

LANL

LOS ALAMOS NEWS LETTER

A publication of Los Alamos National Laboratory

Vol. 3, No. 6 • April 4, 2002

Los Alamos/Livermore teams complete first 3-D simulations of a nuclear weapon

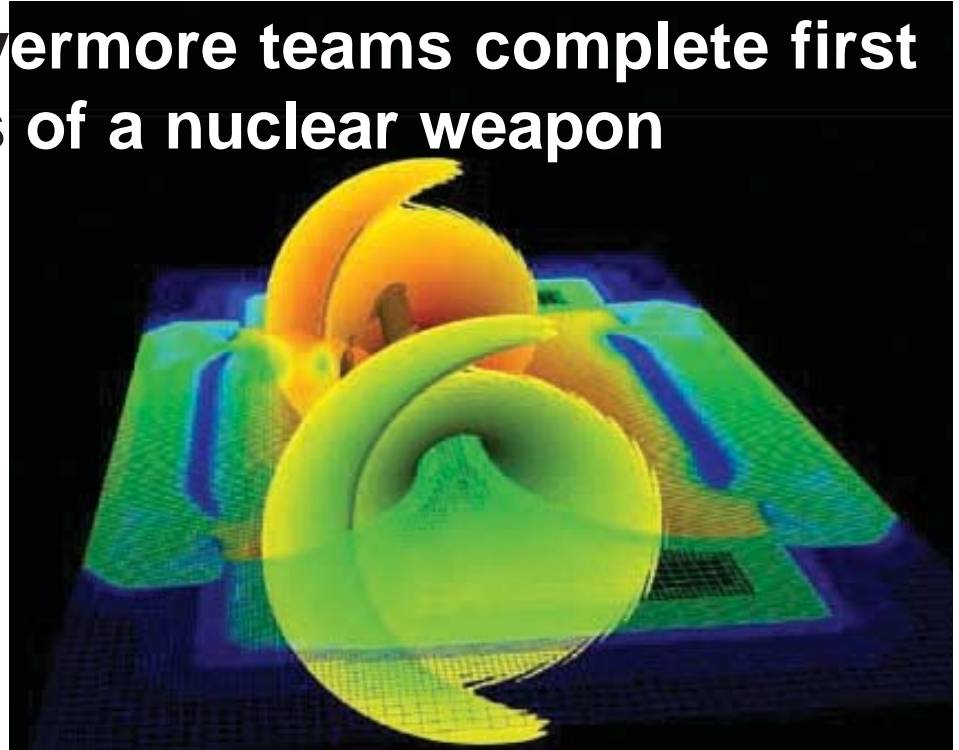
The National Nuclear Security Administration recently issued a news release about the first full-system three-dimensional simulations of a nuclear weapon explosion, a significant achievement for Los Alamos, Science Applications International Corp. and Lawrence Livermore National Laboratory.

These simulations signify completion of an important milestone in the maturing of NNSA's Stockpile Stewardship Program, which is responsible for maintaining the safety, security and reliability of the nation's nuclear deterrent.

Two years ago, Los Alamos and Livermore scientists completed the first 3D simulations of, respectively, a weapon secondary and a weapon primary, the two stages of modern nuclear weapons. The new simulations build on the experience gained in those achievements to enable simulations of a weapon's complete operation.

Being able to simulate a complete weapon system allows national laboratory researchers to examine key physics issues through a combination of simulation, precision experiments and analysis of data from past nuclear tests.

"Our simulation was run remotely from Los Alamos on the White machine at Livermore, more than 1,000 miles away," Los Alamos' Crestone Project Leader Bob Weaver



The Crestone Project team produced this visualization from a simulation done by Randy Kanzleiter of Thermonuclear Applications (X-2) in support of hydrodynamic validation experiments performed at the Shiva Star facility at Kirtland Air Force Base. Bob Greene of High-Performance Computing Environments (CCN-8) used EnSight Visualization software to generate the image, which shows an adaptive mesh (lower center region) in a single plane.

explained. "Thanks to the secure network connecting the laboratories, this remote computing effort worked almost as easily as computing on a local supercomputer at Los Alamos."

