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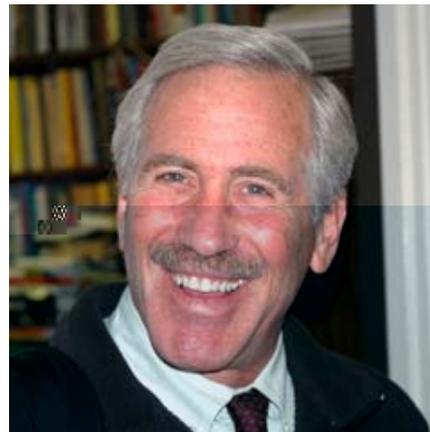
Department of Mathematics & Computer Science Newsletter · Santa Clara University · 2008

Remarks from the Department Chair

It's hard for me to believe but I'm in my sixth year as chair. My job has been made easier thanks to the work of my predecessor, Jerry, who cultivated a culture of respect and congeniality in the Department. When I took over in 2002 my goal was to try as best I could to follow Jerry's lead. I also owe much to the individual members of the Department for their support.

The most challenging part of my job is dealing with administrative details. We are faced with larger assessment burdens, similar to those in secondary schools. The assessment burden came to a head two years ago when it was our turn to do a "program review" for the Department. This process is mandated by the Western Association of Schools and Colleges (WASC) for accreditation of Santa Clara. We did a self study and then brought in two outside reviewers to see if our self-assessment was accurate and to determine what needed improvement. The two reviewers, Dr. Ran Libeskind-Hadas (Joseph B. Platt Professor of Computer Science, Harvey Mudd College) and Dr. Edward Packel (Volwiler Professor of Mathematics, Lake Forest College), were diligent and seemed to understand our program. After their visit they reported, "We were most appreciative of the chance to visit this distinctive and historically successful department. During our two full days of interviewing (June 1 and June 2) we had uniformly meaningful and enjoyable interactions with the faculty, students, and administrators. In the process we think we have gotten a clear sense of the impressive collegiality that so many of you have mentioned as a great strength of the Mathematics and Computer Science Department." They then went on to make some suggestions for improvement that we are in the process of implementing. If you look carefully you will see, in this Newsletter, reports on some of the changes that were suggested. And, if you sign on to the Department web site you will note even more changes.

On a personal note, I continue to enjoy outdoor recreation and travel. Last summer my wife, Linda, and I traveled to the Canadian Rockies for a week of hiking and climbing. This proved to be more rigorous and challenging than expected because of the remoteness of our cabin and the difficulty in hiking out without established trails. I am still recovering from the experience — Linda's recovery was complete some time ago!



Robert Bekes

Robert Bekes

Sharon Kugler '81 Named Chaplain at Yale



Sharon Kugler, a mathematics major of the class of '81, was recently named chaplain at Yale University, following in the footsteps of such Yale chaplains as the esti-

mable William Sloane Coffin. She has the distinction of being the first woman to be appointed chaplain at Yale, the first Catholic, and the first chaplain who is not an ordained member of the clergy. While at Santa Clara she showed a strong interest in religious studies and after leaving here she earned a master's degree at Georgetown, followed by some years at the renowned Cleveland Clinic in Ohio. She was recruited to Yale from the chaplaincy at Johns Hopkins University in Baltimore, already quite a prestigious appointment.

She has served as president of both the National Association of College and University Chaplains

and the Association of College and University Religious Affairs. She is married to Duane Isabella and they have two daughters.

David Nash Wins Award

David Nash '04 was awarded the 2005 Richard V. Andree Award for his paper, Cayley Graphs of Groups Generated by Reversals, *TIME Journal* 12:3 (2005), 143-147. The research was done under the supervision of Rick Scott when David was a Santa Clara senior. David is currently finishing work on his Ph.D. in Lie theory at the University of Oregon in Eugene.

Tom Kearns '62 Honored

Tom Kearns, after graduating with a bachelor's degree in mathematics from Santa Clara, got his Ph.D. from the University of Illinois at Urbana-Champaign. After a stint at the University of Delaware, he moved to Northern Kentucky University from which he retired this past year after 32 years of service. Long interested in athletics, he was for many years his university's representative to the NCAA.

Recognizing Tom's service, the University, after a significant contribution by an alumnus, dedicated the Thomas J. Kearns Student-Athlete Academic Center. Accompanying statements from the University pointed out Tom's distinction as "a teacher, an administrator, an author, and an active participant in service for the University," and his contributions to "students, the university, the community, the Commonwealth of Kentucky, the Great Lakes Valley Conference and the National Collegiate Athletics Association."

Tom and his wife Carol plan to enjoy retirement by spending part of each year in Florida to avoid the northern winters. Their son Dan graduated from Santa Clara with a degree in history.



Gerald Alexanderson, Thomas Kearns, Leonard Klosinski
All three came to the University of Santa Clara in 1958, the first as an instructor and the other two as freshmen.

Brian Thorsett '00--Operatic Tenor

A double major in mathematics and music, Brian Thorsett of the class of 2000 was featured prominently in an article on the San Francisco Opera's Merola Program in the July issue of *Opera News*, published by the Metropolitan Opera Guild. A year after graduation, while he was working for a computer supply company, he was urged to participate in the Schwabacher Competition at the San Francisco Opera and he won. From there he went on to join the Merola Program, which he calls the boot camp of opera singers. He has been singing regularly since with Bay Area orchestras and opera companies, and this past summer at Glimmerglass in New York. Most recently he was singing the Evangelist in Heinrich Schütz's Christmas Story, with the Philharmonia Baroque Orchestra. He tells us that his taste now runs to music by Bach and earlier composers, though we note from recent performances that he has been singing some Mozart and even Puccini as well.



Don Albers Joins SCU as a Visiting Scholar

Donald J. Albers, for fifteen years Associate Executive Director of the Mathematical



Association of America in Washington, DC, has returned to California in a new role, as the person in charge of the publication of books by the MAA. Prior to this move he was in charge of book publication as well as MAA journal publication and on-line services. With Don's move these other duties were assumed by the well-known mathematical writer, Ivars Peterson, allowing Don and his wife, Geri, to move back to Menlo Park. He is currently operating out of an office in O'Connor Hall. The move allows Don and Geri to get back to California weather, the Sierras (for hiking), and their daughter, Lisa, who lives in San Francisco.

New Prize in Department

Robert P. Balles, a resident of Carmel, California, has endowed a new prize in the Department, the Robert P. Balles SCU Mathematics Scholar's Award, to be given to "a distinguished Mathematics major entering his/her senior year at SCU, as evidenced by a high cumulative GPA in Mathematics courses completed in his/her first three years at SCU." This significant award will increase in value each year and will reach a maximum level through a permanent endowment that will be established upon Mr. Balles's death.

Mr. Balles earned degrees from Fordham, Harvard, and California State University at Los Angeles. He is a retired California Community College Mathematics Professor, retired businessman and private investor. He established similar prizes at California State Polytechnic University at San Luis Obispo, Harvard University, Fordham University; and the University of Notre Dame, and has also generously contributed to the Mathematical Association of America.

