The Interaction Point

Events and Happenings
in the SLAC Community
April 1993, Vol. 4, No. 4

Accelerator School Prize Winner

by Rene Donaldson

MARC ROSS, an accelerator physicist in the SLC group, is one of three recipients of the US Particle Accelerator School Prize for Achievement in Accelerator Physics and Technology "for his measurements and analysis of the SLC accelerator and beam properties." The prize, rumored to be cash, will be awarded at the 1993 Particle Accelerator Conference banquet in Washington, DC, on May 19. Given to young people working in the accelerator field, this award also honors two others, Richard Sheffield of Los Alamos National Laboratory and John Fraser of TRIUMF in British Columbia, for their invention of a high brightness electron source.

Marc, who has been at SLAC ten years, has spent much of that time working to improve the stability, and thus reliability, of the SLC by focusing on methods to improve feedback so that the team that runs the collider will have exact knowledge of what is occurring and where in order to tune the micron-sized beam more precisely (and in the linear collider business, precision is the name of the game). What Marc designed three years ago was an improved scanner with two or three wires that then produced feedback on a computer screen to enable finer tuning than was previously available. Marc, who appears easygoing but who has spent days, nights, and weeks trying to improve the machine's reliability, says that the idea of the wire scanner beam profile monitors, as they are called, was not new and that they are similar to ones used at Fermilab and CERN. In early 1990, eight monitors with three wires each, were installed in the SLC. They worked so well in helping to control the beams that another 40 were built and installed. "Almost every one showed something that wasn't anticipated," said Marc. When asked, "like what?" Marc explained that they discovered optical problems with the damping ring transport lines. In addition, they expected to learn more about the collider's sensitivity to three things: daily temperature differentials, which as everyone knows can be extreme in California; electrical fluctuations, which

(See Marc Ross, p. 3)

FIVE SLAC PHYSICISTS NAMED APS FELLOWS

DAVID BURKE, Gregory Loew, Ken Moffeit, and Ron Ruth, were elected fellows in the American Physical Society (APS) in March. Gerhard Fischer, who recently passed away, was also honored.

Fellowship in the society is a great honor, and very difficult to achieve; fewer than one half of one percent of the membership in each of the disciplinary divisions of the society are honored as fellows. Usually the award expresses an appreciation for the physicist's lifetime contribution to the field, but it can also represent a singular and especially important achievement.

Burke and Moffeit were elected in the Division of Particles and Fields, Fischer, Loew, and Ruth in the Division of Physics of Beams.

DAVID BURKE

David Burke has been at SLAC for 15 years since receiving his Ph.D. from Michigan. For the first ten years he worked on the Mark II detector at SPEAR and PEP, and on the ASP experiment at PEP. David helped to eliminate background debris not generated by the desired particle collisions. For the last five years David has worked on the SLC and on development of a future linear collider. In particular he has managed the Final Focus Test Beam, which is a large international collaboration.

(See Physicists, p. 2)

(Physicists, *cont'd. from p. 1)*

David Burke

Burke appreciates the validation that the award offers: "It gives you additional clout to keep doing what you're doing; it lets you know that what you're doing is relevant. "Of course, you have to know you're right on your own anyway," Burke added. "But it [the fellowship] helps."

GREGORY LOEW

Gregory Loew was elected as a fellow for his contributions to the design, construction, and operation of linear accelerators and associated devices, and for his more recent work with extremely high rf fields. Loew, a long-time employee of SLAC, came to Stanford University in 1954 as a student and started to work on Project M (which later became SLAC) in 1958. His first job was to help design the approximately one thousand accelerator sections which constitute the heart of the two-mile accelerator. In fairness, when interviewed, he pointed out that while each section has 86 different cavities, almost all the sections are alike! Loew is presently Deputy Director of SLAC's Technical Division and a member of the SLAC faculty.

Loew's election is especially satisfying to him because it means that he has caught up with his wife who became a fellow in her division fifteen years ago.

KEN MOFFEIT

Ken Moffeit's award recognizes his work in the production of polarized beams in linear colliders, and his contributions to the study of charmed particle production. Moffeit came to SLAC as a post-doc after receiving his Ph.D. from Berkeley in 1970. After a two-year stint at DESY in Hamburg between 1974–1976, he returned to work on charm photoproduction in the SLAC Hybrid Facility using bubble chambers.

Moffeit's recent work is of much interest to SLAC. He has been intimately involved in the polarized beam project since 1985. Moffeit said the increased polarization of the beam is an exciting and important development. Increased polarization represents an opportunity to more accurately test the asymmetry predicted by the Standard Model, and as Moffeit said, "The data are coming in."

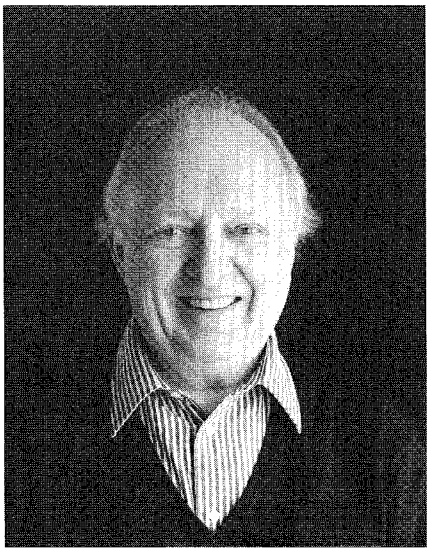
Moffeit reflected about the long road to achieve a satisfactory polarized beam, and the reward of finally realizing some success, and added, "It is important never to give up when you reach those hurdles that get in the way."

