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Director's Corner

By Jonathan Dorfan

Twenty-two months from now, the GLAST satellite, a complicated and sturdy set of particle physics detectors, will be encapsulated into the cone of a Delta 2 Heavy rocket at Kennedy Space Center, and blasted into space.

A crew of SLAC engineers and physicists will crane their necks and shield their eyes, looking on in pride as their painstaking work takes flight. They will be accompanied by an equally excited and exhilarated group of collaborators from the rest of the U.S., and around the world.

See whole story...

Kavli Building Update

By Linda DuShane White

The stylish building planned to house the joint Stanford University and SLAC Kavli Institute for Particle Astrophysics and Cosmology (KIPAC) is scheduled for completion by the end of January 2006, and construction is currently on schedule.

“It’s all taking shape,” says Stuart Marshall (RD/KIPAC).

See whole story...

Biological Tubes to Serve as Miniature Drug Capsules

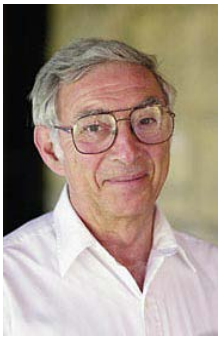
By Heather Rock Woods

By mixing two common cell ingredients, scientists have assembled tiny hollow tubes whose ends can be open or closed, giving them great potential to serve as drug capsules thousands of times thinner than a human hair, but still 10 times wider than a gene.

With an open-close switch, these ‘lipid-protein nanotubes’ may prove to be an excellent way to encapsulate a therapeutic drug or gene and then release it in the appropriate location.

See whole story...

Bienenstock in the News



Arthur Bienenstock (Stanford/SSRL) has been elected vice president of the American Physical Society (APS) for 2006. Per the organization’s succession system, he will become president elect in 2007, president in 2008 and immediate past president in 2009.

At the SSRL Users’ Meeting on October 17, Pat Dehmer, Associate Director of the DOE Office of Basic Energy Sciences presented Bienenstock with a DOE Distinguished Associate Award.

See whole story...

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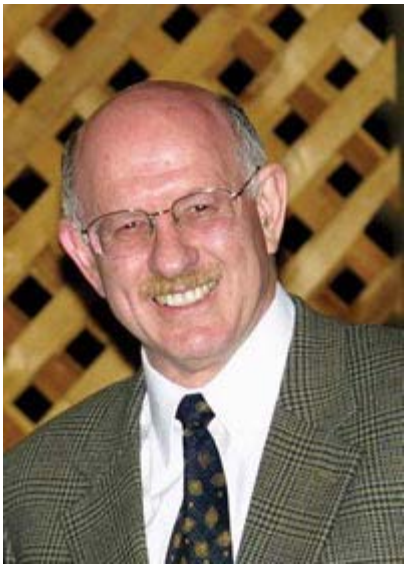
Director's Corner

By Jonathan Dorfan

GLASTing into Space

Twenty-two months from now, the GLAST satellite, a complicated and sturdy set of particle physics detectors, will be encapsulated into the cone of a Delta 2 Heavy rocket at Kennedy Space Center, and blasted into space. A crew of SLAC engineers and physicists will crane their necks and shield their eyes, looking on in pride as their painstaking work takes flight. They will be accompanied by an equally excited and exhilarated group of collaborators from the rest of the U.S., and around the world.



Jonathan Dorfan, Director
(Photo by Diana Rogers)

Once in orbit around the Earth, the entire GLAST observatory, including the Large Area Telescope (LAT) detector assembled and tested at SLAC, will come free from the rocket and will begin its primary mission: surveying the entire sky every two orbits encoding the energy, arrival time and directions of gamma rays. Orbiting well above the earth's dense atmosphere, the gamma rays are detected with high precision.

Gamma rays are photons, as are x-rays, sunlight and microwaves, but with a lot more energy. The LAT will identify the energy and direction of gamma rays with energies from 10 MeV to 300 GeV. To get a sense of how extremely energetic these particles are, remember that the linac accelerates particles to 50 GeV.

The observatory will take a picture of the gamma-ray sky, which will look quite different than what we see when we look at the heavens. What our eyes see is low energy visible light. The two pictures of the heavens tell very different stories and reflect different extra-terrestrial phenomena. Gamma rays can be emissaries from the oldest and farthest reaches of the universe. We expect to learn more about black holes, supersymmetric dark matter, quantum gravity, pulsars, and understand how gamma rays are accelerated and how they behave.

