journal Matrix Analysis and Applications* and *International J. of Information and System Sciences*

Special Topics Courses

Fall 2009

MATH 279
Communications in Math
Taught by Ron Perline

Winter 2010

MATH 498
Financial Mathematics
Taught by Pavel Grinfeld

MATH 480
Financial Math for Actuaries
Taught by Richard Owens

MATH 279
Pre-calculus Workshop
Taught by Patricia Russell and Le Yu

MATH 680
Algebraic Geometry
Taught by Justin Smith

MATH 680
Numerical Linear Algebra
Taught by Thomas Yu

Spring 2010

MATH 480
Financial Math for Actuaries II
Taught by Richard Owens

MATH 680
Tensor Analysis
Taught by Pavel Grinfeld

MATH 680
Spectral Theory
Taught by Dmitry Kaliuzhnyi-Verbovetskyi

MATH 680
Combinatorial Representation Theory
Taught by Jennifer Morse

MATH 680
Calculus of Variations
Taught by Ron Perline

Honors Day Awards

The Drexel University College of Arts and Sciences Honors Day was held on May 22, 2008 in the Mandell Theater**.** This year's winners are:

Robert J. Bickel Award – Valarie Banas, Elizabeth Lilley
Harry Muchnic Award – Sean Balentine, Binoy Bhatt, Huey Wong, Alexander Youcis
Frank Williams Prize – Erin Hamalainer

Sean Ballentine was born and raised in Philadelphia and went to Central High School of Philadelphia. He came to Drexel as a mathematics major and loved every minute of it. Sean originally wanted to pursue a career in actuarial science but after taking higher level math courses he decided that graduate school would be best. Last year, Sean helped create the Drexel Actuarial Science Student Association and presided as vice-president since its conception. More recently, Sean was nominated as president of Mathematics Student Organization.

Erin Hamalainer began Drexel as a Chemical Engineering major in the fall of 2006 and was awarded a Presidential Scholarship. Erin participated in the STAR program at Drexel, where she researched fiber-embedded hydrogels. In her first year as a Math major, she received the Robert J. Bickel Award. Erin is currently a junior co-oping at Susquehanna International Group and hoping to pursue a graduate degree in Pure Mathematics once she graduates Drexel. She is a member of the Pennoni Honors College and has a 3.9 GPA.

Binoy Bhatt started out as a Biology student, but switched to Math during the summer before my sophomore year. He was able to combine his interests in biology and math through courses like Human Physiology I, which utilizes programming in Matlab to simulate physiological anomalies in the human body. He has done research in the Department of Pediatric Endocrinology at the Children's Hospital of Philadelphia, and has been a member of the Pennoni Honors College with a 3.75 GPA. Binoy is an AJ Drexel Scholar, STAR Scholar, Dean's List recipient, Barry M. Goldwater nominee, and recipient of the Harry E. Muchnic Scholarship of Excellence in Mathematics. Binoy will begin attending the George Washington University School of Medicine in August 2010.

Elizabeth Lilley Originally from Pittsburgh, Liz came to Drexel as a freshman Mathematics major in the fall of 2007, and could not be happier with her chosen major. She is a member of Drexel Actuarial Science Student Association, Mathematics Student Organization, and Pennoni Honors College. She also spent the majority of her junior year assisting professors and tutoring in the Math Resource Center. Currently, she is on CO-OP at Susquehanna International Group, working on the convertible bonds trading desk. In December, she will be graduating early with a degree in Mathematics and three additional minors including Business Administration, Finance, and Economics. From there, she plans on pursuing a career as an Actuary.

Honors Day Awards

Alexander Youcis realized that he loved math in the eleventh grade when he picked up the book Principles of Mathematical Analysis by the late Walter Rudin. Since then he has spent most of his waking time doing math. Alex comes from south central Pennsylvania and is currently a freshman at Drexel University in the math department. He is working towards his ultimate goal of being a research mathematician at a major university. His favorite kinds of math are real analysis and point-set topology. He loves it here at Drexel, especially the loving and supporting math department. He would like to thank the math department as a whole for the incredible opportunities they have afforded him.

Valerie Banas came to Drexel as an engineering student, but quickly learned that she was better suited for the Mathematics department. Valerie's favorite classes were Differential Equations, Partial Differential Equations, and Complex Variables. Outside of class, Valerie loved her job tutoring at the Math Resource Center. She also began to do yoga, learned to knit and crochet, and participated in the University Choir, the Madrigal Choir, and the Drexel A Capella choir, the TrebleMakers.

