Berkeley

Mathematics

Newsletter

A newsletter of the Department of Mathematics and Center for Pure and Applied Mathematics at the University of California, Berkeley

MATH DEPARTMENT UPDATE

The Department is again booming with increased undergrads declaring a Math major, outstanding visitors, and awards and honors abounding.

New and Visiting Faculty

I can successfully report we were able to lure Ming Gu away from UCLA to become our newest professor in the Department. Gu was at UC Berkeley from 1993-96 as a Morrey Assistant Professor. His field is numerical linear algebra.

In addition, the Administration has given us approval to hire three tenure-track faculty next year.

This fall we welcome several outstanding visitors: Mark Haiman is a Visiting Miller Professor from UCSD; his field is algebraic combinatorics. Don Zagier from the Max Planck Institute for Mathematics and the University of Utrecht taught a course on number theory as the Chern Visiting Professor, and in addition, gave the Bowen 2000 Lecture Series this October. René Schoof will be teaching number theory this spring and is visiting from Universita di Roma II. Jørgen Andersen's interests are moduli spaces, topology, and quantization. Andersen

is visiting from Aarhus University in Denmark.

We have 19 postdoctoral visitors this year. Some of them are mentioned in the section welcoming new visitors.

Honors

I am delighted to offer congratulations to a plethora of faculty who have won prestigious awards this last year. They are listed in the Honors and Awards section later on. I would like to mention the newest planet discovered on October 21, 1982 by L.G. Karachkina

## Highlights

What's inside:

LOYALTY OATH CONTROVERSY

INTERVIEW WITH LEON HENKIN

Fear of communism was being developed and fanned for political purposes by a junior senator from Wisconsin, Joseph McCarthy, in the late 1940's. McCarthy eventually formed a committee that went to universities to question professors concerning their connection to the Communist Party. More widely known are the inquisitions of Hollywood actors, but it extended to all levels of public influence. McCarthy was spreading fear of educators as well.

Wanting to show proof of loyalty, Robert Gordon Sproul, then President of the University of California, proposed the Loyalty Oath which would have all professors declare they were not and never had been communists.

Some 29 tenured professors from UC Berkeley and two from UCLA (one of whom later became a UC President) refused to sign. They declared that political affiliation should not be required to be made public, and the Communist Party was a legal party in the US. It
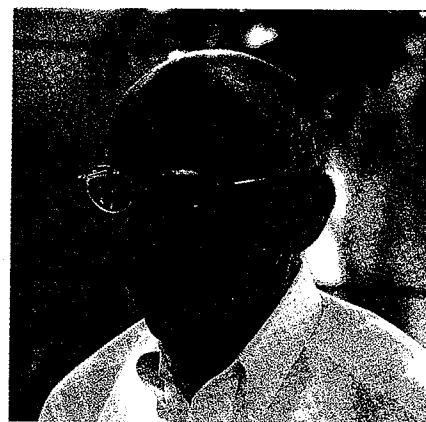
LEON HENKIN

was a matter of principle.

The Regents of the time mandated that all professors had to sign, or be fired. In the Mathematics Department, three professors refused: John Kelley, Hans Lewy, and Pauline Sperry. Another professor, D.H. Lehmer, attempted to avoid signing by taking a leave of absence to take a federal job at UCLA

MATH DEPT UPDATE
(continued from page 1)

at the Crimean Astrophysical Observatory has finally been given a name. Suggested by V.J. Judovich, the new planet "Smale" was named after our own Stephen Smale.

A Sad Note

I regret to add we had three noteworthy professors emeriti pass away this last year: Tosio Kato, John Kelley, and Lucien Le Cam.

Student News and Honors

This year's Charles B. Morrey Prize awardees are Frank Calegari and Julia Kempe.

Outstanding GSI's not graduating last spring were Stephan Garcia, Joon Bum Bang, Megumi Harada, Joseph Johnson, and Howard Thompson. A note about Joseph Johnson: he is an undergraduate and had some of the best student evaluations ever read.

Seven students won NSF Post Doctoral Fellowships out of only 36 awarded: Michael Anshelevich, Jim Borger, Danny Calegari, Ezra Miller, William Stein, Dylan Thurston, and Harry Tsai.

We welcomed 40 new graduate students this fall. A very capable group!

Working hard to increase the number of math majors, Catherine Pauling, under the Director of Student Services Barbara Peavy, has a goal of 500. From 170 declared majors two years ago, she advised 376 last spring!

Computing News

We've upgraded our computer system with a new server early last spring and got computers in every grad student office.

Staff Accomplishments

I would like to thank all the staff for doing a fine job while working under the stress of on-going construction noise, dust, and covered windows, the new BFS accounting change-over confusion, and lack of union contract settlement. Despite such hardships, several of the staff won Merit Awards this last year; they are mentioned later in the newsletter. Ω

WELCOME VISITORS
Haruko Bruce

Charles B. Morrey, Jr. Assistant Professor:

The following individual has been appointed to serve as a Charles B. Morrey, Jr. Assistant Professor. This prestigious position was created in honor of the late Professor Morrey, who was one of America's premier analysts.

Dr. Plamen Iliev received his PhD from the Université Catholique de Louvain in March 1999. He works in finite and infinite dimensional integrable systems, their discretizations, algebra-geometric solutions, commutative rings of difference and differential operators, and the bispectral problem.

PLAMEN ILIEV

NSF Postdoctoral Fellows:

We are honored to have **Dr. Kiran Kedlaya and Dr. Monica Vazirani** visit the Department as National Science Foundation (NSF) Postdoctoral Fellows. NSF Postdoctoral Fellowships are extremely competitive. These recipients are among the best young mathematicians in the country.

Kedlaya received his PhD this June from MIT. His research interests include algebraic number theory, algebraic geometry, and combinatorics.

KIRAN KEDLAYA

Vazirani is one of our graduate students who received her PhD this year. She works in representation theory, Hecke algebras, and algebraic combinatorics.

MONICA VAZIRANI

NSF VIGRE Recipients:

We have three recipients of the NSF VIGRE Grant fellowships this year. **Drs. Ernest Croot III, Ruth Kantorovitz, and Thomas Mark** hold the three-year appointments that include teaching and conducting research.

Croot received his PhD from the University of Georgia in August 2000. He is a number theorist working in analytic and combinatorial number theory. He specializes in research on unit fractions, arithmetic progressions, and the distribution of numbers in intervals.

