

PURview

DEPARTMENT OF MATHEMATICS • WEST LAFAYETTE, INDIANA • SUMMER 2010

from the Head

Greetings from all of us in the Department of Mathematics and welcome to this edition of *Math PURview*. Despite the many challenges presented by lean budgets in the last two years, the department continues to fulfill its multiple missions of teaching, research, and service with the highest degree of excellence. This happens thanks to the incredible creativity and dedication of our faculty and staff. In these pages you will read about some of these individuals.



Rodrigo Bañuelos

Of particular note in this issue is the number of faculty awards and recognitions, both internal and external, received during the past year. In addition, many of our faculty often are invited to speak at some of the most prestigious mathematical conferences at major mathematical centers and institutes around the globe. Faculty research is well funded by the National Science Foundation, other federal agencies, and industry. Because of the widely recognized strength of our faculty, we often find ourselves under intense competition with other institutions that try to lure our faculty away from Purdue with lucrative offers. We expect the higher administration will continue to help us retain and support our most productive faculty.

One of the most enjoyable duties as department head is participating in award ceremonies for students. This past April, I was particularly pleased to see so many mathematics and actuarial science majors and minors recognized at the College of Science convocation.

At the end of the day, a university is a community of scholars dedicated to the pursuit of knowledge and to preparing tomorrow's leaders. Mathematics, as a core discipline, will continue to play a fundamental role in advancing the progress of science, engineering, and technology and in helping all students develop critical thinking skills that are transferable to their future pursuits, whatever those may be. Our faculty, students, and staff work very hard to adhere to the higher goals of this community. I hope you enjoy reading about their achievements as much as I have enjoyed sharing in them.

With best wishes,

Purdue Math in the News

On October 20, 2009, mathematics professor Zhilan (Julie) Feng was contacted by the national media to provide her view on how the novel H1N1 flu virus was expected to progress through the population and how that might impact the effectiveness of vaccinations.

Using data collected by the Centers for Disease Control in May, June, July, and August 2009, Professor Feng and her colleague, statistics graduate student Sherry Towers, had constructed a mathematical



Julie Feng

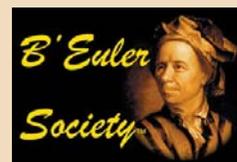
model to predict the spread of the disease. Their study was published October 15 in *Eurosurveillance*, a scientific journal devoted to epidemiology and the surveillance and control of communicable diseases. Their model predicted that H1N1 infections would reach an early peak in late

October/early November. At that point in time, the CDC vaccination program was just getting underway.

In addition to national television and print media reports (including the *Washington Times* and *Los Angeles Times*), the study was mentioned by Senator Susan Collins, who co-chaired a Senate hearing on the national response to H1N1.

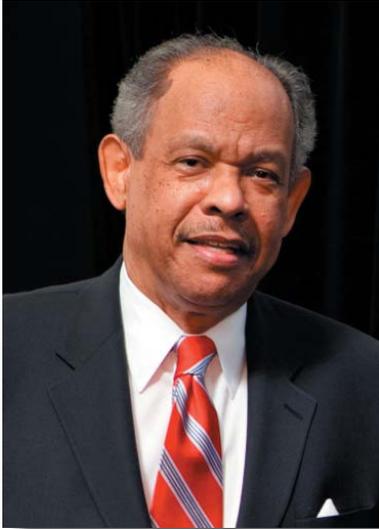
An expert in mathematical biology, Professor Feng has conducted research in the area of disease evolution and epidemic modeling for the past 15 years.

The department is pleased to announce the founding of the **B'Euler Society**. Its mission is to celebrate the beauty of mathematics as well as to promote awareness of new discoveries and trends in mathematics at Purdue University and beyond. For more information, please visit www.beuler.org/.



2010 Distinguished Alumni

The College of Science honored distinguished alumni at a banquet on April 16, 2010. This year's mathematics honorees were Arthur F. Powell and Edward R. Shugart.



Arthur F. Powell
B.S. Mathematics, 1966

Career Highlights

2006

Received Thurgood Marshall Scholarship Fund Award of Excellence

1987

Led the first-ever, sole-managed bond transaction underwritten by a 100 percent minority-owned investment bank

1973

Named the national sales leader for IBM Corporation

1966

Provided scientific programming on weather satellite program at Missile and Space Division of General Electric

As a principal in the investment-banking firm of Grigsby Brandford Powell Inc., Arthur F. Powell was responsible for its marketing efforts in the eastern half of the United States. He also served as president and founder of AGH Financial Corporation and has been associated with the Intel Corporation, the Data Processing Division of the IBM Corporation, and the Missile and Space Division of the General Electric Company. Currently, he is president and chief executive officer of Powell Capital

Markets, Inc., a firm he founded. Powell also is involved in many civic and professional organizations such as the Autism Education Foundation of the Morris-Union Jointure Commission. He was the vice chair and founder of the New Jersey Development Authority for Small Business, Minorities, and Women's Enterprises and a former member of the South Carolina State University Board of Visitors.



