Math Times

Letter from the Chair

Dear Colleague,

This fall semester 53 new students have come to the department to start their graduate work. Some of these student mathematicians have received their bachelor's degrees this year; others have been out in the world for a while.

The term began with a total campus enrollment of 10,070 students in the department's courses, ranging from Mathematics 102 to Math 499. Our faculty continue working to improve the teaching of mathematics from the beginning classes through the most advanced graduate courses.

Summer in Urbana-Champaign was even hotter and more humid than usual, but the weather did not slow down the members of the department. Many of our faculty went to meetings and conferences elsewhere in the country or abroad to give papers on their work and to talk with colleagues. Others stayed here and did what they always do, worked on their research.

On campus, in addition to summer courses and the usual mathematical work, a lively geometry institute for graduate students from all over the country was held in July. And in May many distinguished visitors were welcomed at a conference held here in honor of former department head Heini Halberstam. See articles inside on both.

Three of our long term faculty members **Eva Gray, Franz Kamber**, and **Richard Jerrard**

retired and were honored at a reception at the close of the spring term. They are each continuing to be active.

This year several academic staff members will be on leave. Among them **Nigel Boston** will spend some time at the Institute for Advanced Study and some at Harvard, and **Lou Van den Dries** will visit the Universities at Rennes and Oxford this term. **Sergei Ivanov** will spend the first semester this year at the Center for Advanced Study at UIUC, and **Everett Dade** will be at the Center the second semester. In spring **Peter Loeb** plans to visit universities in Frankfurt and Munich, **Esther Portnoy** will go to the Australian National University in Canberra, and **Paul Schupp** will go to France, to IHES, the Universities of Paris VII and of Marne-la-Vallee.

Three new assistant professors joined the staff: **Kequan Ding, Robert Jerrard**
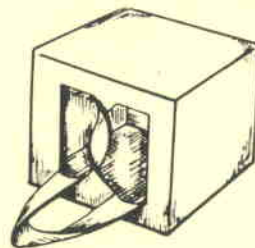
and **Eugene Lerman**. A fourth assistant professor, **Richard Sowers**, will come in January. In addition this year there are several visitors who will be teaching.

Please keep the letters coming. We are always glad to hear from you and to see you.

Jerry Janusz

One has to be able to count, if only so that at fifty one doesn't marry a girl of twenty.

Maxim Gorky

Coble Lecturer

Kenneth A. Ribet, University of California, Berkeley, is this year's Coble lecturer. On October 23, 24 and 25 in Altgeld Hall he is speaking on Fermat's Last Theorem.

Professor Ribet's article, "Galois Representations and Modular Forms," appears in the October 1995 issue of the Bulletin of the American Mathematical Society. In it he discusses material which is related to the recent proof of Fermat's Last Theorem.

This will be the 25th in the annual series of the **Arthur B. Coble** Memorial Lectures, which honor the memory of Professor Coble (1878-1966), who was a professor of mathematics at UIUC from 1918

Unusual Collaboration

Marshall Greenwood, a self trained amateur mathematician who doesn't use either a computer or calculator, is a co-author of a paper with Professor **Nigel Boston,** "Quadratics Representing Primes" in the August-September issue of the American Mathematical Monthly.

The backgrounds of the two authors are quite different.

Mr. Greenwood came to mathematics rather late. He graduated from San Diego State with honors in 1950 but did not become seriously interested in mathematics until he was 59 when, as he writes, he took up creative math; he is now 80. Boston, who was educated at Cambridge University, has a Ph.D. from Harvard and is almost 50 years younger. He joined the department in 1990 after two years at the University of California at Berkeley and a year at the IHES.

In the past few years Marshall Greenwood has been corresponding with several mathematicians at UIUC. In 1993 one of them, **Harold Diamond**, showed Boston a

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to 1947. His family established the fund to endow a series of public lectures by outstanding mathematicians.

copy of the newsletter "Mathematics by a Non-mathematician," which Greenwood writes and distributes.

Boston saw that Greenwood was attacking an interesting problem, and that even though Greenwood used notation and language which were not standard, his methods were serious. As he thought about it he saw that Greenwood "had found the best example for quadratics with relatively small discriminant," Boston writes in the article and that "a better example would require an extensive search."

Boston began a search. The collaboration from these two people with different backgrounds and education produced the article in the MAA Monthly.

