Welcome

Inside this edition of the Duke Math News, you will find some information about the new faculty and graduate students in the department, you can read about events and courses of possible interest to undergraduates, and you can bask in the reflected glory of those who have been granted honors and awards.

To those new to the Duke Mathematical Community, we hope that you have found a congenial atmosphere at Duke and especially within our department. To those returning, you have surely noticed that the construction around our building is finally drawing to a close and the noise level in our classrooms is not as oppressive as last year. If you have any problems or concerns that we can address, we welcome your suggestions for improvement.

—*E*ditor

Events

Einstein Celebration

Professor Arlie Petters and assistant professor Anita Layton organized a conference this September celebrating the centennial of Einstein's celebrated papers. Duke math and physics professors Robert Bryant, Ronen Plesser, Kate Scholberg and Arlie Petters outlined several of the contributions of Einstein and their implications for modern physics. Professor Ted Newman from the University of Pittsburgh entertained the audience with anecdotes concerning some of the major figures in 20th century physics. The week celebration was capped by the Duke Undergraduate Relativity Competition in which senior math physics major Abhijit Mehta '06 won $1000 for his first place finish and junior math and physics major Morgan Brown '07 took home $500 for placing second.

Undergraduate News

DUMU

The Duke University Math Union sponsors social events, gaming sessions and an occasional sports competition with the Society of Physics Students. All Duke students are welcome to participate. Contact Brandon Levin `bwl3@duke.edu` or Keigo Kawaji `kk34@duke.edu` to get on the DUMU mailing list.

High School Math Meet

This annual ARML style competition attracts up to 200 high school students from throughout the southeast. Duke students are needed to compose contest problems, to help with registration and to act as guides for the many teams that will be coming to Duke for this day-long event on Saturday, November 19. Encourage your high school math teacher to bring a team. Get a chance to introduce your former classmates to a taste of the Duke experience. For more information, contact Paul Wrayno `pmw5@duke.edu` or Dr. Garrett Mitchener `wgm@math.duke.edu` . See also `http://www.math.duke.edu/dumu/contests/2005/`.

Math Competitions

Two dozen Duke undergraduates competed in the the Virginia Tech Math Contest on October 29. While the results will not be known for another month, all signs point to continued domination of this meet by Duke. All undergraduates are welcome to take the W.L. Putnam Math Competition from 10 to 6 on Saturday, December 3. Lunch will be provided for participants and monetary prizes will be awarded. If you are interested in taking this challenging test of mathematical ingenuity or if you would like more information, contact Nikifor Bliznashki `nb22@duke.edu` or David Kraines `dkrain@math.duke.edu`.

PRUV Fellows

Among the Duke undergraduates who participated in mathematically related research last summer were members of the sixth class of PRUV Fellows: Nikifor Bliznashki , Slava Kungurtsev, Brandon Levin, Peter Merkx , Ibraheem Mohammed, Qinzheng Tian , Gabriel Williams and Yee Lok Wong. Each of these students worked with a Duke math professor for at least six weeks on a project that is expected to lead to a senior thesis worthy of graduation with distinction. On October 4 and 5, the six PRUV Fellows in residence this fall each gave a short talk on their research project. For more information and an application form for the 2006 program, see `http://www.math.duke/vigre/pruv`.

Math Contest in Modeling

The team of Pradeep Baliga '06, Adam Chandler '06, and Matthew Mian '06 wrote an award-winning paper for the Mathematical Contest in Modeling (MCM) last February. The Consortium for Mathematics and its Applications (COMAP) and the Mathematical Association of America (MAA) selected their paper, "The Booth Tolls For Thee," for an Outstanding rating and invited them and their team advisor, W. Garrett Mitchener, to Albuquerque, New Mexico, last August to present their work at the annual MAA Mathfest. The students wittily recounted how they developed three models for the flow of traffic through a toll plaza, yielding [1.6L+0.9] as the optimum number of booths, where L is the number of travel lanes. The North Carolina Department of Transportation has contacted the students for advice.

While at the Mathfest, Baliga and Chandler competed brilliantly against other undergraduates throughout the country in the US National Collegiate Mathematics Championship sponsored by the American Society for the Communication of Mathematics. For taking first prize, Baliga is to receive a Texas Instruments calculator. Chandler finished third in this competition.

The MCM is an extremely challenging contest, requiring teams of students to spend a weekend creatively solving a real-world problem by applying a wide range of mathematical techniques and plenty of creative thinking. Over 800 teams around the world participated in this contest last February. The department thanks Baliga, Chandler, and Mian and Duke's other MCM teams for representing our university so well.

Undergraduate Courses

Math 196S *Introduction to Computational Modeling in the Life Sciences*

The course will focus on the construction and analysis of models for oscillations and flows, such as in the cell cycle and the cardio-vascular system. An additional goal is to teach what research in computational science is about and how to get it done! Emphasis will be placed on the collection, management and analysis of data using a variety of computational and simulation tools, including *Matlab*, *Amira*, and *AVS*. Students will work on both group and individual projects.

