Duke University Math News October 1, 2010

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Welcome

As Director of Undergraduate Studies in the Mathematics Department it is my pleasure to welcome you back for the new academic year. Clark Bray, the Associate Director of Undergraduate Studies, is working closely with me to assist you.

Let me mention a few resources available to you. There is lots of information at our web site, www.math.duke.edu, under the heading *For Current and Prospective Undergraduates*.

Click on *undergraduate mathematics* for information about courses, transfer credit, study abroad and (at the bottom of the page) summer research programs. Information about social activities is available through the link to the Duke University Mathematics Union. You will also find the online version of the *Handbook for Majors and Minors*, which contains information about major/minor requirements and course prerequisites. Clicking on *Why major in math* in the middle of the page brings up a brief discussion of career opportunities for math majors. Much more information is at http://www.ams.org/programs/students/ undergrad/undergrad towards the bottom of the page under *Careers*.

It is never too early to think carefully about what you might be doing after graduation! Your departmental adviser and I are here to try to answer your questions and offer advice. The best way to contact me is by e-mail: schoen@math.duke.edu.

Let's make this an enjoyable and productive term!
—Chad Schoen, D.U.S.

Lectures and Events

Triangle Lectures in Combinatorics
On September 25 the Duke Mathematics department hosted the Triangle Lectures in Combinatorics, the Fall 2010 installment of a series of combinatorial workshops rotating among the universities in the Research Triangle. The speakers this fall will be Alexander Barvinok, Anne Shiu, Sami Assaf, and Persi Diaconis. The workshop is supported by the National Science Foundation, with additional funds provided by Duke University. For more information see http://www.math.ncsu.edu/TLC/

Training in Mathematical Biology
The Mathematics Department has received a large Research Training Grant (RTG) from the National Science Foundation to support the training of undergraduate and graduate students in mathematical biology. The grant includes funds to support eight undergraduates every summer for the next five years as well as summer and academic year support for graduate students. The Principal Investigator of the grant is Professor Michael Reed who is serving as Director of the project. Professor Anita Layton is the Assistant Director. The Director is advised by a committee of distinguished Duke biologists.

The RTG grant and University funds will be used to hire three postdoctoral associates during the course of the grant. The first, Karin Leidermann, has joined the faculty this Fall. She is an expert on partial differential equations and studies the mechanisms of blood clotting and blood flow around clots. Many of the faculty in the Mathematics Department have expertise in both pure and applied mathematics and spend part of their research time solving biological or medical problems or developing areas of pure and applied mathematics inspired by biology.

Everyone is invited to the mathematical biology colloquia on Fridays, 12noon - 1pm in room 119 of the Physics Building.

To check out the research interests of the faculty and find out more information about the RTG grant, go to the Department's webpage and click on *mathematical biology at Duke* in the fish at the bottom.

Undergraduate News

DUMU

The Duke University Math Union sponsors events ranging from math contests and speakers to games nights and basketball contests. The Freshman Social on East Campus on Saturday, September 11, attracted over 50 students to partake of Thai food and learn about the math program. Thanks especially to Yiwen Zhu and Thames SaeSue for organizing this fun dinner and arranging for the food.

DUMU welcomes your participation and suggestions for other activities. For more information or to get on the DUMU mailing list, contact DUMU Secretary, Yingyi Shen (`ys53`).

Competitions

All undergraduates are eligible to participate in various mathematical competitions. The Virginia Tech Math Contest will take place from 9 to 11:30 on Saturday, October 30. The more challenging W. L. Putnam Mathematical Competition will be held on Saturday, December 4. These competitions require creative insight and rigorous proofs more than technical knowledge of higher math. Interested students are invited to attend practice sessions in Math Physics 119 each Thursday evening from 6:00 to 7:30. Contact Joe Keefer (`jjk22`) or Misha Lavrov (`mpl10`) for more information.

The Mathematical Contest in Modeling attracted over 2500 teams of three undergraduates from around the world last February. For four days and four nights, teams grappled with one of two open-ended real-world problems for which they were to develop a mathematical model.

For more information about these contests, contact contest coordinator David Kraines (`dkrain@math.duke.edu`) and see `www.math.duke.edu/news/awards/competitions.html`.

