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Laboratory Moves into Normal Work Mode

As of Monday November 15, the Laboratory has moved from a 'restricted work' status into a 'normal work' mode.

By Jonathan Dorfan

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See whole story...

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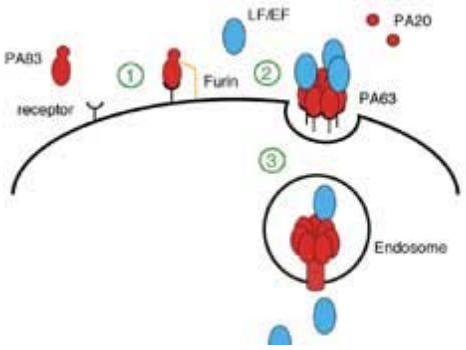
By Heather Rock Woods



X-ray images taken at SSRL have revealed how anthrax hijacks important cell machinery to enter and destroy human cells. The results give a clearer picture of how anthrax works and bring researchers closer to developing a therapy

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By Neil Calder

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against anthrax infection as well as a new cancer therapeutic.

See whole story...

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See whole story...

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In resuming normal work, there are revised processes and procedures that govern the way we carry out electrical work and hoisting/rigging. These processes and procedures are designed to ensure that SLAC will continue to have a safer workplace and strong ownership by the full 'line' for safety in the workplace.

Safety Comes First!

Extremely important to our success is the renewed commitment of supervisors and their staff to consistently review, plan and document their work using the Job Hazard Analysis and Mitigation (JHAM) and the Area Hazard Analysis (AHA) processes. This will ensure that hazards continue to be identified ahead of the work, that the appropriate level of training is verified in advance, and that the applicable protective equipment and procedures are consistently incorporated into the work-execution phase. This process underlies the overall 'line management' approach to safety inherent to SLAC.

Work on electrical circuits is pervasive in any high-tech workplace like ours. Such work can present especially hazardous situations, which require a case-by-case safety review. The higher the level of hazard, the more stringent will be our level of preparation, scrutiny and sign-off. Under no circumstance should expediency or convenience be accepted as a justification to bypass this scrutiny.

Of course this principle of 'safety comes first!' extends to all areas of the workplace. The 'Values and Expectations' document found at http://www-group.slac.stanford.edu/esh/eshvalues.html describes how we balance our priorities to ensure that safety comes first even as we achieve outstanding science.

A crucial element for safe work at SLAC is each individual's empowerment to stop unsafe work activities. Everybody at SLAC has that right, without concern that they would be retaliated against for doing so. The 'Stop Unsafe Activity' authority is outlined in the ES&H manual, chapter 2, section 3. If at any time you feel your safety is being put at risk, it is your responsibility to talk to your supervisor immediately. If it is your judgment, as an individual, that you see some work being done that you truly believe is unsafe, you are

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authorized to stop the activity immediately.

Key Actions

The past few weeks have been challenging for all of us. We had a so-called 'near miss' in hoisting and rigging. We had a very serious electrical accident followed by a DOE Type A Accident Investigation. The Type A Investigation Team concluded its investigation two weeks ago and their draft report is at DOE headquarters for review. I anticipate that we will receive the report and 'Judgments of Need' soon. It will take us, together with the DOE Site Office, about two weeks after that to generate a corrective action plan. Elements of the corrective action plan will influence our approach to restoring the machines to operations.

All of us have attended numerous meetings and have read many documents as part of re-invigorating our commitment to safety in the workplace. A very large attendance of classes in safety-specific training has also taken place. I want to thank all of you for your cooperation in all these processes.

I have created the position of Electrical Safety Officer (ESO) and Perry Anthony has kindly agreed to take up that position. The role of the ESO is patterned on the successful model used in the areas of radiation safety, pressure and vacuum vessel safety, and laser safety. Please work supportively with Perry, as you do with Sayed Rokni (Radiation Safety Officer), Richard F. Boyce (Pressure and Vacuum Vessel Safety Officer) and Ted Fieguth (Laser Safety Officer).

We are grateful to the Director's of Fermilab and Lawrence Berkeley National Lab for providing, on very short notice, four each of their experts covering the areas of electrical safety and hoisting/rigging. These colleagues spent a week at SLAC and left us with many very helpful comments, observations and recommendations. These were part and parcel of the guidance under which we returned to normal work. A small group internal to SLAC will conclude this week a study of our policies and procedures for managing the safety requirements of outside contractors and sub-contractors.