RON RUTH

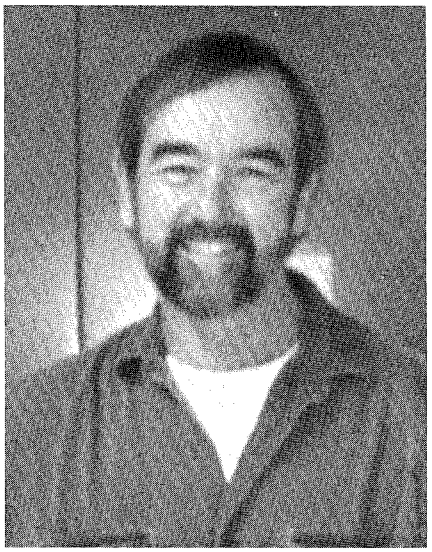
Ron Ruth has made many contributions to the field of accelerator physics. His quality work during his stays at Brookhaven, Lawrence Berkeley Laboratory, CERN, and SLAC has earned him the position of Associate Professor and Head of Accelerator Theory & Special Projects at SLAC, as well as a fellowship in the APS. Ruth agrees with Burke that it is nice to be recognized by your peers.

"It [the award] is done by your peers," Ruth said. "The people who review it are the experts. It

(See Physicists, *p. 3)*

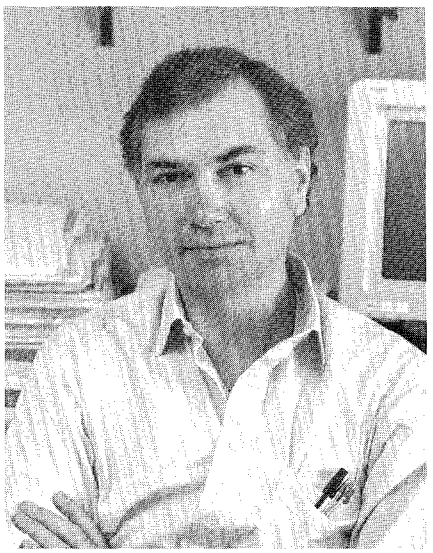


Gregory Loew



Bette Reed

Ken Moffeit



John Beach

Ron Ruth

(Marc Ross, *cont'd. from p. 1)*

are controlled by the master station at Moss Landing; and mechanical vibration, which may or may not be controlled at SLAC, depending upon the nature of the vibration. And they did. To improve the temperature differential, the air flow in the SLC tunnel was blocked off two years ago, with a noticeable improvement in stability. It is just these types of things for which the scanners provide feedback and that the team operating the SLC has at their disposal in order to adjust the beam. Funding permitting, Marc would like to build and install more scanners in the SLC to allow even more feedback.

Owing to its extreme sensitivity, the SLC is more computerized than any other collider in the world, thanks to the brilliance of scientists like Marc. Computerization allows the staff who operate the collider to obtain more knowledge by examining the beams' subtle effects. Obviously the payoff came last August when the ten-thousandth polarized Z particle was created at the SLC (see *The Interaction Point*, Vol. 3, No. 7, page 1). By the end of the run, over 11,000 Zs had been logged by the SLD. The very successful operation of SLC opened up a bright future for very high energy electron-positron colliding-beam physics that was not previously available.

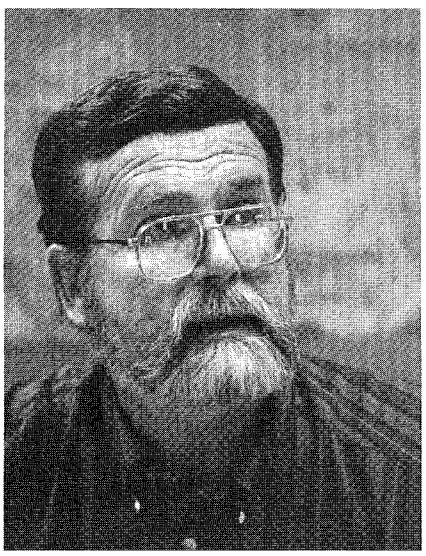
Since that time, the beams are better focused, and the polarized source has performed at record levels. Luminosity is up by a factor of 2, and next year Marc and colleagues hope to raise it another factor of 2 or 3. Nan Phinney, coordinator of the development program of the SLC, said that the high-energy physics community is "really stunned by the luminosity and reliability that we have achieved with this machine," and thanks to Marc Ross and his team we increase our operating knowledge every year, thereby paving the road for the Next Linear Collider. Marc, are you up for that challenge?

SLAC Receives $50,000 Education Grant

SLAC RECEIVED A $50,000 PLANNING GRANT from the Eisenhower Mathematics and Science Education State Grant Program. Helen Quinn, assistant to the Director for education and public affairs, is the project coordinator. The co-director for the project is Dr. William Fisher, associate superintendent of Imperial County Office of Education. The author of the grant and administrative director for the project is P.A. Moore, SLAC's new Education Officer.

The goal of Project Reach Out is to develop a model of distance learning and communication using technology. The target audiences are rural and urban middle school teachers in Fresno County and Imperial County. A local education business, SERA Learning Technologies, will develop a demonstration video calling on SLAC scientists for technical assistance to develop the concepts that will be portrayed in the video. As part of the project, SLAC will implement an electronic bulletin board to link teachers and scientists to foster communication.

—P.A. Moore



Gerry Fischer

(Physicists, *cont'd. from p. 2)*

shows that the work you've done is appreciated by the community."

GERRY FISCHER

Finally, Gerry Fischer was posthumously honored for his work in the development of accelerator technology. Throughout his career Fischer was interested in accelerators, and came to SLAC in 1965 to work on the SPEAR electron-positron storage ring. Fischer also worked on the PEP ring and the SLC project. He was an instrumental figure in all of these projects. Before his death he worked on the next generation linear collider. He was widely recognized as an expert in problems related to ground motion and vibration problems. He had recently diagnosed a peculiar symptom with the LEP storage ring in Geneva as being due to gravitational effects of the moon and the sun.

—Trevor Payne

This newsletter is printed with soy-based ink.

ANNUAL STATE OF SLAC ADDRESS

by Trevor Payne

ON APRIL 12 Director Burton Richter delivered the "State of SLAC" address, an annual message whose timing is governed by news of the Federal budget. Richter's comments this year emphasized that the lab is working very well and the future should be bright, although he warned the over 1100 users and 1400 employees not to put on sun glasses just yet.

