PURDUE UNIVERSITY

Math PUrview

Newsletter of the
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IN THIS ISSUE

Math PUrview is published annually for alumni and friends of the Purdue Mathematics Department. We welcome comments and suggestions for future newsletters.

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Cowen Appointed IUPUI Science Dean

Professor Carl Cowen will become Dean of Science at Indiana University–Purdue University, Indianapolis on August 1.

Carl Cowen

Cowen received A.B. and M.S. degrees from Indiana University and in 1976 earned a Ph.D. in mathematics from the University of California, Berkeley. He spent two years at the University of Illinois before joining the Purdue Mathematics Department as assistant professor in 1978. He was promoted to full professor in 1989 and in 1992 became Director of Purdue's Actuarial Science Program. During his five years as director, Cowen increased engagement with the insurance industry, and the actuarial science program grew in size and strength. During his tenure as head of the Mathematics Department (1997-2002), the department received a National Science Foundation "Vertical Integration of Research and Education" (VIGRE) award and a Department of Education "Graduate Assistance in Areas of National Need" (GAANN) award, which increased support for faculty and student research activities.

Throughout his university career, Cowen has been highly successful in the classroom while teaching a wide range of courses at all levels. In 1986 he received the School of Science Outstanding Undergraduate Teaching Award, and in 1997 was the winner of a Mathematical Association of America "Deborah and Franklin Tepper Haimo Award for Distinguished College or University Teaching of Mathematics." Cowen has directed 10 Ph.D. students in mathematics and has supervised numerous undergraduate research projects, many of them with support from NSF's Research Experience for Undergraduates program.

Cowen is the author of numerous research papers and, with Barbara D. MacCluer, of the book *Composition Operators on Spaces of Analytic Functions* (CRC Press, Boca Raton, 1995). His research interests include operators on Hilbert space, analytic functions, matrix analysis, and recently he has begun research in mathematical neurobiology (see article on page 9).

The School of Science at IUPUI currently has 1660 undergraduate and graduate students enrolled in 30 degree programs and one certificate program. In addition to his new post there, Cowen will begin a two-year term as President of the Mathematical Association of America in January 2005.

Leonard Lipshitz

Greetings from West Lafayette. I hope you will enjoy this issue of our newsletter, which highlights departmental activities and developments during the past year.

Research mathematicians are a diverse group, representative of many nations and cultures, but closely bound by their common interests in mathematics. As is typical of mathematics departments worldwide, we host a large number of visiting mathematicians throughout the year. Some visitors have faculty appointments for one or more semesters, but more frequently, visitors spend a few days or weeks here to take advantage of our excellent mathematical sciences library, participate in departmental seminars, and work on problems with their Purdue colleagues. Below is a list of new faculty who will arrive here in August; in addition, dozens of other mathematicians from the U.S. and abroad will find their way to Purdue during the next year to exchange and share ideas.

Another way in which mathematicians interact is by gathering periodically at conferences that focus on specific areas of mathematics. Earlier in the summer, the department hosted two international conferences, about which you will read on pages 4 and 10. In the fall we will host a topology conference in honor of Professor Clarence Wilkerson's 60th birthday.

Our mathematics B.S., M.S., and Ph.D. graduates are making their mark around the globe in various professions. I hope that as you read about the contributions and accomplishments of our current faculty and students, you will recall the time you spent at Purdue with a sense of pride in having been a part of Purdue's rich mathematics culture.

— Leonard Lipshitz, Head

New Faculty	*Research Area*	*Coming from*
Associate Professor (with tenure)		
Yi-Jen Lee	mathematical physics, gauge theory symplectic geometry	Princeton, IAS, MSRI
Assistant Professor (tenure track)		
Edray Goins	number theory, algebraic geometry	California Institute of Technology
Research Assistant Professor (3 yr.)		
Jose E. Figueroa-Lopez	math finance, stochastic processes	Georgia Tech
Roman J. Sasyk	functional analysis, ergodic theory	UCLA
Yanqiu Wang	applied math	Texas A&M
Visiting Faculty		
Tilak Bhattacharya	analysis, nonlinear pde	Bishop's University, Quebec
Natalia Blank	mathematics education	University College Stavanger, Norway
Yashowanto Ghosh	probability	University of Florida
Colin Guillarmou	spectral and scattering theory, pde	University of Nantes
Zbigniew Jelonek	algebraic geometry	Instytut Mat. PAN, Poland
JaEun Ku	numerical analysis	Cornell University
Seon Gan Lim	cryptography	Korea Information Security Agency
Winston Chih-Wei Ou	harmonic analysis	Indiana University
Loren Spice	representation theory	University of Chicago
Robert Szoke	complex analysis	Eötvos L. University, Hungary
Alexander Ulanovskii	function theory	University College Stavanger, Norway
Ik Kwon Yie	algebraic geometry	Inha University, Korea

