Mathematics Newsletter

University of Illinois at Urbana-Champaign Spring 1991

Letter from the Chair

This is the first issue of a newsletter which will be published once each semester and sent to our former Ph.D. students. In it we will bring you news of what is happening on the Urbana campus, in particular news of the mathematics department and its faculty, and will try to keep you up to date on any changes. We will also print news from our alumni.

It gives me great pleasure that a former student, **Gene Golub** of Stanford University, will be awarded an honorary degree, the Doctor of Science, at the University of Illinois Commencement in Urbana-Champaign, May 12. He will also be the speaker at the Department of Mathematics Convocation Ceremony at 4:30 pm that afternoon at Krannert Center for the Performing Arts.

With the appointment of **Wolfgang Haken**, who joins **Donald Burkholder** and **Michio Suzuki**, there are now three mathematicians who are UI Center for Advanced Study Professors. **Earl Berkson** was appointed to the Center for the year and **Zhong-jin Ruan** for one term.

Three of our colleagues have retired this academic year. We will miss Professors **Robert Ash, Robert Bartle,** and **Frank Knight** and wish them the best in their retirement.

I also have to announce the death of Professor **Harold Benzinger**. To the great regret of his colleagues and students, he died suddenly while swimming on June 25, 1990.

Due to the state's financial deficit our faculty and teaching assistant numbers have not kept up with increasing enrollment. We have tried not to cap courses but in some cases this has proved a burden on both our faculty and on the students who find themselves in extremely large classes. Department members are trying to find the most effective ways to use our teaching hours.

The intellectual excitement and vitality in the department, which I hope you remember as an important feature of your time here, continues apace. The weekly calendar shows an amazing variety of seminars, colloquia and special lectures. The Commons Room and the halls of our buildings are full of excited talk about theorems proved and hoped for. This is a lively place, full of people dedicated to mathematics, and no amount of budget stress can really diminish that.

Let us hear from you. We are eager to know and let others know where you are and what you are doing.

Ward Henson

User Information not Allowed: UIUC Policy

Last summer Associate Chair **Kenneth Appel** requested that the word 'Mathematics' be added to the Altgeld Hall sign. Instead the Assistant Director of the Office of Facility Planning and Management wrote to him, "in an effort to standardize the process and provide uniform signage, the campus adopted the Exterior Signage Guidelines in December 1988.

"The Guidelines restrict the information contained on a sign to building name and address. Unit designation is permitted under certain conditions. For instance where there is a community attraction (such as a museum) within the building. This is not the case here at Altgeld Hall.

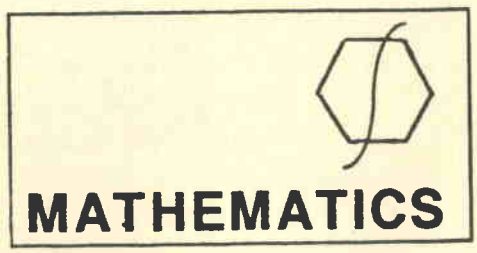
"Our Office will follow the Guidelines and keep to an absolute minimum the number of building signs that have user information. Therefore, I have decided not to approve the request for non-standard copy to be placed on an existing Altgeld Hall Sign." Appel appealed. He wrote to the Vice-Chancellor that "Altgeld is unique in many ways. 1) The only identifying sign is the inscription Law Building on the front of the building. 2) It is one of the few subject area buildings that have not been given the name of the subject, e.g. English, Psych, EE, etc. 3) Roughly ten thousand students per semester have to take mathematics courses. They have to find the place (often with parents) for pre-advising." He finished "I hope you will reverse this ill advised decision."

The next day he received a telephone call from the Director of the Office of Facility Planning and Management who told him that his letter was insulting and that "mathematics seemed to think itself much too important."

Appel wrote another letter to the Vice Chancellor saying that it "does not make sense for such a large number of parents and incoming students to look for the building that contains the Department of Mathematics, find a building that says 'Law Building' and wander around in frustration." Again he asked for the policy to be reversed.

This time he did receive an answer from the Vice-Chancellor. "After a thorough study and considerable discussion it was decided several years ago to put only the names of buildings on building identification signs except for some with a public function. We will proceed with signage for Altgeld according to plan."