Part of the good news is that SLC is performing at levels better than expected. Last year SLC met its goal of recording ten thousand polarized Zs on tape, and it achieved the goal with 23% polarization of the beam. So far this year because of the flat beams and a new "strained lattice" cathode source for the electrons, the machine is running at 60% polarization with quite high luminosity. The increase in polarization by a factor of three is even better than it sounds because the effective rate actually increases by the square of the polarization. Or in other words, they are essentially getting nine times as many Zs during this run compared to last. SLAC has also renewed success with its fixed target experiments. With only two months worth of data, the experiment to determine neutron spin (E-142) achieved better results than those using a different technique and two years at CERN. A special polarized target was made for the experiment which performed very well. Primary data from the experiments suggest that the spin of the proton within the nucleus is not carried entirely by the valence quarks, a surprising result. Basically what this means is that the previous standard theory on proton spin is wrong, and a new explanation is needed.

Scheduled for November 1993 is a follow up experiment (E-143) on proton spin structure that should provide more data to help explain this exciting turn of events.

In addition to the high energy experiments, synchrotron radiation research at SSRL has been very effective, and SPEAR, the machine where the research is performing, has over 90% up time. Over the last year a Caltech group has been able to use SSRL beams to image the enzyme nitrogenase. Nitrogen fixation, or the reduction of atmospheric nitrogen into ammonia, is essential to plant growth, and the work by Caltech will hopefully enable a synthesis of the enzyme. This could represent a breakthrough for food production techniques.

Interesting AIDS research is also being done at SPEAR. The high intensity x-rays are being used to image the outer protein coat of the virus. By understanding the structure of the membrane, the researchers hope to develop an enzyme inhibitor to prevent the coat, and hence the virus, from growing.

According to Richter, another area of SLAC which is moving very smoothly is the R&D for the next linear collider, including the development of the critically important final focus test beam (FFTB). The current goal is to produce beams that have an area smaller by a factor of thirty than the area of the beams now. They expect to run some test beams soon.

R&D on the B Factory is also going well, with progress being made on the key items in order to prepare for construction in FY '94. However, concern over the B Factory is the reason why Richter suggested things may not be as bright next year. At the moment, a review is scheduled to determine if the B Factory belongs at SLAC or Cornell. Given that budgets to build the machine are relatively equivalent, Richter suggested that there should be no contest because much of the pre-development work for the project has already been done here; SLAC has always been the leader in collider R&D, and in Richter's words, the lab is "the engine for the future."

"The technology that everybody is using and developing for the future was made here," Richter commented. "Everybody, including Cornell."

If the B-Factory comes through for SLAC it will mean an additional 36 million dollars for the budget. On the other hand, the overall budget for existing SLAC facilities will drop 11% this coming year. If SLAC doesn't get the project, or if construction is delayed a year, jobs will have to be cut and belts tightened a few notches in other areas as well.

The purpose of the B-Factory is to determine why there is a disparity between matter and anti-matter, or as Richter joked to answer the question of why we are here. SLAC needs the funding to stay around and find out.

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ACCESS TO INFORMATION

Credit Card Telephone Calls

YOU CAN PLACE a personal long-distance call from SLAC using your calling card before 7 AM or after 5 PM when the SLAC phone operators are not available.

Follow these steps when making a credit card call from a SLAC phone:

- Enter: 149
- You will hear a dial tone
- Enter: 0 + area code + number
- You will hear a bong
- Enter: Calling card number
- The number you called will ring. If you receive a fast busy signal, 149 is busy; hang up and try later.

These instructions are available in the SLAC Telephone Directory Reference Section, Telecommunications' equivalent to Pacific Bell's "Customer Guide" that you find at the front of every telephone book.

Getting a copy of this handy set of information is very easy: log on to VM and enter the command PHONLIST. Select "Reference Section" from the menu PHONLIST presents. A copy will be printed on the 3800 printer in the Computer Building. Or, you can look at selected topics of the reference section on your computer screen by choosing the last menu entry that PHONLIST presents (entitled SUBSECTIONs).

Several years ago Telecommunications chose not to distribute paper versions of the telephone white pages and their Customer Guide equivalent because they recognized that the information changes constantly. So, just remember the VM command PHONLIST and you'll have access to information that's as current as we can make it. —*Ilse Vinson*

LaserWriter and NeXT Printing from VM

Did you know that you can print on many printers connected to the Ethernet, such as LaserWriters and NeXT printers, from VM using the PRT command? SCS implemented this function in early 1990 to decrease VM users' dependence on Imagen printers, the only distributed printers accessible through VM until then. It gives departments access to additional print resources already in house so that they don't have to buy additional Imagen printers when they need more local print power.

To find out what printers you can print on with PRT (besides Imagen printers), look at the VM file PRINTCAP NAMES *. You will see that each LaserWriter has been given two unique names: as a Text printer and as a PostScript printer. For example, a LaserWriter on the first floor of the A&E Building addressed as LWAE1C_PS will accept only PostScript files; the same printer addressed as LWAE1C_TEXT will accept plain text files. To print the SLAC phone list, PHONLIST DATASET, mentioned in the previous article, for instance, you might give a command such as PRT PHONLIST DATASET (ON LWAE1C_TEXT. Don't be alarmed by the message "Did not get final ACK"; it doesn't really mean anything. —*Ilse Vinson*

Pager pickup/dropoff

The Telecommunications phone attendants and paging service have moved from Room 112 to Room 205 in the Computer Building. Times for dropping off pagers for service and picking them up continues to be 1:30 to 3:30 Tuesdays and Thursday, but now in Room 205. If you drop off your pager for service on Thursday, it will most likely be serviced by the following Tuesday; however, if you drop it off on Tuesday, you will need to wait at least until the following Tuesday.

For pager requests, pickup, or repair you can e-mail Iris Walker FLYGURL2 or call at ext. 3557. You can also call ext. 3557 to order any telephone books.

