

2006 - 2007 Annual Report
Department of Mathematics
College of Arts & Sciences
Drexel University



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Photo by R. Andrew Hicks

MESSAGE FROM THE DEPARTMENT HEAD

Dear Alumni and Friends,

It has been another great year for our department. It is wonderful to have award winning faculty in the department. Dr. Pavel Grinfeld received the College of Arts and Sciences Excellence Award for both his research and teaching accomplishments, and Ms. Marna Mozeff Hartmann received the Barbara G. Hornum Award for Excellence in Teaching for her dedication to teaching and advising our undergraduates. Also several of our students have been recognized. Teaching Assistants Emek Kose and Jason Aran have won two of Drexel's Teaching Assistant Excellence Awards. In addition, Jason Aran has won our Departmental Al Herr Award for his dedication to teaching. Our undergraduates have been successful as well with our award winning students Nathaniel Beers, Erica Freed, Jacy Moreno and Daniel Szymkowiak, recipients of the Harry E. Muchnic Award; Ravi Bhagat, recipient of the Frank Williams Prize; and Stephen Burghart, winner of the Robert Bickel Award.

As a department we are also growing rapidly. This year Associate Professors Jennifer Morse and Thomas Yu have joined our department. As you will be able to tell from this report, both Dr Morse and Dr. Yu are great assets to our department with their research and teaching accomplishments. Also our undergraduate teaching mission is greatly enhanced by the new auxiliary faculty members, Professors Daryl Falco, Polina Grosman, and Judy Smith.

The department has a lot of plans for the future. Our major initiative is the Financial Mathematics Masters Program that we hope to put in place within the next few years. As one first major step, we put together an Advisory Board for the program, and we had a very productive meeting with them this past February. For our undergraduates we have greatly enhanced our Mathematics Resource Center, which is a drop-in tutoring center. This year our auxiliary faculty started serving in the center along with the teaching assistants who had been doing this previously. The Resource Center has been growing extensively in popularity. This past year we have served all of Drexel's students with 3000 student tutoring hours.

We hope that you are as excited about our department as we are. It would be great to hear your reaction on this annual report, and also we would greatly appreciate your involvement in accomplishing our mission of excellence in research and education.



Thank you and Best Wishes,



Dr. Hugo J. Woerdeman
Professor and Department Head



TENURE-TRACK FACULTY

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

William M.Y. Goh, Ph.D. (Ohio State University) Associate Professor. Number theory, approximation theory and special functions, combinatorics, asymptotic analysis.

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, catadioptrics.

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

Dmitri Kalyuzhnyi-Verbovetskii, 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.

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.

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



AUXILIARY FACULTY

Minerva Catral, Ph.D. (University of Connecticut) Senior Lecturer. Matrix theory, applied linear algebra, functional analysis and operator theory.

Alexander Dolgopolsky, Ph.D. (Case Western Reserve University) Senior Lecturer. Applied mathematics.

James W. Donnelly, M.S. (Drexel University) Coordinator for the Mathematics Resource Center, Senior Lecturer. Math foundations of engineering.

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

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

Polina Grosman, M.S. (Drexel University) Instructor.

Patricia Henry, M.S. (Drexel University) Associate Head of the Mathematics Department, Senior Lecturer. Probability and statistics.

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

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

Marna A. Mozeff-Hartmann, M.S. (Drexel University) Advisor, Instructor.

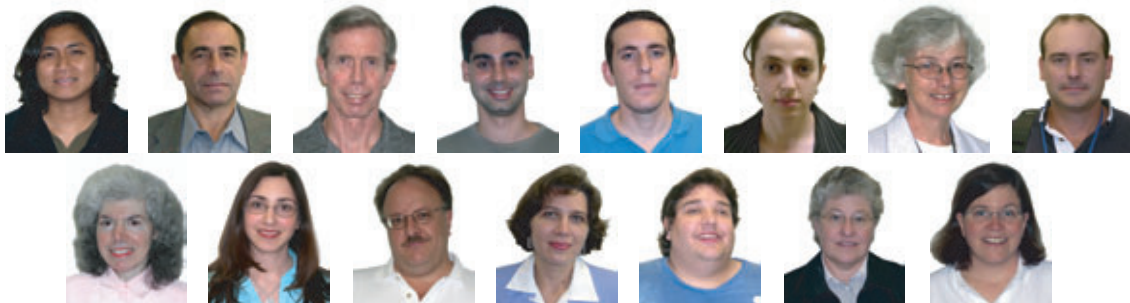
Gregory L. Naber, D.A. (Carnegie-Mellon University) Senior Lecturer. Topology, differential geometry, and mathematical physics, particularly relativity and gauge theory.

Oksana P. Odintsova, Ph.D. (Omsk State University) Senior Lecturer. Math education.

Adam C. Rickert, M.S. (Drexel University) Instructor.

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

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



VISITING FACULTY AND FELLOW

Anatolii Grinsphan, Ph.D. (University of California at Berkeley) Visiting Assistant Professor. Analysis of function theory and operator theory, harmonic analysis, potential theory. Dr. Grinsphan received his Ph.D. in Mathematics from UC Berkeley in 2001 and held a postdoctoral position at Caltech. Before coming to Drexel University he also worked at UC Berkeley and Oklahoma State University.

Alin A. Stancu, Ph.D. (University of Buffalo) Visiting Assistant Professor. Homological and commutative algebra, derived categories and Hochschild cohomology.

Gang Xie, Ph.D. (Rensselaer Polytechnic Institute) Postdoctoral Fellow. Wavelets, subdivision methods, applied mathematics.

EMERITUS FACULTY

Loren N. Argabright, Ph.D. (University of Washington) Professor Emeritus. Functional analysis, wavelets, abstract harmonic analysis, the theory of group representations.

Robert C. Busby, Ph.D. (University of Pennsylvania) Professor Emeritus. Functional analysis, C^* -algebras and group representations, computer science.

Ewaugh Finney Fields, Ed.D. (Temple University) Dean Emeritus, Professor Emeritus. Mathematics education, curriculum and instruction, minority engineering education.

Herman E. Gollwitzer, Ph.D. (University of Minnesota) Professor Emeritus. Applied mathematics, differential equations, data analysis, user interface design, visualization, scientific computing.

Bernard Kolman, Ph.D. (University of Pennsylvania) Professor Emeritus. Lie algebras; theory, applications, and computational techniques; operations research.

Charles J. Mode, Ph.D. (University of California at Davis) Professor Emeritus. Probability and statistics, biostatistics, epidemiology, mathematical demography, data analysis, computer-intensive methods.

Chris Rorres, Ph.D. (Courant Institute, New York University) Professor Emeritus. Applied mathematics, scattering theory, mathematical modeling in biological sciences, solar-collection systems.

Jet Wimp, Ph.D. (University of Edinburgh) Professor Emeritus. Applied mathematics, special factors, approximation theory, numerical techniques, asymptotic analysis.



STAFF

Robert D. Henry: Budget Coordinator



Margaret A. Mercer: Secretary / Receptionist



Alissa R. Morris-Alexander: Program Coordinator



C. Gene Phan: Computer Specialist



TEACHING ASSISTANTS / RESEARCH ASSISTANTS

Jason Aran

Steven (Zack) Murtha

Lei Cao

Christopher Novak

Meredith Coletta

Nattapol Ploymaklam

Taylor Kingsbury

John Vogel

Emek Kose

Wei Wang

Selcuk Koyuncu

Yun Yoo

Salvatore Rodriguez-Martin

Svitlana Zhuravytska

John Matulis

**2006 - 2007
Mathematics
Department**





Professor Daryl Falco: earned his B.A. in Mathematics from Duke University in 1995. Before pursuing his graduate degree, he worked as a computer support technician for Chase Manhattan Bank. During this time he also was a teaching assistant at Hofstra University where he lectured computer programming classes. Daryl started graduate work at Drexel University in 2001. He worked as a research assistant for the Intelligent Time-Critical Systems Laboratory and as a teaching assistant for the mathematics department where he received the Albert Herr Teaching Assistant Award. Daryl earned an M.S. in Mathematics and an M.S. in Computer Science from Drexel University, and he is now an auxiliary professor in the mathematics department. He teaches a variety of undergraduate classes, including algebra, calculus, and discrete mathematics.