Huey Wong is a transfer student majoring in Mathematics. Huey is grateful for all the help the professors and teaching assistants in math department have given her during her time here. In addition to her love for math, she has found a new passion: fine art. Huey began taking art classes during the summer of the 2009-2010 academic year and is now pursuing a minor in fine art. Even though many of the courses are not as mentally challenging as the Math courses, she finds them challenging in a very different way. Huey will be graduating in the Spring of 2010-2011.

Honors Day was held on May 26, 2010 in the Main Auditorium.

Undergraduate Awards

Senior First Honors
- Ian Johnston

Senior Second Honors
- Binoy Bhatt

◄ Hugo Woerdeman, Sean Ballentine, Alexander Youcis, Binoy Bhatt, Donna Murasko

Hugo Woerdeman, Erin Hamalainer, Don Williams ►

◄ Don Williams, Hugo Woerdeman

Bachelor of Science Degrees Awarded

Mathematics Majors

Valerie Banas - *Cum Laude*
Mackenzie Bergstrom - *Summa Cum Laude*
Binoy Bhatt - *Magna Cum Laude*
Jessica Colditz
Stephanie Datu
Andrew Fiore
Ian Johnston - *Summa Cum Laude*
Janelle Joseph - *Cum Laude*
Justin Knowles
Howard Nicole
Eric Nutz - *Cum Laude*
Steven Palubinski
Heather Pollard
Zachary Reilly
Vito Salerno - *Cum Laude*
Jonathan Snyder- *Magna Cum Laude*
John Stake

Mathematics Minors

Joseph Angelo
Timothy Chagnon
Mamadou Cisse
Song Han
Phyllis Huang
Hagna Kane
Stephen Miller
Jerome Mlack
George Neusch
Nupur Patel
Quy Pham
Oleq Pistolet
Kaleb Politis
Raymond Ross
Jeffrey Segall
David Serratore
Matthew Snyder
Joshua Spurrier
Stanly Viss
Thomas Wambold
Ian Yoder

Masters of Science Degrees Awarded

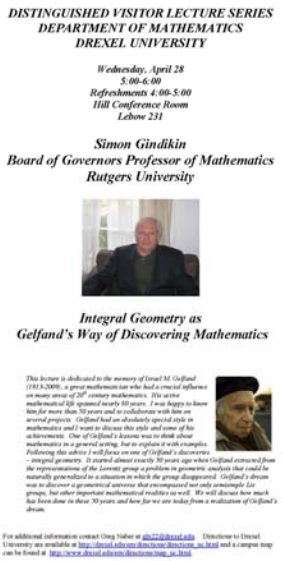
Ramil Berner
Lingqiong Guo
Matthew O'Connell
Dimitrios Papodopoulous
Min Rong

Doctor of Philosophy Degree Awarded

In August of 2010, Mr. Yun Yoo presented and defended with success his Ph.D. thesis entitled "Semigroup Approach to Representation Theory of Infinite Wreath Products". His Ph.D. advisor was Professor Robert P. Boyer.

Distinguished Visitor Lecture Series

April 28, 2010
Simon Gindikin
Rutgers University
Integral Geometry as Gelfand's Way of Discovering Mathematics



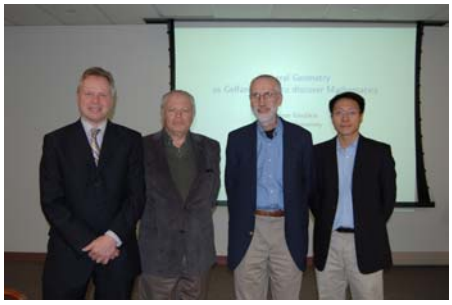
DISTINGUISHED VISITOR LECTURE SERIES
DEPARTMENT OF MATHEMATICS
DREXEL UNIVERSITY

Wednesday, April 28
5:00-6:00
Refreshments 4:00-5:00
Hill Conference Room
Lebow 231

Simon Gindikin
Board of Governors Professor of Mathematics
Rutgers University

Integral Geometry as
Gelfand's Way of Discovering Mathematics

Abstract: This lecture is dedicated to the memory of Israel M. Gelfand (1913-2009), a great mathematician who had a crucial influence on many areas of 20th century mathematics. His active mathematical life spanned nearly 80 years. I was happy to know him for more than 50 years and to collaborate with him on several projects. Gelfand had an absolutely special style in mathematics and I want to discuss this style and some of his achievements. One of Gelfand's lessons was to think about mathematics in a general setting, but to explain it with examples. Following this advice I will focus on one of Gelfand's discoveries – integral geometry. It started almost exactly 50 years ago when Gelfand extracted from the representations of the Lorentz group a problem in geometric analysis that could be naturally generalized to a situation in which the group disappeared. Gelfand's dream was to discover a geometrical universe that encompassed not only semisimple Lie groups, but other important mathematical realities as well. We will discuss how much has been done in these 50 years and how far we are today from a realization of Gelfand's dream.



