Math Times

University of Illinois at Urbana-Champaign

Fall 1993

Letter from the Chair

Dear Colleague,

Halfway through this semester, there is the usual high level of mathematical activity in the department. In addition to the weekly colloquium and the Cairns, Trjitzinsky, and Coble lectures, each week more than a dozen seminars meet, and there are constant mathematical discussions taking place in halls, offices, classrooms, and the commons room.

Six of our long-term colleagues retired this fall and were honored at a reception in Krannert Center. **Ralph Alexander** joined the department in 1963, the year he received his Ph.D. from Purdue. After **Kenneth Appel** received his Ph.D. from the University of Michigan in 1959, he went to the Institute for Defense Analysis for two years, then joined our faculty in 1961, and for the last few years has been Associate Chair of the department. Now he has left to head the

mathematics department at the University of New Hampshire. **John Brown** received a Ph.D. from UCLA in 1966 and that year came to the University of Illinois. Brown is now teaching at the Polytechnic in Singapore.

Howard Osborn taught at UC Berkeley after receiving his Ph.D. from Stanford in 1954, and came to UIUC in 1956. **Lee Rubel** taught at Cornell University and went to the Institute for Advanced Study after being awarded his Ph.D. from the University of Wisconsin in 1954; he joined our department in 1958. **John Walter,** who received his Ph.D. from the University of Michigan in 1954, came here in 1961 after teaching at the University of Washington. Although they have officially retired, all six are active and productive.

Staff Associate **Betsy Gillies** of the Association for Symbolic Logic retired at the same time and was also honored at the

reception.

Paul Weichsel has been appointed Associate Chair to replace Ken Appel.

The university's financial situation continues to be far from good, but we were able to bring in some excellent new mathematicians to join our faculty.

We have welcomed these new faculty members: Professor **Igor Nikolaev**, who was a visitor last year, Associate Professor **Alexander Tumanov**, and Assistant Professor **Sergei Ivanov**, and also visiting Assistant Professors **Ian Aberbach**, from Purdue, and **Zhiren Zin** who comes from the University of Michigan.

In September the Coble lectures were delivered by Professor Bela Bollobas, who holds a joint appointment at the department of mathematics of Cambridge University and at Louisiana State University. Professor Bollobas is one of the

world's foremost experts on graph theory and extremal set theory.

In October Professor Eugenio Calabi from the University of Pennsylvania delivered the three Trjitzinsky Memorial lectures. His research is in the area of global differential geometry. The overall title of his talks was "Some Differential Methods in Calculus of Variations."

We are always pleased to receive news from any of you. Keep the letters coming.

Jerry Janusz

Let us grant that the pursuit of mathematics is a divine madness of the human spirit.
Alfred N. Whitehead

Rubel goes to Asia

Emeritus Professor **Lee Rubel** left in October for a ten week trip to Asia. He started in Hawaii, where he spoke at the University of Hawaii, then flew to Korea where he lectured at a meeting of the Korea Mathematics Society in Dae Gu, at Seoul National University, and also in Seoul at Yon-Sei University.

After Korea he is going to Hong Kong for eight weeks to give both an undergraduate and graduate seminar at Hong Kong University of Science and Technology at Clear Water Bay, Kowloon, Hong Kong. At Hong Kong he will do research with Chung-Chien Yang. He expects to return December 23.

M. L. Greenwood

Marshall L. Greenwood of San Diego, CA, has given $1,000 to the UIUC mathematics library. Mr Greenwood, who heads the Creative Mathematics Foundation, publishes a mathematics newsletter.

A 78 year old retiree, he lives on a military pension and is an honors graduate of San Diego State University who began to study creative mathematics at the age of 59. He describes himself as a self-trained amateur who does his calculations without a computer or calculator.

His newsletter, which bears the heading "To fascinate, to challenge, to enlighten," focuses on number theory, particularly on prime numbers and contains problems, items from MLG's correspondence with mathematicians, conjectures and discussions of prime yielding functions.

MLG's only connection to our department has been with Professor **Harold Diamond** with whom he has been corresponding. For the past few years he has donated money for prizes for the Mathematics Department's problem contests.

Mathematics Librarian **Nancy Anderson** says that Mr Greenwood's generous gift will be used to purchase monographs.

Students Queried on Choices

Two graduate students, **Mark** and **Judy Walker**, who were married while studying here, were interviewed for a new magazine, *Math Horizons*, which is being published by the Mathematical Association of America. The first issue will appear later this fall and will reach 100,000 students.

