

SFSU

# Mathematics & Statistics Newsletter

Department of Mathematics \* San Francisco State University \* Spring 2002

## *Greetings from the Chair*

**By David Meredith,  
Chair of the Mathematics Department**

Greetings from the ninth floor of Thornton Hall. Last January I moved three doors from the office where you used to see me to the Chair's much nicer quarters. Leaving the old office was a little sad. It had been mine since the day Thornton Hall opened in Fall 1973, and we had grown to fit each other. However, I am adapting quickly to my new position. Being Chair brings me into contact with all the math faculty, and I'm learning much more about their many activities and accomplishments than I knew before. As you can see from this newsletter, the faculty are engaged in wide variety of excellent teaching and research projects.

To our graduates I have a special invitation. When you have a free day in San Francisco, come to campus and see all the changes that have taken place since you left. Ride the elevator up to the ninth floor (that hasn't changed) and check out the Math Department. Stop in the office and say hello. It is important to me to hear how you are using your mathematics education, and how we could do an even better job for our current crop of students. If you cannot visit, then write me at [meredith@sfsu.edu](mailto:meredith@sfsu.edu) telling me what you are doing with (or without) mathematics. I look forward to hearing from you.

## *From Chair to Dean*

**By Sheldon Axler,  
Dean of the College of Science and Engineering**

After four-and-one-half years as Chair of the Mathematics Department, in January 2002 I became Dean of the College of Science and Engineering at SFSU. I had chosen not to apply for the Dean position the previous year when the university first searched for a replacement for Dean Kelley. That first search was unsuccessful, and as the second search procedure began, I considered again whether I should be a candidate.

I worried that being Dean would take me too far away from mathematics. But for years I had been saying that being Chair is the hardest job on campus; I could not imagine that any job could take more hours per week. Perhaps a Dean has more time available to work on mathematics than a Chair? Furthermore, being Dean sounded like an interesting new challenge. So although I had a terrific job that I loved, I applied for the Dean position, although with great ambivalence.

I have been Dean now for less than a semester. So far I'm enjoying the job. Deans have more responsibility than Chairs, but they also have more resources available and more assistance in meeting their responsibilities. I still believe that being Chair is the hardest job on campus.

I miss contact with students, which is one of the true pleasures of the Chair's job. Lots of students come into the Dean's office clutching some form that asks for the Dean's signature, but those students get directed to the Associate Dean. Most of all I miss being a key part of the Mathematics Department. Of course I am still a member of the department, and I still intend to remain a research mathematician with those extra hours that I gained by moving from Chair to Dean. But now most of my day focuses on issues other than mathematics.

If I had to pick my most important accomplishment as Chair, it would be the outstanding assistant

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# A Report on the February MAA Meeting

by James T. Smith

On a Davis sidewalk Saturday, 2 March, some academics met another, struggling to control a huge cardboard poster in the wind. Suddenly they heard someone crashing through the bushes. “Who’s that? Oh ... we know him! What’s he doing?” The poster man replied, “Looking for the mathematics ...” “Well, we know mathematics is everywhere, but—in the bushes?” “... meeting. We can’t find it, and I have to put up my poster.” “That’s where we’re going. How many mathematicians does it take to find ...?”

The poster man and the outdoorsman (this writer) were heading for the annual section meeting of the Mathematical Association of America, part of a contingent of six faculty and thirteen students, three of whom brought posters. As always, the hardest part of the trip was getting from the parking lot to the meeting.

What are mathematics posters? Graduate students Seth Sullivant and Geoff Baldwin summarized their theses, and senior Emily Putnam reported on her recent participation in the NSF Research Program for Undergraduates at Oregon State.

About 25 students in all displayed their work and answered questions.

That morning we heard a wonderful lecture by Davis Prof. Don Chakerian on the Cantor set  $C$ , an enchanting example of precise reasoning. “Is  $\frac{1}{4}$  in  $C$ ?” he asked. (How many mathematicians does it take to find a quarter?) Williams College Prof. Frank Morgan followed with an effervescent talk on bubbles. Recent research, some by undergraduates, has shown that bubbles really must join at the angles we observe in the bathtub. The meeting concluded with insights into complex analysis by Davis Prof. Evelyn Silvia.