Professor Polina Grosman: a Drexel University Alumni, received her Master of Science degree in Mathematics as well as Master of Science Degree in Computer Science in 2002. She has 8 years of experience as an IT professional within the telecommunications industry. Her teaching career began in 1998 as a teaching assistant in the Drexel University Mathematics Department. Since 2002 she taught on a part time basis a variety of calculus and mathematical analysis courses for both working professionals and National Guard personnel within the Goodwin College of Evening and Professional Studies. During the 2006-2007 school year, Polina held a full time position as an Instructor in the Drexel University Department of Mathematics.



Dr. Jennifer Morse: received her PhD in math from U.C.S.D. in 1999. She held a post-doc at the University of Pennsylvania and became an Associate Professor at the University of Miami in 2006. Her work on combinatorial problems arising in geometry, representation theory and physics has been continuously funded by the National Science Foundation and she currently holds the NSF Focused Research Grant.



Professor Judy Smith: received a B.S. in Mathematics Education and an M.A. in Mathematics from West Chester State University. She taught for seven years in public high school and close to twenty years in the Evening College at Drexel University. She also taught for short periods of time at Delaware County Community College, Montgomery County Community College and DeVry University. Previous to joining the full time staff at Drexel, she worked as a test developer for twelve years at Educational Testing Services. At ETS she was mainly responsible for the mathematics section of the computer delivered GRE and the pencil and paper GRE.



Dr. Thomas Pok-Yin Yu: Dr. Yu received both a B.S. degree in computer science and a M.S. degree in mathematics from Purdue University in 1993. He received his Ph.D. in Scientific Computing and Computational Mathematics from Stanford University in 1997. In 1997-1998, he was a postdoctoral fellow at the department of Statistics of Stanford University. He taught at the department of Mathematical Sciences at Rensselaer Polytechnic Institute from 1998-2005 before he joined Drexel. Thomas Yu works in the area of multiscale method for geometric modeling and nonlinear signal processing. In 2000, he was granted a NSF CAREER Award for his work in this area.



FACULTY AWARDS



James Herbert, Pavel Grinfeld, Stephen Director

Dr. Pavel Grinfeld was the 2007 recipient of the *College of Arts and Sciences Faculty Excellence Award*.

Pavel Grinfeld received his PhD in Applied Mathematics from MIT in 2003. Prior to his doctoral studies, Pavel spent three years in the financial industry, including two years with the Global Risk Management group at Merrill Lynch. He spent two years as a postdoctoral fellow at the MIT Department of Earth, Atmosphere and Planetary Sciences conducting research in inner core dynamics and planetary dynamics. He joined the Mathematics Department at Drexel University in 2005. His papers have appeared in *Physical Review Letters*, *Quarterly of Applied Mathematics*, *Philosophical Magazine A*, *Physics of the Earth and Planetary Interiors* and others.



John Dinardo, Marna Mozeff Hartmann, Stephen Director

Ms. Marna Mozeff Hartmann was the 2007 recipient of the *Barbara G. Hornum Award for Teaching Excellence*.

Marna Mozeff Hartmann received both her Bachelor of Science Degree in 1997 and her Master of Science Degree in 1998 from Drexel University. She has been auxiliary faculty in the Department of Mathematics since 1998. As a Teaching Assistant, in 1998 she was the recipient of the Al Herr Teaching Assistant Award, and in 2006 was the recipient of the Barbara G. Hornum Auxiliary Faculty Teaching Award. Marna is also the advisor to the undergraduate Mathematics majors and teaches Math 101 and Math 102.

R. Andrew Hicks, National Science Foundation, IIS 0413012, Micromirror Arrays for Imaging Sensors, 2004-2008, \$340,000

Pawel Hitczenko, National Security Agency, MSPF-04G-054, Probabilistic Methods in Combinatorics and Analysis of Algorithms, 2004-2006, \$66,185

Pawel Hitczenko, National Science Foundation, DMS 0230800, Analysis and Evaluation of Combinatorial Structures and Algorithm, 2003-2007, \$21,000

Georgi Medvedev, National Science Foundation, IOB-0417624, Irregular Firing in Dopaminergic Neurons and Related Problems, 2004-2008, \$263,114

Jennifer Morse, Anne Schilling, Mark Shimozone, 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, Kocak, Huseyin, Pestien, Rosenberg, Sutcliffe, National Science Foundation, DUE 0630894, Computer Science and Mathematics for Scientists 2006-2007, \$467,575

Jennifer Morse, National Science Foundation, DMS 0638625 Refined symmetric functions and affine analogs in combinatorics, 2004-2007, \$111,766

Gregory Naber, Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany, July 2007, Fully funded one month stipend.

Li Sheng, National Science Foundation, CCF 0311413, Physical Mapping: Models, Complexities, and Algorithms, 2003-2007, \$90,000

Hugo J. Woerdeman, National Science Foundation, DMS 0500678, Multivariable Moments and Factorization and Other Problems in Analysis, 2005-2008, \$89,950

Thomas Yu, National Science Foundation, DMS 0542237, Multiscale Data Representatives in Geometric and Nonlinear Settings, 2005-2008, \$149,982



FACULTY APPOINTMENTS / CONFERENCE ORGANIZATION

Robert P. Boyer

- Member, Executive Committee, Mathematics Association of America

R. Andrew Hicks

- Member, Program Committee, 11th IEEE International Conference on Computer Vision ICCV 2007.

Pawel Hitczenko

- Member, Program Committee for ANALCO, New Orleans, Louisiana, January 6, 2007.

Georgi Medvedev

- Editor, Discrete and Continuous Dynamical Systems – Series B.
- Minisymposium Co-organizer, "Stochastic systems with multiple timescales," SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 2007.

Jennifer Morse

- General Member, Mathematical Sciences Research Institute program in Combinatorial Representation Theory, Berkeley, California
- Organizer, American Institute of Mathematics, Generalized Kostka Polynomials, k -Schur functions and LLT polynomials
- Panel Member for FPSAC submissions
- Program Committee Member, Formal Power Series and Algebraic Combinatorics, San Diego, CA, 2006
- Scientific Organizer, East African Summer Schools, Tanzania, Africa, 2006-2008.

Gregory Naber

- Associate Editor, for the Journal of Geometry and Symmetry in Physics
- Associate Editor, for the Journal of Dynamical Systems and Geometric Theories
- Reviewer, for Mathematical Reviews
- Standing Committee, 9th International Conference on Geometry, Integrability and Quantization, Varna, Bulgaria, June 8-13, 2007.

Li Sheng

- Program Committee Member, IASTED International Conference on Computational and Systems Biology CASB 2006 Dallas, Texas
- Co-organizer, DIMACS workshop on "Computational Methods for Predicting Outcome in Cancer," May 29-30, 2007.

Hugo J. Woerdeman

- Editor of SIAM J. Matrix Anal. Appl., 2002 – present
- Editor of the special issue 'Matrix Analysis and Applications' of the International J. of Information & Systems Sciences.
- Co-organizer, "2nd International Workshop on Matrix Analysis and Applications," Nova Southeastern University, Fort Lauderdale, Florida, December 15-17, 2006.