Hugo Woerdeman, Simon Gindikin,
Robert Boyer, Thomas Yu

Colloquium

September 24, 2009
Wojciech Czaja
University of Maryland
“Kaczmarz Algorithms and Frames”

October 2, 2009
Ivan S.F. Chan
Merck Research Laboratories
“Assessing Efficacy and Correlates of Protection in Vaccine Studies”

October 22, 2009
David Levermore
University of Maryland
“Gas Dynamics for the Boltzmann Equation”

November 12, 2009
John Nolan
American University
“A Gentle Introduction to Stable Distributions”

November 19, 2009
Anna Mazzucato
Pennsylvania State University
“Dissipation in Turbulent Flows”

December 3, 2009
Bo Dong
Drexel University
“Optimal Convergence of the Original Discontinuous
Galerkin Method on Special Meshes for Variable Transport Velocity”

January 14, 2010
Panayotis Keverekidis
University of Massachusetts
“The Many Faces of “Discreteness”: From Granular Crystal and
Layeed Optical Media to Multi-Component Bose-Einstein Condensates and Beyond”

February 4, 2010
Dennis DeTurk
University of Pennsylvania
“Adventures in Linking”

February 25, 2010
Giovanni P. Galdi
University of Pittsburgh
“2D Steady-State Navier-Stokes Flow Past a Cylinder: A Longstanding Open Problem”

Colloquium

April 1, 2010
Andrey Melnikov
Drexel University
“Class RSI and Scattering Theory of the Sturm-Liouville Operator”

April 15, 2010
Gil Strang
Massachusetts Institute of Technology
“Banded Matrices with Banded Inverses”

April 28, 2010
Simon Gindikin
Rutgers University
Distinguished Visitor Lecture: Integral Geometry as Gelfand’s Way of Discovering Mathematics

May 13, 2010
Georgi Medvedev
Drexel University
“Synchronization and Denoising in Interacting Stochastic Dynamical Systems”

May 20, 2010
Giovanni P. Galdi
Rutgers University
“2D Steady-State Navier-Stokes Flow Past a Cylinder: A Longstanding Open”

May 27, 2010
Pavel Grinfeld
Drexel University
“Exact Hamilton Equations for Fluid Films”

Analysis Seminar

September 25, 2009
Lei Cao
Drexel University
The Uniqueness of Solutions to A. Horn's Problem Up to Unitary Similarity

October 2, 2009
Hugo Woerdeman
Drexel University
On Positive and Completely Positive Maps

October 9, 2009
Dmitry Kaliuzhnyi-Verbovetskyi
Drexel University
Theory of Reproducing Kernels, Part 1

October 16, 2009
Dmitry Kaliuzhnyi-Verbovetskyi
Drexel University
Theory of Reproducing Kernels, Part 2

October 23, 2009
Gregory Naber
Drexel University
Reproducing Kernels and Group Representations, Part 1

October 30, 2009
Gregory Naber
Drexel University
Reproducing Kernels and Group Representations, Part 2

November 6, 2009
David Kimsey
Drexel University
Theory of Reproducing Kernels, Part 3

November 13, 2009
David Kimsey
Drexel University
Theory of Reproducing Kernels, Part 4

November 20, 2009
Anatolii Grinshpan
Drexel University
Theory of Reproducing Kernels, Part 5

Analysis Seminar

December 4, 2009
Anatolii Grinshpan
Theory of Reproducing Kernels, Part 6

December 11, 2009
Lei Cao
The High Road to an Exceptional Formula

January 8, 2010
Robert Boyer
Drexel University
Representation Theory for Unitary Groups

January 11, 2010
Andrey Melnikov
Drexel University
Theory of Transfer Functions of Vessels

January 13, 2010
Andrey Melnikov
Drexel University
Scattering Theory of the Sturm-Liouville Differential Equation

January 15, 2010
Andrey Melnikov
Drexel University
Overdetermined 2D-Systems Invariant in One Direction

January 22, 2010
Andrey Melnikov
Drexel University
The Class SI of Interwining Functions and Scattering Theory of the Sturm-Liouville Differential Equation

January 29, 2010
Hugo Woerdeman
Drexel University
On Sendov's Conjecture
On Dritschel's Theorem, and How it Fits with Reznick's Result

February 5, 2010
Dmitry Kaliuzhnyi-Verbovetskyi
Drexel University
Singularity Sets of Rational Functions in Commutative and in Noncommutative Setting, Part 1

Analysis Seminar

February 12, 2010
Dmitry Kaliuzhnyi-Verbovetskyi
Drexel University
Singularity Sets of Rational Functions in Commutative and in Noncommutative Setting, Part 2