Shau-Wai Lam
2004 Distinguished Alumnus
B.S. 1963; M.S. 1964

Shau-Wai Lam was among nine School of Science alumni honored at a banquet hosted by Dean Jeffrey Vitter on April16 at University Inn and Conference Center in West Lafayette.

Shau-Wai Lam

Lam is president and CEO of the DCH Auto Group in New Jersey. He joined the Dah Chong Hong Trading Corporation in 1967, working in international trade. In 1977, DCH began to venture into automobile retailing with its first dealership in New Jersey, and Lam launched DCH's Western Region in 1979.

After his appointment as President of DCH in 1988, Lam continued to lead the company's expansion to 25 dealerships in California, New Jersey and New York, with sales exceeding $1 billion. The DCH Auto Group has won numerous awards from its franchisers, as well as 25 J.D. Power and Associates Certified Retailer awards for outstanding sales experience.

Lam received the 2004 Time Magazine Quality Dealer Award for New Jersey. He serves as director of the Toyota-Lexus Minority Dealers Association, the New Jersey Chinese-American Chamber of Commerce, the Hong Kong Association of New York, and the American Friends of Shanghai Museum.

Students get SAGE advice . . .

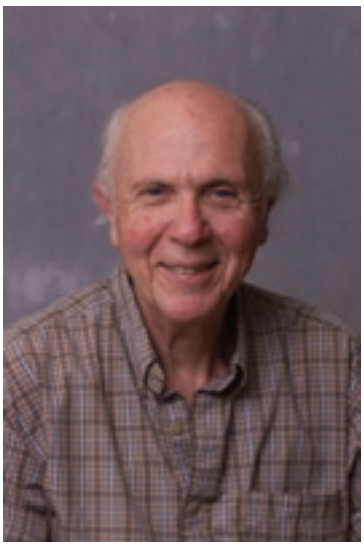
. . . from the Mathematics Department on-line homework system, known as Student Assignments Graded Electronically (SAGE). The program is easy for students to use and indicates immediately whether an answer is correct or incorrect. If the answer is incorrect, multiple tries are allowed, at no penalty, until the correct answer is found. Problem sets are individually generated for each student, and the problem set does not change no matter how many times a student logs in or out. A student can print out his/her questions, log out, work them, log back in, and test the answers. Written by Prof. Brad Lucier, the program has been used in MA 154 since spring 2003 and is being developed for use in MA 153 starting spring 2005.

Retirement
Justin J. Price

The Mathematics Department celebrated the 50-year career of Professor Justin J. Price at a retirement dinner held at the Purdue Memorial Union on June 12.

Price received his Ph.D. in 1956 at the University of Pennsylvania, where he continued as a research associate on an Air Force contract for two years. He then was an assistant professor at Cornell and came to Purdue in 1963 as associate professor. He was promoted to full professor in 1968. Over the years, Price spent sabbaticals and professional leaves at Paris, University College London, University of California Berkeley, and Harvard.

Price's first research interests were in real analysis and especially orthogonal expansions. He produced a series of papers that appeared in top journals including *Proceedings* and *Transactions of the AMS*, *Michigan Math. Journal*, *Illinois Journal of Mathematics*, and *Annals of Mathematics*.



Justin J. Price

In the second part of his career, Price extended his already well-known talents for exposition and pedagogy. On his own and jointly with Harley Flanders, he produced a series of successful calculus and algebra texts. In 1976 he was awarded a Lester R. Ford Award for Expository Writing by the MAA for the paper "Topics in Orthogonal Functions" (*MAA Monthly*, 1975).