ERNEST CROOT

Kantorovitz received her PhD from the University of Illinois in June 1999. She works in commutative algebra and algebraic K-theory, and to some extent algebraic topology.

RUTH KANTOROVITZ

Mark received his PhD from Michigan State University in June 2000. He is a low dimensional topologist working in gauge theory of three- and four-dimensional manifolds, including applications to gauge-theoretic invariants.

THOMAS MARK

Dr. Adam Logan received the VIGRE Grant last year, but delayed his arrival to take part in the research program at the Mathematical Sciences Research Institute (MSRI.) Logan received his PhD from Harvard University-

ADAM LOGAN

sity in June 1999. He is an algebraic geometer working in birational geometry of moduli spaces of curves.

Visiting Professors:

The Department is pleased to welcome **Professors Jørgen Andersen, René Schoof, and Donald Zagier** as Visiting Professors for the fall semester.

Andersen is visiting from Aarhus University in Denmark. His interests lie in moduli spaces, low dimensional topology, and quantization.

JØRGEN ANDERSEN

Schoof is visiting from the Universita di Roma II. His interest lies in number theory.

DONALD ZAGIER

Zagier was visiting from the Max-Planck-Institut für Mathematik in Bonn, Germany. His interest also lies in number theory. Zagier gave the Bowen 2000 Lecture series this October, entitled, "Periods and Special Values of *L*-Functions."

Visiting Assistant Professors:

We welcome the following as Visiting Assistant Professors to the Department, **Drs. Agust Egilsson, Christian Haase, Michael Hitrik, Anton Kast, Mariel Vazquez, and June Zhu**.

Egilsson received his PhD from UC Berkeley in June 1995. His current research is on Poisson manifolds and symplectic geometry.

Haase received his PhD in January from the Technical University of Berlin. He works in combinatorics and polytope geometry.

Hitrik received his PhD in November 1999. His research interests include inverse spectral problems and inverse scattering, and distribution of scatting poles for Schrodinger operators.

Kast received his PhD in Physics from UC Berkeley in 1995. He works in the areas of statistical mechanics and hydrodynamic turbulence.

ANTON KAST

MARIEL VAZQUEZ

Vazquez received her PhD July, 2000 from Florida State University. She works in knot theory, DNA topology, and computational biology.

Zhu received her PhD from UC Berkeley in June 1997. She works in arithmetic algebraic geometry, especially on supersingular abelian varieties and their rings of endomorphisms.

JUNE ZHU

Lecturer in Math Education:

The Department is pleased to welcome **Dr. Michael Keynes** as Lecturer for the fall semester. He received his PhD from the University of Washington in 1999. Keynes has a PhD in mathematics, but his work here is on mathematics education.

MICHAEL KEYNES

WELCOME NEW FACULTY

Ming Gu received his PhD from Yale University in 1993 after completing his MS at the Chinese Academy of Sciences in China in 1986. Gu was awarded the Alfred Sloan Research Fellowship in 1998 and the NSF CAREER Award in 1997. In addi-

PROFESSOR MING GU

tion, the SIAM Activity Group on Linear Algebra awarded the 1997 Prize to Gu for the best paper in applied linear algebra written in the last three years worldwide. In 1996, Gu was awarded the Householder Award for best PhD thesis worldwide in numerical algebra written since 1993. Topics in the thesis included efficient algorithms for eigenvalue problems and rank-revealing QR factorizations.

Gu has been Assistant Professor at UCLA since 1996. He was a Morrey Assistant Professor at UC Berkeley and a Hans Lewy fellow at the Lawrence Berkeley National Laboratory from 1993-96.

Gu's current research interests are scientific computing, numerical linear algebra, and numerical optimization. His main focus is on using numerical linear algebra tools to solve application problems in creative ways. Ω
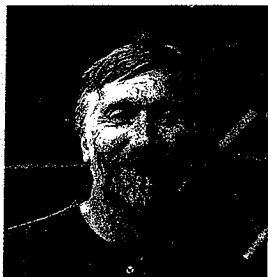
HONORS AND AWARDS ABOUND

The Department and Berkeley Mathematics Community congratulate our professors and students for their many honors and awards!

David Aldous is (effective July 2000) holder of the Chair of the Class of 1940 at UC Berkeley. Also in November he received an honorary Doctor of Science degree from the University of Chicago.

DAVID ALDOUS

Richard Borcherds was elected as a member of the American Association for the Advancement of Sciences (AAAS) and awarded a Miller Professorship.

RICHARD BORCHERDS

Grigory Barenblatt has been elected a Foreign Member of the Royal Society of London. Grisha is already a Foreign Member of the US National Academy of Engineering, a Foreign Member of the US National Academy of Sciences, and a Foreign Member of the American Academy of Arts and Sciences. Given that foreign members of an academy usually constitute a rather small fraction of the total membership, this level of recognition must set some kind of record.

GRIGORY BARENBLATT

Alexandre Chorin was awarded the Wiener Prize from the AMS. In addition, Chorin was ap-

ALEXANDRE CHORIN

pointed Faculty Research Lecturer and was a Clifford Lecturer at Tulane University.

Michael Christ was awarded a Miller Professorship.

MICHAEL CHRIST

Craig Evans received the Donald Sterling Noyce Prize for excellence in undergraduate teaching.

CRAIG EVANS

Leon Henkin's Citation for Distinguished Service

BY OLIVER M. O'REILLY

At a celebratory dinner marking the 25th anniversary of the Professional Development Program (PDP) last spring, **Professor Leon Henkin** was awarded a citation by the Academic Senate's Committee on Special Scholarships (CSS). The citation was presented "in recognition of his exceptional commitment to the development of students from groups who are underrepresented in the academy." As an active member of the CSS for several decades, Professor Henkin was instrumental in founding PDP and organizing its programs. Presently, PDP is actively involved with Berkeley undergraduates as well as students in the Berkeley and El Cerrito High Schools.

Vaughan Jones received the Onsager Medal from Trondheim University.
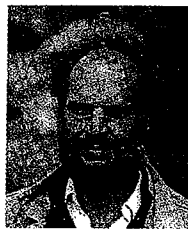
VAUGHAN JONES

Vel Kahan, in addition to receiving the 2000 IEEE Emanuel R. Piore Award and gold medal mentioned in the last edition of this newsletter, also received an Honorary Doctorate of Mathematics from Waterloo University.

