



“The mathematical sciences particularly exhibit order, symmetry and limitation; and these are the greatest forms of the beautiful.”

## Puzzles

SOLUTION TO LAST NEWSLETTER PUZZLE  
The children are 2, 2 and 9.

THIS YEARS PUZZLE  
Each letter stands for a different digit 0-9 in this addition sum:

SEND  
+MORE  
-----  
MONEY

Find the values that make the sum correct.

## Note

Donations to the Department Scholarships at whatever level are always truly appreciated. You may send a check payable to ASU/Department of Mathematics.

Thank You

Spring 05

# Math:Minutes

Department of Mathematics and Statistics at Arizona State University

Welcome to the 2004-05 issue of the Department newsletter, the final year of my own Chairmanship; the College is undertaking a national search for a new Chair, who will take over on July 1, 2005. Yang Kuang continues to act as Director of Graduate Studies, and Matt Isom as Director of First Year Mathematics; Don Jones has replaced the inimitable Glenn Hurlbert as Director of Undergraduate Studies. This past year saw the retirement of Phil Leonard in May 2003 after 36 years of service to ASU. We wish him and Mary the very best for an active retirement both here in

## Letter from the Chair

BY ANDREW BREMNER, CHAIR

Arizona and at their home in Vermont. Joan McCarter retires at the end of the Fall 04 semester after 43 years at ASU, and we similarly extend

to her many thanks for her incredibly dedicated service, with every good wish for a productive and happy retirement. In both cases, we shall miss their distinctive and much appreciated contributions to Department life. We are delighted to welcome Professor Carlos Castillo Chavez to our faculty, who came to ASU in January 2004 from Cornell. He has taken over Directorship of the SUMS Institute, at the same time as establishing his very successful MTBI (Mathematics and Theoretical Biology Institute). There is full detail of this program elsewhere in the Newsletter. New Assistant Professors joining the Department in Fall 04 are Grace Chen and Ananda Majumdar, both in Statistics; Sharon Crook, a joint hire with the School of Life Sciences, who works in Computational Biology; and Svetlana Roudenko, in Analysis. Congratulations are offered to Helene Barcelo and to Sergey Suslov on their promotion to Full Professor with effect Fall 04; and congratulations to Steve Kaliszewski on his tenure and promotion to Associate Professor.

The current hiring season allows us to seek four future tenure-track faculty, in addition to the Chair. One appointment is for a senior hire in Statistics, two are for junior to mid-level positions in Mathematics Education, and one is for a junior appointment in Computational Biology. President Crow approved "Project 85" this year, that prescribes running MAT 114 and MAT 117 in classes of size at most 19. The result has been the need to hire many new Lecturers and Instructors, and so we welcome Anthony d'Alesandro, Sue McClure, and Beth Newhouse, as new Lecturers, and Stan Conrad, Holly Dison, David Fishman, Jamshed Ghouse, Sheryl Hawkins, David Heckman, Sharmin Karim, Eric Kennedy, Ana Kupresanin, Jelena Milovanovic, and Hedvig Mohacsy, as new Instructors. Further, congratulations are extended to Terri Miller, Faris Odish, Richard Ruedemann, and Scott Sargent, on their promotion from Lecturer to Senior Lecturer; and to Firozzaman, Igor Fulman, Chris Heckman, Ryan Melendez, Diane Richardson, and Charles Seal, on their promotion from Instructor to Lecturer.

The redoubtable Bev Lantrip retired from her position in the Undergraduate Office in May 2004, and we sorely miss her presence and good-natured banter. She has left the Valley for the heights of Yarnell, but is said still to support the Diamondbacks. We give a warm welcome to her replacement, Gya Watson, who has taken over Bev's duties with real aplomb, being tested immediately with the construction of the extremely complicated Fall 04 schedule with its huge number of sections and FYM faculty teaching five courses. Further additions to the staff include Kristine Murray, running the Testing Centre, with Jeff Fralish as the evening supervisor; Susan Rosenthal with responsibility for administrative support in the first-year math program; Sherrie Conner, responsible for all the department's administrative databases; Ciel Bailey, who replaces Irina Long in the first-year mathematics front office; Patricia Wardell, replacing Melissa Yubeta as the Chair's Administrative Associate. New visiting faculty are Karel in't Hout, Jinling

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## Letter from the chair (continued from page 1)

Yang, Seog-Jin Kim, and Tim Chilkin. Welcome, one and all. Staff who will be retiring later this year include Marlene Salvato and Bruce Long. A full appreciation of their tremendous and devoted contributions to the running of the Department appears elsewhere in the newsletter.

The first ever Arizona Mathematics Undergraduate Conference (AMUC) took place at ASU over the Feb 29 weekend in 2004, and was a resounding success. Glenn Hurlbert put this together with indefatigable energy and enthusiasm, with well over 100 students attending from throughout the Southwest. The conference will be an annual affair, rotating through the three Arizona universities; as of writing, preparations are in hand to send a group of individuals to AMUC 2005 at the University of Arizona in Tucson. We were fortunate to have a lecture from James Yorke as part of the 2004 Math Awareness Month festivities. He is a world leader in the theory of chaos with exceptional expository ability, and his chaotic pendulum entranced the audience of several hundred faculty and students from both ASU and Valley high-schools.

The Charles Wexler Mathematics Prize for excellence in undergraduate study was awarded in May to Joshua Whitney, who exhibits first rate talents in mathematics. He has left us to pursue a Ph.D. degree at UC Irvine. The Charles Wexler Teaching prize was awarded to Katie Kolossa, recognizing her excellence in the classroom. Congratulations to both. Marilyn Carlson was appointed this year to full-time Directorship of CRESMET, the Centre for Research on Education in Science, Mathematics, Engineering, and Technology; and she is to be highly congratulated on winning two educational grants at the stunning levels of \$4.5m and \$12.5m. More is written about these projects elsewhere in the Newsletter.