Of the many teaching awards won by Price, perhaps the most noteworthy was the MAA national award for distinguished college and university teaching in 1994. This was one of only three national awards made. The award recognizes the importance of Price's long insistence that in order to learn mathematics students must learn to express their mathematical thoughts clearly in writing—a simple but profound point of view.

In the 1990's Price was the PI of a major NSF grant aimed at improving the preparedness of Indiana mathematics teachers.

Faculty and staff in the Mathematics Department will miss seeing J.J. Price—scholar, teacher, expositor, and always, gentleman and good colleague—on a daily basis.

Department Hosts Lipman-Fest: A Conference in Honor of the 65th Birthday of Joseph Lipman

Joe Lipman (second row, fourth from left) outside the Math Building with his many colleagues and friends.

A recent conference in honor of Joseph Lipman on the occasion of his 65th birthday celebrated his groundbreaking contributions to both commutative algebra and algebraic geometry.

The Midwest Commutative Algebra and Geometry Meeting was held at Purdue May 17-21, 2004. The themes of the conference were loosely grouped around Lipman's research interests: resolution of singularities, singularity theory, Rees algebras and Briançon-Skoda theorems, and duality theory and homological algebra.

Organized by William Heinzer, Craig Huneke, and Bernd Ulrich, the conference continued a tradition of commutative algebra and algebraic geometry meetings in the Midwest. NSF, MSRI, and Purdue provided support.

Joseph Lipman

Joseph Lipman has made important contributions to both algebraic geometry and commutative algebra. He has 51 publications, including *Collected Papers of Joseph Lipman* in two volumes (622 pp. and 905 pp.) published by Queens University Press, Kingston, Ontario, 2000.

Lipman received his B.A. from the University of Toronto in 1960 and his Ph.D. from Harvard in 1965. Oscar Zariski was his advisor.

He came to Purdue in 1966 as an assistant professor and was promoted to associate professor in 1968 and to professor in 1972. He has held visiting positions at Columbia, Harvard, Cambridge, Nice, and MSRI.

At Purdue, Lipman has supervised 13 Ph.D. students. He served as Acting Department Head in 1984-85 and as Head 1987-92. He has also performed extensive service to the larger profession, serving on organizing committees for Oberwolfach meetings, on various AMS committees, including the Rochester Task Force in 1996, and on the editorial board of a research text in tribute to Oscar Zariski.

Lipman has played a major role in guiding the development of algebraic geometry and commutative algebra at Purdue for more than 30 years. Our department's continued strength in both subjects is a testimonial to his good sense and sound professional judgment.

List of Conference Speakers

Leo Alonso
Donu Arapura
Michael Artin
Luchezar Avramov
Chunsheng Ban
Edward Bierstone
Ragnar Buchweitz
Antonio Campillo
Brian Conrad
Alberto Corso
Steven Dale Cutkosky
Sankar Dutta
David Eisenbud
Hubert Flenner
Robin Hartshorne
Herwig Hauser
Melvin Hochster
I-Chiau Huang
Steven Kleiman
Gennady Lyubeznik
Juan Migliore
Uwe Nagel
Suresh Nayak
Claudia Polini
Paul Roberts
Pramathanath Sastry
Bernard Teissier
Wolmer Vasconcelos
Orlando Villamayor
Jonathan Wahl
Ulrich Walther
Keiichi Watanabe
Jaroslaw Wlodarczyk

Wlodarczyk Appointed Faculty Scholar

Jaroslaw Wlodarczyk

Associate Professor **Jaroslaw Wlodarczyk** has been appointed a University Faculty Scholar by Provost Sally Mason. The honor recognizes outstanding accomplishments by faculty mid-way through their academic career and carries with it $10,000 per year of discretionary funding for the recipient's research program.

Wlodarczyk's work on the factorization of general birational maps is a major achievement that has attracted a great deal of attention. His 2000 paper "Birational cobordisms and factorization of birational maps (*J. Algebraic Geom.*, 9(3); 425-449) provided the machinery for the solution of the 40-year-old factorization problem in two important papers—one joint with Abramovich, Karu, and Matsuki (*J. of the AMS,* 15 (2002); 531-572) and the other "Toroidal varieties and the weak factorization theorem" (*Inventiones mathematicae*, 154 (2003); 223-331).