The first three winners of the Balles Award at Santa Clara are José Acain (2005-2006), Felipe M. Miranda (2006-2007), and Rebecca Glover (2007-2008).



José Acain



Felipe M. Miranda



Rebecca Glover

Bay Area Mathematical Adventures (BAMA)

This "outreach" program has continued under the leadership of Peter Ross of our Department and Tatiana Shubin of San Jose State University, with venues for the talks alternating between our two campuses. Though aimed primarily at high school students and teachers, members of the general public also attend, in addition to college students and even some faculty. A sample of speakers from just the past year includes such "stars" as Carl Pomerance (Dartmouth College; "Prime Time for Primes"); Ron Graham (UC San Diego; "Mathematics and Computers: Problems and Prospects"); Brian Conrey (American Institute of Mathematics; "The Riemann Hypothesis"); Jean Pedersen (Santa Clara; "My Favorite Mathematical Toys"); Martin Isaacs (University of Wisconsin, Madison; "Soccer Balls, Pentagons, and Euler"); Robin Hartshorne (UC Berkeley; "History of Imaginary Numbers"); and Vladimir I. Arnold (Steklov Institute, Moscow; "Real Algebraic Geometry").

Arnold spoke to an SRO crowd in Daly Science 207. At almost every talk there is a cluster of very young middle school students sitting up front in the first two or three rows and extraordinarily eager to participate. Arnold is one of the most eminent mathematicians of the 20th century. (He started his career with a Ph.D. dissertation that solved the thirteenth of David Hilbert's famous list of 23 problems described at the 1900 International Congress of Mathematicians in Paris, intended to set the agenda for mathematics in the 20th century.) Arnold opened his

BAMA lecture with a problem to which he later suggested a solution. A boy up front said he had a counterexample and proceeded to try to explain it to Arnold, but initially without success. Perhaps there was something of a language problem. Or perhaps Arnold had intentionally set up the scene to stimulate discussion. Anyway, the student, losing patience, finally rushed up to the board to draw a picture to explain why the "solution" was incomplete. To the relief of all, this encounter delighted the eminent Russian professor and after his appearance here, he was quoted as having told friends at Stanford about his positive experience in speaking to these students at Santa Clara. (Incidentally, that student, Evan O'Derney, was to



Vladimir I. Arnold

achieve fame a month later by winning the national spelling bee. When interviewed and asked what he enjoyed most, he said he liked spelling bees but liked mathematics and music even more!

In 2004 the MAA published a book of 19 articles based on BAMA talks from the first few years of the program (*Mathematical Adventures for Students and Amateurs*, David F. Hayes and Tatiana Shubin, editors). A second volume, includ-

ing some essays by speakers listed above, should be appearing soon.

American Institute of Mathematics (AIM)

As reported in earlier newsletters, the American Institute of Mathematics was founded by an alumnus of the Department, John C. Fry, of the class of 1978. John is the founder of Fry's Electronics which has giant electronics stores in many parts of the country, extending from Portland, Oregon, through California, the Southwest and Texas, to Atlanta and the Midwest (Chicago and Indianapolis). Set up in 1993, the Institute has been operating out of temporary facilities in Palo Alto and has been attracting significant grants from the National Science Foundation to conduct special focussed workshops in various branches of mathematics. The Executive Director, also an alumnus of the Department, is Brian Conrey '76. Kevin McCurley of the same class has served on the Scientific Advisory Board and Jerry Alexanderson chairs the Board of Trustees. Several members of the Santa Clara Department (Rick Scott, Dan Ostrov, Ed Schaefer) have organized or participated in workshops sponsored by AIM.

The Institute also sponsors five-year fellowships for extraordinarily promising new Ph.D.s in mathematics and supports various outreach programs in the schools.

The big news at AIM this past year was a groundbreaking ceremony in Morgan Hill, California, for the permanent building for AIM. Most of the faculty in the Santa Clara Department attended this exciting and lavish event on

May 31, 2007. The principal speaker was Congressman Jerry McNerney, who represents the Congressional District that includes Morgan Hill. And he is, incidentally, the only member of Congress who holds a Ph.D. in mathematics. Pictures of the groundbreaking can be seen at <http://aimath.org/images/groundbreaking/> and artists' renderings showing what the structure will look like when completed can be seen at http://aimath.org/images/foothill_2.jpg. From the AIM web site one can also watch a video showing various aspects of the new building, the design of which is based on the Alhambra in Granada, Spain. Of course, this structure was chosen, in part at least, because of the extraordinary array of symmetries in the Moorish tiles and such that decorate the Alhambra.

At the AIM web site one can also read about some of the extraordinary achievements made by participants in AIM workshops in recent months, one of the most spectacular concerning the exceptional Lie group E_8 , a simply enormous mathematical object. A very attractive "picture" of E_8 can be seen on the AIM web site. A curious sidelight to the announcement of this result, which was held formally at MIT, was the result of the press release on it being embargoed until the formal announcement could be made. Googling it, one found that the first appearance of the news was on the MIT web site. Rather surprisingly, perhaps, was the second appearance: the Iranian News Service.

Keith J. Devlin of Stanford University, chair of AIM's Advisory Board and often the presider at

AIM public lectures, was awarded the Carl Sagan Prize this fall for his work in popularizing science. Keith is frequently heard on NPR explaining new mathematical results as "the Math Guy."

MAA Mathfest in San Jose

The annual summer meetings (the Mathfest) of the Mathematical Association of America (MAA) was held in San Jose, August 3-5, 2007, at the Fairmont Hotel. Our Department played only a peripheral role, though Peter Ross served on the Program Committee to arrange for the principal speakers. The number of participants registered set a new record, roughly 1500; it was widely thought to be one of the most successful Mathfests, others being in recent years those held in Providence, RI, Madison, WI, Knoxville, TN, and Albuquerque, NM. For Santa Clara the high point of this Mathfest was the Silver and Gold Banquet held at the Adobe Lodge on the last day of the meetings to honor those who have been members of the MAA for 25 or more years. With perfect weather and the magic of the Mission Gardens, it was a memorable way to close the meetings. Jerry Alexanderson was master of ceremonies at the dinner and, following dessert, Frank Farris spoke to the group in the Recital Hall, a presentation that was visually dazzling, erudite, witty and, at times, even touching. Participants left with good memories of Santa Clara.



Career Night Dinners

Each winter term the Math Society sponsors a career night dinner in the Adobe Lodge so students can hear directly from alumni about possible careers for majors in mathematics or computer science. (It's also good for faculty to hear these presentations on what our alumni are likely to end up doing out there in the real world.) Recent speakers have included Susan Lindner '76, a technical writer; Shari Abdalian Plummer



Susan Lindner

'83, software engineer, Applied Signal Technology; Trudy McCulloch '67, high school principal in Los Gatos; Chris Sarcone '99, software engineer, Apple; Mike Thibodeaux '71, mathematics teacher, Menlo School; Eric Madia '95, actuary, AAA; Joseph Pulford '00, financial analyst, Cisco Systems; William Forrest '92, statistician, Genentech; Holly Anderson '95, intellectual property rights attorney; Kevin McCurley '76, senior scientist for Google; Laura Hofmeister '73, physician; among others. The food is really good too.