At lunch, we chatted with many old and new friends, including former lecturers Jerry Minkus, Judith Ng, Peter Ross, and Fred Schmitt, and former students Tadashi Tsuchida and David Sklar. After the meeting we drifted home bubbling, refreshed, and inspired.



*From Chair to Dean...continued from page 1*

professors who were hired during my time as Chair. They, along with the assistant professors to be hired in the next few years, form the future of our department.

Most good math department Chairs spend much time convincing their Dean that having an excellent Mathematics Department is important for the success of the College. David Meredith, my successor as Chair, won't have to worry about that, because I already know how crucial the Mathematics Department is to the College of Science and Engineering.

I wish much success to David as he leads the SFSU Mathematics Department to new levels of excellence.

# BADM Math Days

by Serkan Hosten

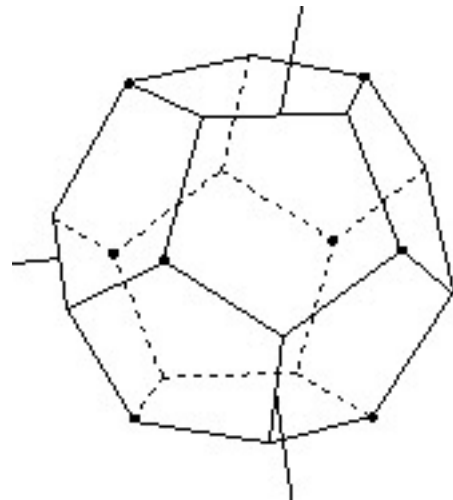
The fourth Bay Area Discrete Mathematics Day (BADM Math Day) took place at Stanford University on March 30. This one-day event gathered over fifty mathematicians, postdocs, graduate and undergraduate students who are interested in combinatorial mathematics. It all started in Fall 2000 when Prof. Jesus De Loera from UC Davis teamed up with a few Bay Area mathematicians with a combinatorial bend bent to organize the first BADM Math Day in Davis. The idea was to bring together those who are interested in various parts of mathematics and computer science where structures of finite and discrete nature (as opposed to continuous structures as in real analysis) are involved. For instance, graph theory that investigates properties of networks of nodes and their connections, or discrete geometry which studies polytopes (higher dimensional analogs of tetrahedra, cubes etc.) as well as algebraic combinatorics that is concerned with, for example, counting and generating functions, were some examples of topics intended to be covered in the event.

The first meeting set the format as well as the informal tone of the subsequent meetings. Two principal speakers who are famous in their areas of expertise each give one-hour talks, and there are four or five half-hour talks given by mostly junior folks (including some graduate students). Everything is done to facilitate an environment of interaction: a simple lunch is served in the same room as the talks are held so that participants can grab a sandwich and some salad, and sit down to a chat to discuss a question. The day ends with a dinner at a nearby restaurant where more math is discussed, news is traded, and gossip exchanged.

The Davis meeting was followed by the one at

SFSU organized by myself at our department. Last Fall, BADM Math Day was held at CSU Hayward, and the next one will be in Berkeley during October 2002. Since the first meeting with about thirty participants the event has grown to a full-fledged local celebration of discrete mathematics with more than fifty participants.

For more information, please visit the official BADM Math website: <http://badmathday.csuhayward.edu/>.



## Mathematicians Do It Better

It is proverbial to mention during a mathematics talk that “every math talk should contain a proof.” In his plenary address at the 2002 AMS/MAA Winter meeting in San Diego, the number theorist Henrick Lenstra gave an interesting variation. In the middle of his address he commented: “A math talk without a proof is like a movie without a love scene” (dramatic pause) “and I have proven THREE theorems already!”

# Student Activities

❖ Geoff Baldwin presented results from his MA thesis *Mathematical Modeling of a Composite Heat Sink* in the poster session at the February meeting of the Northern California Chapter of the Mathematical Association of America (MAA) held at U.C. Davis. He also represented the Math Department in the CSU Student Modeling Contest. The faculty sponsor for his thesis is Dr. David Ellis.

