

Lab scientist watches ‘amazing’ landing on asteroid



Asteroid Eros

by *Shelley Thompson*

Robert Reedy watched the first-ever landing of a spacecraft on an asteroid by live video feed in the auditorium at the John Hopkins University Applied Physics Laboratory in Maryland.

“It was very exciting,” recalls Reedy. “We saw pictures the spacecraft was taking as it neared the asteroid and were trying to figure out in real time exactly what we were seeing. I kept thinking how amazing this was.”

The Near Earth Asteroid Rendezvous (NEAR) spacecraft had

been orbiting the potato-shaped asteroid Eros since Feb. 14, 2000, and was expected to end its two-billion-mile mission on Feb. 12, 2001. NASA sent commands to NEAR’s multi-spectral imager — or camera — to take pictures as it approached its crash site on the asteroid’s surface. But NEAR’s surprisingly soft landing left the spacecraft intact and operational, and also left Reedy and his colleagues with a unique opportunity.

Reedy, a nuclear scientist in Space and Remote Sensing Sciences (NIS-2), works with the Gamma-Ray Spectrometer aboard the NEAR spacecraft. He and his colleagues interpret the data from this instrument to gain insight into the composition and origin of the asteroid. Extrapolating from these discoveries will allow scientists to better understand the origin of Earth and the solar system.

Unfortunately for the GRS team, a delayed rendezvous with Eros put

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Gift program highly successful, seeks more equipment to give


Universities, colleges, high schools and not-for-profit organizations in New Mexico and around the country have received nearly \$1 million worth of excess equipment from the Laboratory's Education Equipment Gift Program, which is approaching its first birthday.

In fact, said program coordinator Thomasina Gurule of Business Planning and Budgeting (BUS-3), the program has been so successful that she needs more equipment to meet the demand and volunteer technicians to help set up computers given to nearby schools.

The giving program began in the spring of 2000 after Laboratory Director John Browne proposed to the Department of Energy that a new process be developed to provide educational institutions and nonprofit organizations with excess equipment more expeditiously.

Items eligible to be declared excess and donated to educational institutions include computers, computer accessories, photographic equipment, communication equipment, measuring tools, and special industrial and metalworking machinery.

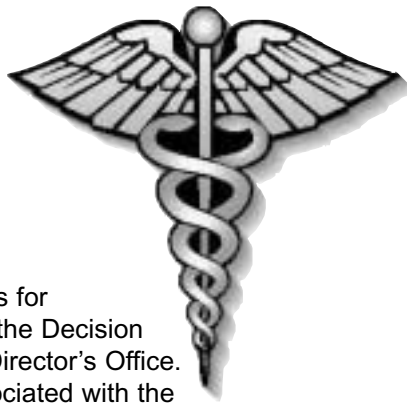
Check the Feb. 28 issue of the online Daily Newsbulletin (www.lanl.gov/newsbulletin) or call Gurule at 5-8079 for more information about the program.



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Health-care plans analyzed



An analysis of health-care plans and services for Laboratory employees has been completed by the Decision Applications (D) Division at the request of the Director's Office.

The study compared costs and benefits associated with the Lab's health-care plans to state and national figures. It found that the health-care plans for employees provide excellent coverage at well below the average premium costs.

The 184-page public report is available online at <http://www.lanl.gov/worldview/welcome/LA-UR-01-779.pdf> (Adobe Acrobat Reader required).

Information from the study has been, and will continue to be, presented in L.A.N.L.

Lab scientist watches ...

continued from Page 1

NEAR in orbit around the asteroid when cosmic rays were at a minimum and also forced NEAR to orbit at a greater distance from the asteroid than planned. Having fewer cosmic rays and being farther from Eros meant the GRS was picking up very weak gamma-ray signals — generated when cosmic rays slam into the nuclei of the asteroids' atoms — and so the data Reedy and his team members were getting weren't nearly as good as they had hoped.

Reedy said, "We were just planning to extract the little data we had gotten, but now we are getting a bonus.