Kevin McCurley

Enrollments

A smaller than usual freshman class at Santa Clara several years ago resulted in fewer majors in both Mathematics and Computer Science recently. The small number of CS majors has been exacerbated by the (incorrect) impression that "all CS jobs are being outsourced." Of course, we know that the opposite is true as evidenced by data provided by the Association for Computing Machinery and other national organizations (e.g., usacm.acm.org/usacm/weblog/index.php?p=542 or computingcareers.acm.org/?page_id=5). It appears there are plenty of jobs in mathematics and computer science but not enough students studying these disciplines to fill the openings. Our challenge is to spread the word among parents of prospective students!

Curriculum Development

The department continues to review its course offerings and requirements as part of an ongoing evaluation. Recently the department decided to require Discrete Mathematics of both Mathematics and Computer Science majors, since that material is gaining more and more prominence for both majors.

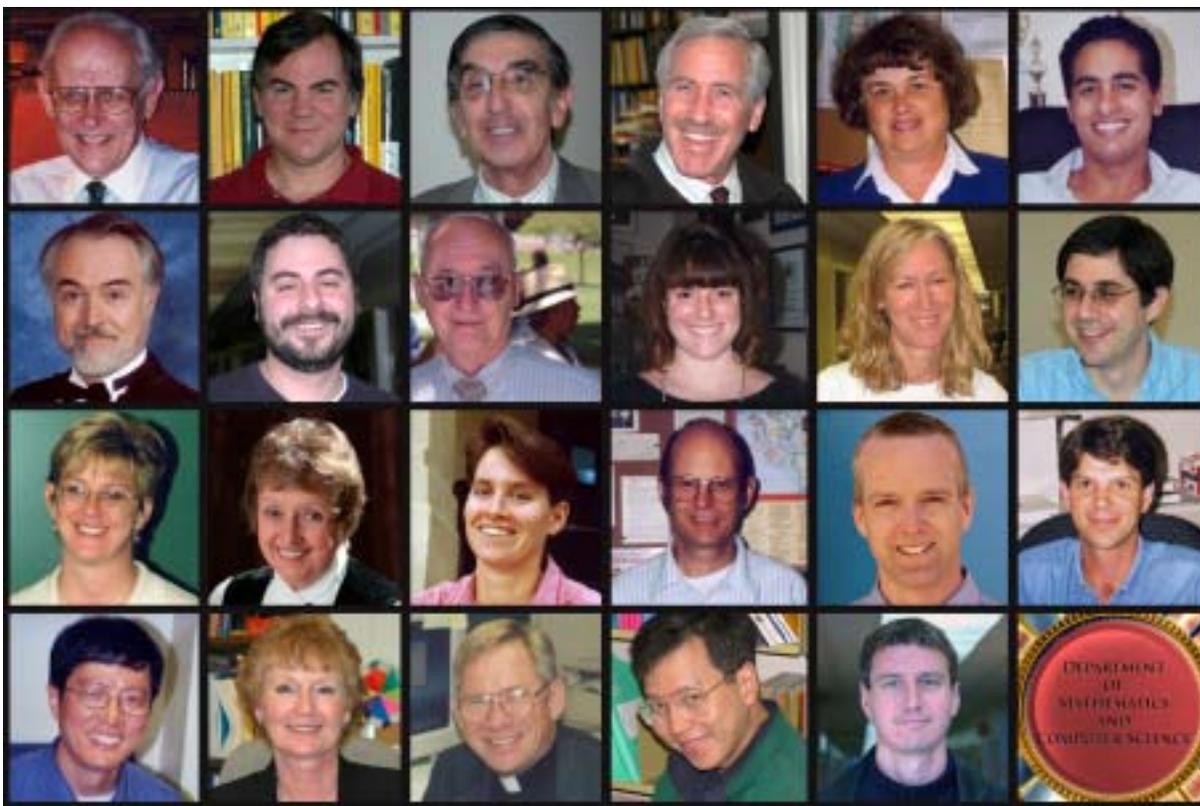
New Computer Science Emphasis

In an attempt to attract more students to study Computer Science, the Department received approval for a new "emphasis" in "Cryptography and Security" for Computer Science majors. This emphasis builds on a popular existing departmental course in cryptography and requires students to take additional

courses in digital steganography (new CS course), applied cryptography (new CS course), computer forensics, computer security, or networks. Since "Silicon Valley" is home to various software companies that focus on virus detection and email spam elimination, we hope that this new emphasis will attract more CS majors!

Other News of Computer Science

The departmental computer lab next to the Sussman Room was upgraded last August with new Dell machines. Our departmental "mobile lab" (of about 25 laptops) is being used in several classes as well. Last summer, most of the campus went "live" with a new, password-protected WiFi system, enhancing the ability of students to connect to the Internet from almost anywhere on campus.



Row 1: Alexanderson, Appleby, Barria, Bekes, Caradonna, Diaz. Row 2: Farris, Horwitz, Klosinski, Long, McGinley, Ostrov. Row 3: Papay, Pedersen, Poe, Ross, Schaefer, Scott. Row 4: Shao, Shunk, Smolarski, Tran, Walden

News of the Faculty and Staff

BOB BEKES: (See the chair's comments on page 1.)

JERRY ALEXANDERSON: Most of Jerry's time beyond that spent in the classroom and in office hours goes to editing, mainly the Spectrum Series of books published by the Mathematical Association of America. Since he took over as editor in 2000, 32 new volumes have been added to the series. The most recent and challenging to produce was a five-volume set of books on Leonhard Euler, celebrating the tercentenary of Euler's birth in Basel, Switzerland in 1707. Another half dozen volumes in the series are in production and due to appear shortly.

Beyond editing, much time is spent on projects for the MAA and in programming for the Carriage House Conference Center in Washington, DC, a facility largely supported by a gift from Paul Halmos (who died in 2006—see obituary in this newsletter) and his wife Virginia. Another conference center Jerry is involved with is the new facility for AIM going up in Morgan Hill, California. (See the separate article on AIM.)

In San Diego, at the 2008 joint AMS-MAA winter meetings, Jerry was awarded membership in the select Icosahedron Society of the MAA, in recognition of service to the Association.

GLENN APPLEBY: Glenn returned to the Department in the Fall of 2005, after a two-year leave during which he taught at Beloit College, in Beloit, Wisconsin. While in the Midwest, however, he did find time to collaborate with Dennis Smolarski (who was in residence nearby at the University of Illinois,

Urbana-Champaign), resulting in a publication in numerical linear algebra. Upon Appleby's return he continued his work in algebraic combinatorics with Professor Tamsen McGinley. This past fall they submitted their paper (relating linear algebra and power series to problems in combinatorics) to the *Journal of Algebraic Combinatorics*.

Over the summer Glenn took part in a program to help strengthen the mathematical understanding of local K-8 teachers in a program called the "Intel Mathematics Initiative," sponsored by Intel and the Silicon Valley Leadership Group. He also recently married and now tries to maintain a 100-year old house in San Jose.