Other members of the Crestone Project team are the senior code architect of the Crestone Project, Michael Gittings of SAIC and X-2; Bob Boland of SAIC who oversaw the day-to-day running of the simulation, essentially a 24-hour, seven-day-a-week job for more than seven months; Rob Oakes

and John Fowler of Computational Science Methods (X-8); Rich Holmes of X-2; Robert Kares of Plasma Physics (X-1); Ray Alcouffe and Scott Turner, both of Transport Methods (CCS-4); Robert Greene of High-Performance Computing Environments (CCN-8); Tom Betlach, David Harris and Michael Clover, all of SAIC; and Patrick Fay of Intel Corp.

To read the NNSA release, go to http://www.nnsa.doe.gov/docs/2002-03-07-ASCI_Milestone_Release.pdf.



Protecting against 'dirty bombs' and other nuclear devices

by John R. Gustafson



Don Cobb

Calling for a systematic approach that provides "defense in depth" against a range of threats posed by nuclear terrorism, Los Alamos Associate Director for Threat Reduction Don Cobb outlined a number

of efforts that should be undertaken to protect against radiological dispersal devices — so-called "dirty bombs — and other nuclear devices.

Creating a nuclear search team in Russia, expanding an existing nuclear material accounting and control program, and developing new detection technologies and forensics capabilities are among the efforts that could increase protection against nuclear-based threats.

"Implementing these response measures in the United States is not enough. We need to make sure that other countries have them as well, and Russia should be at the top of the list," Cobb said in testimony before the Senate Committee on Foreign Relations last month.

Cobb said "a systematic approach

is possible against the spectrum of nuclear terrorist threats, but it will take much hard work and continued investments to achieve."

Radiological dispersal devices couple explosives with nuclear materials not to achieve a nuclear yield but rather to contaminate an area with radiation.

Cobb described an ongoing effort with Russia that has placed under secure accounting literally tons of weapons-grade plutonium and uranium. "Can we extend the program to cover radiological sources as well as weapons-usable materials? ... The answer appears to be yes."

Radiological sources are widespread and have fewer controls than those in place for weapons-usable nuclear materials. Cobb noted that export controls for weapons-usable materials could be extended to include other radiological sources.

Existing technologies to detect and intercept weapons-usable nuclear materials as they cross borders could, with modest modifications, effectively spot smuggled radiological sources, which generally have much stronger radiations signatures than

uranium and plutonium, Cobb said.

Still, better technology is needed to detect and intercept nuclear materials of all sorts concealed in luggage, packages or shipping containers, Cobb said.

Cobb noted the capabilities of the Nuclear Emergency Search Team, a National Nuclear Security

continued on Page 4



The Los Alamos News Letter, 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 in the IT Corp. Building at 135 B Central Park Square 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.

Editor:

Jacqueline Paris-Chitanvis, 5-7779

Associate editor:

Judy Goldie, 5-0297

Managing editor:

Denise Bjarke, 7-3565

Graphic designer:

Edwin Vigil, 5-9205

Contributing photographers:

John Bass, 5-9204

Michael Carlson, 5-4610

LeRoy N. Sanchez, 5-5009

Joshua Smith (IM-1), 5-3179

Contributing writers:

Jim Danneskiold, 6-1640

Michael Carlson, 5-4610

Judy Goldie, 5-0297

John Gustafson, 5-9197

Kathryn Ostic, 5-8040

Kevin Roark, 5-9202

Joshua Smith (IM-1), 5-3179

Fran Talley, 7-5225

Lecole Trujillo, 7-7000

Los Alamos National Laboratory is operated by the University of California for the National Nuclear Security Administration (NNSA) of the U.S. Department of Energy and works in partnership with NNSA's Sandia and Lawrence Livermore national laboratories to support NNSA in its mission.