Edward R. Shugart
B.S. Mathematics, 1963

Career Highlights

1990

Named President and Chief Operating Officer at Investment Life

1983

Became one of the first to develop and implement Universal Life products

1982

Named Senior Vice President and Chief Actuary of Integon Corporation

1968

Hired at Hartford Life as an actuarial student

1965

Became an officer in the U.S. Marine Corps

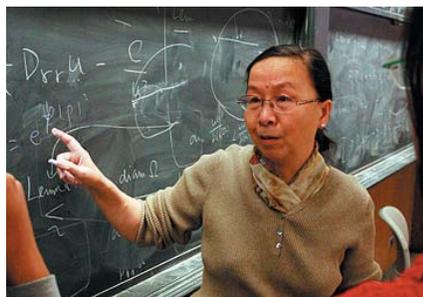
For more than 40 years, Edward R. Shugart has been in the insurance business. He began his career at the Hartford Life Insurance Company as an actuarial student and later was appointed senior vice president and chief actuary of Integon Life Insurance Corporation. In 1982, he partnered with W.H. Odell to form a consulting firm. Eight years later, Shugart joined the Investment Life Company of America as president and chief operating officer, helping build a viable life insurance company from scratch. Within two years, the company was issuing nearly 1,000 universal life policies per month. Currently, he is vice president of Actuarial Management Resources Inc.

Math PURview is edited by Sally Goeke and published annually for alumni and friends of the Purdue Mathematics Department. For information and updates about the department throughout the year, visit us at www.math.purdue.edu/.

Special Events

The Department hosted several special events and conferences during the past year.

Sun-Yung Alice Chang, Professor and Chair of Mathematics at Princeton University, was the featured guest at the department's annual **Women in Mathematics Day** on November 19, 2009. Organized by Professor Donatella Danielli, activities included a luncheon for Purdue women in science and mathematics. Later that afternoon, Professor Chang gave the Jean E. Rubin Memorial Lecture entitled "Q-curvature in Conformal Geometry."



Sun-Yung Alice Chang

Professor Chang has received numerous awards for her mathematical achievements and service to the community. She was the recipient of an Alfred P. Sloan Fellowship and a Guggenheim Foundation Fellowship, and she is a member of the American Academy of Arts and Sciences and the National Academy of Sciences. She served as Vice President of the American Mathematical Society (AMS) from 1989 to 1991, and in 1995, she received the AMS Ruth Lyttle Satter Prize for outstanding contributions to mathematics research by a woman. In 2002, she was an invited plenary speaker at the International Congress of Mathematicians in Beijing. Professor Chang has also been active in many efforts to increase the representation of women in mathematics.

The next Women in Mathematics Day is scheduled for October 19, 2010. Dusa McDuff of Barnard College will be the guest speaker.

The department hosted the **Midwest Several Complex Variables Conference** on October 10-12, 2009. Nine invited speakers gave talks. Local organizers Professors Greg Buzzard and Laszlo Lempert also gave talks on October 9 to provide background on foundational ideas and techniques related to the main lectures. The conference was supported in part by NSF and the Institute for Mathematics and its Applications (IMA) through its Participating Institution (PI) program.

The same weekend, the department hosted the fourth **Illinois-Indiana Symplectic Geometry Conference**, featuring six invited speakers with sponsorship from NSF. Local organizers Peter Albers and Yi-Jen Lee joined with other faculty from the University of Illinois, IUPUI, and Notre Dame in arranging this meeting.

On November 7-8, 2009, the department hosted the **Midwest PDE Seminar**. Eight speakers gave talks at the event, organized by Professors Patti Bauman, Dan Phillips, and Monica Torres.

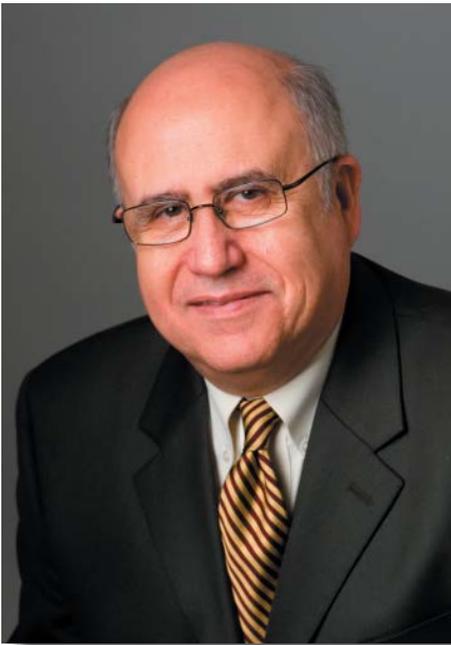
On March 23, 2010, Professor Richard Wheeden of Rutgers University visited the department to give a special talk **Some of the Mathematical Legacy of Richard A. Hunt: The Years 1968-1973**. Wheeden was a collaborator and close friend of Professor Hunt. Together with Benjamin Muckenhoupt, their papers had a profound influence on the development of harmonic analysis and its applications to other areas of mathematics.

Professors Saugata Basu and Uli Walther organized the second biannual **AIGeCom Day** on May 1, 2010, which was comprised of four one-hour talks. Participants were mathematicians with research interests in algebra, geometry, and combinatorics from the University of Illinois, Purdue, and nearby universities.