MARY ASUNCION: Mary and her husband Stan have developed a taste for cruises lately, the most recent being a cruise of the Mediterranean, but earlier of the Caribbean and of the coast off Mexico. Between cruises she continues doing a superb job of keeping the various activities of the department moving along smoothly.

JOSÉ BARRÍA: José is putting the finishing touches on a paper on matrices and topology. He is working on approximation of matrices using a topology that is weaker than the norm topology.

José and his wife Erika continued to travel, tempted by their growing interest in art exhibitions. Last year they went to two exhibitions of Rembrandt's paintings, one in Portland, Oregon (a loan from the Rijksmuseum in Amsterdam), and the other in New York. An added treat in their New York visit was the special Klimt exhibit at the Neue Galerie.

Their daughter Lilian and her husband Steve are spending a year in Qatar, from which they have ven-

tured farther away into Laos, Nepal, and Vietnam. They are eager to come back so they can continue their annual journeys to the Napa Valley.

MONIKA CARADONNA: Monika and her husband, Frank, report that they acquired a daughter-in-law in February. They also welcomed a new granddaughter in June; she arrived just in time to attend her Dad's MBA graduation at Santa Clara.

AARON DIAZ: Aaron spent much of the summer at the Centre d'Été Mathématique de Recherche Avancée en Calcul Scientifique in Luminy, France and produced two papers based on work there: "A cell-centered Arbitrary Lagrangian Eulerian (ALE) method for multimaterial compressible flows" (with F.-H. Maire, *et al.*), *ESIAM, Société de Mathématiques Appliquées et Industrielles* 13 (2007), and "Re-zoning techniques for ALE computations" (submitted to the *International Journal for Numerical Methods in Fluids*).

FRANK FARRIS: Frank returned to a more normal schedule after he finished his five-year term as Editor of *Mathematics Magazine*, though in his last two years in that role he was tapped to serve as the representative of publications on the Executive Committee of the Mathematical Association of America (MAA). During his full term as editor he also served on the national MAA Board of Governors. The visibility naturally led to his being asked to serve on various MAA committees, including chairing a Strategic Planning Working Group on the American Mathematics Competitions, the national secondary school contests at all levels that lead up to the determination of the U.S. representatives to compete in the International Mathematical

Olympiad. He also chaired the Program Committee for the annual winter meetings in New Orleans in 2007.

Much in demand as a speaker, Frank as an editor spoke at MAA Section meetings from New England to Southern California and many points in between. The title of his Trevor Evans Award winning article, "The Edge of the Universe," was used as the title of a recent MAA book, a collection of articles from *Math Horizons*, edited by Deanna Haunsperger and Stephen Kennedy. Frank's article was reprinted in the collection. And Frank continues to sing, most recently in "The Quaker Girl," an early 20th century operetta once admired by Noel Coward but now largely forgotten. It proved to be rewarding and worthy of revival, albeit somewhat quaint from a modern perspective.

LEONARD KLOSINSKI: At the Prize Session of the joint AMS-MAA meetings in San Diego in January, 2008 Leonard received the MAA's Certificate of Meritorious Service, an honor given each year to six members of the Association for special service to the national organization or to one of its sections. The award has been given since 1984.

Leonard continues to direct the William Lowell Putnam Mathematical Competition, now having served in the role of Director longer than any previous person in that position. The Competition thrives, the number of participants having set a new record in 2007, more than 100 additional participants over the previous year—roughly 3760 for 2007.

He continues to travel extensively, in the past several years to the Arctic regions, Svalbard (Spitsbergen), to complement his earlier trip to Antarctica and more recently to India and Botswana and this past

summer to the Balkans via river boat, followed by hot-air ballooning in the Swiss Alps. This brings the number of countries he has visited up to 76!

He's producing DVDs for various mathematical groups and has done one as an addition to the Departmental brochure. It's quite dramatic!

MARY LONG: During the San Jose Mathfest in San Jose in August, 2007, Mary did yeoman's duty at the MAA's book exhibit. She reports that it was "great fun." She ably assisted the MAA's Washington-based staff members and was assisted in setting up the display by Leonard Klosinski and Steve Chiappari. Santa Clara student Rebecca Glover also spent hours at the MAA's booth selling books. The sales at this Mathfest set new records.

TAMSEN (WHITEHEAD) MCGINLEY: Tamsen is collaborating with Glenn Appleby in research on matrix realizations of Littlewood-Richardson coefficients; a resulting paper has been submitted for publication. Much of Tamsen's time is devoted to being a PTA president, a girl scout leader for Nora (age 10), and a volley ball coach for Neal (age 8).



Mary Asuncion

Tamsen this past year oversaw the organization of the annual Career Night, held each winter term to introduce current students to alumni who are pursuing careers in a variety of fields. She succeeds Mary Long and Dan Ostrov in this role. (See separate report in this newsletter.)

DAN OSTROV: Dan's research has most recently been in mathematical finance. He and Professor Sanjiv Das in the Business School will be offering a team-taught course on this subject in spring term 2008. He gave papers on "Optimal investment strategies for simple and multi-stock portfolios" at an AIM workshop in 2005 and on "Using options to lower transaction costs" at a San Francisco meeting of the SIAM Conference on Control and Its Applications in June, 2007, where he also chaired the session.

On campus he chairs the University Coordinating Committee. Dan and his wife Barbara have just announced that their 2-year old son David will have a new sister or brother in July

LAURI PAPAY: Lauri says she has really enjoyed teaching this past year and finds her work fulfilling. She has been busy with her three children. Her oldest, Sean, is now a sophomore in high school and is currently taking Honors Precalculus and enjoying Marching Band. Her middle child, Maggie, is now 2 and 1/2 and her youngest, Samantha, is almost 2 and 1/2. They have different fathers and mothers and, unfortunately, they are both doing rather poorly in obedience school. That is to be expected since they are Boston terriers, however, they bring her hours and hours of joy when they are not causing trouble.

JEAN PEDERSEN: Jean continues her schedule of talks given both lo-

cally and internationally; in 2005 she gave lectures in Austria and in 2006 she was an invited speaker at the Seventh Gathering for Gardner (G4G7) conference honoring Martin Gardner. She is still involved with a vast McGraw-Hill SRA series of K-6 textbooks and serves on the Editorial Board of the Hungarian journal, *Teaching Mathematics and Computer Science*. Jean also handles the Department's Visiting Lecture Series for high school students and continues to direct Santa Clara's Individual Studies Program.

In 2006 Jean and Peter Hilton translated *99 Points of Intersection: Examples—Pictures—Proofs*, by Hans Walser, a visitor to the Department from Switzerland twice in the last seven years. The translation was published by the Mathematical Association of America.

LAURIE POE: Laurie is currently a very effective member of the Student Affairs Committee and was singled out for praise at a recent Inclusive Excellence luncheon. Personally she reports that she is happy, having acquired the complete "I Love Lucy" series on DVD.

PETER ROSS: At the summer meetings in Knoxville, Tennessee in 2006 the Mathematical Association of America awarded Peter (along with Jerry Alexanderson, and San Jose State faculty Tatiana Shubin and David Hayes) a Certificate of Recognition "for extraordinary service to the mathematical community in organizing the mathematical lectures [BAMA] and editing the related expository articles comprising [the book] *Mathematical Adventures for Students and Amateurs*."

