

SLAC is operated by Stanford University for the Department of Energy

Stanford Board of Trustees Visits SLAC

DESCRIBING THE SLAC SITE as "one of the most beautiful settings for a linear accelerator," Jonathan Dorfan welcomed the Trustees of Stanford University to the Laboratory for a talk, lunch and tour in early October. It was the first time that the full Board had visited the Lab, and the comments were consistently energetic, ranging from "I wish I had taken more science in college" to "Isn't that cool?" when viewing the 2-mile accelerator length from inside the Gallery. Hosted by Stew Smith at the *BABAR* detector, Dave Burke at the Linac Visitor's Alcove, and Keith Hodgson at SSRL, the Trustees received an abbreviated Physics 101 course that generated questions and comments when they returned to their buses.

Smith gave an informative poster board introduction to the *B* Factory and then welcomed the group to the Control Room, where explanations of the drift chamber and event tracking captured their attention. Smith described the constant pace of the 24/7, 10-month run and pointed to the operators' on-call phone numbers on the nearby whiteboard. Seeing the number to call for pizza, Stanford University President John Hennessy kidded, "Now that's an important number!" Dorfan summarized by stressing the importance of the "international partnership, which continues to be fruitful." Back on the bus, one business-oriented Board member asked about electrons and positrons and a colleague told him to "just think of it as debits and credits."



(Photo: D. Rogers)

Debra Zumwalt (second from left), General Counsel to Stanford, joined the tour. The Trustees were accompanied by John Hennessy, Stanford President (second from right) and led by Jonathan Dorfan (far right).

Burke gave the audience an overview of the main accelerator, focusing on the crucial function of the klystrons. One Trustee recalled the work of the Varian brothers, and Burke acknowledged this important segment of our history, adding that continuous technology developments have increased the energy of the linear accelerator by a factor of three since its inception in 1966. He went on to discuss how basic research drives industry and improves the technology in such important medical fields as radiology and oncology, stating that one in five Americans will undergo radiation treatment from an accelerator facility. Burke concluded with a description of the Next Linear Collider (NLC) as an international effort with ten years of R&D already completed, pointing to beneficial contributions via our own test facilities.

"A great asset" was the unanimous refrain of SLAC's guests as they viewed a number of SSRL's projects. They were introduced to the methods of analyzing trace metal impurities and allowed to view a 3-D model of the DNA-bound protein RNA-polymerase with special glasses—always a big hit.

At the conclusion of the tour, Hennessy expressed appreciation for the opportunity Stanford's Trustees had been given to see the "wonderful science" being performed at SLAC and thereby more fully understand the vital interactions between Stanford and SLAC.

—Janice Dabney



(Photo: H. Lynch)

Members of the Board of Trustees listened attentively at an SSRL presentation while on the SLAC tour.



Director's Corner

Jonathan Dorfan

THE PROCESS FOR ESTABLISHING a long-range plan for US particle physics was outlined in my June 2001 column. At a meeting of the High Energy

Physics Advisory Panel (HEPAP) held in Washington earlier this month, the Chairman of the 20-person planning group (the so-called sub-panel) released its recommendations. While the full report will only become public in January 2002, the Executive Summary, containing the five leading recommendations, is now public.

The primary recommendation of the sub-panel reads: "We recommend that the highest priority of the U.S. program be a high-energy, high-luminosity, electron-positron linear collider, wherever it is built in the world. This facility is the next major step in the field and should be designed, built and operated as a fully international effort." The sub-panel goes on to say: "We recommend that the United States prepare to bid to host the linear collider, in a facility that is international from the inception, with a broad mandate in fundamental physics research and accelerator development. We believe that the intellectual, educational and societal benefits make this a wise investment of our nation's resources." The United States has thus aligned itself with the European and Asian communities, both of whom are urging that the next major particle physics project be a linear collider.

These recommendations are very much in line with the hopes of the SLAC community as expressed at the visit of the sub-panel to SLAC in May 2001 (see June *TIP*). SLAC can be proud of the major role that it has played in forging this new direction for frontier science. What started at SLAC with the SLC has now become particle physics' highest priority for its next construction project.

There are many challenges ahead before a concrete plan for this international endeavor can be realized. We look forward with excitement to SLAC's participation in developing such a plan with our US and international partners.