Alumni Honored for Excellence in Teaching

Janice Mitchener (B.S. 1983), a mathematics teacher at Carmel High School in Carmel, Indiana, is the recipient of a *2010 Presidential Award for Excellence in Mathematics and Science Teaching*. Winners of this honor receive a \$10,000 award from the National Science Foundation to be used at their discretion. They also receive an expenses-paid trip to Washington, D.C. for an awards ceremony and several days of educational and celebratory events, including visits with members of Congress and science agency leaders.

Each year, the Mathematical Association of America recognizes outstanding university faculty who have been widely recognized as extraordinarily successful teachers. **Christine Shannon** (Ph.D. 1972) of Centre College in Danville, Kentucky and **David Shannon** (Ph.D. 1971) of Transylvania University in Lexington, Kentucky were both recipients of a *2009 Section Award for Distinguished Teaching*.



Freydoon Shahidi

Freydoon Shahidi, Distinguished Professor of Mathematics, has been elected to the 2010 Class of Fellows of the American Academy of Arts and Sciences, one of the nation’s oldest and most prestigious honorary societies. A center for independent policy research, the Academy celebrates the 230th anniversary of its founding this year. The current membership includes more than 250 Nobel laureates and more than 60 Pulitzer Prize winners. The new class will be inducted at a ceremony on October 9, at the Academy’s headquarters in Cambridge, Massachusetts.

Shahidi is considered one of the preeminent researchers within what is known as the Langlands Program, which relates algebraic geometry, harmonic analysis and number theory. The program seeks to discover hidden properties and interrelations of prime numbers and has practical applications in cryptography. Techniques he pioneered are now known as the Langlands-Shahidi Method and have been used to prove important theorems within the field, solving some very long-standing problems in the subject. Shahidi’s work is part of a program that played a major

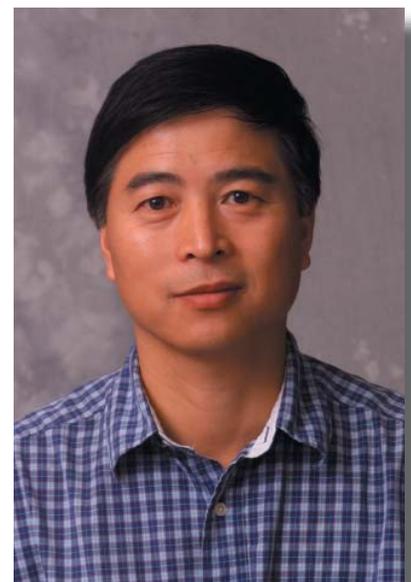
role in the solution of Fermat’s Last Theorem, which challenged mathematicians for three centuries before being proven in 1995.

Preeminent Discoverers

Jie Shen has been awarded a 2010 Chang Jiang Chair Professorship by the Ministry of Education of China. The award will support visits to Xiamen University, where he will conduct collaborative research in numerical analysis and scientific computing.

The Chang Jiang Scholars Program was jointly established by China’s Ministry of Education and the Li Ka-Shing Foundation in 1998 to attract, select, and create a group of world leaders for advanced research in all areas of higher education. This year, China has awarded a total of 100 Chang Jiang Chair Professorships in all fields.

Shen has made major contributions in many areas of numerical analysis and scientific computation, including in particular the design and analysis of efficient numerical schemes for Navier-Stokes equations and the development of spectral-Galerkin methods for a broad class of partial differential equations. He is widely considered as a leading expert in spectral methods and computational fluid dynamics, both nationally and internationally.



Jie Shen

Svitlana Mayboroda, Assistant Professor of Mathematics, has been awarded a 2010 Sloan Research Fellowship. The Sloan Research Fellowships were established in 1955 by the Alfred P. Sloan Foundation to provide support and recognition to young scientists who are regular (tenure track) faculty members of a college or university in the U.S. or Canada. The \$50,000 fellowship is awarded for a two-year period.

Mayboroda earned her Ph.D. at the University of Missouri-Columbia in 2005. Prior to joining the Purdue mathematics faculty in 2008, she held visiting faculty appointments at the Australian National University, Ohio State University, and Brown University. Her research interests lie at the interface of harmonic analysis and partial differential equations. More specifically, her work is centered around elliptic boundary value problems with particular emphasis on the setting of domains in Euclidean spaces whose boundaries are nonsmooth. This is an area of analysis with a long and rich history and in which many fundamental questions remain wide open.



Svitlana Mayboroda



Ralph Kaufmann

Ralph Kaufmann, Associate Professor of Mathematics, has been awarded a Humboldt Research Fellowship for Experienced Researchers. The fellowship supports long-term research projects conducted in cooperation with research institutions in Germany. The Alexander von Humboldt Foundation promotes academic cooperation between excellent scientists and scholars from abroad and from Germany. Candidates of all nationalities from all fields and disciplines are considered for the Humboldt research fellowships.

Kaufmann is one of 600 experienced and post-doctorate researchers that will receive a Humboldt Research Fellowship this year. His project, “Stringy Structures in Geometry and Topology and their Symmetries,” will be conducted in two phases of four to five months each during 2010 and 2012 at the University of Hamburg with his host, Prof. Dr. Bernd Siebert.