Within the department Peter, who has started "phased retirement," continues to administer the Calculus Readiness Exam, to write frequent Media Highlights articles

for the *College Mathematics Journal*, and to codirect the Bay Area Mathematical Adventures (BAMA) program. (See the separate item in this Newsletter.) Peter sings bass with various Bay Area choruses and retains connections to the local group of alumni Peace Corps Volunteers. Last summer he attended a Peace Corps reunion in Bend, Oregon.

Peter served on the important Program Committee that arranged for a first class lineup of speakers for the MAA's Mathfest in San Jose in August, 2007—the first time either of the major mathematical organizations has met in San Jose. (See separate note.)

ED SCHAEFER: Having spent 2005-2006 at Mzuzu University in Malawi on a Fulbright grant, Ed returned to Malawi this past summer after a year back at Santa Clara, to continue advising his master's students' theses at Mzuzu. The first quarter of his first visit he took along two undergraduate majors, Kevin Dyer and José Acain, the first now a graduate student in London, the second a graduate student at SCU in mechanical engineering, pursuing work in robotics. This past summer another undergraduate, Dennis Fong, joined him and gave mathematics tutorials to secondary school students.

Ed claims that he is now one of two dozen non-Africans who can speak the Chitumbuka language (learned from doing work in Malawi with villagers who have AIDS). We have to take his word for this since few in the Department would feel entirely qualified to check out his fluency in the language.

Ed was promoted to full professor in 2005. He is also the director of the peer educator program and is Faculty Senate President-Elect.

RICHARD A. SCOTT: Rick spent the fall quarter of 2007 at the Mathematical Sciences Research Institute at Berkeley, working on geometric group theory. Last spring he co-organized an AIM (American Institute of Mathematics) workshop on open problems in the field. He has since found himself sucked into a much bigger project of setting up a "wiki" (a public editable website) to keep the mathematical community informed of these open problems and their status. In 2005 he received the well-deserved Santa Clara Valley Mathematics Association Teaching Award. He has also secured some of the most coveted committee assignments on campus!

Rick's wife Norine decided in August to leave her director position at a local high-tech public relations agency in order to spend more time with their children, Audrey (age 5) and Emily (age 3), and pursue other interests (like gardening). Audrey's take on Kindergarten after her first full day without an afternoon nap: "School is tiring."



A Moebius strip in cocobolo

BIN SHAO: Bin remains in charge of the Department's computer labs. In August, 2005 he participated in the Third Pacific Rim Conference on Mathematics held in Shanghai.

NEDRA SHUNK: Nedra is currently Dean of the Academic Support Services which oversees the Drahnann Center, where she supervises a large staff. It's the office on campus that is responsible for all of the academic advising in the University.

DENNIS SMOLARSKI, S.J.: As always Dennis is extremely busy on campus, both as teacher and priest. He was promoted to full professor in 2006 and continues off campus as a researcher with Professor Douglas Swesty at the State University of New York, Stony Brook. They are developing code related to simulating supernovae, with Dennis working on appropriate preconditioners.

In January 2007, Dennis was appointed by the Bishop of San Jose to serve on the diocesan liturgical commission for a two year term. He also continues to write liturgical "Question and Answer" columns and give seminars in Menlo Park on liturgy at the Vatican II sabbatical program for priests.

NICHOLAS TRAN: Nicholas received third-year funding (\$42,104) from the National Science Foundation for his project "A Complexity-theoretic Foundation for Digital Image Watermarking Systems." He presented a paper titled "Design and Analysis of a Watermarking System for Care Labels" at the Pacific Rim Conference on Multimedia held in Hong Kong, December 11-14, 2007. This was coauthored with Benjamin Ragan-Kelley, who graduated in computer science and physics in June, 2007. At the Conference Nicholas chaired the session on Video Communication and Systems.

BYRON WALDEN: Byron spent part of his sabbatical at the University of South Australia in Adelaide, visiting his coauthor Lesley Ward, and in Sydney visiting his former colleagues at the University of New South Wales. See Byron's latest crossword puzzle on page 19.

Crossword Mania Persists

Byron Walden continued constructing crossword puzzles for the *New York Times*, *New York Sun*, and *The Onion*. He can be seen ever-so-briefly in the documentary *Word Play*, now available on DVD after its debut at Sundance and a successful theatrical run. (The puzzle he constructed for the finals of the contest in the film gets much more screentime than he does.) He has also given two courses on crosswords for the Osher Lifelong Learning program at Santa Clara and his first book of crosswords, *Sit and Solve: Commuter Hard Crosswords*, came out in August 2006.

He was accompanied to Sundance 2006 by Mary Long and Jeremy Horwitz of the Department. Mary has also twice attended the American Crossword Puzzle Tournament in Stamford, Connecticut and appears in the Sundance extras on the *Wordplay* DVD for, she says, about two seconds, sitting next to Jeremy. In Stamford she placed 293rd among 700 contestants—but Phil Donohue came in 642nd! Jeremy has not made it to Stamford yet but plans to go this year. He has been busy making up puzzles, though: for the *New York Times*, *New York Sun*, *Games Magazine*, and the *Los Angeles Times*.

Recent Faculty Publications.

The following are lists of faculty publications, sometimes abridged, that give some idea of the level of scholarly activity in the Department.

Alexanderson, Gerald L. Euler and Königsberg's bridges: A historical view. *Bull. Amer. Math. Soc.* 43(4) (2006), 567-573.

____ Euler's *Introductio in analysin infinitorum*. *Bull. Amer. Math. Soc.* 44(4) (2007), 635-639.

____ Review of *King of Infinite Space: Donald Coxeter, The Man Who Saved Geometry*, by Siobhan Roberts. *New York, Walker*, 2006. *College Math. J.* 38(5) (2007), 405-408.

____ Review of *Dark Hero of the Information Age/In Search of Norbert Wiener, the Father of Cybernetics*, by Flo Conway and Jim Siegelman. *New York, Basic Books*, 2005. *Math. Intelligencer* 28:2 (2006), 70-73.

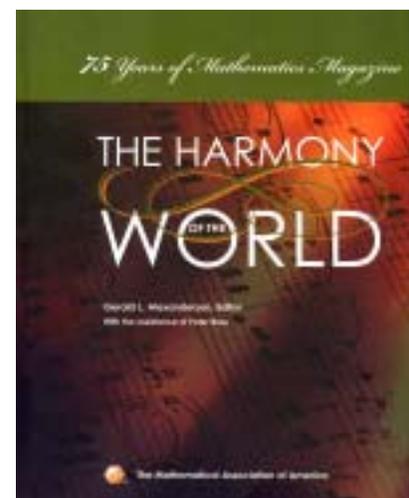
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The New Student Commons and Library

Student Research

(1) Rebecca Glover, a current senior, spent the summer of 2007 working with Rick Scott examining growth series for right-angled Coxeter groups. They're preparing a manuscript for publication.