From the SLAC Library
Lesley Wolf

I'VE BEEN SITTING HERE at the Circulation Desk in the library for nearly a year now, and I haven't seen YOU here yet. So, below you'll find my exclusive, embossed (feel the raised lettering?) invitation to browse the SLAC library.

cut on dotted line...

You are Cordially Invited to Pass a
Pleasant Morning or Afternoon
In the SLAC Library
(evenings and weekends by
arrangement)

OK, I can hear what you're thinking: "I'm not a physicist so I'm going to have just a teensy bit of trouble following that piece on brane anti-brane inflation in *Journal of Physics* and whatnot on the shelves over there." I hear ya, and, having spent many a night crying (really!) over calculus homework, I feel your pain. But, take a look around our sunny, comfortable reading room. It's true, as a scientific research institution we have quite a few core academic journals on the shelf, like *Nuclear Physics* and *Physical Review*, but we also have *Time*, *Working Woman*, *WIRED*, and my favorites, *The Skeptical Inquirer* and *The Journal of Irreproducible Results*. We've got daily local papers, as well as the *Wall Street Journal* (box of tissues gladly loaned!) and the *New York Times*.

We've got computer books to help you tame your NT, excel at Excel, and weave a website. Public terminals are available for web browsing. Bring your cup of coffee and relax while you surf. We have atlases (atlai?), road maps and visitor's guides to help you get where you're going. There should be no waiting list for maps. My impression is that only half the population ever asks for directions.

But, most importantly, we have librarians and library specialists to help you find the information you need. If it isn't here at SLAC, we can probably find it elsewhere. (And you thought we were just paid to guard the books!)

If you can't leave the office right now, check out the SLAC Library web page at <http://www.slac.stanford.edu/library/>. Don't be afraid to click on some of the links, like the books catalogue, or the SPIRES literature database, or the online journals. And talk as loudly as you want, it's a virtual library, remember?

January-February *TIP*

THE NEXT ISSUE OF *The Interaction Point* will be a combined January-February issue, and will be distributed the first week of February 2002.

SLAC EMERGENCY HOTLINE: 1-877-447-7522



Do You Have A Suggestion?

HAVEN'T YOU OFTENTIMES COME up with a great idea and wished someone would listen? Well, now there's an easy way for you to convey that thought. A new Suggestion Program was rolled out by the SLAC Director the end of October. As Dorfan's *All Hands* memo stated, the program was developed "with the purpose of providing SLAC community members an opportunity to submit specific ideas that can make a difference in how the laboratory accomplishes its scientific mission."

What kind of suggestions have been made so far? Plant more trees to further beautify SLAC, one person offered. Access to information on the proposed energy efficiency of new buildings was the concern of another participant. Input has ranged from redesigning crosswalks to providing scratchpads for brainstorming sessions in the cafeteria (ideas always develop more quickly over food!). It's great to see how people immediately make use of a new program, and the Committee looks forward to hearing from even more of you in the future.

See <http://pallas.slac.stanford.edu/suggestions/> for the name of the Committee representatives and for links to submit a suggestion. If you need a hard copy of the suggestion form, boxes with forms are located in the Cafeteria (Building 42), Canteen (Building 27), SEM (Building 35), SSRL (Building 120), and the Research Yard (Building 211). The completed form is then sent to MS 11. So the next time you say "ah ha!" make sure and log on or take pen to paper and transmit your idea. Everyone will benefit.

—Suggestion Program Committee

Quinn Appointed APS Vice President

(Photo: T. Peterson)



HELEN QUINN (THP) HAS BEEN appointed Vice President of the American Physical Society (APS) effective January 2002. This begins a 4-year leadership role on the executive committee (equivalent of the board) for APS. The first year she is Vice President, the next

year she is President-Elect, and the third year she becomes President. The following year she becomes Past-President. "I am honored, of course," said Quinn of her appointment. Other SLAC physicists who previously held this office are Pief Panofsky, Burt Richter, and Sid Drell.

The APS is the professional society for physics in the US with over 40,000 members. It publishes the *Physical Review* and *Physical Review Letters*. It also holds national meetings, both as a whole and as units (such as the Division of Particles and Fields, Division of Physics of Beams, etc.). "As we move into the electronic era, and to a pattern of many subject-specific meetings, we must put our emphasis on how best to serve the membership," said Quinn.

