VAN VLECK NOTES:
THE
NEWSLETTER
of the
MATHEMATICS DEPARTMENT
of the
UNIVERSITY OF WISCONSIN
MADISON

Number 6, FALL 1993

One of the prime news items during the past year was the load of water that was dumped on us. Madison escaped serious flooding, but it was enough to make Lake Mendota seek out its old companion, the marsh across from University Bay Drive. As I biked home one day I had to peddle through a swift current coming from the lake and spilling across the bike path on its way to the fields near lot 60. The next day it was waist deep and a few brave (foolish?) cyclists were heading through it, but the road was blocked off for busses and cars. The path near the Waisman Center and new hospital was just passable. The Nielsen Tennis center had, it seemed, just opened up waterfront access and installed parking meters for the arriving boats. A few days later a one and a half acre bog (marsh), having broken loose from some point across the lake, arrived at the Memorial Union. The 'island' was complete with wildlife, nests, and a large, confused grey heron. There were immediate speculations about title to the 'land' and what to build there, but it was soon pushed over to the landing near Picnic Point, devoured by a steam shovel, and loaded onto trucks to be hauled away. There were reports of a five acre bog, which materialized for the admiration of terrace dwellers after a couple of days. It was sent the way of its smaller sibling as was a one acre bog that followed.

As most of you know, our chancellor, Donna Shalala, joined her friends Bill and Hillary in Washington as Secretary of HSS. I'm reminded of a New Yorker cartoon of a young boy and girl playing 'hospital', with the girl saying "OK you be the doctor and I'll be the Secretary of Health and Social Services".

Our new chancellor is David Ward, the former Provost. Among the other musical chairs, Phil Certain, of Chemistry, is the new Dean of L and S, *Alex Nagel* has been appointed the Associate Dean for Natural Sciences, and *Richard Brualdi* has been chosen to be the new Chair of the Mathematics Department. He is off to an energetic start, sending us all email messages with the day's activities, and seems like an old hand at it already.

Of course there are the things that don't change. The Van Vleck coffee - what shall we say? - it doesn't compete with the brews at the

plethora of cafés on State Street. The janitors still throw away the colored chalk and the heating system has its ups and downs, with chilled and overheated colleagues comparing notes.

1   New Faces

Two colleagues who were here during 1992-93 as visitors have been given new appointments. *Claudia Neuhauser* was appointed as a Tenure-Track Assistant Professor. She works in probability theory including its applications in biology. *Gloria Marí-Beffa* was appointed as a Van Vleck Assistant Professor. Her area is geometry and Lie algebras as applied to completely integrable systems of mathematical physics.

Visitors and Honorary Fellows: The visiting faculty this academic year include *Paul Erdös* from the Hungarian Academy of Sciences (among myriad other places). He was here as a Brittingham Visiting Scholar. He gave a master class to students in Math 490, the undergraduate problem seminar, and a colloquium entitled "Some of my favorite problems". Other visitors are *Yuri Bahturin*, Moscow State University; *Liron Nadav* from the Technion, Israel; *Russ Lyons*, Indiana University; *Yuri Medvedev*, University of Ottawa: *John Palmieri*, University of Minnesota; *Jose Dias da Silva*, University of Lisbon; and *Sergey Yuzvinsky*, University of Oregon.

In addition there are honorary fellows, on sabbatical leave from their home institutions and spending the academic year or part of it with us. They include: *Gergen Alexandrian*, Yerevan State University, Armenia; *Marat Arslanov*, Kazan State Univeristy; *Esmail Babolian*, Teacher Training University, Teheran; *Daniel Britten*, University of Windsor, Ontario; *Patricio Felmer* (Ph.D. with P. Rabinowitz) University of Chile; *Ismor Fisher* (Ph.D. with R. Askey), Naval Postgraduate School, Monterey; *Kin Ming Hui*, Academia Sinica, Taiwan; *Suk-Geun Hwang* (Ph.D with R. Brualdi), Kyoogpook University, S. Korea; *Alexei Kostrikin*, Moscow State University; *Mikhail Kuznetsov*, Mizhny Novgorod Univeristy; *Xavier Massaneda*, University Autonoma de Barcelona;

David Miller, Wright State University; *Andre Nies*, University of Heidelberg; *Vilen Paskonov*, Moscow State University; *John Pfaltz*, University of Virginia; *Daniel Robinson*, Georgia Institute of Technology; *Pascal Thomas*, Université Paul Sabatier, France; *Zhixue Zhang*, Hebei University, China; and *Sarah Ziesler*, University of Sussex.