(2) Victor Quintanar-Zilinskas and Linda Velarde, with faculty Peter Hilton, Jean Pedersen, and Byron Walden, have submitted a manuscript, Patterns relating to complete symbols, to appear in the *Proceedings of the Second International Congress of Algebra and Combinatorics*.

(3) Kevin Dyer coauthored a paper in cryptography with his advisor Ed Schaefer when they were in Malawi in 2005-2006. Kevin presented the work at a meeting of the Southern African Mathematical Sciences Association. He is now finishing an M.Sc. in cryptography at the Royal Holloway University in London.



Kevin Dyer

(4) As mentioned earlier, Benjamin Ragan-Kelley worked with Nicholas Tran on a paper given at the Pacific Rim Conference on Multimedia in Hong Kong. Benjamin is now a Ph.D. student in physics at UC Berkeley.



Laura Huston

(5) This summer, Laura Huston worked with Glenn Appleby to help develop new course work in applications of mathematics to environmental science. Among her activities, Laura surveyed a number of papers and books in environmental modeling and developed a database of articles that will serve as course resources. Laura is majoring in mathematics and environmental science and is considering a number of career options, including applying GIS methods to create better water-use policies.



Stephen Pessagno

(6) Stephen Pessagno did research over the summer with Byron Walden about the random subdivision of triangles. They are preparing a paper for publication. Stephen plans to attend law school in the fall.

SCU High School Contest Passes Milestone

The high school contest held on campus this fall was the 50th annual Santa Clara contest. Founded by A. P. Hillman in 1958, the contest has had a longer life than most regional contests in the country. A collection of problems from the first 25 years was published in 1985: *The Santa Clara Silver Anniversary Problem Book*, assembled by Dave Logothetti, Abe Hillman, Leonard Klosinski, and Jerry Alexander. These days the problems are made up by Byron Walden and the contest is, as it has been for many years, administered by Leonard Klosinski, with the able assistance of Mary Asuncion. Here, so you can try your hand at them, on the facing page are the problems from the 50th contest.



The New Student Commons and Library

Santa Clara University
50th Annual High School Mathematics Contest
November 10, 2007

No books, notes, or calculators may be used. Answer the question by any method and in any order. Partial credit may be given; however, credit will only be given for solutions or contributions to solutions that are presented clearly. Show all work.

RESERVE the FIRST PAGE of the bluebook. Perform all work elsewhere in the bluebook and copy the **ANSWERS** to all problems onto the **FIRST PAGE**.

- (15 pts) In a variation of the game Fizz Buzz, players call out the sequence of positive integers in turn, beginning with 1, but when the number contains the digit 3, the player must say "fizz" instead of the number, and when the number contains the digit 5, the player must say "buzz" instead of the number. If the number contains both the digit 3 and the digit 5, the player must say "fizz buzz" in place of the number. If we assume the players play correctly up through the number 2007,
 - On how many turns will some player say "fizz buzz"?
 - On how many turns will some player call out an actual number?
- (10 pts) What is the largest number $n < 2007$ which can be written as the sum of five consecutive perfect squares?
- (10 pts) Given that $t - 1/t = 5$, determine the value of $t^3 - 1/t^3$. Simplify your answer.
- (10 pts) Determine numbers c and d such that in the polynomial division problem below, the remainder will be $2x - 1$.

$$x^3 - 3x + 2 \overline{) 2x^4 - 13x^3 + cx^2 + dx + 15}$$

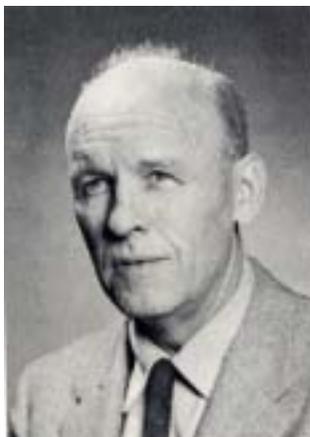
- (10 pts) Points P , Q and R are the vertices of an equilateral triangle, C is the circle circumscribing triangle PQR , and X is a point on the shorter arc of C with endpoints P and Q . If the length of the line segment \overline{XP} is 4, and the length of segment \overline{XQ} is 9, then what is the length of segment \overline{XR} ?
- (10 pts) The space underneath a traffic cone is 24 inches high, and has a diameter of 20 inches at its (circular) base. What is the radius of the largest ball that can completely hidden beneath the cone?
- (10 pts) Find positive integers m and n with the following three properties: (a) $m < n$. (b) Neither m nor n is a multiple of 10.

$$(c) \frac{mn}{m+3n} = 10.$$

- TIE BREAKER (if needed): As clearly as you can explain why Problem 7 has exactly one solution.

In Memoriam

Two former faculty members, both highly respected teachers, died within the last couple of years. We remember them here.



MICHAEL J. BUCKLEY, JR.: A graduate of West Point in the class of 1923, Mike Buckley became the first American prisoner of war in World War II. Just before Pearl Harbor he was in North Africa as a military observer with the British Eighth Army in Libya when he was captured by General Rommel's troops. As a noncombatant he should have been freed but, after Pearl Harbor, he was interned in Italy until he was released in a prisoner exchange in 1942. After he retired from the Army in 1954 he taught mathematics at Santa Clara until his retirement in 1968. He and his wife, Eleanor, were strong supporters of the Department for many years. When Eleanor died in 1999, the couple had been married for 73 years. Eleanor came within weeks of living within three different centuries, having been born just prior to 1900.

Mike was a very conscientious teacher who, with his West Point background, taught calculus with an emphasis on applications. He was very popular with a generation of Santa Clara engineers. Two of his sons became Jesuits: Fr. Michael Buckley, S.J., long at Boston College and more recently at Santa Clara, and Fr. Thomas Buckley, S.J., of the Jesuit School of Theology at Berkeley.

Mike died on August 17, 2006, in Oakland, at the age of 104.

PAUL R. HALMOS: Born in 1916 in Budapest, Paul Halmos came to the United States as a teenager. Later, with a Ph.D. from the University of Illinois, Champaign-Urbana, he became an assistant to the renowned John Von Neumann at the Institute for Advanced Study in Princeton in 1938. After appointments at the University of Chicago and the University of Michigan at Ann Arbor, as well as shorter stays at various other universities, he came to Santa Clara in 1985. In the classroom he used a modified Moore Method that involved active participation by students.

He was a highly respected research mathematician, recognized with many honors (a Guggenheim Fellowship, honorary degrees, and membership in national academies). He wrote fifteen books, some of which have become classics, and roughly 150 papers, articles, and reviews. What set him apart from many other renowned research mathematicians was his lifelong interest in mathematical exposition, making mathematics accessible to many people with various backgrounds.

He retired from active teaching in 1995, after which he continued to write. In 2003 he and his wife, Virginia, made a very significant financial contribution to the Mathematical Association of America, to allow the Association to renovate an existing building in its complex in Washington to form a meetings center to promote programs in mathematical exposition. Dedicated in April 2007, the Carriage House Conference Center is already well-known for its varied and high profile lecture series, workshops and symposia.

Paul died on October 2, 2007, in Los Gatos.



