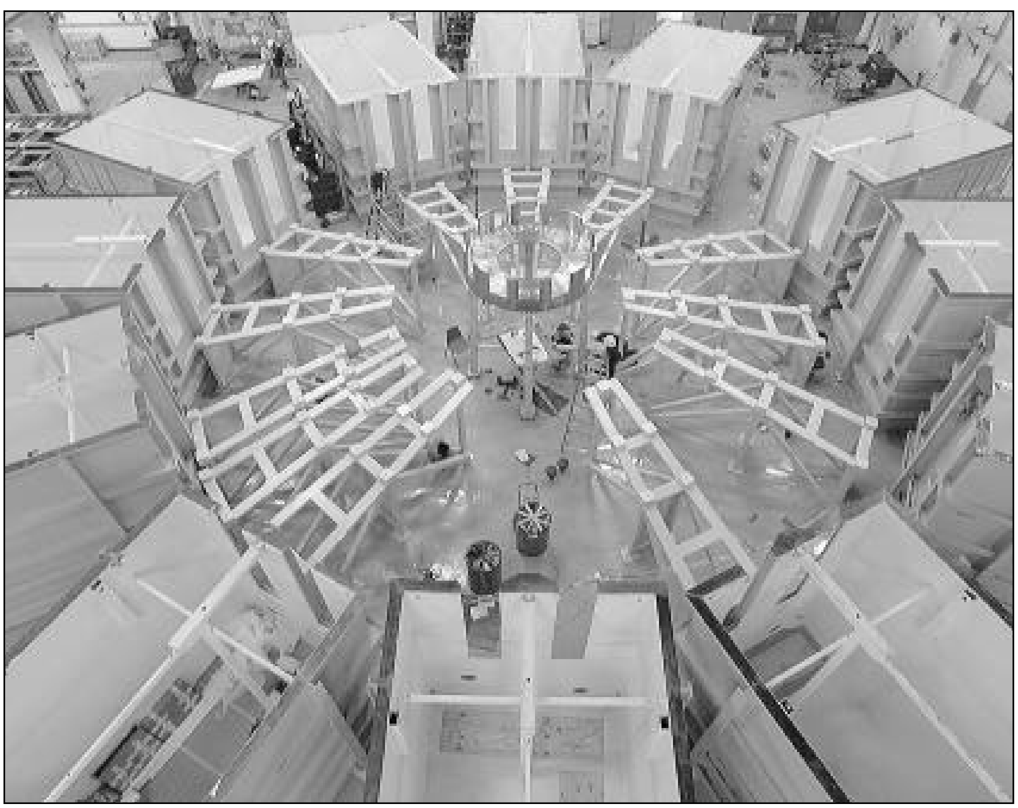
Reflections

Los Alamos National Laboratory Vol. 5, No. 4 • May 2000

PEGASUS

makes way for



ATLAS

... pages 6 and 7

A Department of Energy/University of California Laboratory

Inside this issue ...

Cover: Photo of Pegasus by Fred Rick and photo of Atlas by LeRoy N. Sanchez

Reflections

Reflections, the Laboratory monthly publication for employees and retirees, is published by the Public Affairs (PA) Office. The staff is located at TA-3, Building 100, and can be reached by e-mail at *newsbulletin@lanl.gov,* by telephone at 7-6103, by fax at 5-5552 or by regular Lab mail at Mail Stop C318. The individual telephone numbers are listed below.

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editor's journal

'Just the facts'

"Just the facts," Sergeant Joe Friday used to say on Dragnet. Joe Friday knew accurate, timely information is hard to communicate.

After taking the Myers-Briggs personality test in a recent communication class, I found that I have more in common with Sgt. Friday than I had thought. It's called exclusive communication. Exclusive communicators get to the point quickly and are sometimes thought of as abrupt. I'm not good at small talk.

So if you'll excuse me, I'll get right to the point. It's hard to communicate. There is no formula for doing it successfully. Often times there are more stumbling blocks than tools to properly get a message across.

The way we communicate, I'm told, is influenced by culture and heritage. In some cultures, the exclusive communication method is preferred. In others, exclusive communicators may offend those who communicate inclusively. Inclusive communicators use more inferences and implications or tell a story to illustrate a point.

The way people receive the messages are influenced by a host of other factors: body language, tone or inflection, as well as word choice. Words are perceived differently in print than they are when they are heard. Printed words give the reader the ability to review the text, so if something is not clear, the reader goes back and sees what was written. Verbal communication, such as a radio broadcast or the TV news, gives the viewer only one chance to hear the message. In Public Affairs, I've received two complaints about what a newscaster has said in a report. Upon following up with the reporters and reviewing the scripts, both times it was an error on the listening end; something they thought they heard.

The structure of our language allows words with multiple meanings, adding to the potential frustration of getting a message across. For example, the word critical has many different meanings. It may mean the status of a person admitted to the hospital. It could mean "to pass judgment." In mathematics, critical is defined as relating to a point at which a curve has a maximum, minimum or point of inflection. In physics and at the Lab, going critical is probably something researchers want to avoid.

The computer has changed the way we communicate. Technology has assigned new definitions to old words. Before the proliferation of PCs, memory was something you lost with age; a CD was in a bank; a mouse was something you tried to get rid of; and an application was a form you filled out.

Not only have computers changed the meaning of words, but now e-mail is quickly becoming the preferred means of communication. Because it lacks the human element, the e-mail language has evolved its own source of icons to identify happiness, sadness or other emotions. Called smileys, these icons also are a shorthand method to convey a certain message in the e-mail text. To understand the smiley, the reader should place his or her left ear on the left shoulder: a face or image appears sideways. Some of my favorites are:

[:-) writer is listening to headphones	:-/ writer is skeptical
(-) user needs a haircut	|-| writer is sleeping
:-D user is laughing aloud	@= user is pro-nuclear

Public Affairs, of course, is in the communications business, and we work hard to find the best ways to do it. We like to ask: Should a communication toolbox include e-mail, Web pages, printed material, personal interactions? The answer is probably a combination of all. A recent survey indicated that most employees prefer to hear about an issue directly from supervisors, in a face-to-face interaction. In a world where it's so easy to mis-communicate, the old fashioned face-to-face communications seem to be the best. One thing is certain, it is difficult to communicate.

Kathy

New Diversity Office director is glad to be back home

by John A. Webster

Diversity Office Director Lisa Guiterrez

Lisa Gutierrez doesn't like to be told that change takes time. In fact, she hopes to be able to weave diversity into the fabric of the Laboratory workplace so well that she'll be out of a job as director of the Diversity (DV) Office within five years.