Duke Math Meet

The Duke Math Meet is scheduled for Saturday, November 13, 2010, and DUMU is busily preparing to welcome over 300 high school students from Alabama to New Jersey. Duke students design and grade math problems for this annual event and award prizes to the top teams and individuals. Student volunteers assist competitors and coaches with registration, escort them to contest rooms, serve lunch and distribute the awards at the wrap-up ceremony.

Contact your high school math teachers and encourage them to participate in this competition. More information and registration details are at `www.math.duke.edu/dumu/mathmeet`. If you are willing to volunteer or if you have any questions, contact Joe Keefer (`jjk22`).

Summer Research Opportunities

The PRUV Fellow program provides summer stipends for sophomores and juniors to engage in mathematical research projects leading to a senior thesis and Graduation with Distinction honors. Each summer since 2000, up to nine undergraduates have been paired with faculty mentors for six weeks of intensive research.

The 2010 PRUV Fellows, Veronica Ciocanel, Kaitlin Daniels, Theo Frelinghuysen, Misha Lavrov, Philip Pham, Yingyi Shen, Bo Waggoner, and Peichun Wang have given talks on their summer research projects this September. For more information and an application, see `www.math.duke/vigre/pruv/` or contact David Kraines `dkrain@math.duke.edu`.

Even in these tight economic times, internships and research opportunities are available throughout the country for math and math related activities. Over the past decades, Duke students have attended many of the NSF sponsored Research Experience for Undergraduates programs in math. A list of such programs for summer of 2011 should be available by the end of this year.

Graduate Program News

We are happy to welcome the following students into our graduate program:

- **Phillip Andreae** from Emory University

- **Halcyon Derks** from Kalamazoo College

- **Jack Enyeart** from the University of Notre Dame

- **Brian Fitzpatrick** from Trinity University

- **Tingran Gao** from Tsinghua University (China)

- **Torin Greenwood** from the University of Pennsylvania

- **Caitlin Leverson** from Wellesley College

- **Alex Pruss** from the University of Utah

- **Joey Schmitt** from the University of Notre Dame

- **Kangkang(Claire) Wang** from Georgia Tech

- **Yuan Zhang** from Peking University (China)

—*T*om Witelski, DGS

2010 NSF Fellowship

Second year math graduate student Anil Venkatesh has been awarded a 2010 National Science Foundation Graduate Research Fellowship from the NSF Division of Mathematical Sciences (Algebra and Number Theory section). Applications for the 2011 fellowship competition (open to undergraduate seniors and first year graduate students who are US citizens) must be completed by November 18, 2010. For more information, see `http://www.nsf.gov/publications/pub_summ.jsp?WT.z_pims_d=6201&ods_key=nsf10604` .

Sixth year math graduate student, Oliver Gjoneski has been awarded a Katherine Goodman Stern Fellowship by the Duke Graduate School for 2010-2011.

Excellence in Teaching Award

The 2009-2010 winners of the L. P. and Barbara Smith Award for Excellence in Teaching are Sarah Schott and Alan Parry. Each of these excellent teachers will receive a substantial award from a fund provided by the Smiths.

Sarah has done an excellent job in teaching calculus at a variety of levels. Her students consistently praise her for her clarity, organization, and hard work in helping them. Sarah has made contributions to curriculum development and provided leadership to other graduate student teachers.

Alan has shown enthusiasm for helping those undergraduate students who struggle most in math. Those students have expressed their appreciation for his willingness to spend time helping them, for his ability to explain mathematics, and for his concern that they succeed. Alan has also made contributions to course development and has been an ongoing participant in the calculus committee.

Sarah and Alan have demonstrated the commitment and the success in the classroom which L. P. and Barbara Smith valued so much and wanted to recognize. It is fitting that the generosity of L. P. and Barbara Smith have enabled our Department to recognize Sarah and Alan with these awards, and it is appropriate that we also take this time to honor the memory L.P. and Barbara Smith whose friendship and generosity still touch us today.