They were asked about choosing a graduate school, a topic "of great importance to thousands of students." Which were the key factors in their choice? Was it the student environment, gender balance, faculty support, cost, location, size, or facilities such as libraries? They were also asked why they chose mathematics.

Mark was a National Science Foundation Fellow for three years; Judy has been a Department of Education Fellow, and currently holds a two year Clare Booth Luce Fellowship.

Teachers' Institute

Fifteen Illinois teachers came to Urbana-Champaign in June for a two-week institute to learn how to take their high school geometry students into the third and fourth dimensions by using computer graphics and virtual reality.

The teachers learned how to operate real-time computer animators using a program perfected by math graduate students **Chris Hartman** and **Glenn Chappell.** This program does amazing things with shapes, says **George Francis**, director of the institute. It can slice a 3-d cone with a plane or show the interior of a sphere.

Computer animations make it easier to understand mathematics, says Francis, who believes that virtual reality, "is an attempt to pass over the threshold to the suspension of disbelief".

The teachers made a trip to the electronic visualization lab at UI Chicago to experience the software in a virtual environment. In addition, while here they made short videotapes to use in their classrooms.

The 77 minutes of videotape was collected and edited to produce a six minute summary. This was post-produced by the National Center for Super-computing Applications and is being distributed.

Gillies honored

Betsy Gillies, who retired on September 30 from the Association of Symbolic Logic where she has been the staff associate, was honored at the department reception this fall. The ASL Executive Committee issued a resolution of appreciation which says in part that all ASL members have benefited from Gillies' energy and dedication and that she has put the business operations of the association "on such a solid and efficient foundation that her past efforts will continue to aid the Association".

"Contrariwise," continued Tweedledee, "if it was so, it might be; and if it were so, it would be; but as it isn't, it ain't. That's logic." Lewis Carroll

Marginal Note

This summer **Nigel Boston**, who was in England at Cambridge University, heard Andrew Wiles of Princeton present the outline of his proof of Fermat's last theorem.

The conference, at the Isaac Newton Institute, was attended by top algebraic number theorists from all over the world, Boston recalls. Wiles is so shy and had said so little about his work that in recent years some mathematicians had wondered what he was doing. When Wiles contacted the organization and asked to speak for three hours, a lot of time at such a meeting, they realized he had been doing mathematics all along and that he had something to say.

Wiles lectured for three days on increasingly important work, and by the third day the room was packed. Many of the people who came did not understand the mathematics but knew that it was a historic event and wanted to be present and were taking photographs.

When Wiles announced the solution, the room erupted in applause.

Boston is giving a weekly seminar this fall on Wiles' proof.

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Mathematicians Join the Mathematics Department

Alexander Tumanov

"In Moscow changes are happening quickly," says Associate Professor **Alexander Tumanov** who has just joined the department, and he says that this instability is affecting everyone and that it is hard for young people to stay in school and study. Fewer of them are students now and fewer still are going into science and math. Why go into those fields they ask, when scientists and mathematicians cannot make money? "Prices have gone up 100 times. People cannot survive by doing ordinary things," Tumanov says. So most young people try to make money, many to help their parents who cannot cope on meagre salaries with such huge price increases.

Tumanov received his M.A. in mathematics from Moscow State University in 1974 but was not permitted to go to graduate school or to work in mathematics. Instead he began working as a computer programmer, far from mathematics, he says. For 13 years he did mathematics as a hobby. In 1987 he took a position as an assistant professor at the Moscow Institute of Radio, Electronics, and Automation at a lower salary, but this brought him back to mathematics. At the Institute he taught 15 hours or more a week and began to receive invitations from colleagues abroad who were interested in several complex variables. The president of the Institute forbid him to leave Moscow.

In 1990 he went to work at Moscow's Center for Science, Technology and Social Initiatives, an institute set up during Gorbachov's time which has already closed. There the staff processed his visa. In 1991, he became a visiting associate professor at Purdue, then an assistant professor at the University of Illinois in Chicago before coming here this summer. His wife Olga teaches English as an International Language, and his two daughters, Eugenia, 12, and Anastasia, 7, attend Champaign schools.

American students work harder and are more serious than Russian students, Tumanov says, but it is very difficult to compare Russian and American education.

Sergei Ivanov

Assistant professor **Sergei Ivanov** who has also joined the department this fall, agrees that it is impossible to compare education in the two countries when the societies, even the mentality, is so different. Mathematics, he says, is not independent of society. He finds the students he is teaching are excellent and says that the Americans he has met are open and friendly, similar to Russians.