"We knew the GRS was built to be rugged because it has to withstand the launch, but we weren't optimistic the spacecraft would survive the landing. The spacecraft didn't have any feet — it wasn't designed to land, just to orbit, so we all assumed the spacecraft had crashed," he said. But later, when Reedy and his colleagues found out NEAR had not only survived the crash, but had landed in an orientation to possibly allow their instrument to be turned back on and transmit data, they scrambled to put together a proposal to NASA to do so.

"Our request was doable," said Reedy, "so NASA did it. We didn't really think they would though, so we were extremely excited when they agreed.

The data we get from the surface could be a factor of 10 times better than what we got in orbit. We can now give a far better computational analysis with much less uncertainty.

"We have never directly measured the elements in an asteroid. We've done it for the moon, but never an asteroid. This is the first measurement of elemental composition of an asteroid. These measurements have allowed us to rigorously make the connection between asteroids and meteorites.

"This asteroid probably hasn't changed for 4.5 billion years. It gets us as far back as anything. You have to look hard on Earth to find something even one billion years old. On the moon you can find things three to four billion years old, but we need something to tell us about the first half billion years of our solar system's formation," Reedy said.



Robert Reedy

ISM Corner

The first guiding principle: Management Commitment and Worker Involvement

ISM is an employee-based safety and environmental management system. Managers are visibly committed to the implementation and sustained execution of all elements of the system, and workers exhibit continual involvement in the system by understanding and using ISM elements in their work. For more information go to the ISM Description Document at <http://www.lanl.gov/orgs/ism/>.



The National Nuclear Security Administration recently celebrated its first birthday since becoming the Lab's new boss. Laboratory Director John Browne has said he intends for Los Alamos to be the NNSA laboratory of choice and a key player in the success of NNSA.



LANL, the Laboratory bi-weekly publication for employees and retirees, is published by the Public Affairs Office in the Communications and External Relations (CER) Division. The staff is located at TA-3, Building 100, and can be reached by e-mail at newsbulletin@lanl.gov, by fax at 5-5552, by regular Lab mail at Mail Stop C177, or by calling the individual telephone numbers listed below.

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Science creating our future

The role of basic research in a national security laboratory



A guest editorial by Susan Seestrom, Physics (P) Division director

Our national security mission demands significant operational and overhead costs, making basic research at Los Alamos expensive, especially when compared to a single-purpose lab or a university. So, why is basic research important here? Because of the dynamic synergy that can develop between basic research and the applied research mission, in which both activities are able to benefit and flourish. Our 58-year history exhibits innumerable examples of this synergy from the Nobel prize-winning research of Fred Reines and Clyde Cowan in discovering the neutrino to current-day proton-radiography and quantum-information-science programs.

Basic research is most valued as the engine for new ideas and technologies that feed back to benefit the core mission of the Laboratory. First-rate basic research activities also serve as a magnet for the best scientific talent, who then may contribute to our national security mission. A possibly under-appreciated benefit is that basic research nurtures a culture of disciplined scientific inquiry and peer review, essential to any future one can envision for the Lab.

On the other hand, basic research benefits significantly from the diverse array of resources available at a multi-disciplinary lab, from facilities, equipment and computational power to intellectual expertise that spans all scientific disciplines. We can accomplish research goals easily at Los Alamos that would be difficult to impossible elsewhere. Researchers also have ample opportunity to apply their expertise and skills to problems of broad national interest.

The creation of the Los Alamos Meson Physics Facility (LAMPF) provides a case study of the synergy that can

develop between basic and applied research. LAMPF, a high-power 800 MeV proton accelerator, was the flagship of nuclear science in this country for nearly 20 years. Scientists in the Physics (P) Division conceived of and created LAMPF. Many of the scientists and engineers who were attracted to Los Alamos by the unique capabilities of LAMPF are now engaged in mission-focused programs in the Physics, Chemistry (C), Theoretical (T), Dynamic Experimentation (DX), Applied Physics (X) and Environment, Safety and Health (ESH) divisions and other divisions. The LAMPF facility enabled other scientists to invent and build the proton storage ring and the Weapons Neutron Research Facility. From those facilities, programs such as accelerator transmutation of waste, accelerator production of tritium and proton radiography were spawned and more scientists were attracted to the Lab.

