

Duke University Math News

May 10, 2009

Graduation

2009 Graduation

More than 50 students will be graduating with a first or second major in mathematics this May. Even in these tough economic times, many of our graduates have lined up excellent jobs in the financial world, been admitted to law or medical school or will pursue graduate work at elite universities in math or a mathematically related field. These students have each succeeded in one of the University's most challenging programs and this experience will prepare each of them for a rewarding career.

To those of you who are leaving Duke, we wish you continued success. Do send *Duke Math News* a note from time to time. At the Graduation Luncheon following graduation exercises on May 10, you have the opportunity to introduce your family to your classmates and professors. Following the lunch, you will receive your diploma in a short but sweet ceremony.

Events

Special Lectures

Professor Ingrid Daubechies of Princeton University visited Duke in early April to present the Annual Sponer Presidential Lecture and two lectures in the Gergen Mathematical Lecture Series. Hertha Sponer was a distinguished scientist and teacher who in 1936 became the first woman on the Duke Physics faculty. John Gergen joined the relatively new Duke Mathematics Department in 1936 and served as chair from 1937 until shortly before his death in 1967.

Although postponed for a day for weather reasons, Daubechies attracted a large and appreciative group of mathematicians, physicists and others for these lectures. In her first lecture, *Applications woven into the mathematical fabric*, Daubechies promulgated her view of applied math as a diverse and

productive area of research. In the Gergen lectures that followed, she described how the use of wavelets, her specialty, can be applied to a wide range of problems such as data compression and analogue-to-digital conversion. In her final lecture she described an exciting real-life story regarding a competition to verify the authenticity of paintings purported to be by Van Gogh. Her role in this was featured in a NOVA program.

Graduate Student Conference

The third annual graduate student conference in Probability was held at UNC from May 1 to May 3. This conference, sponsored jointly by Duke, UNC and the Statistical and Applied Mathematical Science Institute and supported by the NSF, provided a forum for graduate students and postdoctoral fellows to speak and meet others with similar interests.

The organizers of the conference were graduate students Tiffany Kolba and Rachel Thomas and students from UNC. Over 100 students and post-docs had registered and 50 of them gave talks. Keynote speakers were David Aldous, Daniel Stroock, and Russell Lyons.

Undergraduate News

Duke Math Meet

The Duke math meet attracted a record 38 teams for its annual event held last November 15. A team from Thomas Jefferson HSST won the meet with newcomers from A.A.S.T, a magnet public high school in Bergen County, NJ, placing second. Columbia Math Circle and Atlanta Math Club took third and fourth places. In addition to finishing first in the team competition, the leading three individuals in the Meet were Dan Li, Keyyoung Lee, and Brian Hamrick all from Thomas Jefferson. Hamrick took first place in an exciting tie-breaker round.

For this event, DUMU members invite the teams, create the math problems, distribute the lunches,

grade the students' papers and present awards to the winning teams and individuals. In the morning, teams were sent to dozens of classrooms on Science Drive to solve the challenging Power Problem. After a leisurely lunch on the French Science Terrace, they returned to Bio Science auditorium for another series of contest problems, including the fast paced Relay and Devil rounds.

Putnam Competition

The Duke team of Jason Ferguson, Aaron Pollack and Thames SaeSue finished eighth in the 69th William Lowell Putnam Competition, the fourteenth straight top ten finish for a Duke team. Aaron Pollack finished highest among the Honorable Mentions with sophomore Misha Lavrov not far behind. Jason Ferguson ranked among the top 100, Wutichai Chongchitmate and Matt Rognlie placed among the top 5% and Vivek Bhattacharya, Alan Guo, Mark Hallen and Thames SaeSue ranked among the top 12%.

A total of 3627 students from 546 colleges and universities in the United States and Canada participated in the Competition.

Menger Prize

For their top finishes in the Putnam Competition, Ferguson, Lavrov and Pollack received the Karl Menger Award of \$300 each. Chongchitmate and Rognlie received \$150 each for their strong performance. See www.duke.edu/news/awards/menger/ for more information.

ACM World Finals

A team from Duke has competed in the ACM international collegiate competition in computing in Stockholm this April. Math major and DUMU president-elect, Matt Rognlie joined Nadeem Kolia and Siyang Chen in this competition.

Mathematics Contest in Modeling

More than 2000 teams of three undergraduates from around the world competed in the 2008 Mathematics Contest in Modeling. Freshmen Vivek Bhattacharya, Yingyi Shen and Peichun Wang received the ranking of Meritorious for their paper analyzing the power consumption of cellular phones throughout the world and suggesting strategies to reduce this consumption. The team of Jason Chen, Bo-chong Li, and Andrew Tutt also competed successfully in this 96 hour marathon contest.

