

UNIVERSITY OF UTAH

AFTERMATH

MATHEMATICS DEPARTMENT NEWSLETTER

(1995-1996)

A WORD FROM THE CHAIRMAN

Despite a few vexations such as the budget cut, it has been a good year for the department. We have a promising group of entering graduate students, and out of six offers made for instructorship positions, five were accepted: Daniel Allcock, Jaime Amoros, Dean Bottino, Roger Kley, and Yimin Xiao. The Department made assistant professorship offers to three outstanding young mathematicians: Alexander Balk of Caltech, Wieslawa Niziol of the University of Chicago, and Richard McLaughlin, University of Utah (originally from Princeton). All of these were accepted. Among the honors garnered by our regular faculty, Robert Morelli received a Sloan Fellowship and Janos Kollar was elected to the Hungarian Academy of Science. Fred Adler, Mark Lewis, and Hans Othmer are just now finishing up with the special year program in Mathematical Biology, a very successful program supported by a major grant from the National Science Foundation which brought both young and distinguished senior researchers to the campus for visits of one to ten weeks.

The department is very pleased by the great performance of its team of undergraduates in the COMAP modeling contest (see later article) and by the outstanding achievements of the graduating seniors who are recognized at the awards ceremony today. It is gratifying to see so much young talent going on to careers in teaching, research, and industry. In this connection I would like to make special mention of the fellowship endowed this year by Mr. C. Bryant Copley. This generous gift will provide for tuition scholarships to promising students, giving them the means and encouragement to pursue a career in mathematics.

Our undergraduate program will be the subject of much work and study over the next year as we prepare to change to the semester system in the fall of 1998. It is an opportunity to rethink the curriculum and to make sure that it is the best one that we can offer our students.

This past year the Graduate Committee chaired by Peter Trombi has expanded the two-day orientation given new graduate students to an intensive two-week "boot camp" followed by a faculty mentorship program. Peter will be working over the summer to have things ready for this September. I believe that it will significantly help our new Teaching Assistants and Teaching Fellows in the beginning steps of their teaching careers.

I'd like to thank all the faculty and staff for making this year a successful one.

Jim Carlson

CALVIN WILCOX RETIRES

Professor Calvin Wilcox is retiring after serving as a member of the departmental faculty for twenty-five years. Calvin did both his undergraduate and graduate study at Harvard University, receiving his Ph.D. in 1955. Prior to coming to Utah, he was on the faculty at Caltech (where he taught freshman calculus to the editor of this newsletter), the University of Wisconsin (where he was also a member of the Mathematics Research Center), the University of Arizona (where he was Chairman of the Mathematics Department), and the University of Denver. He also has been a Visiting Professor at the University of Geneva, the University of Liege, the University of Stuttgart, Kyoto University, Ecole Polytechnique Federale in Lausanne, and the University of Bonn. In 1976, he was awarded the Humboldt

Foundation Award from the University of Stuttgart.

He has over 60 research publications reflecting his interests in (among other topics) mathematical physics, scattering theory, applied functional analysis, partial differential equations, and wave propagation.

At Utah, he has served for many years as the main liaison between the department and the College of Engineering. In collaboration with Grant Gustafson, he has revamped the Engineering Mathematics curriculum with an emphasis on using computers. Calvin and Grant are writing a textbook *Advanced Engineering Mathematics* reflecting these changes.

Calvin's numerous friends will miss his many contributions to the department. We extend our wishes for a most pleasant retirement to both Calvin and Fran.

DEGREES AWARDED IN 1996

Including teaching majors, there are 212 undergraduates majoring in Mathematics. In June, 43 students will receive a baccalaureate degree in Mathematics. A total of 4 M.S. degrees will be awarded. Students receiving the Ph.D. degree in Mathematics in 1995-1996 are: Jose Burillo, Shirnping Chen, John Dallon, Ionut Ciocan-Fontanine, and Monika Serbinowska.

SPECIAL YEAR IN MATHEMATICAL BIOLOGY

The Department of Mathematics at the University of Utah is currently running an NSF-funded Special Year in Mathematical Biology. So far the Year has provided an exciting mix of science and education in mathematical modeling applied to biological problems. The pool of visitors includes long- and short-term visitors, post-doctoral fellows, and visiting graduate students who stay for a quarter of specialization.

The fall quarter focused on mathematical approaches to problems in ecology and

evolution. Steve Ellner showed us the excitement of life-history in muddy ponds, with savvy copepods prepared to wait for centuries before emerging into the harsh world. Bob Holt and Richard Gomulkiewicz brought a mixture of ecology and evolution into play to determine the success of species at low population levels, and incidentally proved (for those who did not already know) that existing classical theory had it all backwards. Odo Diekmann brought us up to speed on some of the subtle mathematical problems that pests must address to succeed in the North Sea. Ancestral inference and the coalescent proved, in the masterful hands of Simon Tavaré, to be just the gnarly sort of tools needed to really figure out our relatives. Before we decided that the world was a big system of differential equations, Simon Levin reminded us about living and modeling in a stochastic world, answering some questions and asking more. Invertebrate guts were shown to work like a carefully calibrated predictive model in Roger Nisbet's exposition of individual-based models for *Daphnia*. The value of neighborly disputes was made clear at the minisymposium on territoriality where birds, ants, lizards, wolves and researchers were seen to vie for space.