In order that the Lab continue to derive that dynamic synergy, we must foster the necessary conditions and culture. We can create groups that function broadly and encourage our scientists to look beyond their normal sphere of activity to contribute to an even broader set of problems, and we can encourage program managers to look beyond current technologies to new ideas for solving problems. If we continue to successfully nurture the atmosphere of creativity and synergy at Los Alamos, we will remain a premier resource to the country's national security mission for the next 50 years.

Lab is top contributor to two United Way campaigns



Laboratory employees pledged or donated \$92,840 to the United Way of Santa Fe's 2000 campaign, making the Laboratory the top contributor to the campaign. The figure includes about \$9,000 from the not-for-profit Los Alamos National Laboratory Foundation.

The amount also is the largest ever donated by one organization to the United Way of Santa Fe County.

The Lab was recognized for the effort at an awards reception in Santa Fe last month.

University of California Lab employees also pledged or donated \$613,000 to the Los Alamos/Northern New Mexico 2000 campaign, which raised a total of \$966,000.

Benefits Buzz

The Laboratory health-care plan is a self-insured, self-funded plan similar to a cooperative. The University of California and UC employees jointly pay the actual cost of most of the health care for employees that is specified in the plan. UC outsources an "administrative services only" contract for implementation and administration to a third party, currently Blue Cross/Blue Shield of New Mexico.



Laboratory scientists are watching **simple knots** untie themselves in order to better understand how granular materials flow and how filamentary objects like DNA molecules tangle. The research was published in the Feb. 19 issue of *Physical Review Letters*. Eli Ben-Naim of Complex Systems (T-13) said, "Understanding the physical mechanisms governing the relaxation of knots is actually quite crucial to characterizing the flow and deformation properties of materials like polymers, gels and rubber." The knot-untying experiments by Ben-Naim and his colleagues allow the comparison of real-world phenomena to theory.

Technology that could ease the transition from the present analog television to **high-definition television** is being developed at the Lab. The technology developed by George Nickel of Hydrodynamics and X-ray Physics (P-22) is a new transmission algorithm capable of compressing an HDTV data stream to the point where HDTV and analog TV signals can be broadcast over the same channel.

This would enable television networks to avoid spending millions on separate transmission systems. Congress has mandated that HDTV be the required format for broadcasting TV signals by 2006.

Two Laboratory researchers have mapped the life cycles of **El Niño events** and identified categories of patterns that may lead to a model able to predict the weather occurrences up to a year in advance. Aaron Lai and Zhen Huang of Atmospheric and Climate Variations (EES-8) presented their findings at a symposium of the American Meteorological Society in Albuquerque. Although knowledge of the El Niño phenomenon is increasing, scientists still are unable to predict when it will occur.

The first large-scale pictures of the behavior of **Earth's magnetic force field** confirm the existence of a suspected, but previously invisible, "tail" of electrified gas. The tail, which streams from Earth toward the sun, was detected by NASA's Imager for

Magnetopause-to-Aurora Global Exploration, or IMAGE, spacecraft, whose imaging technology offers unprecedented views of Earth's magnetosphere. The instruments aboard IMAGE include a Lab-developed sensor called MENA, for Medium-Energy Neutral Atom imager, which captures data on energetic neutral atoms.

The Laboratory has received \$900,000 from the Department of Energy for **olefin/paraffin separation research** using membranes to replace distillation processes at plastics processing plants. BP Amoco is the Lab's industrial partner for the project, which could lead to savings of more than \$250 million annually in energy costs and to a significant reduction in greenhouse gas emissions. Researchers in Polymers and Coatings (MST-7) are working on the project.

Community leaders surveyed



by Steve Sandoval

Community leaders surveyed in Santa Fe, Los Alamos and Rio Arriba counties praise the Laboratory's educational programs and the Los Alamos Laboratory Foundation's community outreach efforts, while recognizing the Lab's economic force in the area.