Alumni Gifts are Important to Us!

As we continually work to improve the quality of our programs, one of our goals is to increase the amount of money available for departmental student activities and scholarships. We appreciate the support of those who currently help mathematics students, and we hope many of our alumni and friends will consider designating the Mathematics Department for future gifts.

Mathematics Undergrads Recognized by the School of Science

School of Science Outstanding Seniors: Jennifer Kowall, Paul Kuliniewicz, Kristofer-Roy Reyes, Jeanette Roell, Benjamin Zwickl

School of Science Outstanding Achievement Award: Scott Burdick, Steven Hood, Amber Meyerratken, Paris Miles-Brenden, Bess Walker

School of Science Alumni Outstanding Achievement Awards: Paris Miles-Brenden (junior); Scott Burdick, Bess Walker (sophomores); Steven Hood, Amber Meyerratken (freshmen)

Bess Walker, Jeanette Roell, Jennifer Kowall, Paris Miles-Brenden

Arlie Petters, Professor of Mathematics and Physics at Duke University, lectured in the mathematics auditorium on March 30, 2004. His talk was sponsored by the School of Science Minority Scientist Lecture Series, which each year brings a distinguished minority scientist to Purdue to interact with faculty and students.

Arlie Petters

Petters spoke on "Violation of the Magnification Theorem in Gravitational Lensing" before a diverse audience of mathematicians, physicists, and astrophysicists. Gravitational lensing is the relativistic effect where a massive object (like a galaxy) "bends" the light rays from objects behind it and acts like a lens.

Student Awards

Mathematics Awards

Eugene V. Schenkman Memorial Award	Michael Reschly
Glen E. Baxter Memorial Award	Jason Anema
	Damir Dzhafarov
Michael Golomb Mathematics Award	Jeanette Roell
Meyer Jerison Memorial Award in Analysis	Daniel O'Malley
Gerald R. MacLane Memorial Award	Bartlomiej Siudeja
Merrill E. Shanks Memorial Award	Mike O'Connor
Mathematics Department Achievement Award	Damir Dzhafarov
Senior Achievement Award	Christopher Connor
	Seth Streitmatter
	Samuel Vaughn

Problem of the Week Recognition

Chad Aeschliman	Akira Matsudaira
Al-Sharif Talal Al-Housseiny	Jignesh Vidut Mehta
Nitin Alreja	Neel K. Mehta
Michael C. Chang	Paris Miles-Brenden
Trushal V. Chokshi	Adam Welborn

Prof. Kenji Matsuki presented the Mathematics Department Achievement Award to junior Damir Dzhafarov.

Mathematics award winners Samuel Vaughn, Daniel O'Malley, Jeanette Roell, Michael Reschly, Christopher Connor.

Professor Bob Zink, Baxter Award winners Jason Anema and Damir Dzhafarov, Professor Mary Ellen Bock.

Left: Professor Emeritus Michael Golomb recognized Purdue students for solving "Problems of the Week" during the year.

Professor Golomb recently announced that he is stepping down as administrator of the long-standing problem series.

Since we began publishing "Problem of the Week" on our department web site, solutions have been arriving from all over the world — over 50 countries to date. (http://www.math.purdue.edu/pow/pow.cgi)

Award-winning students and scholarship recipients were recognized at the annual Mathematics Department awards program on April 30.

Scholarship recipients: (front row) Brenda Banning, Bess Walker, Jason Anema. (back row) Megan Barr, Kyle Riggs, Sally Diekelman, Damir Dzhafarov.

Left: Christopher Connor, Seth Streitmatter, Samuel Vaughn.

Below: Actuarial Science program director Richard Penney with Sebastian Kleber, the recipient of a Towers-Perrin Scholarship.

Ingeborg MacLane with the winner of the Gerald R. MacLane Memorial Award, Bartlomiej Siudeja.