The graduate program is in an extremely healthy state, and we are attracting students to ASU who hold offers from such top schools as Berkeley, UCLA, and Caltech. The number of graduating Ph.D. students continues to climb. The research profile of our faculty is as impressive as ever, with strong increases in the level of external

## Distinction

Professor Sharon Lohr has been awarded a Dean's Distinguished Professorship. The official title she carries is the "Thompson Industries Dean's Distinguished Professorship"



grant funding. The PFMF program (Preparing Future Math Faculty) continues to thrive under the shepherdship of Dieter Armbruster. The Department has voted to introduce a combined Bachelors/Masters degree program that will allow our best students to complete an undergraduate and graduate degree within the space of five years. This reduces by a year the time to graduate degree, and encourages our very best students, who previously have gone elsewhere, to stay and complete their Ph.D. degree at ASU. It is not just the graduate program that is displaying

robustness: overall, the number of undergraduate mathematics majors has almost doubled in the space of the last four years. The first Jack E. Hawes Scholarship was awarded to Shawn Elledge, who has been working with Glenn Hurlbert as mentor. Shawn's work was awarded a Best Student Paper prize at the Mathematical Association of America Mathfest meeting in Providence this summer. Congratulations to Shawn and Glenn.

Gerard wrote in his Herball of over four hundred years ago: "Put garlic down a mole's run and you shall see him run out, astonish'd". The

departmental garlic this past year was an e-mail from our courageous Director of Undergraduate Studies to the Upper Administration stating that the Department would be removing the General Studies designation from College Algebra with essentially immediate effect. There has been move to do this for several years, but the issue arouses considerable political resistance at the state level. This direct approach certainly caused quite some consternation. Matt Isom, Glenn Hurlbert and Don Jones have given spirited defence of the proposal, arguing the case around the state. The senior administration at ASU is very supportive, and the change is due to come into effect in Fall 05. The Department has acquired its own Helaman Ferguson sculpture, the Umbilic Torus SRC, which now graces the faculty and student meeting room (see photo on back). We join a select group of establishments including the Mathematical Sciences Research Institute at Berkeley, the AMS building in Washington, and the headquarters of Merck Pharmaceuticals, in exhibiting Ferguson's work.

Nothing astonishes me more as Chair than the sheer volume of e-mails received. Most days there can be at least 100 messages (excluding the spam), dropping to around 20 each weekend day. If only 10 require serious thought, this is still a major inroad into the hours in the day. I give thanks to all those patient souls who have not becudgelled me for lack of reply within an hour or so of their earlier message. This is an aspect of the Chairmanship that will not be unduly missed! Thank you to all for the help, support, and your excellence in departmental contributions at all levels, that have made my tenure as Chair so pleasurable and rewarding.

## Joan McCarter retires after 43 years of service

growing dwarfed potted plants.) She has grown many plants at her home and also attended many gatherings of bonsai growers across the country. She has plans possibly to start a bonsai nursery after her retirement.

Another love of hers that has persisted for most of her life has been that of sailing. She has a sailboat and sails it on our canyon lakes. Here is one final thing. I attended one party of hers that was perhaps the most unusual and interesting party I have ever attended in my life, and likely will ever attend. With this last brush stroke, I have attempted to complete a zen-like sketch of Joan's life in a few brief lines. I hope I've been able to capture some of her in this. She will be much missed.

## External grants

The following individuals have current grant funding:

Hans Dieter Armbruster  
Joaquin Bustoz  
Marilyn Carlson  
Sharon Crook  
Carl Gardner  
Ann Gelb  
Glenn Hurlbert  
Zdzislaw Jackiewicz  
John Lopez  
John Jones  
Matthias Kawski  
Henry Kierstead  
Eric Kostelich  
Yang Kuang  
Sharon Lohr  
Alex Mahalov  
Hans Mittelmann  
Renate Mittelmann  
Basil Nicolaenko  
Michael Oehrtman  
Rosemary Renaut  
Hal Smith  
Sergei Suslov  
Horst Thieme  
Thomas Taylor  
Michelle Zandieh

## Computing news

BY RENATE MITTELMANN

All these years the department has maintained top of the art computing facilities. Several Linux clusters were built, installed, and configured for the use by individual faculty members and their research groups. This year members of the computational group will add another high-end, top of the line Linux cluster. We were awarded a SCREMS grant by NSF to replace our aging 24 processor SUN, HPC 6500, with an 18-node dual-processor (36CPUS) 64bit Linux Opteron cluster. This cluster will be built, installed, and tested here in our GWC computer lab. Faculty members will use this new cluster for high end computations in parallel and distributed mode.

Research in these areas will benefit from this new cluster.

- 1) Improved capabilities for understanding of chemical processes in the brain and interpretation of the Earth's core-mantle boundary.
- 2) Greater understanding of how biological channels function, and thus ultimately development of drugs that more precisely control ion channel functions.
- 3) Advances in techniques for applications of spectral methods to generation of high-resolution three-dimensional images.
- 4) Systems identification of complex processes in chemical engineering, through implementation of large-scale nonlinear optimization techniques and the novel application of model predictive control to supply chain management
- 5) Better understanding of the chemical and mechanical processes in semiconductor manufacturing and the investigation of the application of distributed computing to deterministic simulations of kinetic flows.
- 6) Education of Computer Science graduate students who work under the PI's supervision as part-time systems support personnel and whose training will include support of the proposed cluster.