"I truly believe that people are smart and fundamentally caring, and they can learn quickly," she says. "So when some say significant change will take a long time, they may really be saying that they don't think people can handle it. And that's not correct; they can handle it."

Gutierrez, who returned to her Northern New Mexico roots when she joined the Lab as DV director in December, brings enthusiasm and energy to the job, plus a successful record in similar positions in private industry.

She joined Procter & Gamble as a sales representative, but quickly became involved in diversity-related issues for the firm, largely on her own time. Later, as manager of U.S. recruiting, training and development for P&G, she established a globally recognized multicultural resource team that improved minority recruiting, retention and development.

'If I can embed diversity into how we work here, then this office will not be needed.'

Gutierrez says diversity encompasses more than traditionally accepted, visible differences such as sex, ethnic background or age. It also includes "invisible" distinctions, such as scientific interests or similarities of family situations, which may be more important to many people.

"Diversity is all the dimensions of how we identify and connect with each other, either in visible or in less visible ways," she said. "When people feel connected, it's great. When they don't, they suffer and their work suffers. So it's in all our interests to find those connections."

New initiatives under way at the Diversity Office include reorganizing the working groups that have been established for specific groups of people. By this spring, Gutierrez plans to have created an issue-oriented diversity resource team that includes representatives of the working groups and other employee organizations.

The plan derives from her experience in setting up a similar, successful group at P&G and from her realization that much of this kind of effort at the Lab was fragmented among the working groups and other employee organizations.

"Out of 10 issues, eight of them are the same for each group," said Gutierrez, who jumps to a whiteboard and quickly covers it with circles, lines and arrows to emphasize her point. "The new multicultural team will be able to coordinate these efforts. It will sponsor specific events, manage a cultural calendar and identify issues, such as cultural leadership or mentoring, which it can deal with effectively."

Gutierrez has a long list of other initiatives, including developing an online library of diversity resources, working with the Human Resources (HR) Division and the Ombuds Office on quality of work/life issues and preparing a "talent inventory" where organizations can locate people with specific talents they need to solve problems.

"If I can embed diversity into how we work here, then this office will not be needed. When people 'do' diversity, then we have to ask: Do we really need a Diversity Office? I'm looking at how to become obsolete in five years or less."

Gutierrez, who peppers her discussions with examples from her own experiences, said she accepted the job offer at the Laboratory because she wanted to be near her family and because she believes she can make a difference. She adds that she also enjoys challenges, citing her experiences skydiving and taking boxing lessons.

She is a 1979 graduate of Los Alamos High School. her parents both retired from the Lab and her brother works here now. Family and friends are important to her. After three months at the Laboratory, she said she found the job to be fun. But when all is said and done, she hopes to have made a difference.

Institute for Complex Adaptive Matter

ICAM, I saw, I conquered

by Steve Sandoval

In the policy world, think tanks are a dime a dozen. In the scientific world, "institutes" are equally common, focusing on solving problems in major disciplines such as physics or biology. But an institute based at the Laboratory is different, because it promotes collaboration in cutting-edge materials science among researchers at many research universities, national laboratories and other institutions.

The Institute for Complex Adaptive Matter, which is a little more than one year old, isn't confined to bricks and mortar; it attracts scientists who see materials-driven research across the traditional disciplines as an exciting frontier to develop shared intellectual concepts and experimental research. It is located at Los Alamos, but is a unit of the University of California.

ICAM's national, experiment-based scientific agenda is the study of complex adaptive matter — the search for the organizing principles that govern emergent behavior in matter, be it animate or inanimate.

'ICAM seeks to identify, stimulate and conduct collaborative research and scientific training.'

The study of complex adaptive matter, or complexity, attempts to understand what happens when scientists put enough things together they don't know or can't predict what will happen. It also is referred to as emergent or nonlinear behavior.

"ICAM seeks to identify, stimulate and conduct collaborative research and scientific training that draws from the biological, chemical and physical viewpoints on complex adaptive materials," said Don Parkin, deputy director of the Materials Science and Technology (MST) Division and co-director of ICAM with David Pines of the Los Alamos Neutron Science Center (LANSCE).

The institute doesn't have its own research facilities, said Parkin. Rather, activities initiated by ICAM lead to multidisciplinary workshops devoted to promising research themes, communicating workshop results to the broader scientific community and catalyzing the formation of experiment-based research teams at leading research universities.

ICAM has received more than $200,000 in start-up funding from UC and $150,000 in Laboratory Institutional Program Development funds. The UC umbrella allows the institute to pursue other funding sources, and it recently received its first two foundation grants: $25,000 from the David and Lucille Packard Foundation in support of its workshop program and $45,000 from the Alfred P. Sloan Foundation to fund the rapid formation of nascent research groups.

ICAM's 28-member board of trustees include scientists from the Laboratory and Rutgers, the University of Chicago, the Salk Institute, the University of Illinois at Urbana-Champaign, Stanford, Oak Ridge and Lawrence Berkeley national laboratories, Florida State and six UC campuses. Half of the board are members of the National Academy of Sciences.

The institute's first workshops focused on fundamental problems in chemistry, physics and biology in which adaptive atoms play a significant role, and on identifying the origins and role played by mesoscopic organization, which occurs between the microscopic and macroscopic levels, in soft, hard and biological matter.

Pines said the initial workshops have resulted in 16 proposals for the funding of emerging multi-institutional research groups on topics ranging from pattern formation in films to understanding the behavior of certain proteins.

An ICAM workshop at the Laboratory early this month was designed to focus on such "nuts and bolts" issues as ways to set up successful multi-institutional, multidisciplinary collaborations; determine the focus and scope of research from year to year; and identify the best tools and techniques for the research.

"Conceivably, scientists could come here for months to use ICAM to infuse state-of-the-art thinking and interactions," Parkin said. "When we talk about chemistry, physics and biology, we talk about them as equal partners in the development and pursuit of complex adaptive matter.