John Cushman, University Distinguished Professor of Earth and Atmospheric Sciences and Professor of Mathematics, has been named a fellow of the Geological Society of America. All newly elected fellows and their nominators will be recognized at the presidential address at the GSA annual meeting in Denver, Colorado on October 30, 2010.

Cushman’s research interests include fluids in porous media, stochastic processes, computational chemistry, and swelling media. In 1995, he received the Herbert Newby McCoy Award, Purdue’s recognition for the faculty member who made the most significant contribution to science during the previous year.



John Cushman

Faculty Transitions

The promotions of Edray Goins to Associate Professor and Greg Buzzard to Professor were approved on April 9 by the Board of Trustees. Congratulations Edray and Greg!

Edray Goins grew up in South Los Angeles. After attending school in the Los Angeles public school system, he continued his education at Cal Tech, where he majored in mathematics and physics, and Stanford, where he earned a doctorate in mathematics.



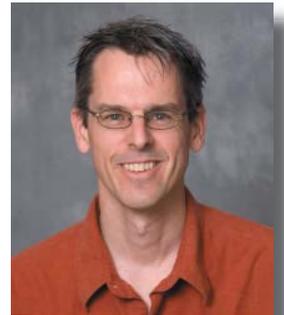
Edray Goins

Edray works on properties of Selmer groups for elliptic curves, using computational tools and concrete combinatorial methods to study problems in number theory. He has held visiting appointments at some of the world's top research institutions, including the NSA, MSRI, IAS, Max Planck Institute, Harvard, and Cal Tech. Recognized by his peers for bringing passion and excitement for teaching, research, and training to the forefront of his profession, he has been a sought-after invited speaker at professional meetings that focus on these endeavors.

Edray has devoted much time and energy to working with underrepresented student communities throughout the U.S. In recent years, his contributions to educational outreach and student mentoring have focused on engaging underrepresented students in math research during the summer months. He has taught mathematics with the Vanguard Engineering Scholarship Program through the National Action Council for Minorities in Engineering (NACME); taught mathematics and physics in the Freshman Summer Institute (FSI) at Caltech; and led a research seminar in number theory in the Summer Undergraduate Mathematical Sciences Research Institute (SUMSRI) at Miami University. Some of his former students have enrolled in graduate programs at Howard University, MIT, Ohio State, Purdue, Stanford, UCLA, UC San Diego, Michigan, Nebraska, and Yale.

When he was about 10 years old growing up in Fort Wayne, Indiana, **Greg Buzzard** told his parents he wanted to get a Ph.D. in mathematics. The path between that declaration and his promotion to full professor was not exactly straight. As an undergrad at Michigan State, he started a major in computer science, then switched to violin performance. A few years later, after a brief transfer to the St. Louis Conservatory of Music, he returned to finish both degrees at MSU.

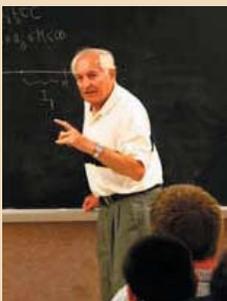
After starting a graduate program in computer science at Northwestern, and then returning to Michigan State for a master's degree in math, Greg earned his previously announced Ph.D. in math at the University of Michigan. He held a postdoctoral position at Indiana University, with some time off for semesters in Paris and Berkeley, and then an NSF postdoc at Cornell in Ithaca, NY, where he applied some of his knowledge of math and computer science by consulting and programming for a computer graphics startup company.



Greg Buzzard

Greg came to Purdue in 2002. In addition to teaching a wide variety of courses at all levels, he soon started doing research in the computational modeling of biological systems. He used a specially targeted NSF grant to work with a biotechnology startup company for a year in 2004-5, then returned to Purdue and developed flourishing collaborations with colleagues in Biomedical Engineering and Agricultural and Biological Engineering.

Greg and his wife, Hilary, have two boys, 2 and 4 years old. Although Greg doesn't practice the violin as much as he once did, he plays in the Lafayette Symphony and his research, teaching, and family are thriving.



After teaching generations of mathematics students, Professor **Chris Neugebauer** retired at the end of the spring 2010 semester.

Born in 1927 in Dessau, Germany, Neugebauer was intrigued by math as a boy. After immigrating to the U.S. with his family in 1947, he received his undergraduate education at the University of Dayton and his Ph.D. from Ohio State University in 1954. He began his career at Purdue in 1954 and throughout the years has been known for his clear lecturing style, his profound knowledge, and his excitement for mathematics, which he shares with colleagues and students alike. He supervised eight Ph.D. students and served on countless other Ph.D. committees for students in mathematics and various fields of engineering. He was chair of the Graduate Committee, which oversees the graduate program, from 1987 to 1989.

Neugebauer's research area is real and harmonic analysis. He has made many important contributions in the theory of weighted norm inequalities, which play a prominent role in applications of harmonic analysis to other areas of mathematics, particularly partial differential equations and geometry. One of his most recent published papers, "Weighted variable L_p integral inequalities for the maximal operator on non-increasing functions," appeared in 2009.

Outstanding Alumni Awards

Outstanding Alumni visited Purdue and were honored at a banquet on September 24, 2009.

Alex Himonas, Professor of Mathematics at the University of Notre Dame, was recognized as the Outstanding Mathematics Alumnus.