They say, however, that the Laboratory needs to do a better job communicating with Native Americans and in the area of Lab partnerships with state government entities.

"No matter what types of new programs or program improvements that [the Laboratory] decides to make now or in the future, it is essential that more is done to improve communication with community leaders," states the survey report.

The telephone survey, conducted for the Laboratory by Research and Polling Inc., queried 162 government, business, education, tribal, special interest groups and Department of Energy community leaders.

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Postdoctoral Publication Prize in Experimental Sciences

Nominations are being sought for the Postdoctoral Publication Prize in Experimental Sciences. This biennial prize, sponsored by Damon Giovanielli and the Laboratory, is awarded for the best article in experimental sciences published or accepted for publication after Jan. 1, 1998.

The winner will receive a certificate and \$500 during an award ceremony and will present a colloquium regarding the work described in the winning publication.

The nomination deadline is at the close of business April 5. For more information, call Mary Anne With at 5-5306 or see the Jan. 23 Daily Newsbulletin at <http://www.lanl.gov/newsbulletin>.



Laboratory technology and people continue to make news in New Mexico and around the country. Here's a recent sampling:

Bob Reedy of Space and Remote Sensing Sciences (NIS-2) was interviewed by several **New Mexico newspapers** about the "little satellite that could," aka NEAR-Shoemaker (see story on Page 1). Reedy is a member of the team that put a gamma-ray spectrometer on the spacecraft, which continued to send data for several days after its unexpectedly successful landing on the asteroid EROS.

Physics Today reported on the selection of Susan Seestrom as the leader of the Lab's Physics (P)

Division, noting that she is the first woman to hold the job. It quoted Seestrom as saying she hopes to be a model for women who want to have a life as well as a job. Her appointment also was reported in the January issue of **DOE News**.

USA Today reported in its Feb. 21 issue about the Lab-developed technology called SCORR (see the Feb. 8 issue of L.A.N.L.), saying the technology has the potential to all but eliminate hazardous corrosives in the production of computer chips. SCORR also scored in the Feb. 21 issue of **Chemical Week**.

Research into the secret of simple knots was written up in the **Albuquerque Journal** on Feb. 21. The story said Laboratory scientists believe that understanding how knots unravel will provide important clues into how genetic material, polymers and other things work. It said about 30 scientists from other institutions already had visited the Lab to find out more about the research.

Discover magazine wrote in its March 3 issue about Laboratory research into ways of creating fusion energy in a cylinder about the size of a can of soda (see the Jan. 11 issue of L.A.N.L.). Headlined "Hot Fusion in a Can," the article quoted Richard Siemon of Science and Technology

Base Programs (STB-FE) as saying a demonstration unit costing less than \$1 billion could be ready within 20 years.

In its Feb. 24 report on an apparent big jump in the temperature at which a specific compound becomes superconducting, the **Washington Post** quoted Dean Peterson, head of the Lab's Superconductivity Technology Center. Peterson told the newspaper that the announcement gives researchers something new to investigate, which he said is "always exciting."

ISSM Corner

ISSM asks the question: How do you know?

Through Integrated Safeguards and Security Management, all workers must become aware of the security vulnerabilities associated with their work and workplace and have confidence in their mitigation. This includes being able to respond positively and confidently to the following questions:

Do you perform your work securely? Is your workplace secure?

How do you know? Do you know the security requirements governing your work/workplace and how they are being met? Do you know the security vulnerabilities in your work/workplace and whether controls are sufficient to mitigate them?

If you are unable to answer these questions, or are just unsure of the answers, you should discuss them with your supervisor. Your organization's OSSO (Organizational Safeguards and Security Officer) also is a valuable resource, along with Security (S) Division's "one-stop" Security Help Desk at 5-2002 or security@lanl.gov. Security — it's everyone's responsibility.

Community leaders ...

