The Quaternion

USF UNIVERSITY OF SOUTH FLORIDA

Just a Thought about Poincaré
by Boris Shekhtman

Andrei Okounkov, Grigori Perelman, Terence Tao, Wendelin Werner. Which of these names sounds familiar? If you circled Perelman you are not alone. I do not remember when so many people from different walks of life asked me about a mathematician:

"Do you know the dude? What's he done?"

"Not personally but he solved the Poincaré Conjecture."

"What's that?"

"He proved that a 3-dimensional, simply-connected manifold is homeomorphic to a sphere"

Then after a pause, "Yeah, whatever, dude. What do you think? Is he nuts?"

So who is Perelman and why is he crazy?

Grigori "Grisha" Perelman, WJM, 40, mathematician, lives as a recluse in St. Petersburg, Russia, in small one-bedroom apartment with his mother. Favorite activities include opera, long walks through the woods, gathering berries, mushrooms, and thinking. In 2002, posted a proof of Poincaré Conjecture. Awarded Fields Medal, the traditional "Nobel of mathematics" in August 2006, but declined to accept the prize. In search of: Friends. (They don't have to be mathematicians).

Refusing the medal brought him (and the Poincaré Conjecture) the notoriety. The other three people mentioned at the beginning of this article also received Fields Medals but accepted them and went unnoticed. Grisha stole the limelight. In December, 2006, (four years after the discovery but a few months after the refusal) the journal *Science* recognized Perelman's proof of the Poincaré Conjecture as the scientific "Breakthrough of the Year", the first such recognition in mathematics.

He certainly got more fame than he would had he accepted. In the minus column, he is out about ten thousand bucks (after taxes). You do the math. Power…? That remains to be seen, but according to *The*

The R. Kent Nagle Lecture Series

The Navier-Stokes (ordinary differential) equations are extensions of Newton's laws of motion to flows of liquids or gases. Developed by Claude-Louis Navier and George Gabriel Stokes (among others) during the Nineteenth century, these equations are critical in modeling weather, air flow around planes and rockets, motions of stars in a galaxy, and many other physical phenomena.

These equations are very difficult to solve, and the Clay Institute has offered $ 1,000,000 for a tractable solution as one of the seven "millennial problems" in modern mathematics.

Fang-Hua Lin, Silver Professor of Mathematics at the Courant Institute of Mathematical Sciences at NYU and recipient of a Sloan fellowship, a Presidential Young Investigator Award, the Bochner Prize, and the Chern Prize, came to USF last spring to outline some of the problems facing mathematicians who try to solve these equations.

The equations start with the "conservation of mass": as a liquid or gas flows, none can appear or disappear. So one starts by formulating the statement *the amount of matter does not change; it can only move from one place to another*. These statements are differential equations with unknowns: do solutions for these unknowns exist? And assuming that the equations are correct and solvable, how might we compute these solutions?

The Nagle Lecture Series was established in honor of the late R. Kent Nagle, a mathematician deeply interested in mathematics in itself, in education and in society. In this spirit, the NLS invites world renowned scholars to speak on mathematics in lectures designed for the general public.

The next Nagle Lecture will be on November 1, when **John H. Conway** *will speak at 7:30 pm in BSF 100. His talk will lead into the Knotting Mathematics and Art Conference. For more information, consult the event web-page* http://www.math.usf.edu/~saito/Nagle/conway.html.

Perelman, *continued from Page 1*

New Yorker, another former Fields Medal laureate, Shing-Tung Yau, attempted to "use" Perelman's work to gain absolute power over mathematics in China (a country of a billion people!).

Is there a woman? Well…you read his personal.

Yet there may be a profound wisdom to his actions. A job in academia awards us the luxury of having a day or so per week that I like to call "A Thinking Day." A day, completely void of anything mundane, spent in joy of thinking about anything that comes to mind. No guilt, no interruptions, just me and my thoughts. An intellectual Sabbath if you will. So ... maybe the "dude" is brave enough to give himself a "Thinking Life." Have you ever thought of that? I have (on my Thinking Day, of course).

And then… maybe he is simply nuts!

Transitions

Arun Mukherjea retired this summer. He received his Master's degree in Applied Mathematics from Calcutta University in India and his Ph.D. degree in Mathematics from Wayne State University in Detroit. After a brief stay at Eastern Michigan University as an Assistant Professor, he joined USF in 1969 as an Assistant Professor of Mathematics. He has been a Professor of Mathematics at USF since 1975. During his forty years of service, Professor Mukherjea has been one of our most productive research mathematicians – publishing dozens of books, monographs, and chapters, and scholarly research papers. His research interests include the study of probability measures on algebraic structures, weak convergence of their convolution products, and random walks induced by such measures; also, Markov chains, problems in multivariate analysis concerning identification of parameters in multivariate distributions, and random matrices and limit distributions of their products. We wish him well on his further adventures.