Prof. Himonas received his Ph.D. in mathematics in 1985 under the direction of Salah Baouendi. Prof. Himonas is interested in the regularity of solutions to linear partial differential equations (PDE), and in the Cauchy problem for nonlinear evolution equations. His earlier work concentrated on the microlocal analytic regularity of the solutions to principal type PDE with analytic coefficients. More recently, he is working on the regularity theory (analytic, smooth) for degenerate elliptic PDE, in particular PDE that are sums of squares of vector fields. In non-linear PDE, he is working on the well-posedness of the initial value problem for evolution equations.

Kent H. Somers was recognized as the Outstanding Actuarial Science alumnus. He is Vice President, Appointed Actuary, and Head of the Financial Actuarial Department of the Lincoln Financial Group. He also serves on the Executive Steering Committee for the Actuarial Development Program at Lincoln.



After receiving his B.S. in mathematics in 1986, Mr. Somers joined Lincoln as part of the actuarial science program. Prior to serving in his current role, he headed the Life & Annuity Valuation Department. Other positions held at Lincoln include Valuation Actuary, Director of Asset/Liability Management, and Assistant Appointed Actuary.

Mr. Somers is a Fellow of the Society of Actuaries (FSA). He earned his Chartered Enterprise Risk Analyst (CERA) credential, and he is a CFA Charterholder.

Peter Albers joined the Mathematics Department as assistant professor in August 2009. After earning a Ph.D. at the University of Leipzig in 2005, he held appointments at the Courant Institute and ETH Zurich. This past spring, he was a Member at the Institute for Advanced Study. Peter's research interests are symplectic geometry and topology, Floer theory, and Lagrangian submanifolds.



Peter Albers

Andrew Toms joins the mathematics faculty this summer as associate professor. He comes to Purdue from York University (Canada). Prior to his appointment at York, he was assistant professor at the University of New Brunswick. He was an NSERC Postdoctoral Fellow at Copenhagen University/Fields Institute for a year and a half after earning his Ph.D. at University of Toronto in 2002. Andrew's research area is operator algebras and their classification.

In August, we will welcome three new Golomb Assistant Professors: **Ariel Barton** (Ph.D. 2010, University of Chicago), **Caleb Eckhardt** (Ph.D. 2009, University of Illinois), and **Selma Yildirim Yolcu** (Ph.D. 2009, Georgia Tech). **Nathaniel Rounds** (Ph.D. 2010, Stony Brook University) and **Luis Lomeli** (Ph.D. 2007, Purdue University) will have one-year visiting assistant professor appointments.

After serving 11 years in the Mathematics Department as a Continuing Lecturer, **Cari Carpenter** will leave us at the end of the summer session. In addition to teaching, Cari has been coordinator of Algebra and Trigonometry (MA 153), which involves nearly 2,000 students and dozens of teaching assistants each academic year. Her duties included helping set instructional goals and testing in these courses, the corresponding online distance courses, and the evening courses. Cari worked extensively with other faculty, staff, and graduate students in carrying out these tasks. She was one of the first two instructors in the department to participate in the SIGNALS project. Recently highlighted on NBC Nightly News, SIGNALS is a web-based application developed by Purdue that monitors students' academic performance in particular courses.



Cari Carpenter

Cari is a model of organization and efficiency. Her departure is a loss for the department, but a gain for her family. She anticipates spending much more time with her husband Dan and their very active children.

Accolades

Professor **Saugata Basu** was named a University Faculty Scholar by the Office of the Provost, effective July 1, 2010. The designation recognizes faculty who are on an accelerated path for academic distinction. The term of appointment is five years and includes a discretionary allocation.



Saugata Basu

Basu joined the Purdue Mathematics and CS Departments in August 2008. He earned his Ph.D. from the Courant Institute at NYU in 1996, did postdocs at MSRI and IBM, and was assistant professor at Michigan for two years before joining the faculty at Georgia Tech. A recipient of an NSF CAREER award and a Sloan Fellowship, his research continues to be well-funded by NSF.

Basu is one of a handful of world leaders in the field of real algebraic geometry. He publishes in top mathematics and computer science journals, has co-authored the definitive text on real algebraic geometry, and is a sought after invited speaker and conference organizer. His presence at Purdue has established us as a preeminent center for real algebraic geometry, and we are extremely pleased that his accomplishments have been recognized by the University.

Jeffrey A. Beckley (FSA, MAAA), Professional Actuary in Residence and Co-Director of the Purdue Actuarial Science Program, was elected to a three-year term on the Board of Directors of the Society of Actuaries (SOA). The SOA is an education, research, and professional organization dedicated to serving the public and its 20,000 members.



Jeff Beckley

After graduating from Ball State University with a degree in actuarial science, Beckley held executive positions with Lafayette Life Insurance and Standard Life Insurance before starting his own firm, Beckley & Associates, in 1986. His actuarial consulting firm was purchased in 1999 by Deloitte & Touche, for whom Beckley worked until 2004.

As a member of the actuarial science program faculty, Beckley has taught at Purdue since 2004. Each year, science undergraduate students select the faculty member whose teaching has had the greatest impact on science majors. He was voted the College of Science Outstanding Undergraduate Teacher for 2005-06, 2006-07, and 2009-10.