Next Steps

Moving forward involves three phases of activities:

Between now and the early part of 2005, our goal is to re-establish user operations at SPEAR3 and BABAR, contingent on the Type A corrective actions which are forthcoming. We will also use this time to continue to remedy deficiencies noted by the OSHA and other audits.

The medium term phase will end around May 1, 2005 and the long term phase about a year later. During these two periods, we will increasingly refine and consolidate our high level safety procedures and documents, complete training for that part of our staff that needs it, continue correction of items noted by the OSHA and other audits and implement any medium-term and long-term Type A corrective actions. In the long-term, we will close out any remaining compliance tasks which we committed we would complete prior to the recent accident.

Turning on the Machines

The near-term challenge in resuming the work associated with turning on our machines is: 1) the effort required to achieve full conformance to the new guidance for work performed on electrical and hoisting/rigging, and 2) the need to gain ground on the OSHA-type corrections. There will also be corrective actions coming from the Type A 'Judgments of Need'. Satisfying these combined requirements means that re-establishing the running machines will take significantly longer than usual. But once we have completed this cycle of rigor, we will have these new guidelines fully incorporated in our system, ready for future machine re-starts.

The main responsibility for the safe return to work is, as it should be, borne by the Associate Directors, their divisions and their staffs. Within this "line" organization framework, each of us must renew ownership of responsibility for a safe workplace.

Thank You All

In moving forward, let me again acknowledge that SLAC's greatest asset is the competence, skill and dedication of the SLAC staff, namely you. I am very proud of the fact that the SLAC Family knows how to work in support of each other, and knows how to team effectively to achieve our goals. As we engage the challenges of returning to full operations, our mutual spirit of cooperation and support will be more necessary than ever. I know that you will all use this time to strengthen, even more, the bonds and respect we all share, so that the demands of the next few months leave us even more united, with no loss of the wonderful spirit and deep commitment that has served us so well in the past, while at the same time reaffirming our commitment to the goal of a safer workplace for us all.

As always, I thank each and every one of you and greatly appreciate your support as we move forward.

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Two hundred and thirty linear collider specialists meet at KEK in Japan.
(Photo by Neil Calder)

Originally conceived as a meeting for some 30 people, the organizers were overwhelmed with requests to participate. The enthusiasm for this new project was clear throughout the meeting.

"KEK has been delighted to host this important workshop," KEK's Director General Yoji Totsuka said. "For the first time the world's linear collider community is working together to start discussions on a final design for the ILC. We have provided opportunities for accelerator experts from various regions, who may have previously been working on different projects, to get to know each other and start the important process of creating a unified team."

"Last August, the international particle physics community made a difficult but necessary decision in choosing superconducting-technology for the accelerating system of the ILC. Cornell University's Maury Tigner, chair of the International Linear Collider Steering Committee, said, "The decision opened the way for the world particle physics community to unite and concentrate our combined resources behind one technology. There is a long way to go and much hard work needed before the final design of the ILC is established. However, the first steps on a journey can sometimes be the hardest. The success of the KEK ILC workshop has set us off in the right direction."

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Working groups at the meeting focused on many aspects of the future design of the accelerator including; the parameters of the main linacs, the injector system, the beam delivery system, the design of the high gradient radio-frequency cavities and how to effectively communicate both within the ILC community and to the public. SLAC was represented in all working groups.

"It has been a very stimulating meeting," said Tor Raubenheimer, head of the SLAC's Linear Collider Department. "Since the technology decision is made, people will no longer be working with opposite goals or different goals. We'll be working towards a common goal and that makes it very exciting."

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Anthrax Hijacks Its Way into Human Cells

By Heather Rock Woods

X-ray images taken at SSRL have revealed how anthrax hijacks important cell machinery to enter and destroy human cells. The results give a clearer picture of how anthrax works and bring researchers closer to developing a therapy against anthrax infection as well as a new cancer therapeutic.

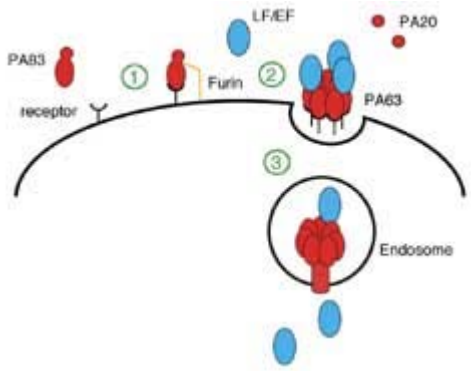
Researchers from The Burnham Institute and the National Institute of Allergy and Infectious Diseases used the SSRL data to discover the structure of an anthrax toxin bound with a cell receptor.