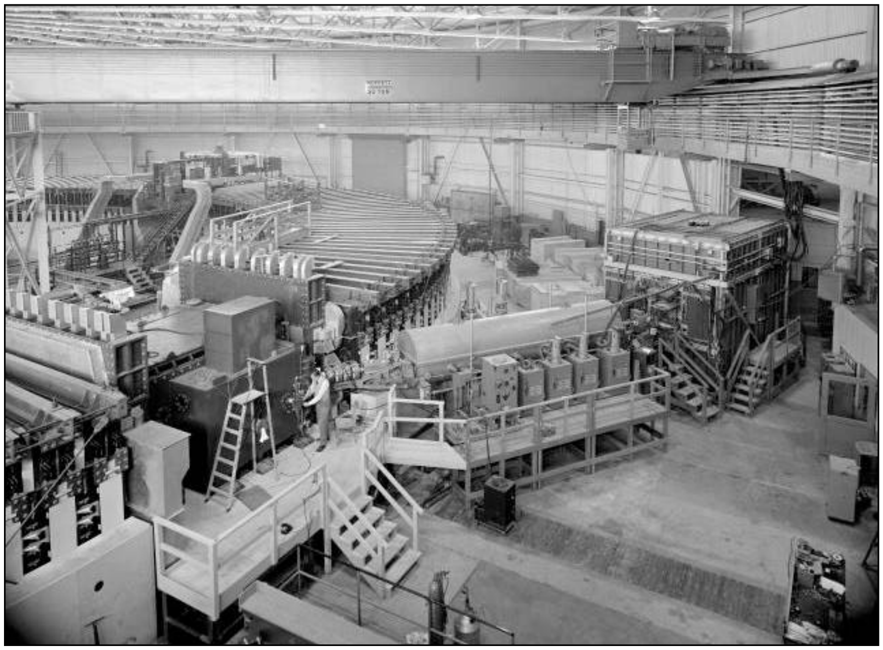
"That's why we think it's so right at Los Alamos. Every one of these things are part of Los Alamos' future."

E-shopping saves money, preserves history

by Ternel N. Martinez

Saving money is a good thing. Saving hundreds of thousands of dollars is a really good thing. Saving millions of dollars is even better. To top it all off, a little bit of history is preserved in the process.

Los Alamos and E.O. Lawrence Berkeley national laboratories recently signed an agreement in which Lawrence Berkeley will ship to the Lab about 300 tons of steel plates formerly used as magnet yokes for its now-decommissioned particle accelerator. The plates will be used as shielding for the Lab's new Spectrometer for Materials Research at Temperature and Stress, or SMARTS.



This file photo shows the Cockcroft-Walton accelerator, right, that fed protons into an Alvarez linear accelerator, center, for injection into the Bevatron accelerator at Lawrence Berkeley National Laboratory. The Bevatron was decommissioned seven years ago, but some of its steel plates will be used as shielding in a new spectrometer at the Los Alamos Neutron Science Center.

SMARTS is under construction at the Los Alamos Neutron Science (LANSCE) Division's Manuel Lujan Jr. Center. When operational this summer, SMARTS will have the ability to perform nondestructive tests on objects that vary in size from a few millimeters to that of a modest-sized jet engine.

SMARTS is one of five new world-class spectrometers being constructed at LANSCE as part of the Short-pulsed Spallation Source Enhancement Project, funded jointly by the Department of Energy's Office of Defense Programs and Office of Basic Energy Science.

Jon Kapustinsky, project leader for spectrometer development for the SPSS Project, said Joe O'Toole of Design Engineering (ESA-DE) and SMARTS project engineer was looking for ways to save project funds. Gene Gould of Environmental Science (EES-15) assigned Randy Mynard, also of EES-15, to help find surplus steel. Dianne Wilburn of the Environmental Science and Waste Technology Division Office (E-DO) helped Mynard with an electronic mail request to which Brookhaven and Lawrence Berkeley national laboratories responded.

After O'Toole determined that Lawrence Berkeley could provide the plates at less cost, he and Kapustinsky negotiated the deal, which was then approved by SMARTS principal investigator Mark Bourke of Structure/Property Relations (MST-8). When Berkeley discovered it didn't have sufficient funds to provide the steel in a form that would meet the SMARTS requirements, Environmental Stewardship Office (E-ESO) Program Manager Tom Starke worked with Lawrence Berkeley and the DOE Office of Science to secure those funds.

The plates, which are approximately 20 feet long, three feet tall and a half-inch thick, at one time comprised the central core of the magnet yoke in an historically important accelerator called the Bevatron. First commissioned in February 1954, the Bevatron made major contributions in high-energy particle physics, nuclear heavy-ion physics, medical research and therapy, and space-related studies of radiation damage and heavy particles in space. It was decommissioned in February 1993.

While the plates are slightly radioactive, their dose rates are only slightly higher than that from normal background radiation, and they therefore meet all applicable worker protection standards without the need for special handling.

According to the agreement, Lawrence Berkeley will custom-cut the steel plates and assemble them to fit the specific design requirements of SMARTS' beam line, which is more than 100 feet long. The Lab will be charged only for shipping costs.

Compared to what it would have cost to purchase new steel plates commercially, Kapustinsky said the overall savings to the project will be about $250,000. Lawrence Berkeley saves even more, about $1 million, based on what it would have cost to dispose of the steel. In addition, O'Toole said it is possible that the Lab may receive an additional 1,600 tons of plates from Berkeley. If so, he said, the additional savings could be five times higher for both labs.

Also, the Spallation Neutron Source under construction at Oak Ridge National Laboratory has expressed interest in taking the remaining tons of surplus steel plates from Berkeley.

"By working with Lawrence Berkeley to secure our steel plates, the Lab set the path for Oak Ridge to receive the remaining surplus if it wishes," said O'Toole. "The potential for all three labs to save millions upon millions of dollars is enormous."

Who says you can't save a lot of money via e-mail?

From war horse to p

Pegasus is retired to make way for Atlas

by Todd Hanson

On Sept. 23, 1999, a small group of researchers and guests gathered in a darkened control room at Technical Area 35 to witness the end of an era. With a flash and a bang that day, the Pegasus II experimental shot No. 129 successfully marked the end of five years of service for the renowned Los Alamos war horse. Through its demise, it also shifted the focus of the Laboratory's High-Energy Density Hydrodynamics Program into a new realm of pulsed-power high-energy physics being built upon Pegasus II's successor — Atlas.

Over the years, scientists from around the world, representing a dozen research institutions and universities, traveled to Los Alamos to use Pegasus II. They came to learn how high pressure and sudden changes in magnetic fields affected materials placed in the core of the device. In roughly 10 millionths of a second, Pegasus II could discharge massive amounts of electrical energy from its capacitor banks onto a target placed at the core. This sudden influx of energy produced a million atmospheres of pressure capable of crushing target materials and launching extremely energetic shock waves. It was a well-used and highly regarded instrument.