Los Alamos enhances global security by ensuring safety and confidence in the U.S. nuclear stockpile, developing technologies to reduce threats from weapons of mass destruction and improving the environmental and nuclear materials legacy of the cold war. Los Alamos' capabilities assist the nation in addressing energy, environment, infrastructure and biological security problems.



Printed on recycled paper. Please recycle.

ScienceDay2002 Making the World a Safer Place



Second annual Science Day on April 17

The Laboratory's second annual Science Day is scheduled for April 17. All employees are invited to attend. This year's theme is "making the world a safer place," which captures the essence of the Laboratory's vision.

Science Day includes presentations by Lab researchers, poster sessions and tours of the proton radiography facility at Technical Area 53.

Presentations are scheduled from 8 a.m. to 5 p.m. in the Jemez and Cochiti rooms of the J. Robert Oppenheimer Study Center and will be simulcast on LABNET at both the Administration Building and the Physics Building auditoriums at Technical Area 3. Poster sessions will begin at 1:15 p.m. in the Santa Clara Gallery of the Study Center.

Gen. John Gordon, administrator of the National Nuclear Security Administration, originally conceived Science Day. This event provides an opportunity for NNSA laboratories to highlight some of their most recent science and engineering accomplishments.

For more information and a listing of the speakers and their talks, visit the Science Day 2002 Web site at int.lanl.gov/science/sciencedays.shtml.

Local school girls expand their horizons at the Laboratory

by Lecole Trujillo

The Laboratory's annual Expanding Your Horizons technical career workshops for young women reached out to surrounding communities last month to educate and inspire girls in junior high and high school to get involved in math, science and technical fields.

About 100 students from two dozen local school districts participated in various workshops demonstrating the importance of math and science. Female scientists, engineers and professionals from the Laboratory and the area led the workshops at the Lab and the Los Alamos Research Park.

The girls were randomly placed in groups to interact and experience the workshops with new people. The groups were assigned to make a functioning boat out of foil and to make an advertisement to market their product. Each group attended two workshops, one in the morning and one in the afternoon.

Workshops ranged from the biology of tuberculosis, to creating a presence on the Web, crystal growth, designing the ultimate motion machine, dynamic material testing, fun properties of fluids, health and wellness in the workplace, making "ooey goey" polymers, preserving the past, robotics, scanning electron microscopy, tails of a veterinarian, and toys and science.

Christine Crowder, a 10th grade student at McCurdy High School in Española, is interested in engineering and graphic design. She attended the "Fun Properties of Fluids" workshop. "The learning process of the workshops introduced me to these disciplines and will be helpful to me in the future,"



Christine Crowder, left, a 10th grade student at McCurdy High School in Española; Victoria Roybal, center, an 8th grade student at Española Middle School; and Amber Lovato, also an 8th grade student at Pojoaque Middle School, have a hands on experience in the "Fun Properties of Fluids" workshop presented by Katherine Prestridge of Hydrodynamic Applications (DX-3). Photo by LeRoy N. Sanchez

said Crowder. "Science isn't boring like people think; it's actually really interesting and fun. More girls should get involved."

Toni Marie Sprague, a freshman at Coronado High School in Gallina said, "I want to become a veterinarian because I love animals. My love for animals got me interested in math and science because I need to know these subjects to take better care of my future patients."

Kyndra Garcia, an eighth-grade student at Pojoaque Middle School, said she wants to be a crime-scene investigator. "It is really interesting how math is involved with being a doctor," Garcia noted, adding that Wednesday's workshops also taught her more about engineering.

The Los Alamos chapter of EYH is sponsored by the New Mexico Network for Women in Science and Engineering and the Los Alamos Women in Science.

ADO and ADSR employees briefed on reorganization

Employees in the Operations and Strategic Research directorates were informed last month of organizational changes that will result in consolidation and movement of functions related to environmental compliance and operations.

The changes primarily affect the Environmental Science and Waste Technology (E) and Environment, Safety and Health (ESH) divisions but also touch on Earth and Environmental Sciences (EES), Chemistry (C) and Facilities and Waste Operations (FWO) divisions.