Mr. Greenwood, who is now in a nursing home, is a good friend of the department. He established the M.L. Greenwood Prize competition for undergraduates here at UIUC.

Proof is an idol before which the mathematician tortures himself.
Arthur Eddington

Faculty News

Bruce Berndt presented an invited hour address at the Colloquium Magnum in Aachen in March. This was an unusual meeting of mathematicians and historians gathered together to commemorate the founding of Aachen 1200 years ago by Charlemagne. Berndt also gave a total of thirteen lectures at Aachen, Clausthal, Muenster, Vienna, and Munich.

In June, Berndt was one of the principal speakers at a conference on q-series sponsored by the Fields Institute in Toronto.

Nigel Boston, as well as a number of graduate students from here, attended a conference in Boston this summer on Fermat's Last Theorem at which experts on the theorem, including Andrew Wiles, spoke.

At the end of August **Steve Bradlow** attended a meeting at Oberwolfach, Germany, on "Vector Bundles in Geometry and Physics" and gave a talk entitled "A Hitchin-Kobayashi Correspondence for Holomorphic Extensions."

Ward Henson gave an invited lecture at the Tenth Latin American Logic Symposium, which was held July 24-29 in Bogota, Colombia. In March he gave a colloquium and MAMLS lecture at Carnegie Mellon

Alma Mater statue in front of Altgeld Hall

University, and in February he gave a logic colloquium at the University of Chicago.

In Israel this summer **Joseph Rotman** gave invited talks at the algebra seminar of Hebrew University, Jerusalem, and also at the joint algebra seminar of Ben-Gurion University and Bar-Ilan University. Rotman's new book, *A First Course in Abstract Algebra*, published by Prentice-Hall, is appearing this fall. The front cover contains a copy of a painting in **Joann Hower**'s office illustrating the 10x10 orthogonal Latin Square discovered by **E.T. Parker**, a former member of our faculty.

Zhong-Jin Ruan visited the Fields Institute at Waterloo, Ontario, from February 5 to June 30. While there he gave several lectures on operator spaces and locally compact

quantum groups. At the end of June he organized a workshop on "Quantum Groups and Their Connections with Quantized Functional Analysis," where he gave a talk on operator spaces associated with quantum groups. Two of our graduate students, **Kevin Fitzgerald** and **Walter Schreiner**, went to Canada with him and spent the semester there.

Alex Tumanov visited the Max Planck Institute for Mathematics in Bonn from June to August. While he was in Europe he also gave talks at the University of Wuppertal, the University of Padua, and the University of Paris VI. He also visited San Carlos, Brazil, where he spoke at the conference in honor of Francois Treves.

New Assistant Professors

Three new assistant professors have joined the UIUC mathematics department this fall. They are **Kequan Ding, Robert Jerrard,** and **Eugene Lerman**.

Kequan Ding's research interests are combinatorics, algorithms, optimizations and algebraic geometry.

A native of China, Ding is a permanent resident of the United States. He received his bachelor's degree from China's Northeast Normal University

Kequan Ding

in 1982 and an M.S. in computational mathematics from Dalian Institute of Technology in 1984 where he was a lecturer for two years before coming to the United States.

In 1993 he was awarded his Ph. D. from the University of Wisconsin in Madison where his thesis advisor was Professor Louis Solomon. The title of his dissertation is "Rook Placements and Cellular Decomposition of Partition Varieties."

Ding has a Ph.D. minor in computational mathematics and was a postdoctoral fellow at the Institute for Advanced Study in Princeton and at the National Science Foundation Science and Technology Center for Discrete Mathematics and Theoretical Computer Science.

He has given a number of invited talks in the United States, Canada, and China, and has received awards for his teaching. One honor was at the University of Minnesota where he was named the Distinguished International Teaching Assistant. A video tape of Ding teaching was made and is kept in the library there.

Robert Jerrard's research is in nonlinear partial differential equations. His recent work has been on problems related to mean curvature motion and phase transitions. He is also interested in related problems in homogenization, geometry, and probability, and in viscosity solutions of nonlinear PDEs.