Ivanov, a native of Moscow, received his Ph.D from Moscow State University in 1988, then had a position as an assistant professor in the university's department of mechanics and mathematics. In 1991 he went to the University of Utah as a visiting assistant professor for one year, then went to McGill University as a visiting scientist before joining our faculty this fall. His research interests are in combinatorial group theory and its applications. He and his wife Olga have a seven year old daughter, Alex, who, he says, speaks the best English in the family.

In addition to the two new faculty members Professor **Igor Nikolaev** who was a visitor

Ian Aberbach

Zhiren Jin

here has joined our department. His profile appeared in the *Math Times* last year

Two visiting assistant professors, **Ian Aberbach** and **Zhiren Jin,** also started at the department this year.

Ian Mark Aberbach's research interest is in commutative algebra. A graduate of Swarthmore, he received his Ph.D. from the University of Michigan in 1990. While there he was awarded a National Science Foundation Research Assistantship, as well as a Department of Education Fellowship. In 1990 he became an NSF Postdoctoral Fellow at Purdue.

Zhiren Jin, whose research interests include partial differential equations and geometric

PDEs, received his bachelor's and master's degrees from Hangzhou University, People's Republic of China, and his Ph.D. from the University of Pennsylvania in 1990. In 1990-91 Jin was at the Institute for Advanced Study at Princeton; he was then awarded a Hildebrandt Research Assistant Professorship at the University of Michigan for two years until he came here.

Italo Dejter visited this fall from the University of Puerto Rico to do research on combinatorics. He works with **Paul Weichsel**.

From the intrinsic evidence of his creation, The Great Architect of the Universe now begins to appear as a pure mathematician.
        Sir James Hopwood Jeans

Education is ... hanging around until you've caught on.
        Robert Frost

Faculty Notes

Philipppe Tondeur lectured at the meeting in Oberwolfach on "Differential-geometrie im Grossen" and at the Riemannian Geometry program in August at the Fields Institute for Mathematical Research in Waterloo, Ontario.

In July **Steve Bradlow** gave two talks in Durham, England, as one of the key speakers at the London Mathematical Society Symposium on vector bundles in algebraic geometry. The title of the talks was "Stable Holomorphic Pairs."

Bruce Reznick gave an hour address at the MAA Trisection meeting in April at St. Mary's College, Notre Dame, IN. The meeting commemorated the fiftieth anniversary of the Illinois, Indiana and Michigan MAA Sections. During the spring semester Reznick also gave a colloquium at Kent State. He is now revising *Chalking it Up: Advice to a New TA* for Harper/Collins.

In Germany this summer **Dan Grayson** spoke at a K-theory conference at Oberwolfach on "Weight Filtrations via Commuting Automorphisms" and on the same topic the following week at a seminar at the University of Bielefeld.

Ward Henson who was on sabbatical leave last year in Tubingen, Germany, gave a series of lectures in England this summer. He spoke at the universities of Hull, Leeds and Oxford as well as at Queen Mary and Westfield Colleges in London.

Calculus by **Gerald Janusz** has recently been completed and will be published in December.

Peter Loeb spent seven weeks this summer at Frankfurt University. From there he travelled to Austria where he gave three invited lectures at a meeting on nonstandard analysis and to France where he spoke at a NATO meeting on potential theory. He also gave colloquia on nonstandard analysis in Amsterdam, Duisburg and Konstanz and a colloquium on covering theorems in analysis at Erlangen University.

Loeb also spoke at the NATO meeting on potential theory held in the south of France as did **Lee Rubel.** Professor **Jang-Mei Wu** gave one of the hour addresses at the meeting.

During the 1993 summer and fall, **Julian Palmore** participated in two conferences sponsored by the Army Research Office regarding his research on analysis and validation of complex models and simulations, as well as on dynamical systems theory. The first was held at Carnegie Mellon University in June and the other, about high performance computing in environmental science, was held at the Army Corps of Engineers Waterways Experiment Station in Vicksburg, MS.

He recently participated in a conference at the Institute for Simulation and Training, University of Central Florida in Orlando. In October he spoke about dynamics and validation of high performance computing at RAND in Santa Monica CA and at the Army Operations Research Symposium in Petersburg VA on verifying complex discrete event simulation.