Julia Dale Award

The Julia Dale prize for excellence in mathematics will be shared this year by seniors Jason Ferguson, Mark Hallen, and Aaron Pollack.

Although graduating in three years, Hallen completed several graduate courses in mathematics and chemistry. He is a B. M. Goldwater Scholar and a PRUV Fellow. His senior thesis qualified Hallen for Graduation with High Distinction. Hallen will pursue a doctorate in Biomedical Engineering at Duke.

Ferguson, an AB Duke scholar and PRUV Fellow, has taken 10 graduate math courses since his first year at Duke. He helped coordinate the Problem solving seminar and took charge of constructing problems for the Duke Math Meet. His senior thesis qualified Ferguson for Graduation with High Distinction. Ferguson plans to continue his research

and study of mathematics as a graduate student at the University of California, Berkeley.

Pollack, an AB Duke scholar, Faculty Scholar, PRUV Fellow and President of DUMU, has also taken 10 graduate math courses. His senior thesis was deemed outstanding and he will graduate with highest distinction. Pollack will enter the graduate program in mathematics at Princeton University this fall.

The winners of the Freshmen Julia Dale prize were Vivek Bhattacharya, Veronica Cioncanel and Ana-Maria Tenekedjieva. Each received a cash award for their outstanding academics.

Graduation with Distinction

Seven students will graduate with distinction in mathematics this year. Each has worked extensively on a challenging mathematical problem under the direction of a Duke professor.

- Jason Ferguson - mentor Chad Schoen; *Factorization of Primes in Biquadratic Extensions of Q*
- Jared Haftel - mentor Mark Huber ; *A Closer Look at ADC multivariate GARCH*
- Mark Hallen - mentor Anita Layton; *Improving accuracy and scope of quantitative FRAP analysis*
- Andy Ng - mentor John Mercer; *Retinoid Transport in the Vision cycle*
- Aaron Pollack - mentor Richard Hain; *Relations between special derivations arising from modular forms*

- Jesse Thorner - mentor William Allard; *Simplicial homology and DeRham's theorem*
- Barry Wright III - mentor Hugh Bray; *Objective measures of preferential ballot voting systems*

Most of these students received a summer stipend as PRUV Fellows to pursue their research project. The PRUV Fellows for this summer will be Wutichai Chongchitmate, Alan Guo, Hans Kist, Jason D. Lee, Thames SaeSue, and Max Tabachnik. Each will receive a stipend for the summer to concentrate on a research problem in mathematics. See <http://math.duke.edu/vigre/pruv/>.

At the annual mathematics department party held April 23, the prize winners and others were honored for their success, as math majors, graduate students and faculty enjoyed food and drink in an informal setting.

Graduate Program News

Graduating Ph.D Students

Sergey Belov completed his Ph.D. thesis *Breaking in the semiclassical solution of the focusing nonlinear Schrödinger equation* in September 2008 under the direction of Stephanos Venakides. Sergey is G.C.Evans Instructor at Rice University, Houston, Texas.

Paul Bendich completed his Ph.D. thesis *Finding and measuring stratifications using persistent intersection and local homology* in September 2008 under the direction of John Harer. Paul holds the position of Lecturer in Mathematics at Pennsylvania State

University. During the fall 2009, he will be a postdoc at the Institute for Science and Technology Austria (in Vienna).

Matthew Surles completed his Ph.D. thesis *Numerical approximations of layer potentials along curve segments* in September 2008 under the direction of J. Thomas Beale. Matt is an actuarial analyst for Anthem Blue Cross Blue Shield in Richmond, VA.

Feng Xu completed his Ph.D. thesis *Geometry of $SU(3)$ Manifolds* in September 2008 under the direction of Robert Bryant. Xu is currently a Postdoc at the Mathematical Sciences Research Institute, Berkeley, CA. He will begin a 5-year postdoc at Australian National University in Fall 2009.

Benjamin Cooke completed his Ph.D. thesis *Folding peptides using replica-exchange molecular dynamics (REMD)* in December 2008 under the direction of Scott Schmidler and Bill Allard. Cooke is currently Assistant Director of the Academic Resource Center at Duke University

Mihaela Froehlich completed her Ph.D. thesis *Two Coating Problems: Thin Film Rupture and Spin Coating* in spring 2009 under the direction of Thomas Witelski. Mihaela recently moved to Heidelberg, Germany.