February 19, 2010
Andrey Melnikov
Drexel University
The Riemann-Hilbert Problem and Integrable Systems

March 5, 2010
Hugo Woerdeman
Drexel University
The Little I Know about the Riemann-Hilbert Problem and Discrete Painleve Equations

March 12, 2010
Anatolii Grinshpan
Drexel University
Grothendieck's Inequality

April 2, 2010
Thomas Yu
Drexel University
Optimization on Matrix Manifolds (a.k.a. Nonlinearlity in Linear Algebra)

April 9, 2010
Mathew Brenneman
Miami University
A Dyanamical Systems Solution to GPS Interference Mitigation

April 16, 2010
Dmitry Kaliuzhnyi-Verbovetskyi
Drexel University
A Schwartz Lemma on the Polydisk

April 23, 2010
Dmitry Kaliuzhnyi-Verbovetskyi
Drexel University
A Schwartz Lemma on the Polydisk

April 30, 2010
David Kimsey
Drexel University
Finite Atomic Measures for Truncated Moment Sequences

Analysis Seminar

May 7, 2010
Daniel Parry
Drexel University
Zeros of Partition Polynomials

May 14, 2010
Yuriy Sereda
Drexel University
Polynomials in Two Variables - The Unknown Function and its Gradient - as a Promising Tool for Solving the Ordinary and Partial Differential Equations and Their System

May 21, 2010
James Lambers
University of Southern Mississippi
A Crash Course on Matrices, Moments and Quadrature
Weighted Seminorn Inequalities for Power Series

May 28, 2010
Andrey Melnikov
Drexel University
Finite-Dimensional Sturm-Liouville Vessels and their Tau Functions

June 4, 2010
Arcadii Grinshpan
University of South Florida
Weighted Seminorm Inequalities for Power Series

Combinatorics and Algebraic Geometry Seminar

Sep 17, 2009
Grothendieck Polynomials, Affine Grothendieck Polynomials, and t-analogs.
Jason Bandlow
University of Pennsylvania

Oct 1, 2009
A Combinatorial Interpretation for Computations in the Quantum Polynomial Ring
Justin Lambright and Mark Skandera
Lehigh University

Combinatorics and Algebraic Geometry Seminar

Oct 8, 2009
q,t-Catalan Numbers
Kyungyong Lee
Purdue University

Oct 22, 2009
Finite and affine k-parabolic arrangements
Jacob White
Arizona State

Nov 5, 2009
Pieri rules for the K-theory of cominuscule Grassmannians
Anders Buch
Rutgers University

Nov 12, 2009
Grobner bases for Kazhdan-Lusztig ideals
Alex Yong
Univ. of Illinois at Urbana-Champaign

Dec 3, 2009
Applications of Symmetric Polynomials
Trueman MacHenry
York University

PDE/Applied Mathematics Seminar

October 19, 2009
Ronald K. Perline
Drexel University
A Class of Vortex Filament Solitons in Fluids, Plasmas and Superconductors

October 26, 2009
Jon Wilkening
UC Berkeley
Computation of Time-Periodic Solutions of Nonlinear PDE

November 2, 2009
Sarah Raynor
Wake Forest
A System of ODEs for a Perturbation of a Minimal Mass Soliton

PDE / Applied Mathematics Seminar

November 16, 2009
Bernard Deconinck
University of Washington
The Stability of Finite-Genus Solutions of the KdV Equation

November 19, 2009
Anna Mazzucato
Pennsylvania State University
Dissipitation in Turbulent Flows

November 23, 2009
Hongqiu Chen
University of Memphis
Solitary-Wave Solutions of Systems of Nonlinear Dispersive Wave Equations

February 15, 2010
Vince Ervin
Clemson University
Coupled generalized nonlinear Stokes Flow with flow through a porous media

March 8, 2010
Alex Mahalov
Arizona State University
3D Navier-Stokes and Euler equations with uniformly large initial vorticity