This course is an introduction to the (currently unofficial) program in undergraduate research in computational science, engineering and medicine, offered by the Duke Center for Computation Science, Engineering and Medicine(CSEM). Students in this course will be encouraged to work on research projects in summer 2006. Stipends will be available on a competitive basis. Students will also be offered the opportunity to continue to work with CSEM throughout their careers at Duke - making use of the new methods and tools in scientific visualization, distributed computing and database analysis.

Priority for enrollment will be given to sophomores who expect to major in the natural sciences or engineering. Prerequisites Math 107 or 131.

Instructor John Harer

> *God does not care about our mathematical difficulties; He integrates empirically*
>
> —Albert Einstein

Graduate Program News

New Graduate Students

Twelve graduate students join our program this fall. Wth their undergraduate institution, they are:

- **Matthew Bowen,** University of Pennsylvania
- **David Cesa,** Northwestern University
- **Oliver Gjoneski,** Bates College
- **Kevin Gonzales,** Rochester Institute of Technology
- **Aubrey Hb,** Bard College, Columbia University
- **Jeffrey Jauregui,** Harvey Mudd
- **Michael Jenista,** Notre Dame University
- **Mau-Kwong(George) Lam,** Johns Hopkins University
- **Veronica Rozmiarek,** Michigan Tech Univesity
- **Lauren Shareshian,** New York University
- **Alberto Teguia,** East Tennessee State University
- **Rachel Thomas,** Swarthmore College

Teaching Award

The 2004-2005 winners of the L.P. and Barbara Smith Award for Excellence in teaching are Wenjun Ying, Bill LeFew, Thomas Laurent, and Dan Yasaki. These winners will each receive an award of $1000, as well as the recognition which accompanies their selection. This award was made possible by Captain and Mrs. Smith, who established a fund in 1981 for the purpose of recognizing graduate students who have excelled in teaching mathematics. Captain Smith had been Supervisor of First-year Instruction in the Mathematics Department from 1973 until his retirement in 1982.

Laura Taalman received the MAA's Henry L. Alder Award for Distinguished Teaching at the MAA's summer meetings in Albuquerque last August. This award honors beginning college or university faculty whose teaching has been extraordinarily successful and with an influence beyond their own classroom. Taalman received her Ph.D. from Duke in 2000 and is currently an assistant professor at James Madison University. Her book *Integrated Calculus* has been published this year.

Faculty News

New Faculty

The following professors and research associates have joined the department this fall.

- Postdoctoral Fellow **Jin An** comes to Duke from Cambridge University. He will work with Arlie Petters on Gravitational Lensing.

- VIGRE Postdoctoral Fellow **Anne Catllá** received her Ph.D. in applied mathematics from Northwestern University. She works on problems in dynamical systems and pattern formation.

- Assistant Professor and Lecturing Fellow **Joshua Davis** received his doctorate from the University of Wisconsin (Madison). His research is in symplectic topology, specifically Gromov-Witten Theory.

- Visiting Associate Professor of Physics **Savi Iyer** is visiting from SUNY-Genesco. She works on problems in General Relativity.

- Visiting Assistant Professor **Amir Jafari** received his doctorate at Brown. He comes to Duke after a year each at Northwestern University and the Institute for Advanced Study. His research is in Arithmetic Geometry.

- Assistant Research Professor **Dan Lee** received his doctorate from Stanford University. He works in geometric analysis, specifically special Lagrangian geometry.

- Postdoctoral Research Associate **Rachel Levy** received her Ph.D. in applied mathematics from NCSU. She will be working with Thomas Witelski on the fluid dynamics of thin liquid films.

- Postdoctoral Research Associate **Yurij Mileyko** received his doctorate from Stevens Tech. He will be working with John Harer and Herbert Edelsbrunner on computational topology.

- Visiting Professor **Alex Oron** is at Duke on sabbatical from the Technion in Israel. His expertise is in the area of fluid dynamics.

- Visiting Assitant Professor **Gregory Pearlstein** received his doctorate from the University of California at Irvine and comes to us after a year at the Institute for Advanced Study. His specialty is Hodge Theory.

- Visiting Assistant Professor **Fernando Schwartz** received his doctorate from Cornell University. He works in differential geometry.

- Assistant Research Professor **Jin Wang** received his doctorate from Ohio State University. His research field is numerical analysis and scientific computing.

Faculty News

With the support of fellowships from the Guggenheim Foundation, the Clay Mathematics Institute, and the Mathematical Sciences Research Institute, professor David Morrison is participating in the program "Mathematical Structures" in String Theory at the Kavli Institute at UC Santa Barbara during the fall of 2005 and will participate in the program "New Topological Structures in Physics" at MSRI in Berkeley during the spring of 2006.

Duke research associate Rachel Levy, recently of North Carolina State University, was awarded the SIAM student paper prize for her paper titled *Kinetics and Nucleation for Driven Thin Film Flow* at the annual SIAM meeting in New Orleans last July. The co-author is professor Michael Shearer of NCSU and adjunct professor at Duke.

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 `jones@math.duke.edu` or `dkrain@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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