Now Appel wrote to the highest officer on campus, the Chancellor, saying that since 'Law Building' was carved in stone on Altgeld Hall and as the campus has a signage but not a flaggage policy he would like permission to put a flag



with the word 'Mathematics' over the front door.

He waited several months. There was no reply. Appel again wrote to the Chancellor that "since I have not heard any response from you on the flaggage policy we intend to design and create a tasteful banner for the front of Altgeld which will identify the occupants of the buildings as other than the College of Law."

Pat Martin, a long time associate of the department, made a banner. A few weeks later the banner was unfurled and installed, to the music of a band and the applause of spectators.

And that is why a banner hangs over the front door. It combines a hexagon with an integral sign, and proudly emblazoned on it is the word 'Mathematics'.

I have hardly ever known a mathematician who was capable of reasoning - Plato

Faculty Notes

Robert Fossum who is the Secretary of the American Mathematical Society, attended the International Congress of Mathematicians in Kyoto, Japan, in August as the AMS representative. Earlier he'd been an invited speaker at the Conference on Commutative Algebra and Combinatorics in Nagoya where he reported on his joint work with **William Haboush.**

Fossum also presented an invited address on his work with Haboush at the meeting on Commutative Algebra and Algebraic Geometry in honor of Paulo Salmon in Torino, Italy, September 12 to 15. After this meeting he represented the AMS at a banquet to celebrate the one hundredth anniversary of the founding of the Deutsche Mathematiker-Vereinigung in Bremen, Germany.

Last summer **John Gray**, who was a visitor at ETH in Zurich where he gave a series of lectures on categorical semantics, was also invited to INRIA in Paris; he gave talks there, at Paris VII, at a conference in Como, Italy, on lambda calculus, and on models of polymorphism in Bremen, Germany.

Philippe Tondeur gave a lecture at the Conference on Foliations in Lodz, Poland, in September.

Donald Sherbert was invited to participate in a curriculum review and discussions of mathematics in undergraduate programs at Egerton University in Kenya, Africa, last winter.

Ward Henson, Department Chair, is the Secretary-Treasurer of the Association for Symbolic Logic.

Gerald Janusz resigned as managing Editor of the *Illinois Journal of Mathematics*, took a leave of absence and moved to Ann Arbor, Michigan, last August to become Executive Editor of *Mathematical Reviews* following **Robert Bartle**. The current managing editor of the IJM is **Philippe Tondeur.**

Several faculty members, **Robert Craggs, Wolfgang Haken, Ward Henson, Derek Robinson** and **Douglas West**, were awarded funds by the NSF to obtain new research computing equipment. The University's Research Board and the College of Liberal Arts and Science also provided support. These funds will increase the speed and memory of the equipment on our Orion network and will upgrade the existing file server. This will significantly improve the department's research facilities.

Lee Rubel is Associate Editor of the American Mathematical Monthly. His term is from 1987 until 1997. During the past year he has lectured at Washington University, CUNY, Northwestern University and Rutgers, among other places.

Paul Newton, who last year was a Fellow at the Center for Advanced Study, this year has been appointed to the Beckman Institute for Advanced Science and Technology. He is working on developing mathematical techniques to understand unstable physical processes, such as the mathematical and physical phenomena associated with instabilities in fluid systems. His long range goal is to understand deterministic chaos and to develop an overall theory of turbulence which incorporates classical statistics and the modern deterministic approach.

This year **George Francis** acquired an Iris 4D/25G graphics workstation with *Mathematica*. Francis, in collaboration with Professor **Albert Gray**, who was visiting from the University of Maryland, used *Mathematica's* symbolic computational power to produce simple formulae for the system of nonlinear ordinary differential equations that generates geodesic flows on common surfaces and their deformations. These have been put into an interactive animation package on the Iris.

$$M \int_0^{at} ds\, e^{\ln h} \to \infty$$

News from Alumni

Paul Halmos (1938 student of Doob's) who has retired from the University of California at Santa Barbara and from Indiana University is now working at Santa Clara University. He writes that "one trouble with being a senile alum is that nothing much new happens to senile alums." When he "uncelebrated" his 75th birthday in early March a "bunch of guys" got together to prepare a Festschrift which they predicted will appear in early May.