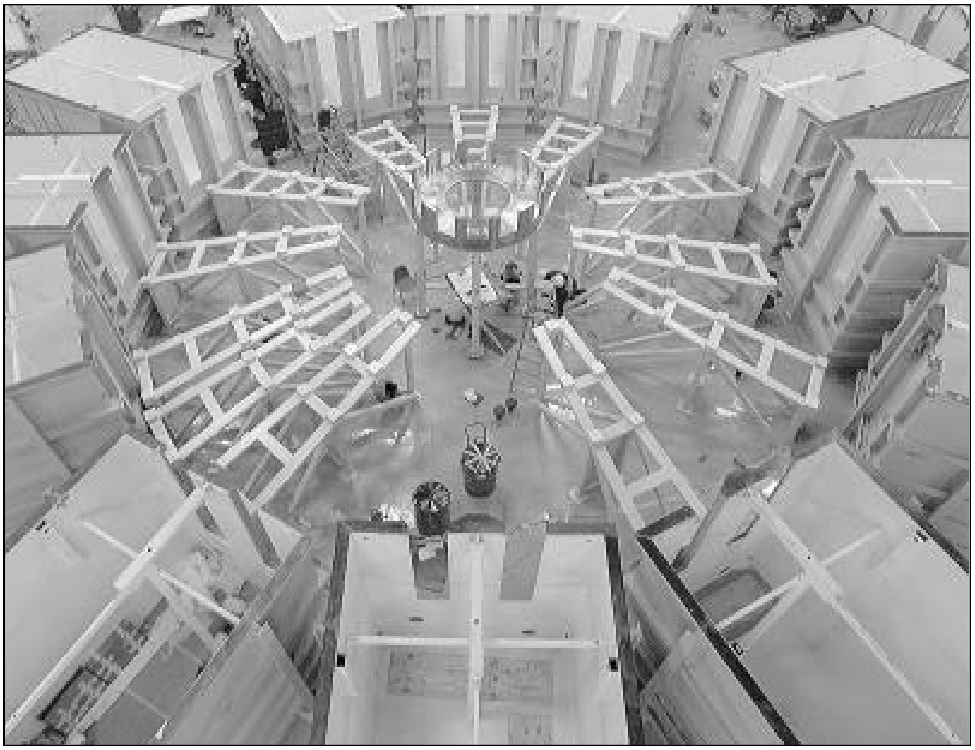
Pegasus II had 144 energy-storage capacitors arranged around the two-story Pegasus machine. The capacitors could charge to voltages up to 100 kilovolts, and the 4.3 megajoules of stored energy at this voltage made Pegasus II one of the largest capacitor-bank facilities in the world. Pegasus II produced peak currents as high as 12 mega-amps, or roughly a million times what a typical microwave oven uses.

A typical Pegasus II experiment used a cylinder, called a liner, made from extremely pure aluminum known as 1100-series aluminum. This liner was roughly five centimeters in diameter, two centimeters in height and had paper-thin walls. Targets were placed in the liner before being put in Pegasus II for testing. More often than not, these liners and targets were fabricated by the Laboratory's Target Fabrication Facility operated by Materials Science and Technology Division's Polymers and Coatings Group (MST-7).

From the long list of Pegasus II experiments came advances in materials science, plasma physics and hydrodynamics. In hydrodynamics research, scientists peered into the mysteries of the Rayleigh-Taylor Instability — a phenomenon observed at the interface between two materials of differing densities when the lighter density material is accelerated toward the heavier material.

While Pegasus II had applications in a number of important basic science areas, the Atlas facility will substantially extend these applications beyond basic physics or materials sciences into areas of geophysics, planetary physics, astrophysics and condensed-matter physics. The ability to produce extreme conditions of pressure, density, magnetic field and material velocity will allow research work in untold areas.

In many respects, Atlas will be similar in function to Pegasus II, but the new giant will literally dwarf the once-mighty Pegasus II. Not only will Atlas be more than 80 feet in diameter, but it will have a much larger



The giant Atlas pulsed-power machine begins to take shape in workspace once occupied by the Antares laser project and, more recently, by a portion of the National High Magnetic Field Laboratory. *Photo by LeRoy N. Sanchez*

ulsed-power titan

chamber at its core and will be capable of achieving energy levels six times that of Pegasus II. Atlas' capacitor bank will be capable of storing 23 megajoules and should deliver a peak current of roughly 30 mega-amps in a pulse lasting little more than 4 millionths of a second.

Atlas' phenomenal magnetic field strengths will open up research into exciting new areas of condensed-matter physics. Research could include experimental studies into the magnetization of high-temperature superconductors or the study of conductivity mechanisms and quantum-limit phenomena in atoms.

Atlas also could be useful in understanding the thermal properties of materials near the center of Earth, where the pressures are a million times that found on the surface, or in measuring the equation of state of dense, strongly coupled plasmas. These experiments are useful for testing models of theoretical plasma physics and in constructing theories regarding the interiors of giant planets and brown dwarf stars. Naturally, the fundamental studies of material instabilities that were conducted using Pegasus II will also be extended with the Atlas facility.

On budget and on time through the first quarter of the year, Atlas is scheduled to be up and running at TA-35 by the end of the year.

Ringed by capacitor banks that could achieve 4.3 megajoules of stored energy, Pegasus II, shown in this file photo, was once one of the largest capacitor-bank facilities in the world.

Photo by Fred Rick

And the band will play on ...

by Todd Hanson

Successful, large-scale experimental programs like Pegasus II and Atlas are a lot like orchestras, with an ensemble of different players working together to accomplish something greater than the individual parts could do alone. Pegasus II was no exception and over the course of its 129 shots the players played their parts well.

Carrying out the experiments required a series of coordinated steps from conceptual design and computation to fabrication and data recording and analysis. This process required the collaboration of designers, computational physicists, modelers, diagnosticians, hydrodynamicists, draftsmen, machinists, materials scientists, pulsed power engineers, and mechanical, optical and electrical technicians from the Applied Theoretical and Computational Physics (X), Physics (P), Materials Science and Technology (MST), Dynamic Experimentation (DX) and Theoretical (T) divisions.