The winter quarter focused in on what goes on inside cells, as opposed to outside organisms. Hans Othmer gave us a glimpse of how cells see the world via signal transduction and second messenger systems. Biochemical and genetic factors were demonstrated by John Tyson to be responsible for forcing unsuspecting cells into inescapable cycles of growth and division. Exotic diseases of the blood were shown to adhere to exotic delay equations as Michael Mackey took on the dynamics of cellular replication and feedback mechanisms. Further delays were apparent during John Milton's lectures as he skillfully explained his approach to understanding coupled neurons, the brain, and why American health care is doomed. Arthur Sherman led us through the amazing bifurcations witnessed by

seemingly normal cells residing in the average pancreas. Designed by Joel Keizer, a minisymposium on calcium dynamics featured expert discussion on the ins and outs of puffs, sparks, waves and ryanodine receptors.

Fluids, muscles and blood are promising to dominate discussion during this final quarter of the special year. In his quest to understand the mechanics of motor protein function Ed Pate has showed us how early models are not always wrong (but it helps to know what you are measuring). Leon Glass reset us into the global theory of nonlinear oscillators as he entrained on a variety of clinical applications. Currently the real story of what goes on in the emergency room during massive shocks to the heart is electrifying the group as Wanda Krassowska works through the details of bidomain models. Charlie Peskin promises to soon deliver heart-felt aspects of his research, specifically fluid flow, valve movement and fiber architecture. Lastly Nick Hill is scheduled to initiate us into the secret lives of swimming micro-organisms. This quarter featured a recent minisymposium on mapping the heart and on the books is a final minisymposium on Biofluids.

During their two-week visits the principal lecturers have given us an in-depth look at some of the exciting current areas of mathematical biology. The short-term visitors (3 days) have stayed long enough to interact informally on research topics with graduate students, post-docs, other visitors and permanent faculty. Graduate students, coming for a given quarter of specialization, have visited from Australia, Canada, Germany, Great Britain and the Netherlands as well as the United States. The minisymposia, lasting 2 or 3 days, have involved outside visitors, and have remained focused on specialized topics in mathematical biology.

C. BRYANT AND CLARA C. COPLEY SCHOLARSHIP FUND

C. Bryant Copley celebrated his 99th birthday this year by giving rather than

receiving. His generous gift of stock has established the C. Bryant and Clara C. Copley Scholarship Fund to benefit students in the Department of Mathematics at the University of Utah. We are very grateful for this fine gift and the first awards of scholarships from this fund will be made next year.

Mr. Copley was a scholarship recipient himself, receiving the Governor's Award in 1917, a stipend of \$50 which helped bring him to the University of Utah. While still a student, he began teaching mathematics at North Summit High School in his hometown of Coalville, Utah, where he has lived his entire life. After graduation from the University in 1921, he tried to borrow money to go on with his education but as he recalls, "I was turned down by everyone, including the banks; I couldn't raise a nickel." His loss was North Summit's gain as he returned to his teaching job and what would become a 45-year career as both math teacher and principal.

Gift giving is something Mr. Copley has been doing for a lifetime. Knowing what his own scholarship meant to him and how hard he had tried to find additional assistance to continue his education, he and his wife Clara decided early on to help other young people obtain a college education. They established scholarships for students from North Summit High School as well as scholarships at Ricks College and Brigham Young University and now at the University of Utah.

GEORGE C. BARTON AWARD

A new award is being offered this year in honor of George C. Barton, long-time mathematics teacher at Olympus High School. His warm concern for students attracted many young minds to the field of mathematics. During his twenty-six years of teaching, one of his students won the State Math Contest thirteen times.

From his first four years alone, 22 of his students went on to earn a Ph.D. in Mathematics or a related area. Two of those 22 are on our faculty—Joe Taylor and Larry

Lewis. The funding for this award will be from donations from his grateful students.

MODELING CONTEST

Two teams of 3 undergraduates each participated in a national contest in mathematical modeling sponsored jointly by The Consortium for Mathematics and Its Application and the Mathematics Association of America. Working against time (they were allowed no more than 72 hours from first reading the problem to devise a solution) and competing against over 390 other teams from Asia, Europe, and the United States, one of the teams received a meritorious award while the other received honorable mention. The team receiving meritorious recognition consisted of Matthew A. Bjorge, Aleksandra Kuswik, and Jun Zhang, while the members of the team earning honorable mention were Parrish C. Brady, Matthew C. Cargo, and Jeffrey F. Gold. Professor Don Tucker served as faculty sponsor for both teams.

STATE MATHEMATICS CONTEST

For the third year in a row, the Utah State Mathematics Contest was held at the University of Utah. Once again Professor Grant Gustafson ably handled everything even though there were more than 2500 participants from 155 schools taking the exams at the University and at 12 remote sites. The University, the schools, and the students involved all owe a debt of gratitude for the truly herculean task accomplished by Professor Gustafson, who now can rest from this particular chore as the responsibility for the Contest shifts to Utah State University.