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It was commissioned to measure the Laboratory's and University of California's perceived progress in responding to the needs of communities in Northern New Mexico and the community leaders' awareness and satisfaction levels of specific Lab programs and activities.

"The community leader surveys were one of a number of so-called 'off-ramp' provisions of the Laboratory's contract with the university," said Albert Jiron of the Community Relations Office (CRO). "However, even today after Los Alamos has already met the off-ramp requirements, we believe it is important that we continue seeking input from these leaders through additional surveys and by continuing to address all the off-ramp areas in regional involvement."

More information about the survey can be found in the Feb. 26 issue of the Daily Newsbulletin at <http://www.lanl.gov/newsbulletin> or at http://www.lanl.gov/orgs/cr/LANL_survey2000_.pdf online.



Alan Hurd

Alan Hurd has joined the Laboratory as director of the Manual Lujan Jr. Neutron Scattering Center at the Los Alamos Neutron Science Center (LANSCE). Hurd also will manage the Lab program for interacting with the

Department of Energy's Office of Basic Energy Science in Neutron Scattering and serve as group leader for LANSCE-12. He comes to the Lab from Sandia National Laboratories, where he had served in a number of senior technical and management positions since 1984. Hurd earned a bachelor's degree in engineering physics from the Colorado School of Mines and master's and doctoral degrees in physics from the University of Colorado.



Michelle Thomsen

Michelle Thomsen has been named a fellow of the American Geophysical Union. She was cited for her fundamental contributions to the physics of collisionless shocks and the Jovian and terrestrial

magnetospheres. Thomsen received a doctorate in physics from the University of Iowa in 1977. She did postdoctoral work at the University of Iowa and the Max Planck Institute for Aeronomy in Germany before coming

to Los Alamos in 1981. She became a Lab Fellow in 1997. Currently she is the space physics team leader in Space and Atmospheric Sciences (NIS-1). Thomsen will accept her honor and certificate at the AGU meeting in December in San Francisco.

Terry Conner is the new group leader of Procurement (BUS-5), the 106-person office that does the majority of purchasing for the Laboratory. A U.S. Navy veteran,



Terry Conner

Conner joined the Laboratory in March 1991 as a senior contract administrator. He has supervised a number of teams that oversaw construction and equipment purchases, automated data processing and complex subcontracts. As acting BUS-5 group leader, Conner developed a new procurement approach

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Employees officiate at Native American Science Bowl

Several employees officiated at the recent 10th annual Native American Science Bowl, which was co-sponsored by the Laboratory. The winners of the event, which was held in Colorado Springs last month, compete in the Department of Energy's National Science Bowl.

Participating from the Lab were **Carl Hoth, Eliud Vigil, Denise Thronas, Vera Aguino, Paul Moniz, Michael Lopez, Julie Lanterman, Annabelle Salazar and Ron Wieneke**, all of the Nuclear Materials Technology (NMT) Division; **Roger**

Byrd of the Nonproliferation and International Security (NIS) Division; **William Eklund** of Laboratory Counsel (LC); and **Sharon Eklund** of the Security and Safeguards (S) Division. Their participation was coordinated through **Barbara Grimes** of the Community Relations Office (CRO).

About 40 teams of high school students from schools across the country competed in this year's Native American Science Bowl. Teams from Ignacio and Montezuma-Cortez high schools in Colorado advanced to the national competition, which will be held in Washington, D.C., in May.

Two recognized for assistance

Former Laboratory Director Sig Hecker, right, and James Toevs, center, of Russian Nonproliferation Programs (NIS-RNP) hold plaques that recently were presented at the Lab. The Department of Commerce recognized Hecker, now a Senior Laboratory Fellow in the Materials Science and Technology (MST) Division, and Toevs for their assistance in relocating computer equipment from a secure area of the nuclear weapons laboratory in Sarov, Russia, to the Sarov Open Computing Center, a civilian, commercial enterprise. At left is Mark Menefee of the Department of Commerce, who presented the awards. Photo by LeRoy N. Sanchez



In Memoriam

Lawrence W. Hantel

Laboratory retiree Lawrence W. Hantel died Feb. 1. He was 62. Hantel received both his bachelor's and his master's degrees in physics from Michigan State University. After working two summers as a graduate research assistant, he permanently joined the Lab July 1962 as a staff member in the former GMX-2 group. At the time of his retirement in 1995, Hantel was a program manager in the Dynamic Experimentation (DX) Division.