Thomas Yu

- Reviewer for National Science Foundation Proposals
- Organizer, Minisymposium at the "Twelfth International Conference on Approximation Theory," San Antonio, Texas, March 4-8, 2007.

Robert Boyer and William Goh, On the Zero Attractor of the Euler Polynomials, *Advances Mathematics*, 38 (2007), 97-132.

Robert Boyer and Theodore Theodosopoulos, Periodic Attractors of Random Truncator Maps, *Physica A: Statistical Mechanics and its Applications*, 382 (2007), 302-310.

A. Fridman, A. Gutsol, A. Dolgopolsky, E. Stessel, CO₂-free Energy and Hydrogen Production from Hydrocarbons, *Energy and Fuels*, Volume 20, (2006), 1242-1249

P. Chung, J. Clayton, M.M. Cole, M. Grinfeld, Pavel Grinfeld, W. Nothwang, Stress driven rearrangement instability of crystalline films with electromechanical interaction, in: A. Misra, J.P. Sullivan, H. Huang, K. Lu, S. Asif (Eds.) *Mechanics of Nanoscale Materials and Devices*, Res. Soc. Symp. Proc. 924E, Warrendale, Pennsylvania, 0924-Z07-04, (2006).

Anatolii Grinshpan, Monotone functions of abstract chains, *Computational. Methods and Function Theory*, 6 (2006), no. 1, 183-201.

Anatolii Grinshpan, A note on Chebyshev polynomials and finite difference wave equation, *Contemporary Math*, 428 (2007), 57-60.

R. Andrew Hicks, Vasileios T. Nasis, Timothy P. Kurzweg, Programmable imaging with two axis micromirrors, *Optics Letters*, Volume 32, No. 9, (May 2007) 1066-1068.

R. Andrew Hicks, Lead Inventor, Provisional Patent Application No. 60/887,698, Reflective Surface.

S. Corteel, William.M.Y. Goh, Pawel Hitczenko, Local limit theorem in the theory of overpartitions, *Algorithmica*, 46 (2006), 329-343.

S. Corteel, Pawel Hitczenko, Expected values of statistics on permutation tableaux, *Discrete Mathematics and Theoretical Computer Science AD*, 2007, 329-343.

S. Corteel, Pawel Hitczenko, Generalization of Carlitz compositions, *Integer Sequences*, 10 (2007), article 07.8.8, 13.

J.A. Ball and Dmitry.S. Kalyuzhnyi-Verbovetzki, Conservation dilations of dissipative multidimensional systems: The commutative and non-commutative settings. *Multidimens. Syst. Signal Process*, Springer Verlag, 2007.

FACULTY PUBLICATIONS / PATENTS

Georgi Medvedev, Transition to bursting via deterministic chaos, *Phys. Rev. Lett.* 97, 048102 (2006).

Georgi Medvedev and Yun Yoo, Multimodal oscillations in systems with strong contraction, *Physica D*, 228 (2007), 87-106.

L. Lapointe and Jennifer Morse, A k -tableau characterization of k -Schur functions, *Advances in Math*, 213/1 (2007), 183-204.

Jennie C Hansen, Eric Schmutz, Li Sheng, The expected size of the Rule k dominationg set., *Algorithmica*, 46 (2006), no. 3-4, 409-418.

Minmei Hou, Webb Miller, C. Thach Nguyen, Jian Shen, Li Sheng, Louxin Zhang, Approximating the Spanning Star Forest Problem and Its Applications to Genomic Sequence Alignment, *Proceeding of the 18th Annual ACM-SIAM Symposium on Discrete Algorithms*, 2007, 645-654.

E.W. Freeman, C.R. Gracia, H. Lin, D.B. Nelson, G.W. Pien, M.D. Sammel, Li Sheng, Symptoms Associated with Menopausal Transition and Reproductive Hormones in Midlife Women, *Obstetrics and Gynecology* 110(2) (2007), 230-240.

Jeffrey S. Geronimo and Hugo J. Woerdeman, Two-variable polynomials: intersecting zeros and stability. *IEEE Trans Circuits Syst. I Regul. Pap* 53 (2006), no. 5, 1130-1139.

Hugo J. Woerdeman, Interlacing properties or roots of certain biorthogonal polynomials, *J. Approximation Theory* 143 (2006), 150-158.

Shaun M. Fallat and Hugo J. Woerdeman, Refinements on the Interlacing of Eigenvalues of Certain Totally Nonnegative Matrices, *Operators and Matrices* 1, (2007), 271-281.

Gang Xie, Thomas Pok-Yin Yu, Smoothness Equivalence Properties of Manifold-Valued Data Subdivision Schemes based on the Projection Approach, *SIAM Journal on Numerical Analysis*, 45 (2007), no. 3, 1200-1225.

Robert P. Boyer, *Special Function and Orthogonal Polynomials*, invited poster presentation at the AMS Meeting, Tucson, Arizona, April 2007.

Robert P. Boyer, *Euler's Contributions to Analysis, Euler Day*, Drexel University, Philadelphia, Pennsylvania, March 2007.

Robert P. Boyer, *Combinatorial Polynomial Zero Problems*, Analysis Seminar, Drexel University, Philadelphia, Pennsylvania, March 2007.

Minerva Catral, *The Kemeny Constant of an Ergodic Chain*, presented at the International Workshop on Matrix Analysis and Applications, Fort Lauderdale, Florida, December 2006.

Pavel Grinfeld, *Mechanochemistry of Brittle Fracture*, keynote talk ASME Applied Mechanics and Materials Conference, University of Texas at Austin, Austin, Texas, June 2007.

Pavel Grinfeld, *International Symposium on Plasticity*, invited, International Symposium on Plasticity, Girdwood, Alaska, June 2007.

Pavel Grinfeld, *Phase Transformation Waves in Heterogeneous Systems with Solid Phases*, invited Ninth Congress in Computational Mechanics, San Francisco, California, July 2007.

Anatolli Grinshpan, *Higher Rank Numerical Range of a Matrix*, Classical Analysis Conference, University of North Carolina, Chapel Hill, North Carolina, September 7-9, 2007.

Anatolli Grinshpan, *Wigner's Theorem, Lecture*, Analysis Seminar, Drexel University, Philadelphia, Pennsylvania, April 20, 2007 and May 4, 2007.

Anatolli Grinshpan, *Introduction to Random Matrices*, Analysis Seminar, Drexel University, Philadelphia, Pennsylvania, April 2007.

Anatolli Grinshpan, *Polynomials and Convex Sets*, Colloquium, Drexel University, Philadelphia, Pennsylvania, November 2006.

Anatolli Grinshpan, *An Analog of the Gauss-Lucas Theorem for an Electrostatic Model*, Analysis Seminar, Drexel University, Philadelphia, Pennsylvania, October 2007.

Yixin Guo, *Parkinson's Disease and Deep Brain Stimulation*, invited presentation, Mathematical Biology Seminar, New Jersey Institute of Technology, Newark, New Jersey, April 17, 2007.

Yixin Guo, *Breaking the Synchrony in an Ensemble of Bursting Neurons by Multisite Stimulation*, invited presentation, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 28 – June 1, 2007.

FACULTY PRESENTATIONS

R. Andrew Hicks, *Mixed partial derivatives: a threat to automotive safety*, invited talk, Department of Mathematics, Swarthmore College, Swarthmore, Pennsylvania, March 6, 2007.

R. Andrew Hicks, *Direct Methods of Optical Design*, invited talk, Tetrahedral Geometry/Topology Seminar, Lancaster, Pennsylvania, March 30, 2007.

R. Andrew Hicks, *Direct Methods for Freeform Surface Design*, invited, Conference on Novel Optics, SPIE Annual Meeting on Photonics and Optics, San Diego, California, 2007.

