

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

<http://www.math.wisc.edu>

Number 8, FALL 1995

1 The Wilds of Madison

One day this fall two steers broke out of a stock pavilion on campus and kept police and staff occupied for more than an hour. One steer was captured near the intersection of Babcock and Linden Drive. The other 1500 pound animal made a loop through the campus and eventually got to the lakeshore path. It bumped into a police car and headed to the crew house, eventually getting into the lake and swimming toward Picnic Point. A team of workers in a rubber boat coaxed the steer back to land, into a temporary coral, and then into a stock pavilion trailer. The campus paper treated us to a short bit of advice on how to handle liberated livestock. Among the items: steers are color blind, so we needn't have worried about red clothing.

Shortly before the steer incident a rhinoceros was found on Picnic Point. This, however, was no surprise to the people who had buried it there 10 years ago. It had died naturally at the Milwaukee County Zoo and had been buried on Picnic Point as a way to let nature clean up the bones of the 3200 pound, 15 foot long animal in preparation for its being displayed at the Zoo-

logical Museum.

In spite of the rampant growth of Madison, we're still occasionally reminded of the natural world in our midst and can still stop to smell the roses, or the cattle at the end of Linden Drive.

2 New Faces

Paul Milewski is a new tenure track Assistant Professor. He received his PhD from the Massachusetts Institute of Technology in 1993 working with Prof. David Benney on "Fluid mechanics and the interaction of water waves with vorticity". He comes to Madison from Stanford University, where he spent two years as a "Gabor Szego Assistant Professor". There he collaborated with Prof. Joseph Keller on problems in free-surface singularities, hydrodynamic stability, and periodic patterns of interacting waves.

Yongbin Ruan has been hired as a new Associate Professor, but will be on leave for the current academic year. A native of China, Ruan started his graduate studies in Madison and obtained his PhD at Berkeley in 1991. He held a postdoctoral position at Michigan State (1991-93) before taking a position at the University of

Utah. Ruan has done most of his work in gauge theory and symplectic topology. He defined a series of critical invariants which have been extremely important in the recent developments in these subjects. Recently, in joint work with G. Tian he was able to establish an associativity formula in Quantum Cohomology, a result with many important applications.

Mirna Dzamonja is a new Van Vleck Visiting Assistant Professor. She graduated from Madison in 1993, working with Ken Kunen in the area of set theory and has spent the last two years on fellowship (including a Lady Davis Fellowship) at the Hebrew University in Jerusalem.

Dikran Karagueuzian, is an NSF Postdoctoral Fellow and Van Vleck Visiting Assistant Professor. He graduated from Stanford University and works on homotopy theory.

Max Karoubi is a Visiting Professor for the fall semester. He comes from Université Paris 7. One of the courses he is teaching is a topics course on 'K-theory and cyclic homology'.

Thomas Roby is a Research Associate (Robin Pemantle's Presidential Faculty Fellowship) and Lecturer. He comes from Reed College.

The HONORARY FELLOWS now here are: *Kerstin Bernet* from the Technical University of Ilmenau, Germany; *Jochen Geiger* from the University of Frankfurt, Germany; *Robert Howlett*, Univ. of Sydney, Australia; *Choon Ho Lee*, Hoseo Univ., Korea; *Alexander Lichtman*, University of Wisconsin-Parkside; *Joaquim Ortega*, Univ. Politecnica of Barcelona; and *Yugen Takegahara*, Muroran Institute of Technology, Japan.

Honorary Fellows still to arrive during the 95-96 academic year are:

Manuel del Pino, Universidad de Chile; *Patricio Felmer*, Universidad de Chile; *Kevin McDougal*, University of Wisconsin-Oshkosh; *Margherita Nolasco*, PhD Fellowship at the International School for Advanced Study; *James Osterburg*, University of Cincinnati; and *Andrea Previtali*, University of Padova, Italy.

This year all of our new graduate students have some kind of financial support. Most are teaching assistants, but we also have flexibility

in providing fellowship support from graduate school funds. The incoming students and their previous institutions are: *Antonio Behn* - University of Chile, *Maria Borges* - University of Lisboa, *David Cwik* - DePaul University, *Ferry Gunawan* - UW-Madison, *Brent Hetherwick* - U. North Carolina at Chapel Hill, *Eric Klis* - U. Minnesota-Minneapolis, *John Lee* New College of U. of South Florida, *Paul Mariz* - Pomona College, *Armen Melikian* - California State U.-L.A., *Malabika Pramanik* - Indian Statistical Inst., *Karen Rayl* - Austin College, *Robert Schwarz* - Marquette University, *Stanislav Shalunov* - Moscow University, *Dejan Slepcev* - Univ. Novi Sad, *Halldor Stefansson* - University of Iceland, *Stephen Tanner* - Brigham Young University, *Evan Thomas* - Dartmouth College, *Julia Velikina* - Rochester Inst. Tech., and *Peter Wiles* - Pacific Lutheran University.

Best wishes to the new and old.

3 Honors and Awards

Two prestigious named professorships have been given to members of the Mathematics Department. *Richard Askey* has been named John Bascom Professor of Mathematics and *Donald Passman* has been named Richard Brauer Professor of Mathematics.