GLAST is an international collaboration funded by NASA, the Department of Energy, and government agencies in Italy, France, Japan and Sweden. The observatory consists of two scientific instruments, LAT and the GLAST Burst Monitor (GBM). INFN in Italy, in collaboration with Japan and the U.S., built the 16 towers for LAT that collectively make up the tracker detector. These were mounted into the aluminum support frame along with the calorimeter modules which were built as a collaboration of the U.S., France and Sweden. SLAC integrated the tracker towers and the calorimeters with electronics, trigger and data flow systems. This week the team at SLAC covered these central elements with the Anti-Coincidence Detector, which identifies the many incoming particles that are not gammas, and are therefore not of interest.

I am delighted that so many of you went to the GLAST open house on Oct. 26 to take a last look at the tracker through the clean-room windows.

In January, SLAC will send the completed LAT to the Naval Research Laboratory for flight testing. The LAT instrument will be shaken, put under vacuum, heated and

cooled to extreme temperatures, and blasted with noise, all to simulate launch and space conditions to make sure the instrument is flight-qualified. SLAC has already tested each individual module of LAT in these ways.

After GLAST successfully reaches space, SLAC will continue to play an important role. The observatory's data will be relayed to NASA and then sent to the Instrument Science Operating Center (ISOC) at SLAC. This new center will occupy part of the Central Lab Annex. ISOC staff will monitor the health and safety of the instrument, create commands to operate it, and process the raw data so researchers can use it.

In the first year of operation, the GLAST collaboration will analyze the gamma-ray sky, how it changes on a daily basis, trying to understand what happens around black holes, what dark matter is, and other key questions in 21st century particle astrophysics. GLAST represents a true merging and collaboration of particle physics and particle astrophysics, with particle physics detectors launched into space to answer questions by watching the most powerful particle accelerators in our universe. Exciting times are ahead for all of us.

The Stanford Linear Accelerator Center is managed by Stanford University for the US Department of Energy

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Bienenstock in the News

2006 APS Vice President

Arthur Bienenstock (SSRL) is presented the DOE's Distinguished Associate Award from Pat Dehmer (DOE, Office of Basic Energy Sciences).
(Photo courtesy of Artie Bienenstock)

Arthur Bienenstock (Stanford/SSRL) has been elected vice president of the American Physical Society (APS) for 2006. Per the organization's succession system, he will become president elect in 2007, president in 2008 and immediate past president in 2009.

A professor in the departments of Materials Science and Engineering and Applied Physics and at SSRL, Bienenstock served as director of SSRL from 1978 to 1997. As a senior science adviser to President Clinton from 1997 to 2001, he was a strong advocate for federal research funding and provided guidance on complex scientific and policy issues. In his APS leadership roles, Bienenstock plans to focus on issues including federal funding for research in the physical sciences and engineering (with some emphasis on energy research) and the maintenance of openness in research during a security-conscious era.

DOE Distinguished Associate Award

At the SSRL Users' Meeting on October 17, Pat Dehmer, Associate Director of the Office of Basic Energy Sciences, DOE, presented Bienenstock with a DOE Distinguished Associate Award, with a citation from Samuel W. Bodman, Secretary of Energy.

The citation reads: In recognition of your many accomplishments, contributions, and leadership in both science and science policy. Your exemplary service to the Stanford Linear Accelerator Center and particularly to the Stanford Synchrotron Laboratory, the Department of Energy, the Nation, and the scientific community has made possible world leading scientific research across disciplinary and geographical boundaries. You have elegantly brought together diverse ideas, peoples, and institutions to work together. You serve to remind scientists of all ages that one person with a vision can truly make a difference.

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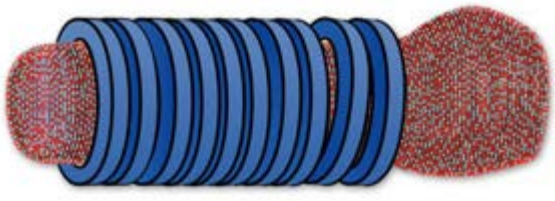
Biological Tubes to Serve as Miniature Drug Capsules

By Heather Rock Woods



A lipid protein nanotube with closed end and lipid caps. (Image courtesy of Cyrus Safinya)

By mixing two common cell ingredients, scientists have assembled tiny hollow tubes whose ends can be open or closed, giving them great potential to serve as drug capsules thousands of times thinner than a human hair, but still 10 times wider than a gene.