Meanwhile, Catherine Bènèteau, Brendan Nagle, and Dmitry Khavinson joined our faculty during the 2006-2007 academic year.

Catherine Bènèteau received her Ph.D. from the State University of New York at Albany in 1999. After a stint at the Center for Talented Youth at Johns Hopkins University, she went to Seton Hall, where she continued her work in complex function theory. Her current NSF grant supports the development of a multidisciplinary course in wavelets and their applications.

Dmitry "Dima" Khavinson came to us from the National Science Foundation, where he was the Program Director in Analysis, and before that Distinguished Professor of Mathematics at the University of Arkansas. He received an M.S. from Moscow State Pedagogical Institute (Moscow, USSR) in 1978, then, after immigrating to the United States, earned his Ph.D. from Brown University in 1983. He has worked in a broad range of areas of analysis, from approximation theory to potential theory to differential equations to real analysis to ... all appearing in two books and over seventy papers. He has also mentored student theses from high school student projects to doctoral dissertations.

Brendan Nagle received his PhD from Emory University in 1999. The intervening years were spent as a postdoctoral fellow at Georgia Institute of Technology, and Assistant Professor at the University of Nevada, Reno. He continues his work in various areas of graph theory, especially hypergraph and extremal theory.

Faculty News

Natasha Jonoska was awarded the *DNA Scientist of the Year Award* during the Thirteenth International Meeting on DNA Computing this year. This award, also called the *Tulip Award* because the trophy is a crystal tulip, is given in recognition of long-term contributions to molecular computing. Tulips have been awarded annually since 2000, and are awarded at the annual DNA Computing conference.

Dima Khavinson's work in gravitational microlensing got him an invitation to be a plenary speaker at New Trends in Complex and Harmonic Analysis in Bergen, Norway, in May.

Wen-Xiu Ma served as President of the Chinese-American Association of Tampa Bay and co-edited a special issue on Topics on Integrable Systems in the *Journal of Computational and Applied Mathematics*.

Manoug Manougian was invited to the Oxford Round Table to present a paper on reclaiming trust in government; the conference itself was on the waning of trust in government.

Jogi Ratti and **Marcus McWaters** have published a new text, *College Algebra*, with "a strong emphasis on both concept development and real-life applications." Published by Pearson/Addison-Wesley, it is designed to help students "find mathematics useful and interesting."

Vilmos Totik has co-authored a book, *Problems and Theorems in Set Theory*, with Peter Komjáth of Eotvas University in Budapest, Hungary.

Yuncheng You will be visiting Shanghai University in China as a Ziqiang Distinguished Visiting Professor this fall.

USF Math Club Activities

Last year, the MAA Student Chapter was led by Denise Kalos (President), Michael Grossman (Secretary), and Nicole Hooper and Ryan Grotheer (Treasurer). The PME was led by officers Egor Dolzhenko (President), and Christine Fitch (Vice-President). The two clubs met jointly 14 times, and heard presentations by students Brent King and Clayton Beardsley, Oleg Polupan, Dewey Estep, and Erik Lundberg, as well as former student and current entrepreneur Kurt J. Long.

Members attended the 2006 MAA Suncoast Meeting at Hillsborough Community College, the 2007 MAA Florida Section Meeting at FSU (where Matthew Williamson gave a talk), and the 2007 MAA/AMS Joint Meetings at New Orleans; we are grateful to the USF Student Government, the Math & Stat Department, and generous donors for financial support.

PME and the Math & Stat Department twice hosted the biannual Hillsborough County Math Bowl, to which all Hillsborough County High Schools send their best math students to complete in individual and as team categories. About 400 students and teachers showed up at the USF Sun dome in November, 2006 and April, 2007 for a half-day of mathematical competitions in algebra, geometry, pre-calculus and calculus. Overall winner bragging rights went to Middleton High School both times.

Sandra Bird, Egor Dolzhenko, Dewey Estep, Lisa Fazio, Amanda Griffith, Elizabeth Kieran and Oleg Polupan reviewed a chapter of a new calculus book published by Freeman Publishing Co., which awarded the Math Club $500.00 for this work.