Alejandro Adem has been awarded a Romnes Fellowship by the University of Wisconsin Graduate School.

Yongbin Ruan, a new Associate Professor, has been awarded a Sloan Fellowship.

Thaleia Zariphopoulou, who has a joint appointment in the School of Business and the Department of Mathematics, was awarded a Sloan Fellowship this past year and has been awarded a Harold and Margaret Laun Professorship by the School of Business, effective with the Fall semester 1995.

Professor *Michael Voichick* has been chosen as the faculty recipient of this year's Letters and Science Excellence in Student Advising Award.

Professor *Steve Bauman* was selected to be a member of the UW-Madison Teaching Academy, a select group of faculty that strives to enhance

the quality of education.

Emeritus Professor *Mary Ellen Rudin* was given an honorary degree by the University of North Carolina at Greensboro in May this year and in the summer was made an honorary member of the Hungarian Academy of Sciences.

4 Promotions

This past year *Claudia Neuhauser* was promoted to Associate Professor. Her work is in the area of probability called "interacting particle systems." Her interest is primarily in biological applications, such as problems in ecology and population genetics.

5 Sabbaticals

Eight members of the department are on university supported sabbatical leaves during part or all of this academic year. Professor *Patrick Ahern* is at the Autonomous University in Barcelona, Spain for the year. Professor *Amir Assadi* will be at Harvard during Fall semester, and at Berkeley during January-July 96. Professor *Maury Bramson* is at the Institute for Advanced Study for the year. Professor *Steffen Lempp* will be in Leeds England from January through July and will be making a trip to Beijing to lecture at the 6th Asian Logic Conference. Professor *Peter Orlik* plans to stay in Madison and study the Aomoto-Gelfand theory of multi-dimensional hypergeometric functions and relations with arrangements of hyperplanes. He'll also be giving lectures in Toronto, Oslo, and Stony Brook. Professor *Dan Shea* will be based in Madison for the first semester and will spend a good deal of the spring semester in Uppsala, Sweden and Joensuu, Finland. Professor *Paul Terwilliger* will be on leave for the fall semester and spend it in Madison working on a book on algebraic graph theory. Professor *Dietrich Uhlenbrock* will spend the fall semester as Resident Director of the University of California/University of Wisconsin Education Abroad Program in Budapest, Hungary. There are 27 students in the program this year, with 8 from the Madison

Campus. In the spring semester he will spend time at the Technische Universität Berlin, Germany and plans to spend about four months at the Middle Eastern Technical University in Ankara, Turkey.

In addition to those on sabbatical leaves, Professors *Sigurd Angenent* and *Gloria Mari-Beffa* are on leave in Madrid, Spain. He is at the Universidad Complutense de Madrid in the Applied Mathematics Department and she is working with people in the same department. Others on leave are Professor *Claudia Neuhauser*, at Princeton University for the year, and Professor *Efim Zelmanov*, at Yale University for the year.

6 Retirements

On September 9, this fall, three recently retired members of the department were honored at a pot-luck dinner held in the meeting room on top of Van Vleck Hall. The recent retirees are *Richard Meyer* whose research is in fluid dynamics and the theory of asymptotic expansions, *Louis Rall* whose research is in the area of numerical analysis and the analysis of computing codes, and *Millard Johnson* (joint with Engineering Mechanics), whose research is in continuum mechanics, viscoelasticity, and lubrication.

7 Graduate Student News

On May 10, 1995 the department had its annual GRADUATE STUDENT AWARDS CEREMONY. The Department of Mathematics Excellence in Teaching Awards consist of a certificate of recognition and a \$75 certificate for purchases at the University Bookstore. This year's recipients were: *John S. Caughman IV*, *C. Laura Denny*, *Oliver Eng*, *Susan L. Hollingsworth*, *Christopher M. Kribs*, *Kristopher K. Presler*, *Randall Rogers*, and *Neeza Thandi*.

The Walter Rudin/McGraw Hill Award in Complex Analysis was also awarded this year. This award was established by McGraw Hill in honor of Walter Rudin on the occasion of his retirement in 1991 and is intended to recognize outstanding work by a graduate student in the

field of complex analysis. It consist of a certificate, copies of the three McGraw Hill books by Walter Rudin, and a \$500 monetary prize. It was first awarded in 1992. The second recipient of the award is *Manuel Flores*, who is currently working with Alex Nagel.

The Chair paid tribute to graduate students who won prestigious awards outside the department:

Aaron Montgomery, was named an L & S teaching fellow. (This carries a monetary award of \$500.) and *Kellie Evans* was named an alternate.

Shaun Cooper received a 1994-95 Graduate Student Excellence in Teaching Award given by the Graduate School. (This carries a monetary award of \$700.)

Some students received fellowships administered through the university. The following are on continuing fellowships: *Dolores Danneker*, National Physical Science Consortium; *Mark S. MacLean*, National Science Foundation; and *Michael Neergaard*, Wisconsin Alumni Research Foundation and the Office of Naval Research.