Pawel Hitczenko, *Probabilistic Analysis of a Class of WHT Algorithms*, invited, Algorithms and Complexity Seminar, Orsay, France, November 2, 2006.

Pawel Hitczenko, *Permutation tableaux*, invited, Combinatorics Seminar, Lozere, France, January 31, 2007.

Pawel Hitczenko, *Stochastic properties of random permutation tableaux*, invited, Probability Seminar, Warsaw, Poland, February 26, 2007.

Pawel Hitczenko, *Probabilistic Analysis of a Class of WHT Algorithms*, invited, Probability Seminar, Technical University of Warsaw, Warsaw, Poland, February 28, 2007.

Pawel Hitczenko, *Perpetuities*, invited, Quantum Computation Group Seminar, Orsay, France, April 3, 2007.

Pawel Hitczenko, *Limit distribution for the number of parts in partitions with restricted part sizes*, invited, Probability Seminar, Warsaw, Poland, April 19, 2007.

Pawel Hitczenko, *Statistics on permutation tableaux*, invited, 13th International Conference: Random Structures and Algorithms, Tel Aviv, Israel, May 27 – June 1, 2007.

Pawel Hitczenko, *Expected values of statistics on permutation tableaux*, referred, 2nd International Conference on the Analysis of Algorithms, Juan-les-Pins, France, June 17 through June 22, 2007.

Dmitry Kalyuzhnyi-Verbovetskii, *Non-Commutative functions and the Taylor – Taylor formula*, International Conference “Modern Analysis and Applications”, Odessa, Ukraine, April 9-14, 2007.

Dmitry Kalyuzhnyi-Verbovetskii, *Conservative Dilations of Dissipative Multidimensional Systems in the Commutative and Non-Commutative Settings*, invited, International Conference “Characteristic Functions and Transfer Functions in Operator Theory and System Theory”, Beersheva, Israel, July 9-13, 2007.

Dmitry Kalyuzhnyi-Verbovetskii, *Non-Commutative Functions: Algebraic, Analytic, and System-Theoretic Aspects*, invited, Virginia Tech Mathematic Department Colloquium, Blacksburg, Virginia, August 24, 2007.

Georgi Medvedev, *Using one-dimensional maps to analyze neuronal dynamics*, lecture at Dynamical Systems Colloquium, Georgia Tech, Atlanta, Georgia October 2007.

Georgi Medvedev, *Noise-induced bursting*, lecture, Conference on Mathematical Neuroscience, Université de Montréal, Montréal, Canada. September 2007.

Georgi Medvedev, *Discrete models of bursting*, lecture, Dynamical Systems/Nonlinear Science Seminar, Princeton University, Princeton, New Jersey, March 2007

Georgi Medvedev, *Using one-dimensional maps for analyzing neuronal dynamics*, lecture, Mathematics Colloquium, Drexel University, Philadelphia, Pennsylvania, November 2006.

Georgi Medvedev, *Statistics of irregular bursting*, poster, Computational and Systems Neuroscience, Salt Lake City, Utah, February 2007.

Georgi Medvedev, *Statistics of irregular bursting*, poster, Society for Neuroscience Annual Meeting, Atlanta, Georgia, October 2006.

Jennifer Morse, *An update on the k -Schur approach to statistics problems*, invited, Banff International Research Center, Banff, Canada, September 2007.

Jennifer Morse, *Towards a t -compatible affine insertion*, invited, Centre de recherches Mathématiques, Montréal, Canada, May 2007.

Jennifer Morse, *Combinatorial aspects of affine*, invited, Incontro Italiano di Combinatoria Algebrica, Rome, Italy, December 2006.

Jennifer Morse, *Generalized Kostka Polynomials*, Overview on k -Schur functions, invited, American Institute of Math, Palo Alto, California, July 2006.

Jennifer Morse, *Tableaux combinatorics of affine Schubert calculus*, invited, MIT Combinatorics Seminar, Boston, Massachusetts, May 2007.

Jennifer Morse, *How to be discrete in complicated equations*, Dean's Seminar, Drexel University, Philadelphia, Pennsylvania, Spring 2007.

Jennifer Morse, *Symmetric functions and representation theory*, Analysis Seminar, Drexel University, Philadelphia, Pennsylvania, PA, Spring 2007.

Jennifer Morse, *Combinatorics and Affine Schubert Calculus*, invited, Combinatorics Seminar, University of Pennsylvania, Philadelphia, Pennsylvania, November 2006.

FACULTY PRESENTATIONS

Jennifer Morse, *Refined combinatorics and geometry of Schur functions*, invited colloquium talk, Tulane University, New Orleans, Louisiana, March 2007.

Gregory Naber, *Differential Topology and Physics*, invited talk, International Conference of Dynamical Systems 2007, Bolu, Turkey, June 26-30 2007.

Gregory Naber, *Supermanifolds*, short course, Max Planck Institute, Leipzig, Germany, July 1-August 1, 2007.

Eric Schmutz, *Splitting Fields for Characteristic Polynomials of Matrices with Entries in a Finite Field*, A.M.S. Special Session on Number Theory, Hoboken, New Jersey, April 2007.

Alin Stancu, *Hochschild Cohomology and Derived Categories*, presented at the AMS/MAA joint meeting, New Orleans, Louisiana, January 2007.

Hugo J. Woerdeman, *Estimates for inverses of doubly Toeplitz matrices*, invited one hour presentation at the conference "Character Functions and Transfer Functions in Operator and systems theory", Beersheva, Israel, July 9-13, 2007.

Thomas Yu, *A solution to Donoho's Smoothness Equivalence Conjecture*, invited presentation at the MAIA 2007 Conference "Multivariate Approximation and Interpolation with Applications", Alesund, Norway, August 22-26, 2007.

Thomas Yu, *Euler Characteristics and Subdivision Surfaces* presented at *Euler's Day*, Drexel University, Philadelphia, Pennsylvania, March 2007.

Thomas Yu, *Subdivision Schemes of Manifold-Valued Data*, presentation, 12th Conference on Approximation Theory, San Antonio, Texas, March 4-8, 2007.

Winter 2006

MATH 318 – *Math Applications of Statistical Software*

Instructor: **Yihong Zhang**

This course will define the SAS environment, SAS data step programming, frequently used SAS procedures as well as provide many examples of SAS code used in the financial and pharmaceutical industry for students to keep for future reference.

Winter 2006

MATH 633 – *Real Variables I*

Instructor: **Dmitry Kalyuzhnyi-Verbovetskii**

This is a core mathematical course which serves as an introduction to measure theory and integration, and as a base for further studies in function theory, functional analysis and harmonic analysis. It is essential for better understanding of probability theory and approximation theory. The course is intended mostly for graduate students, and also for well motivated senior undergraduate math majors, and as well interested engineering students. It covers topology of the real line, Lebesgue measure, Lebesgue integral, and metric spaces. The course is based on the book by H.L. Royden, *Real Analysis*, 3rd edition, Prentice Hall 1988.

Winter 2006

MATH 680 – *Matrix Completions, Moments and Factorizations*

Instructor: **Hugo J. Woerdeman**

Matrix completion problems are concerned with finding a matrix of which some entries are prescribed and which belongs to a certain class. In this course we shall mainly focus on the class of positive definite matrices, as this class appears in many applications. As an example, the trigonometric moment problem, where a positive valued function defined on the unit circle in the complex plane is sought that has certain prescribed Fourier coefficients, may be viewed as a positive definite matrix completion problem. In this course we will treat these classical problems which have applications in filter design, but we will also encounter some very recent results that appear in the active research area of multivariable moments problems.