Mathematics Scholarships

Alton D. and Juanita S. Andrews Memorial Scholarship
- Bess Walker

Leonard D. and Anna W. Berkovitz Scholarship
- William George

Mark Hoppy Memorial Scholarship
- Brenda Banning

Meyer Jerison Scholarship
- Zachary Catlin
- Erin Meyer
- Luobei Zhu

Virginia Mashin Scholarship
- Elizabeth Hamrick

Arthur Rosenthal Scholarship
- Ashwin Adhikari
- Jason Anema
- Megan Barr
- Lisa Bramer
- James Martindale
- Jenni Prior
- Kyle Riggs
- Christopher Schreiner
- Kenneth Wakeland

Jean E. Rubin Scholarship
- Lee Ballard
- William George
- Scott Mueller
- Michael Munson
- Bradley Rodgers
- Christopher Sheper
- David Weissenborn

Helen Clark Wight Scholarship
- Sally Anne Diekelman
- Jessica Larson
- Deborah Simon

Actuarial Science Awards

Lincoln Scholarship
- Jenni Prior

Towers-Perrin Scholarship
- Sebastian Kleber

CIGNA Scholarship
- Mohd Hafiz Ab Hamid

CIGNA Exam Awards
- Neal Drasga
- Darci Eby
- Laura Hodge
- Jacqueline King
- Sebastian Kleber
- Evi Laksana
- Uzair Muhammad
- Jenni Prior
- Jeanette Roell
- Vikas Shah
- Ashlee Shellenbarger
- Hsiao-Fan Tang
- Wendy Thompson
- Kathleen Ward
- Zachary White

Accolades

Papers from **Shreeram S. Abhyankar's** 70th Birthday Conference appear in *Algebra, Arithmetic and Geometry with Applications* (Springer, 2004). Edited by C. Christensen, G. Sundaram, A. Sathaye, and C. Bajaj, the volume is the proceedings of a conference held at Purdue July19-26, 2000. The book offers an outstanding collection of papers by experts in algebraic geometry, singularities, group theory, Galois theory, combinatorics, Drinfield modules, affine geometry, and the Jacobian problem.

Alumnus **Kevin Clancey** (Ph.D. Purdue 1969, advisor C. Putnam) of the University of Louisville will become the Executive Editor of *Math Reviews* on August 1. Clancey was a faculty member for many years at University of Georgia, where he served as department head from 1995 to 2001. He also served as program officer at the National Science Foundation from 1993 to 1995. In 2001, he became the Chair at the University of Louisville, to help start a new Ph.D. program.

Associate Professor **Donatella Danielli** is the recipient of a "Teaching for Tomorrow Award," made possible by Purdue's Classes of 1944 and 1945. Danielli and other Purdue faculty will over the next year address topics related to teaching and student learning. In recognition of past accomplishments and future commitment to the program, recipients are awarded $500 in faculty development funds.

Associate Professor **Zhilan Feng's** proposal entitled "Mathematical approaches for the study of control of emerging/re-emerging infectious diseases" was selected to receive a 2004 Showalter Grant Award. Feng's project will be funded in the amount of $66,666 for one year.

Each year the Showalter Trust provides $522,200 to Purdue investigators to support research in selected areas of research, including the use of the computer in the measurement of biological processes, in the collection, recording, analysis, and interpretation of data.

Professor **Laszlo Lempert** was elected to the Hungarian Academy of Sciences. Members of the Academy are consulted on issues regarding science policy.

Professor **Jim McClure** was named one of the top ten teachers for 2003-04 by juniors and seniors in the School of Science.

Professor **Fabio Milner** is the recipient of a Purdue "Faculty Program of Study in a Second Discipline" award for 2004-05. Milner will use the award to further develop mathematical modeling for biomedical research. He also will develop a graduate level course in mathematical models for immunology and cell biology.

Graduate student **Mark Ward** was invited to attend the Mathematical Association of America Board of Governors meeting at MathFest 2003 in Boulder. He wrote about his experience, "Eight Hours with the Board," for the November 2003 issue of the MAA publication FOCUS.

Mathematics Department TAs were among those honored by the university during this past year. **Lucian Sega** received a 2004 Purdue Graduate Student Government Distinguished Teaching Assistant Award. **Su-Jeong Kang** was honored on April15 at the annual Celebration of Graduate Student Teaching banquet, sponsored by the Committee for the Education of Teaching Assistants, the Teaching Academy, and the Office of the Provost.

Faculty Receive Spira Awards

Gregery Buzzard

Greg Buzzard, **Laszlo Lempert**, and **E.C. Zachmanoglou** were the recipients of 2003-04 Spira Awards for outstanding faculty teaching in the Mathematics Department.