VEL KAHAN

Allen Knutson won a prize fellowship from the Clay Mathematics Institute. Prize Fellows are young, established researchers who are selected to work for CMI principally during the summers.

ALLEN KNUTSON

Hewlett-Packard Visiting Research Professor at MSRI:

Hewlett-Packard Company (HP) and the Mathematical Sciences Research Institute (MSRI) have named **Professor Hendrik W. Lenstra, Jr.**, as the HP-MSRI Visiting Research Professor for the 2000-2001 academic year. Lenstra will divide his time between MSRI in Berkeley, where he will work closely with postdoctoral students in a major research effort in algorithmic number theory, and HP Labs, where he will apply his expertise to a broad research agenda that includes computational number theory, error correcting codes, cryptography, finite fields, elliptic curves, analysis of algorithms, complexity and operations research.

HENDRIK LENSTRA

"The connection between mathematics and technology continues to grow, creating rich opportunities for collaboration between academia and industry, such as the HP-MSRI Visiting Research Professorship," said Dick Lampman, HP vice president of research and HP Labs

director. "Our mathematics team is delighted by the prospect of pursuing these opportunities with Professor Lenstra, one of the world's foremost mathematicians."

David Eisenbud, director of MSRI, said, "The appointment of Hendrik Lenstra as HP-MSRI Visiting Research Professor continues the program on the extraordinary level established last year by Richard Karp, one of world's best-known computer scientists. Lenstra is the inventor of some of the most remarkable algorithms in number theory. He is famous for his theoretical brilliance, his distinctive style of inquiry and his wide-ranging research. He will be a leader in the fall Algorithmic Number Theory program at MSRI, and we look forward to the collaboration with HP Labs that his presence will generate."

Isabella Novik received the 2000 Haim Nessyahu Prize for excellent PhD Thesis in Mathematics in Israel.

ISABELLA NOVIK

Andrei Okounkov was awarded a Sloan fellowship.

ANDREI OKOUNKOV

Lior Pachter was awarded a Project NExT Fellow. Project NExT (New Experiences in Teaching) is a program for new or recent PhDs in the mathematical sciences who are interested in improving the teaching and learning of undergraduate mathematics.

LIOR PACHTER

Kenneth A. Ribet was elected to the National Academy of Sciences this year, 2000, in the field of mathematics. Ribet is a number theorist who did deep work on l-adic representations of Galois groups and modular forms. In addition, Ribet revolutionized the classical subject of cyclotomic fields by introducing a technique of great originality. Ribet is best known for his crucial role in Wiles' proof of Fermat's Last Theorem.

KEN RIBET

Kenneth A. Ribet was noted as the most distinguished alumni of the past century in the Brown University Alumni Magazine. Also, he was honored as a Whiteman Lecturer at the University of Southern California. Whiteman was a number theorist at the University of Southern California.

Planet Named after UCB Professor:

The newest planet discovered on October 21, 1982 by L. G. Karachkina at the Crimean Astrophysical Observatory has finally been given a name. Suggested by V.J. Judovich, the new planet "Smale" was named after our own **Stephen Smale**.

STEPHEN SMALE

John Steele won an Alexander von Humboldt Prize last Spring. This prize finances 6 to 12 months of research in Germany. Steele will do his research in Berlin with Ronald Jensen after the spring semester.
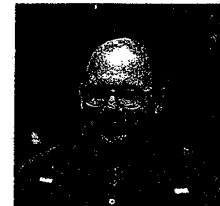
JOHN STEELE

Bernd Sturmfels received the MAA Lester R. Ford Prize as well as a Miller Professorship.

BERND STURMFELS

Dan Voiculescu received a Clay Professorship.

DAN VOICULESCU

Hugh Woodin was elected as a member of the AAAS.

HUGH WOODIN

Maciej Zworski was elected a Foreign Member of the Royal Society of Canada and won the Coxeter-James Prize from the Canadian Mathematical Society.

MACIEJ ZWORSKI

Graduate Awardees:

This year's Charles B. Morrey Prize, Jr. awardees were **Frank Calegari** and **Julia Kempe**. This award was established by Mrs. Frances Morrey to honor the memory of her husband, Charles B. Morrey, Jr., an outstanding analyst and the sixth Chairman of the Department of Mathematics. A cash prize is awarded to a graduate student of promise to encourage pursuit of doctoral research.

Recipients of the Outstanding GSI Award not graduating last spring were **Stephan Garcia, Joon Bum Bang,**

UNDERGRAD AWARDEES

A l i c e Chan received an honorable mention from the Association for Women in Mathematics (AWM) and an invitation to their awards ceremonies in New Orleans in January.

ALICE CHAN

The 2000 Mathematical Contest in Modeling team from UC Berkeley received honorable mention. Members of the team were: **Joaquin Chung, David Matters, and Rory Solomon with Faculty Advisor, Rainer K. Sachs and Brian Curtin.**   Ω

New Peer Advising Program

Starting this fall 2000, the Math Department has a peer advising program. It's primary purpose is to offer a student to student perspective and assist students in making a successful transition to the math majors.   Ω
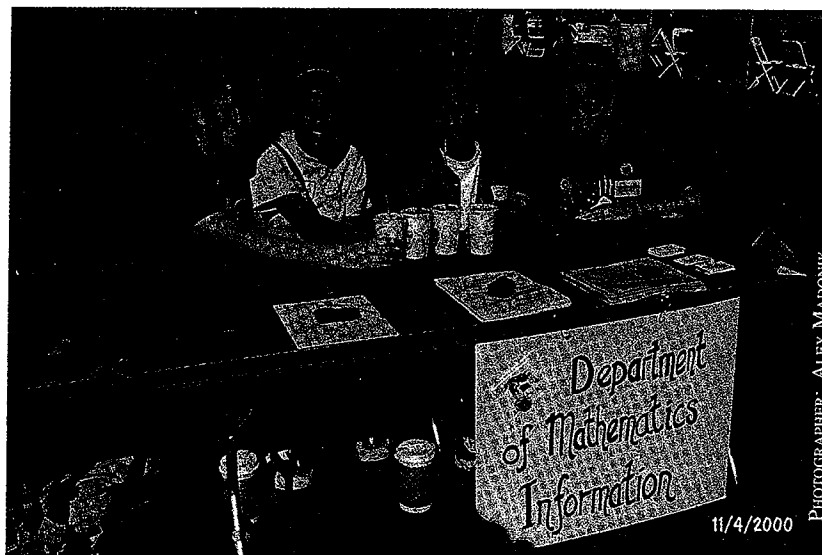
UNDERGRADUATE PEER ADVISORS: KIRSTEN FAGNAN, AYESHA HAROUN, EDWIN LINARES WITH CATHERINE PAULING, UNDERGRADUATE ADVISING SUPERVISOR DOING OUTREACH TO HIGH SCHOOL STUDENTS AT THE CAL-OREGON FOOTBALL GAME.