Spring 2007

MATH 723 – *Medical Neuroscience*

Instructor: **Georgi Medvedev**

Computational neuroscience is a rapidly growing field of science with promising applications to physiology, medicine, and psychology, to name a few. It uses mathematical and computational modeling for studying how the nervous system functions. After a classical series of papers by Hodgkin and Huxley, nonlinear differential equations became a common framework for modeling electrical activity in neural cells. Now the language and methods of the theory of differential equations and applied dynamical systems are indispensable parts of the theoretical neuroscience.



HONORS DAY AWARDS

The Drexel University College of Arts and Sciences Honors Day was held on May 16, 2007 in the Mandell Theater. This year's winners are:

The Robert Bicket Award - **Stephen Burghart**

The Harry Muchnic Award - **Nathaniel Beers, Erica Freed, Jacy Moreno, Daniel Szymkowiak**

The Frank Williams Prize - **Ravi Bhagat**



Nathaniel Beers started at Drexel in September 2004. He decided to play to his strengths and major in Mathematics. He is considering becoming an actuary; although he would like to have a co-op cycle working with actuaries to see if this truly is what he wants to do. In the 5-year plan, he is currently in his second co-p experience. The first was with Drexel's physics department as a scientific programmer. His current experience is with Monell Chemical Senses Center as an administrative / accounting assistant. Nathaniel received the *Harry E. Muchnic Award* for his outstanding academic performance.

Ravi Bhagat chose to major in mathematics because he was contemplating what to choose back in high school. Initially, he applied to Drexel as a Biomedical Engineer, but before the first day of school, he switched to math. He felt with mathematics he could build a solid foundation that he could delve into any field later on. He chose Drexel because of the co-op program. He had two co-op experiences, the first of which was at Penn Mutual Life Insurance Company, where he was an actuarial analyst, working in the financial reporting/valuations department. His second co-op was at ACE re-Insurance services, where he worked in the collections department. Upon graduating in June, he plans to get a job in the Insurance industry. He hopes to eventually get his graduate degree in Mathematics or Financial Mathematics. Ravi received the *Frank H.M Williams Award* for his outstanding academic performance.



Stephen Burghart enjoyed both Math and Physics in high school, and finally decided to major in Math when he applied to college. He chose Drexel because of the co-op program. He did his co-op at ACE Re-Insurance for his first two co-ops and his third will be as Susquehanna International Group. At ACE Re-insurance, he was a re-insurance collector. At Susquehanna International Group, he will be working at the municipal bond trading desk, reconciling trade tickets. He will graduate in June of 2008, and plans to search for a job, possibly in Financial Mathematics. Stephen received the *Robert J. Bickel Award* for his outstanding academic performance.

Erica Freed started at Drexel in September 2004. After deciding engineering was not for her, Erica chose to simultaneously pursue a B.S. in Mathematics and a M.S. in the Science of Instruction. She has had two co-op experiences, both with the transportation engineering firm, Traffic Planning and Design. There she works with the planning department writing Traffic Impact Studies. She plans on graduating June 2009 after taking next coop off to do volunteer work abroad. Erica received the *Harry E. Muchnic Award* for her outstanding academic performance.

Jacy Moreno started her Drexel career fall 2003 as an Electrical Engineering major, but after doing her first co-op at the Philadelphia Stock Exchange with Susquehanna Investment Group, she decided that she wanted a career in finance. After seeing how extensively mathematics is used in the field of finance, Jacy ultimately chose mathematics as her major. Her second co-op was also at Susquehanna Investment Group on their Index desk where she worked closely with futures and options on futures of various indices. Her third and final co-op is at BlackRock, where she currently assists in the portfolio management of over \$200 billion in money market securities. She graduates June 2008. Jacy received the *Harry E. Muchnic Award* for her outstanding academic performance.



Daniel Szymkowiak spent his freshman year at the Rose-Hulman Institute of Technology in Indiana majoring in chemistry. After taking a year off, he enrolled at Drexel in September, 2006. In January, 2007 he grew tired of wearing goggles and is now pursuing a major in mathematics with a minor in chemistry. Dan has participated in research in several areas, including organometallic catalysis and polymer characterization. Upon graduation in 2009, Dan plans to attend graduate school to study computational finance. Presently, he is on co-op at Rohmax USA, conducting research on viscosity index improvers for automotive lubricants in the technical services research division. Daniel is a recipient of the *Harry E. Muchnic Award* for his outstanding academic performance.



Ravi Bhagat, John Hopkins, Hugo Woerdeman, Marna Hartmann, Daniel Szymkowiak, Patricia Henry, David Kern



Nathaniel Beers, Kyle Binder, Ravi Bhagat, Daniel Szymkowiak, David Kern

GRADUATE STUDENT DAY AWARDS

The Drexel University's Second Annual Graduate Student Day was held on May 17, 2007 in Bossone's Mitchell Auditorium. The following two members of the Drexel Mathematics department were recognized for their teaching excellence: **Jason Scott Aran** and **Emek Kose**



Jason Aran joined Drexel University as a graduate student and teaching assistant after graduating from the University of Pittsburgh in May of 2006. Jason has been a TA for Math 101 and Math 119 and will be the instructor for Math 201 during the summer of 2007. Jason would like to thank all of the instructors with whom he has had the opportunity to work for. He appreciates all of their hard work and dedication to teaching. In addition, Jason would like to thank his fellow graduate students for all of their continued support and encouragement. Currently, Jason is interested in the fields of Number Theory and Algebraic Combinatorics. Jason is the 2007 recipient of the Teaching Excellence Award and the Al Herr Teaching Assistant Award.

Emek Kose had received her BS degree in Mathematics from Middle East Technical University, Turkey in 2001. She joined Drexel Mathematics Department PhD Program in January 2003. Her interest is in Catadioptric Sensor Design. As of now, she is a PhD Candidate and working towards her dissertation, which is to be finished this coming spring. Since January 2003 she has been working as a teaching assistant in the Math Department and received the Albert Herr Award in 2004 and Drexel University Excellence in Teaching Award in 2007.



ALBERT HERR TEACHING ASSISTANT AWARD

Drexel University's Department of Mathematics has established an endowed Teaching Assistant Award in memory of Albert Herr, a distinguished and much-admired faculty member for over thirty years. It is awarded annually to a teaching assistant in the Mathematics Department. The first award was presented in the spring of 1997. Al's family gave a generous initial contribution to the award fund and we hope that Al's many friends, students, and colleagues will add to the fund so that this award will continue to be a worthy testament to Al's contributions to mathematics education.



Jason Aran recipient of the 2007 *Albert Herr Teaching Assistant Award*, presented by **Robert Boyer**.

STUDENT PRESENTATIONS

Daniel Jordan and **Daniel Szymkowiak**, *A Mathematical Model of Gliomas Brain Tumors Using Dendritic Treatments for Cytotoxic T Lymphocytes Stimulation*, oral presentation, Mathematical Association of America local EPaDel Conference, West Chester University, West Chester, Pennsylvania, October 28, 2006.

David Kimsey, *Normal and Commuting Completions*, oral presentation, Mathematical Association of America local EPaDel Conference, West Chester University, West Chester, Pennsylvania, October 28, 2006.

David Kimsey, *Normal and Commuting Completions*, presented, 2nd International Workshop on Matrix Analysis and Applications, Nova Southeastern University, Fort Lauderdale, Florida, December 15-17, 2006.