Bacillus anthracis, the bacteria that causes anthrax disease, circulates in the bloodstream and produces three toxins. The toxins enter nearby cells and turn off their distress calls to the immune system, like an intruder disabling 911 phone access. Without an immune response, the bacteria keep reproducing and making more toxins. Eventually, the toxins kill the cells.

To get into cells, one of the toxins—protective antigen (PA)—binds to a receptor called CMG2 on the surface of human cells. This triggers the joined pair—to which the two other anthrax toxins are attached—to be wrapped inside a membrane ball and moved inside the cell. PA takes advantage of the receptor and a natural change in the ball's acidity to change its shape.

"PA makes a big loop, a long hairpin structure that pokes through the membrane of the ball," said Robert Liddington (Burnham Institute), an author on the recent Nature paper describing this work.

Piercing through the ball membrane allows the toxin to form a channel, like a straw in a soda. The other two toxins usurp energy from the cell and use the PA channel to flow out of the ball and into the main part of the cell where they prevent an immune response.



1. One of the three anthrax toxins, PA (the bowling-pin shaped 'PA83' in the illustration), binds to a CMG2 receptor on the surface of a human cell. 2. The two other anthrax toxins, LF and EF (oval shapes), stick to PA. The toxins and the receptor are wrapped inside a membrane ball and pulled into the cell. 3. PA transforms its shape and forms a channel through the membrane ball that allows EF and LF to get into the main compartment of the cell and cut off distress calls to the immune system. (Graphic courtesy of Robert Liddington)

"The toxin is using natural cellular machinery in a very creative way," Liddington said. The new information on how PA recognizes and tricks our cell receptors is potent information

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for designing anti-anthrax drugs that derail the PA-CMG2 interaction.

PA also binds to a receptor called TEM8 found primarily on the surface of cells lining the blood vessels that supply nutrients to tumors. This scenario for treating cancer involves PA binding to TEM8, allowing one of the toxins, called lethal factor, to enter and kill rapidly proliferating cancer cells. PA toxin injected into blood vessels has already killed tumors in mice. The PA can also enter normal cells via the CMG2 receptor, but the damage is limited because there are no anthrax bacteria pumping out huge doses of toxin. To more precisely target cancer, researchers are looking for differences between TEM8 and CMG2.

"The two receptors are quite similar but probably there are enough differences to engineer anthrax PA molecules to favor binding to the TEM8 receptor," Liddington said.

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New Investigator Award Established at SSRL to Honor W. E. Spicer (1929-2004), Co-Founder of SSRL and Photoemission Spectroscopy Pioneer

By Cathy Knotts

On June 6, 2004, while vacationing in London, William E. (Bill) Spicer died of heart failure. Overcoming a series of obstacles as a youth, Spicer went on to become an esteemed member of the international scientific community as a teacher and researcher in electrical engineering, applied physics and materials science. He spent the past 40 years as a professor at Stanford where he pioneered the technique of ultraviolet photoemission spectroscopy and its subsequent expansion into the use of synchrotron radiation.

In 1972, Spicer together with Sebastian Doniach founded the Stanford Synchrotron Radiation Project which evolved into today's SSRL. He was a prolific author with over 700 works and the recipient of many honors and awards including the Lifetime Mentor Award by the AAAS in 2000, reflecting his tireless effort on the behalf of under-represented minorities and women. Though retired for some years, Spicer continued to actively advise students at SSRL up until his death.

William E. Spicer (left) and Sebastian Doniach (Photo by Diana Rogers)

In honor of his many contributions to our community, both professional and personal, SSRL established the W.E. Spicer Award for Scientific Excellence to be awarded annually to a young scientist. The Spicer Award will be presented at the annual SSRL users' meeting to a young investigator who has made important technical or scientific contributions that benefit from or are beneficial to SSRL or the synchrotron community.

On October 21, the first Annual W.E. Spicer Award was presented to N. Peter Armitage, a former graduate sudent who worked with Z.-X. Shen in the Stanford Department of Applied Physics.

The award, which is open to senior graduate students and those within seven years of entry into their professional scientific field at the time of nomination, will consist of a certificate and $1,000.