❖ Michael Begonia presented a paper "Some practices on irregular sampling" at the SPIE Symposium, Conference on Advanced Signal Processing Algorithms, Architectures, and Implementations held in San Diego, Aug., 2001. The paper he presented was authored by Shidong Li. Michael assisted Dr. Li in his research.

❖ David Dryer, a student in SFSU's Cooperative Graduate Program with Sonoma State University, presented *Modeling GE Math Grades* in a poster session at the same MAA meeting.

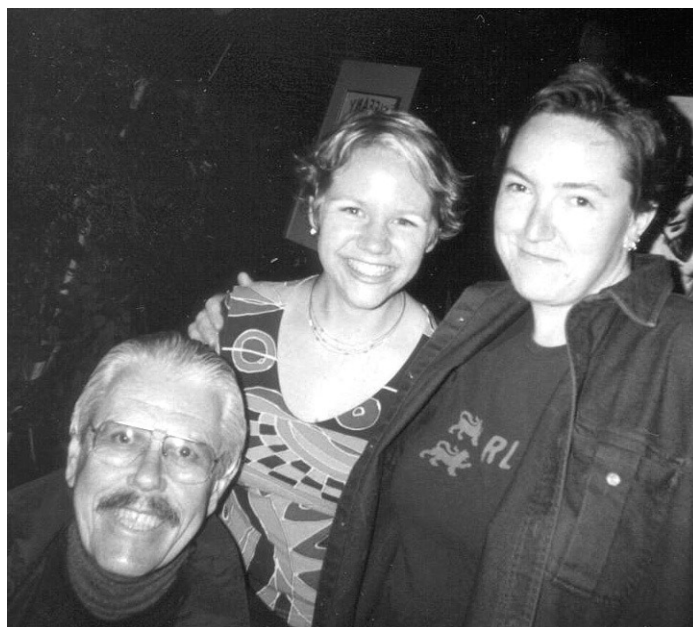
❖ Yukie Goto is one of 16 juniors selected to participate in the Summer Program for Women in Mathematics at George Washington University in Washington, D.C.. Each participant in the 5 week program will receive a travel allowance, room and board, and a \$1500 stipend. The topics of study will be in the fields of Queueing Theory, Knot Theory, Mathematical Logic and Algebraic Topology.

❖ Katrina Keating spent the fall semester at Pennsylvania State University in the Research for Undergraduates (REU) program sponsored by the National Science Foundation. Her studies at Penn State included courses in combinatorics, geometry and relativity, and the mathematical analysis of fluid flow. This semester, she is finishing her BA math degree at SFSU and will enter our MA program in the fall.

❖ Manli (Mary) Li has been selected by the Summer Research Opportunity Program held at the Engineering Research Center of the University of Michigan. Students in the 8 week REU program will participate in research on Reconfigurable Manufacturing Systems and receive free travel, housing, and a \$4000 stipend.

❖ Emily Putnam spent the summer in the REU program at Oregon State University where she participated in research in algebraic topology. She presented her findings in a poster session entitled *Distinctness of once-intersecting curves on the punctured n-holed torus* at the February MAA meeting in Davis. This fall, Emily will enter the Ph.D. program in mathematics at the University of Utah.

❖ Seth Sullivant presented results of his collaboration with Dr. Serkan Hosten at the MAA poster session in February. The title of his poster was *Algebra and Geometry of Hierarchical Models*. Seth currently has an NSF Graduate Student Fellowship and will start the Ph.D. program at U.C. Berkeley in the fall after completing his MA as SFSU.



# Graduate Student Lecture Series

The graduate student lecture series was founded last year by Seth Sullivant to give graduate students an opportunity to present mathematical talks to their peers. Students speak on a wide range of topics from applied and pure mathematics. The talks are on material not normally encountered in math courses and also provide a forum in which students can present their own research. To maintain a “safe” atmosphere, talks are open only to students. This semester, Abigail Leaf and Ian Sammis and are taking over for Seth. Here is a list of the lectures given in 2001-2002:

Geoff Baldwin	Mathematica and Laplace’s Equation
Dan Wheeler	A 4-dimension Illusion
Emily Putnam	Distinctness of Curves on Surfaces
Jennifer Mogel	Hypatia, the Last Librarian of Alexandria
Seth Sullivant	The Geometry of Numbers
Sarah Blum	The Effects of Doing Math in a Fun, Casual Environment
Geoff Baldwin	A Minimal Predator-Prey Ecology
Kevin Lin	Topological Invariants
Shuichiro Takeda	Topological Interpretations of Intuitionistic Logic
Jon Freedman	Hyperbolic Trigonometric Functions
Stephen Jaymeson	A Generalization of Möbius Functions
Jennifer Mogel	Mathematical Models of the Spread of Disease
Brian Tenneson	Was Newton Right? An Introduction to Nonstandard Analysis
Alan Von Hermann	Von Neumann Normal Rings
Seth Sullivant	Symplectic Geometry and the Heisenberg Uncertainty Principle
Michael Skonovd	Products of Locally Connected Hausdorff Spaces

## *Awards and Scholarships*

## *2001 Graduates*

Michael Begonia and Kim Williams-Brito were awarded SFSU Alumni Association Senior Scholarships (\$1000 ). Only six of these awards were given in the entire university.

Katrina Keating received the 2001 Jenny Low Chang Scholarship (\$1400) from the Associated Students, Inc.

### CIRE Fellowships for Spring 2001

Dominique Cenicerros  
Theresa Jackson  
Tim Coxon  
Amy Starks  
Betsy Koehler

### NSF Scholarships for COSE Fall 2001

Sarah Blum  
Dominique Cenicerros  
Nga Y. Chow  
Stephen Fredricks  
Ramal Lamar  
Michael McAssey  
Karen Miller  
Emily Putnam  
Alan Roth  
Greg Rothman  
Benjamin Russell  
Stacy Slinger  
Amy Starks  
Xuan N. Thai  
Angela Torres  
Max Van Engers  
Kimberly Williams-Brito

### CIRE Fellowships for Spring 2002

Erik Bennett  
Stephen Fredricks  
Theresa Jackson  
Stephen Jameyson  
Abi Leaf  
Thomas Long  
Jennifer Mogel  
Chris Robison  
Ian Sammis  
Stathi Verras

### Bachelor of Arts in Mathematics

Michael Begonia  
Dominique Cenicerros  
Tom Chan  
Frank Goodell  
Luong Le  
Kitty Ng  
Binh Nguyen  
Jean-Paul Ouellette  
Amaranta Perez  
Alan Roth  
Faith Santos  
Angela Torres  
Jeffrey Walther

### Bachelor of Science in Mathematics

Jayarathna Adapa  
Xuan Thai

### Bachelor of Science in Statistics

Mui Chu  
Wilson Fong  
Melchor Gaspar  
Roland Ramirez

### Master of Arts in Mathematics

Shannon Creager-Travers  
Jonathan Freedman  
Timothy Murdock  
Jennifer Smith  
Shuichiro Takeda  
Brian Tenneson

# Mathematics Department 2001 Events

*"Freedom is the freedom to say that two plus two make four. If that is granted, all else follows." -George Orwell*

## *First Annual Mathematics Graduation Celebration*



*"The first step is believing in what you are doing.  
The second step is getting on the right bus."*

*-Erik Bennet*

This year the Math Department began, what we hope will be the first of many, joyful graduation celebrations. Students receiving Master and Bachelor degrees mingled with their friends, families and faculty over catered refreshments. The program included three speeches given by faculty, a MA recipient and a BA recipient, all elected by the graduating class. The event was well attended with over 120 guests and set a fantastic precedent for future events.



*"As we let our own light shine, we unconsciously  
give other people permission to do the same. As  
we are liberated from our own fear, our presence  
automatically liberates others."*

*-Nelson Mandela*

# Roundup of Faculty Activities

✿ After a two-year national search, Sheldon Axler was selected as the new Dean of the College of Science and Engineering at SFSU. During five hot days in July, Sheldon bicycled solo from San Francisco over the Sierra to the middle of the Nevada desert. In October, he delivered the keynote address “A Stroll Through Bergman Spaces” at the Conference on Trends in Banach Spaces and Operator Theory held in Memphis, Tennessee.