The reorganization has been in the planning stages for several months as senior managers considered various options that would respond to the request of

continued on Page 5



Saturday, April 13
8 a.m. to 3 p.m.

Access to secure areas for pre-registered participants
from 10 a.m. to 2 p.m.

For more information, go to the Family Day Web site at
<http://www.lanl.gov/familyday>.



Traveling with laptop computers

by Kevin Roark

If you take a laptop or notebook computer with you on either official or unofficial travel, especially if you are going to a sensitive country, it is imperative that you maintain positive control of the computer at all times.

While on official government business in a sensitive country, travelers have been confronted by security forces and have had their laptop computers confiscated, according to Internal Security. The computers are eventually returned to the travelers, but only after being "secured" out of U.S. control. Occasionally travelers report evidence that their laptop computers appear to have been tampered with or have been temporarily misplaced while on travel.

It is important to remember that if you cannot ensure that you have had complete and immediate control of your laptop or notebook computer while on travel, it may need a comprehensive forensics examination upon your return to work.

For more information, contact ISEC at 5-6090.

UC organization holds first-ever meeting at Los Alamos

Fernando Quintana, left, of Facilities and Waste Operations (FWO) discusses one of the displays in the Bradbury Science Museum with Karleen Meaker of the University of California, Santa Cruz. In March, members of the Council of University of California Staff Assemblies held its first-ever meeting outside the state of California. The two-day meeting began with a tour of the museum and presentation by BSM Director John Rhoades. There also were presentations and questions-and-answer periods with Rich Marquez, associate director for administration; Allen Hartford, Science and Technology Base Programs (STB) Office leader; and William "Buck" Thompson, Weapons Physics Directorate chief of staff. Quintana is chairman of the Laboratory's Employee Advisory Council and the senior delegate to CUCSA. Meaker is the senior delegate from UC Santa Cruz. Photo by John Bass

Protecting against ...

continued from Page 2

Administration group consisting largely of volunteer experts from the NNSA labs whose duties are to search for nuclear devices and protect people and the environment from harm.

Given the heightened threat of nuclear terrorism, NEST capabilities should be expanded through increased practice and training, investments in science and technology needed for effective radiological decontamination of wide areas, better analysis for forensics and attribution.

A Russian nuclear emergency team similar to the NNSA NEST

program "would be in our mutual interest," Cobb said.

"The ability to locate and recover nuclear materials, including weapon-usable material or radiological sources, before they get out of the country should be a top priority," said Cobb.

He who laughs, lasts

The medicinal value of laughter has been well established. Besides making those around you feel good, it can improve the immune system, enhance blood circulation, speed up tissue healing and reduce stress. So make an effort to improve your laugh life.

Source: American Institute of Preventive Medicine



Students give learn-while-you-earn program high marks

by Michael Carlson

Life at the Lab may run a little smoother because of those who journey through the Electromechanical Technician Program, a collaborative effort between the Laboratory and the University of New Mexico, Los Alamos. As participants in a two-year certificate program, students are trained in the areas of drafting, computers, electronics and shop practices.

Students enrolled in the program work at the Laboratory as part of course requirements through a limited-term appointment. Those who earn a certificate in the program may be eligible for full-time, regular employment at the Lab.

Two recent high-school graduates are using the program as a stepping-stone toward independence and fulfillment, while a "baby boomer" sees the program as an opportunity that allowed him to make a life change.

Before completing the program five years ago, Joe Strotman was a baker in the grocery business. But he grew tired of the long hours and few days off that come with managing a bakery department. After seeing an ad in the local paper for the electromechanical program, Strotman realized he could get a job at the Laboratory without a background in science.

Strotman currently works in High Power Microwave, Advanced Accelerator and Electrodynamic Applications (NIS-10). He has had a variety of responsibilities that have

included work on vacuum systems and ensuring that machine shops are in working order.

"I can feel good about something, whether it's contributing to the advancement of science or something else. I don't want to just collect a paycheck," said Strotman.