The incoming graduate students represent lots of countries around the globe: *Dion Alaniz* - University of Houston, *Philip Apps* - Oxford University, *Yanming Cao* - Beijing University, *Jennifer Carr* - Washington & Lee, *Stefan Catoiu* - University of Bucharest, *Chien-Pang Chen* - Natl. Tsing Hua University, *Hsing-Hsia Chen* - Chung Yuan Christian University, *Jongho Choi* - Hanyang University, *Susan Daffinrud* - University of St. Thomas, *David Eiler* - University of Wisconsin-Madison, *Jeffrey Greiveldinger* - University Rochester, *Woo Jeon* - Hanyang University, *Anatoly Karp* - Novosibirsk University, *Rajesh Kasturi Rangan* - Indian Inst. Tech.-Kanpur, *Jool Il Kim* - Yonsei University, *Moses Klein* - Yale University, *Shinar Kouranbaeva* - Novosibirsk State University, *Michel Lang* - St. Norbert College, *Young Sook Lee* - Yeungnam University, *Chia-Hsin Liu* - Natl. Taiwan University, *John May* - University of Wisconins -Madison, *John McCulloh* - University of Kansas, *Javier Medina* - University Puerto Rico-Humacao, *Richard Noble* - Jackson State University, *Kyle Novak* - University of Wisconsin - Madison, *Randall Rogers* - Lawrence University, *Fei Su* - Beijing University, *Joao P. Teixeira* - University de Lisboa, *Dror Varolin* - University of Toronto, *Ergun Yalcin* - Bilkent University, *Wan Chuan Zhang* - Beijing University,

To new and old, best wishes for the academic year

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2   Promotions

This past year *Hiroaki Terao* was promoted to Professor. His work combines geometry, algebra, and topology, with some combinatorics thrown in. Two colleagues in Computer Science

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who hold affiliate positions with Mathematics received promotions: *John Strikwerda* to Professor and *Amos Ron* to Associate Professor. John works in numerical analysis and Amos works in approximation theory.

This past summer Claire Rider, head of the Tutorial Program, was given an indefinite appointment by the Chancellor. The program continues to give a big boost to many students.

3 Sabbaticals

Three people received sabbaticals this year. *Steve Bauman* will be on leave in the spring. He'll be based in Madison, but will spend some time at Spellman College in Atlanta, where he previously taught for a semester. *Sufian Husseini* will be on leave in the spring semester 1994 visiting institutions in Germany and Italy. *Jean-Marc VandenBroeck* is spending the year in Tel-Aviv and his wife, *Mirna Dzamonja*, has a Postdoctoral position in Jerusalem (see new Ph.D's). They have begun to learn Hebrew for fun.

4 Obituary

It is with sorrow that we report that Emeritus Professor *Wolfgang Wasow* died on September 11, 1993. Professor Wasow was born in Switzerland in 1909 and had his early schooling in Germany, where he received his Diploma in Mathematics from the University of Göttingen in 1933. Forseeing the turmoil in Germany at that time he left for Italy where he taught in a school for German students for several years. Having been born in Switzerland he was able to move to the U. S. and completed his Ph.D. in the area of asymptotic expansions and singular perturbations for ordinary differential equations at New York University in 1946 with K. O. Friedrichs. In his thesis he provided the significant ideas that made singular perturbations into a mathematical subject. For the next fifty years he provided leadership in the field.

After obtaining his degree at NYU. he accepted a teaching position at Swarthmore College. In 1949 he went to UCLA and became involved in research on numerical analysis. One of the important texts in that area and one which is still used today is 'Finite Difference Methods for Partial Differential Equations', written with G. Forsythe. During his whole career, however, his prime interest was in asymptotic expansions and the vast majority of his more than 60 papers were on this subject. He wrote the text 'Asymptotic Expansions for Ordinary Differential Equations', published in 1966. As with the earlier book, it became a standard in the field and made him world-renowned for his research in that area.

Professor Wasow joined the Mathematics Department in 1957 and served as chair from 1970 to 1972. His chairmanship began at the height of the student resistance movement growing out of the Vietman War. He retired in 1980, but remained active in mathematics, continued his broad reading in several languages, and maintained close contact with his colleagues.

5 Honors and Awards

Walter Rudin was awarded one of three 1993 Steele prizes at the International Joint Mathematics Meetings in Vancouver, British Columbia. The prize was given for his books, particularly the well-known Principles of Mathematical Analysis and Real and Complex Analysis.

Robin Pemantle has received multiple honors. He was awarded a Rollo Davidson prize for "outstanding work by a young person in the field of probability theory", a Sloan Foundation Fellowship, an NSF Presidential Faculty Fellowship, and a Lilly Teaching Fellowship. This last grant will provide release time for development of a new Liberal Arts math course 'What is Mathematics'.

Richard Askey was elected to the National Academy of Arts and Sciences.

Carl de Boor received an honorary degree from Purdue University this past May. He was cited "For fundamental contributions to the mathematical theory of piecewise polynomials and their application in geometrical design and

functional approximation". He was also elected to the National Academy of Engineering.