During its lifetime, Pegasus II helped people establish valuable professional collaborations that extended beyond the immediate project. In addition, many diagnostic techniques developed at Pegasus II have since been applied to other experiments at Los Alamos and elsewhere. Noteworthy among these are flash radiography, infrared pyrometry, optical and electrical pins, holographic particle detection and shadowgraphy.

Obviously, the legacy of Pegasus II remains in spite of the closure of the facility, and as the Atlas facility nears completion, researchers look forward to a new generation of successful collaborations.

people

Gosling honored by the AGU


Jack Gosling

Jack Gosling of Space and Atmospheric Sciences (NIS-1) is the recipient of the American Geophysical Union's John Adam Fleming Medal for 2000. He was honored for his major contributions to the present understanding of the physics of the solar wind and its interaction with the geomagnetic field.

The award, which will be presented at the annual AGU meeting June 2, recognizes original research and technical leadership in geomagnetism, atmospheric electricity, aeronomy, space physics and related sciences.

"This medal is a significant honor for me and for the Laboratory and comes as a very pleasant surprise," said Gosling. "My work has relied heavily on the contributions of many others here at Los Alamos and elsewhere, and I hope those colleagues will view this as a shared honor."

The AGU, an international scientific society with more than 35,000 members in over 115 countries, is dedicated to advancing the understanding of Earth and its environment in space and making the results available to the public. The Fleming Medal was established in 1960 in honor of John Adam Fleming and his contributions to the establishment of magnetic standards and measurements.

Gosling is a Laboratory Fellow and former team leader for Space Plasma Physics within NIS-1 who earned his doctorate in physics from the University of California, Berkeley in 1965. In addition to solar wind dynamics, his research interests include coronal mass ejections, interplanetary disturbances, collisionless shock physics, magnetic reconnection, magnetospheric physics and ion optics. As author or co-author, he has published more than 350 papers in the above areas of research and is co-editor of two books.

Gosling, a fellow of the AGU, has been the principal investigator for Los Alamos plasma experiments on several space missions. He has received the National Center for Atmospheric Research Technology Achievement Award, two Laboratory Distinguished Performance Awards, several NASA Achievement Awards and five Editor's Citations for Excellence in Refereeing in various AGU journals. He is the president-elect of the Space Physics and Aeronomy Section of the AGU.

CRO's Anderman featured in 'Working Mother'


Linda Anderman

Linda Anderman of the Community Relations Office (CRO) was featured in the March issue of Working Mother Magazine. She was one of several women featured in the cover story on how working mothers are financing their children's higher education.

"I've been a member of the magazine's Readers' Panel for a couple of years now, and I guess the freelance writer who contacted me for the story got my name from the list of panel members," said Anderman. "The writer probably was looking to get a single mother's perspective on this issue.

"I'd actually completely forgotten about the interview when I received my copy of Working Mother and saw the article." The cover story contains several subsections. Anderman's section, titled "Getting Closer," is on Page 63.

"One of the most painless ways I've found to save for my daughter has been to keep hold of my change," Anderman said. "It's incredibly easy and yet I've saved over $1,000 for her over the years."

Anderman has been involved in several women's and child-care issues over the years. She served as both a member and chair of the Lab's Women's Diversity Working Group from 1996 to 1998. She also formerly co-chaired the Los Alamos Afternoon Adventures Child Care Program, for which she won a Los Alamos Achievement Award in 1999. She currently serves on the YMCA Board of Directors, which oversees Afternoon Adventures.

As for what the article does for her, Anderman quipped, "There goes five of my 15 minutes of fame." The magazine has more than 1 million subscribers.

In Memoriam

Arno Roensch

Lab retiree Arno Roensch died Dec. 22, 1999. He was 81. While attending Rutgers University, Roensch enlisted in the U.S. Army in 1944 and was sent to Los Alamos as a scientific glassblower. He came to work for the Lab in 1967 as a short-term technician in the former Designation (SD-3) group while a summer student. After the war, he continued to head the glass shop with SD-3 until his retirement in October 1974. While employed at the Lab he earned his bachelor's degree in business administration from New Mexico Highlands University. After leaving Los Alamos he moved to Albuquerque and established a glassblowing shop for the chemistry department at the University of New Mexico. He retired from UNM in 1988 but continued to blow glass at his own business until his death.

Lawrence "Larry" Rice

Lab retiree Lawrence "Larry" Rice died July 2, 1999. He was 80. Rice graduated from the University of Nebraska in 1942. In July 1955, Rice came to the Lab to work in the former Mechanical Engineering (J-7) group. In 1962, Rice became the group leader for the former Test Cell Operations (J-5) group and relocated to Las Vegas, Nev., to work at the Rover Project Testing Facility. He returned to Los Alamos in 1965 and became the alternate group leader for J-7. In 1973 he became the group leader for the former Downhole Design (J-7) group. He retired June 1977 but worked on a part-time basis for several more years.

continued on Page 9

April employee service anniversaries

40 years
Joseph Fritz, DX-1

35 years
Richard Hassman, FWO-RLW
Ernesto Martinez, DX-1
Wilfred Romero, ESA-EPE

30 years
John Ingraham, NIS-2
Audry Martinez, NMT-DO
Barton Olinger, ESA-WMM

25 years
Richard Carlson, ESA-TSE
Donald Martinez, C-25
John Pratt, NIS-9
Larencita Torres, CIC-13
Jeannie Vasquez, CIC-4

20 years
Celine Apodaca, NIS-RD
Jose Gil Archuleta, DX-2
Thomas Archuleta, MST-7
James Bergauer, BUS-2,
Roberta Bobbett, BUS-3
Randall Cardon, CIC-2
Alex Carrillo, NMT-15
Thomas Kunkle, EES-5
Michael Meier, NIS-2
Dennis Olive, CIC-1
Ward Rupprecht, ESA-TSE
Teresa Salazar, NMT-4
James Sheldon, NIS-4
Gary Thayer, TSA-4
Susan Trujillo, CIC-6
Laurie Wiggs, ESH-2
Gerald Winsemius, CIC-4

15 years
Loretta Apel, QIO
Scott Bowen, C-11
Fermin Casados, BUS-3
Gary Chavez, BUS-4
Gary Clark, CIC-12
Paul Dunn, MST-6
Jay Elson, TSA-10
Geralyn Hemphill, TSA-1
Myrna Jones, B-N1
Chih Yue Kao, EES-8
Donald Mietz, NIS-4
Collin Sadler, DX-2
Jay Stimmel, NMT-9
John Tegtmeier, DX-8
Alfonso Vargas Jr., NMT-2
Allen Wallace, BUS-6
Gary Weber, S-6
Mary Anne With, STB-EPO