With an open-close switch, these 'lipid-protein nanotubes' may prove to be an excellent way to encapsulate a therapeutic drug or gene and then release it in the appropriate location.

The research team from UC Santa Barbara (UCSB) investigated the structures of their nanotubes by using a sophisticated analysis of x-ray scattering data gathered at SSRL, combined with high-resolution transmission electron microscopy.

Gene therapy currently relies on incorporating therapeutic genes within engineered viruses, which then 'infect' the cells where the genes are needed. Scientists have been seeking a non-viral way to deliver genes and have increasingly turned to positively charged lipids.

The biological tubes are made from lipids and microtubules. Lipid membranes, made of fatty acids, form the protective lining around cells and also make smaller packets containing everything from crucial sustenance to cell garbage. They typically have a negative charge.

This study used a synthetic lipid with a positive charge to coat a negatively charged hollow cylinder made of microtubules. Microtubules are the skeletons and train tracks of cells, and play a key role in cell division. In this case, the microtubules were the scaffolding for the lipid.

"It's literally like a drug capsule, just tiny," said Cyrus Safinya, professor of materials and physics at UCSB.

When the charge per unit area of the lipid membrane gets high enough, the lipid coats the microtubules, forming the nanotubes. The coating either seals the ends of the tube or leaves them open, depending mainly on the overall electrical charge of the nanotubes.

"It's a combination of the actual charge of the complex plus the relative area of the membrane to the microtubule," said Safinya.

In the lab, researchers can adjust the charge and add either more lipid or more microtubule components to flip the switch between open and closed. But that is difficult in the body, so the team is now studying ways to trigger the tubes to open or close based on pH, which naturally varies in the human body.

"The pH is expected to change the charge of certain lipids. It's an easier way of tuning the nanotubes to load them up with the molecule you want —a gene silencer, a gene that encodes for a protein, a drug—and then release the molecule where and when

you want," Safinya said.

In making the nanotubes, the researchers varied certain chemical properties, resulting in different nanotube structures. For example, the scattering and microscopy data showed that when the lipid membrane was thick, it beaded up on the surface of the microtubules, like water on a duck's back, rather than fully coating the tubes.

The research was published in the Proceedings of the National Academy of Sciences in late July. The first author is Uri Raviv, a postdoctoral researcher in Safinya's lab and a fellow of the International Human Frontier Science Program Organization. Researchers included members of Safinya's laboratory and members of the laboratory of Leslie Wilson, UCSB professor of biochemistry. The National Science Foundation and the National Institutes of Health supported this research.

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Kavli Building Update

By Linda DuShane White

Siding which will coordinate the Kavli exterior with the other SLAC buildings is now in place. The building is expected to be completed in early 2006.
(Photo by Diana Rogers)

The stylish building planned to house the joint Stanford University and SLAC Kavli Institute for Particle Astrophysics and Cosmology (KIPAC) is scheduled for completion by the end of January 2006, and construction is currently on schedule. “It’s all taking shape,” says Stuart Marshall (RD/KIPAC).

Inclement weather or other unexpected factors could slow the process down, but the roof is on and waterproofed and the windows are slated to be installed next, assuring that the inside work can proceed. As each day passes, the building looks more like the architectural renderings we first saw. SLAC can look forward to a handsome addition to the buildings circling The Green.

Electrical experts are currently putting in power, data and phone lines. A large area behind the Panofsky Grove has recently been excavated but will eventually be covered with grass again and will not, as some have surmised, be another patio. Instead, this area will house the underground pipes for the hot and cold water which provide heating and air conditioning. Meeting space is always a topic of interest at SLAC, and the 158 seat auditorium planned for the Kavli building will be in great demand. Marshall emphasizes that the auditorium will not be ready for use until it is equipped and furnished. Still, the Kavli building will soon be up and running and we will have a welcome addition to cutting edge science at SLAC and Stanford.