—*Ilse Vinson*

Bette Reed

The Telecommunications group, from the top, left to right: Row 1: Mike Telang, Janet Dixon; Row 2: Frank Nee, David Price; Row 3: Thelma Bynum, Fran Balkovich; Row 4: Ilse Vinson, Iris Walker.

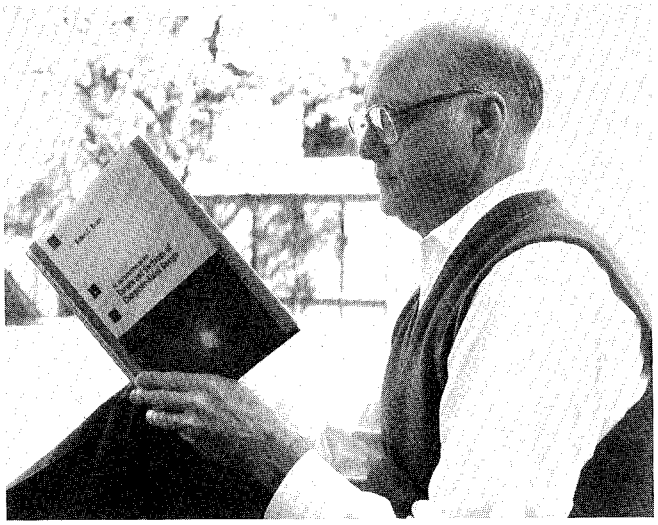
Another Voice Mail Tip

When dialing in from offsite to SLAC's voice mail system you can pick up your messages and call someone at SLAC with a single call. Here's how.

Dial voice mail and pick up your messages. After disposing of your messages and while still in the voice mail system, dial 0 + nnnn#. nnnn is the extension you want to call.

—*Mike Telang and Ilse Vinson*

Bob Beach—25 Years



BOB BEACH'S 25-year tenure at SLAC ends April 30 with his retirement. Bob came to the Bay Area in 1967 from the General Motors Research Laboratories in Warren, Michigan, when he joined the Computation Research Group. He liked it so much he stayed for the next 25 years.

His first project was working on the 2250 Scope Package, a very early graphics package for the IBM 2250 terminal that ran on the IBM 360 Model 91. Other work with the Graphics and Control Group included development of the Graphics Interpretation Facility, a pioneering effort in the development of computer graphics that enabled the user to make primitive movies and view them through a 3-D viewer. A few years ago, he wrote a spelling checker that recognizes TeX and Script commands (for example, it does not ask you if you would like to substitute "refill" for "\vfill").

Despite his work on the spelling checker, the focus of Bob's work has always been graphics. Probably his best known project is the SLAC Unified Graphics System. Invented by Bob in the early seventies, it continues to be widely used today. He also wrote a user interface for the Graphical Kernel System (GKS) that makes it more accessible to the user. Recently, Bob put some of that computer graphics expertise to use in writing a book called *An Introduction to the Curves and Surfaces of Computer Aided Design*, which has been used as a text in the Stanford Computer Science Department.

Bob is not sure if he's interested in tackling another book after his retirement; he is making a point of not making any plans yet. He says, "On May 1, I'll think about what I'm going to do." SLAC will certainly be losing an invaluable resource for graphics knowledge and support and all of Bob's friends here at SLAC will be missing, but certainly not losing, a real friend. We all wish him much happiness in his future plans, whatever they might be.

—Arla LeCount

Mickey Bryant—24 Years

AFTER 24 YEARS OF SERVICE to Stanford and to SLAC, Mickey Bryant is retiring. Mickey, a native Californian raised in San Francisco, began her career working for the US Weather Bureau.

After resigning from the Weather Bureau, she and her husband moved to San Carlos where her two sons, Ron and Brad, were born. When her sons reached school age, Mickey started a part-time position at SLAC in the Data Entry department of the Computer Center. From this position she became a full-time microfilm technician, then a Programmer Analyst I providing user support at the Service Desk.

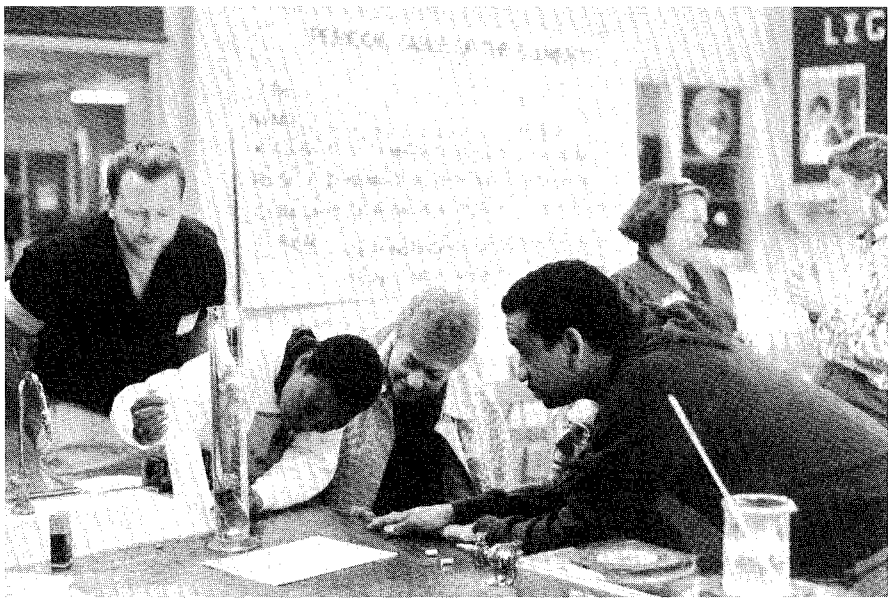
Many of us, however, associate Mickey with her position of many years as the Building Manager of the Computer Building, as the Chairperson (for nine years) of the SLAC Operating Safety Committee, and as a member of the Safety Overview Committee. Mickey took great pride in maintaining the Computer Building to the highest standards and in working to help make SLAC a safe place for all employees.