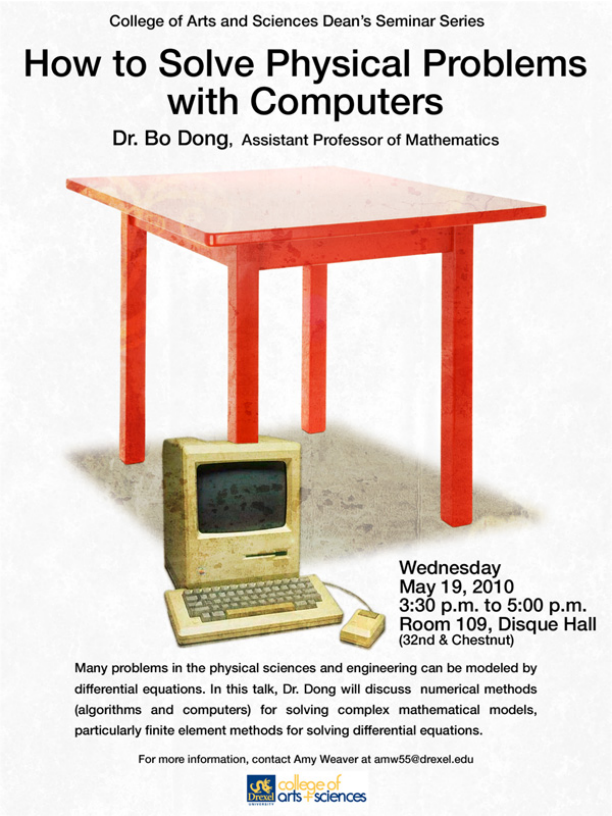
March 15, 2010
Ben Akers
University of Illinois-Chicago
Stability of traveling water waves: resonant perturbations

April 5, 2010
Peter van Heijster
Brown University
Planar radial spots in a three-component FitzHugh-Nagumo System

April 15, 2010
Gideon Simpson
University of Toronto
Magma Dynamics: Coherent Structures and Constitutive Relationships

April 19, 2010
Shu-Ming Sun
VPI
Surface waves on water with surface tension

Dean's Seminar



Bo Dong
May 19, 2010

"How to Solve Physical Problems with Computers"

Abstract: Many problems in the physical sciences and engineering can be modeled by differential equations. For complicated mathematical models, exact solutions are often impossible to obtain using analysis tools. Instead, individuals will often use numerical methods (algorithms and computers) to obtain approximate solutions while maintaining reasonable error bounds. In this talk, Dr. Dong will discuss numerical methods for solving mathematical models, in particular, finite element methods for solving differential equations.

Departmental Committees

Departmental Committees 2009-2010

Tenure and Promotion
- Pawel Hitczenko, Chair
- All tenured faculty members

Teaching Faculty Search
- Shari Moskow, Chair
- J. Doug Wright
- David Ambrose

Graduate Curriculum
- Jennifer Morse, Chair
- David Ambrose
- Thomas Yu
- Li Sheng
- Graduate Advisor: R. Andrew Hicks
- Qualifying Exam Subcommittee
  - Appointed by Graduate Committee

Undergraduate Curriculum Committee
- Marci Perlstadt, Chair
- Adam Rickert
- J. Doug Wright
- Bo Dong
- Undergraduate Advisor: Marna Mozeff

Actuarial Science/ Financial Math Program Committee
- Pavel Grinfeld, Chair
- Robert Boyer

Teaching Faculty Promotion
- Ronald Perline, Chair
- Justin Smith
- Hugo Woerdeman (ex-officio)

