



Mathematics & Statistics Department Newsletter



Fall 2006

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Chair's Message

Seasons Greetings!

The
SDSU
Department of
Mathematics
and
Statistics
wishes you
a prosperous
NEW YEAR!



I am the new department Chair, starting in the past summer. Before coming to San Diego, I was at the University of Alberta, Edmonton, Canada. I lived in Canada for 17 years. I was born and grew up in Sanmiaoling, a remote mountain village in the eastern China whose latitude is about the same as that of San Diego, 32°N. I came to the United States in 1983 as a graduate student at the University of Wisconsin-Madison, and obtained my PhD in 1987 in the area of applied mathematics. My current research is on climate data analysis and global warming.

Many exciting things have happened to the Department. You will find them out from this newsletter. To highlight a few, the Department hired four new professors and a staff member, including myself, got a Computational Statistics PhD program under the framework of the current Computational Science PhD program, and received a generous donation from the McLeod Foundation to support statistics teaching and research.

SDSU has a huge potential. We are the oldest and largest higher education institution in the San Diego region. Our department features strength in applied mathematics, applied statistics, and mathematics education. We are teaching about 6,000 students each semester. Our mission and goals are to

1. Excel in teaching at all levels ranging from lower division undergraduate to PhD,
2. Be prominent in several research areas in mathematics, statistics, and mathematics education,
3. Offer flexibility and a variety of undergraduate programs,
4. Offer strong graduate programs, including the PhD, and
5. Provide outstanding service to both SDSU and outside communities.

San Diego is the 8th largest city in the country. Its modern economy has a huge demand for highly qualified personnel in the area of applied mathematics, applied statistics, and mathematics education, which are our strengths. We plan to build excellence in these directions. We will not only become a research and teaching leader in San Diego in these directions, but also build internationally competitive programs. Our award-winning faculty members and creative undergraduate and graduate students have the confidence to successfully complete our mission and achieve our goals. Our talents and service are reaching out to the San Diego community. For example, through our collaboration with Torrey Pines High School, one of the Newsweek top 100 American high schools, we support the teaching of advanced level calculus and other higher mathematics to bright high school students. Our alumni in industry have visited our campus and helped us to place intern students. For example, our former graduate Mark Coodey from the Aerospace Corporation in Los Angeles visited our department on November 16, 2006, together

with his colleague, Dr. Fletcher Wicker, and presented research opportunities for faculty members and students.

We appreciate the support from the friends of SDSU Department of Mathematics and Statistics. With limited state funding, your donations have become more important than ever to our success. The donations have been used for supporting our teaching and research activities, such as colloquiums, seminars, and research result releases.

Finally, you are welcome to visit the Department and I'd be pleased to meet you in person and to discuss issues of your concern. Also I'd be delighted to visit you, your colleagues, and your family and friends. Please feel free to contact me at shen@math.sdsu.edu or Tel: 619-594-6191.

Sincerely yours,
Samuel Shen

Welcome

New
Faculty
and
Staff

New Faculty

Barbara Bailey, Ph.D., North Carolina State University



Dr. Bailey is an applied statistician with applications in the atmospheric, environmental, and ecological sciences. Her Ph.D. is in Biomathematics, a graduate program inside the Department of Statistics where her research focused on nonlinear time series and estimation of dynamical system quantities from data. She was postdoctoral research fellow at the National Center for Atmospheric Research. At NCAR, she was part of the Geophysical Statistics Project where her research emphasis was on modeling the spatial and temporal distribution of cloud cover and biogeochemical processes. She has continued and is currently researching the temporal and spatial modeling of environmental processes and the diagnostic and visualization of nonlinear statistical models.

Kristin Duncan, Ph.D., The Ohio State University



Dr. Duncan is an applied statistician with research interests in Bayesian modeling, educational assessment, and survey sampling. She is currently working on assessing the fit of item response models such as those used in standardized testing and also on using nonparametric Bayesian modeling for item response.

Vadim Ponomarenko, Ph.D.,
University of Wisconsin-Madison



Dr. Ponomarenko is a discrete mathematician specializing in inter-disciplinary applications of combinatorics. His areas of interest include jump systems, matroid theory, coding theory, monoid theory, discrete dynamical systems, number theory, polymerization dynamics, and mathematics education. His work frequently has components that provide opportunities for undergraduates to do research in mathematics. He is presently researching, together with undergraduates, a generalization of a problem in elementary number theory that was first considered by Diophantus (3rd century CE), popularized by Frobenius (19th century CE), and heavily studied ever since.

Samuel Shen, Ph.D., University of Wisconsin-Madison



Dr. Shen is the new Chairman of Department of Mathematics and Statistics. He is an applied mathematician specializing in statistical climatology and nonlinear waves. His areas of research include optimal analysis of climate data for global warming assessment and detection, agroclimatic database and information service, signal analysis for nonlinear and non-stationary processes, and forced water waves. He is presently researching on the uncertainties of the global climate change in the last 150 years in both surface air temperature and precipitation, optimal blending of the data from satellite remote sensing and ground station observations, and North America drought monitoring.