Another function of the APS is to keep the physics community aware of what is happening in Washington that might be relevant to their work. "It is important in the political process to have someone to carry our message," Quinn said. The APS works together with other national scientific societies to keep Congress aware of the importance of funding all areas of science.

—Teri Peterson

Tips from TIP

•SLAC Community Support Programs this year include:



⊙ The "Hometown Holiday" Party which will be held Thursday, December 20. Watch for flyers on opportunities to sign up for subcommittees!



⊙ Food and toy drive containers and giving trees which will be located around site. Be generous and help the less fortunate by participating in these drives.

• Don't forget—new picture badges are due by the end of the year. Stop by Trailer 206 to turn in your old badge and smile for your new photo ID!

•SLAC will be closed from December 21 at midnight until the end of the day Tuesday, January 1, at midnight. See <http://www.slac.stanford.edu/grp/>

do/slaonly/allhands/2001-09-26.html for complete information.

•Where was Knut Skarpaas VIII the day of the SLAC race (see article in last month's *TIP*)? Unfortunately, he was having surgery on his hand that day instead of beating his previous record in the in-line skating division.

•The overall winner of the 30th annual SLAC race was Ashley Deacon (SSRL) with a time of 22:01.5. See <http://www-project.slac.stanford.edu/slacrace/results/2001.html> for complete race results.

•Concepcion Zelaya (RD) organized the eight SLAC walkers who joined the Making Strides for Breast Cancer walk, held October 28 at the Golden Gate Park. They were sponsored by co-workers, as well as friends and family, for the 5-mile walk.

Purchasing Welcomes Adams

(Photos: T. Peterson)



JANET ADAMS HAS BEEN selected as the new Deputy Purchasing Officer. She will be responsible for assisting Robert Todaro, Purchasing Officer, in the overall administration of the Purchasing Department. Adams will be directly

responsible for providing day to day supervision and management of Buying Group II within the department. The selection of Adams reinforces Todaro's commitment to positive customer service for the laboratory.

Adams came from Lawrence Livermore National Laboratory (LLNL) where she served as Acting Manager of the Business Affirmative Action Office (BAAO) in the Procurement and Material Department. The primary objectives of the BAAO are to enhance the quality of vendors doing business with the Laboratory while simultaneously assisting the Laboratory in achieving its socioeconomic goals. She had previously worked as a Senior Subcontract Administrator at LLNL.

Adams has a Masters Degree in Geology and holds certificates in management from the University of the Pacific, School of Business and Public Administration and the University of California Los Angeles, Department of Engineering, Information Systems and Technical Management.

Adams is actively involved in several civic organizations and scientific societies, and has also co-authored professional papers in the geology field.

-Jean Hubbard

Skinner Lands New Position



EVERY SO OFTEN WE catch an old, familiar face in an unexpected place. Since coming to SLAC from Stanford Stores in September of 1982, John Skinner has been moving around SLAC Stores in various capacities. Recently he applied for a new opening in Purchasing's Expediting group, and landed it. During a job rotation program this past summer, Skinner spent roughly three months learning the basics of expediting on the job; he knew well the implications of the position for which he was applying! By the end of November he will be fully integrated into the Expediting group with Rebecca David and Gloria Azevedo. "I am excited about the change and new challenges ahead of me," reports the old, new guy.

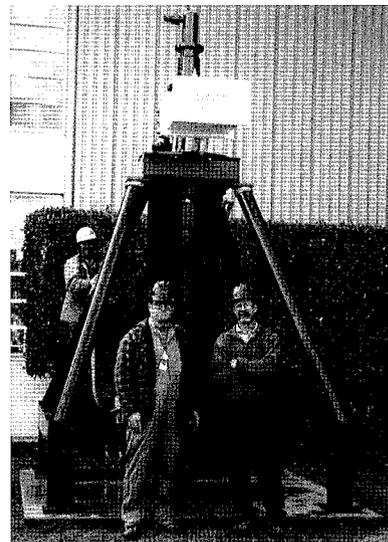
During his days off, Skinner enjoys writing poetry, cycling, and building speaker systems. He is currently reading J.R.R. Tolkien's *Trilogy* with his eight-year old son, Nathaniel, and they hope to see the upcoming movie adaptation together.