He received his A.B. degree from Cornell in 1986 in physics after spending two years at

Robert Jerrard

Deep Springs College, a small liberal arts college in the high California desert. In 1994 Jerrard received his Ph.D. at the University of California Berkeley where his adviser was Professor L. Craig Evans. The title of his thesis was "Fully Nonlinear Phase Field Equations and Generalized Motion by Mean Curvature." Before coming to Illinois in 1994-95 he was a postdoctoral fellow at the Center for

Nonlinear Analysis at Carnegie-Mellon University.

Earlier he taught English at two universities in Changchun in northern China where his students were faculty members and science graduate students. Among the places Jerrard has given invited talks is Zakopane, Poland, where he spoke this past summer on "Generalized Ginzburg-Landau Systems and Higher Codimension and Mean Curvature Flow" at the International Congress on Free Boundary Problems - Theory and Application.

Eugene Lerman's research interests are symplectic geometry: group actions on symplectic manifolds and orbifolds, and symmetric Hamiltonian systems.

A 1983 graduate of the University of Maryland, he received his Ph.D. in 1989 from

Eugene Lerman

the Massachusetts Institute of Technology, where his thesis supervisor was Professor Victor Guillemin. The thesis title was "Symplectic Fibrations and Weight Multiplicities of Compact Groups."

From 1992 to 1995 he was a National Science Foundation Postdoctoral Research Fellow at Massachusetts Institute of Technology and at the University of California at Santa Cruz. Before that, in 1991-1992, he held an N.S.F. research grant.

Princeton is among the places where Lerman has given invited talks. At Princeton he spoke on symplectic cuts and Hamiltonian group actions on compact non-Kaehler symplectic manifolds. In the

same month, November 1994, he also spoke at a workshop on applications of symplectic geometry at the Isaac Newton Institute in Cambridge, UK. There his lecture was on symplectic blow-ups in slow motion. He has also given invited talks at a number of universities in Canada and the United States.

Edward J. Scott
1913-1995

Emeritus Professor **Edward Joseph Scott** died on June 29, 1995, in Urbana.

Professor Scott received his bachelor's degree from Maryville College in Tennessee in 1936, a master's from Vanderbilt University in 1937 where he was a teaching fellow, and a Ph.D. from Cornell University in 1943. At Cornell he was a teaching assistant.

In 1946 he joined the UIUC mathematics faculty. His research was in partial differential equations and in wave propagation. Professor Scott, who retired in 1983, was a keen tennis player. He is survived by his widow, Jane.

Fun With Geometry

"I feel very inspired," one student wrote, after attending the Institute for Mathematics and its Applications Summer Program here for graduate students in geometry. Another commented, "I'm excited about discussing the material I've learned, at my home institution with professors and in seminar format." The conference was held here July 10-August 4.

"The program gave me exposure to many parts of differential geometry that I was interested in, but never found the time to pursue," another student wrote, adding "I have a better feel for the field."

The 43 graduate students, who had been nominated by the mathematics departments at their universities and selected by the IMA, came together for the four week program. Each week they heard lectures by one of four well known mathematicians in the mornings and spent the afternoons working on problem sets provided by that morning's speaker. The conference was organized by UIUC professors **Stephanie Alexander**, **Richard Bishop**, and **Philippe Tondeur**.

Each mathematician, a leader in the field, gave lectures for one week on geometric topics. The speakers were: Professors Frank Morgan of Williams College, who spoke on "Geometric Theory and Minimal Submanifolds"; Seiki Nishikawa, Tohuku University, Sendai, Japan, whose title was "Harmonic Maps"; Thomas Parker, Michigan State University, "Gauge Theory"; and Martin Bridson, of Oxford and Princeton Universities, on "Metric Spaces of Nonpositive Curvature."

The problem sessions in the afternoon, and many of the logistical details for the visiting students were handled by four mathematics graduate students: **Paul Gies**, **Dimitrios Kalikakis**, **Bryan Mosher**, and **Gary Salsbery**.

Some of the students attending the program were introduced to geometry, others were more advanced and familiar with the subjects, but all seemed enthusiastic.

In the evaluation form at the end of the conference one student wrote "these four speakers are among the best teachers I ever had."

One student wrote that a faculty member's enthuiasm "made math a lot of fun."

In order to find the truth, it is necessary, once in one's life, to put everything in doubt.
                                        Pascal

Math 400

John W. Gray, who became the new Director of Graduate Studies in May after former director **Richard P. Jerrard** retired, has instituted a new course, Mathematics 400, an Introduction to Graduate Mathematics. This is designed to introduce the 53 new graduate students in the department to the nine research areas that faculty are working in.