A Small Fraction Enter Graduate Program

KEN RIBET, VICE-CHAIR FOR GRADUATE AFFAIRS

I took over the reins of the graduate program from Don Sarason in July, 1999. It has been a great pleasure for me to develop an overview of the program as I have taken over this enormous responsibility.

At Berkeley, we attract a staggeringly large pool of highly qualified applicants from all over the world. Last year, for example, we received roughly 400 applications, with 300 coming from the US and 100 from abroad. After offering admission to a small fraction of the 400 applicants, we welcomed an entering class of 38 students this past fall. While a significant number of our new students hold bachelor's degrees from various campuses of the University of California, our entering class includes students from 8 foreign countries, 15 of the 50 states, and the District of Columbia. A large number of these students arrived with non-teaching fellowship support from outside this department. Using our NSF VIGRE (Vertical InteGration of Research and Education) and GAANN

(Graduate Assistance in Areas of National Need) grants, we were able to provide research support to all arriving domestic students for their first year of graduate study. Our entering class reflects the Department's decision to increase the size of our graduate program very slowly over time; last year's incoming class numbered 36. The gradual increase in our student population is intended to mirror the increase in our faculty as we come back to full strength after a large number of retirements a decade ago.

Even as we expand our program, we continue to offer five years of support to our students who are making good progress in the program. In fact, we have even been able to support students in their sixth year of study.

At the other end of the pipeline were the 34 students who received graduate degrees in mathematics in 1999–2000. (Two other students received degrees from the program in Logic and Methodology.) These graduates were greeted

by job opportunities that were much more plentiful than those available to students five, or even three, years ago. The bulk of our new PhDs accept postdoctoral teaching or research positions at academic institutions, although our students are now increasingly receptive to the opportunities afforded by positions in industry. One measure of the impact of Berkeley's graduate program in the mathematics community is the number of our graduates who were afforded NSF postdoctoral fellowships this past year: Out of 36 fellowships in the entire mathematics program, 7 went to new PhDs from the Berkeley Mathematics Department and 2 to new PhDs from the Berkeley Computer Science Department.   Ω

NOTES FROM MSRI

DAVID EISENBUD, DIRECTOR

FALL 2000

The Institute is thriving with major programs this year on Algorithmic Number Theory, Operator Algebras, and Spectral Invariants of Manifolds, and a microprogram on Minimal Surfaces. UC Berkeley is represented in many ways: among others, Hendrik Lenstra and Vaughan Jones are organizers of the first and second of these programs. On the applied mathematics side, MSRI is conducting workshops on Cryptography, Combinatorial Designs, Nonlinear Estimation, and Randomized Algorithms in Financial Mathematics. We're working on putting together a Hot Topics Workshop on Percolation; stay tuned for details.

Early in September, just after the dust of the Introductory Workshops had settled, we hosted a three-day event called "The Panorama of Mathematics" in honor of our founding director, Shiing Shen Chern. The range of talks was very wide; you can get a sense of it from the program on our web site (http://www.msri.org). A special Saturday event, "Mathematics Across The Sciences," reached beyond the mathematical community to a much broader audience. Leonard Adleman (the "A" in "RSA") spoke on DNA computing and the adventures and misadventures in his lab ("If the DNA computer doesn't do what it should, try throwing in a handful of salt"); Richard Karp surveyed the tremendous mathematical challenges that remain in dealing with our burgeoning knowledge of the genome; and Brian Greene wowed a packed house with his amazing blend of showmanship and exciting science. (As usual, you can find most of the conference in streaming video on our website.) By the time you read this newsletter we'll have done our next public event too, a timely lecture on voting systems and paradoxes by Don Saari.

NEW CHALLENGES

I'm truly delighted to finish a story whose progress I've reported in every Emissary since I became Director, three and a half years ago: MSRI HAS SIGNED ITS COOPERATIVE AGREEMENT WITH THE NSF! This agreement is the final step of the recompetition. It secures our major operational funding for the next five years, after which, if all goes well, there may be a noncompetitive renewal. This victory was made possible by the support of the mathematics community, and UCB in particular, in innumerable ways. I'm proud of this vote of confidence, in the work being done by MSRI.

As for future renewals, there is a significant expectation: the NSF requires that MSRI demonstrate serious progress toward identifying new sources of funding, and toward decreased dependence on the NSF. With this mandate the Board of Trustees and I have focused on exploring ways in which MSRI can increase its individual, corporate and foundation support.

Many valued programs that MSRI does for the mathematical community are not eligible for support from our NSF core grant. Funding from private sources allows us the freedom to launch such important activities as our Journalist-in-Residence program and the events we offer to inform the public about the value of mathematics to society at large. Non-governmental funding is necessary even for such much-anticipated and scientifically indispensable events as our daily teas! On a larger scale, the NSF has made it clear that the necessary major improvements to our building must come from private sources. To ensure all these programs central to our mission of supporting mathematics, we need to continue to develop a wide range of private support. I am confident that we will be able to satisfy the funding expectation set forth by the NSF. A number of elements are already in place. **MSRI's web page is: http://www.msri.org** Ω

DAVID EISENBUD

Dual Tracks for Mathematics Library Materials

ANN JENSEN, LIBRARIAN

Library materials and library access at Berkeley continue to develop positively along the dual tracks of digital and traditional paper. The California Digital Library has successfully negotiated hundreds of licenses, enabling system-wide electronic access for thousands of journals. These, along with many important titles that are licensed for Berkeley access, comprise a core of mathematics literature that is available at your desk top and increasingly linked from MathSciNet and other indexes. Other titles are becoming digitally available as licenses are negotiated that allow seamless, remote access for our campus community.