When asked about the constant interactions with requestors and vendors that are at the heart of this new position, Skinner commented, "communication is a practiced art, and I hope the discipline of writing poetry is teaching me to be more concise rather than more verbose..." (a little chuckle), "but the jury is still out."

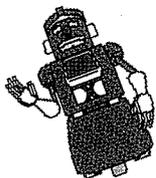
Best of luck and welcome!

Klystron Tube on Display

STORAGE RINGS, SUCH AS SPEAR and PEP, are powered by continuous-wave (CW) klystrons. In 1974, when the energy was increased in SPEAR (the first storage ring accelerator), four 125kW klystrons, developed at SLAC, were used. In 1975, those klystrons were modified for higher power and equipped with a harmonic cavity. The result was this 500kW klystron. Pictured with the CW Klystron (l-r) is a rigger from Reliable Crane who helped lift the PEP tube into position with the help of Mike Hughes (SEM) and Russ Burkart of Labor Services Company.



(Photo: J. Dabney)

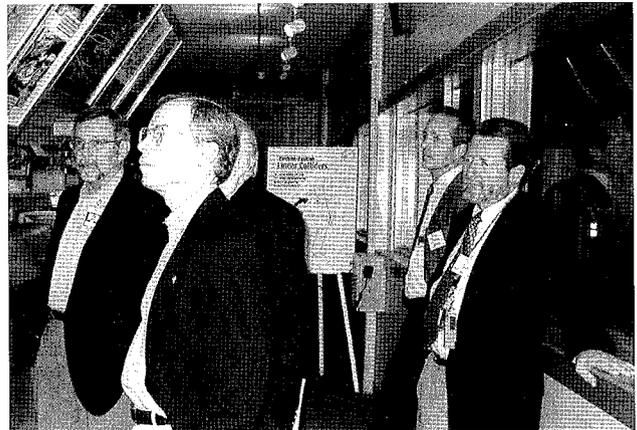


Robotics Team Seeks Donors/Volunteers

THE WOODSIDE HIGH SCHOOL Robotics Team designs and builds robots for entry in Robotics Competitions. They are looking for donations and volunteers to help them participate in the National Competition, which will be held at Disney World, Florida in Spring 2002. There will be more than 350 teams participating in this event. The team first became involved in robotics in 1995 and took first place in the National Competition that year. They have attended every national competition since then. They also participate in the annual SandHill Challenge, a modern soapbox derby race, and took first place among high schools this year. If you are interested in being a donor or a volunteer, contact Carl Rago at x3636. Visit their website at <http://www.woodsideshs.org/activities/clubs/wrt/indexrob.html> for complete information on this local team.

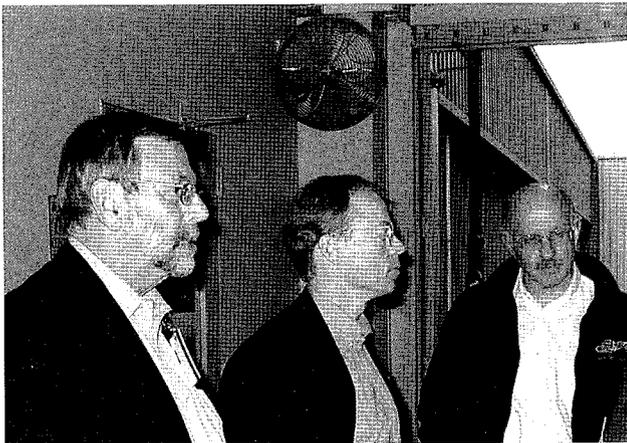
DOE Under Secretary Visits SLAC

ROBERT CARD, DOE UNDER Secretary for Energy, Science and Environment, visited SLAC on October 30 to meet with the Directorate and tour the site. In addition, he was given presentations on SLAC's high energy physics and synchrotron programs. Accompanying him on his trip to SLAC was Robert Kuckuck, Principal Deputy Administrator of the National Nuclear Security Administration, headquartered in Washington, D.C.



(l-r) Kuckuck and Card (DOE) tour the Klystron Gallery, accompanied by Greg Loew (DO), Dave Burke (NLC), and John Muhlestein (DOE Site Office).

(Photo: s D. Rogers)



(l-r) Robert Kuckuck and Robert Card, both of DOE, are shown here with Jonathan Dorfan (SLAC).