Adam Pacheco of the Electronic and Electromechanical and Device Group (MST-11) is finishing the final semester of the program. Pacheco, who came to the Lab a few years ago as a high school co-op student, anticipates being hired as a regular employee within his group.

Working with electronics, Pacheco wires circuit boards and designs mechanical devices, an interest he developed while attending high school in Española. After completion of the certificate program, Pacheco said he intends to further his education in electromechanical engineering while maintaining regular, full-time employment at the Lab.

A former environmental science major, David Lujan eventually plans to pursue a bachelor's degree in electromechanical engineering. But for now, he's pursuing a certificate at UNM-LA and working in Neutron and Nuclear Science (LANSCE-3).

"We have a one-of-a-kind program. There are a variety of experiments. We need someone who can do just about anything," said Deputy Group Leader Bruce Takala.

Takala helps administer the electromechanical program for LANSCE-3.



David Lujan of Neutron and Nuclear Science (LANSCE-3) displays a barium fluoride crystal, which is part of the Detector for Advanced Neutron Capture Experiment (DANCE). The experiment will be used to develop an understanding of the synthesis of chemical elements in stars, the burn-up of nuclear waste as well as an understanding of nuclear explosives from archived data. Lujan, an electro-mechanical student, is helping to get the project online. Photo by Michael Carlson

He said his group benefits from the program by giving entry-level employees a chance to work and learn from senior technicians.

"It's a symbiotic relationship," Lujan said. "I help the group and they pay for school."

The number of students enrolled in the program has doubled since its inception in 1997. Four students are expected to graduate this spring, with about 14 entering the program each year.

Bonnie Martinez, a program coordinator at the Lab and an HR generalist assigned to the Los Alamos Neutron Science Center, said most students will get full-time, regular employment with the Lab after graduation, but there is no guarantee.

"A lot of it has to do with availability and funding within a group," she said.

For more information on the Electromechanical Program, contact Martinez at 7-5534.

ADO and ADSR ...

continued from Page 3

customers — internal and external — to minimize the number of interaction interfaces and better clarify organizational responsibilities and authorities. The changes also separate environmental science and operational activities.

In a memo that went out to affected employees in the Operations Directorate, Associate Director for Operations Jim Holt noted that "the driving force behind this reorganization [is] the guiding principle of providing a single point of contact for environmental compliance and environmental stewardship operations at the Laboratory."

For more on the reorganization, watch the Daily Newsbulletin.



Student's research earns meeting with Nobel laureates

by Joshua Smith, Communication Arts Services (IM-1)

Amanda Bean, a third-year graduate student in Isotope and Nuclear Chemistry (C-INC), is attending the July 2002 meeting of Nobel laureates in Lindau, Germany. Bean is mentored by Wolfgang Runde (C-INC), who nominated her to attend the meeting.

This is the 52nd meeting of the Nobel laureates and is intended to bring together outstanding young scientists and Nobel laureates. Twenty laureates representing the Nobel prizes in chemistry will attend the meeting; approximately 400 students from around the world have been invited.

Bean, who joined C-INC in July 2000, currently is enrolled at Auburn University where she is working

toward a doctorate with a research focus in hydrothermal synthesis and spectroscopic characterization of transuranic compounds. Bean earned her bachelor's degree in chemistry from Charleston Southern University, Charleston, S.C.

She was selected to attend the meeting in Germany because of her outstanding research record. During her two years at Auburn, Bean performed several hundred hydrothermal reactions to unravel the crystal chemistry of 10 novel uranium iodate compounds. She authored seven publications, five as first author, in refereed chemistry journals.

Bean will have the opportunity interact with her fellow students and some of the world's most recognized scientists.



Amanda Bean



William Feiereisen

William Feiereisen, a computing program manager from the National Aeronautics and Space Administration will head the Computer and Computational Sciences (CCS) Division in the Laboratory's Weapons Physics Directorate.

The CCS Division provides basic and applied computing research in support of the Laboratory's multidisciplinary programs.