In March, *Shayne Waldron* attended the Annual meeting of SIAM Southeastern-Atlantic Section in Charleston, South Carolina (24-25 March), which had a special session in his area, approximation theory. He presented a paper entitled 'The error in linear interpolation at the vertices of a simplex' which was judged first in the competition for best student paper. The prize was \$50. For the next two years he will be a postdoctoral fellow in the Department of Math., Technion, Haifa, Israel (working with Allan Pinkus). In October 1997 he will take up a permanent position in the Mathematics Department at the University of Auckland, New Zealand, his native land.

8 New Prize

The Mathematics Department has just established a new "Research Prize" to be awarded for truly outstanding research by a graduate student, in those years when the Awards Committee identifies an appropriate recipient. The award

will function somewhat like the current Walter Rudin/McGraw Hill award, but be open to all areas of research. The prize will consist of a cash award (we envision \$200 to \$300) and a certificate. The prize will have a name attached, depending on the area and to be decided at the time. For example, for a student in logic it could be called 'The S.C. Kleene Prize'. In a year when there were two outstanding candidates, two prizes might be in order. Funds for the award will come from the Mathematics Department Fund at the University of Wisconsin Foundation and, as always, we welcome your contribution to the fund (see the end of the newsletter for the address).

9 Undergrad Student News

In May, Mathematics Department scholarship awards to undergraduates for 1995-96 were announced. *Erik McWoods Scott* and *Yi-Jui Wu* were awarded Mark H. Ingraham Scholarships. *Jeffrey R. Ylvisaker* was awarded Frank D. Cady and Professor Linnaeus Wayland Dowling Scholarships. Congratulations to these outstanding undergraduates!

PROBLEM SOLVING PRIZE

Last fall, approximately weekly, problems were posted conspicuously around Van Vleck for undergraduates to hone their problem solving skills. The student with the most correct answers at the end of the semester receives a \$75 prize in the form of a certificate to be used at the University Bookstore. Last year's winner was *Michael John Hall*. Problems are being posted again this fall. The latest is: Find all solutions in (positive or negative) integers for $a + b = xy$, $ab = x + y$.

For a month this past summer *Turi Swan*, an undergraduate sophomore, attended the Carleton/St. Olaf Summer Mathematics Program, which is part of the NSF Consortium to Advance Women in Mathematics. There were 18 undergraduate women from around the country, most just finishing their second year. They did knot theory with Gail Kennedy from Carleton, and did dynamics (and a little chaos theory) with Judy Kennedy from the University of Delaware.

The dynamics class was taught with the Moore Method and, according to Turi 'was a phenomenal experience'.

This fall the the Undergraduate Math Club is being run by Turi Swan. Their first meeting was eclectic, including presentations by representatives of the Anderson Consulting Company, information on the Peace Corps, and a video from the Minneapolis Geometry Center on 'Turning spheres inside out'. At the second, listeners were treated to a lecture by *Richard Askey* on 'A Walk in Ramanujan's Garden'. It is planned to have both professors and graduate students as speakers for the club. To contact the Math Club direct email to mathclub@math.wisc.edu.

10 Alumni News

We had a message from *Bob Gethner* who received his PhD with Simon Hellerstein in 1982. He enjoys the newsletter and would like to hear from some of his grad school cronies. He is now teaching at Franklin and Marshall College in Lancaster, PA after a five year stint at Northern Illinois University. He's enjoying the small college atmosphere. He and his wife, Marge Bardeen, have a five-year-old daughter, Gwen Bardeen Gethner, who wants to be a paleontologist when she grows up (other recent choices have been religion teacher and fireman). Bob has been increasingly interested in weather and climate and, last semester taught a course on Math Models including some simple models of global warming. He can be reached at r_gethner@acad.fandm.edu.

Wayne Roberts is now Provost at Macalester College in St. Paul, Minnesota. He writes '... I realize that such a fall from grace calls for an explanation to my mathematician colleagues. It is a long story, but I have spent 30 years in the math department here, the last nine as Chair, and circumstances were such in the institution, that I thought I might make a contribution in this new spot for the next couple of years. I will remain as Chair of the MAA CRAFTY committee until after the Orlando meetings so as to see to its conclusion, the committee's newest pub-

lication, "Calculus, The Dynamics of Change." This book is meant to commemorate ten years of efforts to improve the teaching of calculus, following the Tulane Conference.

Bruce Berndt of the University of Illinois - Urbana expresses his appreciation for the newsletter and wonders 'Does any university have more alums on its staff than Illinois?' In addition to Bruce, there are *Ken Stolarsky*, *Bob Craggs*, *Joe Miles*, *Hiram Paley*, and *Kequan Ding*. *Lee Rubel*, a UW graduate and longtime member of the Illinois faculty, died last March.

Duane and Margaret Blumberg say 'Hello From Louisiana' Duane finished his Ph.D. in 1970 with Ed Fadell and Margaret was a Technical Typist for the Department and also taught a few classes. Duane is currently serving as Dean of Sciences at the University of Southwestern Louisiana in Lafayette, LA. He is involved in economic development projects as a volunteer in the Lafayette area and still gets in a game of golf now and then. Margaret teaches in the Mathematics Department and had the pleasure of teaching two of the first round of reform calculus sections (Harvard) at USL in the Fall, 1994. She no longer does technical typing (except for personal work), and with the advent of technology wonders how she ever did it the old-fashioned way. They have one son, Ken, soon to graduate from USL in Telecommunications.

