University of Utah
Department of Mathematics

April, 2001
Volume 1, Number 3

A f t e r m a t h

From the Chairman

This past year has been truly remarkable. In the fall the Department received the astounding news that alumni John and Marva Warnock were donating $1.5 million of Adobe Systems stock to establish a Presidential Endowed Chair for Faculty Development in Mathematics. It is the first endowed chair of any kind in this department, and will make a singular and lasting contribution to maintaining creative excellence in mathematics at the University of Utah. Our sincere and profound thanks to John and Marva.

The other major event this year was the award in January of a VIGRE grant from the NSF ($2.9 million over five years). As you all know, the task of putting together the proposal was an arduous two-year process which required participation of almost everyone in the Department. Thanks to all for your tremendous effort, and especially to the steering committee: Aaron Bertram, David Eyre, Nick Korevaar, Hugo Rossi, Gordan Savin, Nat Smale, Peter Trombi, and Klaus Schmitt, who is the PI. As you know, award of the grant is just the beginning: we now have to follow through on our plans and promises. If we succeed (as we will), the Department will benefit enormously. We have already seen some of these benefits --- sixteen new graduate students admitted, an increase in the number of Instructors from seven to eleven, funding of our summer outreach program for talented high school students, and funding for undergraduates to participate in a program of research experience. Each part of the program works to enhance the others, and I believe that at the end of five years we will find ourselves intellectually richer as a result.

As you all know, parts of the VIGRE proposal that required no funding were put in place over the last two and a half years. Among the most notable are the undergraduate colloquium, which has developed a regular audience, and the graduate colloquium, run entirely by the GSAC. I urge you all to attend the talks in these series and to encourage your students to do likewise. I've learned a lot from these talks, and their quality has been superb.

Both the undergraduate colloquium and the research experience project will be part of the Department's new honors degree, which we will be able to award as of June 2002. This is a significant new development which will finally give us the means to recognize our most talented undergraduates, and to provide them with the challenging program of study they deserve. The sine qua non of the honors degree in mathematics will be the senior thesis or project. Fletcher Gross will lead this important new program.

This year Professor Bill Coles and Distinguished Professor Paul Fife are retiring. They will add "emeritus" to their title, and we all look forward to seeing them in the Department for years to come. Both Bill and Paul have contributed enormously to mathematics at the University of Utah. It is also a great, great pleasure to recall that our colleague Herb Clemens, was elected to the rank of Distinguished Professor this year. His work is distinguished not only in depth, but also in range, extending from deeply creative mathematics to outstanding service to the mathematical community nationally and internationally.

Two members of the Department have resigned this year. The first is David Eyre, who has accepted a position at Idaho Technologies, where he is developing improved DNA sensing devices based on research work he conducted as Research Assistant Professor in this department. The second is Larry Lewis, who will be mission president in Warsaw for the LDS church. We wish David and Larry well, and look forward to hearing from them.

Hiring this year went exceptionally well under the leadership of Graeme Milton: we made four offers and have had three acceptances. One offer, to geometer Ken Bromberg at the University of Michigan, is pending. The acceptances are David Dobson, from Texas A & M University, in applied mathematics, and winner of the first Felix Klein prize; number theorist Chandrashekhar Khare from the Tata Institute of Fundamental Research in Bombay, and algebraic geometer Christopher Hacon from the University of California at Riverside.

There are many, many other good works and notable events that should be recognized, but I will limit myself to just a few more comments. First, I would like to thank those faculty who have made gifts to the Department. Some have been quite substantial; all are greatly appreciated and play a crucial role in providing scholarships, supporting undergraduate students in other ways such as travel, providing funds to purchase books for the library, and, in general giving the Department the flexibility and means to better carry out its mission. Next, I would like to recognize Elijah Newren, who won an extremely competitive fellowship from the Department of Energy which provides full support through completion of his Ph.D.

I would also like to recognize Nick Korevaar, recipient of this year's faculty teaching award. Teaching is a calling, an obligation, and our opportunity to reveal the beauty of our subject to our students, to initiate them into one of life's deepest and most challenging intellectual activities. Nick is an exemplar of what a demanding and inspiring teacher should be, and we congratulate him.

This year the Department will award for the first time a graduate fellowship endowed by Gail and Benny Rushing. Benny served twice as chair of the Department and died almost three years ago. We miss him very much and are deeply grateful for the opportunity which he and Gail have provided for students to pursue a Ph.D. in mathematics.

The Cowles Building and Math Center will be ready for occupancy by mid-December of this year. There will be a formal building dedication some time in March, to be followed by a weekend conference. Prior to the dedication, noted local artist Anna Bliss will have her public art project installed in the connecting tower lobby and along the north walls of Cowles. Please contact me if you would like to visit Anna's studio with me this summer to see how the project is coming along. (Her work is funded by the one percent for the arts initiative).