Computers in our undergraduate teaching labs, ECA 221 and ECA 225, were replaced. All computers are now P4, 2.4 GhZ machines, all necessary mathematical and statistical software is installed and configured for our use. One lab is a Linux only lab, one is dual-boot, Linux and Windows XP. At night both labs are open to math students currently enrolled in classes with lab use. The Linux lab can be accessed remotely by students as well.

Online placement testing has been improved. Test scores for advisors will be updated twice a day.

In the 18 months since I became first interim and then permanent director of CRESMET—ASU's Center for Research on Education in Science, Mathematics, Engineering and Technology—my

## Math Faculty Helped CRESMET Win Nearly \$20 million

BY MARILYN CARLSON

colleagues in the Mathematics Department have been invaluable allies in our center's growth and accomplishments.

Faculty members of the Department of Mathematics and Statistics were leaders in a recent proposal drive that brought \$17 million in federal funds to ASU for research-based improvements in science and math instruction. They were also key in winning an ABOR grant of \$50,000 and a grant from the Boeing Company for \$43,000.

Sharon Lohr, Glenn Hurlbert, Hal Smith, Yang Kuang, Hal Kierstead, Michael Oerhtman, Michelle Zandieh, and Irene Bloom worked on the proposal teams that won a \$12.5 million Math and Science Partnership grant and a \$4.5 million Teacher Professional Continuum (TPC) grant, both from the National Science Foundation. The generous departmental support our chairman Andrew Bremner gave our team was a critical factor in our success.

In the Project Pathways Math and Science Partnership, mathematicians on the CRESMET team will work with the Chandler, Gilbert, Tempe and Tolleson school districts to research a professional development model for secondary mathematics and science teachers. Both the MSP and TPC projects will involve mathematics and science faculty delivering graduate courses at these school district sites. The TPC project also focuses on research to understand how best to support the ongoing development of secondary mathematics teachers mathematical learning and teaching. It will include support to continue Hal Kierstead and Glenn Hurlbert's work to provide rigorous mathematical experiences for secondary mathematics teachers and students. It will also provide support to bring our friend and colleague, Phil Leonard, back from retirement—we appreciate Phil's willingness to share some of his retirement time with our projects to develop and deliver high quality courses that secondary mathematics teachers want and need. To date we are working with partner schools in Gilbert, Tempe and Glendale on this project. Both NSF grants run for five years, and our mathematics faculty will be engaged in the work for the duration of the projects.

Through the ABOR grant Michael Oehrtman and I are working with engineering faculty to create five modules of research-based curriculum for a precalculus and an introductory calculus class.

The Boeing grant is the beginning of what will be an exciting alternative certification path for mathematics teachers and in time, science teachers as well. With Boeing's funds and additional support from the department and the university, we are building the Summer Certification in Secondary Mathematics program (SCISM). The program will make it possible for talented mathematics and engineering majors to take summer courses and a

post-graduation field experience that certify them as secondary math teachers. Since we know from the National Science Foundation that 90% of mathematics graduates go directly into the work force, we hope SCISM will encourage more of those graduates to choose a path as teachers in Arizona's classrooms. Glenn Hurlbert has been instrumental in leading the design and development of this exciting new program.

The teachers who take courses in our Pathways and TPC projects can apply the credits toward a MNS in Mathematics or a master's degree in the College of Education. These courses and programs are crucial for helping schools to meet the federal NCLB requirement that requires all teachers to be highly qualified in their discipline.

In all these projects our Mathematics colleagues are collaborating with faculty from the sciences, the Fulton School of Engineering and the College of Education. Seeing their creativity and collaborative spirit they bring to this cross-disciplinary work has been a privilege and delight for me in my new position at CRESMET. Our NSF grants each has a rigorous research component, and already ASU is receiving national attention for the high benchmarks our team is setting for scientific standards in education research. Much of the theoretical foundation for our recent projects comes from research on which Michael Oehrtman, Irene Bloom, Michelle Zandieh and I have collaborated over several years. The contributions of Sharon Lohr as a leader of our research team also promises to bring a rigorous quantitative component to our complex projects and difficult research questions.

CRESMET's growth in this last period has been explosive. From a staff of four we have grown to 15, and we are ambitiously setting our goals for new projects and funding strategies. I am tremendously pleased that President Crow has recognized the role our center and the Mathematics Department are playing in creating the New American University. On a personal level, I am exceptionally proud and grateful to have the support of my Mathematics colleagues, and trust they will look to CRESMET as an ongoing partner in mathematics education research, teaching and outreach.

## Wexler awards

BY HAL SMITH, 2004 AWARDS COMMITTEE CHAIR

The Awards Committee of our Department is charged with the task of identifying worthy recipients for a number of scholarships and awards. In 2003-04 a total of fourteen people were recognized for outstanding achievements.

We now have four memorial awards funded by friends and family of four people whose lives were profoundly affected by their love of mathematics. The Charles Wexler Award for outstanding undergraduate teaching by a faculty member went to Katalin (Katie) Kolossa. The other half of the Wexler award honors an outstanding graduating senior in our department. This went to Josh Whitney, a double major in mathematics and physics. The other memorial awards are the Andre Levard Mackey Award, the Jack H. Hawes Memorial Research Scholarship and the Joaquin Bustoz Memorial Scholarship Award, which go to outstanding undergraduate majors in our department. The winners were Annette Spyker, Shawn Elledge and Miguel Sanchez, respectively.

The other scholarships for outstanding undergraduate majors are the Undergraduate Research Award, the Dean's Circle Scholarship in Mathematics and the Arizona Power Authority Scholarship. The winners were Christopher D. Blakely, Caleb Cook and Sukhpreet Kaur, respectively.