Buzzard and Zachmanoglou—recognized as outstanding undergraduate course teacher and outstanding calculus lecturer, respectively—were selected on the basis of an online polling of all undergraduates in the School of Science conducted by the School of Science Student Council. The Council chose the winners based on the number of votes and accompanying testimonials.

E.C. Zachmanoglou

Laszlo Lempert

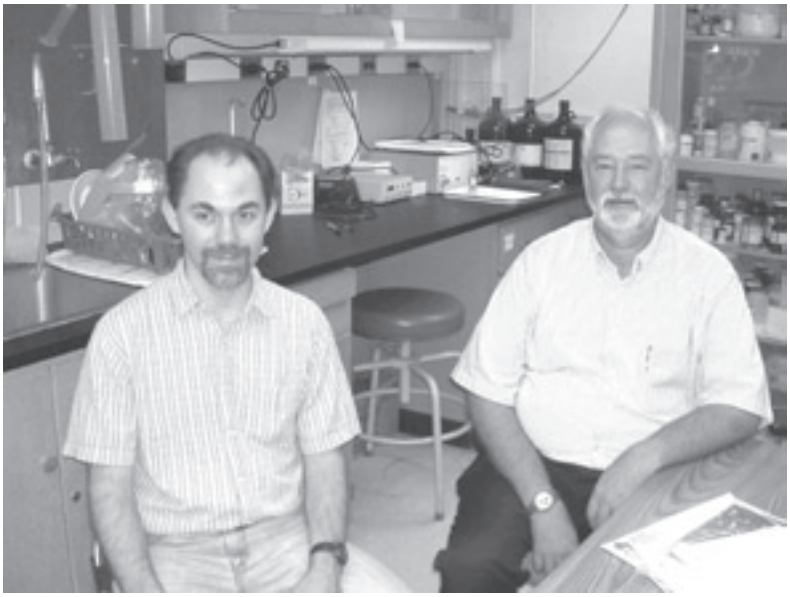
Lempert, who was recognized as outstanding graduate course teacher, was chosen on the basis of nominations drawn up and collected by our Mathematics Department graduate student representatives. Their decision was based on nominations, testimonials, and evaluations.

Each awardee received a cash prize of $1000, made possible by Purdue physics alumnus, Joel Spira, founder and operator of Lutron, a large manufacturer of switches and lighting controls.

Interdisciplinary Innovations: Purdue Mathematicians Hook Up with Biologists, Ecologist

Biology professor Chris Sahley employed an unusual postdoctoral researcher in her lab this past year—mathematics professor **Carl Cowen**. Cowen spent the year learning about the lab's experiments on the associative learning of the leech in order to develop a mathematical model of the leech's touch system.

This collaborative work was supported in part by an "Interdisciplinary Grant in the Mathematical Sciences" from the National Science Foundation, which Cowen received to study mathematical neuroscience. The NSF, along with the National Institute of Health, supports increased dialogue between mathematicians and biologists to advance medical and biological research.



Assistant Research Scientist Brian Burrell and Carl Cowen

Mathematical neuroscience represents a major change from Cowen's previous research in operator theory, complex analysis, and linear algebra. Cowen learned the basics of neuroscience while on sabbatical in 2002-03 at the Mathematical Biosciences Institute at Ohio State University. Cowen had become interested in working with biologists while serving as head of the Purdue Mathematics Department. He preached interdisciplinary collaboration among the sciences to his colleagues and eventually, "I began to believe it," he said.

Cowen has been less motivated by the research contributions he may make than by his influence on younger scientists. "I think I can make a big difference in terms of training," he said.

This past semester, Cowen taught a course "Introduction to Computational Neuroscience" for advanced undergraduates and graduate students in both the biological and mathematical sciences.

"We need to get people comfortable working in both areas a little," Cowen said. "Together mathematicians and biologists can solve problems that neither can solve independently."

Fabio Milner, Zhilan Feng

Other Purdue teams are doing just that. Biology professor Dennis Minchella and mathematics professors **Zhilan Feng** and **Fabio Milner** have been jointly studying the epidemiology of schistosomiasis, a chronic parasitic disease infecting 200 million people worldwide. Their work to develop host-parasite models that accurately reflect conditions in the field is supported by the National Science Foundation.

