



## Hales Nets Award for Cracking 400-year-old Problem



**Thomas C. Hales**  
Mellon Professor  
of Mathematics

In another nod to his success at unraveling a 400-year-old math mystery, University of Pittsburgh Mellon Professor of Mathematics Thomas C. Hales took home an

award for his unique math research from the American Mathematics Society (AMS) during the society's Joint Mathematics Meetings in New Orleans, La., on Jan. 6, 2007.

The society's inaugural David P. Robbins Award recognizes Hales' work on the Kepler conjecture, a posit that spheres can most efficiently be packed

in a pyramid shape. Kepler, a German astronomer and mathematician, could not prove his idea when he published it in 1611. Several people attempted to prove Kepler correct over the centuries, but never completed the task.

Hales shook the math world when he offered the long-elusive proof in 1998. In 2005, the academic journal *Annals of Mathematics* published a short version of Hales' work titled "A Proof of the Kepler Conjecture." (The full version ran in the July 2006 edition of the journal *Discrete and Computational Geometry*.) Reviewers spent five years vetting Hales' proof. The long process spurred Hales to undertake what he calls the Flyspeck Project to develop computer technology that would automatically check the correctness of long, complicated proofs. The goal is to get away from the "pencil and paper"

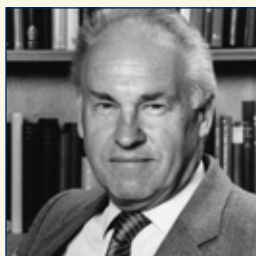
method of proof checking, Hales said. Flyspeck could take up to 20 work-years to complete.

The AMS award honors Hales' 2005 article. He shares the award with Samuel P. Ferguson of the National Security Agency, who coauthored part of the paper. Hales and Ferguson are the first recipients of the award, which was established in 2005 to recognize fresh research in algebra and discrete math. The \$5,000 prize is awarded every three years.

In recognizing Hales and Ferguson, AMS called their work "a landmark achievement."

Established more than 200 years ago, AMS has approximately 30,000 members and promotes mathematics by highlighting its relevance to other fields.

## J. Bryce McLeod Retires



**J. Bryce McLeod**  
University Professor

Spring 2007 marked the final term at Pitt for Professor J. Bryce McLeod, who came to the Department of Mathematics almost 20 years ago (in September 1987) from

Oxford University. While at Oxford, McLeod established a worldwide reputation for his research in differential equations. Shortly after he arrived in Pittsburgh, McLeod's reputation was sealed when he was elected a Fellow of the Royal Society of London (FRS), the world's oldest existing learned society of science.

As an FRS, McLeod followed in the footsteps of his academic advisor, Professor Edward Titchmarsh, with whom he studied in Oxford. McLeod's early work was on linear theory in differential equations. This work established him as one of the leading researchers in the field.

Pitt was indeed fortunate to attract him. He has, for many years, taught one of the most popular graduate courses. In recent years he also has been teaching linear algebra for undergraduates, and both he and the students have, by all accounts, found this very rewarding. He has had many research collaborations in the department, and will be greatly missed as he returns to Great Britain to be closer to most of his children and grandchildren. He also will be continuing his research, with wide-ranging mathematical contacts at Oxford, across the UK, and across Europe.

In honor of McLeod's retirement, the Department of Mathematics and Dean N. John Cooper of the School of Arts and Sciences sponsored a meeting on Topics in Nonlinear Analysis, April 13–14. Speakers included Professor James Serrin of the University of Minnesota, whose lectures in Edinburgh in 1968 inspired McLeod to turn to nonlinear problems. Also speaking was McLeod's son, Kevin, who is a mathematician at the University of Wisconsin, Milwaukee. He gave a fascinating talk on some of the problems

grade school children have in learning mathematics.

The remaining speakers were all McLeod's PhD students. The extent and quality of their research was a most impressive testimony to the training they received from him. It has been an honor to have him at Pitt for the last 20 years.

### Featured Alumnus: Traian Iliescu

Traian Iliescu is an assistant professor of mathematics at Virginia Tech. He received his PhD in 2000 under the direction of Bill Layton, a professor in Pitt's Department of Mathematics. From 2000 to 2002, Iliescu was a Wilkinson Fellow at the Argonne National Laboratory.

As a graduate student in 1999, Iliescu won the prestigious Society for Industrial and Applied Mathematics (SIAM) Paper Prize. His research interests include applied and computational mathematics, computational fluid dynamics (large eddy simulation of turbulent flows, geophysical flows), and numerical analysis (subgrid-scale modeling and mesh adaptation).



## Integration Bee a Smashing Success



*Front row (L to R): Justin Murray (3rd place), Ryan Manion (1st place), Chuck Sleasman (2nd place) Back row (L to R): Joe Frambach and Jay Jacobs (4th place winners)*

After two hours of high drama, witnessed by more than 50 spectators, Pitt undergraduate and mathematics major Ryan Manion won the seventh annual University of Pittsburgh Integration Bee on Thursday, April 5. Manion received the coveted Integration Bee champ t-shirt and \$80 in Pitt Book Center gift certificates.

Second place went to Chuck Sleasman and third to Justin Murray; each received \$40 in Pitt Book Center gift certificates. Joe Frambach and Jay Jacobs (last year's champ) rounded out the list of winners, each receiving a \$20 Pitt Book Center gift certificate.

Sponsored by the University Honors College and the Department of Mathematics, the Integration Bee is run like a spelling bee. In each of the first two rounds, contestants attempt to evaluate an integral within a given time limit. These rounds are single elimination (if you miss, you are out), but each student has the opportunity to call up a "lifeline" in one of the rounds for a 20-second consultation. Any audience member who is not a bee organizer can serve as a lifeline. This year, mathematics instructor Angela Athanas was a particularly popular lifeline choice. The preliminary rounds are followed by lightning rounds, in which all surviving participants race head-to-head to evaluate the same integral.