Website Committee
- Justin Smith, Chair
- Gene Phan
- Marna Mozeff

Departmental Committees

Departmental Grants Advisor: Pawel Hitczenko

Computer Systems Liaison: Justin Smith

Departmental Grants Advisor: Pawel Hitczenko

Colloquium Coordinator: Greg Naber

Distinguished Speaker Coordinator: Thomas Yu

Library Liaison: Dmitry Kalyuzhnyi-Verbovetskyi

Resource Center Coordinator: David Shen

CoAS Undergraduate Program representative: Marci Perlstadt

CoAS Graduate Program representative: Jennifer Morse

CoAS Tenure and Promotion representative: Pawel Hitczenko

Goodwin Liaison: Marna Mozeff

University 101 representative: Marna Mozeff

Math 121-122-123 coordinator: Ronald Perline

Math 101-102 coordinator: Marna Mozeff

Math 100 coordinator: Elaine Kyriacou

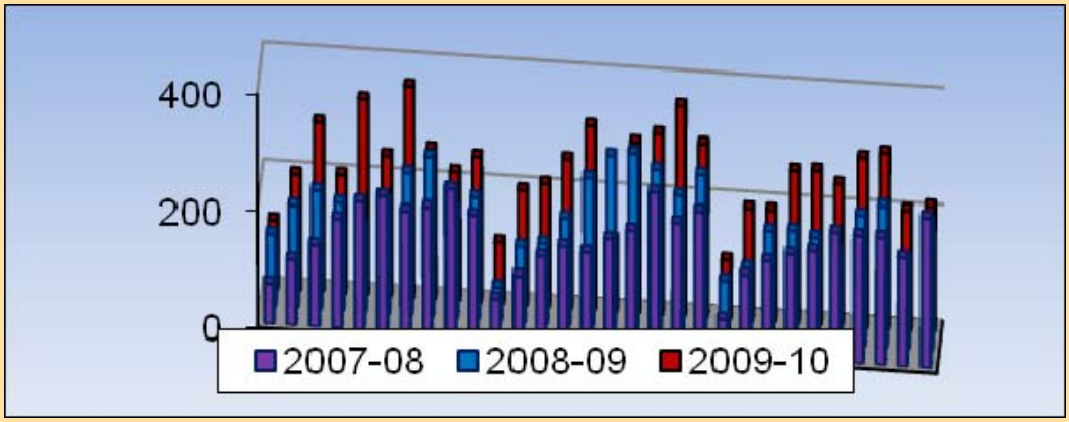
Math 110 coordinator: Patricia Russell

Math Competition coordinator: Gregory Naber

PiMuEpsilon Liaison: Pavel Grinfeld

Mathematics Resource Center

Despite limited space, the Math Resource Center (MRC) continues to grow, providing valuable tutoring for 1261 students this year. On average, students visited 240 times per week, up 23% from 2008-9. The MRC is unique as a help center: most tutors are not undergraduates, but TA's and faculty. With office hours pooled together, students have access to 42 tutor hours per week—Monday through Thursday 10-7, Friday 10-4. Our high quality, individualized instruction brings students back 5.7 times per year, up 28% from the previous year. Students who come regularly benefit the most: F's become C's, C's change into A's, and A's rise to A+'s. The 1261 students who used the MRC constitute 26% of students taking Math Department courses at Drexel.



Highlights of the year:

- A record 226 students in one day. The previous record was 184 students.
- More students tutored in higher level math courses--Linear Algebra, Prob & Stat, Differential Equations, Discrete Math, Vector Calculus

"I like to come here because I know that the people who are tutoring me are professors and actually know what they are doing. Half the time I can even get tutored by the professor who is giving me the exam."

Mathematics Resource Center

"I can honestly say that without the math tutoring center's help I would have failed all of my math courses. I must have spent at least seven to eight hours a week at the math tutoring center…. I owe everything to the math tutoring center and the great staff that works there."

"You don't just show the answer. You make me think."

"This is the best help resource on campus. It should be used as a model for all other departments."

"I was never very good at math. Ever since I started algebra in junior high school I've struggled with the subject….Calculus is certainly no joke. This has made me a regular at the Math Resource Center. I've come to know most of the staff there personally. They have all helped me tremendously, and I am always greeted with a smile and a helping hand….Without [their] assistance….there is a pretty good chance that I would no longer be a Dragon at all. I would definitely recommend Drexel's Math Resource Center to any of my fellow students. It's just too good of an opportunity to pass up."

"The tutoring was of the highest caliber….With a mix of professors and capable students I felt comfortable with addressing all my math related issues. I say this because as an adult student many of the basics are not basic for me….Please accept my heartfelt thanks and appreciation for an essential resource at Drexel University."

Student Activities

Graduate Student Seminar

September 28, 2009
David Kimsey
Complex Symmetric Matrices

October 5, 2009
Caroline Shapcott
Random Integer Compositions

October 19, 2009
Selcuk Koyuncu
Estimated Inverse of a Multivariable Toeplitz Matrix

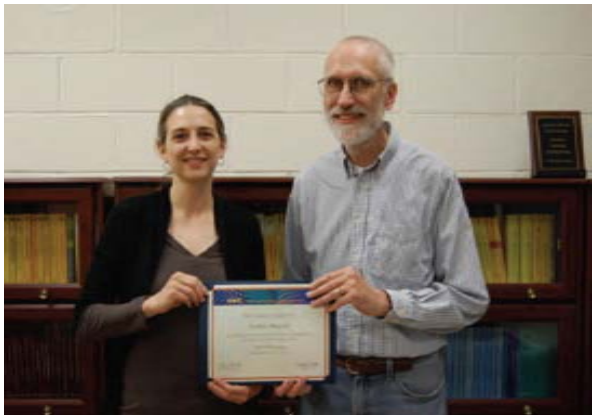
October 26, 2009
Timur Milgrom
Analysis of Solutions to a Vortex Sheet Problem with Different Types of Boundary Conditions

November 2, 2009
Svitlana Zhuravytska
Reliability and Frequency Control in a Computational Model of the Locus Coeruleus Network

November 9, 2009
Jonah Smith
A Few Proofs of Euclid's Theorem

November 16, 2009
Derek Heilman
A Mathematical Look at Hitting Streaks in Baseball

November 30, 2009
Dan Jordon
Numerical solutions to the KdV equation and other PDE via the Fast Fourier Transform



The Society for Industrial and Applied Mathematics (SIAM) gave Caroline Shapcott, teaching assistant, recognition for her outstanding efforts as President of Drexel's SIAM Student Chapter. The Graduate Student Seminar is sponsored by the SIAM Student Chapter.