In May 1993 *John Harvey* received the Outstanding Mathematics Educator award from the Wisconsin Mathematics Council at their annual meeting.

Marty Isaacs was selected by the Wisconsin section of the MAA for their teaching award.

A ring theory conference "Methods in Module Theory, 1993" was held in honor of Professor *Larry Levy's* 60th birthday. The meeting took place on October 1 and 2 at the University of Colorado in Colorado Springs. Speakers included Professor Levy, several of his coauthors, and many of his students. The conference banquet and Levy Roast was held at Johnny Nolan's Saloon and Gambling Emporium in Cripple Creek.

Tom Ilmanen received a National Science Foundation Postdoctoral Research Fellowship.

Efim Zelmanov has been awarded a Romnes Faculty Fellowship by the University of Wisconsin - Madison.

6   Graduate Student News

The annual awards ceremony for teaching assistants was held on April 28th. After a delightful spread of refreshments arranged by *Jeanne Bleicher*, Alex Nagel announced the following awards:

Thomas Halverson received an Excellence in Teaching Award for 1993 ($700) from the Graduate School in a university wide competition.

Mark Lawrence and *Carlos Ortiz* were named L&S Teaching Fellows for 1993. This carries an award of $500 for each fellow. They will help incoming TA's learn the ropes.

Mathematics Dept. teaching awards (including a $75 gift certificate for the University Bookstore) were presented to *Ethan Berkove, Guangping Huang, Matthew Ikle, Kurt Johnson, Oumar Kaba, Aaron Montgomery, Eric Westlund, Steve Young,* and *Golbon Zakeri.*
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Many of our graduate student received fellowships this year (some of them continuing fellowships).

Jennifer Carr, Nat'l. Physical Sci. Consortium; *Brian Curtin*, NSF; *Dolores Danneker*, Nat'l. Physical Sci. Consortium; *Craig Jensen*, Hertz Foundation; *Javier Medina*, Advanced Opportunity Fellowship; *Michael Neergaard*, Office of Naval Res.; and *Richard Noble*, Advanced Opportunity Fellowship.

In addition the following Department of Education fellows were named:

12 month awards: *Liduvina Cruz, Joan Hart, Mark Lewis, Stephen Mellendorf.* 7 month awards: *Garth Dickey* and *Ben Collins.* 2 month awards: *Kevin Godbey, Joan Hart, Steven Leonhardi, Stephen Mellendorf, Kevin Strobel,* and *Jennifer Szydlik.*

7   Everybody loves Saturday morning

Graduate students *Nancy Neudauer* and *Stephen Young* were teachers in a 'Saturday Enrichment Program' run by the University of Wisconsin School of Education and the Madison Education Extension Programs. They each teach a course for 5th to 8th graders. Steve's is a 'potpourri' covering differents topics each week and includes some trips to the Mathematics Department Computer Lab. Nancy teaches geometry to the older group and also to a group of 1st to 4th graders. The courses are very 'hands-on' and aim to make math fun.

8   New Ph.D.'s

Twenty-four graduate students received the Ph.D. degree this past year. Their names, advisors, thesis title and new affiliation or location, if known, are:

December 1992

JARVIS, Peter (S. Wainger), Georgia College, Milledgeville, GA; The effect of quadratic maps of R^2 on the uniform invertibility of the Fourier transform of functions initially in $A(R^2)$.

MAIA, Liliane de Almeida (R. Turner), U. de Brasilia, Brazil; Problems on waves in stratified fluids.

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WANG, Qing (G. Benkart), Lincoln National Corp., Fort Wayne, IN; On the tori and Cartan subalgebras of Lie algebras of Cartan type.

WILLIAMS, John (I. M. Isaacs), Pomona College, Claremont, CA; Character correspondences in finite groups.

May 1993

DZAMONJA, Mirna (K. Kunen), Hebrew U. of Jerusalem; A set-theoretic approach to some problems in measure theory.

INGENOSO, Marc (T. Kurtz), gBAR Limited Partnership, Chicago, IL; Stability analysis for certain queueing systems and multi-access communication channels.

IZMIRLIAN, Grant (P. Ney), Drake U., Des Moines, IA; Large deviations for additive functionals of a Markov exchangeable sequence.

KIM, Sang Dong (S. Parter), Kyungpook National U., Taegu, Korea; Preconditioning collocation method by finite element method.

QUINN, Jennifer (R. Brualdi), Occidental College, Los Angeles; Colorings and cycle packings in graphs and digraphs.

McDONALD, Judith J. (H. Schneider), U. of Regina, Saskatchewan; Combinatorial spectral theory of M-matrices.

MUELLER, Carl D. (J-P. Rosay), Georgia Southwestern, Americus, GA; On the polynomial hulls of the unions of convex sets in C^n.

NEWMAN, William (W. Dickey), Creighton U., Omaha, NE; Nonlinear string and beam equations.