Our ability to build the monograph collection is slightly stronger than it has been in the recent past. And that collection is continually enhanced by several endowment funds and book donations from our own faculty. Your support is greatly appreciated.

If you would like help with any aspect of our collections or services - either electronic, traditional journals or books, or document delivery from other collections - please let us know. It's my goal and the goal of library staff to serve your needs as best we can. **Email: ajensen@library or phone 642-5729.**

JOHN KELLEY: END OF AN ERA (1916 - 1999)

LEON HENKIN

John L. Kelley arrived in Berkeley in 1947, and twice served as Chair of the Mathematics Department: 1957-60 and 1975-78. During his tenure he brought to Berkeley some of its most

JOHN KELLEY IN 1968

distinguished faculty, strongly contributing to the Department's ascent to its top position in national rankings. He also played a major role in reforming both the undergraduate and graduate curricula of the Department before retiring in 1985.

Kelley was born in Kansas on December 6, 1916. After earning AB and MA degrees at UCLA, he obtained the Ph.D. at the University of Virginia in 1940. He began his professorial work at Notre Dame, 1940-42. During the war years, 1942-45, he worked in a small mathematical group at Aberdeen Proving Grounds, which included future Berkeley colleagues Charles Morrey, Jr. and Anthony Morse. He then returned to university life at the University of Chicago, 1945-47, before settling in Berkeley as an Associate Professor. His research publications were principally in the fields of topology and analysis, and brought him to national prominence. He also contributed to several generations of mathematical researchers through his graduate textbook, *General Topology*, which first appeared in 1952, was translated into Spanish, Russian, and Japanese, and re-issued in later editions in 1968 and 1976. This textbook is still widely used, as it established the model for graduate textbooks on mathematics. Between 1951 and 1975 he mentored ten PhD students.

They were all summarily fired.

Kelley served on the Council of the *American Mathematical Society* and on The Board of Governors of *The Mathematical Association of America*. He was a Fulbright Research Professor at Cambridge, England in 1957-58 and accepted an AID appointment as Adviser and Teacher at The Indian Institute of Technology in Kanpur, India, in 1964-65. At Berkeley he was a Research Professor in the Miller Institute for Basic Research in Science in 1966-67.

Kelley's interest in mathematics teaching extended far beyond his own classes. In 1960, he took a leave of absence to serve as The National Teacher on NBC's National Classroom television program. He was an active member of The School of Mathematics Study Group which, in the early 1960's, transformed the way mathematics was taught all across America. In 1964 Kelley introduced a new Mathematics for Teachers major in the Mathematics Department, arranging a special program of internships to aid its graduates enter directly into schoolrooms; they were able to earn a teaching credential with education courses pared down to the summers before and after a first year of teaching, following their AB in Math. In another prong of his effort to help school teachers, he developed a Math Department course for prospective elementary teachers, first borrowing an instructor from the School of Education to serve as the lecturer, and subsequently teaching the course himself as well as encouraging colleagues to take a turn. Out of this activity emerged his 1970 book entitled, *Elementary Mathematics for Teachers* (co-authored with Donald Richert).

During 1977-78 he was a member of the U.S. Commission on Mathematical Instruction, and subsequently helped bring The Fourth International Congress of Mathematics Education to Berkeley in 1980. He welcomed some 2,000 teachers and professors from 90 countries to the Berkeley campus.

Kelley was very active in a variety of non-mathematical activities aimed at improving the social fabric on and off

campus. Foremost among these was joining a group of 29 tenured faculty members at Berkeley (and two at UCLA) who refused to sign a special loyalty oath demanded by The Regents in 1950. They were all summarily fired. From 1950-52 Kelley then served as a Visiting Associate Professor at Tulane University and from 1952-53 as Visiting Professor at University of Kansas. By then the California Supreme Court had ruled The Regents' oath unconstitutional, and ordered the rehiring of all non-signers. Kelley returned to Berkeley to a warm welcome in the Math Department, which had also produced two other non-signers, Pauline Sperry and Hans Levy.

Another way in which Kelley took part in improving the social fabric of the '60s was stirring resistance to the U.S. war in Vietnam — resistance that spread from students to increasingly wide segments of our population. Along with his wife, Ying Lee, Kelley was very sympathetic to the demands of students on campus for freedom to speak on politi-

LOYALTY OATH CONTROVERSY

as Director at the Institute for Numerical Analysis. However, he was told he needed to sign before he could go on the payroll. With five children to support, he eventually signed but with objection.

Other math faculty organized to contribute money to the non-signers in support of their decision and the expensive court costs in fighting this Loyalty Oath all the way to the Supreme Court. Their treasurer was Raphael Robinson.

Finally, in 1952-53 the California Supreme Court ruled the Loyalty Oath to be unconstitutional. All non-signers were to be rehired with reimbursement of lost pay if they had taken a loss of income from positions they found elsewhere. Pauline Sperry had reached the mandatory age of retirement so was not rehired. John Kelley and Hans Lewy returned to UC Berkeley's Mathematics Department and were active for many years. Ω

HANS LEWY (1905 - 1988)

Hans Lewy was born in Breslau, Germany and educated at Göttingen. After receiving the PhD degree there at the age of 22, he stayed on at Göttingen, at that time one of the major centers of mathematics in the world; he left for the United States when the Nazis came to power in 1933. He accepted an appointment at Berkeley in 1935 and remained until his retirement in 1972.

In 1928 Professor Lewy developed criteria for determining conditions which guarantee the stability of numerical solutions of certain classes of differential equations. His work in this area turned out to be crucial later for the use of high speed computers in solving such equations; as a result, thousands of research articles have been written about numerical solutions based on the pioneering work of Hans Lewy.

The unexpected characterized Lewy's work. In 1957, he startled the mathematical world by exhibiting a simple partial differential equation which has no solution at all, thus chang-

ing the thinking of all the experts in the field and giving rise to many investigations which explored the ramifications of Lewy's result. Professor Lewy distinguished himself not only in differential equations however; he also obtained outstanding results in geometry, analysis, and hydrodynamics. He remained active in research throughout his retirement, and even lectured on a result of such research at a conference in Cortona, Italy, only ten weeks before his death.