The committee is responsible for two awards to graduate students in our department. An Excellence in Teaching Award is given to one or more of our graduate teaching assistants. The recipients were Rochus Boerner and Eric Gehrig. The Graduate Student Research Award went to Younghae Do and Luis Gordillo (Fall 2003) and to Amylou Dueck and Shelly Smith (Spring 2004).

## Noteables

### WEDDINGS

Associate Professor Ann Gelb was married on Aug. 22, 2004 to Dan Bagatell in Laramie, Wyoming.

### BIRTHS

Rebekah Reynolds was born on Oct. 15, 2003 to Lecturer Richard and Sharlah Reynolds.

Vincent Zhou Baer was born on Jan. 5, 2004 to Associate Professor Steve and Jeanine Baer.

The department celebrated its sixth annual Mathematics Awareness Month in April 2004, in coordination with the Joint Policy Board for Mathematics and colleges and universities

## Math awareness month

BY STEVE KALISZEWSKI

is the Distinguished University Professor of Mathematics and Physics at the University of Maryland, College Park. Professor Yorke is perhaps best known to the general public for coining the mathematical term "chaos" in 1975. He was awarded the Japan Prize for Science and Technology in 2003.

Professor Yorke's lecture, which was attended by a large and enthusiastic crowd, was titled "Chaos". Using slides and a fascinating double-pendulum contraption, he demonstrated the fundamental characteristic of chaotic systems: small changes in initial conditions result in large differences later on.

A Math Department Open House and Barbecue preceded the lecture, and many people turned out to mingle with math professors and students and enjoy the sunny April afternoon.

A special Math Awareness Colloquium was held the next day, at which Professor Yorke discussed his recent work on modelling the infectiousness of HIV-AIDS.

For more details on last year's and previous years' Math Awareness Month events, visit [math.la.asu.edu/~mam](http://math.la.asu.edu/~mam)

Max Thomas Isom was born on Sept. 9, 2004 to Senior Lecturer and First Year Math Director Matt and Sheri Isom.

Joasia Czygrinow was born on Oct. 02, 2004 to Assistant Professor Andrzej Czygrinow and Maggie Malowinska.

Antonio Geraldo Arce was born on Oct. 15, 2004 to Lecturer Leslie and Antonio Arce.

# Graduate program reports

BY YANG KUANG

First of all, I would like to thank and congratulate Helene (Shelly Smith, assist. prof., Grand Valley State Univ.), Marilyn (Sean Larsen, assist. Prof., Oregon State University), Ying-Cheng (Younghae Do, postdoc, ASU), Anne (Rochus Boerner, no info), Sergei (Louis Gordillo, postdoc, ASU), Horst (Tim Lant, RAND corp) for each producing a Ph.D so far this year. We have several more lined up for December graduation. We may have another record year in Ph.D production (we had 10 in 2002, 9 in 2003). As the numbers show, with the streamlined graduate exam structure in place, the newly implemented qualifying final format



and an effective graduate mentoring committee, our graduate program is greatly improved, much more competitive and productive than our competitors such as UA, U. Utah and U. Florida.

This fall, we have 139 graduate students enrolled in our program (including MS Stat students but excluding CBS program students) and taking 1189 credit hours. There are

119 students enrolled in our graduate programs (admitted through this office). Last fall, we have 99 students enrolled in our graduate program taking a total of 1002 credit hours.

We have 41 new students this fall 04. Among them, 19 are Ph.D students and 7 are minority students. Many of them are from top US schools such as Univ. of WI-Madison, UCLA, Rice University, UC-Santa Barbara, and Wellesley. These students are very competitive and well motivated. They fully recognize ASU

and our faculty members' increasing strengths. We must continue to strive to make their education experience a productive and rewarding one. As in the previous year, we were able to assign TA graders to all qualifying courses.

Thanks to the hard work of this great faculty, the strong support of our chair and the graduate committee, and most importantly, the indispensable support of Debbie, many noteworthy events took place in our graduate program this year. They include the following (limited by space, I have to be highly selective here).

1) We successfully piloted the new qualifying exam format in several areas last year and it is now fully implemented. The qualifying exams will be replaced by course finals and students can pass each exam by parts. We will continue to offer the full (including both parts) exams in August. 2) The BS/MA program was almost unanimously passed by the faculty and we expect to implement it in spring, 05. 3) Thanks to Carlos's amazing effort, we now have more than 10% US minority graduate students. Only Univ. of Iowa has such bragging right. 4) Marilyn and her great team members' grants as well as many other significant grants secured by the faculty members of this department bring a total of more than 25 RAs/year. 5) Again thanks to Carlos, many of our minority graduate students are the recipients of several rich and prestigious fellowships.

After one whole year trying to establish a joint interdisciplinary applied math Ph.D program with the engineering school, we decided to simultaneously pursue our own interdisciplinary applied math Ph.D program. This discussion is ongoing and will take some time.

# Amylou Dueck receives E. C. Bryant Scholarship

BY SHARON LOHR

Ph.D. student Amylou C. Dueck received the 2004 E. C. Bryant Scholarship for outstanding graduate student in survey sampling from the American Statistical Association on August 10, 2004. Amylou's award was one of only two student awards made at the awards ceremony on August 10 in Toronto.

Amylou's research involves developing robust hierarchical multivariate statistical methods for estimating quantities of interest when there are missing data. She is applying her results to the quality-of-life surveys she worked on during her internship at the Mayo Clinic in summer 2003. Often, in these surveys, the reason data are missing is because the patient has suffered some side effects resulting in illness or fatigue, so ignoring the missing data would result in an overly optimistic picture of quality of life. Amylou's research provides a way of filling in the missing values so that researchers can obtain more accurate estimates from the data and also assess the degree of uncertainty associated with those estimates.