"I still," he continues, "do some small amount of travelling and preaching to the heathen—partly here, in the California neighborhood, and partly elsewhere. So, for instance, I am scheduled to address GPOTS (Great Plains Operator Theory Symposium) in Texas in May and scheduled to spend three weeks (June) in Spain, giving several lectures (in Spanish, if I can do it!)."

In response to some questions he said "Promotions: there is nowhere to go from here. Sabbaticals: I am already there. Honors: who me? Lecture series: as above. Editorships: no journals at present, but still three book series (for Springer: Graduate Texts in Mathematics, Undergraduate Texts in Mathematics, and Universitexts). Job changes: you kidding? Personal news: I stopped shaving a quarter of a century ago and I went from a heavy smoker (two packs of cigarettes a day) to obnoxiously lecturing anyone who dares light up within smelling distance of me over 40 years ago.

"Who were the students at Urbana with me? The one I am in closest touch with (and that's not all that close—he lives in France now) is **Warren Ambrose**. Doob's first four students were me, Ambrose, Kibbey and Blackwell. Kibbey died some years back; Blackwell is a big shot (retired but very active) statistician at Berkeley and we see one another from time to time. Some of my reminiscences of those years appear in my book titled *I Want to be a Mathematician; an Automathography*—if you have not read that, kindly rush out, buy six copies and read them all."

When **David Blackwell** began college he would have been surprised to know that one day a colleague like Paul Halmos would describe him as a 'big shot.' At that time he planned to become an elementary school teacher; instead he stayed on to get his Ph.D. under **Joe Doob** which he received in 1941 when he was only 22. That same year he joined the Institute for Advanced Study, the first black person invited there.

From 1952 to 1954 Professor Blackwell was at Howard University. He then went to the University of California at Berkeley. He is now retired but maintains an office at UC. He has had many honors, including the presidency of the Institute for Mathematical Statistics. He is a member of the National Academy of Sciences, an Honorary Fellow of the Royal Statistical Society and received the Von Neumann Theory Prize from the Operations Research Society of America

Marvin Knopp (1958 Bateman) is no stranger to the UIUC campus as he gave the Trjitzinsky Lecture here in October 1988 and a one hour talk at the Bateman Retirement Conference, held at the UIUC center at Allerton, in April 1989. He is at Temple University where he writes he is the "co-editor of a volume of papers dedicated to the memory of Emil Grosswald, the distinguished number theorist; to be published soon by the AMS in the series *Contemporary Mathematics*, and also that he is currently re-writing his 1970 book, *Modular Functions in Analytic Number Theory*, long out of print, which he hopes to have back in print within two years or so.

Burgess Davis (1968, Burkholder) who gave the Coble Memorial Lecture last fall and who is at the department of Statistics at Purdue University writes that he would "like just the names and addresses of former grad-

uates. I have lost track of quite a few and if they aren't society members you can't find them." He writes that "**John L. Lewis** [1970, Heins] of the University of Kentucky was given a non-sabbatical year completely free of teaching in 1990-91."

William Perry (1972, Ting) was appointed Dean of the Faculty at Texas A. & M. University, effective September 1990.

During 1990-91 **Maria Girardi** (1990, Uhl) has been working at the Institut de Calcul Mathematique, an independent research institute at the University of Paris VII. Girardi holds a postdoctoral position which the UI and ICM agreed to fund jointly.

Mathematicians are like Frenchmen: whatever you say to them they translate into their own language and forthwith it is something entirely different - Goethe

Contest

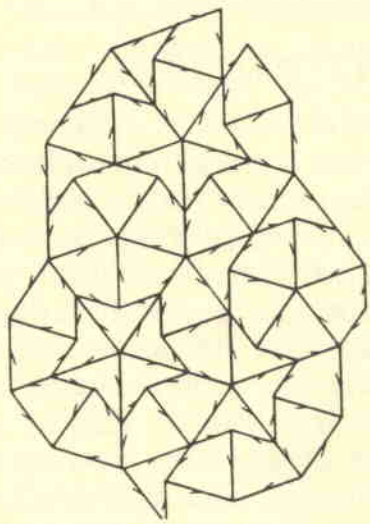
Announcing a competition for a name for this newsletter. Anyone is eligible to compete. There are no prizes, only the honor. If no suitable name is found, this will continue to be called the Mathematics Newsletter. Please send all entries to the editor at the address given at the end of this issue.