10 years
Erik Anderson, CIC-4
Joel Berendzen, P-21
Sherri Bingert, MST-6
Ronald Chavez, NIS-RD
Therese Dinehart, BUS-5
Bradley Edwards, NIS-2
Shawna Eisele, ESH-4
Melinda Gutierrez, S-DO
Heidi Hahn, HR-8
Barbara Martinez, BUS-5
David McCollum, BUS-4
Daniel Oakley, BUS-4
Marion Sasser, TSA-11
Langdon Toland, EES-DO
Alice Ann Travis, BUS-5
Ravi Varma, MST-8
Michael Warren, T-6

5 years
Jessica Archuleta, E-DO
James Bell, PM-3
David Costa, NMT-15
Jerome Gonzales, FWO-UI
Elizabeth Gray, ESH-14
John Kelley, FWO-SWO
Bret Lockhart, C-9
Viola Maes, CIC-6
Kevin Morley, P-23
Barbara Roybal, BUS-1
Lillard Scott, MST-6

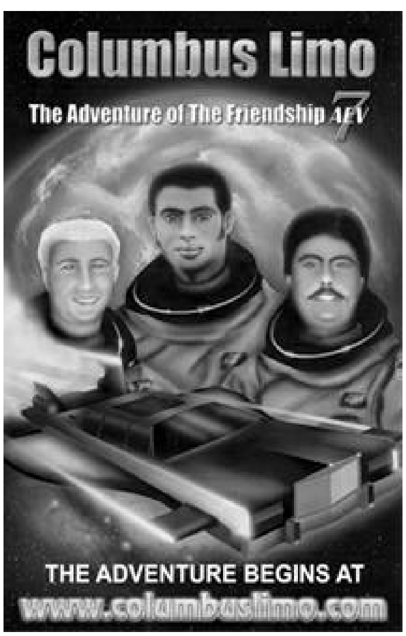
Osburn authors new book


Brian Osburn

Brian Osburn of Production Control (CIC-18) has published an action adventure novel, "Columbus Limo: Adventure of The Friendship 7 A.E.V" (Aggregate Environmental Vehicle).

The book cover design portrays three astronauts. "The astronaut on the right is me. The other two guys are friends of mine at Sandia Labs," said Osburn. The target audience for Columbus Limo are ages 12 to 17.

Osburn will be having at least 24 book signings at bookstores across New Mexico during the summer, including a book signing, reading and lecture at Mesa Public Library in Los Alamos. Osburn also has a Web site for his book at *http://www.columbuslimo.com*.



Osburn was raised in Pensacola, Fla., and began writing creatively at the age of six. He now lives in New Mexico with his wife Amy and his three daughters Sarah, Brianna and Elena.

Osburn is attending the University of New Mexico, Los Alamos, pursuing an associate's degree in computer science. His goal is to continue his education and earn a bachelor's degree in computer science.

In Memoriam ...

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David Phillips

Laboratory employee David Phillips of Materials Technology: Metallurgy (MST-6) died March 18 of a heart attack while on a hiking trip. He was 48. Phillips came to the Laboratory in 1984 as a technical staff member in the Materials Science and Technology (MST) Division. During his tenure at the Laboratory, he served as project leader for Engineered Porous Materials and as team leader for Ceramics Processing.

Elizabeth Macy

Laboratory employee Elizabeth Macy of Desktop (CIC-2) passed away Feb. 29. Macy joined the Lab in 1987 as a graduate research assistant with CIC-10. She later joined MEC-9 in October 1988. In December 1990 the group reorganized and became C-7 and then reorganized again in May 1994, becoming CIC-2. Elizabeth was a system administrator specializing in PC computers. She also was on the Information Architecture Desktop Security Team for more than two years. She had a deep interest in computer security.

"Science at Home" is a publication developed by Science Education (STB-SE) to interest children, particularly those in grades four through eight, in science through hands-on activities. We are reprinting experiments from the book, along with other scientific activities, for employees to share with their families or just to enjoy themselves.

You're the Tops

What do frisbees, bicycle wheels and the gyroscopes aboard the space shuttle have in common? They all use angular momentum to keep traveling in a straight line. Angular momentum is the force that makes spinning things tend to keep going in the same direction. You can see it in action anytime a toy top starts spinning around.

Spinning tops have been enjoyed around the world for hundreds of years. In Japan, top spinning, called koma asobi, was once a very popular activity. Each year at Hanukah, Jewish children worldwide play with dreidels. In the past, Eskimos made tops from ice, Native Americans used bones and South Sea Islanders worked with palm wood or volcanic ash. Some South Sea Islanders practiced top spinning on their big toes. An African tribe has a top that spins in the air.

While most commercial tops are made of wood, metal or plastic, almost any solid material can be used. Tops can be round, oval, cone shaped, or in the case of the dreidel, even square. In the following activity, you will build your own top and test to see how changing its launching method will affect its ability to spin. After doing several trials, you'll be acquainted with rules about momentum, forces and motion. You'll also understand what a top needs to spin a long time.

The stuff you'll need

Nine paper plates, 6-inch diameter; two sharpened pencils; two rubber bands; scissors or Exacto knife; ruler; thumb tack; paper and pencil; watch or clock that records seconds; flat surface (floor or table top).

Here's the plan

1. Find the center of one paper plate by carefully folding it into quarters (diagram 1). Unfold and mark the center of the plate where the fold lines cross.

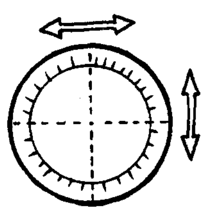


diagram 1

2. Place the marked plate on top of a stack of eight paper plates. At the center mark, push the tack through all of the plates. Take the tack out and set the folded plate aside.

3. Using the pin hole as a center guide, mark an X about 1/4" long on the center of each plate (diagram 2).

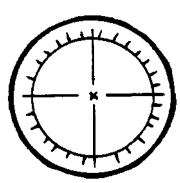


diagram 2

4. Use scissors or a knife to cut along the lines of the X on each plate.

5. Slide all the plates together onto a pencil about 2" from the pencil tip.

6. Wrap the rubber bands around the pencil snugly against the plates so that they are held tight. Presto! You have created a top (diagram 3).