In closing I would like to recognize the excellent work of our staff, without whom we could not carry out our complex and wide-ranging mission, nor have the freedom to pursue creative mathematics. I would like also to make an announcement: in view of the increasing complexity of our work, it would be good to have a retreat somewhere in the mountains early in the fall so that we can informally and extensively discuss and compare our views of the challenges and opportunities the department faces and the best ways to address them. Look for an announcement of this retreat later. It will be fun as well as productive. In the meantime, I wish you all a good summer.

Coles and Fife Retire

Professor William Coles, who has served as a member of the departmental faculty for 45 years, plans to retire at the end of the current academic year. After his undergraduate education at the University of Northern Michigan, Bill went to Duke University, earning first an M.A. and then a Ph.D. After a year as an instructor at the University of Wisconsin and a year working for the Department of Defense, Bill came to the University of Utah in 1956. Initially his research was concerned with Ordinary Differential Equations; later he became interested in Mathematical Biology. At Utah, he has directed 3 doctoral theses and 6 master's theses. He has served the department as Associate Chair and the profession as Chair of the Board of Directors of the Rocky Mountain Mathematics Consortium. He has served on far too many committees to list here. He has given invited lectures in Italy and Canada as well as several universities in this country. His many friends all wish Bill a long and happy retirement.

Professor Paul Fife, who is a native of Utah being born in Cedar City, also is retiring at the end of this year. Paul earned undergraduate degrees atthe University of Chicago and at Berkeley and then worked as a physicist at Sandia Laboratories. He left Sandia to do graduate work in mathematics at New York University. After receiving his Ph.D., he taught at both Stanford and the University of Minnesota before a 20-year career at the University of Arizona. He came back to

Utah in 1988 when he accepted a Professorship at the University of Utah. Subsequently, he was named a Distinguished Professor. His research deals with Partial Differential Equations and Applied Mathematics and he has published over 80 research papers. He has given invited colloquium lectures at over 115 different universities and institutes in several different countries. In 1990, he was awarded an honorary doctorate by the University of Bordeaux. He served as Department Chair and on many, many committees, both university and professional. He has supervised 15 Ph.D. students. His colleagues and friends wish him many happy years of retirement.

Calculus Challenge

The second annual Calculus Challenge for undergraduates was held on March 31, 2001. Fourteen students took part in this three hour test which consisted of six calculus problems. Ryan Rettberg took first place, Lethuy Tran was second, and Peijung Tsai and Paul Watkins shared third place.

A couple of the problems from this year's Calculus Challenge are:

- Prove that $x^e \leq e^x$ for all positive x and determine when equality occurs.

- Evaluate $\int \frac{dx}{x^3+1}$

Faculty Changes

New Instructors for 2001 (and the year, University and specialty of their Ph.D.'s) are Alastair N. Craw (2001, Univ. of Warwick, Algebraic Geometry), Florian Enescu (2001, Univ. of Michigan, Commutative Algebra), Javier A. Fernandez (2001, Univ. of Massachusetts, Hodge Theory), David A. Hartenstine (2001, Temple Univ., Partial Differential Equations), Pedro J. Mendez (2001, Purdue, Probability), Thomas Pietraho (2001, MIT, Representation Theory), and Jesse L. Ratskin (2001, Univ. of Washington, Differential Geometry).

There are three new appointments to the faculty for 2001-2002. Professor David C. Dobson received his Ph.D. at Rice in 1990 and works in the field of Partial Differential Equations. Associate Professor Chandrashekhar Khare received his degree from Caltech in 1995 and his specialty is Algebraic Number Theory. Assistant Professor Christopher D. Hacon received his degree from UCLA in 1998 and specializes in Algebraic Geometry.

Boas Erez from the University of Bordeaux will be a Visiting Professor during the Fall of 2001. His field is Algebraic Number Theory.

Karl Glasner and Bingtuan Li have finished their terms as Instructor and will be leaving. We wish them well.

Degrees Awarded

There are approximately 150 undergraduates majoring in Mathematics. In May, 46 students will receive a baccalaureate degree. A total of 11 Masters degrees will be awarded. Students receiving the Ph.D. in 2000-2001 are Eric Cytrynbaum, Martin Deraux, Miguel Dumett, Jian Kong, Chong Keat Arthur Lim, and Xiangdong Xie.

Promotions

During the 2000-1002 academic year, Davar Khoshnevisan was promoted to Professor and Grigory Mikhalkin was awarded tenure. Among the staff, Nancy DeMello was promoted to Senior Accountant, Mary Levine was promoted to Program Coordinator, and Cindi Phillips was promoted to Accountant.

Faculty Awards/Activities

Professor Herb Clemens was awarded the rank of Distinguished Professor.