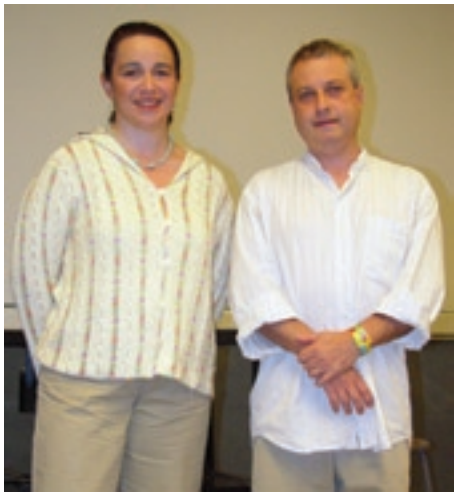
One of their models addresses how drug treatment rates for human patients affect the development of resistant parasite strains. They have found that increasing the treatment rates reduces transmission of the disease but creates a greater range of resistant strains. Minchella tests the validity of the models with laboratory studies and field work, which is supported by a National Institute of Health grant.

According to Minchella, "Our work in Brazilian villages assessing the degree and structure of genetic heterogeneity of parasite populations is an essential first step in predicting the epidemiology of infectious diseases."

In another project, Feng is working with Rob Swihart and Yssa DeWoody of the Department of Forestry and Natural Resources to study metapopulation modeling of ecological systems by examining the role of habitat heterogeneity in spatially realistic metapopulation models, as well as the role of patch age in dynamic landscapes. This study is supported by the James S. McDonnell Foundation in the amount of $490,000 for three years.

Second Conference on Analysis and PDE Held at Purdue

Eighty mathematicians participated in the 2nd Symposium on Analysis and PDE held at Purdue June 7-10, 2004. Organized by associate professor Donatella Danielli, the meeting focused on recent developments in analysis and pde and consisted of two five-hour minicourses presented by the principal lecturers and 10 one-hour lectures given by invited speakers. The principal lecturers were Lawrence C. Evans of the University of California (Kinetic Formulations of Nonlinear PDEs) and Carlos E. Kenig, University of Chicago (Unique Continuation for Evolution Equations).



Donatella Danielli, Carlos Kenig (Chicago)

Invited speakers included Guy David, Université de Paris 11; Robert Jensen, Loyola University; David Jerison, MIT; Fang-Hua Lin, Courant Institute; Benoit Perthame, Ecole Normale Superieure, Paris; Gustavo Ponce, University of California, Santa Barbara; Henrik Shahgholian, Royal Institute of Technology, Stockholm; Gigliola Staffilani, MIT; Tatiana Toro, University of Washington; and Luis Vega, Universidad del Pais Vasco, Spain.

Time was also allocated for contributed talks. The aim of the conference was to introduce graduate students and young researchers to a larger mathematical community and to help them establish professional connections with key figures in their areas of interest. The conference also provided an opportunity to summarize some of the most recent progress in the fields, exchange ideas towards the solution of open questions, and formulate new problems and avenues of research.

Conference sponsors were the National Science Foundation, the Purdue Mathematics Department, and the Institute for Mathematics and its Applications.

Gigliola Staffilani (MIT)

Scientific Program

Craig Evans (UC Berkeley)

Prof. Evans gave an introduction to the method of kinetic formulation for certain nonlinear transport equations, as introduced by Lions, DiPerna, Perthame, Tadmor, Souganidis, etc. Topics discussed included: kinetic models and entropies; velocity space averaging; uniqueness and related issues; systems.

Professor Kenig presented some recent unique continuation results for parabolic and dispersive equations. The results for parabolic equations are due to Escauriaza-Seregin-Sverak and have been applied by them to regularity of weak solutions to Navier-Stokes equations. The results for dispersive equations are due to Kenig-Ponce-Vega and Ionescu-Kenig. These have applications to control theory questions, and it is hoped that they will be useful for the study of regularity of solutions to critical non-linear Schrodinger equations, in analogy with the work of Escauriaza-Seregin-Sverak.

The invited speakers presented a variety of interrelated topics, including applications ranging from geometry to inverse problems. The contributed talks were in subjects close to the main themes of the symposium.