ZHAO, Kang (C. de Boor), U. Utah, Salt Lake City, UT; Density of the dilates of a shift-invariant subspace.

August 1993

ASAVANANT, Jack (J. Vanden-Broeck), Two-dimensional free-surface flow past a surface piercing object.

DING, Kequan (L. Solomon), Institute for Advanced Study, Princeton, NJ; Rook placements and cellular decomposition of partition varieties.

HALVERSON, Thomas (G. Benkart), Macalester Coll., St. Paul, MN; Characters of the centralizer algebras for mixed tensor representation of the general linear group and its q-deformation.

IKLE, Matthew O. (M. Slemrod), U. of Nevada, Las Vegas; Exact solutions to a discrete velocity model for coagulation-fragmentation.

JEWELL, Kenneth (P. Orlik), Edgewood College, Madison; The generalized Mayer-Vietoris spectral sequence of sphere and subspace arrangements.

JOHNSON, Warren (R. Askey), Penn State, University Park, PA; Some problems in combinatorial analysis.

KOO, Hyungwoon (A. Nagel), Hankuk U. for Foreign Study, S. Korea; Boundary behavior of holomorphic functions on domains of finite type.

MARSHALL, James (S. Wainger), Illinois College, Jacksonville; Fractional integrals of imaginary order supported on convex curves.

MARSHALL, Mary (M. Isaacs), Illinois College, Jacksonville; Derived lengths of solvable groups with Abelian Sylow subgroups.

MATHEWS, Hans V. (S. Husseini), Cellular twisted products.

WINGERS, Louis (K. Kunen), Countable box products.

Our best wishes to all of them as they begin their new careers. We hope they and their predecessors will return to Van Vleck before too long and will keep us posted with their news from many lands.

9 New Results

Melania and *Alejandro Adem's* daughter, *Martha Luisa Melania*, just started to walk. She was born on September 22, 1992. *Fariba* and *Amir Assadi* have a son, *Rostam*, almost a year old, born on December 2, 1992. During 1993 there were several babies born to those in the department (or just graduated) *Liliane Maia* and *Gustavo Gilardoni* have a new daughter *Carmen* born in Brasilia, February 18; *Brenda* and *Steffen Lempp* have a son, *Kevin Friedrich*, born May 24; *Nilgun* and *Mustava Akgul* have a new daughter, *Sara Ezgi*, born on July 17. *Shannon* and *Kevin Strobel* have a second child, *James Marc*, born on July 27. Last minute flash! ... *Karen* and *Al Letarte* have a new son, *Stefan Chandler*, born on November 19.

10 Genealogy

Donald Crowe gave his History of Mathematics class an assignment to interview a faculty member with the aim of finding out the person's 'mathematical ancestry'. With whom did that person study? How far back can the line be traced? The project met with enthusiastic approval from students and faculty. Apart from other information that the students were to write up, the following results emerged. Of the 27 faculty interviewed, 6 were traceable to E. H. Moore (U. of Chicago); 5, to David Hilbert in Göttingen; and 3, to K. Weierstrass (via Frobenius (Berlin). Of the remainder, 13 were traced to someone in the U. S. A.; 3, to Great Britain, 2, to Hungary; and one each, to Austria, Czechoslovakia, Germany, Japan, and Russia.

11 Undergraduate News

Several undergraduates were selected for Mathematics Department awards for 1993-1994. *Paul S. Bradley* and *Brian A. Meloon* were given Professor Linnaeus Wayland Dowling Scholarships; *Justin B. Cruz* received the Frank D. Cady Scholarship; David *Tsung-Shiao Kung* and *Eric Mortensen* received Mark H. Ingraham Scholarships; while *David A. Larson, Kimberly A Retert,* and *Bret A. Sherfinski* were awarded Irma L. Newman Scholarships.

Congratulations to these outstanding undergraduates!

Last academic year the Math Club was run by *Kelly Wieand* and *Ariel Glenn*, who are now at Harvard and Princeton, respectively. This year *David Kung* is organizer and so far talks have been given by *Dick Askey, George Andrews* (Penn St.) and *Mary Ellen Rudin*, the last on 'What is Topology?'

Brian Meloon, an undergraduate math major, participated in the 1993 Summer Institute at the Geometry Center in Minneapolis. This is a program for undergraduates sponsored by the NSF, the Department of Energy, Minnesota Technology Inc. and the University of Minnesota. It is a ten week program providing opportunities for research and training in computation, visualization, and mathematics. Incidentally, there is a seminar at Madison, jointly with engineering, which has a similar focus in material, but is for faculty and students at all levels. *Amir Assadi* is the departmental contact.