Others at SLAC may know Mickey from the SLAC Bowling League where she served as both President and Vice President. Mickey, an excellent ballroom dancer, will keep her dancing shoes polished and ready to go. She has big plans for using some of that Building Manager expertise to remodel and landscape her own home. She may spend some time working with her son Ron, an electrical contractor, in his business. Or, she may visit her son Brad, who is completing his Ph.D. in Clinical Psychology.

Mickey loves having contact with people, so whatever path she chooses will find her new friends. Mickey says that she has always loved SLAC and thought of it as an extension of her family. She says she will miss it. We will miss her. Best of luck, Mickey, in your next adventure!

—Arla LeCount

BREAKFAST AT BASTEC



P.A. Moore

Having fun with physics first-hand are, left to right: Matt Smith, Beth Napier, C.C. Jones, Eric Edgerly, Andrea Keaa, and Helen Quinn.

ENERGY WAS THE KEY FOCUS of a teachers' workshop in the Oakland Unified School district recently. Helen Quinn, SLAC staff theorist, teamed up with Beth Napier, an Oakland teacher, to demonstrate hands-on activities for ninth-grade physical science teachers to take back to their students.

The workshop was part of SLAC's involvement in the Bay Area Science and Technology Education Collaboration (BASTEC). Other national labs involved in BASTEC are LBL, Livermore, and Sandia. In addition to teacher workshops, SLAC has contributed to curriculum development for the Oakland Schools science program.

All the activities were related to the various forms of energy and to transformations of energy. A basket of rocks bouncing on a spring, a ball rolling down a ramp and falling into a bucket of water, tuning forks, a light bulb, a book of matches, and chemical hand warmers each challenged teachers to consider the forms and transformations of energy involved.

The most popular activity was dubbed "Breakfast at BASTEC" with teachers analyzing the energy transformations involved in making toast with butter and jam, then eating the toast. According to Eric Edgerly of Castlemont High School, "My students will love this lesson!"

—P.A. Moore

RADIATION PHYSICS SEMINARS

THE RADIATION PHYSICS Group and ES&H are organizing a series of seminars covering subjects related to radiation protection, nuclear medicine, radiation biology or even broader issues related to particle accelerators or science in general. The talks will be held in the Orange Room, from 4 to 5 PM. For more information contact Vashek Vylet, Radiation Physics, ext. 2048.

May 4	Mark Bodnarczuk NREL, CO
June 15	Yoshi Namito KEK, Japan
August 31	Helen Nuckolls SLAC
Sept 28	Ralph Thomas LLNL, CA
Oct 26	Pat Durbin LBL, CA
Nov 30	Lynn Anspaugh LLNL, CA

—Vashek Vylet

Welcome Guests and New Employees

Maynard Harding, Klystron; **Kiyoshi Kubo,** Technical; **John Kubodera,** Mechanical Engineering; **Eric Lundahl,** Mechanical Fabrication; **Gregory Mullholan,** Accelerator; **Yoshihito Namito,** ES&H Radiation Physics; **Annetta Papadopoulos,** Mechanical Engineering; **Catherine Puzo,** Controls; **Anthony Sirna,** Publications; **Monica Strong,** Personnel;

SUMMER RESEARCH POSITIONS NEEDED

DO YOU HAVE a summer research position for a teacher or undergraduate student?

The Education Office needs placements for approximately eight high school math, physics or chemistry teachers and twenty undergraduate physics majors. These people come free of charge to your group, but will need someone willing to spend a little extra time in supervision.

Teachers: seven-weeks, full time, July 6–August 20.

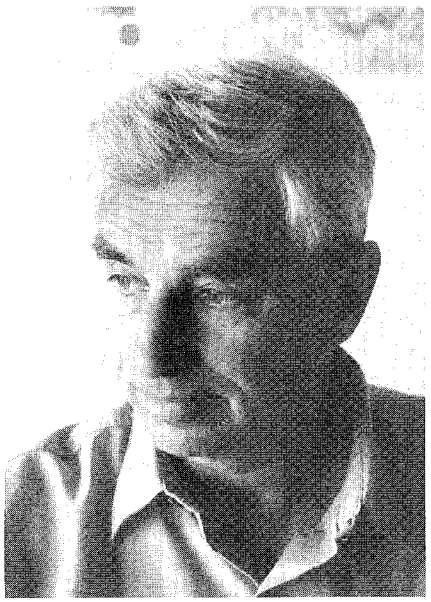
Undergrads: nine-weeks, June 21–August 20, 10 AM –5 PM.

The undergraduates are part of the Summer Science Program which has a lecture component each morning, followed by the work experience.

For information call Helen Quinn, ext. 2713.

—P.A. Moore

Leroy Schwarcz 1914–1993



LEROY SCHWARCZ, a mechanical engineer whose work helped develop the field of elementary particle physics, died in San Rafael on March 28. He was one of the first group of engineers who designed and constructed the large particle accelerators and detectors that were built just after World War II. Leroy came to Stanford in 1961 as the first mechanical engineer to be hired by Project M, the precursor to SLAC. He supervised the engineering staff during much of the early design and construction, and in 1965 he started working as the chief engineer of the streamer-chamber group (Group D) and together with Bob Bell took charge of the design, construction, and installation of the large streamer-chamber magnet. He was also a major contributor to the mechanical design and experimental operation of the streamer chamber and helped in the administration of the group. Leroy continued working with Group D until his retirement in 1980.

Leroy came to SLAC with wide experience in the large-scale construction that had been going on in the world of high-energy physics. After serving in the infantry for a year at the beginning of World War II, he was transferred to the Ordnance Engineering Ballistic Research Laboratory at Aberdeen, Maryland. By the end of the war he was a First Lieutenant, Chief of their Instrument and Design Section.

At Aberdeen he met the theoretical physicist, Robert Sachs, a research leader there. After the war, Sachs, by that time at the University of Chicago, brought him to the attention of Herbert Anderson, who was in charge of building the University of Chicago's synchrocyclotron. Leroy was hired in 1947 as its Chief Mechanical Engineer. Upon its completion in 1952, the synchrocyclotron was, at 450 MeV, the highest-energy proton accelerator in the world. With it, Enrico Fermi, Herb Anderson, and others did some very exciting experiments showing, among other things, the first good indications of the resonance of the nucleon.