MAA Conference at Indiana State University

by Shannon Lee

On Friday April 2, three Boilermakers, Professor Dominic Naughton, freshman Kyle Riggs and I, traveled to Terre Haute, Indiana to participate and compete in the spring 2004 Mathematics Association of America Conference and undergraduate competition. The conference consisted of several talks on various mathematical topics presented by faculty and students, workshops for both graduate and undergraduate students, and a friendly competition among undergraduates from across the state.

Dominic Naughton, Kyle Riggs, Shannon Lee

A total of 42 teams, each consisting of as many as three members from universities such as Wabash College, Indiana State University, Rose-Hulman Institute of Technology, Saint-Mary-of-the-Woods College, and Purdue University converged on Indiana State University just like the series

$$\sum_{n=1}^{\infty} 2^{-n}$$

converges. The 42 teams were then divided and placed in separate rooms where they were given two hours to solve six problems. The problems were challenging for both Kyle and myself. We would have been able to solve another problem if we knew what it meant to "remain at the slip for ten minutes." After the allotted time, we learned that a "slip" was simply a synonym for a dock.

Other problems at the competition consisted of topics in infinite series, linear algebra, number theory, analytic geometry, and logic-based problems. The Purdue team did extremely well considering we were short one member, due to late cancellations, and were competing against students who had as much as three additional years of math. Purdue finished 24th out of 42 teams and looks to improve upon that next year.

I attended a two-part undergraduate workshop on "Fractals in Linear Algebra." In this workshop students explored how various fractals like the Sierpinski triangle can be generated using linear algebra. Professor Oakley from Goshen College stated that we were going to study fractals because "fractals are kind of sexy." This set the tone and provided an interesting and interactive workshop. The workshop gave me a new perspective on eigenvalues and how they can apply to linear transforms and how linear transforms can produce fractals. I had never made this connection before the workshop.

Next year the Purdue Math Club plans to expand its participation and enter more teams so more students can experience such a wide variety of topics and make connections with other math departments and universities across the state.

Excellence in Teaching Awards

In keeping with its commitment to excellence, the Mathematics Department annually recognizes Graduate Teaching Assistants for their outstanding teaching. Winners are selected on the basis of student and faculty evaluations.

Six Purdue graduate students were selected to receive "2003-04 Excellence in Teaching Awards." Each awardee received a cash prize of $250 at an awards presentation in the Mathematics Department on November 24, 2003.

Front row: Mark Ward, Luiza De Souza, Su-jeong Kang. Back row: Mark Rogers, Raghubhushan Pasupathy, Anantha Sundararajan, Professor Johnny Brown.

2004 Summer Undergraduate Researchers

by Steve Bell

The Purdue VIGRE Summer Research Program for Undergraduates is off to a running start. Eight undergraduates (above) have begun to work with Purdue faculty mentors Steve Bell, Carl Cowen, John Cushman, Yssa Dewoody, George McCabe, and Bob Zink in an eight-week session of study and research on a range of topics from "The Riemann Zeta Function as a Conformal Map" to statistics, measure theory, mathematical biology, and mathematical neuroscience. This year, Purdue graduate students Natalie Kleinfelter, Phil Mummert, and Scott Simon will also serve as research consultants to the various projects.

Standing, left to right: Timesa Hoover, Maya Johnson, Kara Lewis, Matt McBride. Seated, left to right: Jason Anema, Scott Patterson, Richard Geji. Not pictured: Damir Dzhafarov.

"VIGRE" stands for "Vertical Integration of Research and Education in the Mathematical Sciences." The Purdue Departments of Mathematics and Statistics hold a five-year joint VIGRE grant from the National Science Foundation funded in the amount of $2 million. The Summer Undergraduate Research Program is an area where "vertical integration" is clearly in evidence. Faculty, postdocs, and graduate students have banded together to give undergraduates from Purdue and across the country a very stimulating eight weeks of research and study.

This summer's research program will culminate in a joint meeting with the undergraduate research programs at Indiana University, Notre Dame, Rose Hulman, and Wabash College, where the students report on their research. The following week, the Purdue students will present their work at a special all day mini-conference in West Lafayette.

Math PUrview

Purdue University
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