# Undergraduate program notes

BY DON JONES

The past year has seen some big changes in the personnel of the undergraduate office. With the retirement of Bev Lantrip and simultaneous sabbatical leave of the former director Glenn Hurlbert, the possibility of ensuing chaos was distinct. However, the fortress-like structure of the office is indeed robust. Thanks to the hard work of the previous directors and the staff, the undergraduate office is running smoothly. Irina Long (office specialist senior) and Gya Watson (Administrative Associate) are invaluable. They know so much about the mechanics of the office, and the office would simply not function without them. Of course I've left out the FYM component of the office - which would not function without Matt Isom's efforts. Matt has worked tirelessly implementing/articulating several major changes in FYM this year.

The table below summarizes the numbers of our majors over the last few years. The numbers include all of our majors who are currently taking at least one credit hour, and the BAE numbers include pre-professionals in the Education college. The numbers differ slightly from previous reports.

	2001	2002	2003	2004
BS	121	121	136	162
BA	43	49	57	48
CMS	22	35	42	34
BAE	142	157	159	161
Total	328	362	394	405

With the click of a button Glenn Hurlbert removed the MA status of MAT 117 last spring - students at ASU soon will no longer be able to use MAT 117 to satisfy their general studies mathematics requirement.

This action had similar consequences to the clicking of the button that exploded the first atomic bomb. Most concerns are about implementing the change rather than the reasons for the change - thanks to Matt Isom's efforts convincing all involved of the necessity of the change. Indeed, a quick glance at the syllabus for MAT 117 reveals that it closely matches mathematics taught in the third year of high school. For many years we have urged counselors to direct non science degree students into college mathematics-MAT 114. The removal of the MA status from MAT 117 will finally facilitate this change, and students will be exposed to mathematics not seen at the high school level.

Last academic year, under the direction of Glenn Hurlbert, the undergraduate committee streamlined the BA degree so that it better suits the needs of math majors pursuing a degree for non-scientific careers. The amendments made passed a department vote of 14 to 11 in favor. The new BA degree has been approved by the college -curriculum committee and will be in the 2005-2006 catalog. The main change allows students to take more courses at the 300 level that could be more appropriate for their future careers.

We really have no idea what happens to our graduates or the way they feel about their experiences as a math major at ASU. With advising from the undergrad committee, a

# Service awards

- 5 years Jay Abramson
- 5 years Michelle Howe
- 5 years Ying-Cheng Lai
- 5 years Mary Lemon
- 5 years Scott Martin
- 5 years Terry Turner
- 10 years Carl Gardner
- 10 years Ela Jackiewicz
- 10 years Scott Surgent
- 15 years Dieter Armbruster
- 15 years Eric Kostelich
- 15 years Mary Sabel
- 15 years Michael Trapuzzano
- 20 years Andrew Bremner
- 25 years Edwin Ihrig
- 25 years Hal Smith
- 35 years Doug Moore

two-page survey has been mailed out to all graduates over the past three years. The survey is also posted on the web. We hope to get some useful feedback soon. We also asked many universities about the way they teach calculus - is it taught by lectures, tenure track, large or small sections...? We will collate the data soon. Stay tuned.

Math club is alive and well. The first meeting occurred last October 5 with 13 students present. Not all were math majors either. High on the agenda was the upcoming AMUC (Arizona Mathematics Undergraduate conference) meeting in Tucson (Nov 12-14). Last year AMUC brought in 92 students and 24 faculty from Arizona, California, New Mexico and Texas for a fabulous time - including 45 talks and speakers from NSA and local industry .

Our total class enrollment fall 2004 is 11,885 students, ostensibly down from last year's 12,169 students. However, our small-class mandate in MAT 114 and MAT 117 required us to defer 580 students from these courses to spring sections.

When Carlos Castillo-Chavez arrived at ASU in January 2004, he brought a lot of accomplishment and energy with him. Joining the Department of Mathematics and Statistics as the Joaquin Bustoz, Jr. Professor of Mathematical Biology, Castillo-Chavez is a prominent mathematical epidemiologist whose research was featured in the national news during last year's SARS epidemic. He is also the past recipient of numerous national awards, including being recently named Los Alamos National Laboratory's

## Carlos Castillo-Chavez joins Department of Math and Stats

BY JAMES HATHAWAY



prestigious Ulam Distinguished Scholar, and winning the Tapia Diversity in Computing Award (both in 2003). However, Castillo-Chavez brings more than his reputation to ASU. Also coming with him is a group of minority graduate students that he recruited as undergraduates and mentored in his past position at Cornell University and that he will continue to mentor in Arizona. In fact, these students have followed him not just from university to university, but through a one-year research residency at the Los Alamos National Laboratory as well.

Castillo-Chavez has such a significant following because, in addition to being a prominent researcher, he is also well known for developing programs to encourage minority

participation in science. At Cornell, where he was a professor in the departments of Biological Statistics and Computational Biology and Theoretical and Applied Mechanics, he was the director of the Mathematical and Theoretical Biology Institute (MTBI), an undergraduate research institute with a larger purpose.

Founded by Castillo-Chavez, MTBI is a program designed "to encourage undergraduates to pursue advanced degrees in math and sciences and to facilitate the access to graduate studies for minority students in the sciences." MBTI does this through a training program that includes a series of small group research projects, mentored by faculty scientists and guided by Castillo-Chavez, who is both recruiting students for science and also preparing them for the next step - successful graduate careers. The institute moved with him to ASU where it expands its mission by including a mentorship graduate program in computational, mathematical and theoretical biology.