In 1971, after the synchrocyclotron had been shut down, Schwarcz took a leave of absence from SLAC to return to Chicago and move the 2000-ton magnet to Fermilab for use in one of the experimental beam lines. He was the only person who could have done this because, although drawings existed, knowledge of the assembly procedures existed only in the minds of Leroy and those who had helped him put the cyclotron together. Leroy brought together the group of technicians who had assembled it, many from retirement, and together they managed the complicated job of taking the cyclotron apart.

This was only the start of the problem. The individual pieces of the magnet weighed up to 30 tons and were very long and wide. Leroy had to take down the wall of the cyclotron building to remove the magnet and then had to find a way to move the pieces on overloaded trucks through the semi-residential streets near the university, under many bridges, and 30 miles west to Fermilab.

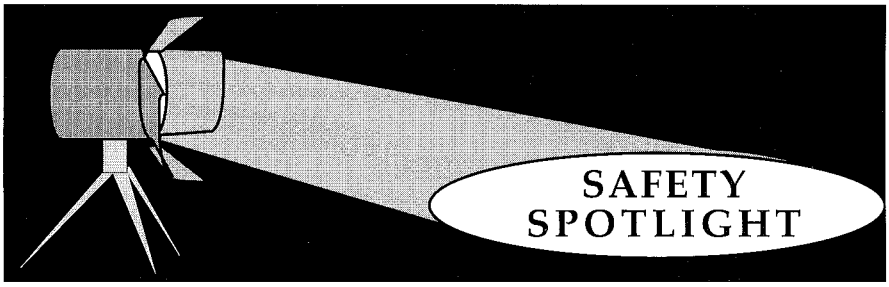
He solved the bridge problem by carrying the large pieces upright, to stay within the 10 foot road width limit, and, when he came to an underpass, lowering the pieces onto their sides for the move through the underpass. An even more complicated part of the enterprise was negotiating the trucking procedures with Mayor Daly's police force. At Fermilab the group quickly reassembled the large magnet. It is still in use in one of their beam lines.

Leroy was remarkable in his engineering knowledge, particularly that relating to handling and assembling heavy loads. He was full of a variety of information about materials, methods of machining, and manufacturing processes. His approach to engineering was essentially intuitive, and he had an amazingly good intuition. He did not enjoy mathematical analysis and, if concerned with the strength of some critical component he had designed, would usually ask a more analytical engineer to check his results. His intuitive designs were almost invariably right. He almost never did any drafting type of design and, if possible, worked with a crude sketch which he would take to the shop and discuss with the machinist who was to work on it. For major projects, of course, he worked in the approved manner, supervising designers to produce the required detailed drawings.

Leroy is survived by his wife June, his son Carl, his daughter and grandson, Kim and Adam Schwarcz, and his brother Morton Schwarcz.

Leroy visited SLAC often during his retirement (including every St. Patrick's Day). We shall miss those visits as we have missed having him work with us.

—Robert Mozley



EMPLOYEE TRAINING TRACKS

THE 1993 VERSION of the Task Hazard Survey has recently been distributed to all department heads and group leaders. This form helps supervisors identify the appropriate training needed to protect employees against known hazards in the workplace.

To help track what training an employee has already completed, the ES&H Division maintains a Training Database which may be accessed through VM. This database includes most of the courses offered through the ES&H Division. However, at this time this database does not include radiation training, CPR, or First Aid, nor does it include courses offered through Personnel or those that are academic in nature.

This database draws personnel information (name, department, division, MS, extension) from the binlist database. This is one example of why it is important to request changes to binlist as appropriate.

HOW TO GET TRAINING HISTORY REPORTS

To use the report generator, log onto VM and type TRAINRPT. There are three report options:

Report 1—Employee Training Record

Report 1 is a summary of an individual's training history. To generate this report, type 1 at the main menu and press <enter>. Type in the employee's last name or their binlist key number, if known, and press <enter>. If the last name is entered, the program will prompt you with a list of one or more possible employee names. To generate a report, type the number that appears next to the correct name and press <enter>. The report will print on the default printer assigned to your VM account.

Report 2—Department Training Records

Report 2 is a listing of all individual training histories for a given department. Type 2 at the main menu and press <enter>. The program will prompt you with a list of department codes. To generate the report, type the correct code and press <enter>. The report will print on the default printer assigned to your VM account.

Report 3—Training Due Within Next 60 Days

Report 3 is a list of courses for individuals in a given department who need retraining within the next 60 days, or for whom retraining is past due. Type 3 at the main menu and press <enter>. The program will prompt you with a list of department codes. To generate the report, type the correct code and press <enter>. The report will print on the default printer assigned to your VM account.

If you have any questions about using the Task Hazard Survey or about using the ES&H Training Database, please contact Ruth McDunn at ext. 3054.

—Ruth McDunn and Melinda Saltzberg

EVENT CALENDAR: May–June 1993

All meetings are held in the Orange Room, unless another location is listed. Larger meetings and conferences have a contact listed. Please notify the Public Affairs Office of any additions or changes by calling ext. 2204 or sending e-mail to NINA@SLACVM.