There are two lectures a week. At each class one of the professors talks about the field he or she is working in and describes the courses offered in that field and the research being done. They discuss the connections between different areas of mathematics and also the connections between mathematics and science or engineering.

John Gray said the lecturers have been enthusiastic about their work and open to the students' questions. They have a real concern for the future of these new mathematicians.

While Math 400 was planned primarily for new graduate students it has become so popular that many other people have been attending, including professors and older students.

What They Are Doing Now

A number of our readers have asked what our recent Ph.D.s are doing.

Eberth Alarcon (1995, Stolarsky) has a tenure-track appointment at the University of Wisconsin-Eau Claire.

Adam Borek (1993, Griffith) is a Research Assistant Professor at Purdue.

Gebhard Boeckle (1995, Grayson) has gone to Strasbourg, for one year.

David Bradley (1995, Diamond) has accepted a two-year postdoc at Simon Fraser University in British Columbia.

Heng Huat Chan (1995, Berndt) has a one year fellowship at the Institute for Advanced study in Princeton.

Pat Callahan (1994 ,Haken) is at the University of Texas, Austin, where he has a 3 year Bing Assistant Professorship.

Kevin Ford (1994, Halberstam) went from the IAS to a three year Bing Assistant Professorship at the University of Texas at Austin.

The University of Maine at Farmington is where **Paul Gies** (1995, Schupp) has accepted a tenure track position.

Judy Holdener (1994, Grayson) has a tenure track position at the United States Air Force Academy in Colorado.

After two years as a John Wesley Young instructor at Dartmouth College, **Tamara**

Hummel (1993, Jockusch) has accepted a tenure-track assistant professorship at Allegheny College in Meadville, Pa.

Jose Iovino (1994, Henson) is at Carnegie Mellon, starting the second year of a three year Zeev Nehari Assistant Professorship.

Karen Johnsgard (1993, Schupp) is in her third year as a National Science Foundation Fellow at Cornell.

Brad Kline (1995, Palmore) has accepted a tenure track position at the United States Airforce Academy.

Niels Lauritzen (1993, Haboush) has moved from Bonn to the University of Aarhus in Denmark.

In Jin Lin (1994, West) has joined the Taiwan Institute of Information and Industry

David Peifer (1992, Schupp) moved from St. Olaf's College to a tenure track position at the University of North Carolina-Ashville.

Anton Petrunin (1995, S. Alexander) is at MSRI Berkeley.

Walter Schreiner (1995, Ruan) is teaching at St. Mary's College in Winona, Minnesota.

Mary Lynn Reed (1995, Haboush) has a tenure track position at the Philadelphia College of Pharmacy.

Todd Will (1993, West) has a tenure track position at Davidson college, NC.

Visiting Faculty

Professor **Joseph Zaks**, University of Haifa, is visiting this year. He is interested in problems which combine geometry with combinatorics. He is the editor of the *Journal of Computational Geometry*.

The author of 66 publications, he has been a visiting faculty member at a number of American universities.

James Haglund, from Kennesaw State College, is also visiting. His 1993 Ph.D. is from the University of Georgia. His M.S. is from Minnesota where he worked in scientific computing, optimizing code for vector architecture.

Advice to Young Mathematicians

"Try to be interested in mathematics as a whole," said Professor **Philippe Tondeur** to the graduate students in Mathematics 400, Introuction to Graduate Mathematics.

To him, a chief attraction of geometry and topology is that it mixes techniques from many subjects in mathematics, and while the most spectacular applications are in mathematics itself, there are strong interrelations with areas of physics. There are also applications to biology.

"Do not be surprised if the course offerings get revised as time passes," he said. The curriculum evolves with the changes in mathematics "since the faculty form a living body of people learning, creating and adapting new ideas."

He advised students to take part in seminars and colloquia, to get experience in other disciplines and to be flexible in acquiring new knowledge. Also important, he said, is to strengthen skills in computing and communication.

Discovery Program

The department is participating in the Discovery Program, in which freshmen are taught by a senior faculty member in a class limited to 20 students. This is designed "to develop interaction between faculty and first-year students from the start."

Students have been enthusiastic. One young woman said that she wanted "to get to know a full-fledged professor," because "I can use any help I can get."

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