New Faculty

Three new mathematicians joined our faculty this year. They are Associate Professor **Aimo Hinkkanen**, and Assistant Professors **Maarten Bergvelt** and **Nigel Boston**.

Aino Hinkkanen, a native of Finland, received his Ph.D. from the University of Helsinki in 1980 and then went as a postdoctoral fellow to Imperial College in London for three years. There he worked on research in complex analysis. In 1983 he came to the United States to the University of Michigan as an assistant professor where he stayed until 1987, except for a term in spring 1986 which he spent at the Mathematical Sciences Research Institute at Berkeley. In 1987 he went to the University of Texas and came to the UIUC in August 1990. He has just been awarded a two year Sloan fellowship which will start in September. He plans to continue working on problems in complex analysis, particularly in quasiconformal mappings and complex dynamics.

Maarten Bergvelt was born in The Netherlands. He started out to study physics at the University of Amsterdam and received a Ph.D. in theoretical physics in 1985. While he was working on his doctorate he switched to mathematics and now considers himself a mathematician. After he received his degree he went to Germany for two years to the



Max Planck Institute in Bonn, then to the University of Georgia in Athens before coming to Urbana. His work is in mathematical physics.

Born in England, Nigel Boston attended Manchester Grammar School and Trinity College, Cambridge, where he studied pure mathematics. After receiving his bachelor's degree in 1982 he stayed on at Cambridge for a one year graduate course in which he specialized in number theory, then went to Harvard University to work on his Ph.D. with Barry Mazur. At Harvard he received a Sloan doctoral dissertation grant. After he was awarded a Ph.D. in 1987 he went to the IHES in Paris where he continued his work on number theory. From 1988 to 1990 he was a Morrey Assistant Professor at the University of California in Berkeley. He is working in profinite group theory, applying results from group theory to algebraic number theory.

Anatolii Fomenko

"I think of my drawings as if they were photographs of a strange but real world, and the nature of this world, one of infinite objects and processes, is not well known. There is a connection between the mathematical world and the real world. This is the relationship I see between my drawings and mathematics," says **Anatolii Fomenko**, Moscow State University, who with his mathematician wife Tatiana visited Urbana in March. Fomenko, the author of more than 140 scientific publications and 16 books and monographs, since the 1970s has been working at expressing abstract mathematical concepts through art. One of his books is *Mathematical Impressions*, published by the AMS. It contains more than eighty reproductions of his work, with captions in which he explains the mathematical motivation as well as their emotional, historical and mythical subtexts. He describes the images as "deep reflections about the essence of being and about the place of modern man—in particular the learned man—in the stormy and unpredictable world around him."

Fomenko gave two talks while in Urbana, the first at the department colloquium about a new theory of topological classification of integrable dynamic systems which was recently discovered as a result of the interaction of methods of topology, symplectic geometry, Hamiltonian physics and mechanics. He spoke next day at the Beckman Institute to an overflow crowd on visual images in 3–dimensional topology, computer geometry and Thurston's conjecture on hyperbolic 3–manifolds. Also, **Tatiana Fomenko** gave a lecture on her work in topology.

Our reasonings grasp at straws for premises and float on gossamers for deductions - *A. N. Whitehead*

Numbers

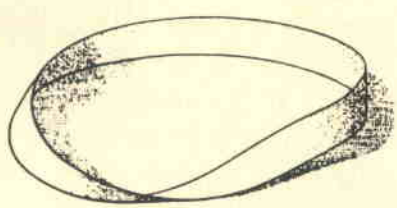
The new Director of Graduate Studies will be **Richard Jerrard** who will take over the duties of overseeing the progress of the 249 graduate students in May when **Wilson Zaring** retires. Zaring, who has been the director since 1978 announced that of the increase from last year's enrollment of 234, 75 are new students. There are 61 master's candidates and 188 Ph.D. candidates. One hundred, 40 percent, are international students, many of them from Asian countries. Among the graduate students 64 are women, 26 percent.

The number of people applying to start graduate work in the fall has increased. This will make the program more selective, particularly as the decrease in funds will mean that the department will not be able to support as many students as the director would like to.