News of Alumni

Shweta Bansal '02 married Shashank Khandelwal in June, 2006, and continues in the Ph.D. program in the Computational and Applied Mathematics Program at the Institute for Computational Engineering and Sciences at the University of Texas at Austin.

George Barnidge '01 has been teaching at Lindenwood University in St. Louis, Missouri, but recently decided to leave academe to become an actuary—probably an easy shift since his graduate work was in statistics at the University of Washington in Seattle.

Rob Beezer '78 may be headed for administration on his campus, the University of Puget Sound in Tacoma—he's "the faculty point-man on a \$66 million construction project adding a new wing to the Science Building and totally renovating the existing building."

Ren Bitonio '94 is back in graduate school finishing a master's degree in software engineering at Carnegie-Mellon University.

Mike Burke '82 is a "computer scientist" at Adobe Systems in downtown San Jose. He lives in Los Gatos.

Dennis Carney '84, after 20 years with IBM in the Denver area, has moved to a new company, Infoprint Solutions (a joint venture formed by IBM and Ricoh)—still in Colorado.

Dan Cavagnaro '02 received a Ph.D. from the University of California, Irvine, and is now on a postdoctoral grant at the University of Illinois at Urbana-Champaign. He reports a differ-

ence in climate between Orange County and central Illinois. But he has a publication already in the *Journal of Mathematical Psychology* with another paper on the way.

Catherine Cavagnaro '87, who is on the faculty of the University of the South in Sewanee, Tennessee, gave a talk "Modeling Aircraft Longitudinal Motion" at the 2006 Mathfest in Knoxville. She admitted that in addition to teaching mathematics, she is also an aerobic flight instructor.

Peter Chu '06 is back in Hong



Peter Chu

Kong, running his family's business there. Peter donated a brick for the Paul R. Halmos Commemorative Walk at the new Carriage House Conference Center in MAA's headquarters complex in Washington, DC.

J. Brian Conrey '76, at the national joint meetings of the American Mathematical Society and the Mathematical Association of America in San Diego in January, 2008, was awarded the 2008 Levi L. Conant Prize of the American Mathematical

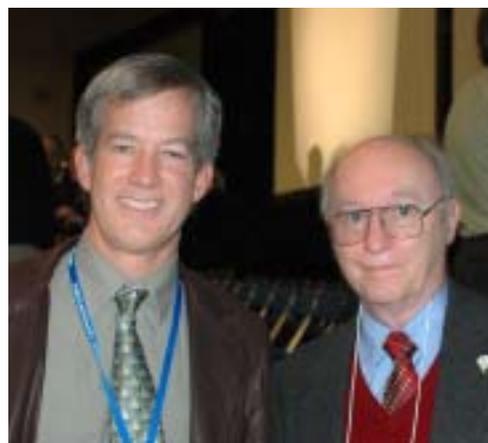
Society for his article on the Riemann Hypothesis that appeared in the *AMS Notices* 50:3 (March 2003), 341-353.

Stephen DeBacker '90 and his wife, Lillian, and two sons, Kenneth and Matthew, have settled in Ann Arbor, Michigan, where Stephen is an associate professor of mathematics at the University of Michigan. Prior to this appointment he had been a Dickson Instructor at the University of Chicago and a Benjamin Peirce Assistant Professor at Harvard. There are reports that he will have his second paper soon in the *Annals of Mathematics*, thought to be the most prestigious mathematical journal in the world.

Jim Dechene '75 is still practicing health law at one of



Jim Dechene



J. Brian Conrey and Leonard F. Klosinski at the Prize Session in San Diego



Class of 1972 at the 2007 reception for alumni:
 Peter Lyons, Michael Penick, Marilyn Stelzner, Robert Mullis, Mary McPeak Hellenthal, Steve Hellenthal, Michael Piccardo

Chicago's largest and most prestigious law firms, but he is also teaching a class at the De Paul Law School. Jim earned both his law degree and a Ph.D. in economics at the University of Michigan, Ann Arbor. Teresa Caserza Dechene, Jim's wife, also got her degree in mathematics from Santa Clara in 1975.

Edward Dunne '80 is Senior Editor for the American Mathematical Society in Providence, RI. Ed received his Ph.D. in mathematics from Harvard University.



Edward Dunne

Stephen Faletti '75 after serving 12 years with the Santa Clara County Office of Education has been a financial aid counselor at California State University East Bay for over six years. In 2007 he received the Cunniff Award for service excellence.

Anne Garrison '01 is working on a master's degree in education at Vanderbilt University in Nashville and plans to return to the West Coast to pursue a doctorate in mathematics education.

Richard Grassl '65 was recently honored with a Faculty Excellence Award for Academic Leadership at the University of Northern Colorado in Greeley. A member of the Mathematical Sciences Department, Rich has served for many years as department chair and, most recently, as Associate Dean. As a mathematician he has published extensively in combinatorics and has promoted many new activities in his department, notably contests.

Katherine Heaney '06 will soon be starting work on a single subject credential in mathematics at San Jose State.

Garrett Hellenthal '01 received a Ph.D. from the University of Washington in statistics, with a specialty in statistical genetics, and is currently in England on a postdoctoral appointment at Oxford University

Nick Hellenthal '99, after receiving his M.D. degree from Georgetown, with a specialty in urology, is doing his residency at the University of California, Davis, Medical Center in Sacramento.



Nick Hellenthal

Robert Hupf '70 reports that he has just finished his 35th year as an actuary at Mutual of Omaha. He and his wife Therese and six children live not far from Omaha, in Bellevue, NE.

Jafari Johnson '00 has been working in SCU's IT department and is now working part-time on an MBA, also at SCU.

Christopher King '00 left high-tech industry to go back to school—law school at Santa Clara this time—and is now a practicing patent attorney with Fenwick and West in Mountain View.

Kathy Long '71 continues to lead the curriculum development team at Duck Creek University, designing online tests for self-directed insurance courses. Her Ph.D. is from the University of Texas, Austin.

Suzanne Nezzar '97 received her Ph.D. in mathematics from UCLA and is now teaching at Stockton College in New Jersey.

Valerie Peterson '01 is finishing work on a Ph.D. at the University of Illinois, Champaign-Urbana, and has already coauthored a paper with her advisor, R. Ghrist: The geometry and topology of reconfiguration, *Adv. in Appl. Math.* 38:3 (2007), 302-323.

Bob Owens '70, who teaches at Lewis and Clark College, turned

Tom Pennello '74 cofounded Metaware and was its Chief Technology Officer until the company was acquired by ARC International in late 1999, where he continues his work in software. He has “created automated compiler tools, compiler front ends, code generators, assemblers, debugger engines and



Bob Owens



Tom Pennello

down our invitation to grade Putnam exams this fall. He was leading an overseas study group in Tanzania.

GUIs, multicore instruction set simulators and cycle-accurate simulators, hardware bus and memory models in SystemC, hardware/software co/simulation tools and various computer languages along the way.”



Alumni reception, Fall 2007

Roseanna Torretto '65 is serving as president of the League of Women Voters of Sacramento



Roseanna Torretto

County where she works as a mainframe computer performance specialist for the State of California in the Department of Technology Services.