This month in history

March service anniversaries

35 years

Jose Arellano, ESA-FM-ESH
Lyle Edwards, ESA-WE
Gomer Gray, DX-1
Sara Helmick, C-FM
Leonard Stovall, ESA-EPE

30 years

Arthur Adair, DX-7
Richard Benavides, ESA-WMM
Harvey Haagenstad, LANSCE-1
Theodore Handel, D-DOD
Alex Lopez, ESA-WMM
Fidel Maestas, ESH-3
Patrick Martinez, E-ET
Sylvia Trujillo, DX-1
Gary Wall, X-4

25 years

William Barr, BUS-5
Glenn Bentley, C-AAC
Katherine Campbell, D-1
Robert Critchfield, DX-4
Jerry Dick, DX-1
Fraser Goff, EES-6
Sandra Hildner, NMT-4
Susan Huggard, MST-DO
Paula Knecht, BUS-1
Petronilla Lopez, DX-4
Walter Lysenko, LANSCE-1
Robert Steinke, D-10
Leslie Trujillo, D-7
Mark Wilder, B-N2

20 years

Jane Beck, BUS-5
Nancy Boudrie, X-DO
Mary Bowen, CIO-PO
Helen Bustos, EES-10
Gregory Canavan, P-DO

Newsmakers ...

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that focuses not on what tasks are performed, but for whom they are performed. He earned a bachelor's degree in business administration and economics from LaGrange College in LaGrange, Ga., and a master's degree in management from the Navy's postgraduate school.

Darlene Colombe, P-DO
Charles Davis, NMT-16
Veronica Gomez, MST-7
Brenda Griego, NMT-2
Doris Harvey, NMT-4
Laurie Hixson, NIS-CSSE
Laura Jarvinen, C-AAC
Marcia Jones, EES-10
Michael Maloney, ESH-3
Larry Marek, P-25
Carla O'Rear, BUS-5
Dennis Schneider, ESA-EPE
Wayne Taylor, NMT-11
Michelle Thomsen, NIS-1
Kurt Tiefa, BUS-2
Andrew Zardecki, X-8

15 years

Fairley Barnes, EES-10
John Edwards, D-10
Stuart Flicker, ESA-WE
Jeffery P. Hill, ESA-DE
Jeffrey O. Hill, SNS-04
Craig Idler, CCN-5
Walter Martinez, FWO-FIRE
Donald Montoya, IM-1
William Radzinski, FWO-SEM
Richard Salazar, NMT-7
Mark Schmitt, X-1
Tsutomu Shimada, P-24
Joe Silva, ESA-WMM
Terry Taddeucci, LANSCE-3
Gregory Valentine, EES-6

10 years

William Ambrose, B-N2
Terrence Conner, BUS-5
Andrew Dubois, CCN-5
C.J. Fresquez, BUS-DO
Steven Hopkins, SNS-03
Luis Pocaterra, NMT-8
Jay Sessions, HR-7-DS

5 years

Gerald Ansell, B-DO
Susan Barns, B-N1
John Darby, D-11
Irene DeBaca, LANSCE-5
William Hinckley, P-22
Janet Marchi, ESH-2
L. Christine Rodriguez, BUS-2
Joe Romero, NMT-2
Jose Velarde, P-24
Theresa Wilson, E-PPC

March

1781 — The Continental Congress adopts the Articles of Confederation

1862 — Confederate and Federal forces fight the Battle of Apache Canyon, N.M., with the Federals claiming victory

1915 — The national Advisory Committee for Aeronautics, the forerunner of NASA, is created with an annual budget of \$5,000

1946 — The first issue of the Los Alamos Times, a nonprofit weekly newspaper, is published

1947 — The Trapp Family Singers, including Baroness Maria Von Trapp and her seven daughters, entertain members of the Los Alamos Community Concert Association

1949 — Electricity is first produced from an atomic pile at Oak Ridge, Tenn.