BACHELOR OF SCIENCE DEGREES

MATHEMATICS MAJORS

Kyle Binder - Magna Cum Laude
Ravi Bhagat - Summa Cum Laude
William Brasch
Manthan Gandhi
Scott Haney - Magna Cum Laude
David Kern - Magna Cum Laude
David Kimsey - Cum Laude
Sean Ripley
Hee-Ryung Moon
Hadiyantros Saputro - Summa Cum Laude

MATHEMATICS MINORS

Christopher Allegra
Archit Baweja
Ekaterina Beregovaia
Jennifer Crowell
Mark Dobbins
Michael Foster
Sonal Gupta
Raffi Hovagimiar
Natalia Karpenko
Nichole Keiper
Zenko Klapko

Daniel Markley
Vinay Mavinkurve
William Morgan
David Oakes
Devang Patel
Sugnesh Patel
Susan Philip
Gwen Roberts
Kenneth Sink
Edward Stehle
David Turner

Matthew Whitehead
Petia Zamfirova
Mark Zuber

MASTERS OF SCIENCE DEGREES

Hung Cheung
Daryl Falco
Benjamin Huddell
Taylor Kingsbury

Salvador Rodriquez-Martin
Steven Zachary Murtha
Yuanning Yu

DOCTOR OF PHILOSOPHY DEGREE

In June of 2007, **Ms. Amal Aafif** presented and defended with success her Ph.D. thesis entitled "*Non-Commutative Harmonic Analysis on Certain Semi-Direct Product Groups*". Her Ph.D. advisor was **Dr. Robert P. Boyer**.

Victor Vinnikov (Ben Gurion University) - September 18, 2006
"Linear Matrix Inequality Representation of Convex Sets"

Ji Gao (Community College of Philadelphia) - October 2, 2006
"Fixed Points and Parametric Geometry in Banach Spaces"

Robert Boyer (Drexel University) - October 12, 2006
"Asymptotic Zero Distributions for Combinatorial Polynomials"

Jiangang Liao (Drexel University) - October 19, 2006
"Logistic Regression for Disease Classification Using Microarray Selection in a Large p and Small n Case"

Michael L. Overton (New York University) - November 9, 2006
"Matrix Distance Problems"

Anatolli Grinshpan (Drexel University) - November 16, 2006
"Polynomials and Convex Sets"

Georgi Medvedev (Drexel University) - November 30, 2006
"Using One-Dimensional Maps for Analyzing Neuronal Dynamics"

Leonid Gurvits (Los Alamos National Laboratory) - December 21, 2006
"Hyperbolic (or Stable) Polynomials and van der Waerden Schrijver-Valiant Like Conjectures"

Jason Silverman (Drexel University) - January 18, 2007
"Accumulation and the Fundamental Theorem of Calculus"

Cora Sadosky (Howard University) - February 1, 2007
"Multi-Evolution Scattering Systems in Analysis and its Applications"

Tony Pantev (University of Pennsylvania) - February 8, 2007
"Approximating Special Kähler Metrics via Projective Geometry"

Alin Stancu (Drexel University) - February 22, 2007
"Special Topics in Homological Algebra"

David Gu (SUNY Stony Brook) - March 1, 2007
"Computational Conformal Geometry and Its Applications"

Jonathan Rubin (University of Pittsburgh) - March 8, 2007
"Giant Squid, Hidden Canard: The 3D Geometry of the Hodgkin-Huxley Model"

Percy Deift (New York University) - March 15, 2007
"Universality for Mathematical and Physical Systems"

DEPARTMENT COLLOQUIA

Rob Manning (Haverford College) - April 5, 2007
"Elastic Rod Contact Problems and Conjugate Points"

Linghai Zhang (Lehigh University) - April 12, 2007
"How many stable pulses can a network support?"

Kostas Daniilidis (University of Pennsylvania) - April 19, 2007
"Matching Images Beyond Correspondence"

Man-Duen Choi (University of Toronto) - April 26, 2007
"My Adventures in Wonderland"

Ilya Spitkovsky (College of William and Mary) - May 3, 2007
"Sets of Matrices with Given Joint Numerical Range"

Doron Zeilberger (Rutgers University) - May 10, 2007
"In How Many Ways Can n (straight) Men Marry n (straight) Women in Such a Way that each Person has Exactly k Spouses?"

Justin Smith (Drexel University) - May 17, 2007
"Homotopical Algebra"

Ron Perline (Drexel University) - May 31, 2007
"Solitons, Smoke Rings, and All That"

Hugo Woerdeman - October 2, 2006

"Gauss-Lucas Theorem"

Anatolii Grinshpan - October 11, 2006

"An Analog of the Gauss-Lucas Theorem for an Electrostatic Model"

Anatolii Grinshpan - October 18, 2006

"An Analog of the Gauss-Lucas Theorem for an Electrostatic Model Continued"

Hugo Woerdeman - October 23, 2006

"Normal Matrices and Gauss-Lucas"

Alexander P. Perry - October 26, 2006

"A Survey of the Quaternions"

Anatolii Grinshpan - October 30, 2006

"Zeros of Harmonic Polynomials"

Alin Stancu - November 6, 2006

"Higher Rank Numerical Ranges"

Hugo Woerdeman - November 13, 2006

"A Brief Introduction to Operator Quantum Error Correction"

Hugo Woerdeman - November 20, 2006

"Separability Problem in Quantum Computing"

Hugo Woerdeman - November 27, 2006

"Minimal Rank Completions"

David Kimsey - December 4, 2006

"Minimal Normal Completions"

Justin Smith - December 11, 2006

"Quantum Computation"

Dmitry Kalyuzhnyi-Verbovetskii - January 19, 2007

"Bessmertnyi Class of Homogeneous Positive Real Functions of Several Variables"

Hugo Woerdeman - January 26, 2007

"Outer Polynomials"

Thomas Yu - February 2, 2007

"Daubechies Construction of Orthogonal Compactly Supported Wavelets"

DEPARTMENT SEMINARS

Victor Vinnikov - February 9, 2007

"Overdetermined 2D systems, two-evolution scattering systems, and spectral analysis of pairs of commuting contractions"

Anatolii Grinshpan - February 23, 2007

"Higher Rank Numerical Range"

Robert Boyer - March 2, 2007

"Combinatorial Polynomial Zero Problems"

Hugo Woerdeman - March 9, 2007

"On the Spans of Polynomials and their Derivatives"

Hugo Woerdeman - March 16, 2007

"Algebraic Matrix Riccati Equations"

Hugo Woerdeman - March 23, 2007

"Convexity Proof for the Higher Rank Numerical Range"

Anatolii Grinshpan - April 13, 2007

"Introduction to Random Matrices"

Anatolii Grinshpan - April 20, 2007

"Wigner's Theorem"

Man Duen Choi - April 27, 2007

"Operator Inequalities"

Anatolii Grinshpan - May 4, 2007

"Wigner's Theorem" (continued)

Hugo Woerdeman - May 11, 2007

"Toeplitz Determinants"

Jennifer Morse - May 18, 2007

"Symmetric Functions"

Dmitry Kalyuzhnyi-Verbovetskii - May 25, 2007

"The Strong Szego Limit Theorem"

David Kimsey - June 1, 2007

"Fredholm Determinants"

Eric Schmutz - June 8, 2007

"Concentration of the Large Eigenvalues of Random Graphs"

Ingrid Daubechies (Princeton University) - January 10, 2007
"Surfing with Wavelets"

Abstract: Wavelets are a new approach used in the analysis of sounds and image, as well as in many other applications. The wavelet transform provides a mathematical analog to a music score: just as the score tells a musician which notes to play when, the wavelet analysis of a sound takes things apart into elementary units with a well defined frequency (which note?) and at a well defined time (when?). For images wavelets allow you to first describe the coarse features with a broad brush, and then later to fill in details. This is similar to zooming in with a camera: first you can see that the scene is one of shrubs in a garden, then you concentrate on one shrub and see that it bears berries, then, by zooming in on one branch, you find that this is a raspberry bush. Because wavelets allow you to do a similar thing in more mathematical terms, the wavelet transform is sometimes called a "mathematical microscope".