Dan Kalman, (PhD with Harvey, 1980) received a Pólya Award in August, 1994, for a paper in the *College Mathematics Journal*. He is currently at the Department of Mathematics and Statistics of the American University, Washington, DC. after an 8 year stint in industry.

Tom Halverson and *Kristi Fackel* had a girl, *Ella*, on September 26. Tom did his PhD with Georgia Benkart, finishing in 1993 and now teaches at Macalester College. Kristi was an Art History grad student at Madison.

Bruce Wade went to Cornell in 1987 after getting his PhD with John Strikwerda. He spent two years at the Mathematical Sciences Institute (MSI) of Cornell University doing post-doctoral research with Professor L.B. Wahlbin. He was also Acting Assistant Professor in the Department of Mathematics, and taught two

courses. In 1989 he moved to the Department of Mathematical Sciences, University of Wisconsin-Milwaukee (wade@csd.uwm.edu) and in June of 1995 was appointed Associate Professor. He is the proud father of two boys, Paul (5) and Steven (2).

11 PhD Centennial, 1997

As announced in the last newsletter, we are planning a "UW-Math PhD Centennial Conference" to commemorate the 100th anniversary of the granting of the first PhD in Mathematics in 1897 at Wisconsin. The conference will be held on *May 22 to 24, 1997*. We are planning to have invited talks on areas of mathematics that have been strongly influenced by Wisconsin faculty and students: Algebra (Groups/Geometry/Combinatorics and Rings/Lie Theory/Representations), Analysis (Special Functions, PDEs/Dynamical Systems, and Harmonic Analysis), Applied Mathematics, Topology (Geometric/Point Set and Algebraic), Logic, and Probability. The invited speakers, who are now being chosen, will be a nice balance of former students and current faculty. We hope that these talks will contain a mixture of early work at Wisconsin and more recent work (including work of Wisconsin students), along with some historical vignettes. We already have blocks of rooms reserved at three hotels within walking distance of Van Vleck Hall. The American Mathematical Society has expressed interest in publishing some part of the proceedings of the conference in one of their series.

We would like to hear from people about proposals for minisymposia at the conference and to know whether you would be willing to organize one (possibly in collaboration with another former student or with a current member of the Wisconsin faculty - contact your former advisor). In this way we hope that the many mathematical and educational contributions of former Wisconsin students will be highlighted. In particular, we would like to see a minisymposia organized around the many educational activities and innovations that our former students have been

involved with. Please send me your ideas, and do plan to come to the Centennial Conference! More information will be available at the Wisconsin Reunion in Orlando on January 11, 1996. Richard Brualdi (brualdi@math.wisc.edu)

12 New PhD's

Twenty-eight students received the Ph.D. degree this past year. Their names, advisors, thesis title and new locations (if known) are:

Akgul, Nilgun Atiye, (Slemrod, Marshall), "Coagulation-diffusion systems", Faculty Assistant, UW-Madison.

Cooper, Shaun, (Askey, Richard), "On the Macdonald identities, a conjecture of Forrester and a functional equation", Massey Univ., Albany Campus, Albany, New Zealand.

Dickie, Garth A., (Terwilliger, Paul), "Q-polynomial structures for association schemes and distance-regular graphs", Dept. Math. & Comp. Sci., U. Technology, PO Box 513, 5600 MB Eindhoven, Netherlands"

Dolinak II, Joseph, (Assadi, Amir), "Homotopy operations in Tate cohomology", 179 Second St., Apt. 2F, Troy NY 12180.

Dougherty, Anne, (Kurtz, Thomas), "Averaging and diffusion approximations for stochastic network models", U. of Colorado, Boulder CO 80309-0526.

Ghazel, Moncef, (Adem, Alejandro), "The relative loop space", Ksar Jedid 4151, Tunisia.

Guo, Likang, (Nagel, Alexander), "The peak-interpolation sets in product domains".

Johnson, Kurt N., (Dickey, R. Wayne), "Circularly symmetric deformation of shallow elastic membrane caps", Faculty Asst., UW-Madison, Madison WI 53706.

Johnson, Michael J., (Ron, Amos), "Approx. in $L_p(\mathbb{R}^d)$ from principal shift-invariant spaces", Nat'l. U. Singapore, 10 Kent Ridge Crescent, Singapore 0511.

Juan-Pineda, Daniel, (Adem, Alejandro), "Cohomology and k-theory of discrete groups", Inst. de Matematicas, National University of Mexico, Morelia.

Koepp, Warren P., (Osborn, J. Marshall), "Simple homogeneous subalgebras of generalized Witt algebras of finite rank", East Texas State U., Commerce TX 75429.

Lawrence, K. Mark, (Brualdi, Richard), "Combinatorial bounds & constructions in the theory of uniform point distributions in unit cubes, connections with orthogonal arrays & a poset generator of a related problem in coding theory", Penn State U., University Park PA 16802, (Dept. of Finance, UW-Madison, spring 96).

Mark is a contender for the 'Longest Title Prize'.