12 Mathematics   Computer Lab

The Math Computer Lab is now known as the Math Info Lab. The name change came as part of the fact that now all students are given E-mail accounts. So far we have not had massive amounts of E-mail from students. We now have five 386 and seven 486 PCs in our lab, ten Mac IIcx, seven Mac IIsi, three Centrus 650, and 17 NeXTStations in our lab. We have just received a grant to purchase some classroom display devices. We are looking at devices to be used with overheads. We should be able to get four or five such devices. The Engineering College has asked us to teach calculus using software running on workstations (we'll have to settle for what is in the Lab). This is going to put some pressure on us to learn how to use it. We've run some small experiments, but not on a very wide scale. If this comes to pass, our lab will have heavy usage.

13 Talent Search

The annual Talent Search Honors Day took place on May 4th. Many of the best problem solvers from around the state and their teachers were treated to lectures by geneticist *James Crow* on "Genetics - How Math Keeps Intruding" and by *Robin Pemantle* of the Mathematics Department on " Randomness". A Tour of the UW Space Science and Engineering Center interactive computer system McIDAS was also included. Those invited were high school and middle school students who distinguished themselves by their fine performance in the *Wisconsin Mathematics, Science and Engineering Talent Search*, sponsored by the College of Engineering and the Department of Mathematics, and funded by a Van Vleck bequest. Many students were honored

at the awards luncheon. *Daniel Hass* (Gleason, Wis) was this year's winner of the four year, $4000 per year, Van Vleck Scholarship at Madison. Previous winners were *David Corris* (Milwaukee) and *Brent Halsey* (Janesville). *Donald Passman, Melinda Certain*, and *Deb Johnson* organized the honors day celebration.

14   An International Program

Amir Assadi has been involved with a program, PICMA, which stands for "Program for International Cooperation in Mathematics and its Application". As its title indicates, the purpose of PICMA is to promote research and advanced training in the Mathematical Sciences. A special feature of this program is its emphasis on development of mathematics research in the developing countries (so called The Third World). The program has its roots in the programs for researchers from developing countries at the International Center for Theoretical Physics in Trieste where Amir was involved as a lecturer in their workshops. He came to the conclusion that a more effective way to develop mathematics in The Third World was to simulate the activities of a "research center" within various selected sites with the help of a systematic long-term program and scientific support of the international mathematical community. In 1990, he was nominated as Staff Associate of ICTP (along with M.S. Narasimhan, at the time Director of Tata and presently Director of the Math section of ICTP, and Le Dung Trang from Paris VI and CNRS). The first four-year project (in Geometry and Arithmetic) was organized in 1991. Meetings have taken place in: China (May 1993), Egypt (September 1993), Iran (May 1992 and January 1993), Italy (September 1992), and Turkey (July 1992 and July 1993).

Activities for 1994 are: a three-month research period at Max-Planck-Institut, Bonn (May-July); a six-week activity period in Antalya, Turkey (June 15-July 30), which includes research seminars, a two-week workshop, and a 4-week special program for the gifted students. In 1995, there will a 4-week workshop in China which covers Geometry in a broad sense and follows up on the Antalya activities.

Other participants from the department have included *Hiroaki Terao* who was an invited lecturer in the Singularities Workshop at ICTP in September, 1991. and a recent graduate, *Turgay Kaptanoglu*, who gave lectures on introductory several complex variables in Turkey this past summer. Current graduate students who have participated include *Joe Dolinak, Semra Ozturk, Jari Junnika, Mingli Chen*, and *Ergun Yalcin*. A number of the participants of PICMA from developing countries are now pursuing their Ph. D.'s in Europe and US. If you would like more information about PICMA, please contact Amir Assadi.

15   Some Local Programs

W E S

Michael Bleicher and *Melinda Certain* are developing a Wisconsin Emerging Scholars Program, based on the model developed by Uri Treisman at Berkeley and Austin. The model is founded on the principles of group learning and forming a learning community. The participating students attend the usual large calculus lectures, but instead of the normal discussion sections they go to lengthier workshops (held in their own room in Bascom Hall) in which they are given collections of difficult, informative problems to consider. They work on these problems in small groups with some aid, by way of hints and questions from the workshop instructor. They take the same exams as others and are graded in the same uniform manner and use the same curve, if any. It is hoped that this method will lead to both better grades and more students majoring in mathematics, especially from those groups which have often been discouraged from pursuing mathematically based careers. Preliminary evaluations indicate that the program is succeeding.

TEACHING THE TEACHERS

Jennifer Earles Szydlik is teaching an experimental section of Math 120 this semester. She is continuing in the footsteps of *Robin Pemantle*

who, last semester, designed and taught a section of this new 120 with positive results. Significant changes are being discussed for Math 120 (math for elementary school teachers) and for the related courses Math 121 and 122. The aim is to create a course that is based much more on students solving problems in class – higher-order problems that the students have not been explicitly taught to solve and which are more difficult than students initially believe they can handle – and teaching the students how to think and talk (articulately) about these in the context of small-group problem solving and written homework. She'll be teaching 120 from 2:30-3:45 on Tues. and Thurs. next semester in B203 VV. Anyone who is interested is welcome to visit!