For more information, see: http://www-group.slac.stanford.edu/kipac/

For photos, see: http://www-group.slac.stanford.edu/kipac/building_photos.htm

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LCLS Construction Update

By David Saenz

For more detail, see:
http://www.slac.stanford.edu/grp/lcls/CFWeb/

There are currently four LCLS projects under construction:

Sector 20 Injector Facility

The 1,600 square foot Alcove that had been utilized over the years as a Pump Repair Room and Mechanical Shop for the plant engineering staff has been demolished. The LCLS project will use this space for a new 2,000 square foot facility to house the Laser Injector and RF Gun. Steel erection will commence in November with a final construction scheduled completion date at the end of February 2006. Due to the construction activities, north access along the gallery will continue to be limited access. The LCLS Project Manager is Bob Law.

Magnetic Measurement Facility (MMF)

The interim home for the undulators (MMF) is scheduled for completion by late February 2006. This facility will be located in the existing Bldg. 81 and will contain the new undulators being provided by the Advanced Photon Source at ANL. These components will require fine tuning and calibration before they are relocated to the Undulator Hall in May 2007. The majority of the demolition is complete and new concrete foundations have been poured. The LCLS Project Manager is Javier Sevilla.

Sector 24 Equipment Access

What was previously an empty 35- foot concrete shaft now has a set of steel stairs. These stairs are designed for easy removal should equipment need to be lowered into the shaft. The facility also includes a new metal enclosure to allow for ease of access. The LCLS Project Manager is Jesse Saldivar.

FFTB/RSY Vertical Exterior Shielding

A total of 12 exterior shielding blocks have been removed. Each 9'x 9'x 3'concrete block is a 19-ton load. These have been replaced with a concrete plug of similar thickness. Removal of the blocks was scheduled at this time so that radiation protection remains in place until FFTB demolition is completed. The LCLS Project Manager is Jesse Saldivar.

Major Construction to Begin in March 2006

The major phase of LCLS construction is scheduled to begin in March 2006 with possibly some site work beginning earlier. The full design will be completed by Jacobs Engineering in January 2006. The construction phase will be managed by Turner Construction. The new Beam Transport Hall (BTH) facility will stretch across the Research Yard, bisecting the area.

The FFTB structure in the Research Yard is scheduled for demolition next year. Other

buildings that will be required for demolition include buildings 102A, a portion of building 102B and the High-Bay of Bldg. 113. During all the construction activities safety will be paramount for contractors and lab employees.

Watch for Web Cams

For those who want to keep close tabs on progress during the major construction phase, watch for news and views from the web cams which will be going up in the Research Yard.

The Stanford Linear Accelerator Center is managed by Stanford University for the US Department of Energy

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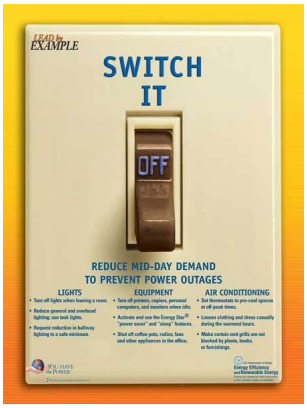
Presidental Directive on Energy and Fuel Conservation

By Luda Fieguth



(Image courtesy of DOE)

SLAC has received a memorandum from Secretary of Energy Samuel W. Bodman regarding implementation of the recent Presidential Directive on Energy and Fuel Conservation by Federal Agencies. This memorandum has been posted to the SLAC Today website at: http://today.slac.stanford.edu/today_detail.asp?id=3829

In the aftermath of the hurricanes in the Gulf Coast, DOE facilities are expected to lead by example and conserve electricity, natural gas, gasoline, and diesel fuel in order to aggressively minimize current energy shortage impacts.

SLAC contributes to energy saving by incorporating energy-efficient design measures into construction projects, procuring energy-efficient equipment and by running the linac at a low repetition rate. The makeup of SLAC's transportation fleet is changing as we replace many gasoline-powered vehicles with electrical vehicles and some of the large maintenance trucks with minitrucks that run ~40 miles on a gallon of fuel.

We at SLAC are expected to identify and implement additional ways of reducing the overall energy use. Please contribute to energy saving at SLAC as well as at home. Energy Conservation Tips are available on SLAC's Energy Management web page, See the websites included in Secretary Bodman's memorandum.

For more information see: http://www.slac.stanford.edu/slac/energy/

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November 4, 2005

SLAC Recycling Program Update

By Rich Cellamare

As of October, we have made some improvements to the recycling program.