Card was sworn in as Under Secretary on June 5, 2001. As Under Secretary, he has responsibility for Departmental operations in Energy, Science and Environment. Card completed the Program for Management Development at Harvard Business School; received a Masters of Science in Environmental Engineering from Stanford University; and a Bachelor's of Science in Civil Engineering from the University of Washington. John Muhlestein, head of DOE's site office at SLAC, said, "Dr. Card was impressed, both with SLAC's science and the management team."



Who Made the Property Control 'Honor Roll'?



THE FINAL PHYSICAL INVENTORY results have been submitted to DOE. The departments and groups that had 100% accountability are members of the "Honor Roll." They are:

BSD Division: BSD Division Office, Accounting, Budgets, and Business Systems & Lab Support

Research Division: Computation Research, Exp Group A, Exp Group B, Exp Group C, Exp Group E, Exp Group G, Exp Group K, Glast, Physical Electronics, SLD, Technical Information Services, and Theoretical Physics

Director's Office: Director's Office, Affirmative Action, Human Resources, and Public Affairs

ES&H Division: ES&H Division Office, Environmental Protection & Restoration, Program Planning, Waste Management, Radiation Physics, and Safety, Health & Assurance

Technical Division: Accelerator Research Dept A,

Advanced Computations Dept, and Technical Division Office

SLAC achieved a rating of "excellent" in locating Sensitive Property and an "outstanding" in locating Equipment (over \$5,000). We salute all SLAC departments and groups for a job well done. Overall, SLAC employees did a great job keeping track of their assigned property.

With your help we would like to continue to be able to report successful, accurate inventories. We can do it if you remember to notify the Property Office when you move or transfer bar-coded property. Notification can be done from the BIS property web site, a phone call to x2231, email or a hand-written note. Property that is excess to your needs should be turned over to Salvage, either by taking it over or by calling them at x2329 to have it picked up.

—Leslie Normandin

Mary Parish Retires



Tony Donaldson (r) was emcee at Mary's party.



Among the attendees were (l-r) Chris Pappas, Barbara Blum, Piotr Blum, Joe Elscewski, Jeff DeLamare, and Ponciano Rodriguez, all of ESD.



Bob Fuller (r) presented Mary with a bouquet of flowers.

MARY PARISH (ESD ADMINISTRATION) has had quite a year. First, she was honored for 30 years at SLAC at the awards banquet held in March at the Stanford Faculty Club. Next, she won an Employee Recognition Award, garnering 16 individual nominations. To complete the year, Parish retired in December. She was feted at a party in October, attended by over 100 people. The attendees included a large number of retirees, welcoming Parish to their ranks. The party and testimonials were a tribute to a great lady who will be missed by all.



(l-r) Mary with husband Van Parish, and Clyde Barker (ESD).

(Photo credits: J. Ashton, J. Beach, V. Flynn)

Operational Health Physics Introduces New Staff



(Photo: T. Peterson)

(l-r) Elsa Nimmo, Paul Weaver, and Henry Tran.

THE OPERATIONAL HEALTH PHYSICS (OHP) Department in the Environment, Safety, and Health Division (ES&H) is proud to introduce three professionals who joined our staff between spring and fall of 2001.

Paul Weaver serves OHP as the Radiological Analysis Laboratory Manager. Weaver came to us from the University of California, Berkeley. Around the SLAC site, Weaver can often be seen guiding the collection of environmental samples for radiological assessment. He recently achieved professional

distinction by being certified by the National Registry of Radiological Protection Technologists.

Henry Tran, the OHP Dosimetry Group Leader, came to us from Lawrence Berkeley National Laboratory. He is in the final stages of his Ph.D. in optical science. Tran is guiding SLAC through improvements in dosimetry services, including introduction of our new personal dosimeter, known as the Luxel, which will replace current TLD dosimeters in January 2002. Additionally, Tran is validating a powerful new dose result database, the Oracle Dose Tracking System (ODTS), parts of which are now operational on the SLAC network. Tran will continue to add useful features to ODTS to help ensure excellence in dosimetry service at SLAC.