Student Activities

Student Presentations

Koyuncu, Selcuk, Computing the Inverse of Positive Definite multi-level Toeplitz Matrix, The SIAM Conference on Applied Linear Algebra, Monterey Bay, CA, October 2009

Koyuncu, Selcuk, Computing the inverse of Multivariable Toeplitz Matrix, Applied Mathematics and Scientific Computing Seminar, Temple University, Philadelphia, PA 2010

Kimsey, David, Truncated Matrix-Valued K-Moment Problems on R^d and C^d, 21st International Workshop on Operator Theory and its Applications, Technische Universität Berlin, Berlin, Germany, July 2010

Brummitt, C., Laureyns, I., Lin, T., Martin, D., **Parry, D**., Timmers, D., Volfson, A., Yang, T., Haley, Y., Slimalicious: A Mathematical Study of Physarum Polycephalum, Graduate Student Mathematics Modeling Camp, Troy, NY, June 2010

Parry, Daniel, Application of the Circle Method to Polynomials of Infinite Products, Bryn Mawr/Temple Number Theory Seminar, Philadelphia, PA, June 2010

Parry, Daniel, A Survey of Result on Plane Partition Polynomials, Pennsylvania State University Number Theory Seminar, University Park, PA, September 2010

Parry, Daniel, Zeros of Polynomials Related to Plane Partitions, MAA MathFest 2010, Pittsburgh, PA, August 2010

Shapcott, Caroline, Product of Parts of Random Integer Compositions, MAA/EPaDel Meeting, Philadelphia, PA, 2009

Shapcott, Caroline, Asymptotic Distribution of the Part-Product Statistics for Random Integer Compositions, Drexel University Research Day, Philadelphia, PA, 2010

Zhuravytska, Svitlana, Reliability and Frequency Control in a Computational Model of the Locus Coeruleus Network, Neuroscience 2009, Chicago, IL, October 2009

Zhuravytska, Svitlana, Reliability and Frequency Control in a Computational Model of the Locus Coeruleus Network, SIAM Conference on the Life Sciences, Pittsburgh, PA, July 2010

Conferences

Lei Cao, Avinash Dalal, and **Derek Heilman** attended the Affine Schubert Calculus Workshop, Fields Institute, Toronto, Canada, July 2010

Lei Cao, Derek Heilman, Caroline Shapcott, and Le Yu attended the 22nd International Conference on Formal Power Series and Algebraic Combinatorics, San Francisco State University, San Francisco, CA, August 2010

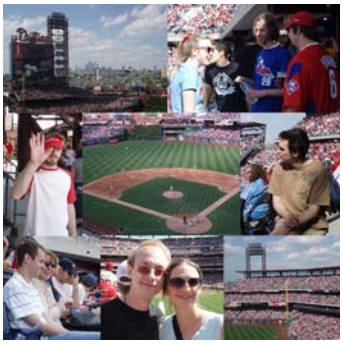
Student Activities

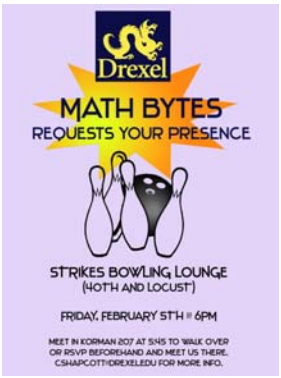
MATHBYTES

MathBytes is the Math Department's graduate student organization. Funding and support are provided by Drexel's Graduate Student Association, and membership is open to all students seeking an M.S. or Ph.D. in mathematics at Drexel. For the 2009-2010 academic year, MathBytes' officers were Caroline Shapcott, President; Timur Milgrom, Vice President; Svitlana Zhuravytska, Treasurer; and Derek Heilman, Secretary.

In addition to our annual "Welcome Back" and "Year End" socials, MathBytes held three off-campus events this year. During the fall quarter, we attended, and marveled at, Gunther von Hagens' Body Worlds exhibit at the Franklin Institute. In winter quarter, on the evening of Philadelphia's first monstrous snowstorm, we headed down to Strikes Bowling Lounge in West Philly for a night of food, fun, and friendly competition. A few weeks before spring quarter finals, we trekked all the way to Citizen Bank Park on a beautiful day to see the Phillies play the Atlanta Braves.