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Nominations in the form of a letter or email summarizing the technical or scientific contributions of the candidate should be sent by the August 1, 2005, deadline to Cathy Knotts, SSRL MS 99, 2575 Sand Hill Road, Menlo Park, CA 94025. Nomination packages should include the candidate's curriculum vitae and a list of publications; supporting letters are encouraged.

Nominations received by the deadline will be reviewed by the selection committee. The next award will be presented at the 32nd Annual SSRL Users' Meeting (October 17-18, 2005).

Anyone interested in making a donation towards the W.E. Spicer Award can do so by sending a check made out to 'Stanford University' to SSRL c/o Dave Dungan, SSRL MS69, 2575 Sand Hill Rd., Menlo Park, CA 94025. Please note 'Spicer Award' on the memo line.

For more information on Bill Spicer, see: http://news-service.stanford.edu/news/2004/july7/spicerobit-77.html

For more information on SSRL, see: http://www-ssrl.slac.stanford.edu

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Future Science for Future Scientists

By Raven Hanna

How many CDs are in the box? "100," one child guessed. "1,000," said another. The answer was 2,000, representing the equivalent of just 0.1 percent of the database capabilities at SLAC. "Imagine two million CDs," explained Yemi Adesanya (SCS). "Stacked end to end, they would span the length of the Golden Gate Bridge."

Last month, 600 Chicago area children, ages 11 to 13, glimpsed the science of the future. The 'What's Next: Future Science for Future Scientists' exposition at Chicago's Navy Pier featured exhibits intended to interest and amaze. Sponsored by the DOE, the program's aim is to retain the interest students have in the sciences beyond their junior high school years.

SLAC's exhibit, 'High Speed Data Transfer will Revolutionize Your Lives,' demonstrated the cutting-edge technology of the large and fast database developed.

Along with impressing students with a large box of CDs, the exhibit included a video demonstration on a large plasma screen. Visually dramatic, the video compares the speed and quality of downloading streaming video over a DSL line with downloading at SLAC's data transfer speed, which allows 100 DVDs to be simultaneously transferred in highest quality. The children first watched the jumpy and grainy DSL-transferred Spiderman movie, then were delighted to see quick and crisp clips of their favorite movies superimposed on the screen.

"I enjoyed the challenge of trying to convey to children what we do and why the database at SLAC is so special," said Adesanya, who helped represent SLAC at the expo. "What we are doing today they will see in their homes in the future."

At other exhibits the students were able to isolate their own DNA, preserving it in a necklace with assistance from LLNL and burning, literally, CDs in a microwave oven provided by Underwriters Laboratory.

The What's Next Expo will be an annual contribution to the DOE program Scientists Teaching and Reaching Students (STARS), which Energy Secretary Spencer Abraham announced during his July visit to SLAC. The STARS program was created to help reverse the declining trend of U.S. children's performance in the sciences after fourth grade.

"I'll bet you didn't think in the fourth grade that you were at your peak in comparison with other students

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around the world, but according to this study you were," Abraham told the students at the Expo. The study the Energy Secretary referred to also found U.S. students to be among the worst performers, compared to 21 other countries, in math and science in grades eight and 12.

"I sincerely hope that someday in the future, when one of you steps up to receive the Nobel Prize for physics or chemistry," Abraham said, "you can say you owe some of it to What's Next."

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SLUO Election Results

By Nina Adelman Stolar

It's that time of year and the SLUO election results are in.

The most recent SLUO election ended on September 10. Congratulations to new Executive Committee members Lance Dixon (THP), David Lange (LLNL), Abi Soffer (Colorado State U) and Sasha Telnov (Princeton U).

The current Executive Committee chair is Gregory Dubois Felsmann (CalTech). Bruce Schumm (UCSC) is Secretary/Treasurer and Abi Soffer (Colorado State U) is coordinator of committees. Current subcommittees include Computing,

Outreach, Public Meetings, Quality of Life, Visa Problems and Washington DC Trip (see TIP, April 4, 2003).

The Executive Committee is comprised of 12 users and SLAC collaborators serving three year terms. Members are nominated by institutional representatives at the Annual Meeting and voted on by the full SLUO membership. Minutes of the Executive Committee are available on-line.

The SLUO Administrator is Fran Spiller (see TIP, November 5, 2004). For more information on SLUO, see: http://www-group.slac.stanford.edu/sluo/

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SEM Service Requests: Your Patience, Please

By Burl Skaggs

Since SLAC's work suspension began three weeks ago, SEM has accumulated over 1,200 service requests. Many of these requests involve work that is not permitted to be performed without case by case review. This includes lockout and tagout electrical work, roof access, hoisting and rigging, and limits our use of certain tools and equipment.