Changes in Paper Recycling

You can now deposit paper in any of the green recycling carts that accept paper. Use the Mixed Paper label as a general guide to what kinds of paper can be recycled, but remember white paper and newspaper are included.

It is too expensive to re-label the carts, so the different labels will remain. Just remember any green cart labeled Mixed Paper, White Paper or Newspaper can accept any of the recyclable papers.

Plastic and Drink Container Recycling

You can deposit more types of plastic drink containers in the carts that accept bottles and cans. As with recyclable paper carts, the labels for bottle and can carts will not be changed.

Green carts labeled 'Bottles and Cans' now also accept the following:
• Plastic beverage bottles (containers with necks only) numbers 3 through 7
• Aseptic containers ('drink boxes'— primarily for milk, fruit juice and wine)

We Can Use Your Help

Recycling just got easier.
(Photos courtesy of Rich Cellamare)

Now that we do not need to separate papers, we should need fewer carts. Building managers are encouraged to coordinate and call the CEF Service Desk (Ext. 8901) to collect extras. These will come in handy for other areas around SLAC.

Thank you again for supporting the recycling program. The program continues to reduce waste disposal costs and generate recycling revenues, which are used to support the program. If you have questions, call Rich Cellamare (Ext. 3401, rcellamare@slac.stanford.edu).

For details on what we recycle and how, see: https://www-internal.slac.stanford.edu/sem/recycling/separation.html

INTERACTION POINT
November 4, 2005

Benefits Open Enrollment Period

Benefits Open Enrollment runs from October 26 through November 15. Elections made during this time period will take effect on January 1, 2006. On-line go to the Stanford Benefits website at http://benefitsu.stanford.edu. To make Open Enrollment elections by phone call (877)905-2985.

Informational Meeting

An Open Enrollment Informational Meeting will take place at SLAC on Thursday, November 10, from 11:00 a.m. to Noon in the Orange Room (Central Lab, Bldg. 40, Rm. 140-150).

Beneficiary Re-Entry Required

Since there is a new benefits administration system in place, all beneficiary information must be re-entered. Whether or not you decide to make any changes to your benefits during Open Enrollment, you must go on-line and record your life insurance beneficiary. You can designate anyone as your beneficiary and can make changes at any time; only the most recent information will remain in your records. If you do not have computer access, you can submit beneficiary data by calling (877)905-2985.

If you plan on using a Flexible Spending Account for Health Care or Dependent Care, you must re-enroll for 2006 since this benefit does not automatically rollover to the next plan year. Also, if you have been approved for a Child Care Subsidy Grant for 2006, you must go on-line or call (877)905-2985 to accept your grant during the Open Enrollment period.

Contact: Anita Piercey, Ext. 2356, anita@slac.stanford.edu

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SLAC Land's End

2005 Logo-wear Sale

November 7 – 11
Noon – 1:00 p.m.
SLAC Guest House Lobby

Note: Delivery will be in early December

Contact: Doug Kreitz, Ext. 4550, dougkr@slac.stanford.edu

Kingston Chan (CEF) shows off Lands' End SLAC Logo items.
(Photo by Diana Rogers)

INTERACTION POINT
April 15, 2005

Paletas for Lunch?

Delicia Gipson and Dennis Leonardo (both MFD) spend their workdays in the Document Control department (A&E, Bldg. 40). They are always looking for ways to have fun and burn calories. In the beginning, they played Frisbee but now they spend their lunch time on The Green playing Paletas. This two-player sport originated on the beaches of Brazil. A tennis ball is struck back and forth between the two players using Paleta paddles. The object of the game is to keep the ball up; it can not hit the ground. If, while you are playing, the ball lands at your feet, your opponent scores a point. Gipson and Leonardo never really keep score—they only look forwards to the physical challenge and activity.
(Photo by Diana Rogers)

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Computer Training

Computer classes have been scheduled for November and December in the SCS Training Room (Bldg. 50, Rm. 111).

For more details or to register see:
http://www2.slac.stanford.edu/comp/edu/classes/

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Welcome New Employees!

The new employee orientation held on October 6 included (left to right): Agnieszka 'Aga' Egan (CEF), Murat Kerimbaev (RP), Arno Candel (ACD), Traci Kawakami (REG), Richard Swent (ILC), Zhi Liu (ESRD), Lionel Loskamp (CEF) and Yee-Ting Li (SCS).
(Photo by Erin Shatara)

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The SLAC Emergency Hotline Number:

1-877-447-SLAC (7522)

Please make a note of the SLAC Emergency Hotline number. In the event of an emergency, the most current information about SLAC will be a single phone call away.