✿ Arek Goetz presented research talks on dynamical systems in GranzGraz, - Austria and at the University of Marseille II[is II correct?] in France, where he was a Visiting Scholar during the summer. He also published “Stability of cells in non-hyperbolic piecewise affine maps and in piecewise rotations” in *Nonlinearity*, 14 no.2 (2001) pp. 205-219.

✿ Serkan Hosten organized two conferences that took place last April 2001: the Session on Computational Algebraic Geometry and its Applications, Eastern Section of the American Mathematical Society, and the Bay Area Discrete Math (BAD Math) Day. His paper “Monomial ideals” (co-authored with G. Smith) was published in *Computations in Algebraic Geometry with Macaulay 2, Springer Algorithms and Computations in Mathematics* 8 (2001) pp 73-100.

✿ Eric Hsu presented two lectures: “Developing A Virtual Community Of Teachers: The Effects Of Contact And On-Line Conversational Dynamics,” NARST (National Association of Research in Science Teaching) 2001 Annual Meeting, St. Louis, MO. Talk-in, March 2001, and “Mixed Metaphors: Undergraduate Language and Understanding in Calculus,” 2001 Joint Mathematics Meetings, New Orleans, LA. Talk,-in January 2001.

✿ Jean-Pierre Langlois presented “Dispute Settlement Design in International Agreements: A Game Theoretic Perspective” (with Catherine Langlois) at the APSA meeting, August 2001, and published “Engineering Cooperation: A Game Theoretic Analysis of

Phased International Agreements” (with Catherine Langlois), *American Journal of Political Science*, 45 no.3 (2001), pp. 599-219.

✿ Shidong Li published “A theory of generalized multiresolution structure and pseudoframes of Translates-translates”, *The Journal of Fourier Analysis and Applications*, 7 no. 1, pp23-40, 2001 and “Pseudo-duals of frames with applications”, *Applied and Computational Harmonic Analysis*, 11, pp289-304, 2001. (The second paper with H. Ogawa.)

✿ Sergei Ovchinnikov published three papers: “Topological automorphism groups of chains”, *MATHWARE* 8(1) (2001), pp 47-60; “On ordered structures of scale type  $(N,N)$ ”, *J. of Math. Psychology*, 45 (2001), pp 913-916; “Boolean representation of manifolds and functions”, *J. of Math. Analysis and Appl.* 263 (2001), pp 294-301.

✿ Neville Robbins spent 5 weeks as a Visiting Researcher at the University of the Witwatersrand in Johannesburg, South Africa while on sabbatical during 2001-2002. He also published the following papers: “Some arithmetic properties of Eulerian numbers”(with A. Knopfmacher), *J. Combinatorial Math. & Combinatorial Computing*, 26 (2001), pp161-165; “On the order of a finite field”, *Math. Gazette* 85 (2001), p. 285; “Some identities related to Ramanujan’s tau function”, *Ars Combinatoria* 60 (2001), pp 219-224; “On the number of partitions with a fixed least part”, *Rocky Mountain J. Math.* 31 (2001), pp 1097-1102.

✿ Alex Schuster published “Multiple interpolation and extremal functions in Bergman spaces”, (with M. Krosky), *J. Anal. Math.*, 85 (2001) 141-156.

✿ Last Spring, Sheldon Axler, Arek Goetz, Shidong Li, and Alex Schuster were each awarded 3 year research grants from the National Science Foundation (NSF). Sheldon Axler was also successful in obtaining two years of NSF funding for student scholarships in the College of Science and Engineering.

## *Retirements*

Professor Rad Aiyar retired at the end of the fall semester. Dr. Aiyar began teaching at SFSU in 1967. He received an M.S. in statistics from Bombay University in 1962 and a Ph.D. in statistics from U.C. Berkeley in 1969. He will return in the Fall to teach under the FERP program. In the meantime, he is enjoying the extra time he has to read, travel, hike, and visit his daughter, who is currently a law clerk for Justice Stephen Breyer of the U.S. Supreme Court.

## *Good News*

Professor Emeritus Vincent Bruno (retired 1996) has made a remarkable recovery following a liver transplant nearly a year and a half ago. With unflagging support from family, friends, and colleagues, he has resumed his vigorous lifestyle.