Prime among the reasons Castillo-Chavez decided to move to ASU is a climate that he perceives as being favorable to his major interests. "I've been recruited and tried to move to ASU for the past 11 years," he said. "ASU has a very talented group of mathematical biologists who have been my friends for a long time." Regarding the recent tragic loss of Professor Joaquin Bustoz, Jr. he added, "His presence and leadership at ASU as well as his deep contributions and commitment to the training and mentorship of minority students were also a key factor in my decision to move. The legacy of his work is now a source of inspiration and strength as we try to continue Joaquin's work."

Explaining why he would choose to leave an Ivy league institution for a large public university, Castillo-Chavez said, "I have always wanted to be at a school that was more accessible to people from all backgrounds. ASU has a mission to reach out to the Native

American and Hispanic population, and I am sure that my institute and its programs will make a difference."

Castillo-Chavez has received numerous national awards for his research and for his efforts to expand social participation in science and mathematics. The list includes the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring, given by President Clinton in 1997; the Faculty Fellowship Award (1992-97), given by President Bush; the 2001 Distinguished Scientist Award, given by the Society for the Advancement of Chicanos and Native Americans in Science; and the QEM Mathematics, Science and Engineering Network 2000 Giants in Science Award.

In his research, Castillo-Chavez is an authority on the fields of theoretical, mathematical and computational epidemiology. He finished a year-long residency as the 2003 Stanislaw M. Ulam Distinguished Scholar at the Center for Nonlinear Studies at Los Alamos National Laboratory, where he has been working on a variety of projects, including influenza dynamics, dengue fever evolution, homeland security and the study of epidemics on networks.

During the SARS epidemic, Castillo-Chavez had an opportunity to show how accurate his mathematical models can be. A model that he and his students developed of the outbreak of the disease in Toronto accurately predicted the number of cases while identifying the relative magnitude changes in diagnostic and isolation rates required to control an outbreak. The model showed that if the Canadians had not immediately isolated those infected, the number of victims would have been much higher - perhaps as many as 200,000. A feature article in the *Washington Post* noted the significance of the finding. Castillo-Chavez has co-authored or edited five books and more than one hundred articles. His most recent book is an edited volume (with Tom Banks) entitled *Bioterrorism: Mathematical Modeling Applications in Homeland Security*, which will appear this December in the SIAM Series, *Frontiers in Applied Mathematics*.

## Bruce Long retires

BY ANDREW BREMNER

Bruce Long who joined the Department in 1988 as a Word Processor retires in January 2005 following his 19 year career at ASU. Everyone

who has had interaction with Bruce is fully aware of the absolute excellence that he has brought to his work. He has always been a steadfast adherent to the Macintosh computer, which in a Windows and Linux environment has sorely tested his mettle on many occasions. But his ability to process information, and to extract useful statistics from masses of data spread around both Department and University, is legendary. We shall miss his talents most sorely. He was born a Kansan, and rose to Yo-Yo champion of his eighth grade class, a harbinger of things to come. In 1978 he had a cameo role in the film "Take Off", with footage re-used for the 1988 Hollywood film "Working Girl". He has had a life-long interest in unsolved crime, and published in 1991 a treatise "William Desmond Taylor: A Dossier" on the murder of the early Hollywood silent film actor/director Taylor. This followed editorship of "Taylorology", a review of the Taylor case. His interest in film extends to articles in "Classic Images", "Movie& Film Collector's



World", "Classic Film Collector", and "The Big Reel". He has had television appearances between 1998-2000 on "Mysteries & Scandals" (E!), "City Confidential" (A&E), and "Perfect Crimes" (History Channel). In 1992 he married Irina, who will be moving from her position in the Undergraduate Office to occupy Bruce's Technical Support Analyst position within the

main Math Office. Their honeymoon in Hawaii was notable for coinciding with Hurricane Iniki. As a little known fact, Bruce rose to the quarter finals in the Pokémon national championship tournament in New Jersey in 2001. Bruce, we thank you for your devotion to your job, and I am confident that everyone in the Department wishes you and Irina the very best in your retirement, with lots of time for fruitful researches into your many and various fields of interest.

## Marlene Salvato retires in 2004

BY ERIC KOSTELICH

Marlene Salvato, Executive Assistant in the Department, retired at the end of 2004 after more than 22 years of service. Marlene was hired in September 1982 by then-chair Joaquin Bustoz to replace another staff member who went on maternity leave. Marlene worked at the front desk initially. In 1983, a position opened up in the word-processing group, and Marlene joined Erna Penta and Charlotte Bunker.



"At the time," says Marlene, "there were no computers in the department. We had three full-time people and one part-time person just to type tests, research papers, grant proposals, and student dissertations. It was quite an operation." The staff used a Micom machine that had different type balls for Latin and Greek letters. Every page of every document had to be run through

the printer twice: once for Latin letters and a second time for Greek letters and mathematical symbols. This required precise manual placement of the paper so that all the characters lined up properly. Documents were stored on 8-inch floppy disks, one of which Marlene keeps in her office as a souvenir.

The temporary position eventually became permanent as Marlene was chosen in 1985 to replace Cindy Ryan, who moved to the newly-created Department of Computer Science. Marlene served first as an Administrative Associate and later as Executive Assistant for eight department chairs: Joaquin Bustoz, Phil Leonard, Tom Trotter, Hal Smith, Christian Ringhofer, Dieter Armbruster, Rosemary Renaut, and Andrew Bremner.

What have been the biggest changes in the front office over the years? "The number of staff members, for sure," says Marlene. "When I started in 1982, we had 8 full-time people. Today we have 14 full-time and one half-time staff members. Of course, student enrollments have grown, too. We have over 13,000 students taking math courses this fall." The other change has been computerization. "When Tom Trotter arrived as chair in 1986, I think there were only one or two computers in the whole department. That changed very quickly." Nowadays the Department has hundreds of computers: one for each faculty and staff member, each lecturer and teaching assistant, plus five department-run computer labs.