Lee, Chang-Ock, (Parter, Seymour), "Multi-grid methods & parallel computations for elliptic problems, with an emphasis on linear elasticity", Inha Univ., Yonghyun-dong, Nam-ku, Incheon, Korea 402-751.

Lee, Ki-Suk, (Terao, Hiroaki), "On logarithmic forms and arrangements of hyperplanes", Dept. Math. Educ., Korea Nat'l. U. Education, Chongwon, Choongbook 363.791, Korea.

Lewis, Mark L., (Isaacs, I. Martin), "A new character correspondence in solvable groups", 1501 N. 6th Avenue E, Newton IA 50208"

Ozturk, Semra, (Assadi, Amir), "Local to global invariants for G-modules, and G-spaces", c/o T. Kaptanoglu, Math, Middle East Tech. U., Ankara 06531, Turkey.

Pires, Gabriel E., (Souganidis, P.), "Threshold growth dynamics: A PDE approach", Inst. Superior Technico, U. Tech. de Lisboa, Av. Ro-visco Pais, 1096 Lisboa, Portugal.

Pritchard, Geoffrey, (Kuelbs, James), "Random samples, series and sets", Dept. Math. Sci., 501 Ewing Hall, U. of Delaware, Newark DE 19716.

Pruim, Randall James, (Joseph, Deborah), "Weakly hard languages and Kuratowski-Ulam theorems in resource bounded category", 2415 Fletch Dr. NE, Grand Rapids MI 49506.

Sha, Huyun, (VandenBroeck, J-M.), "Solitary waves at the interface between two fluids and related surface flows", Monash U., Clayton, Victoria 3168, Australia.

Spradlin Gregory S., (Rabinowitz, Paul), "Multibump solutions to a class of semilinear

elliptic partial differential equations", Postdoctoral Fellow, U. of California, Davis CA 95616.

Szydluk, Jennifer Earles, (Harvey, John), "University calculus students' conceptual understanding of the limit of a function", UW-Oshkosh, Oshkosh WI 54901.

Temple, William V., (Passman, Donald S.), "Finite representation degree groups", Exper. Tune Software, 4734 Sonseeahray Dr., Hubertus WI 53033"

Thandi, Neeza, (Rabinowitz, Paul), "On the existence of infinite bump solutions of nonlinear Schrodinger equations with periodic potentials", Dept. Math, Stat. & Comp Sci, Dalhousie U., Halifax, Nova Scotia, Canada B3H 3J5.

Waldron, Shayne F., (deBoor, Carl), " L_p -error bounds for multivariate polynomial interpolation schemes", Postdoctoral Fellow, Technion-Israel Inst. Tech., Haifa, Israel.

Weng, Chih-wen, (Terwilliger, Paul), "D-bounded distance-regular graphs", Applied Math., Nat'l. Chiao Tung U., 1001 Ta Hsueh Rd, Hsinchu, TAIWAN.

Wilson, Mark Curtis, (Passman, Donald), "Primeness of enveloping algebras", U. of Auckland, Private Bag 92019, Auckland, New Zealand.

Zakeri, Golbon, (Meyer, Robert), "Multi-coordination methods in parallel solution of block-angular programs", Dept. Engineering Sci., U. of Auckland, Auckland, New Zealand.

Our best wishes to this large crop as they begin their new careers. We hope to see them soon, perhaps in Orlando or at the 1997 centennial.

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 *Marshall Osborn* on "Fermat's Last Theorem" and by Professor *Denise Denton* of Electrical and Computer Engineering on "Microfabrication: How the brain of your computer is made".

Twenty-three students were honored for achievement on the talent search problems. The

winner of the Van Vleck Scholarship, valued at \$4000 a year for four years, was *Vahe Poladian* of Blair-Taylor High School, Milwaukee. The Runner-up was *Qi Cui* of Brookfield East.

14 L C Young's 90th

Emeritus Professor Laurence Chisholm Young celebrated his 90th birthday this year, on July 14. The department celebrated the event at the end of the spring semester with lectures and a potluck dinner, and we take this opportunity to give a brief picture of his life. On the last day of the spring semester, May 12, there were lectures by Dick James of the University of Minnesota on "Applications of the Young measure In Materials Science" and by William Ziemer of the University of Indiana on "Curves of Finite Perimeter and Motion by Mean Curvature" The first was in recognition of the use of Young's work on weak convergence, notably the use of the Young measure, in problems of the theory of materials with nonconvex constitutive relations. The setting of the second lecture was the calculus of variations, where L. C. Young had such a strong influence. Bill Ziemer has a special connection with Wisconsin having been an undergraduate here and having Young as a mathematical 'grandfather', the intermediary being Professor Wendell Fleming of Brown University, who was a PhD student of L.C. Young. Wendell Fleming was the speaker following the the potluck dinner on the evening of May 13. He knew the Young family over a period of many decades. His talk focused on the events in Young's life and we have borrowed material from his talk (including the sketch of L.C. skating to campus from his home on Lake Mendota - We are grateful to Antonio Zelic, a recent PhD of Fleming, for the sketch).

L. C. Young's parents, William Henry and Grace Chisholm Young, were both distinguished mathematicians. They met at Cambridge University in England over 100 years ago and subsequently went to the University of Göttingen in Germany where G.C. Young received her PhD from Felix Klein in 1895. It was a rare event at that time for a woman to receive the PhD.