Among the numerous honors Lewy received are the Wolf Prize and the Steele Prize. He lectured on his work throughout the world, including the Soviet Union, the People's Republic of China, Japan, Czechoslovakia, and virtually all the countries of western Europe. He was a member of the National Academy of Sciences, the American Academy of Arts and Sciences, the Italian Academy (Academia Nazionale dei Lincei), and the Göttingen Akademie der Wissenschaften. In 1986, he received
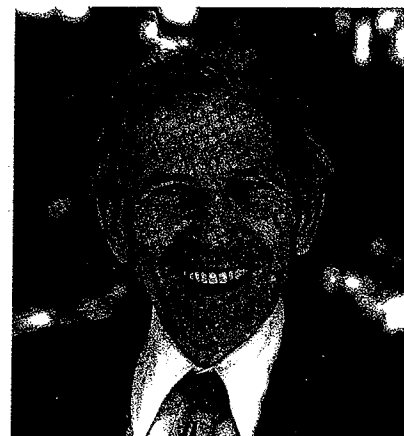
HANS LEWY

an honorary doctorate from the Rheinischen Friedrich-Wilhelms Universität (University of Bonn.)

Among the greatest mathematicians of the twentieth century, Professor Emeritus of Mathematics at the University of California at Berkeley, Hans Lewy died on August 23, 1988 after a brief illness. He was 83.   Ω

PAULINE SPERRY (1885 - 1967)

Born March 5, 1885 in Peabody, Massachusetts, Sperry attended Olivet College and Smith College, receiving the BA in 1906 and MA in Music in 1908 from Smith College.

From 1908 to 1912 Sperry was an Instructor of Mathematics at Smith College before pursuing graduate studies at the University of Chicago. In 1916 she received the PhD in Mathematics.

Returning to Smith College, Sperry taught one year before accepting a position in 1917 at UC Berkeley. Here she remained for the rest of her academic life.

In 1923, Sperry was appointed Assistant Professor and in 1931, Associate Professor of Mathematics. She retired in 1952, just before the

oath controversy waging battle in the universities was resolved in the Supreme Court.

Sperry's field of research was projective differential geometry. At the time of her dissertation, this field was just awakening, but soon grew to importance due to its connection to General Relativity.

Improving the teaching of mathematics in California

Sperry is remembered for her desire to inspire young minds to the study of mathematics. Besides the usual five hours per week of calculus for undergraduate students, Sperry added an additional hour for those interested in math-beyond-calculus, thus inspiring and preparing her students for future graduate work.

She took an active role in organizing various professional societies with the idea of improving the teaching of

mathematics in California. In 1945 she was made Chairperson of the Northern California Section of the Mathematical Association of America.

Raised a Quaker, Sperry's strong ethical beliefs gave her the strength and determination to refuse signing the loyalty oath in 1950, regardless of personal sacrifices. She felt it encroached on the political freedom of the University. Consequently, along with 29 other non-signing professors at UC Berkeley, Sperry was fired.

After the oath was ruled unconstitutional in 1952, Sperry was reinstated, but then she retired that year.

Sperry spent her retirement years on charitable projects, notably founding an orphanage-school in a village in Haiti. Sperry died on September 24, 1967 in Pacific Grove, California.
                    Ω

ALUMNI STORIES

From "applied mathematician" Robert B. Kelman:

Myron Katz's lament, in the fall 1999 *Newsletter* about the nonexistence of applied mathematics in the 70's was all the more true in the 50's. Many of us "drifted" into mathematics because we liked to solve applied problems and wanted more mathematical rigor than found in physics or engineering departments. However, the abstract, and to me abstruse, nature of graduate study in mathematics was disheartening. The *Newsletter* mentions the passing of Professor Kelley. I was in the first class that used his *General Topology*, a splendid book but wasted on me. To this day, I don't know the point of the axiom of choice let alone anything else that followed in the book — *de gustibus non est disputandem*.

> "Many of us drifted into mathematics because we liked to solve applied problems"

Mrs. Lawrence's mention that Latin helped gain her a job also rekindled memories. In my time, the PhD qualifier consisted of 6 one hour oral examinations in 6 subjects — 3 in the morning and 3 in the afternoon. Professor Hans Lewy headed the group examining me in mechanics, the fifth examination. Fatigued, I was doing badly. In exasperation, Professor Lewy said, "Kelman, you don't even know Newton's Laws. We flunk you." I replied I knew the laws and started out, *"Lex Primus. Corpus omne preserverare in statu, Ä¶ ."* As I finished the first law in Latin, Lewy smiled and said, "Maybe you do know something," and gave me another chance.

After my PhD, I worked in the computer industry in sales and research and had a two year stint in the White House as a consultant to President Eisenhower. I spent three years at the University of Maryland's Institute for Fluid Dynamics. I joined the faculty at Colorado State University in 1966 retiring in 1988. I also held a joint appointment at the University of Colorado School of Medicine. After retiring, I started a publishing company, first for outdoor guidebooks and now emphasizing technical writing and editing. In the early 90's I co-authored the rock climbing guide to Vedauwoo, an internationally recognized venue in the Medicine Bow National Forest. Not wishing to give up artistic control of the manuscript, I started my own company which was possible only because of modern book construction software. In the complicated ways life works, this book has led to contracts to edit and layout technical manuals. My background as a mathematician has facilitated my constructing relational databases that automate and eliminate errors in this work.

I am not the only graduate of the program to have written a climbing guide. Leigh Ortenburger, who was an office mate of mine in graduate school, wrote a famous guide to the Grand Tetons. After extreme mountain adventures around the world, he perished in the Oakland Hill fires of the early 90's. His book is still in print and will deservedly remain so for many years.

My research centered on dual Fourier analysis and mathematical physiology — topics remote from my graduate work. I was very lucky to be around in the 60's when the physiology of the kidney was being rewritten to take into account how the geometry of the kidney influenced urine formation — an inherently mathematical subject. It was an easy time to make productive contributions even though many physiologists felt the output of the kidney should be applied to mathematics rather than vice versa.

I have benefited greatly from the technology that has developed since I graduated. Not only has it allowed me, *inter alia*, to enjoy an interesting profession late in life — it has given me life itself. Without a heart valve replacement two years ago (unimaginable in the 50's), I would not be here to enjoy working, grandchildren, rock climbing, and, yes, even following current trends in applied mathematics. When I'm in the cardiologist's office, I realize that most of his diagnostic apparatus depends on the Fast Fourier Transform and the computer chip, two items not available in the 1950's.