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MILESTONES

Appointments & Awards
Bienenstock, Artie (Stanford/SSRL), 2006 APS Vice President, and DOE Distinguished Associate Award, 10/17 (see article, page 1)

Service Awards

5 Years
Batygin, Yuri (NLC), 11/1
Hoobler, Sonya (AD), 11/1
Remerata, Olegario (BSD), 11/1

10 Years
Marcello, David (SCS), 11/6

15 Years
Saleski, E. Michael (AD), 11/5

40 Years
Manuel, Alfonzo (CEF), 11/1

Deceased
Chodorow, Marvin (formerly Stanford Applied Physics), age 92, passed away on October 17, 2005

Goldsberry, Donald (formerly AD), age 81, passed away on October 22, 2005

Peters, Ted (formerly BSD), age 81, passed away on October 20, 2005

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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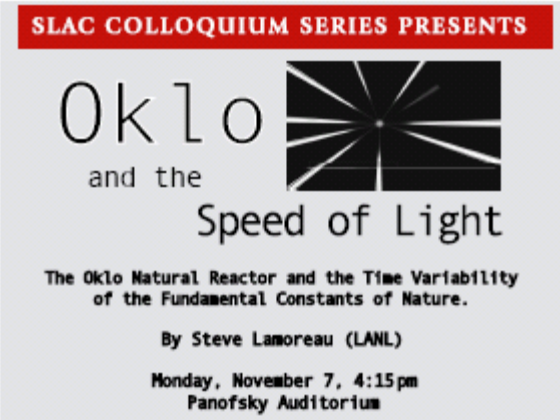

(Image by Chip Dalby)

By Melinda Lee

Natural nuclear reactors? Changes in the speed of light? If either of these concepts seem implausible to you now, they certainly won't once Steve Lamoreaux (LANL) delivers his SLAC Colloquium lecture entitled, The Oklo Natural Reactor and the Time Variability of the Fundamental Constants of Nature.

This lecture is a rare opportunity to hear about Oklo's incredible natural nuclear reactors. In addition, you can learn about how the present day study of these sites may alter our understanding of fundamental constants such as the speed of light.

Join us in Panofsky Auditorium on Monday, November 7, at 4:15 p.m. This is simply a must for the curious!

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34th Annual SLAC Run & Walk

Thursday, November 17

Run starts at 12:05 p.m.

No prior registration is required to participate.

NOTE: Due to construction along the Klystron Gallery road, the course may change. Normally the course starts on the south side of the Klystron Gallery at Sector 30, continues around the end of the gallery, and ends on the north side, again near Sector 30. This year we may run the course up and down one side of the gallery.

A map of the course will be provided at the event. The course length is officially 3.8 miles plus 66.5 feet.

For complete details, see:
https://www-internal.slac.stanford.edu/slacrace/

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DOE Regional Science Bowl at SLAC

WHO?
You—Your support is needed!

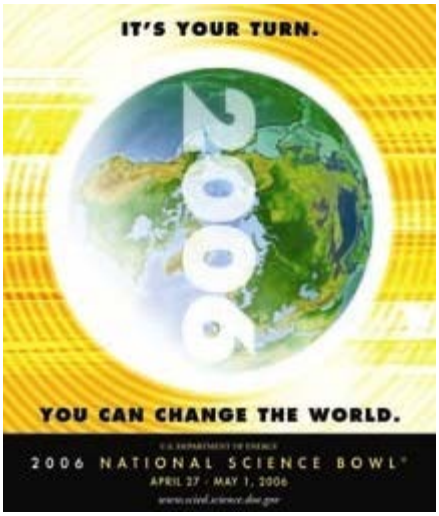
WHAT?
Regional science bowl for local high school teams

WHEN?
Saturday, February 11, 2006

WHERE?
Panofsky Auditorium

WHY?
Great educational outreach event to support the DOE National Science Bowl

To join us as SLAC Ambassadors to the Community for this exciting event, contact Communications (Ext. 8703, pao@slac.stanford.edu).



For more information, see:
http://www.scied.science.doe.gov/nsb/
(Image courtesy of DOE)

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