New Staff

Terry Farquar



Terry writes, "I'm married to a Marine and we have three daughters (12, 7 & 2), plus our blonde child (9 year old yellow lab). During the summer of 2005 we moved to San Diego from Camp Lejeune, North Carolina. I was previously employed with Coastal Carolina Community College as the Mathematics and Sciences Department Secretary. My most memorable time at Coastal was planning the Annual S.E. Regional Mathematics contest."

**New
Statistics
PhD
Program**

Professors Levine and Castillo have developed a PhD program concentration in Computational Statistics which will begin accepting students for the 2007-2008 academic year. The program is offered by the Division of Statistics and the SDSU Computational Science Research Center as part of the joint doctoral program in Computational Science with Claremont Graduate University. Professors Levine and Castillo, along with Professor John Angus of CGU, will be directing the program.

Formally the Joint Doctoral Program in Computational Science with Concentration in Statistics, the Computational Statistics PhD concentration is a unique program imparting to students expertise in statistical methods and computational machinery, invaluable to the modern-day statistician and opening opportunities in all walks of statistical life. For details, see the program web page at www.csrc.sdsu.edu/csrc/Compstat.

Promos

Promotions

Ricardo Carretero and **Michael O'Sullivan** were promoted to Associate Professor with tenure effective at the beginning of the 2006-2007 academic year.

**Prizes
Awards
Honors
&
Recognition**

Prizes, Awards, Honors & Recognition

Richard Levine was awarded a Fulbright Scholar grant. He is the only faculty SDSU Fulbright Scholar this year. He will use the grant to teach and perform research in Computational Biometrics at the Zhejiang University School of Public Health in Hangzhou, China during the spring and summer of 2007.

Kung-Jong Lui was elected a Fellow of American College of Epidemiology in 2006. Kung-Jong has been a Fellow of American Statistical Association since 2001.

Chris Rasmussen received the Mathematical Association of America's Annie and John Selden Prize for significant contributions to research in undergraduate mathematics education. **Chris** also received the Outstanding New Scholar Award from the University of Maryland, where he received his PhD.

Diana Verzi received the Monty Award given by the SDSU Alumni Association in recognition of outstanding contributions to the University. Representing the Imperial Valley campus, Dr. Verzi, an associate professor, is founder and coordinator of the Mathematics Program at IVC.

Funded Research

Funded Research

We are an active research department. We publish over 50 research papers a year. Among our 27 professors, 16 are principal investigators or co-principal investigators of 24 funded research projects. The National Science Foundation funded ten projects. The McLeod Foundation of San Diego started this year to support our teaching and research in statistics. Four large research projects are listed below.

Jose Castillo is holding a five-year, \$1.2 million training grant from the National Institute of Health. The project unites faculty members, undergraduate students and doctoral degree candidates in a team approach to solve biomedical science problems.

Joanne Lobato is holding a three-year, \$1.3 million grant from the National Science Foundation to examine the relationship among (a) teacher knowledge and goals, (b) the mathematical focus that develops in a classroom, and (c) the ways in which individual students generalize their mathematical learning experiences.

Susan Nickerson is holding a \$0.94 million grant from California Postsecondary Education Commission. It is a collaborative project between San Diego State University faculty and the San Diego City Schools administrators to support middle grades mathematics teachers in low-performing schools in meeting the requirements of the federal *No Child Left Behind Act* of 2001 (NCLB) Legislation.

Antonio Palacios is the Principal Investigator of four ongoing National Science Foundation projects with the total funding of \$0.75 million. He is investigating flame patterns and other dynamical systems.

Faculty News

Sabbatical & Leaves

Sabbatical & Leaves

Janet Bowers is on leave for the 2006-2007 academic year.

Juanjuan Fan is on sabbatical.. She plans to return in Fall 2007.

Richard Levine is on sabbatical. He plans to return in Fall 2007.

K.J. Lui, on sabbatical, is planning to return in Spring 2007.

Michael O'Sullivan, on sabbatical, plans to return in Fall 2007.

Retirement

Retirement

David Lesley retired after 36 years of teaching in the Department. He was Department Chair from August 2001 to July 2006. He came to SDSU from UC San Diego, where he was a PhD student of Steve Warschawski, writing a thesis in Minimal Surfaces. He had been an undergraduate at Stanford, from which he graduated with a BS in Mathematics in 1966. He plans to teach one class every spring for the next 5 years via the FERP program.

Talks given this fall 2006 semester included the following speakers.