Elsa Nimmo came to SLAC from a position as Radiation Safety Officer at Honeywell Corporation, located in Cupertino. As the Radiological Environmental Protection Group Leader, Nimmo is managing the overall radiological monitoring program at SLAC. She will also generate annual reports to the EPA and DOE on routine dose projections beyond the SLAC site.

Please join OHP in welcoming Weaver, Tran, and Nimmo to SLAC.

-Steve Frey and Hillary Russak

Listen to Your Accelerator!

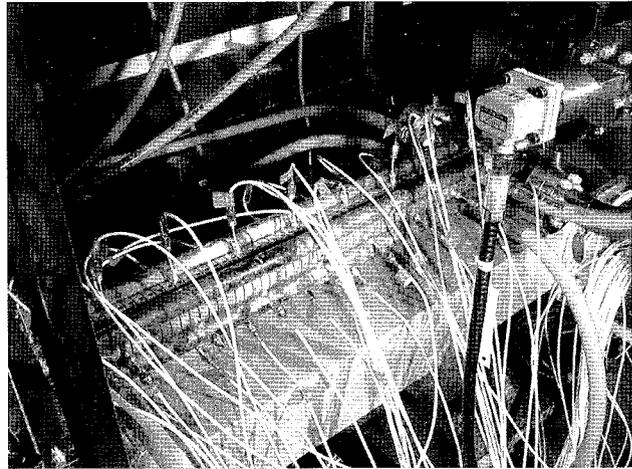
MANY, IF NOT ALL, SLAC'ers have heard the angry buzzing sound that comes from the Klystron Gallery. On every SLAC linac pulse, the transformer sheets inside each klystron's oil tank slap each other stiffly to generate the familiar high-pitched clatter. For many visitors, the sound is one of the most memorable aspects of their stop in the Klystron Gallery. But how many have tried to imagine what sounds there might be in the accelerator enclosure below?

It turns out that SLAC's accelerator sections also make noise on every machine pulse due to the rapid heat expansion of the copper as the structures fill with RF power (similar to the pinging sound a car engine makes as it cools off). The sound is not as loud as the klystrons, but it's still detectable. Using extremely sensitive microphones, the same type used to monitor microscopic cracks in bridges and airplane frames, we can listen to the accelerator as it is running.

That's very interesting, but why bother?

As part of the R&D effort for the Next Linear Collider (NLC), we must demonstrate the ability to accelerate electron and positron beams about three times more efficiently than we currently do in the SLAC linac. This means pumping three times more power into every meter of accelerating structure. In the Next Linear Collider Test Accelerator (NLCTA) in End Station B, we have been testing structures designed to meet the needs of the NLC. Unfortunately, as we increase the power into the structures, they occasionally respond by arcing and sparking inside, rejecting the input and, in effect, ceasing to be accelerators. Not only is this operationally undesirable—we want our accelerators to accelerate on every pulse—it also damages the inner surfaces of the accelerator structures, causing them to detune over time.

It turns out that this arcing also makes noise, much louder than normal accelerator operation. Joe Frisch and his colleagues at NLCTA discovered that by listening

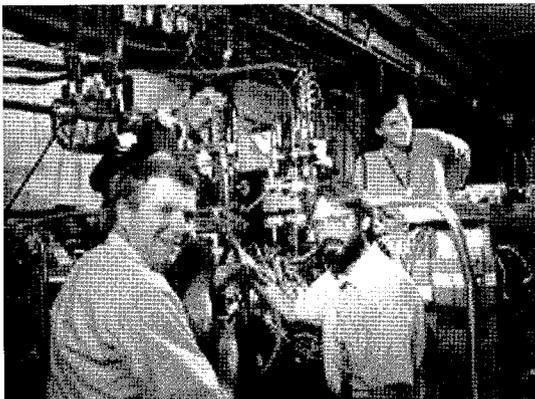


Plastered with the sensors, the accelerator no longer looks like a shiny copper tube but rather like an intensive care patient.

closely to this noise they could better understand what's going on inside the structures. By using microphones to pinpoint areas where these arcs occur we can find out things about how the arcs start, where they go, how big they are—critically important details about these undesirable events. Using this technique, we immediately saw evidence that these arcs often happen in several distinct locations on a single machine pulse, not just in one place. We have also seen arcs grow in magnitude from one machine pulse to the next.