Congratulations to Jeff for achieving special recognition from both his profession and from Purdue students.



Left to right: Owen Davis, Shaun Ponder, Rodrigo Bañuelos, Terri Kepner, and Dean Jeffery Roberts. Outstanding staff in the College of Science were recognized at a program and luncheon hosted by Dean Jeffery Roberts on February 24, 2010 in the Purdue Union ballroom. Four mathematics staff members received awards.

Terri Kepner — Customer Service Award
Terri, the primary contact person in the Mathematics Department, provides outstanding service to students and faculty who visit the main office on a daily basis. Her upbeat personality, positive attitude, and conscientiousness foster a friendly and productive environment for everyone in the department.

Owen Davis — Leadership Award
Owen is an outstanding Continuing Lecturer in Mathematics who is responsible for teaching large lectures of precalculus. He took the lead to help design and oversee upgrades to the Math Help Room, which serves students (10,000+ per semester) enrolled in mathematics service courses.

Shaun Ponder — Customer Service Award
As Account Assistant for both Mathematics and Statistics, Shaun processes countless payroll, reimbursement, and other business transactions for hundreds of faculty, graduate students, and staff. She patiently answers all questions and tries to insure that those who visit her office leave with an understanding of how the various Purdue business processes will work for them.

Chapman Flack — Professional Achievement Award
Since coming to the Department of Mathematics as a Computer Systems Administrator, Chapman has displayed an extraordinarily broad and deep knowledge of computers. His expertise has allowed our small computer group to support 350 plus clients in the department and has enabled the move to some new technologies.

Obituaries

Leonard D. Berkovitz died suddenly but peacefully on October 13, 2009. He was born in Chicago, Illinois, on January 24, 1924.

In 1941, Len began his college studies as a chemistry major at the University of Chicago. When World War II started, he joined the military, completing meteorology training programs at the University of Wisconsin and the University of Chicago. He was commissioned as a Lieutenant in the U.S. Army Air Corps and served as a weather officer.

After completing military service, Len resumed his studies at the University of Chicago. He was elected to Sigma Xi and Phi Beta Kappa honoraries and received a B.S. in meteorology in 1946. He considered graduate work in physics, but chose



Leonard D. Berkovitz

mathematics and entered graduate school at the University of Chicago, receiving a master's degree in 1948 and a doctorate in 1951. His thesis, written under the direction of Antoni Zygmund, was in the area of double trigonometric series.

In 1951-52, Len was an Atomic Energy Commission Postdoctoral Fellow at Stanford University. From 1952 to 1954, he was a Research Fellow at the California Institute of Technology, where he conducted research in asymptotic expansions. While at Caltech, he met

Anna Whitehouse, who was working in a tissue culture laboratory at Cedars of Lebanon Hospital. They were married on June 18, 1953.

In 1954, Len joined the Mathematics Division at the Rand Corporation, where he worked on the mathematical theory of games and on a variety of tactical problems for the Air Force. He participated as a technical observer in Air Force tactical exercises and helped introduce the novel idea (now common practice) of using simulation methods for determining the outcome of tactical engagements.

In 1962, Len joined the Purdue faculty as Professor of Mathematics. He was Head of the Mathematics Department from 1975 to 1980 and Acting Head in 1989-1990. He served on numerous curriculum and administrative committees, and he remained active in research and teaching until his retirement in 2002. Eleven students obtained Ph.D. degrees under his supervision.

Len's research focused on differential games, optimal control theory, and nonclassical variational problems. He was the author of several textbooks and numerous scientific papers. Len served as associate editor, editor, and managing editor for *SIAM Journal on Control and Optimization* from 1967 to 1991. He was associate editor for the *Journal of Optimization Theory and Applications* and for the *Journal of Mathematical Analysis and Applications*. He was a member of the editorial committee of *Mathematical Reviews* from 1985 to 1991.

Len is survived by his wife, Anna; sons Dan of Bethesda, Maryland and Kenneth of Akron, Ohio; and five grandchildren. Donations in memory of Len can be made to the American Heart Association or to Purdue Foundation for the Leonard D. and Anna W. Berkovitz Scholarship Fund, which provides scholarships for undergraduate mathematics majors.

A detailed account of the work of Leonard Berkovitz appeared in the January 2010 issue of *SIAM News*: <http://www.siam.org/news/news.php?id=1695/>.



Sam Perlis

Professor Emeritus Sam Perlis, 96, died June 22, 2009, in Takoma Park, Maryland.

He was born April 18, 1913, in Maywood, Illinois. He attended the University of Chicago, earning bachelor's and master's degrees, and in 1938 a Ph.D. in mathematics. During graduate school, he worked as a science teacher at Sunrise, an experimental collective farm in Michigan.

In 1937, he married Esther Rockoff; she preceded him in death in 2009.

After graduate school, he taught math for one year at the University of Michigan and for two years at Illinois Institute of Technology. During World War II, he moved to Los Angeles and was employed by Lockheed Aircraft. In 1946, he moved to West Lafayette, where he worked in the Mathematics Department until his retirement in 1983.

Sam directed three doctoral dissertations at Purdue. He is known for his 1942 discovery of a mathematical technique now called the Perlis-Jacobson radical, for the 1950 Perlis-Walker Theorem, and for his book *Theory of Matrices*, published in 1952. He twice spent an academic year in Rome.