Professor Nick Korevaar received the Faculty Undergraduate Teaching Award.

The Outstanding Instructor Award, given for distinction in both teaching and research, goes to Anurag Singh.

Professors Herb Clemens, Lajos Horvath, and Grigory Mikhalkin will be on sabbatical for portions of the academic year 2001-2002.

Graduate Student Awards

Elijah Newren has been awarded a Computational Science Graduate Fellowship and Thomas Robbins has been awarded a University Teaching Assistantship Award.

The recipient of the award for outstanding teaching by a graduate student is Emina Alibegovic.

Undergraduate Awards

The recipients of Continuing Departmental Scholarships are Maria E. Bell, Monica J. Hills, Benjamin F. Jones, David Levi Lindsay, and Ryan P. Rettberg

Asami Oka is this year's recipient of the Susan Catherine Christiansen Memorial Award and the Mathematics/Science/ForeignLanguage Scholarship.

This year's Biesele Award goes to Michael Nicholas.

Brent Michael Sallay received the Gibson Award.

Patrick Alex Reinecke is the recipient of the D. Keith Reed Memorial Award and the College of Science Dean's Scholarship.

The C. Bryant and Clara C. Copley Mathematics Endowed Scholarship has been awarded to Wendy Muir.

Spencer D. Stirling and Michelle Adams Brickey are the recipients of the Hurd Award.

The Stephen E. Newman, Jr. Math Alumni Scholarship has been awarded to Rex Carter Butler.

Robin Marie Plachy has received the Kennecott Scholarship.

Paul T. Watkins is receiving the Putnam Contest Award.

Spencer D. Stirling is graduating Magna Cum Laude.

Michelle Adams Brickey, Michael Nicholas, and Jocelyn Gukeisen are graduating Cum Laude.

The new members of Phi Kappa Phi are Wendy Lee Harmon, Sunny H Laws, Michael Nicholas, and Patrick Alex Reinecke.

The new members of Pi Mu Epsilon are Joseph Brubaker, Sarah DeGooyer, Aida Girardi, Stephen Jensen, Sunny Laws, and Asami Oka.

Former Wiley Instructor Wins Award

Yury Grabovsky who was a member of our department, as a Wiley Instructor from 1995-1998 and as a research associate from 1998-1999, was one of two winners of the Monroe H. Martin Prize for an outstanding paper in applied mathematics by a young research worker. Previous recipients of this prestigious prize, awarded by the University of Maryland every five years, are Neil Berger (1975), Marshall Slemrod (1980), Jonathan Goodman (1985), Marek Rychlik (1990), A.M. Stuart (1995), and Z. Xia (1995). Yury's award was for the paper "Exact relations for effective tensors of polycrystals. I: Necessary conditions, Arch. Rat. Mech. Anal., 143 (1998) 309-329" which he wrote while here.

Yury's work was the first systematic approach to understanding the nature of exact relations, which are results about the properties of composite materials that are independent of the microstructure. Yury's idea was simple, which is often the essence of the best mathematics: if an exact relation holds for all composites it must at least hold for laminate materials. This turned out to impose very stringent algebraic conditions on possible exact relations. It led to an interesting unsolved question in group representation theory, that Yury Grabovsky and Dan Sage (also a Wiley instructor) addressed in a following paper [Arch. Rat. Mech. Anal., 143 (1998) 331-356], and subsequently led to sufficient conditions for exact relations to hold for all composites [Comm. Pure. Appl. Math., 53 (2000) 300-353]. There is still an apparent gap between the necessary and sufficient conditions so the problem is not quite completely solved. Yury's work opened the door to a new way of thinking about exact relations.

Yury is now an assistant professor at Temple University.

A Little Humor

A mathematician, a physicist and an engineer went to the races and laid their money down. Commiserating in the bar after the race, the engineer says, "I don't understand why I lost all my money. I measured all the horses and calculated their strength and mechanical advantage and figured out how fast they could run . . ." The physicist interrupted him, ". . . but you didn't take individual variations into account. I did a statistical analysis of their previous performances and bet on the horses with the highest probability of winning . . ." ". . . so if you're so hot, why are you broke?" asked the engineer. But before the argument could grow, the mathematician takes out his pipe and they get a glimpse of his well-fattened wallet. Obviously here was a man who knows something about horses. They both demanded to know his secret. "Well," he says, "first I assumed all the horses were identical and spherical . . ."

The Departmental Newsletter will henceforth appear (hopefully) monthly during the academic year, with an extensive annual edition appearing each Spring. Issues of the newsletter will be archived on the web at:

www.math.utah.edu/newsletter

Editorial staff: Jim Carlson, Angie Gardiner, Fletcher Gross. Please contact one of us if you have an article to suggest or to submit.

E-mail to newsletter@math.utah.edu