The PME's annual banquet in April featured thirteen new members: Joy D'Andrea, Gary Dowd, Zach Jett, Dahomey Kadera, Kenneth Killian, John M. Kowalik, Jill Lusk, Keith McLaughlin, Darwin Morardiellos, Tillahun Muche, Anna Panakhio, Stewart Sumpton and Leslie Vachon. The keynote speaker was Math & Stat professor **Catherine Bénéteau**, who spoke about "Mathematical Morsels: A Peek into the World of a Geek." Oleg Polupan was named 2007 PME Outstanding Scholar, and Keith McLaughlin was recognized as the overall winner of the MAA Club's monthly "The Math problem of the Month" contest.

Student News

Ten students were awarded doctorates between June 2006 and June 2007 (the dissertation director is in parentheses): Kheira Ameur (Masahiko Saito), Gokarna R. Aryal (Chris P. Tsokos), Louis R. Camara (Chris P. Tsokos), Edgardo S. Cureg (Arunava Mukherjea), Jemal E. Gishe (Mourad E. H. Ismail), Abdelelah M. Mostafa (Kandethody Ramachandran), Joni B. Pirnot (Natasha Jonoska), Joseph O. Quarcoo (Athanassios Kartsatos), Michiru Shibata (under Yuncheng You), and Rebecca D. Wooten (Chris P. Tsokos).

Twelve students were awarded masters degrees: Hari P. Adhikari, Anand Ravindra Bhat, Chunling Cong, Natalie Davis, Sandra D. Draper, Sasko Ivanov, David Paul Nezelek, Thucdoan T. Nguyen, Wilkistar Otieno, Andrew Purcell, Arnut Paothong, and Yiting Yu.

Twenty-five students were awarded bacca-laureate degrees: Eric Adams; Nichole Blaquiere; Oscar Castro; Jason Copenhaver, Magna Cum Laude; Daniel Cordeiro; Lisa Fazio, Cum Laude; Casey Garrett; Melody Goodenough, Magna Cum Laude; Amanda Griffith, Cum Laude; Matthew Grace; Melissa Holmes; Crystal Johns; Juliana Kamenica; Elisabeth Kieran, Magna Cum Laude; Sherry Lashley, Magna Cum Laude; Jason Paradis; Oleg Polupan, Magna Cum Laude; Uriana Ponson; Marcus Rodriguez; Cassaundra Slessman; Sherry Taylor, Magna Cum Laude; Aichuc Truong; Vien Truong; Shannon Watkins; and Rachel Zemetres.

Center for Mathematical Services

The thirtieth consecutive USF summer program for gifted and high ability students ran from July 3 to August 10. The program was divided into two levels, each level having three components: Mathematics, Computer Science, and Environmental Science. Level I, for students entering grades 8-10, had 37 students and was coordinated by **Manoug Manougian**. Level II, for students entering grades 11& 12, and working in collaboration with USF Honors College, had 20 students. Students received both high school and college credits in the program.

Justin Norris of Jesuit High School and Derrick Archer of Tampa Bay Technical High School were awarded stipends to participate in a research program sponsored through a grant from the Academy of Applied Science with **J. S. Ratti**. Mr. Norris worked with **Brian Curtin** on "Some Research into Graph Theory," and Mr. Archer worked with **Xiang-Dong Hou** on "Solving Recurrence Relations".

We had a very successful program in 2007 and look forward to an even better program in 2008.

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The Newsletter of the USF Department of Mathematics & Statistics
In this issue:

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News of the Math & Statistics Department

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We'd Like to Hear from YOU!

The Department of Mathematics & Statistics would like to hear from alumni, friends, collaborators, members of the community, and fellow explorers of and guides to the world of mathematics. Contact us at: 974-2643, or fax 974-2700. E-mail <mathdept@math.usf.edu>. We have a web-page at <http://www.math.usf.edu/>. Snail-mail address is Department of Mathematics & Statistics, University of South Florida, 4202 E. Fowler Ave., PHY114, Tampa, FL 33620.

New Faculty

We are pleased to announce the arrival of three new faculty this year: Wonkuk Kim, Sherwin Kouchekian, and Gangaram Ladde.

Appeal for funds

We are a growing department in a new university, and we strive to develop new programs to meet the needs and provide opportunities for our students and our community to fulfill their aspirations. With all due respect to Benjamin Franklin, many of the best things in education and scholarship cost money. We would appreciate any assistance we can get from alumni and the community. Feel free to contact our chair, Marcus McWaters, at the above address for details.