In the last year, since summer 2000, electronic data from the microphones have provided a window into the sealed accelerator allowing us to 'see' and 'hear' the activity within. As we gather data on various types of accelerator structures, we come closer to understanding the underlying causes of these arcs. By understanding the problem, we can then come up with a solution from which we can design and fabricate better structures.

—Marc Ross and Tonee Smith



(l-r) Doug McCormick, Frederic Le Pimpec, Joe Frisch, and Tonee Smith in the NLCTA tunnel listening to one of the structures.

Work Safe, Work Smart

An injury involving days away from work occurred on 10/29/01 according to Sharon Haynes, Workers' Compensation Coordinator. The number of calendar days between then and the last injury of 10/4/01 is 25 days. SLAC's record number of days between claims involving days away from work remains at 184 days.



Electron Gamma Shower...Explained

TAKE A TRIP TO the Virtual Visitor Center (www2.slac.stanford.edu/vvc/egs) to learn about a computer code named EGS (for electron-gamma shower), which was originally developed at SLAC to design safe experiments for high-energy physics. By modeling the processes, physicists could ensure that the shielding they installed would protect everyone around from the short-lived but intense radiation produced when an accelerator beam strikes a target. EGS has become a valuable tool to medical physicists, who use it to calculate radiation effects in the body and plan cancer radiotherapy treatments. The problem is how to give maximum radiation dose to the tumor with minimum damage to healthy tissue. The new section in the VVC includes:

- A history of how the software was developed (**About EGS**).
- A guided tour describing the physics of the displayed interactions (**Guided Tour**).
- Exercises to discover the photoelectric effect, Compton scattering, and pair production (**Lab Activities**).
- An interactive web interface to display showers you request (**Simulation Tool**).
- Details on how the EGS code is used to improve radiation treatment for cancer (**Application**).

Thanks go to Helen Quinn (THP), Ralph Nelson (ESH), and Ray Cowan (SLD) for providing the content and programming to make this section a reality.

Editor's note: see the Web Information Manager's column in the September issue of The Interaction Point for VVC touring on High Energy Cosmic Rays.

Sharing the Road



IN THE OCTOBER TIP (see <http://www.slac.stanford.edu/pubs/tip/pdf/tip1001.pdf>), I announced the creation of a bicycle safety subcommittee of the Operating Safety Committee. The subcommittee developed two goals in their first meeting: to

increase safe riding procedures on site among SLAC bicyclists, and to increase safety awareness of motorists toward bicyclists on site. We also reviewed infrastructure improvements that might improve bicycle safety. Rick Challman (BSD), Joe Kenny (SHA), and Neal Adams (SCS) gave generously of their time to ensure that these efforts were worthwhile and focused.

Some of the results are already in place or in process: we have made a recommendation to SLAC's Long-Range Development Planning Committee for a parking lot rather than an expansion of on-street parallel parking on the Loop Road; we have written safety reminders for motorists, bicyclists, and pedestrians in *QuickNews* and past *TIPs*; a bicycle icon will be placed on the new magnetic loop exiting SLAC; and we are working with Safeguards and Security to place "Shared Roadway" signs at select areas around the site.

The subcommittee has also created a pamphlet on "Bicycle Safety at SLAC." It should appear in

Milestones

AWARDS

Grissom, Mike, ESH, "Volunteer of the Year" by the Medical Health Physics Section of the FDA, 10/01

Siemann, Bob, ARDB, elected as Fellow of the American Association for the Advancement of Science, 10/01

RETIRED

Parish, Mary, ESD Admin., 12/14/01

Smith, William L., ESD System Engineering, 12/3/01

Thompson, Duane, ESD System Engineering, 11/23/01

Email milestones to tip@slac.stanford.edu.

your mailboxes the second week of December, coinciding with a related banner at the Main Gate. We encourage administrative staff to make sure each member of the SLAC community receives a brochure. Motorists and bicyclists can strengthen their safety partnership by understanding the challenges and road requirements of each other.

What's planned for the future? Copies of these brochures will be handed out with badges at the Security Trailer and at Human Resources' monthly employee orientation. Ariadne Scott, Stanford's Bicycle Program Coordinator, who is currently expanding the bicycle safety program on campus, will help us organize a safety fair at SLAC next spring.

OSC wishes everyone a safe and healthy new year, whatever mode of travel you may choose.

—Janice Dabney
Chair, OSC