Douglas West was a principal lecturer at a school for combinatorics held by the Free University of Berlin on June 28-30. He also gave one of the main invited lectures at the twentieth MIGHTY meeting (MIdwest GrapH TheorY) held at Miami University in March.
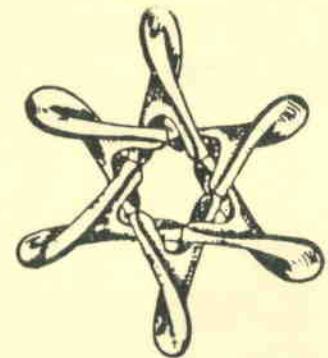
Good students wanted

We are always looking for good graduate students. Don't forget to recommend us to your graduating seniors.

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Letters from Alumni

James Boen (1959, Brahana) a professor of Biostatistics and Associate Dean for Academic Affairs of the School of Public Health at the University of Minnesota describes himself as a "very satisfied customer" of the UIUC mathematics department. He says that he "stumbled on his way to a career in another (hopefully useful) field" and writes in to assuage guilt in "souls who use their mathematics degrees to achieve ends other than mathematics."

"It would seem that an education in finite groups is an unlikely preparation for academic administration," he writes. "Mathematics is perceived as a hard field, most legitimate academically, and the degree gets me addressed as "doctor" when such is useful. The main benefit, though, is the thorough training in precision in thought and word, firmly and effectively demanded by Professors Brahana, Suzuki, Hohn, and company."

As an academic administrator he says the only actual mathematics required has been "the four basic operations of arithmetic plus compound interest calculations. Being able to do them quickly in one's head, however, is most advantageous in heated meetings over money and space." He believes "that high degrees in mathematics have very broad utilitarian value and I encourage mathematics departments to market their products accordingly."

Annette Sinclair (1949, Ketchum) who saw the obituary notices of **Josephine Chanler** and **Pierce Ketchum** in the Math Times writes that she has often thought of them and was indebted to Professor Ketchum for his help and encouragement. She continues that she took a summer course in classical algebraic geometry with Josephine Chanler and writes that Chanler."was an excellent teacher and a person that everyone seemed to admire.... I appreciate having had the privilege of knowing and working with both." She enclosed a contribution "in their memory."

AMS Joint Meeting in Germany

Robert Fossum, George Francis, and **Carl Jockusch** attended the first joint meeting of the American Mathematical Society and the Deutsche Mathematiker Verein at Heidelberg University, October 1-3. This is part of the policy that the AMS has initiated to hold joint meetings with counterparts in other countries.

Fossum, who is Secretary of the AMS, organized the meeting. More than 300 mathematicians attended, and 142 papers were given.

Jockusch spoke at the session on recursion theory. Talks given on topics including degrees of unsolvability, inductive inference, and the recursion theory of structures such as Boolean algebra, were well attended.

Francis, with Mark Phillips of The Geometry Center, MN, and Norbert Quien, Heidelberg, organized the session in geometry and computer visualization which focused on the theory, practice, and application of real-time, interactive computer animation in geometry, topology and related fields and was the largest section. A video is being made of the work presented.

Francis points out that 1993 is the centenary year of German mathematician Felix Klein's visit to the Colombian Exposition in Chicago. Klein believed in the importance of visualizing and stressed mathematical models as a way of doing so. There is again great interest but now visualizing is being done by computers.

And then there are the mathematicians, laying down their novel and inscrutable laws out in the wings, approaching the footlights only when it dawns on the rest of us that some of our most difficult puzzles demand for their solution the very sets of equations invented more than a half century ago by the mathematicians for their own, private enjoyment. There is no field of basic science I can think of that is not dependent for its past accomplishments, even more for whatever it may hope for its future, on theoretical mathematics.
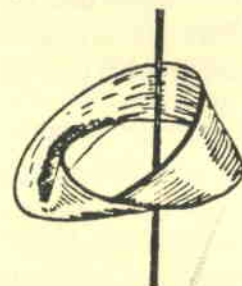
The Fragile Species, by Lewis Thomas. 1992

New Ph.D.s get new jobs

A number of the 1993 Ph.D.s have started new jobs at colleges and universities in the United states and abroad. Among them are **Tamara Hummel** who has a John Wesley Young instructorship at Dartmouth College; **Karin Johnsgard** who is a National Science Foundation Postdoctoral Fellow at Cornell University; **Catherine Cavagnaro** and husband **Will Haight** who both have tenure track positions at the University of the South.

Abdellatif Laradji is teaching at the university in Riyadh, Saudi Arabia; **Neils Lauritzen** now has a postdoctoral fellowship in Bonn and later will go to a tenure track appointment at Aarhus University in Denmark. **Heather Hulett** has a tenure track job at Miami University in Ohio and **Todd Will** has a tenure track position at Davidson College in North Carolina.

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