Melissa Yubeta will replace Marlene in January 2005. Marlene looks forward to spending more time with her grandchildren Haley (6), Harrison (5), Enya (2), and Isabella (1). We extend best wishes to Marlene in retirement and welcome Melissa into her new position!

# Math department graduates

DECEMBER 2003 THROUGH AUGUST 2004

## PH.D. DEGREE

**Luis Gordillo**, August 2004  
Advisor Sergei Suslov  
DISSERTATION *Q-Hausdorff Summability*  
FUTURE EMPLOYMENT Postdoc, ASU

**Rochus Boerner**, May 2004  
Co-Advisor Anne Gelb and John McDonald  
DISSERTATION *Wavelets with Integer Dilation Factors Larger Than Two*

**Younghae Do**, May 2004  
Advisor Ying-Cheng Lai  
DISSERTATION *Chaotic Transient behavior of Dynamical Systems Under Random Perturbations*  
FUTURE EMPLOYMENT Post-Doc, Dept. of Mathematics & Statistics, ASU

**Sean Larsen**, May 2004  
Co-Advisor Marilyn Carlson and John Jones  
DISSERTATION *Supporting the Guided Reinvention of the Concepts of Group and Isomorphism: A Developmental Research Project*  
FUTURE EMPLOYMENT Assistant Professor (TT), Portland State University

**Shelly Smith**, May 2004  
Advisor Helene Barcelo  
DISSERTATION *A Discrete Homotopy theory for Graphs, with Application to Order Complexes of Lattices*  
FUTURE EMPLOYMENT Assistant Professor (TT), Grand Valley State University, Allendale, MI

**Lynn Marie Ybarra**, December 2003  
Advisor Sharon Lohr  
DISSERTATION *Small Area Estimation Using Data from Multiple Surveys*

**Daqing Yang**, December 2003  
Advisor Hal Kierstead  
DISSERTATION *Extension of the Game Coloring Number and Some Results on the Choosability of Complete Multipartite Graphs*

## MA DEGREE

**Phong Chau**, May 2004  
Advisor John Jones  
THESIS *No thesis option*  
FUTURE Continuing in PhD program

**David Fishman**, May 2004  
Advisor Ed Ihrig  
FUTURE Instructor position with ASU Math Department

**Luis Gordillo**, May 2004  
Advisor Sergei Suslov  
THESIS *Masters-in-passing, no thesis option*  
FUTURE Will finish PhD in August 2004

**Yirong Liu**, May 2004  
Advisor Ying-Cheng Lai  
THESIS *Noise Promotes Species Diversity in Nature*

**Michael Ludian**, May 2004  
Advisor Alex Mahalov  
FUTURE Accepted into PhD program

**Jelena Milovanovic**, May 2004  
Advisor Christian Ringhofer  
THESIS *Master-in-passing, no thesis option*  
FUTURE Instructor position with ASU Math Dept. plus continuing with PhD program

**Gautam Pendse**, May 2004  
Advisor Hans Mittelmann  
THESIS *Optimization Based Formulations using the Weyl Criterion for Input Signal Design in System Identification*

**Rachel Wallington**, May 2004  
Advisor John Jones  
FUTURE Continuing in PhD program

**Mingqiang Zhu**, May 2004  
Advisor Carl Gardner

**Andres Garcia**, December 2003  
Advisor John Jones  
THESIS *Elliptic Curve Primality Proving Algorithm*

**Mohammed Jamshed Ghouse**, December 2003  
Advisor Alex Maholov  
FUTURE Continuing in PhD program

**Ryan Melendez**, December 2003  
Advisor Helene Barcelo  
FUTURE Continuing in PhD program (on leave spring 04, working as Lecturer)

## MS STATISTICS DEGREE

**Phillip Backus**, December 2003  
Advisor **George Runger**  
*Cycle Time Prediction: A Data-Mining Approach*

**Haijun Tian**, December 2003  
Advisor Mark Reiser  
*Goodness-of-fit Tests for Log-linear Models When the Cell Frequencies are Sparse*

**Mingbo (Michael) Wang**, May 2004  
Advisor Murat Kulahci  
*The Classification and Regression Tree (CART) Approach to Stock Selection*

**Baohui Zhang**, August 2004  
Advisor Jeff Wilson  
*A Dirichlet-Multinomial Logistic Regression Model: Physician Assistant Satisfaction Over Time*

**Stephen Lee**, August 2004  
Advisor Rick Burdick  
*Estimation of Confidence Intervals for Percentiles*

## PROFESSIONAL SCIENCE MASTERS GRADUATES DEGREES IN COMPUTATIONAL BIOSCIENCES

Ei-Ei Gaw  
John Huynh  
Eric Kennedy  
Jennifer Szeto  
Vidyadhari Edupuganti  
Srilaakshmi Ganta

## MS GRADUATES DEGREES IN COMPUTATIONAL BIOSCIENCES

Naga Vuppaladadium  
Shubhra Gupta  
Shylaja Kokoori

## BACHELOR OF ARTS

Benjamin Byer, May 2004  
Cameron Coleman, May 2004  
Kira Lynn Gartell, May 2004  
John Gilmore, Jr., May 2004  
Sean Hendrickson, May 2004  
Faisal Hayat Khan, May 2004  
Betsy J. Lamm, May 2004  
Traian Lazarescu, May 2004  
Lance Levenson, May 2004  
Leila Elise Moore, May 2004  
LeeAnna Marie Rettke, May 2004  
Stephanie Cherry Smith, May 2004  
Matthew Craig Snell, May 2004  
Lisa Marie Tait, May 2004  
Richard Brasier, December 2003  
Mohammed Nasser Omar Faris, December 2003  
Jenifer Hummer, December 2003  
Simon Jameson, December 2003  
Allen Poon, December 2003  
LyNea Porche, December 2003  
Kristina Skrbic, December 2003  
Cristina Pinto, December 2003  
Lea Wagner, December 2003