The Youngs were married in 1896 and Klein was invited to the wedding. Apparently there was a miscommunication about the appropriate attire and Professor Klein came dressed as a waiter. The elder Youngs left England in 1897 and settled in Göttingen where Laurence was born. Later, on the eve of the first world war, they moved to Switzerland where Laurence completed his pre-university studies. In 1925 he went to Cambridge and became a fellow of Trinity College in 1931. His mentors were Fowler and Littlewood and, at the time, the Tripos exams were in full swing. At that time Constantin Caratheodory, who had a great influence on the calculus of variations, was a professor in Munich. During those years Young arranged some extended stays in Munich where he was greatly influenced by Caratheodory.



During the late 1930's and early '40's Young's ideas on irregular nearly minimizing surfaces for nonconvex integrands came to fruition. (cf. *Annals of Math.* 1942). Later, in the the 1940's and early '50's he developed the idea of curves

and surfaces as elements of dual spaces to spaces of continuous functions. Later followed the beginnings of geometric measure theory, a field developed through the work of many mathematicians. The ideas behind the measures, now called Young measures, that are associated with a weakly convergent sequence of functions, appeared in the late 1930's, but usually reference is made to his 1969 book, "Lectures on the Calculus of Variations and Optimal Control Theory".

Professor Young was Professor and Head of the Mathematics Department at the University of Cape Town, South Africa, from 1938 to 1948. In 1948 the Youngs came to Madison where he remained until his retirement in May, 1976. He was, apropos the last item, the initiator of the 'Talent Search' at Madison.

15 Local Events

The first Wolfgang Wasow Lecture was held on Wednesday, April 12, of this year. Professor *Jürgen Moser* of ETH Zürich was the speaker. The title was "On the role of minimizers in geometry and dynamical systems". Wolfgang's son Bernard came to Madison for the inaugural lecture and the week was a significant mathematical and social event in the department. The second Wolfgang Wasow Lecture will be given in the spring of 1996 by Professor *Joseph Keller* of Stanford University. The precise date has yet to be arranged.

A COROLLARY - Apropos the first Wasow Lecture, Richard Brualdi and Mona Wasow were both at dinner at the Turner's on the day of the lecture, after not having seen each other for many years, and at a party at the Rabinowitz's two days later. We won't go into the technical details of the result, but they recently made it public that they will marry in March, 1996.

National Math Awareness Week for 1995, April 24-28, had the theme "Mathematics and Symmetry". At UW-Madison the Department of Mathematics sponsored a number of activities connected with the event: *John Conway*, Professor of Mathematics at Princeton and inventor of the computer "game" of Life, spoke on

"Shapes and Symmetry". Local talent included: *Donald Crowe*, Emeritus Professor of Mathematics at UW-Madison, who spoke on "Geometric and Color Symmetry in Real-World Patterns"; *Richard Askey*, who spoke on "How to Count Objects: The Binomial Theorem and Extensions"; and *Lawrence Dahl*, Professor of Chemistry at UW-Madison, who spoke on "Symmetry and its Importance in Art and Science".

The Mathematics Department and CMS hosted a 65th birthday bash in honor of *Peter Ney* in mid-July. The celebration opened with a reception at the University Club on July 13, and a birthday dinner the following evening at Kennedy Manor. Highlights of the dinner included special desserts by Chris (Peter's daughter) and her husband Greg, a reading of a letter from Peter's friend Anatole Joff by Tom Kurtz, and a birthday song written by Robin Pemanle and Jeffrey Rosenthal and performed by Joel Robbin and Robin. A sample verse of "Peter Ney goes marching on" - to the tune of "Glory, glory, Hallelujah" :

'Some months he spends in Germany, no doubt in deep travail, And when he comes back from that sunless land his skin looks kinda pale; If he only would learn UNIX then at least he'd get his mail, Peter Ney goes marching on.'

The mathematical portion of the bash consisted of a symposium on topics related to Peter's mathematical interests. These talks were held on July 14-15 with speakers that included Peter's friends, former students, and co-workers from around the world. There were major addresses on topics in Markov chains, branching processes, and large deviation theory.

The University Hilldale Lecture this fall was given on November 1 by the Mathematics Department's nominee, Ivar Ekeland of Université Paris-Dauphine. His lecture was entitled "Variational Principles and Symplectic Geometry: From Gallileo's Pendulum to Modern Symplectic Geometry". Professor Ekeland has broad interests including optimization theory, game theory, variational methods and their application to periodic solutions of Hamiltonian systems, and symplectic geometry. During his week

stay in Madison he also lectured on "Exterior Differential Systems and Economic Theory" He is the author of nearly 100 papers and eight books. Two of his books, "Mathematics and the Unexpected", and "The Broken Dice and Other Mathematical Tales of Chance" have won prizes for scientific writing. This past year he was awarded an honorary doctorate from the University of British Columbia. During the period 1989-1994 he served as President of his university.