Wavelets are used by scientists for many different applications, in a wide range of fields. In addition, wavelets are also finding their uses outside science as well.

The talk will start by explaining the basic principles of wavelets, which are very simple. Then they will be illustrated with some examples.



Hugo Woerdeman, Ingrid Daubechies, Donna Murasko

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Yixin Guo
Ronald Perline
Thomas Yu
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Ronald Perline (winter, spring)

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Dragon Drive Coordinator:

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Barbara G. Hornum Teaching Excellence Award Committee Member:

James W. Donnelly



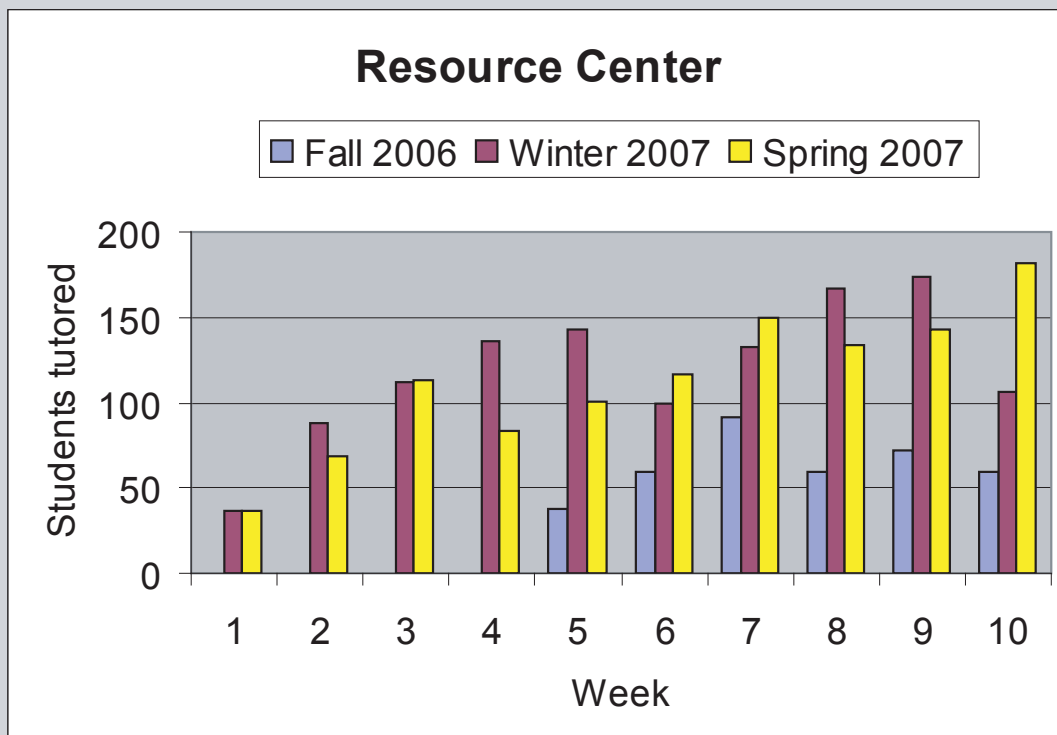
MATHEMATICS RESOURCE CENTER

About 8 years ago Department Head Dr. Nira Herrmann instituted the Resource Room, a drop in tutoring center for our students. An area was set up for this in our common room, Korman 207. There were three alcoves and several large tables where the Teaching Assistants would hold office hours and students could drop in for help. The Resource Room was welcomed by our students right from the beginning and the number of students that used the room quickly increased.

Marna Mozeff was the coordinator of the Resource Room for many years and during that time only the Teaching Assistants would hold office hours in the Resource Room. Under Marna's leadership the hours of the center became more regular and we moved to Korman 245. Also during this period Carol SangtINETTE, an alumna of Drexel's Math Department, met with Nira Herrmann. Ms. SangtINETTE decided to help support the Resource Room. With the donated funds new furniture was purchased and career resources were added to the Resource Room. This support and the new surroundings greatly enhanced its growth and would not have been possible without the generosity of Ms. Carol SangtINETTE.

In September 2006 James Donnelly took over as the administrator of the Resource Room and he introduced the swipe card system. This was the first year that we also asked the non-tenure track faculty to hold office hours in the center. The hours of operation were expanded and in the spring of 2007 we even kept the room open on Tuesday and Thursday evenings until 9:00pm.

Using the swipe card system, we were able to collect data on the use of the Resource Room, and some of the data appears below. Among others, the statistics show how during the academic year 2006-2007 the Resource Room continued to gain popularity. In the Fall quarter the Resource Room averaged 63 students per week with a high of 87 students one week. On average, each student stayed at least one hour for tutoring. In the Winter Quarter these numbers jumped to 120 students per week with a high of 171 students one week. The Spring Quarter saw 113 students per week with a high of 177 students one week.



* Data not available for Weeks 1 - 5 of Fall 2006

Summer Youth Program

Drexel University's Department of Mathematics has co-sponsored a summer program with White Rock Baptist Church in West Philadelphia since 1993, including the summer of 2006. The program was held during the month of July for an average of 40 students between grades 8 and 11. The students took courses in Mathematics, Communication Skills, and Computer Science. The courses were taught by a combination of college professors and high school teachers. Over the years of the program students have been exposed to cultural activities in Philadelphia, New York, Baltimore, and Washington DC. This has been a win-win situation for Drexel University, since many top students in the program enrolled at Drexel's College of Engineering, College of Arts and Sciences, and the LeBow College of Business. Four \$1000 scholarships were reserved by Enrollment Management for the highest performing students. The campus director for this program for the past thirteen years has been Dr. Ewaugh Finney Fields, Department of Mathematics (Emeritus).

Junior High School Project

In the Fall of 2005 Alex Perry, then a Junior at Upper Darby High School, contacted the Department of Mathematics at Drexel in search of a faculty member to guide some additional studies in mathematics. After consultation with Dr. Woerdeman it was decided that the subject of quaternions would provide Alex with a good opportunity to learn some significant mathematics that could be taken in either a theoretical, or a more practical direction. Dr. Gregory Naber, a faculty member with some experience in the area was located and Alex spent the next year studying the subject and writing a 46 page report that contained not only an exposition of the basics of quaternion algebra and geometry, but a number of original contributions that he was able to prove on his own. He gave a 50 minute lecture to the Mathematics Department of Drexel on October 26, 2006, that was very well-received by both faculty and students. Alex also presented the results of his research in a 10 minute talk at a regional meeting of the Mathematical Association of America held October 28th, 2006, at West Chester University of Pennsylvania. Alex is currently taking Real Analysis classes at Drexel and plans on an Independent Study course in Number Theory during the Spring term. He is also submitting applications to study Mathematics at such Universities as Harvard, Princeton, Chicago, and Carnegie-Mellon.

Donations

The department donated furniture and computers to St. Joseph Baptist Church in Philadelphia and books to the Sponsor-A-Scholar Summer Institute by Philadelphia Futures.

2007 Philadelphia MathCounts Chapter Competition

MATHCOUNTS is a national math enrichment, coaching and competition program that promotes middle school mathematics achievement in every U.S. state & territory. With over 23 years experience, MATHCOUNTS is one of the most successful education partnerships involving volunteers, educators, industry sponsors and students. MATHCOUNTS is sponsored by the National Society of Professional Engineers, the National Council of Teachers of Mathematics, the CAN Foundation, Lockheed Martin, Raytheon Company, Texas Instruments Incorporated, General Motors Foundation, 3M Foundation, Northrop Grumman Foundation and National Aeronautics and Space Administration (NASA). The 2007 Philadelphia MATHCOUNTS Chapter Competition took place on Saturday, February 10, 2007, and Drexel's Mathematics Department provided several volunteers to grade the submissions by middle school students, including faculty members Kyriacou, Medvedev, Mozeff, Price and Yu. The need to have independent graders comes from their desire to refrain from having any issue arise concerning volunteer scorers checking papers of schools which they have any acquaintance to the coaches or competitors.