Associate Professor Jonathan Rubin is the main organizer of the bee and this year was assisted by graduate students Judy Day, Justin Dunmyre, Greg Francos, Chris Jones, Evandro Manica, Nate Mays, Angela Reynolds, and Lawrence Udeigwe, as well as faculty members Frank Beatrous, Jacob Burbea, and Bill Troy.

Audience members, including students, faculty members, friends, and parents of contestants had a great time cheering on the competitors. They watched the action on the "prof-cam" display, tried to evaluate the integrals themselves, and enjoyed refreshments. A drawing for door prizes generated plenty of excitement during the intermission.

The Integration Bee is held each spring and is open to all Pitt undergraduates. This year, for the third time, there also was a University of Pittsburgh High School Integration Bee, sponsored by Pitt's College in High School program, on April 22.

Information on the integration bees, including the complete rules, can be found online at [www.math.pitt.edu/rubin/bee.html](http://www.math.pitt.edu/rubin/bee.html) (undergraduate) and [www.math.pitt.edu/rubin/beehs.html](http://www.math.pitt.edu/rubin/beehs.html) (high school).

## STUDENT AWARDS

The department presents annual awards, which are funded by endowments, to outstanding graduate and undergraduate students. The winners are notified shortly before graduation and honored at a special brunch on commencement morning. We are proud to list the 2006 recipients:

### **Thomas C. Hales Prize in Mathematics**

**Recipient: Jason R. Morris**

Given to the doctoral candidate in mathematics who, in the opinion of the prize committee, has written the best doctoral dissertation

### **Esther F. Teplitz Memorial Award**

**Recipient: Brian Molinero**

Awarded to outstanding senior students who are chosen by the faculty of the department

### **John O. Blumberg Memorial Scholarship**

**Recipient: Keith Guydo**

Awarded to a deserving senior in memory of John O. Blumberg, former faculty member in the department

### **M.M. Culver Memorial Fund Award**

**Recipients: Seun Adebisi, Jason Aran, Matthew Badger, Dale Dawes, Erin Goch, Laurel Martin, Eric Pflieger, and Ryan Ritrovato**

Awarded as a memorial to M.M. Culver, professor of mathematics, to an outstanding senior or junior mathematics major

### **Silverman-Culver Prize**

**Recipients: Carolina Manica and Leo Rebholz**

Awarded to graduate students for excellent work

The department and our students appreciate the kind gifts that make these awards possible.

## Welcome New Faculty Members

**Brent Doiron** joins Pitt from the Courant Institute of Mathematical Sciences, Center for Neural Science. He is the recipient of the prestigious Human Frontiers Science Program Long Term Fellowship. Doiron received his PhD under the direction of Andre Longtin in the physics department at the University of Ottawa. Also, he won an award for the top graduating PhD student in the science, engineering, and medicine faculties at Ottawa. Doiron's main area is in neuroscience, where he applies dynamical systems and stochastic methods to a variety of biological problems. He is an expert in stochastic differential equations and his work has appeared in top journals such as *Nature* and the *Journal of Neuroscience*.

**Huiqian Jiang** comes to Pitt from the School of Mathematics at the University of Minnesota. He works on nonlinear partial differential

equations arising in the physical and biological sciences, including reaction-diffusion systems. Jiang recently solved a 30-year-old problem regarding the Gierer-Meinhard system in pattern formation, thin films, and free boundary problems. He has published in leading applied analysis journals.

**Reza Pakzad** joins us from the Max Planck Institute in Leipzig, Germany. Pakzad works in non-linear partial differential equations, form geometry, calculus of variations, and geometric analysis. He will complement and extend our current expertise in our analysis and applied analysis groups. He is the author of a well-known 2004 paper in the *Journal of Differential Geometry*.

Please join us in welcoming these new faculty members to the University community.

## Nobel Laureate Gives Department's Inaugural Michalik Distinguished Lecture

The Edmund R. Michalik Distinguished Lecture in the Mathematical Sciences is part of an annual series started in 2006 from a generous endowment by the Michalik family to honor Edmund R. Michalik.

"Dr. Michalik was a dedicated professor in the Department of Mathematics," said Chair Juan Manfredi. "His wife has said that math was his first love. His dedication and commitment to the department was well known and appreciated."

Robert F. Engle, PhD and Nobel Laureate, gave the inaugural address. Engle was awarded the Nobel Prize in Economics in 2003 for his work on the "methods of analyzing economic time series with time-varying volatility (ARCH)." His presentation centered on "Global Volatility: Its Measurement, Interpretation and Causes."

Another prominent lecturer spoke at the department on April 6. Cathleen Morawetz, former director of the Courant Institute of Mathematical Sciences, gave a talk titled "Collisionless Shocks in Space." Morawetz received a National Medal of Science in 1998 and the Lifetime Achievement award from the American Mathematical Society in 2004.

### Useful links

**New Department of Mathematics**  
**Web site:** [www.mathematics.pitt.edu](http://www.mathematics.pitt.edu)  
**SIAM News:** [www.siam.org/news](http://www.siam.org/news)  
**Michalik Distinguished Lecture:**  
[www.mathematics.pitt.edu/documents/Michalik2007.pdf](http://www.mathematics.pitt.edu/documents/Michalik2007.pdf)  
**McLeod Meeting:**  
[www.mathematics.pitt.edu/resources/mcleod](http://www.mathematics.pitt.edu/resources/mcleod)

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UMC6213-0707

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