Tom Chou, UCLA

Stochastic Exclusion Processes in Protein Production

Mark Coodey, SDSU, and **Fletcher Wicker**, Aerospace Corp.
*Application of Mathematics Within Communications Systems and
Networks at the Aerospace Corporation*

Youri Davydov, University of Lille, France

Lorenz Curves, Gini Index, and Convex Rearrangements

Mark E. Glickman, Boston University

Bayesian Optimal Design of Knockout Tournaments

Dan Goldston, San Jose State University

Approximating Primes in Tuples with Short Divisor Sums

Dan Goldston, San Jose State University

Small Gaps Between Primes

Fan Chung Graham, UCSD

Random Graphs and Internet Graphs

Carmelo Interlando, SDSU

Quadratic-Residue Codes and Number Fields

Charles R. Johnson, College of William and Mary

Completely Positive and Doubly Nonnegative Matrices

Vladimir I. Rotar, SDSU

How to Measure Riskiness: Definitions, Examples, Paradoxes

Sam Shen, SDSU

*Interpolating Daily Precipitation Data and
Regression Variance Correction*

Roxana Smarandache, SDSU

Performance Analysis of LDPC Convolutional Codes

Births

Raymond Hua Levine



Raymond was born to Juanjuan Fan and Richard Levine on April 29, 2006. His favorite book to read (and chew) is Dr. Seuss's "Mr. Brown can Moo! Can You?" He cannot get enough sweet potato, even when mom and dad try to sneak peas into the mix, and his favorite hangout is the Livingroom in La Jolla. And no, he cannot do a t-test yet, well, of course, unless proper priors are placed on the location and scale parameters.

Edison Shen



Edison was born to Sam and Snow Shen on August 29, 2006. This photo was taken at home on November 12, 2006. His 4 year old brother Jackson likes him a lot. When Edison is crying and mom is busy, Jackson would try various ways to stop his crying, including singing songs and playing musical toys.

Student Activities

Undergraduate Summary

Undergrad Summary

1. The Undergraduate Development Committee has begun a process of undergraduate curriculum review. The goal is to assess our curriculum and major/emphasis programs to best meet the needs of our current and future students. Please send any ideas or suggestions to the chair of the committee, Vadim Ponomarenko.
2. The DMS has sponsored the creation of two moderated mailing lists. These will enable information of interest to our students to be easily distributed directly to them. Anyone is welcome to subscribe to one or

both lists; for instructions, see our departmental webpage. If you wish to send an email to all undergraduates, or all graduate students, contact: math-undergrad@scilists.sdsu.edu and math-grad@scilists.sdsu.edu

3. As a byproduct of these mailing lists, we have statistics about the students currently enrolled in our programs.

DMS Undergraduate Summary: Fall 2006

BA, or Minor in Mathematics 70
BA, Single Subject Teaching Credential 95
BA total: 165

BS, Applied Mathematics 45
BS, Computational Science 9
BS, Mathematical Finance 19
BS, Science 16
BS total: 89

Minor in Statistics 0
BS, Statistics 15
BS, Actuarial Statistics 16
BS, Statistical Computing 1
Statistics total: 32

Department of Mathematics & Statistics Total: 286

49% of these students are female. 21 of these 286 students have two majors; these other majors are distributed among the Colleges of Business Administration (5), Arts & Letters (4), Science (4), Engineering (3), Professional Studies & Fine Arts (2), and intercollegiate degrees (3).

Graduate
Summary

Graduate Summary

DMS Graduate Summary: Fall 2006

MA, General 16
MA, Community College Teaching 11
MA, Secondary Teaching 4
MA total: 31

MS, Applied Mathematics 20
MS, Communication 6
MS, Computational Science 13
MS, Dynamical Systems 6
MS total: 45
MS, Statistics 25
MS, Biostatistics 17
Statistics TOTAL: 42

Department of Mathematics & Statistics Total: 118

Problem
of the
Fortnight

The Problem of the Fortnight

Each fortnight, a new and challenging mathematical problem is posted on the department website. See current Problem of the Fortnight here: http://www.sci.sdsu.edu/math_stat/FortnightProblems_files/fortnight.htm

Any undergraduate submitting a correct solution before the deadline receives a Problem of the Fortnight T-shirt. The most elegant mathematical solution and computer solution each also receive a book from the department's collection. The most elegant solution submitted by a graduate student also wins a T-shirt.

Students submit their solution in an envelope, including their name, RedID number, date, address, phone and email, indicating whether they are a graduate or an undergraduate student. Solutions are submitted to the Math & CS Dept Office in GMCS 413, and evaluated by a highly respected faculty committee who select the awardees. Solutions are displayed in a glass encased cabinet located in the foyer of the Business Administration building. Faculty are encouraged to inform their students of each Problem of the Fortnight, and entice their students to participate by awarding stimulating incentives for participation. The newly designed Problem of the Fortnight t-shirts should suffice as an incentive for the ongoing POF mathematical contest.

**Fund
Drive**

**Department of Mathematics & Statistics
Fund Drive**

Kindly consider making your donation to the following department programs.

1. Colloquium talks and public lectures;
2. Graduate student scholarships;
3. Undergraduate student scholarships;
4. The Gene Lopez and Edgar Howard Memorial Fund for mathematical experiences, and
5. Any program agreed between the Department and the donor(s).

Please make your donation check payable to *Campanile Foundation*.

Kindly specify which department program you prefer, and mail to:

San Diego State University
Department of Mathematics & Statistics
Campanile Foundation
5500 Campanile Drive
San Diego, CA 92182-7720

Many corporations have a matching grants program. Please check with your organization to determine whether it provides such a program.

**Contact
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