ADDITIONS TO THE FACULTY

New Assistant Professors for 1996-97 are Alexander Balk (Ph.D. in 1988 from the Moscow Institute of Physics) who specializes in Nonlinear Phenomena, Richard McLaughlin (Ph. D. in 1988 from Princeton) who works on Fluid Mechanics, and Wieslawa Niziol (Ph.D. in 1991 from Princeton) whose specialty is arithmetical Algebraic Geometry. Professor

Balk is currently at the California Institute of Technology, Professor McLaughlin is just finishing his term as an Instructor at the University of Utah, while Professor Niziol comes here from the University of Chicago.

New Instructors for 1996 (and the year, University and specialty of their Ph.D.'s) are Daniel Allcock (1996, Berkeley, Lie Groups), Dean Bottino (1996, Tulane, Mathematical Biology), Holger Kley (1996, University of Chicago, Algebraic Geometry), and Yimin Xiao (1996, Ohio State, Probability).

Instructors who have finished their 3-year term and who will be leaving are Noel Brady, Shaoping Chang, Jan Cheah, Piotr Kokoszka, and Antonella Marini. We enjoyed their stay and wish them well in the future.

PROMOTIONS

Associate Professor Kenneth M. Golden was promoted to Professor.

Associate Professor Gordan Savin was awarded tenure.

Assistant Professor Davar Khoshnevisan was promoted to Associate Professor and awarded tenure.

Adjunct Assistant Professor Chris Johnson was promoted to Adjunct Associate Professor

FACULTY AWARDS AND ACTIVITIES

Professor Don Tucker is the recipient of the Presidential Teaching Award. This is the most prestigious (and remunerative) of the teaching awards given by the University and means that he has won all teaching awards for which he has been eligible.

Professor Larry Lewis has won one of the Student's Choice Teaching Awards. As its name suggests, this award is given based upon votes of students.

Robert Morelli has been awarded a fellowship by the Alfred P. Sloan Foundation. This prestigious and highly competitive award is intended to recognize the very best young

scientists in the country. Professor Morelli received his Ph.D. from Harvard in 1989. He came to Utah after being a Dickson Instructor at the University of Chicago and doing post-doctoral work at the Institute for Advanced Study. His specialty is Algebraic Geometry.

Distinguished Professor János Kollár was elected to the Hungarian Academy of Science.

The following will be on leave for part or all of the 1996-97 academic year: Henryk Hecht, Graeme Milton, Hans Othmer, Paul Roberts, Klaus Schmitt, Domingo Toledo, Aaron Bertram, and Nathan Smale. We wish them success with their research.

The Outstanding Instructor Award, given for distinction in both teaching and research in the Mathematics Department, goes to Piotr Kokoszka and Richard McLaughlin.

GRADUATE STUDENT AWARDS

The University Research Committee has awarded a Graduate Research Fellowship for 1996-1997 to Laura Smithies.

The recipients of the awards for outstanding teaching by a graduate student are Kristina Bogar, Jon Jacobsen, and Sean Sather-Wagstaff.

UNDERGRADUATE AWARDS

Departmental Scholarships: Nathan Hancock and Daniel A. Edwards.

Continuing Departmental Scholarships: John H. Moeller and Nathan M. Simpson.

Susan Catherine Christiansen Memorial Award: Hilary Hutcheson.

Hurd Award: Mirjam Kotar and Brooks A. Brady.

Biesele Award: Kathy G. Vamianakis.

Outstanding Performance on the Utah High School Mathematics Test: Zachariah Allen and Cathy Yen Dang.

Presidential Scholarship: Tiffini L. Christensen and Daniel C. Higgs.

Gibson Award: Jessica Shepherd.

D. Keith Reed Memorial Award: E. McKay Hyde.

George C. Barton Award: Traci L. Jackson.

Putnam Contest Award: Steven E. Parrish.

Phi Kappa Phi Membership: Brooks A. Brady, Angela B. Gardiner, Hilary Hutcheson, Traci L. Jackson, and Kathy G. Vamianakis.

Phi Beta Kappa Membership: Mirjam Kotar and Stacy Knight.

Cum Laude: Mirjam Kotar and Kathy G. Vamianakis.

Magna Cum Laude: Andrea L. Ibarra.

Honors Bachelor's Degrees: Traci L. Jackson ("Attributes of Common Sense"), Mirjam Kotar ("Mathematical Models in Nematodes"), and Andrea L. Ibarra ("Actuary: An Insurance Engineer").

Math Department Student Representative Convocation Speaker: Andrea L. Ibarra.

WEB SITE

Information concerning the department and its activities can be found at the web site www.math.utah.edu

INFORMATION FROM ALUMNI

The Department welcomes news and information from alumni. If you have any special news, please send it to us and we will try to include it in a similar newsletter next year. Address correspondence to Newsletter, Department of Mathematics, University of Utah, Salt Lake City, UT 84112.