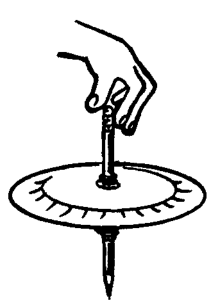


diagram 3

Now, in order to get something moving, you must apply a force to it. A force is either a push or a pull.

7. To spin, or launch your top, hold your pencil on a flat surface with the point down. Use your fingertips to grasp the eraser end. Twist the pencil between your fingertips and let go. The force of friction between your finger tips and the pencil gets the top spinning. Friction is the force that acts between two objects when they rub together. Practice launching the top three or four times to get the motion down smooth. It's important that you launch it the same way each time so that you limit the number of variables in your experiment. A variable is something that changes the results of an experiment.

8. Once you have practiced this launch method, do a timed trial by timing how long your top spins. Use a watch or clock with a second hand. Time from the beginning of a spin until friction and gravity cause the top to fall over.

9. Record the timed trial in seconds on the data sheet in the column marked Launch Method I, Trial 1. Repeat the experiment two more times. Were all the times about the same? Add the three times together and divide the number by 3. This will give you the average time per spin for Launch Method I. Why do you think we use an average time instead of a single trial? No matter how hard you try to launch the top the same way each time, it won't be exactly the same as the time before. They'll be close, but maybe you'll grip the pencil a little tighter, or twist your fingers a little harder. These differences are variables. By averaging the times, you eliminate some of the variables in each spin.

10. Change the launching method. Hold the pencil between your palms with the point on a flat surface. Press your palms together against the pencil and quickly move your hands in opposite directions (diagram 4). Practice launching the top several times using this new method before making a timed trial. What are you doing differently with this method? Where does the force to get the top spinning come from? Do you think that this second method will provide a stronger force than the previous launch? Why or why not?

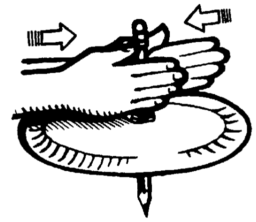


diagram 4

11. Before you begin timing, predict how many seconds you think the top will spin based on your first set of trials. Time from the beginning of the launch until the top falls. Record the time of the spin under Launch Method II on the data sheet. Repeat the experiment two more times and then average the time of the three trials together.

How did the actual time compare to your predicted time? How did it compare to the first launch? Which launch method got the top spinning faster at the beginning? Which launching method allows you to exert more force on the top causing it to spin longer? By looking at your data, what can you conclude, that is, what do you think a top needs for it to spin a long time?

Wrap-up

How long an object spins depends on the amount of force acting on it, the speed at which it turns and its total mass. (In this case we can think of mass as being the same as weight.) Since we didn't change the weight of the top, the only difference between the two launch methods was the amount of force applied. The greater the launching force, the greater the speed. The greater the speed, the longer the spin.

What's going on here?

Back in the early 1700s, Sir Issac Newton, an English mathematician and scientist, investigated the laws of force and motion. He discovered that an object can speed up or slow down only if a force is applied to it. He also discovered that an object's speed (something scientists call velocity) and its mass will control how long an object will keep going. The word that describes this ability to keep going is momentum. Its mathematical formula is Momentum = Mass x Velocity. By either increasing the velocity of an object or its mass, you can keep it moving longer. Linear momentum describes an object moving in a straight line. Angular momentum describes spinning objects.

Because we did not add or subtract from the weight of the top, mass was not a factor in this experiment. The two different launch methods allowed you to change the speed of the spinning top. In Launch Method I, your fingers force the top to spin. In Launch Method II, it was the palms of your hands. Since your palms were rubbing on much more of the pencil's surface, they applied more force to the top. The top spun faster, so it had a greater angular momentum making it spin longer. That's a lot of science for one little top!

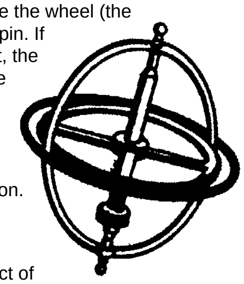
What made the top stop spinning? Since Newton's first law of motion says an object can speed up or slow down only if a force is applied, there must have been a force working against the top. In this case, there is friction between the pencil point and the flat surface. Air resistance also causes friction — the top is colliding with air molecules. Friction slows the top enough to allow gravity to pull it down.

Where does this happen in real life?

Most people don't realize it, but they use friction and angular momentum all the time. Without friction, you wouldn't be able to walk because it's your shoes rubbing against the floor that allows you to push forward. If you have ever tried to walk with socks on a waxed floor, you know how the lack of friction makes it difficult to get going.

Angular momentum comes into play whenever you ride a bicycle. As the wheels spin, they help to hold the bike upright. As you slow down, it gets harder and harder to balance the bike. Try sitting on your bike when it is standing still. Chances are you'll fall over.

Scientists and engineers have used angular momentum in a special device called a gyroscope that helps to navigate ships, airplanes and even spacecraft. A gyroscope is a special top made from a wheel and axle mounted in a frame. When the wheel of a gyroscope spins, the direction of the axle doesn't change. The more massive the wheel (the heavier it is) the more stable the spin. If you turn the gyroscope left or right, the wheel keeps pointing always in the same direction. Because there is no up or down in space, vehicles like the space shuttle actually have three sets of gyroscopes to keep them tilted in the right direction.



Now try this

Since momentum is the product of mass and velocity, you can test to see how changes in mass will effect the angular momentum of your top. Make changes by removing or adding one or more plates. Launch, time, record, average and compare. How do the changes effect the length of the spin?

Make changes to the top by moving the plates further from the pencil point. Launch, time, record, average and compare. What changes do you observe?

This month in history

May

1626 — Peter Minuit buys Manhattan for the Dutch

1871 — The first professional baseball game is played in the US

1922 — The Lincoln Memorial in Washington, D.C., is dedicated

1939 — Hitler and Mussolini sign a 10-year political and military alliance known as the Pact of Steel

1945 — The "Target Committee" meets in the Los Alamos office of J. Robert Oppenheimer to decide on the best use of atomic weapons

1959 — The first house with a built-in bomb shelter is shown in Pleasant Hill, Pa.

1978 — NOAA announces that it will alternate male and female names to designate hurricanes, instead of using only women's names

1982 — Groundbreaking is held for the Proton Storage Ring at TA-53

1992 — Energy Secretary James Watkins testifies before the Senate Armed Services Committee that for the first time since 1945, the United States is not building any nuclear weapons

1998 — India and Pakistan each carry out a series of underground nuclear tests

1999 — The unclassified version of the "Cox Report" about allegations of Chinese efforts to steal U.S. nuclear secrets is released

Note: In last month's history listing, we were 6 years and 3 months late in listing the launch of the first atomic-powered submarine.