SEM is primarily scheduling service requests that address significant safety or maintenance hazards. We will schedule some routine service requests not prohibited by our current work restrictions. All SEM construction projects are stopped at this time and awaiting further guidance on subcontractor safety.

The SEM staff members appreciate your patience and understanding during these unsettled times. Once normal work is resumed without Restriction, every effort will be made to schedule and complete all outstanding service requests as soon as possible.

Service Request Safety Types

The on-line submission form has three selections under Safety: Non-Safety, Safety Regular or Safety Immediate. For service requests, SEM defines Safety as anything that poses a direct/indirect threat or hazard to personnel, property and/or the environment.

A large number of service requests being sent in have Safety selected (versus Non-Safety). Please select Safety only if it meets this definition. For general requests, selecting safety will not ensure that your request will be handled faster or that your request will be completed more quickly.

If you have any questions or need assistance, please contact the SEM Service Desk (Ext. 8901).

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Voluntary Contributions Greatly Appreciated

By Hope Johnson

The Simon family extends their sincere appreciation for the personal generosity of many people here at SLAC and our DOE colleagues.

The voluntary collection to help the family of David Simon, who was injured in the October electrical accident, went directly to Mrs. David Simon. A family of eight, the Simons live in West Virginia.

Under these special circumstances, some of us wanted to help the family with their expenses while the wife is here with her husband.

For more information, see: http://today.slac.stanford.edu/today_detail.asp?id=1726

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December 10
January 21

Stories are due 10 days before publication date.

For more information, see: http://www2.slac.stanford.edu/tip/

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SLAC Guest House when you are planning your next event:

http://www.stanford.edu/dept/hds/SLAC/

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10 Years
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Ward, John (KLY), 11/21

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To submit a Milestone, see:
http://www.slac.stanford.edu/pubs/tip/milestoneindex.html

See Awards and Honors at:
http://www.slac.stanford.edu/slac/award/

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Annual Holiday Party

A colorful international theme will define this year's SLAC Holiday Party:

Thursday, December 16
11:30 a.m. to 1:30 p.m.

There will be a festive lunch, great entertainment and raffles with lots of prizes—all free for the SLAC community including our retirees.

Mark your calendar and watch for further details!

For more information, see: http://www-project.slac. stanford.edu/holidayparty/

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SSRL Users Meeting Workshop

Photo by Diana Rogers

The 31st Annual SSRL Users Meeting was held at SLAC in October. A two-day workshop followed on Ultrafast Science and LCLS Experiments organized by Jerry Hastings and Keith Hodgson (both SSRL). For more information, see: http://www-conf.slac.stanford.edu/ssrl/2004/

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Klaisner Hosts Fermilab Event

By Davide Castelvecchi

Lowell Klaisner (GLAST) traveled to Fermilab where he was joined by Tom Johnson (NASA/Goddard Space Flight Center) on November 8. The purpose of the trip was to celebrate the successful completion of a key component of the Large Area Telescope (LAT), the main instrument of the Gamma Ray Large Area Space Telescope (GLAST).

When in orbit about three years from now, GLAST will be the most powerful eye ever cast on the gamma ray sky—essentially a small, flying replica of the heart of a detector like BABAR.

Lowell Klaisner
(Photo by Diana Rogers)

A Fermilab team led by Phyllis Deering (FNAL) manufactured and tested scintillator tiles, which wrap around the LAT's main detector and pick up the faint flashes produced by the passage of charged particles. Such signals tell the telescope that an event was not a gamma ray but a cosmic ray, so the on-board electronics should ignore it and weed it out as noise. The scintillators are arrays of optical fibers that pick up the light and funnel it to photo-multiplier tubes.

"We're very appreciative. This is the first component of the LAT to be completed," said Klaisner, project manager for the SLAC-based LAT.

Following NASA's specifications was especially challenging, Deering said, because of the limited room available inside the probe. Johnson said Fermilab was chosen for this project because of their experience with manufacturing similar components for two Tevatron detectors, the Minos neutrino detector and the CMS detector for the LHC. Johnson called the routing of the tiles' optical fibers a 'work of art.' "Your technical knowledge, skills and abilities really provided a super product to us," he said.

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The Interaction Point is published twice monthly every first and third Friday. Submissions are due the second and fourth Tuesdays of each month.

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TIP is available online at:
http://www2.slac.stanford.edu/tip/