From Jery R. Stedinger:

After UC Berkeley, I worked at Lawrence Livermore Laboratory, then went East for a PhD in Environmental Systems Engineering at Harvard. I pursed my interest in modeling and statistics at Cornell University where I am a professor. In 1997 I received from the American Society of Civil Engineers the Julian Hinds Award for career achievements and contributions to water resources planning. I enjoyed hearing what the Department is doing; also the activities of senior and new faculty.

From Sharona L. Krinsky-Byrnes:

I received the MS in Mathematics in 1995 and the MBA in 1999 from Ohio State University. Moving back to Los Angeles, I now work in direct marketing on the Internet as an interactive services manager for Direct Partners in Santa Monica.

From Charlton B. Barreto:

I am working at Inprise Corporation as a software architect and designer, for the professional service organization and OEM center.

LEHMER CONFERENCE - August 2000

The Lehmer Conference was held at the end of August this year at UC Berkeley. Three days of fifteen speakers highlighted mathematical contributions, inventions, and influences from Professor Derrick Norman Lehmer and his son, Professor D.H. Lehmer. Speakers included previous students, friend and historian, Constance Reid, and Chair Calvin Moore.

The computer Museum History Center displayed some inventions. David Farrell from the Bancroft Library set up an historical display. Many of the Lehmer family attended the banquet held on the second day of the conference and several members spoke about family life and the inspiration D.H. had on their lives.

D.H. Lehmer was a math professor at UC Berkeley 1940-1972 when he retired. His father, D.N. Lehmer was professor from 1904-1937. Ω
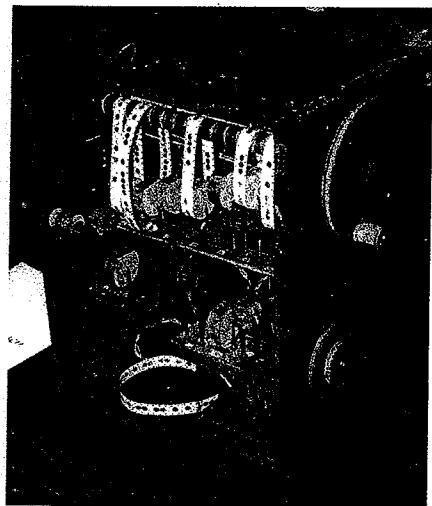

EMMA LEHMER
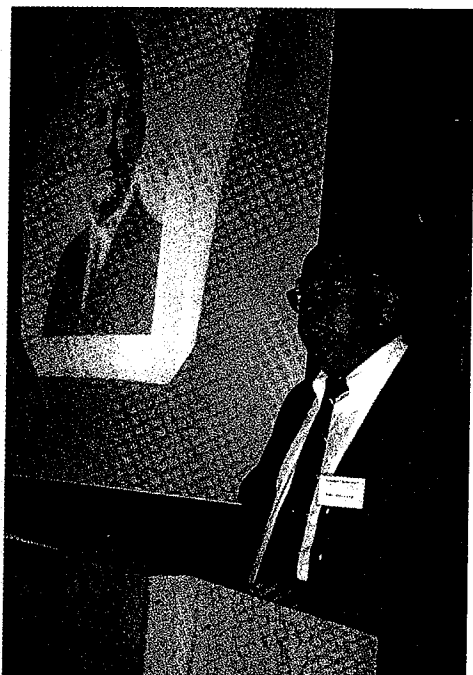
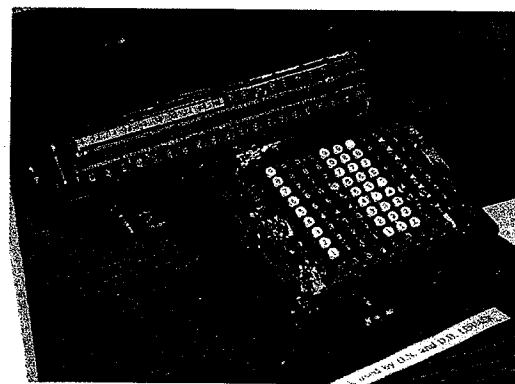JOHN BRILLHART WITH PHOTO OF D.H. LEHMER IN BACKGROUND

LEHMER GRANDSON AND EARLY "CALCULATOR-COMPUTER"

ANOTHER LEHMER INVENTION

OLD-STYLE "CALCULATOR"

PHOTOS BY CHRIS TUFFLEY

MANAGER'S REPORT
Lou Maull

A FOND FAREWELL

The end of the spring 2000 semester was marked with the resignation of Janet Yonan from the Department's Graduate Affairs Office. Janet had been with the Department 19 years having begun her career in 1981 as a Principal Clerk. She worked up the ranks to Student Affairs Officer. She took a student affairs position in the CASMA group, which includes Classics, Ancient History and Mediterranean Archaeology, South & Southeast Asian Studies, Buddhist Studies, and Medieval Studies. Her colleague faculty, staff, and students wish her well and she is missed in the Department.

JANET YONAN

Dan Strick, who worked in the Department as a Programmer/Analyst for four-and-a-half years, went into layoff status this mid-November as we continue with our efforts to reorganize computing services. With the exit last February of systems administrator Gregory Coleman, who took a chance-of-a-lifetime job at a dot com, we have recognized our need for an in-house IT Manager. To accomplish that end, we are re-organizing Dan's position into a manager/supervisor. All of us wish Dan the very best of future endeavors.

DAN STRICK

CHANGING PLACES AND NEW FACES

Since the Fall 99 Newsletter, we have reorganized the large Personnel and Finance unit into a Personnel Services unit and an Administrative Services unit. And, we have hired 3 new staff to fill various vacancies.

Melanie Seepol took over as the Supervisor of the new Administrative Services unit. She is

MELANIE SEEPOL

responsible for finance and administrative services for the Department. Her own work is managing our day-to-day financial business, processing reimbursements, reconciling non-payroll expenses, budget and reporting. She supervises Dave Hernes who is responsible for facilities, equipment, supplies purchasing, and computing accounts. In addition, she supervises Rondi Phillips who coordinates special events for the Department and is the Newsletter Editor. And, Stephanie Caselli, a new hire, reports to Melanie for the travel assistant work she does (more on that below).