1982 — The space shuttle Columbia lands at Northrop Strip on the White Sands Missile Range in southern New Mexico

2000 — The National Nuclear Security Administration formally begins operations within the Department of Energy



Volunteer opportunities

Available on the Community Relations Office (CRO) Web site

http://www.lanl.gov/orgs/cro/cr_volunteerop.html

Life is a mystery for writer

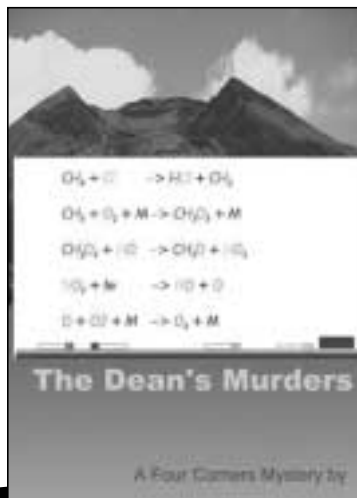
by Michael Carlson

Howard Hanson loves a good mystery, especially one printed on demand.

A group leader and technical writer with Atmospheric and Climate Sciences (EES-8), Hanson is part of a growing number of writers who are bypassing traditional publishing houses for a chance to be read on the Internet. His recently published book, "The Dean's Murders: A Four Corner Mystery," is the first in a series about a college dean who solves crime.

The setting is modeled slightly after the real Fort Lewis College in Durango, Colo. A chemistry professor involved in the manufacture and sale of drugs is killed. The fictitious dean of the school sets out to solve the murder, but becomes a target of the killer himself.

"I transformed Fort Lewis into a research university; therefore it is definitely not Fort Lewis," said



The following is an excerpt from "The Dean's Murders."

"The nightmare had happened so many times that it was becoming familiar and predictable. Bortle almost knew when he would wake up, trembling and drenched in sweat. They were holding Frank down but he was screaming and wiggling uncontrollably. Sal finally whacked Frank on the jaw just in front of the ear with the pistol and knocked him out. But Frank's arm jerked ...

"But why didn't the banging stop when he woke up? Oh. It was somebody pounding on the metal garage door. Bortle looked at the clock: 10:15 a.m. Well, at least he wasn't too hung over. 'Hang on, there! This is the La Plata county sheriff, and we have a warrant to search the premises. Open immediately or we'll break the door in!' Bortle was too asleep to understand anything else except that somebody was using his full name, which never happened, and threatening the imminent destruction of his door, so he stumbled over and opened it before remembering the horrible implication of a search of the place."

Hanson. "My Durango is very different because of such transformations."

Hanson's love for mystery began as a child. He explained that his elementary school library had a machine that kept track of how fast students read. For unknown reasons, he selected the biggest book in the library, a Sherlock Holmes mystery. He was immediately hooked and eventually read the entire collection by Sir Arthur Conan Doyle.

"There are two extremes in which one writes," said Hanson. "Some write with a complete outline of everything that happens. Others begin writing with only an idea in mind." He considers himself to be in the middle of this spectrum.

Hanson is responsible for the design of the book cover. The equations pictured are actually a formula for how air pollution works. However, Hanson admitted that there is a typographical error in the formula.

"It's a joke for the in-crowd (those in the scientific world)," said Hanson.

The grandson of a naturalist, Hanson likes the idea of books-on-demand, a way of selling writing without wasting trees.

"I don't need my ego stroked in having boxes of books," he said.

Hanson graduated from the University of Miami in 1979 with a doctoral degree in atmospheric sciences and spent 16 years at the University of Colorado, Boulder where he worked with faculty on understanding various aspects of Earth's climate.

The book is available for download at 1stbooks.com. Copies also can be purchased at bookstores and other online booksellers.



Howard Hanson

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