CHAOS and COMPLEXITY SYMPOSIUM

Bob Wilson reported that the department together with the Center for the Mathematical Sciences and the Department of Physics arranged a Symposium on Nonlinear Dynamics and Chaos in April. The organizing committee consisted of *Bob Wilson* and *David Griffeath* from the Mathematics Department, *Clint Sprott* from the Physics Department, and *Tom Kurtz* from the Mathematics Department, the Statistics Department, and CMS. The symposium consisted of a public lecture on Sunday evening followed by two days of shorter and more technical talks. The keynote speaker for Sunday night was to have been Ian Stewart, who is well known as the author of the "Mathematical Recreations" column in Scientific American as well as sixty books, mathematically oriented comic strips, *etc.* Unfortunately Ian became ill and with only a few minutes notice Clint Sprott gave a presentation with many demonstration of chaotic behavior both using "real" physical equipment and using computer simulations. This presentation enthralled the audience, who had come from a large area of the state.

The major goal of the symposium was to let people find out what is being done in nonlinear dynamics and chaos by their colleagues, and thus to foster cooperation and interaction. The technical sessions presented speakers from many applications areas as well as the Mathematics De-

partment. Some of the talks reported on chaotic behavior in observed or modeled systems, such as chaotic behavior in financial and economic models, on nonlinear control systems for spacecraft attitude control, on chaotic dynamics in spacecraft maneuvering systems, on chaos in plasmas or in the response of electrical supply grids to changing conditions, and on the dynamics of neuronal response to stimuli. Moving further from specific applications was a report on general techniques useful for searching for chaotic behavior in real-world systems. Others described activities more directed toward the study of chaotic behavior itself, such as computer generation of large classes of previously unknown strange attractors, monotonicity properties for maps, and what happens at the transition to chaos. *Joel Robbin* and *David Griffeath* from this department gave presentations on Structural Stability in Chaos and Self-Organization in Threshold-Driven 2d Cellular Automata.

The symposium helped to uncover what an enormous amount of activity is underway in this area and to bring together the people doing this work.

SPATIAL PROCESSES IN BIOLOGY

The Departments of Mathematics and Zoology and the Center for the Mathematical Sciences at UW - Madison sponsored a symposium on "Spatial Processes in Biology", November 11 and 12. The symposium was held in Union South from 1:30 to 5:00 each afternoon, and featured talks by Richard Durrett of Cornell University, and by Simon Levin of Princeton. In addition many individuals from around the campus gave presentations. The meeting was very successful at bringing together many diverse groups on campus.

NSF FUNDS
GRADUATE TRAINING PROGRAM

The National Science Foundation is funding a new graduate training program in Mathematics and Computation in Engineering (MACE). The MACE program will provide students with the opportunity to pursue graduate study in areas at the interface between engineering and the mathematical sciences. Students will com-

bine study in an area of engineering with related areas of the mathematical sciences. Students may choose from a variety of areas of engineering in which high level mathematics and sophisticated computation is critical for future progress and will pursue in depth study in the areas of the mathematical sciences on which this progress depends. For further information e-mail kurtz@math.wisc.edu or write

MACE, Center for the Mathematical Sciences, University of Wisconsin - Madison, 1308 W. Dayton Street, Madison, WI 53715-1149

SUMMER PROBABILITY INTERN PROGRAM

For the second summer, the Center for the Mathematical Sciences hosted nine young probabilists in an eight-week NSF funded internship program in probability. This summer's program, directed by *Jim Kuelbs*, featured lecture series by John Walsh of the University of British Columbia, Alex de Acosta of Case Western Reserve University, and Joel Zinn of Texas A&M (PhD Wisconsin, 1972). Tom Lewis of Furman University (PhD Wisconsin, 1991) and Wenbo Li of the University of Delaware (PhD Wisconsin, 1992) were among the nine participants.

Planning for next summer's program is now under way led by *Maury Bramson, David Griffeath, Claudia Neuhauser*, and *Robin Pemantle*. If there is a young probabilist (PhD since 1989) in your department, please pass the word. The program emphasizes informal interaction among the interns and with local faculty and visitors and should be of particular interest to young probabilists who are isolated from active research groups in probability. More information can be obtained by e-mailing pip@cms.wisc.edu or writing

Probability Intern Program, Center for the Mathematical Sciences, University of Wisconsin - Madison, 1308 West Dayton Street, Madison, WI 53715-1149

16   Book News

There are several books that have recently come out or to watch for from local authors.