Nancy Ureña Reid '91 is in her third year of teaching at Lincoln High School in San Jose. She reports "I love it."

Shaw Walker '97 taught at Santa Clara for several years before moving back to Michigan where he is now teaching at Ferris State University.

Santa Clara University Department of Mathematics and Computer Science and The Mathematical Association of America

Santa Clara University is

- one of two colleges or universities in the United States and Canada to have on its faculty three or more recipients of the Deborah and Franklin Tepper Haimo Award for Distinguished College or University Teaching of Mathematics,
- the only college or university in the United States and Canada to have had two or more recipients of the Yueh-Gin Gung and Dr. Charles Y. Hu Award for Distinguished Service to Mathematics,



The Crystal Icosahedron

- the only college or university in the United States and Canada to have two or more members of the Icosahedron Society.

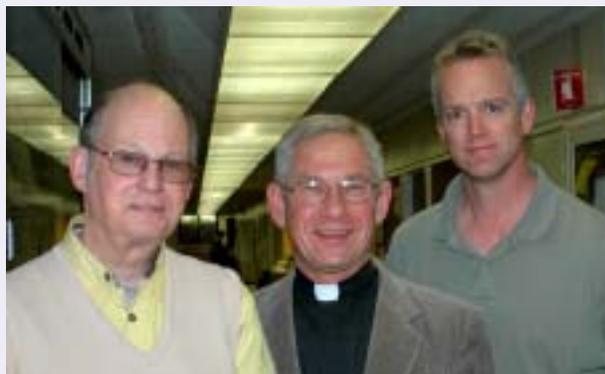
The Department has also had recipients of the Trevor Evans Prize, the Carl B. Allendoerfer Award, and the Meritorious Service Award.

Santa Clara University Awards Ceremony

Ed Schaefer was the winner of the 2005 Brutocao Award for Curriculum Development.

Dennis Smolarski, S.J. and Peter Ross received certificates recognizing their having served on the faculty for 25 years. This year marks Gerald Alexanderson's 50th year at the University.

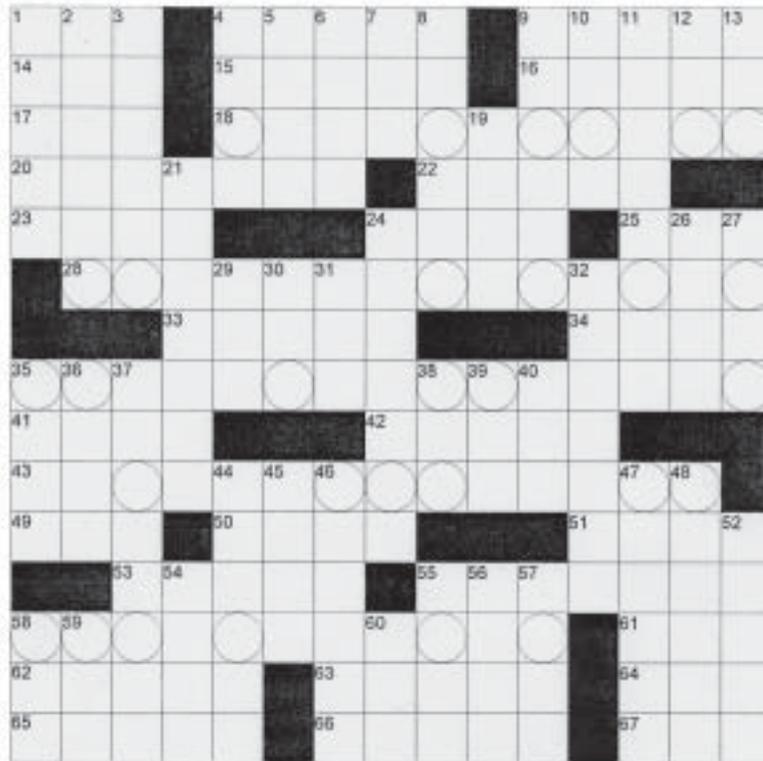
The Department of Mathematics and Computer Science is the only department on campus to have received all of the following College of Arts and Sciences awards: Joseph Bayma Award (for research), David E. Logothetti Award (for teaching), John B. Drahmann Award (for advising), Nancy Keil Award (service), Faculty Senate Professor, and Brutocao Award.



Peter Ross, Dennis Smolarski, S.J., Ed Schaefer

ACROSS

1. Stanford opponent in The Big Game
4. Jewelry measure
9. The folks in the pews
14. Genetic material
15. Napoleon, on Elba
16. Sharp and bitter
17. PIN taker
18. Concern of journalistic watchdogs
20. Charmin-squeezing shopkeeper
22. Works, as a trade
23. Letterman rival
24. "And so it ____"
25. Cry for help
28. Tested, here and there
33. Expressions of pride?
34. Parade problem
35. Computers designed to be compatible with Apple system software



41. Apple MP3 player
42. Continental currency
43. Jesuits, for example
49. Across the street from: Abbr.
50. Kick out
51. Swearing-in statement
53. Lightens
55. Leisurely gait
58. Items used to play the game Nim
61. Airport served by BART
62. Feminine name which is also a kind of ring to algebraists
63. Robot, briefly
64. "No ____, ands or buts!"
65. Central figure of Dali's "Corpus Hypercubus"

66. Major insurance company
67. "____ a far, far better thing..."

DOWN

1. Very slow pace
2. "Advance Australia Fair," for one
3. Thin sheet
4. Dole's 1996 running mate
5. Skating leap
6. Ferris Wheel, for one
7. "The Greatest"
8. Server in the china cabinet
9. Getting toward bedtime, say
10. Certain flu symptom
11. High-tech means of eye-dentification?
12. Involuntary movement

13. NFL stat.
19. Part of EE
21. Olla ____ (Spanish stew)
24. Oscar winner Louis ____, Jr.
26. Dust Bowl refugee
27. 9-digit IDs
29. Long, long time
30. Exam whose high score is now 2400
31. NBA or NHL player
32. Soil conservation concern
35. "Harlequin's Carnival" painter Joan
36. Each
37. Goes for the gold
38. "Say what?"
39. ____-Magnon
40. "Ha-ha," on-line
44. Snacks
45. Pool room implements

46. "Law & Order" job title, briefly
47. Keep tabs on a tabby
48. Court rival to Martina and Monica
52. ____ Perot
54. Rights org.
55. Maclaurin, Maxwell or Napier
56. Related (to)
57. Meat-grading org.
58. "Hot Lips" Houlihan's rank: Abbr.
59. Suffix for lemon or lime
60. Anger

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Name: _____ Employer: _____

Address: _____

Year of graduation: _____ Advanced degrees and from where: _____

Mathematics or Computer Science ; please check.

What kind of work do you do now?

Personal news:

Please fill out and return to the Department of Mathematics & Computer Science, Santa Clara University, Santa Clara, CA 95053-0290, or FAX (408) 554-2370. You can also reach us at masuncion@scu.edu.

Solutions to the High School Contest and the crossword puzzle can be found on the web site <http://math.scu.edu/~bwalden/solution>.

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