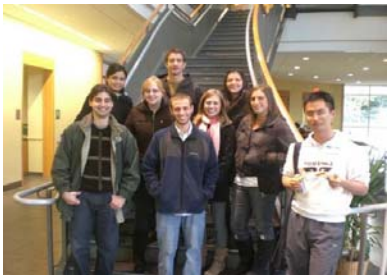
Thank you to everyone who came out to these events! To find out more about our organization, learn about upcoming events, or see pictures of past events, please visit our recently revived website: http://www.pages.drexel.edu/~dsomb/





Mathematics Student Organization

The Mathematics Student Organization (MSO), also known as the “Math Club,” is a student-run organization whose mission is to promote mathematics and related fields by providing a casual and relaxed environment conducive to learning. The MSO is committed to bringing together undergraduate students with a common interest in various aspects of mathematics. The organization meets these goals by sponsoring events that include: guest speakers, fun mathematical problems and challenges, math movies and television programs, and entertaining math-related activities and games. The club also maintains a math library from which students can borrow books, novels, and periodicals about mathematics and related disciplines. The MSO website is: http://www.pages.drexel.edu/~dsomso/



Student Activities

Drexel Actuarial Science Student Association

DASSA, short for the Drexel Actuarial Science Student Association, is an undergraduate student organization dedicated to guiding aspiring actuaries. An actuarial career has consistently been rated one of the top four best jobs in the United States by the Jobs Rated Almanac, and it is part of DASSA's mission to bring together and support its students in taking the initial steps towards pursuing this rewarding career, including working on getting an actuarial minor. In order to facilitate these early steps, DASSA sponsors a lecture/workshop series given by students in the organization and outside speakers on topics including, but not limited to, "What is an actuary?", "The Exams: What they mean and how to navigate them," plan of study workshops, resume critiquing, and the basics of pre- and post-graduate actuarial development programs. *We're always looking for alumni involvement*, so please feel free to contact us at dsodassa@drexel.edu or for more information, please visit our organization's website at: http://www.pages.drexel.edu/~dsodassa/.

Student Awards

Associate Vice-Provost Ferrone, Caroline Shapcott, Vice Provost Simansky

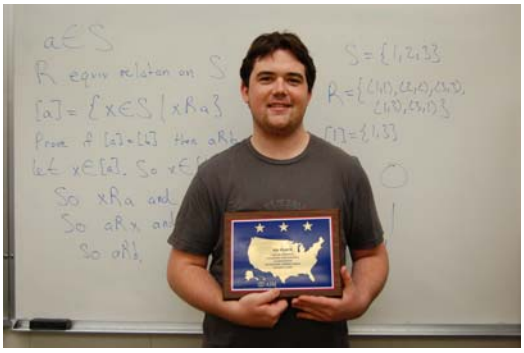
Caroline Shapcott, University Research Day Best Graduate Poster Presentation - Research in Computation and Modeling (Non-Bio)

University Research Day is a celebration of research, innovation, scholarship, and creativity with a day of posters and presentations exhibiting current graduate and undergraduate research. This year's event was held on April 15, 2010 at the Daskalakis Athletic Center. The posters were divided into nine categories of research with winners being selected from each category. Caroline Shapcott won Best Graduate Poster Presentation in the Non-Biological Computation and Modeling category.

Caroline Shapcott is a third-year teaching and research assistant. She currently serves as President of the graduate student organization MathBytes and as Assistant Manager of the Math Resource Center. Her poster highlights recent research under the direction of Eric Schmutz and is titled "Asymptotic Distribution of the Part-Product Statistics for Random Integer Compositions."

Student Awards

Sean Ballentine, was awarded fourth place in the U.S. National Collegiate Mathematics Championship held in Pittsburgh, PA



Sean Ballentine

I was born and raised in Philadelphia and went to Central High School of Philadelphia. I came to Drexel as a mathematics major and loved every minute of it. I originally wanted to pursue a career in actuarial science but after taking some of my higher math courses I decided that graduate school in math would be best for me. Last year, I helped create the Drexel Actuarial Science Student Association and presided as vice-president since its conception. Also, more recently, I have been an active member of the Mathematics Student Organization and recently became president. I also have a vocal scholarship and sing in the University Chorus and Chamber Singers.

Pi Day

Pi day has become a math department tradition. An afternoon loaded with games, food, fun and farewell wishes for our undergraduate students about to leave for co-op. Each year this event is highly anticipated by all. Pi day has become a great way to wish our students all the best. Pi day 2010 saw the addition of new activity, an integration bee. Students from all majors participated and had a blast.

Social Events

On December 12, 2009 the annual Holiday Reception was held at La Terrasse

On May 21, 2010 the department hosted a farewell party for Margaret Mercer

On June 11, 2010 the College of Arts and Science awarded the department with a champagne and cheese event for high participation in the annual fund campaign