Feiereisen is chief of the Advanced Supercomputing Division at NASA Ames Research Center. Previously, he served as NASA-wide program manager for the High Performance Computing and Communications Technologies Program and as NASA project manager for Computational Aerosciences. He came to NASA in 1986 as agency program manager for Aerothermodynamics.

He has a bachelor's degree in mechanical engineering from the

University of Wisconsin, and a master's degree and a doctorate in mechanical engineering from Stanford University.



Mary Hockaday

Mary Hockaday is the new leader of the Dynamic Experimentation (DX) Division.

For the past five years, Hockaday has been leader of Neutron Science and Technology (P-23). She also led the proton radiography project at the Los Alamos Neutron Science Center (LANSCE) for the past three years.

Hockaday joined the Laboratory in 1981 as a graduate student.

She holds a doctorate in physics from New Mexico State University, along with master of science degree in physics from NMSU and a bachelor of science degree in physics with distinction from the University of Hawaii.



Kenneth Keller

Kenneth Keeler has been named group leader for Engineering Science and Applications-Gas Transfer Systems Engineering (ESA-GTS). Keeler will be responsible for providing leadership, ensuring effective development and utilization of all GTS members and coordinating GTS roles and responsibilities Laboratorywide.

Before coming to Los Alamos, Keeler served a number of years at the Savannah River Site, where he was responsible for developing and implementing production processes for new gas transfer systems design.

He came to the Lab in 1994. Some of his positions at the Lab included team leader for Advanced Boost System Development and project leader for Gas Transfer Systems.

Keeler received his bachelor's, master's and doctoral degrees in chemical engineering from State University of New York at Buffalo.

“Wildfire 2002” public meeting planned

Extreme drought sparks concern

by Fran Talley

As the current drought conditions continue in Northern New Mexico, the Interagency Wildfire Management Team and the Laboratory’s Public Interface Design Study are sponsoring “Wildfire 2002,” the fourth in a series of annual public meetings to update residents on current fire concerns and mitigation efforts under way in Los Alamos County and the surrounding area.

“Wildfire 2002” will be held from 6 to 9 p.m. Wednesday, April 17, in Fuller Lodge, 2132 Central Ave. in Los Alamos. It is free and open to the public.

“This is shaping up to be a worse fire season than before the Cerro Grande Fire two years ago,” warned Battalion Chief Mike Thompson of the Los Alamos Fire Department in a recently televised interview with IWMT members Carey Bare and Pat Valerio of Ecology (ESH-20) and Allen Fowler, National Environmental Policy Act coordinator for Santa Fe National Forest on Los Alamos’ Public Access Channel PAC-8.

“The combination of warmer temperatures, low humidity, wind and the absence of moisture in forest fuels are responsible for the increased threat,” explained Valerio. “The woods are basically as dry as the lumber you buy at the store.”

The “Wildfire 2002” event starts at 6 p.m. with exhibits and displays from the American Red Cross, Bandelier National Monument, Los Alamos County Community Development, Los Alamos County Emergency Management, Los Alamos Fire Department, the Laboratory, the Volunteer Task Force, Family Strengths Network, Pajarito Plateau Watershed Partnership, the Nature Conservancy and the United States Forest Service.

Beginning at 7 p.m., a panel of experts from Los Alamos County, Santa Fe National Forest, Bandelier National Monument, the Volunteer Task Force and the Laboratory will discuss current fire conditions, the nearby Valle II project, local and regional mitigation efforts, and “Firewise,” a national program designed to lessen the probability of loss and to help citizens be better prepared to protect their homes and community in case of wild-land fire.

Former Los Alamos County Councilor Robert Gibson will moderate the discussion and a public question-and-answer session.

For more information on the “Wildfire 2002” meeting, call Fran Talley of the Laboratory’s Public Affairs Office at 7-5225 or write to flt@lanl.gov by electronic mail.

Fire restrictions imposed on Lab

Because of continuing dry conditions and the potential for an early and extreme wild fire season, Jim Streit, the Laboratory’s fire marshal, has imposed fire restrictions on Laboratory property.