Syndicated material

Removed at the request of the syndicate

Answers to last month's 'Brainteasers'

1) The first ski season at Pajarito Mountain was the winter of 1957-58.
2) ALEXIS has been in orbit for seven years.
3) The badge photos show (a) Nick Metropolis, (b) Dorothy McKibbin, (c) Harold Agnew.
4) The RMD Building is located at the Nevada Test Site.
5) The Employee's Scholarship fund program started in 1999.
6) The Lab-produced high-resolution physical map was of chromosome 16.
7) Project Rover was active for 17 years (1955-72).
8) Norris Bradbury was director for 25 years (1945-1970).
9) The Nobel laureates are, left to right, Edwin McMillan, Emilio Segré, I.I. Rabi, Hans Bethe and Luis Alvarez.
10) The Lab-built computer was called MANIAC (Mathematical Analyzer, Numerical Integrator, And Computer).
11) TA-57 is at Fenton Hill.
12) The Vela series is credited with the discovery of gamma-ray bursts.
13) The Santa Fe office was located at 109 East Palace Ave.
14) (d) 4,000-5,000 students have participated in the NM High School Supercomputing Challenge.
15) Hans Bethe directed T Division during World War II.
16) Jumbo was a steel vessel designed to contain the explosion of the 1945 Trinity test device; it was not used.

Gotta dance ...

by John A. Webster

Competitive ballroom dancers may appear to float, swoop and glide across the floor without effort, but they're really working very hard. Just ask Dave Cremers.

"It's physically demanding and very disciplined. When you're competing, they judge things like: Do you step with your heel first or your toe first? It's that detailed," said Cremers, an amateur dance competitor who puts in 20 hours a week or more in practice. "You want to make it look effortless, but it's really a lot of work."

Cremers, a physicist in Advanced Chemical Diagnostics and Instrumentation (CST-1), and his professional dancing partner, Kristine Huotari, won the top pro-am award at the 29th annual Grand National Dance Championships in Miami Beach last October. In addition, Huotari received the top teacher award, and Strictly Dancing, the Santa Fe studio where Cremers trains and Huotari teaches, was named top studio.

"It was really a good feeling," said Cremers. "You put a lot of work into it, and winning at this level of competition is really great."

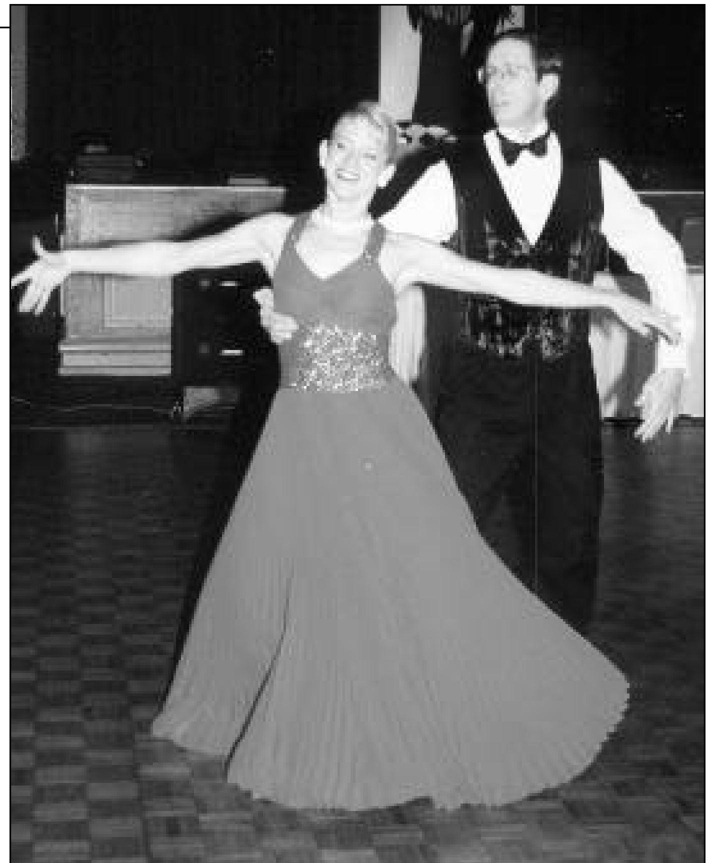
For winning, the pair received an all-expenses-paid trip to Blackpool, England, in late May to see the world championships. Cremers; his wife Terry, a project leader in Pit Disassembly/Surveillance Technologies (NMT-15); Huotari; and Juan Manuel, owner of Strictly Dancing, plan to make the trip.

Cremers, a 20-year Lab employee whose work focuses on an analytical technique called laser-induced breakdown spectroscopy, has liked to dance since he took it in a high school physical education program. He and his wife have danced socially for years. About four years ago, he decided to take it up more seriously and began working with Huotari at Strictly Dancing, where several other Lab employees also take lessons.

"What separates David from many competitive dance students is his commitment to put in the necessary hours of repetitive practice time outside of his lessons," said Huotari. "It really makes a difference, and it shows in his dancing. He is a joy to dance with, work with and compete with."

Competitive dancers are judged in ballroom and Latin dancing. Ballroom dancing, in which the woman wears a ball gown and the man a tuxedo, includes the waltz, foxtrot, tango, Viennese waltz and quickstep. Latin dancing, where the dancers decide their dress, includes the rumba, cha-cha, paso doble, samba and jive.

Four to eight judges grade each pair of dancers on several elements, including timing, footwork, poise, posture and body movement, and award points.



Professional dancer Kristine Huotari and amateur David Cremers of CST-1 dance an American-style Viennese waltz to the tune of the title theme from the movie "Edward Scissorhands" during the national championships in Miami Beach. They won the top pro-am award at the event. *Photo courtesy of Cremers*

Amateur dancers compete at several levels — bronze, silver, gold and open. "The level is determined by the difficulty of the steps and moves," said Cremers. "I'm at the silver level and just starting to move into gold."

In addition to the physical workout, Cremers likes dancing because he enjoys the music and the feeling of moving to the music. It's also a sharp change of pace from his life at work, and it's a constant learning experience.

"The neat thing about dancing is that you can do it at any level, from social to competitive," he says. "As long as you can move, you can dance. You don't have to move like a champion to enjoy it."

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