Last December, Michael Kim was hired as the Supervisor of the new Personnel Services unit. Mike's unit oversees the processing of personnel matters for the Department. He supervises Linda Jarvis, the Academic Personnel and Chair's Assistant, and Haruko Bruce, Visiting Academic Personnel and Vice Chair's Assistant. His responsibilities include staff, graduate student, workstudy, and research appointments. Mike has worked on campus for 10 years, starting in Engineering, moving to Poli Sci, then the School of Public Health before Math. He replaces long-time employee Sui Hing Jen.

MICHAEL KIM

We also hired, last December, Stephanie Caselli, who replaces Kathleen Valerio. Stephanie's position is split, half-time in our Student Services unit and half-time in Administrative Services, previously mentioned, as the Travel Assistant. In Student Services she works with Catherine Pauling in the Undergraduate Program. She has worked at UC for 14 years at UCSF, Chemistry, Space Sciences Lab, and the School of Public Health.

STEPHANIE CASELLI

This past July we hired Thomas Brown into the Student Affairs position vacated by Janet Yonan. Thomas had several years of experience working as a graduate student advisor at Fuller Seminary in the L.A. area.

OUTSTANDING STAFF IN MATH

THOMAS BROWN

We are pleased to announce the recipients of Merit-Bonus awards for outstanding service performed during the 1999-2000 academic year. This bonus program is tied to the performance evaluation process and is to reward those staff who have performed in a superior way. Unfortunately, we do not receive enough funding to monetarily reward all of our staff who are deserving. Recipients of merit-bonuses for exceptional work performed on behalf of the Department over the course of last year were Catalina Cordoba, Catherine Pauling, Barbara Peavy, Marsha Snow, and Faye Yeager, and, on behalf of the Center for Pure and Applied Mathematics, Bernice Gangale.

Other staff were recognized by their peers and supervisors for outstanding service to the Department. They were: Haruko Bruce, Stephanie Caselli, and Deborah Craig.

We thank faculty, staff, and students who submitted letters in support of these colleagues. It is our goal to see that all deserving staff are recognized for their accomplishments.

BUSINESS AS UN-USUAL

On the administrative side, we continue to wend our way through the perilous process of implementing the new financial system. The Purchasing and Accounts Payable modules have been fully operational for over a year. And, though the front-end work of entering payment requests seems to be routine now, the back-end work of generating reports is only newly implemented, and erratically operational. Unfortunately, the old general ledger is no longer available with the result that previous shadow systems are not maintainable. We expectantly await the imminent release of a new reporting series promised to be helpful and functional.

And, starting July 1, 2001 we will

1999-2000 OUTSTANDING STAFF

CATALINA CORDOBA

CATHERINE PAULING

BARBARA PEAVY

MARSHA SNOW

FAYE YEAGER

BERNICE GANGALE (CPAM)

HARUKO BRUCE

STEPHANIE CASELLI

DEBORAH CRAIG

MANAGER'S REPORT
(continued from page 12)

begin implementing the on-line human resources system, the other greatly anticipated on-line module. We expect it to be as fraught with peril as the Purchasing/Accounts Payable modules.

We have accomplished a great deal this past year. The coming year holds the prospect of substantial change on all fronts. Together we will hold a steady course forward. Ω

Happy Holidays from the Math Department!

GRATEFUL THANKS TO OUR FRIENDS

'tis the season
to say
Thank You

The Department of Mathematics extends heartfelt thanks to all our donors over the past years for their generous support. Our donors have contributed to the strength and vitality of our students and the Department. The following is a list of our donors from 1995-2000. We apologize if we have omitted anyone. Please do let us know if that is the case. A special thanks to all our donors who wish to remain anonymous.

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THE DEPARTMENT OF MATHEMATICS

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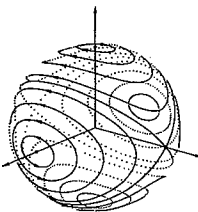
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WELCOME VISITORS

Visiting Postdoc Fellow:

The Department is happy to welcome **Dr. Javier Arsuaga** as a visiting Postdoctoral Fellow. He received his PhD from Florida State University this year. His current research includes large scale chromatine geometry in mammalian cells and chromosome aberrations produced by ionizing radiation. His mentor is Professor Rainer K. Sachs.

JAVIER ARSUAGA

Visiting Miller Professor:

Mark Haiman was awarded a Visiting Miller Professorship for the fall 2000 semester. The purpose of this award is to bring promising or eminent scientists to the Berkeley campus on a short-term basis for collaborative research interactions.

Haiman has been in residence at Berkeley since January, 2000 teaching a well-attended graduate seminar in combinatorics last spring and completing a manuscript giving a full proof for the $n!$ conjecture in algebraic combinatorics. A workshop on his proof of this famous conjecture, jointly organized by Professors Haiman and Sturmfels, was held in late summer. Ω

MARK HAIMAN

HONORS AND AWARDS

Megumi Harada, Joseph Johnson, and **Howard Thompson.** Joseph Johnson, though an undergraduate, had some of the best student evaluations ever read. These Graduate Student Instructors have demonstrated exceptional teaching abilities.

NSF Math Postdoc Fellows:

Each year, following a national competition, the National Science Foundation (NSF) awards a number of Mathematical Sciences Postdoctoral Fellowships (MSPF) to recent PhDs in the Mathematical Sciences. These prestigious fellowships carry two years of fellowship support which the winner can take in residence at an institution of their choice. This year the Foundation awarded 36 of these fellowships.

Berkeley Mathematics graduate students did exceptionally well in this competition and won 7 of the 36 fellowships awarded nationally. The Berkeley winners are: **Michael Anshelevich, Jim Borger, Danny Calegari, Ezra Miller, William Stein, Dylan Thurston,** and **Harry Tsai.**

As Berkeley produces about 3% of the total number of PhDs awarded nationally in the Mathematical Sciences, 7 out of 36 is a spectacular achievement.

JOHN KELLEY

cal matters and other aspects of society that had been banned.

John Kelley died on November 26, 1999 of complications resulting from surgery, just 10 days before his 83rd birthday. He is survived by a younger brother, Charles R. Kelley of Vancouver, Canada, an older sister, Lois Kelley Vincent of Tucson, Arizona and by five children and seven grandchildren in Australia, France, England, and Berkeley. Ω

KELLEY IN 1992