## BACHELOR OF SCIENCE

Christopher Blakely, May 2004  
Michael Dodd, May 2004  
Brian Fall, May 2004  
Caitlin Frederick, May 2004  
Christopher Gorry, May 2004  
Aaron Gottesman, May 2004  
Brie Noelle Mitchell, May 2004  
Vu Hoan Pham, May 2004  
Derek Justin Schaible, May 2004  
Brian Peter Sorahan, May 2004  
Caroline Marie von Bose, May 2004  
Christopher Wagner, May 2004  
Kyle Hughes, December 2003  
Efunwande Osoba, December 2003  
Kelly Witherspoon, December 2003

## BACHELOR OF SCIENCE – COMPUTATIONAL MATHEMATICAL SCIENCES

Adeline Rassas, May 2004  
Michael McCliment, May 2004  
Makalika D. Naholowa'a, May 2004  
Kristin Elizabeth Russell, May 2004  
Lisa Rumble, December 2003  
Wai Yung Yeung, December 2003  
Jason Sims, December 2003

## BACHELOR OF SCIENCE – MATHEMATICS (STATISTICS)

Emmeline Aldis Luciu, May 2004

# Joan McCarter retires after 43 years of service

BY ED IHRIG

Prof. Joan McCarter will retire at the end of this semester after 43 years of service in the Department of Mathematics and Statistics at ASU. I now attempt to pen words that will suitably mark the occasion. Like an artist painting a portrait, it is my desire to say words which will reflect who she is well enough that at least those who know her might recognize her in the description. Of course, there are the basic facts, and they do say something about her. I will begin with some of these.

The primary theme of her career at ASU has been teaching, both the teaching of ASU students and the teaching of teachers at the elementary and high school levels. Her success in this domain is reflected in the Wexler Teaching Award she received in 1990 and the College of Liberal Arts and Sciences Teaching Award she received in 1994. She authored six books and manuals for using graphing calculators (with Wiley, Saunders and Harcourt Brace). She was the recipient of 7 grants including two Eisenhower Grants. She served for 5 years as Vice President of the Arizona Alliance for Mathematics, Science and Technology and for 7 years on its governing board. She has given 11 invited addresses on the use of technology in teaching, and has been a program chair at a number of conferences.

Four major areas of activity that stand out in her career: Diagnostic testing, Reform Calculus, Advanced Placement Calculus and the use of technology in teaching mathematics. In the testing domain, one of her main activities was to serve for 7 years as the director of the Arizona College Mathematics Readiness Testing Program, a state wide program of prognostic testing in high schools directed and funded through the board of Regents. Her Reform Calculus contribution was to direct the implementation of the Oregon system. (Two systems were explored: Harvard Calculus and Oregon Calculus). For 10 years she has served as a reader of the Calculus Advanced Placement examinations and a trainer of Advanced Placement Calculus teachers.

Perhaps the dominant theme of the last 15 years of her career has been the introduction of technology in the classroom, particularly the technology of graphing calculators. The subject matter of her 6 books has been the graphing calculator. All but three of her invited addresses have been on the graphing calculator. (The three exceptions were on Web modules). She developed graduate courses for service teachers using technology in the classroom. She served as an advisor to the HP48 user group, and cochaired a number of Calculator Workshops at the International Conference on Technology for Collegiate Mathematics.

These are some of the facts concerning Joan's career. I now attempt to give you some sense of Joan as a person. Here also there are many facts that will shed light on this. However, I start with a small story. I remember the first time I was stung by a scorpion. I considered the experience to be quite dramatic, and so, wanting to tell a good story, I shared the experience with anyone willing to listen. I told Joan my story and she said something like "oh, yeh. I get stung by scorpions all the time when I walk out into my back yard. I suppose I wouldn't get stung if I put on some shoes, but I'd rather go barefoot and put up with a few scorpion stings." This says a lot about Joan. She is tough and fun loving; always has been, likely always will be. Keeping this in mind I move on to a few of the facts. She is the mother of 4 children whom she raised mostly by herself. She now has four grandchildren. Not only did she raise four children while being a professor at ASU, she came here at time when the female presence in the department of mathematics was not overwhelming.

Cecilia Wang was the only other female Professor here in Joan's first 15 years here. In addition, she was one of a number of faculty hired at that time who did not have a Ph.D. (Most schools in the country hired faculty with Masters degrees at that time). Of course, as will happen to many, if not most of us, the times changed, and the requirements of professors changed. A Ph.D. became a requirement, and the University became almost exclusively focused on research. In those days it was hard for non-Ph.D.s to find a niche in the department. All the other people who did not have Ph.D.s have long gone, but Joan stuck it out. Of course, there is only one permanent thing in life. That is change.

And so the focus in the University is starting to swing back to its pedagogical mission. In the last 10 or 15 years Joan was able to find an important role in this new development; she started to make steady contributions to introducing the use of technology in the classroom. While universities nationwide floundered around with reform calculus only to essentially discard it all, the introduction of technology into pedagogy is a development which has proved to be more long lasting. It has been around long enough to enable Joan to make an impressive contribution to this development both at ASU and nationally through her books and conference participation. When I think back on her career, I am amazed that she was able to accomplish so much. I suppose that it is a real asset in life to be able to walk with the scorpions.

What about Joan outside of work? She is very colorful and multidimensional. I will only mention one or two things to respect her privacy while still giving you some idea about what she is like outside the classroom. She has been very interested in growing bonsai for a long time. (Bonsai is the Japanese art of

*continued on page 11*