In November 1992, 'Explorations with the Texas Instruments TI-85' was published by Academic Press. *John Harvey* and *John Kenelly* edited the book and authored one of the two chapters on calculus. *Klaus Höllig* (formerly in Computer Science at Madison), *Sherm Riemenschneider*, and *Carl de Boor* have written 'Box Splines', volume 98 of Springer's Applied Math.Sciences series. *Marty Isaacs* has written 'Algebra: A Graduate Course' to be published momentarily by Brooks/Cole. *Joel Robbin's* textbook, *Matrix Algebra Using MINImal MATlab*, will appear in December, published by AKPeters Ltd. The book presents the traditional algorithms of matrix algebra as computer programs as well as in the traditional manner. It comes with a disk containing Joel's implementation of MatLab (MINIMAT) as well as .m files which run under both MINIMAT and the *Student Edition of MatLab* published by Prentice Hall. Also watch for "Cohomology of Finite Groups" by *Alejandro Adem* and *Jim Milgram* to be published by Springer-Verlag, and AMS Memoirs #1304, "Elliptic Regularization and Partial Regularity for Motion by Mean Curvature", by *Tom Ilmanen*.

17   The Rest of the News

Si Hellerstein is Chair of the U.W.-Madison Physical Sciences Divisional Committee during 1993-94. Si has also been appointed to the Ethics Committee of the American Mathematical Society.

Last January *Richard Brualdi* gave one of the joint AMS-MAA lectures at the winter meeting. Next January, *Georgia Benkart* will give one of these lectures.

Steffen Lempp organized a special session in recursion theory at the joint AMS/DMV meeting in Heidelberg, Germany, jointly with Klaus Ambos-Spies of Heidelberg.

Alejandro Adem is spending the year visiting ETH-Zurich. He organized a topology conference which took place this past August in Cocoyoc, Mexico, to commemorate S.Gitler's 60th birthday, August 1993.

This year *John Harvey* completed terms on a number of committees. Among them was a 3-year term as Governor of the MAA Wisconsin Section. and a 9 year tenure on the MAA Committee on Testing, where he served as the chair since 1988. John continues to be heavily involved with the use of calculators in instruction (see Books) and in September gave a workshop on the subject at the Technology in Mathematics Teaching Conference in Birmingham, UK.

This past summer was a particularly lively summer for geometry, including the second Art and Mathematics conference in Albany, a Regional Geometry Institute at Smith College, geometry sessions at the AMS-MAA meetings in Vancouver, and a two week Polytopes Institute sponsored by NATO (constructive re-allowcation of funds!) in Toronto. *Don Crowe* went to parts of all of them to get a head start on his retirement.

Other retirements this past year include *Josh Chover*, *Ed Fadell*, and *Hans Schneider*. All of the recent retirees will continue to have part time teaching appointments in the department for the next several years.

In September there was a Mini-Symposium on Lie Algebras organized by *Georgia Benkart*. Lectures were given by Professors A. Kostrikin, I. Kryliouk, M. Kuznetsov, Y. Medvedev, and H. Strade. The meeting is part of an NSF Program for Cooperation in Scientific Research between the US and FSU (former Soviet Union). The program also involves *Marshall Osborn* and *Efim Zelmanov* and is for research related to Lie Algebras and p-Groups.

Tal Slemrod, *Laura Certain*, and *Kathy Nagel* all helped in putting on a great production of 'Fiddler on the Roof' at West High School this fall.

18   Alumni News

Lai-Sang Young, a former undergraduate at Madison (BA 1973), received the 1993 Ruth Lyttle Satter Prize in Mathematics.

Professors *Bolian Liu*, *Qiao Li*, and *Jia-yu Shao* (all formerly having studied at Madison

as visiting scholars or Ph.D. students with R. Brualdi), have jointly been given an award by the National Education Committee of China for their research work on "The combinatorial properties of nonnegative primitive matrices and general Boolean matrices".

Several of our former Ph.D's that have returned to Korea have new positions there: *Jeong-Whan Choi* (Shen) Korea University, *Hyung Chan Jung* (Brualdi) Korea Education Coll. of Tech., *Hyeonbae Kang* (Nagel) Soongsil University, *Sang Dong Kim* (Parter) Kyungpook National University, *Hyungwoon Koo* (Nagel) Hankuk University for Foreign Study, *Dongho Shin* (Strikwerda) Inje University, and *Geum Sook Son* (Brualdi) Pusan Coll. of Foreign Lang.

Walt Potter (Ph.D.with Isaacs), formerly Director of the Mathematics Department Tutorial Program, has been granted tenure at Southwestern University, Georgetown, Texas.

19   Letters

We were pleased to receive the following:

From: russell@reiddesk.math.mtu.edu

To: brualdi@math.wisc.edu

Subject: I enjoy VanVleck Notes!

I got my Ph.D. as a student of Dave Russell in 1979. I'm at Michigan Tech now, and I don't know where you got my address (I don't keep very good contact!), or who pays for the mailings, but I sure enjoy your VanVleck notes.