Fuel moisture contents in both fine and 10-hour fuels are well below normal, Streit said. Laboratory workers are urged to use caution when conducting any activities that could result in igniting a wildland fire.

The restrictions are in place until the local fire danger drops, Streit said.

To read the fire restrictions alert, which includes specific fire restrictions now in place, go to http://labreq.lanl.gov/pdfs/ops/01_operations/alert0001.pdf online.



The Los Alamos News Letter staff would like to know how to better serve its readers, so we are soliciting your feedback. Please take a few minutes to respond to the following questions:

- What do like to read (For example, science stories, awards and recognitions, employee features, institutional goals and related issues pieces, benefits information, service anniversaries, DOE, NNSA and UC news)?
- What would you like to read that is not now in the publication?
- What suggestions do you have for improving the publication?

Send your comments to Los Alamos News Letter, Mail Stop C177, Los Alamos, NM 87545, or by e-mail to goldie@lanl.gov.

At a theatre near you

by Kathryn Ostic

John Turner of Methods for Advanced Scientific Simulations (CCS-2) recently rejoined the Laboratory after a four-and-a-half year absence working for Blue Sky Studios Inc., a computer animation company owned by Twentieth Century Fox. During that time, Turner lived many a child's fantasy. He worked on a number of computer-animated projects, including the Academy Award-winning short film "Bunny" and the recently released feature "Ice Age," which opened March 15 at theatres across the country. Ice Age stars Manfred the woolly mammoth, Sid the sloth and Diego the saber-tooth tiger, three loveable characters that undertake a perilous journey to return a human baby to its tribe.



Blue Sky, originally founded in 1987 by five people who worked at a company called Mathematical Applications Group (Magi), is located a half hour from Manhattan in White Plains, NY. Turner worked from 1997-2001 primarily on the renderer in the research and development department. According to Turner, creating a computer-animated film involves a number of steps. The first step involves making a real model out of modeling clay, which is then scanned into the computer — this creates a mathematical model of each character and object in a scene. Next, animators make the objects move in the computer and then technical directors apply materials to the objects, add lights to the scene and create effects such as dust, smoke, fire, etc. Finally it's time to render, the technique that takes each frame and turns it into an image that can be transferred to film.

Blue Sky uses ray-tracing, an expensive computational method of rendering that isn't used much by other studios, said Turner. Most animation and effects houses, such as

Pixar ("Toy Story," "A Bug's Life," "Monsters Inc."), Pacific Data Images ("Antz" and "Shrek"), and Industrial Light and Magic, use simpler, faster and cheaper rendering methods. This approach can be problematic because of the difficulty in generating realistic images using the simpler methods, noted Turner.

Ray-tracing is based in physics and begins with a physically correct algorithm, explained Turner. Because ray-tracing simulates the way light behaves on objects and surfaces in a natural environment, directors can opt to deviate from reality by incorporating a softer look or by changing the highlighting and shadows of objects. Ray-tracing is a method that is somewhat similar to the Monte Carlo technique, which is used to simulate radiation transport at the Lab, said Turner. Turner worked in Transport Methods, formerly Radiation Transport (X-6) now CCS-4, with former colleague Henry Lichtenstein. Lichtenstein previously worked with one of the Blue Sky founders at Magi and helped Turner make his employment connection.

In addition to working on the renderer, Turner also developed a 2D viscous incompressible flow simulation. This simulation was used for a sequence in the movie in which the characters walk across an ice bridge over a river of lava.

Turner describes Blue Sky's environment as "incredibly vibrant, creative and filled with lots of toys." He adds that, "One of the most exciting aspects of Blue Sky's environment is the integration of science and art. The process of making a computer-animated film requires a high level of both artistry and technical expertise. Watching the results come to life as part of a scene is fantastic."

Los Alamos News Letter

Mail Stop C177
Los Alamos, NM 87545

Nonprofit Organization
U.S. Postage Paid
Albuquerque, NM
Permit No. 532

LALP-02-3

Los Alamos
NATIONAL LABORATORY