ON THE MADISON CAMPUS

The campus-wide seminar on Chaos and Complex Systems, organized a couple of years ago by a group including *David Griffeth* and *Bob Wilson* from the Mathematics Department, continues an active program with speakers from applied as well as theoretical areas. Recently *Joel Robbin* spoke on 'Lyapunov Exponents'. Chaos is also very popular at a non-technical level. *Bob Wilson* has taught several outreach courses, each running for four weeks, that assume only high school algebra as a background, but manage to sneak in some differential equations and notions of convergence in covering chaos and complexity for popular audiences. They have asked him to develop a follow-on course which gets more technically involved. He has also been asked to give several "popular" talks on this subject to audiences ranging from middle school students to summer programs for retirees. He just finished a series combining chaos and 'the arts', including music, poetry, and painting.

MaCE Program

The MaCE program is a cooperative effort by faculty in Mathematics, Computer Sciences, and Engineering to provide students with the opportunity to pursue graduate study in areas at the interface between engineering and the mathematical sciences. Students combine study in an area of engineering with related areas of the mathematical sciences. Work in the engineering area and in the mathematical sciences along with computational and other skill development are directed at preparing the student to develop mathematical models of phenomena in the appli-

cation area, to analyze the models and their implications using a broad array of existing mathematical methods and computational tools, to develop new methods as needed, and to communicate the findings.

Please encourage students with strong backgrounds in mathematics and the physical sciences to apply. 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

16 Coming Events

LOGIC AT MADISON - 1996

The 1995-96 Annual Meeting of the Association for Symbolic Logic will be held on March 9-12, 1996 in Grainger Hall (with some social functions in Van Vleck Hall). The meeting will feature ten invited lectures, approximately fifty contributed talks, and two special sessions in set theory and philosophy. The Seventh Annual Gödel Lecture will be given by *Saharon Shelah*, who will be a Visiting Professor in Madison for the spring semester. A Retiring Presidential Address will be given by *Yiannis Moschovakis*. The ASL will award some modest travel grants to graduate students. For more information and deadlines contact keisler@math.wisc.edu or lempp.math.wisc.edu

KEISLER CONFERENCE

Immediately following the ASL meeting, starting on the afternoon of March 12 and continuing through March 13, a model theory conference in honor of H. J. Keisler on the occasion of his 60th birthday will be held. The meeting will include nine lectures focusing on topics such as finite model theory, nonstandard analysis and probability, and applications of model theory to algebraic geometry, real analytic functions, computer science, linguistics, and set theory. The meeting will also feature a banquet in honor of H. J. Keisler on the night of March 12. Contact lempp.math.wisc.edu for more information.

FADELL TOPOLOGY CONFERENCE

A meeting is being planned for April 12 & 13, 1996 at Van Vleck Hall, UW-Madison, in honor of Edward Fadell's 70th Birthday. The invited speakers include: *A. Dold* (Heidelberg), *F. Cohen* (Rochester), *R. Brown* (UCLA), *K. Millett* (UC-Santa Barbara), and *S. Husseini* (Madison). It is being organized by A. Adem, P. Rabinowitz and P. Orlik

There will be a lecture on Friday, April 12, followed by a reception. The rest of the lectures will be on Saturday, April 13, followed by a banquet. A block of rooms has been reserved at Lowell Hall. Participants should call directly ((608) 256-2621). For more information send e-mail to adem@math.wisc.edu, or check the UW-Madison Math Department homepage on the world wide web (see cover).

Professor Fadell retired in May 1993 with a half-time appointment for a five year period. He and his wife spent 1994 in Europe. He taught a course on 'Topological Methods in Nonlinear Analysis' at the University of Heidelberg and gave a series of Lectures at the University of Milan. One of the highlights of their stay in Milan was the opportunity for them to hear two performances at 'La Scala'. Fadell continues to work on the cohomology and Lusternik-Schnirelmann category of free loop spaces in configuration spaces of manifolds. These results have applications in critical point theory.

SUMMER INTERN PROGRAM IN PROBABILITY AND STOCHASTIC PROCESSES

The intern program brings ten recent PhD recipients in probability and stochastic processes to Madison for the summer. The objective of the program is to stimulate and enhance the scientific development of capable young researchers. The program includes an extensive seminar schedule featuring lecture series by distinguished senior researchers. Interested faculty and students are welcome to participate in the seminars. The program in the summer of 1995 was organized by Peter Ney and Michael Newton (of the UW Statistics Department) and focused on Markov chain Monte Carlo. *Persi Diaconis*

and *Julian Besag* were featured speakers.

The program will continue in the summer of 1996. The primary focus for next summer will be spatial models in biology. For more information contact David Griffeath (griffeat@math.wisc.edu) or Tom Kurtz (kurtz@math.wisc.edu).

IMA COURSE

The summer course of the Institute of Mathematics and its Applications will take place in Madison in 1996, from June 10 to July 5. The structure of these summer meetings envisions having two graduate students from each of the institutions affiliated with the IMA. It is an intensive course, with each of four lecturers giving ten lectures in a given week. The subject next year is 'harmonic analysis' and the current plans are to have as the four speakers: *Robert Fefferman* (Univ. of Chicago), June 10-14; *Tom Wolff* (Caltech), June 17-21; *Carlos Kenig* (Univ. of Chicago), June 24-28; and *Eli Stein* (Princeton University), July 1-5. For information contact *Andreas Seeger* (seeger@math.wisc.edu).