Wai Jing Law completed her Ph.D. thesis *Approximately counting perfect and general matchings in bipartite and general graphs* in the spring of 2009 under the direction of Mark Huber.

Janice McCarthy completed her Ph.D. thesis *L2 Index theory and D particle binding in Type 1' String Theory* in the spring of 2009 under the direction of Mark Stern.

Abraham D. Smith completed his Ph.D. thesis *Integrability of second-order partial differential equations and the geometry of $GL(2, R)$ structures* in the spring of 2009 under the direction of Robert Bryant. Smith received an NSF Postdoctoral Fellowship in Mathematics at McGill University in Montreal, Quebec beginning fall 2009.

Faculty News

Lenhard Ng

Assistant professor Lenny Ng received a Career

Award, National Science Foundation's most prestigious award in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations. Ng was the fifth Duke mathematics professor to receive this award since 1998.

Math Degree Candidates, Academic Year 2008-2009

First Majors

Taiesha Princess Abrams
 Mehak Khalid Aziz
 Julien Cobert
 Jason Masaya Ferguson
 Brant Ross Frazee
 Abraham Fu
 Ryan Daniel Gehring
 Jared Michael Haftel
 Tyler Bryan Huffman
 Syed Hanif Hussaini
 Kristen Leigh Jones
 Arthur Jye Lei
 Alexander Valerio Modestou
 Matthew Paul Moore
 Aaron Joseph Pollack
 Brandon Michael Roane
 Daniel Louis Schwartz
 Michael William Schwert
 Dana Stefanczyk
 David Andrew Absalon Talley
 Victoria Alana Thain
 Jesse Aaron Thorner
 Haoming Wang
 Ye Wang
 Rory Esteban Wasiolek
 Emily Noel White
 Maria Malgorzata Wojakowski
 Barry Edwin Wright III
 Ray Martin Zeller

Second Majors

John Patrick Barrett
Casey Campbell Callan
Chen-Yu Chang
Alexander Delaney G. Crable
Kiril Pentchev Dimitrov
Helin Gai
Yajing Gao
Cecilia Ann Glass
Lauren Leigh Gundrum
Mark Andrew Hallen
Paul David Kim
Lisa Lam
Andrew Michael Lang
Ya Li
Nicholas Kyle Lowman
Jason Michael Nassof
Andrew Xinghan Ng
Tristan Andrew Patterson
Maxwell Warren Thayer
Andrew Timothy Tutt
Min Hyung Uh
Eric Shiyuan Wang
Ivan Wang
Ryan Peter Williams
Benjamin Wu

Minors

Amy Jean Bell
Molly Rebecca Bierman
Nathan Samuel Freiman
Lucas M. Gong
Brian Northrop Jansen
Amanda Jo Knutson
Chloe Maria Mawer
Jovana Pavisic
Joseph Rauseo
Craig Robert Reeson
Paul Markey Riherd
Daniel Adam Roberts
Caleb Alec Seeley
Crystal Rosalie Senko
Raj Ashish Shah
Scott John Spillias
Agee G Springer
Nicholas Davidson Trombold
Luke William Waggoner
Kenneth Stevenson White
Lydia Yao
Guangyuan Zhu

Master of Arts**September 2008**

Prakash Balachandran
 Hyeonkwon Kim
 Mau-Kwong George Lam
 Wai Jing Law
 Anna Little

December 2008

Alan R. Parry
 Michael D. Pruitt

May 2009

Meghan A. McIntyre
 David E. Rose
 Timothy M. Stallmann

Ph.D.**September 2008**

Dr. Sergey M. Belov
 Dr. Paul L. Bendich
 Dr. Matthew W. Surles
 Dr. Feng Xu

December 2008

Dr. Benjamin P. Cooke

May 2009

Dr. Mihaela K. Froehlich
 Dr. Wai Jing Law
 Dr. Janice M. McCarthy
 Dr. Abraham D. Smith

Duke Math News

The *Duke Math News* is published several times a year and is distributed to those in the Duke mathematics community by campus mail. For previous editions and other news, see www.math.duke.edu/news/. We welcome items of interest for our next issue. Send them to dkrain@math.duke.edu.

To read about other news, honors and events concerning mathematics at Duke, visit www.math.duke.edu/news/. The on-line calendar at www.math.duke.edu/mcal lists both regular and special seminars and colloquia for the upcoming weeks. The department maintains video archives of talks, lecture series and special conferences at Duke, many of which are available, on-line. See www.math.duke.edu/computing/broadcast.html for more information.

—David Kraines, DMN Faculty Sponsor

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