As of September 1990 the department had a total of 641 undergraduate mathematics majors. Of these the two biggest fields, Actuarial Science with 228 students and a combined Mathematics and Computer Science major with 210, outnumber the 158 who are listed as mathematics majors. Teaching of mathematics is the major of 32 students, and 13 have a combined major in mathematics and teaching of math.

Also in September 9651 students enrolled in department courses. At the 100-200 level 7644 students enrolled. In the upperclass and graduate courses there were 1559 students taking 300 level classes and 448 in 400 level.

I am ill at these numbers - *Shakespeare*



Mathematics Library

Librarian **Nancy Anderson** who is in charge of the department library, which is well known for its extensive collection of books and journals, sends this information.

The Mathematics Library receives over 400 journals, some by exchange with the *Illinois Journal*. It subscribes to 220 journals which cost, on the average, $335.00. So far this year we have seen price increases averaging 13%. The books and journals budget for the Mathematics Library is the same as last year's.

We do not anticipate any new money for next year so we expect to cancel about $15,000 in journals unless a new source of funding can be found. The department will soon start a fund raising campaign aimed at the faculty.

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Modesty

"Mathematics is at the heart of the sciences. All of them require mathematical formulas to express their various truths. As the saying goes, the physicists defer only to the mathematicians, and the mathematicians defer only to God. (Though one would be hard-pressed to find a mathematician that modest.)" Dick Teresi, New York Times Book Review. Feb. 3, 1991.

Honorary Degree to Golub

Gene Golub, the director of the Scientific Computing and Computational Mathematics Program at Stanford University who will be given an honorary doctorate by the University of Illinois in May, received his bachelor's, master's and doctoral degrees at the UI in 1953, 1954 and 1959 and was a student of A.Taub's. He will address the Mathematics Department Convocation at 4:30 May 12, in Krannert Center for Performing Arts.

After Professor Golub received his Ph.D. he went to the Mathematical Laboratory at Cambridge University 1959-60 on a National Science Foundation Postdoctoral Fellowship. In the early 1960s he worked at Lawrence Radiation Laboratory, Space Technology Laboratory, Stanford University and the Courant Institute before going to Stanford as an associate professor in 1966. Except for leaves during which he was invited to Princeton, London, Oxford, and Zurich, among other places, he has remained at Stanford where from 1981 to 1984 he was chairman of Computer Science .

Among other awards he has received honorary degrees from Linkoping University, as well as from the Universities of Grenoble, of Waterloo, and of Dundee and was named an Honorary Fellow of St. Catherine's College, Oxford. He was recently elected to the National Academy of Engineering. He has been an associate editor of a number of computing, algebraic and mathematical journals and founded and edited the *Journal on Scientific and Statistical Computing* and the *SIAM Journal on Matrix Analysis and Applications*.

He is the author of over 100 papers and has written or edited six books.

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Graduate Student Fellowships

Graduate student **Arthur Woerheide** was recently notified that he has been awarded a Fulbright grant. He is planning to spend the 1991-92 academic year in Austria.

Two graduate students **Claudia Miller** and **Mark Walker** are now holders of National Science Foundation Fellowships and the NSF has just announced that **Kevin Ford** has been awarded a fellowship starting in the fall.

Fifteen graduate students presently hold Department of Education fellowships, and eight others have University Fellowships. In addition, a

number of foreign students are supported by fellowships from their home countries.

Mark all mathematical heads which be wholly and only bent upon these sciences, how solitary they be themselves, how unfit to live with others, how unapt to serve the world -

Roger Ascham

Memorial lectures

Professor **John Stallings**, of the University of California at Berkeley, will deliver the Stewart Cairns Memorial lectures on April 16,17 and 18.

The Arthur B. Coble Memorial lecture was delivered by alumnus Professor **Burgess Davis**, (Ph.D.1968) of Purdue University, early in November. Also in November Professor **Karen Uhlenbeck**, of the University of Texas, formerly a faculty member of our department, gave the Waldemar Trjitzinsky Memorial Lectures.

Send us news

We want to hear from our graduates, and will print your news in future issues. Let us know about job changes, promotions—any interesting things that have happened to you. We also want to find all of our Ph.D alumni. We are tempted to say: if you didn't get this newsletter, please send us your address. Seriously, if you hear about the newsletter but didn't get one, let us know. Send your news to Math Newsletter Editor 1409 W. Green St. Urbana IL 61801.

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