17 The Rest of the News

Richard A. Brualdi and *Bryan L. Shader* (UW PhD, 1990, with Brualdi) are coauthors of "Matrices of Sign-Solvable Linear Systems", Cambridge Tracts in Mathematics No. 116, Cambridge University Press.

Richard A. Brualdi has been elected as president of the International Linear Algebra Society (ILAS) for a three year term beginning March 1, 1996. He will succeed *Hans Schneider* who is the founding president of ILAS.

The book 'Matrix Algebra Using MINimal MATlab', by *Joel Robbin* appeared just after the newsletter went out last year. It is published by AK Peters and includes the software (MINI-MAT) for DOS. Software for Mac and Windows is available on request.

Professor *Steve Bauman* celebrated his 60th birthday this past summer. On that occasion his daughters prepared a scrapbook of reminiscences and salutations from friends in and beyond the Mathematics Department. We had a 'peek' at it.

His devotion to teaching, his conscientious supervision of the Teaching Assistants for many years, his perennial sound advice, and his sense of humor are all warmly noted. Among my own recollections of Steve are his great humor. I recall that one summer there were lots of youngsters (high school students) around Van Vleck and it was noticed that donuts were being consumed and not paid for. The donuts were discontinued for a period and replaced by bagels, thought to be less attractive to voracious kids. However, the bagels also disappeared, at which juncture Steve remarked that they "should put lox on the bagels" Ann Caruso recalls a morning when she had a telephone call to alert Professor Bauman that his house was burning. He was giving a calculus lecture when Ann located him, and calmly told her that he would finish his lecture and then see about the house.

Stephen Szydluk, a graduate student, continues his ultra-marathons. He ran in the 100 Kilometer World Challenge in Winschoten, Holland in September. Contending with some problems with quadriceps and some gastric upset, he finished in 51st place with a time of 7:25:27. Another American, Tom Johnson was third with 6:30:11 and set a U.S. record. The winner was Valmir Nunes of Brazil at 6:18.

Noted: a computer at the University of South Florida is named *Kleene*.

18 New Results

Taeim Kim and *Yong-Geun Oh* had their second son *Joonsung David Oh* on February 9, 1995. On March 7 *Tessa Madelyn Marie Collins* was born to *Ben* and *Nancy Collins*. On March 19, *Justin Wang* was born to *Chih-wen Weng* and his wife *Ming-I Yeh*. *Rok Forstneric* was born on July 5 to *Mira* and *Franc Forstneric*. On October 2, *Robin Pemantle* and *Diana Mutz* had a son, *Walden Scott*.

19 Uplifting Thoughts

At the beginning of the the fall semester elevator number 2 (cf. newsletter 1994, if you've for-

gotten which is which) had to have a REALLY BIG PART replaced and was out of commission for about a week. The event caused considerable agonizing on the part of people trying to decide whether the wait for the one elevator was worth it. If you have any opinions on this matter, please forward them to our 'Elevator Committee - Working Group on Single Elevator Occurrence'.

As has happened in the past, shortly after an elevator repair, there was another failure. Near the end of October, elevator #2 again sat forlornly on B3 for a day. At about that time there were reports of strange noises from elevator #1(cf. reference above). One such report occurred on October 31!!

20 Meet you in Orlando

The Sixth Annual Wisconsin Reunion will take place at the joint AMS-MAA meetings in Orlando, Florida The reunion is scheduled for Thursday, January 11 from 5:30 to 7:30 in Salon 3 of The Clarion.

21 Funds and Contributions

We hope you'll consider giving to the Departmental Fund or one of the memorial funds: the Wasow Fund, the Kleene Fund, or the Hirschfelder Fund. If your employer matches contributions, that would be great. Also, please consider putting a line in your will to benefit the programs of the Mathematics Department. Donations can be earmarked for the department or a named fund and sent to:

UW Foundation, 1848 University Ave., Madison, WI 53705

22 Your News

Please send news about yourself to Bob Turner (turner@math.wisc.edu), the editor of the newsletter. Also please fill out the sheet on the last page and return it to us. Thanks.

database

While we had a number of responses to our invitation to update the database, it was small in proportion to the number of former Madisonians. Moreover, our bulk mailing would not have been forwarded. So, here we go again. This time we're using first class mail and have made a sheet that you can tear off, fill in, and stick in the mail. With the PhD Centennial coming we'd like to have our information as complete as possible. Please fit the address information (work, and home or second work) in the allotted spaces so it fits in our database. Return to address below. Thanks for taking the trouble to fill it out!

Name _____

1st Address _____

Telephone _____ Did you attend VV 25th anniversary?
email _____

Type of business:(circle one) industrial/commercial, higher education, K-12, homemaker, self-employed, retired, other

Last UW Degree:(circle one) Bachelor, Master, PhD, AMEP year _____

Advisor _____

2nd Address _____

Telephone _____
email _____

Are you planning to attend the '97 PhD Centennial? (circle) yes probably no
Do you receive duplicate copies of the newsletter?

Please send to:

Chair's Secretary

Mathematics Department -UW

480 Lincoln Drive

Madison, WI 53706