The Women in Math and Science (WIMS) Organization

The organization, Women in Math and Science (WIMS), wrote their constitution in 2006. Drexel's Mathematics Faculty member Elaine Kyriacou served as faculty advisor. It was approved by Drexel's Office of Campus Activities and WIMS officially became recognized as a campus organization. WIMS participated in MATHCOUNTS where they helped administer tests to middle school participants. In March 2007, for Women's History Month, the members gave presentations on three famous women in Mathematics and the Sciences. Members also participated in "Activities Unlimited" to promote WIMS, emphasizing its goals. WIMS members also participated in a tutoring program at Drexel called, SquashSmarts. SquashSmarts combines the sport of Squash with Academic Tutoring and Mentoring of under-served, urban youth in order to develop self-esteem and discipline through academic, athletic and personal achievement. The tutoring program was held near the University's squash courts and offered tutoring in elementary algebra to seventh and eighth graders.

As we are planning to start a Master's program in Financial Mathematics, the department formed an advisory board. We met for the first time on February 27, 2007 at the Pallett Restaurant in the Sheraton University City Hotel where we had a very useful exchange regarding our plans.

The advisory board members are:

John Breit: is a Managing Director at Merrill Lynch. He is currently head of Global Markets Risk Advisory, providing in-business risk management for the trading areas of the firm. He also is in charge of the Derivatives Analytics group, responsible for the 'quants' who build most of the trading models. John was previously head of Corporate Risk Management at Merrill and DLJ.

John received his PhD in particle theory from Columbia in 1982 and had post-docs at the Institute for Advanced Study in Princeton and at the University of Pennsylvania before abandoning physics for Wall Street.

Janice Giannini: brings 25 years of corporate executive expertise from General Electric, Lockheed Martin and Arbitron to Paradigm Associates. Identified early on as a "fast tracker", she has had P&L responsibility spanning multiple functional areas and disciplines. Her wide-ranging Director level assignments have encompassed program management, global sourcing, information technology, systems engineering, and corporate ethics. Prior to joining Paradigm, Janice served as CIO in two publicly held firms. Immediately prior to joining Paradigm, Janice was EVP/CIO of Arbitron; a global information media company best known for its radio listener ratings. As an executive officer, she helped guide the company through a reverse spin, thus establishing itself as a separate company on the NYSE.

Janice is an accomplished public speaker with experience in a wide variety of business sectors and venues. She has addressed forums ranging from small groups to approximately one thousand participants. Her topics typically reflect her pragmatic outlook and style, ranging from aligning strategy with operations, to planning and motivation.

Robert Miccolis: FCAS, MAAA is currently the Director of Deloitte Consulting LLP and has over 35 years of actuarial experience. Mr. Miccolis specializes in consulting in the areas of insurance, reinsurance, risk management, mergers & acquisitions, and actuarial services. He has expertise in all major lines of property & casualty insurance and reinsurance, as well as financial guaranty, mortgage insurance, crop insurance, weather derivatives, asbestos and environmental, professional liability, credit insurance, alternative market mechanisms (captives, risk retention groups, etc.), loss portfolio transfers, and finite risk reinsurance.

FINANCIAL MATHEMATICS ADVISORY BOARD

Charles Rose: is an Executive Vice President at Karr-Barth Associates in Bala Cynwyd, PA. Mr. Rose has been with the firm for over 30 years. He is a Chartered Life Underwriter and is also a Chartered Financial Consultant. Karr-Barth offers estate conservation, business planning, disability insurance, discount brokerage services and many other financial services. Karr-Barth is also the broker dealer and investment advisor for AXA Financial, Inc., a member of the global AXA Group, which provides financial protection and wealth management services to 50 million clients in 50 countries.

In 2004, Mr. Rose was elected to the Board of Directors for the Arden Theater. He also serves on the Board of Directors for the America-Israel Chamber of Commerce and the Philadelphia Board of Trustees for The Wellness Community. In the past, he has served on the 2001 Musser Tribute Committee and held a position on the board of the Greater Philadelphia Chamber of Commerce. As a Drexel alum, Mr. Rose serves on the Advisory Board of the College of Arts and Sciences and is a member of the A.J. Drexel Society. In addition to his main professional work, Mr. Rose owns a wine store called Corkscrewed in Cherry Hill, NJ. He is an avid wine collector and has 2,500 bottles of wines in his wine cellar.



Pavel Grinfeld, Charles Rose, John Breit, Janice Giannini
Robert Miccolis, Patricia Henry, Robert Boyer, Hugo Woerdeman

STUDENT ACTIVITIES



Mathematical Association of America local EpaDel Conference at West Chester University
October 28, 2006

- Joshua Karstendick
- Bill Gallagher
- David Kimsey
- Marna Mozeff Hartmann

Garden State Undergraduate Mathematics Conference at Rowan University
March 31, 2007

- Daniel Szymkowiak
- Marna Mozeff Hartmann
- Joshua Karstendick
- Daniel Jordan
- Ravi Bhagat
- John Stake



Halloween Party - October 27, 2006



Pi Day - March 14, 2007



Drexel University Chapter of SIAM
Euler Day 2007 - March 23, 2007

"Euler, his life and the times"
Justin Smith

"Euler Characteristics and Subdivision Surfaces"
Thomas Yu

"Euler's Contributions to Analysis"
Robert P. Boyer

Drexel University Math Bytes
*Graduate Student Organization for
Computer Science and Mathematics Majors*

Math Bytes seeks to promote interest and research in the field of Applied and Computational mathematics. To stress the importance of mathematics in other related fields, such as computer science, computational finance, computational biology and engineering.



DEPARTMENT SOCIAL EVENTS

September 30, 2006 - Potluck dinner party hosted by the Woerdemans
December 13, 2006 - Annual holiday party held at Ecco Qui
June 14, 2007 - Annual end of the year party held at Ecco Qui



SUPPORT DREXEL UNIVERSITY MATHEMATICS DEPARTMENT

The dedication, commitment and generosity of individuals like you is tremendously important to our department, its students, and faculty. One of the department's main goals is to improve its ranking. We are currently a Group III department.

In order to increase our overall ranking it is essential that others in the field are aware of our achievements. This process is helped tremendously by: (i) bringing in visitors for an extended period of time for research interactions (ii) having highly successful Ph.D. students (iii) making our faculty visible by supporting their travel and research and (iv) bringing in highly visible speakers. Your dedication and support will help to reach our goals.

Our funding priorities include:

- named visiting professorship
- named scholarship for graduate student
- named endowed professorship
- named lecture series

Each of these priorities will help to increase our visibility within the Mathematics community while recruiting the very best faculty and graduate students, thus improving the educational and academic environment for our outstanding undergraduates.

The College staff will work closely with you and your financial advisers to ensure your philanthropic and personal goals are achieved.

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For more information on any of these giving vehicles, please contact either me or my director of development:

Michael Andrulis
Director of Development
College of Arts & Sciences
Drexel University
3141 Chestnut Street, Suite 310
Philadelphia, PA 19104
215.895.6481
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Additionally, I welcome you back to the Department to learn more about the educational and research environment. It is always encouraging to hear from our alumni and friends and to have them meet our faculty and students. To schedule a visit, please contact either me or Mike Andrulis. I look forward to hearing from you!

Sincerely,



Dr. Hugo Woerdeman
Professor and Department Head
(hugo@math.drexel.edu, 215-895-2668)