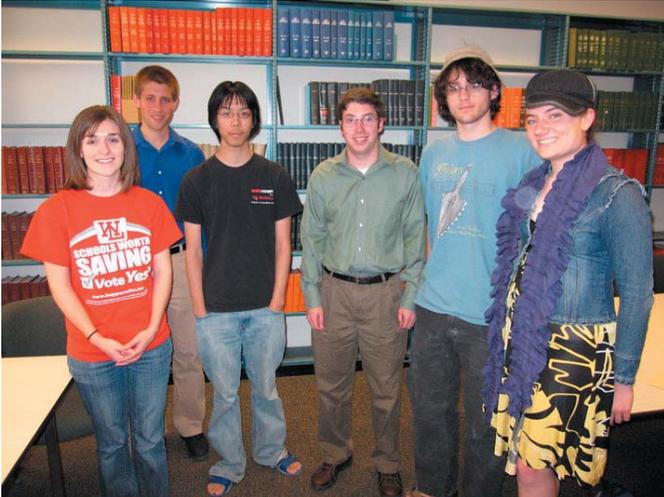
He was very active in the West Lafayette food Co-op and in Save the Dunes, and ice-skated regularly with the Indianapolis Winter Club. He enjoyed landscaping and art.

Surviving are two sons, Donald and Robert.

Undergraduate Awards

The Mathematics Department recognized outstanding students on April 28, 2010 at the annual department awards program.

Math Award Recipients



Catherine Warner, Philip Hebda, Justin Chen, Brent Woodhouse, Eric Haengel, Kristin Ziegler

Your Gifts Matter!

The students below are recipients of 2010-11 mathematics scholarships. We appreciate the support of all who currently help our math majors through contributions to our mathematics scholarship funds. If you are interested in helping students, we can also offer suggestions for other ways to provide support (for example, stipends for summer research). A list of some of our departmental funds is available on our website:

<http://www.math.purdue.edu/people/alumni/>



MATHEMATICS UNDERGRADUATE AWARDS

Eugene V. Schenkman Memorial Award
Justin Chen

Glen E. Baxter Memorial Award
Daniel Stratman, Kristin Ziegler

Michael Golomb Mathematics Award
Kun-Chieh Wang

Meyer Jerison Memorial Award in Analysis
Brent Woodhouse

Merrill E. Shanks Memorial Award
Jason Nikowitz, Joshua Rendall, Catherine Warner

Senior Achievement Award
Philip Hebda, Kun-Chieh Wang

Putnam Exam Recognition
Kun-Chieh Wang, Daniel Stratman

Pi Mu Epsilon Inductees
Justin Chen, Johnson Chu, Eric Haengel, Daniel Stratman

MATHEMATICS SCHOLARSHIPS

Thomas Arai Scholar
YiYan Tang

Leonard D. and Anna W. Berkovitz Scholar
Remy Spoentgen

Mark Hoppy Memorial Scholar
Robert Glasser

Virginia Mashin Scholars
Christopher Barbour, Justin Chen, Uuriintsolmon Ganbold, Benito Martinez, Stephanie Miller, Mary Vaught

Arthur Rosenthal Scholars
Matthew Berry, Kelli Chupp, Angela Hancock, Emily Rhiver, Kristina Rubiano, Allison Salisbury, Brandon Wilson

Helen Clark Wight Scholars
Megan Giordano, Mark Knight, Kristina Rubiano

Andris A. Zoltners Scholar
Jeremy Cunningham

ACTUARIAL SCIENCE AWARDS

<i>AEGON Scholarship</i>	Eric Krafcheck
<i>Alumni Scholarship</i>	Tian Li
<i>Daniel Rubin Scholarships</i>	Andrea Ferris, Grant Goede
<i>Swiss Re Scholarships</i>	Ben Berning, Sarah Ryan, Kristin Shaffer
<i>Outstanding Senior</i>	Elizabeth Moss
<i>Outstanding Junior</i>	Yanyan Ma
<i>Outstanding Sophomore</i>	Kelli Chupp
<i>Outstanding Freshman</i>	Lifan Wu