Janet (Ellzey) Sagaser (B.A. Math 1971, M.S. U. of Utah) is a “full-time wife and mother” and part-time math instructor at Fresno City College.

David Stricker (B.A., B.S., M.S. in Math and Physics “in the 80’s”) is applying his several degrees at Hansen Experimental Physics Laboratory, Stanford University.

Ben Choate (B.A. Math) has moved from software development and is now pursuing a teaching career in math and computer science.

Sean Lloyd (MA circa 1990) is entering the Ph.D. program in Mathematics at the University of Arkansas. 26, 2001.

Ken Logan (B.A. Math 1987) is a math teacher at Dana Hills High School in Mission Viejo, and is currently working on a M.A. in Math at Cal State Fullerton, which he hopes to complete next year. He, his wife Traci, and their son Mike have a new addition to their family: Melissa Ann, born April 26, 2001.

Roland Ramirez (‘01 BS in Statistics) works as a risk analyst/SAS programmer for Wells Fargo in San Diego.

Bernie Walp (B.A. ‘99) is currently working as an assistant to U.C. Berkeley astronomer Geoff Marcy. He spends about 100 nights a year at the Lick Observatory on Mount Hamilton.

## Other News

### *Seth Sullivant Returns to Berkeley*

When Seth Sullivant graduated in Math from Berkeley, he wasn't ready to commit to a Ph.D. program. But the Bay Area is a hard place to leave, so he entered the MA program in Mathematics at SFSU. He quickly became a central member of the graduate student community, organizing the Graduate Student Lecture Series in his first year (read more about this in Student Activities). He also applied successfully for an NSF Graduate Research Fellowship, becoming one of only 31 recipients in mathematics nationwide that year. Meanwhile, Seth was drawn to the area of computational algebraic geometry while taking courses in Algorithmic Number Theory and graduate algebra from Serkan Hosten. Professor Hosten spotted right away that Seth possessed "the kind of [maturity] that guides a mathematician to sort out the important from the unimportant, to distinguish detail from fundamental ideas" and happily agreed to supervise his thesis work.

During the summer of 2001, Seth toiled up for his thesis work by going through the books "Gröbner Bases and Convex Polytopes" by Bernd Sturmfels and "Lectures on Polytopes" by Günter Ziegler. By the end

of summer, he and Hosten were working on applications of algebraic geometry and combinatorics of hierarchical models (see Professor Hosten's article for a description of the area). Since then, he has co-authored two papers which have been submitted for publication: "Polyhedral Geometry and Gröbner Bases of Cyclic and Reducible Models" (with Professor Hosten) and "A Divide-and-conquer Algorithm for Generating Markov Bases of Multi-way Tables" (with Adrian Dobra of U.C. Davis). The title of his M.A. thesis is "Algebraic Geometry and Combinatorics of Hierarchical Models". Seth's promise as a mathematician has been rewarded by fellowship offers from U.C. Berkeley, Davis, and San Diego as well as Stanford and the University of Washington. He has decided to go to Berkeley in the fall to work under Professor Sturmfels, who happens to be Dr. Hosten's former thesis advisor. Though his mathematical career is really taking off, Seth's feet remain solidly on the ground. He can frequently be found hanging out in TH 935 with fellow students. And he still finds time (not enough, he protests) to pursue his outside interests, which include music, movies, and crafts.



## Special Topics Courses

Each semester, the Mathematics Department offers special topics courses (numbered 490 or 890 for undergraduate/graduate courses) based on faculty research interests. Below is a list of some past and future titles. Check our homepage (<http://math.sfsu.edu/>) for the most recent developments.

Fall 2001: Math 490 (SAS programming) and 890 (Integral Geometry)

Spring 2001: Math 890 (Computational Commutative Geometry)

Fall 2002: Math 490 (SAS programming) and Math 490 (Game Theory)

Spring 2003 (tentative): Math 490 (Wavelets) and possibly something in stochastic processes.

Department of Mathematics  
College of Science & Engineering  
San Francisco State University  
1600 Holloway Avenue  
San Francisco, CA 94132-4163