May 6–8, 9 AM
International Industrial Symposium on the SSC
San Francisco

May 8
Physics Teachers Workshop
H. Quinn/PA Moore

May 10–11
SLD Week

May 12–14
SLD Collaboration Meeting

May 12, Noon
Employee Fitness Day
A&E Building Parking Lot
E. Derr

May 16, 6:30 AM
Bay to Breakers Run
Busses to San Francisco
E. Derr

May 18–19
Stanford Telecommunications Symposium
Auditorium
D. Harris,
Stanford Electrical Engineering Department

June 4–5
EPAC Meeting

June 12
SU Commencement Tours
Memorial Auditorium
Campus/Bus Route

June 13
Stanford Commencement
Campus

June 14–18
SLD Week

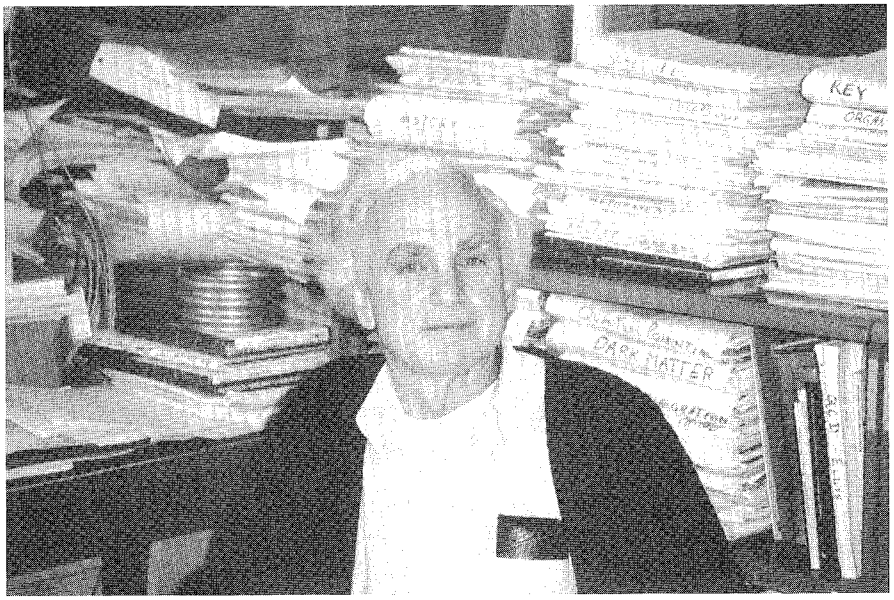
June 18, 2:30
4th Annual
Juneteenth Celebration
Cafe Picnic Area

June 21–July 7
Physics Teachers Workshop
H. Quinn/A. Erzberger/PA Moore

June 23, 9 AM-4 PM
SUBB Mobile Blood Drive
Auditorium Lobby

David Fryberger: Experimentalist and Theorist

by Cynthia Mills



Bette Reed

MANILA FOLDERS, HUNDREDS of them, overstuffed and cryptically labeled, have taken over David Fryberger's office. You can see where the folders started in an orderly fashion on one bookshelf. They spread to the tops of file cabinets and shelves, to the table in the middle of the room, and to his desk. The rim of his desk is so piled with folders that there is barely enough room in the center to open a journal. Writing a letter without knocking down a stack would be next to impossible. On one of the stacks two small stuffed animals, a tiger and a bear, appear frozen in mock combat.

In the mist of this complexity, if David thinks of an article that might help you grasp a concept, he mumbles a second, then walks to the one stack with the one folder that has the reprint you need. He gives you a second to peruse it, then peeks at you from under salt and pepper eyebrows. His clear blue-green eyes always seem to be measuring, assessing whether you are ready to follow him again.

If you're interested, David will introduce you to his magnetic monopole. The magnetic monopole is a so-far imaginary subatomic particle that many physicists expect to find really exists, but this one is different from everyone else's. So different that some of his colleagues, when they are being kind, call his theory "unorthodox." But Fryberger doesn't worry that others don't agree with his ideas. He is a scientist. That does not mean he has to be right, only that he has to make a good guess.

"Only time will tell if he's got crackpot ideas, that is, ideas that are demonstrably wrong," says Buford Price of UC Berkeley, a former collaborator. "His theory is very unorthodox. I don't think anyone took it seriously when it was published. Most physicists feel that the Standard Model is extraordinarily successful at explaining and predicting what we see in our experiments."

David didn't start out as a theorist. He came to SLAC in 1967, when the very first beams were run. His Ph.D. thesis was not yet published when he was handed his share of the responsibilities of running the Center, as well as experimenting with the beams. "In those days they thought physicists could do everything," he recalls. "If that meant working 80 hours a week, that was okay with them."

David's thesis involved detecting particles using a spark chamber, an array of parallel wires used to track charged particles. By adding a magnetic field, one could determine what kind of particle he was observing.

His thesis work, measuring the decay of muon particles, produced data of a quality unmatched until now, 32 years later. "That could be because it was good work," he says, "Or it could always be attributed to lack of interest."

At SLAC he worked with the SLAC-LBL collaboration on the so-called November Revolution, the discovery of the psi particles. There were three SLAC groups working on that project: Burton Richter and his people, Martin Perl and his people, and David himself.

The November Revolution marked the beginning of an era that has seen experimental collaborations with over a hundred people in them. The leader of the experiment has become more of an administrator than an experimenter. A colleague of David's at SLAC, Steve St. Lorant, compares it to herding cats.

David left this kind of collaboration to do his own sort of physics. "I am an experimentalist by training, theorist by inclination," he says. He pursued interests in electromagnetism and fundamental theory, which led him to his current interest in the magnetic monopole.

The magnetic monopole is a particle first hypothesized to exist

(Cont'd. on p. 11)

(Cont'd. from p. 10)

in 1931 by the British physicist Paul Dirac. In simplest terms it is a particle that sports just one half the field of a magnet, either a north or a south pole, the way an electron carries an electrical charge. It also has to have a large mass, which to physicists means a large amount of energy.

"At first I thought I had the field to myself," he says. It didn't bother him that no one paid any attention to what he was doing. The search is still at a point where it doesn't need much support. He can always get collaborators when he needs them, because they don't have to do very much. They are mostly people in other places that keep an eye on his detecting equipment, to make sure it's running. As he puts it, "Most of what I get is technical assistance and sympathy."

Has he found the monopole? "If I had, I would have a bigger office," he says. There have been "events," tracks of particles in detectors that could be from monopoles, and Price himself claimed to have found one in 1975. But that work was flawed. Other scientists pointed out that the event Price claimed could only be a monopole was, quite possibly, something else. After his claim, there was a frenzy of physicists looking for monopoles, but it died down, and David is again, cheerfully, one of the odd few.