Graduate Awards

GRADUATE STUDENT AWARDS

2009-10 Outstanding Mathematics Teaching Assistants

Douglas Babcock, Dustin Belt, Richard Eden, Eduardo Garcia, Stacy Wohead

Gerald R. MacLane Award

Agnid Banerjee

Carl Cowen Exceptional Promise Award

Kassandra Johnson

T.T. Moh Fellowship

Cuiyu He, Yingwei Wang

Zoltners Graduate Scholarships

Paul Kepley, Brian Moehring, Michael Perlmutter, Matthew Toeniskoetter

Andrews Fellowship

Bryan Crist

Ross Fellowships

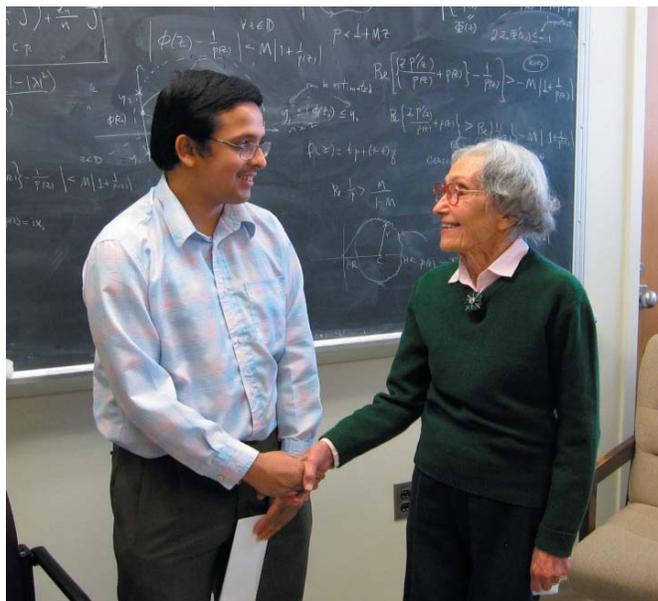
Taylor Hines, Paul Kepley, Christina Lorenzo, Matthew Toeniskoetter

2010 CETA (Committee for the Education of Teaching Assistants) Teaching Awards

Douglas Babcock, Dustin Belt, Richard Eden, Stacy Wohead

2010 Graduate Teacher Certificate

Hayaam Osman, Andrea Rubiano, Huanren Zhang



Ingeborg MacLane presented Agnid Banerjee with the Gerald R. MacLane award on March 11, 2010. The award is given in honor of Mrs. MacLane's late husband, a former Purdue mathematics professor and department head.

Prior to his arrival at Purdue, Agnid received a three-year degree from Chennai Mathematical Institute and spent one year at the University of Kentucky before coming to Purdue in fall 2009. He passed four qualifier exams by the end of his first semester with grades of A. He will work on his Ph.D. thesis under the direction of Prof. Nicola Garofalo.



Graduate TAs were honored at the CETA awards banquet on April 27, 2010. Left to right: Grad chair Professor Steve Bell, Richard Eden, Andrea Rubiano, Dustin Belt, Stacy Wohead, Douglas Babcock.



William Lindsey was awarded a Bilsland Fellowship by the Graduate School. The fellowship provides support to outstanding Ph.D. candidates in their final year. Fellows are expected to devote full-time effort to the completion of all doctoral degree requirements and to receive the degree at the conclusion of the fellowship tenure. The award

provides a stipend, Graduate Tuition Scholarships, payment of fees, and a medical insurance supplement.

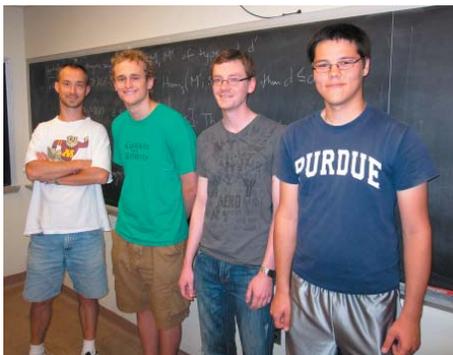
Lindsey is a Ph.D. student under the supervision of Prof. Donatella Danielli. He joined the department in fall 2004 from Oakland University.

Lisa Driskell and **Andrea Rubiano** each received a \$500 travel grant from the Women in Science Programs. The grants support professional activities, such as attendance at mathematics conferences.

Undergraduate News

Undergraduate students are working on math research projects this summer, thanks to the support of alumnus Andy Zoltners, who established a fund to support summer REUs (Research Experience for Undergraduates).

Professor Uli Walther is guiding three students on projects in algebraic geometry. One specific problem deals with the dimension



Professor Uli Walther with 2010 REUs Michael Burkhart and Dave Knott. Matt Davis (right) was a 2009 REU and is working with the group.

of a rooting complex of an LCM lattice. The ultimate goal of this project is to get an idea of how many polynomials are needed to define a subspace arrangement (given as the vanishing locus of a potentially large set of monomials).

Another project concerns the conditions a configuration of points must satisfy in order to be reconstructible from their mutual distances. More precisely, for a configuration of three points in a plane, the three distances between the points completely determine the configuration of the three points up to Euclidean motion. This property is called “reconstructible from distances.”

For configurations of four points in a plane, it is usually but not necessarily true that the $C(4,2) = 6$ distances completely determine the configuration of the points. Walther’s team will be searching for tests that determine when a configuration of 4 points in a plane is

reconstructible from distances and what characteristics a configuration must have in order to not be reconstructible from distances.

Preparing to understand and work on these topics included several chapters of Cox’s text *Varieties, Algorithms and Ideals*, some of Atiyah’s *Introduction to Commutative Algebra*, and a handful of papers.

Working with Prof. Carl Cowen on his summer research project, Justin Chen hopes to use linear algebra and other tools to linearize iteration of polynomial maps (in \mathbb{R}^N or \mathbb{C}^N) of the unit ball into itself. Solutions of such problems will contribute to the research of mathematicians, both at Purdue and at centers in many other parts of the world, who are working in the area of functional analysis. Justin expects to present some of his results in July at a statewide conference for undergraduate research students.



Freshmen mathematics majors had an opportunity to meet other math majors, faculty, and staff at a gathering held in Lawson Commons on September 17, 2009.