—*Lewis Blake*

Faculty News

New Faculty

The following professors and research associates have joined the Duke University Department of Mathematics:

- **Robert Calderbank**, previously Professor of Electrical Engineering and Mathematics at

Princeton University, has joined the Duke University faculty as Professor of Computer Science, Mathematics, and Electrical & Computer Engineering. Moreover, he has assumed the position of Dean of the Natural Sciences at Duke. Professor Calderbank was elected to the National Academy of Engineering in 2005.

- **Ingrid Daubechies**, Professor of Mathematics at Princeton, will join the faculty of the Duke University Department of Mathematics in January, 2011. Professor Daubechies was elected to the National Academy of Sciences in 1998. Watch for more about Professor Daubechies (pronounced "DOHB-shee") in the spring issue of the Duke Math News.

- **Richard Durrett**, previously Professor of Mathematics at Cornell University, joined Duke's Department of Mathematics on July 1, 2010. Durrett is the author of more than 170 research papers and nine books. He was elected to the National Academy of Sciences in 2007.

  Professor Durrett has made significant contributions to probability and to pure mathematics: he as solved a number of open questions in Brownian motion, particle systems, and random graph theory. He has applied the ideas and techniques of probability theory to biological systems where his research has had important influence in ecology and genetics. His work has popularized important biological questions in the mathematics community and helped educate biologists to the power of mathematical methods. His paper with Levin, "The importance of being discrete (and spatial)" helped to advance the use of stochastic spatial models in ecology. In the general area of genetics, Durrett has contributed to microsatellite evolution, the study of selective sweeps, and more recently to cancer modeling. His book, *Probability Models of DNA Sequence Evolution*, is a useful introduction for mathematicians.

  While a professor at UCLA and subsequently at Cornell University, Durrett trained 39 Ph.D. students and mentored numerous postdocs. He is known for his warmth and the genuine interest he takes in the well-being of his students,

as well as for his humor and informal manner. At Duke, he will play a central role in probability research and in the mathematical biology research group.

Durrett has assumed the role of Associate Director of the NSF-supported Statistical and Applied Mathematical Sciences Institute (SAMSI), which is located in Research Triangle Park, NC. SAMSI's mission is to forge a new synthesis of statistics and applied mathematics with disciplinary science to confront the very hardest and most important data- and model-driven scientific challenges.

New Visiting Faculty

- Visiting Assistant Professor Manoj Gopal-Krishnan, on leave from the School of Technology and Computer Science at the Tata Institute of Fundamental Research, Mumbai, India, has joined our faculty for the fall semester. Gopalkrishnan is teaching a course on the foundations of nanoscience. His visit is supported by the Mathematical Biology Research Training Grant, which has been awarded to our department by the National Science Foundation.

- Visiting Assistant Professor Mark Iwen, recent Ph.D. from the University of Michigan and most recently a visitor at the Institute for Mathematics and its Applications, is working closely with Mauro Maggioni.

- Visiting Assistant Professor Karin Leiderman, recent Ph.D. from the University of Utah, is participating in activities sponsored by the Mathematical Biology Research Training Grant.

- Assistant Research Professor Ivan Matic, recent Ph.D. from the University of California, Berkeley, is working closely with Jim Nolen.

- Visiting Research Scholar Anne Shui, recent Ph.D. from the University of California, Berkeley, is an NSF Postdoctoral Fellow. She is working with Ezra Miller.

- Visiting Assistant Professor David Sivakoff, recent Ph.D. from the University of California, Davis, has a joint appointment with SAMSI and is working with Professors Durrett and Mattingly.

- Instructors Sarah Williams and Xavier Mela are again helping us meet the challenges of our growing course enrollments.

Special Faculty Honors, Grants, and Awards

Ingrid Daubechies has been elected president of the International Mathematical Union, the first woman to hold that position. See `http://www.alphagalileo.org/ViewItem.aspx?ItemId=83171&CultureCode=en`

Anita Layton has received a 5-year grant from the National Institutes of Health of $1,268,671 to continue her research into mathematical models of renal transport and dynamics.

Arlie Petters, the Benjamin Powell Professor of Mathematics, Physics, and Business Administration, has been named chair of the inaugural Council of Science Advisers to the Prime Minister of Belize.

Duke Math News

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