He has always been alone in one way, for the monopole he is looking for is different from everyone else's. His magnetic monopole is the fundamental particle, and so starts the unorthodoxy. There is no experimental evidence for his theory, but there is no solid evidence to contradict it either, according to Arthur Rogers, another collaborator who worked at SLAC ten years ago. "David has a deep theoretical understanding of the data that exists, and he is trying to come up with a self-consistent picture of how these things function. The theories might be wrong or they might be right, but it is a good thing to be willing to challenge whatever is accepted as the status quo."

Now David is pushing conventions even further, by becoming interested in ball lightning. This is a rare, unexplained phenomenon that looks like a soccer ball-sized globe of light, which floats slowly through the air, often close to the earth. It has been seen floating through houses or down the aisles of airplanes. Many blame the lightning on overactive imaginations, because the people who see it are usually upset.

Most reported cases appear not to contain much energy, but there have been well-documented incidences requiring huge amounts of energy, like boiling a barrel full of water for minutes, or digging a long trench in the earth. When calculated, the amounts of energy these feats would require are greater than what could be explained by mere electricity or chemical reactions.

A few physicists have guessed that the energy in ball lightning might be nuclear. David and others have set up gamma-ray detectors on mountaintops often visited by thunderstorms. If gamma rays prove ball lightning has a nuclear origin, he might start looking there for his monopole.

Crazy? Maybe, but as St. Lorant says, "You have to be slightly insane to be a physicist." And even Price admits that "a physicist ought to be allowed to dream."

David doesn't care to elaborate on why he chooses such a lonely road. He simply says, "If the magnetic monopole exists, and if it is a fundamental particle, it would be a good thing to find."

TWENTY AND THIRTY YEARS AWARDED

TWENTY- AND THIRTY-YEAR employees were honored with an Awards Banquet at the Stanford Faculty Club on Thursday, March 18. Thirty people with twenty years of service were joined by sixty of the 200 distinguished class of '62—the "pioneers" who started the lab three decades ago. In addition, this is the first time SSRL staff were included in this annual event. It was a rare and unique milestone for the lab as the classes of '72 and '62 mixed with each other for this truly special homecoming.

Barbara Johnson and Karen McClenahan warmly greeted the arrivals and presented all the ladies with corsages. Host Al Ashley heartily welcomed everyone.

The honorees provided entertainment in the form of shared stories and a few wild anecdotes from years past. Included were, of course, gracious corrections, fond remembrances and even a few instances where outrageous events were suspiciously neither confirmed nor denied. Greg Loew, a member of the class of '62, circulated with the '63 Picture Book. It was quite fun to recognize the photos of these young upstarts. Asked how he felt about the evening, Greg said, "It was wonderful...somewhat sentimental, in a way."

The words "Project M" were heard often. This was the name of SLAC at its inception when it was first based in a warehouse on the Stanford campus near the High Energy Physics Lab (HEPL). Noticeably absent were two class members from that period. Richard B. Neal had graciously written a letter to share his thoughts. Ed Ginzton's health did not allow him to join the group that evening so a card was circulated sending him the best wishes of the SLAC community.

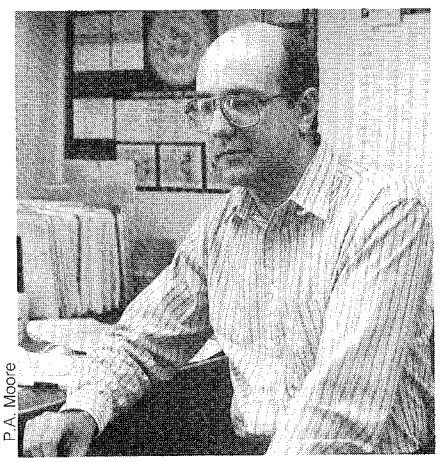
Lee Lyon kicked off the program with a time capsule news report of 1962 and 1972 current events that covered world affairs, politics, sports and literature. Next, Director Burton Richter gave opening remarks and proudly introduced SLAC's first director WKH (Pief) Panofsky. Pief, who held the Directorship for over twenty years, talked fondly of the early construction of the linac. "It was a piece of cake", he said of those simpler times, "especially in contrast to the SSC effort underway in Texas." He proclaimed that SLAC could not have been built and operated without the dedication of people who had faith in a common cause and diligently worked to accomplish goals in physics and technology.

As Lee Lyon read the names of the honorees, each received warm and enthusiastic applause from their colleagues. Burton Richter, assisted by Al Ashley and Bernie Lighthouse, presented the service awards. The twenty-year recipients received commemorative '72 and '62 biographical yearbooks and key chains. The thirty-year (lifers) recipients were each presented a beautifully mounted beam tree— a rare and distinctive treasure.

Richter's closing comments gave recognition to the "brains and abilities" of those present at the banquet. He paid special tribute to their longevity and hoped that they would continue to contribute their best creative efforts to the lab in the future.

—Nina Stolar

Martinez New Summer Science Director



P.A. Moore

WHEN ASKED why he wanted to be director of the Summer Science Program, Jose Martinez said, "Teaching is a fun thing to do. I've taught both high school and college students and so it is very similar to my previous experience."

Jose taught at Hampton University in Virginia, a private college with a predominately African-American student population. He assisted in the design of a summer program established to provide students with prerequisite courses for a physics major.

Jose is currently finishing his Ph.D. research for the University of Cincinnati using data collected by the E135 group. His topic is "Spin precession effects on the K parameters of the cascade minus." He has also conducted numerous SLAC tours for the Public Affairs Office.

The Summer Science Program has been at SLAC for over 20 years and is targeted to undergraduate students who are under-represented in the sciences. This summer SLAC will have twenty students from across the country who are women, minorities, or financially disadvantaged. The students will be here for nine weeks in a program of morning lectures, research assignments, and tours of local high-tech companies and other labs. If your group has a research area in which a summer student can be employed, please contact Helen Quinn at ext. 2713.

—P.A. Moore