A newsletter like that is one of the expenses, both in your time and in printing and mailing costs, that tend to get eliminated in this day and age as not being critical.

It's done so well that I would argue it *is* critical, maybe not to anything this week but to the long-term strength and cohesiveness of mathematics in Madison.

Bravo.

Russell Reid Houghton MI

To all our colleagues - Is our mailing list incomplete or in error? Please let us know. Also, keep us posted on what former 'Mathesonians' are doing in the big, wide world.

20   On the lighter side

We've captured the scripts from some of Pemantle's party patter and edited out the parts that were in dubious taste or 'p. incorrect'. That didn't leave much, but here's a sample:

Rube Goldberg devices: an Erdös-Pavel is device for turning coffee into theorems......

....overheard- "No really, I like it in the Greenhouse."

NEW new guidelines for qualifiers: choose three from among each of four sets of five problems in different sub-areas; you may not choose more than two with the same number in different sections; etc... Recent Ph.D. was awarded to student in combinatorics for proof of a unique solution.

Lost keys – Ilmanen receives grant from NSA to study how keys may be hidden this effectively.

A couple of years ago two pillars of our department, Walter and Mary Ellen Rudin, announced their retirement. We at Van Vleck News asked Walter how he liked retirement; he said, quote, It's great – I recommend it for most of our faculty; end quote. The Rudins have moved from their previous offices into room 607 Van Vleck. About their new quarters, Mary Ellen had this to say: I love it. It's quiet, it's large, it has a lot of windows... The office was apparently designed by Frank Lloyd Wright and has no interior walls.

Among the lectures taking place in the ninth floor lounge last year were two new series. Josh Chover introduced a series of Wednesday afternoon talks for new graduate students, and Dick Askey ran a lunch time seminar on mathematics education. In the coming year, Chover and Askey plan to combine these into one series called "Research mathematics for preschoolers".

AND NOW WE PAUSE FOR THE VAN VLECK HEALTH FLASH, BROUGHT TO YOU BY HILLS BROS COFFEE – IF YOUR LEMMA WAS WRONG, YOU WEREN'T DRINKING HILLS BROS.......

V.V. news would like to take this opportunity to thank in person some of the people around the department who do important things that usually go unrecognized. So, People: you know who you are.

The great success of the graduate program has prompted the administration to impose tighter standards at every step of the admissions process. Recently, Professor Bramson, who sits on the admission committee, received a letter beginning, "Dear Maury: In light of our longstanding friendship, perhaps you could help my son to obtain an application form."

Many of you probably breathed a sigh of relief when Van Vleck's elevators had new timing devices installed in October. This long-overdue change should translate into reduced waiting times. A follow-up study has in fact shown that more than half the time now, the doors remain in the fully open position for less than three milliseconds. The next project will be to get the light-up arrows to correspond with the elevator's direction of motion.

Another long-awaited renovation, the Van Vleck heating system, has been put on hold, because the planning department of the physical plant has come up with an alternate solution. In response to complaints that office temperatures varied from an October mean temperature of 88 degrees in Professor Souganidis' office to a chilly 52 degrees in Professor Ney's office, the proposal has been made that Ney and Souganidis swap office space with two professors in the Statistics department. The reasoning is that two statisticians ought to be perfectly happy with an average temperature of 70 degrees.

OF COURSE, NO NEWS SHOW IS COMPLETE WITHOUT A FORECAST, SO HERE IS THE VAN VLECK PROGNOSTICATION:

* The job market will get better, but not before it gets worse. Strangely enough, the same is true of calculus reform, politics in America, and this show.

21   See you in Cincinnati

The Fourth Annual Wisconsin Reunion will take place at the Cincinnati AMS meeting on Friday, January 14, 1994 from 5:30 to 7:30 p.m. in the Ivory Room of the Clarion Hotel (connected to the Cincinnati Convention Center). As usual there will be a cash bar and hors d'oeuvres, with

a $5 contribution at the door requested to help defray costs. The best part is seeing all your old friends from Wisconsin and making new ones. Last year's reunion in San Antonio was the best one so far, but we hope that this year's reunion will be even more exciting. Come and share what you've been doing with other past and current Wisconsin people. If you're in Cincinnati, don't miss the Wisconsin Reunion! ... Richard Brualdi (brualdi@math.wisc.edu)

Each year many people make contributions to the UW-Madison Mathematics Department. We are very grateful to whose who have done so.

In these times of tightening university budgets, they make it possible for the department to make available services and support for faculty, students, and staff which it would otherwise not be able to do. If you would like to make a contribution, it should be made payable to UW Foundation - Math Dept. Fund and sent to UW Foundation, 150 East Gilman Street, P. O. Box 8860, Madison, WI 53708-8860

[This newsletter was prepared by Bob Turner: turner@math.wisc.edu]

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