February 2000

ON TARGET

THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY • A DEPARTMENT OF ENERGY FACILITY

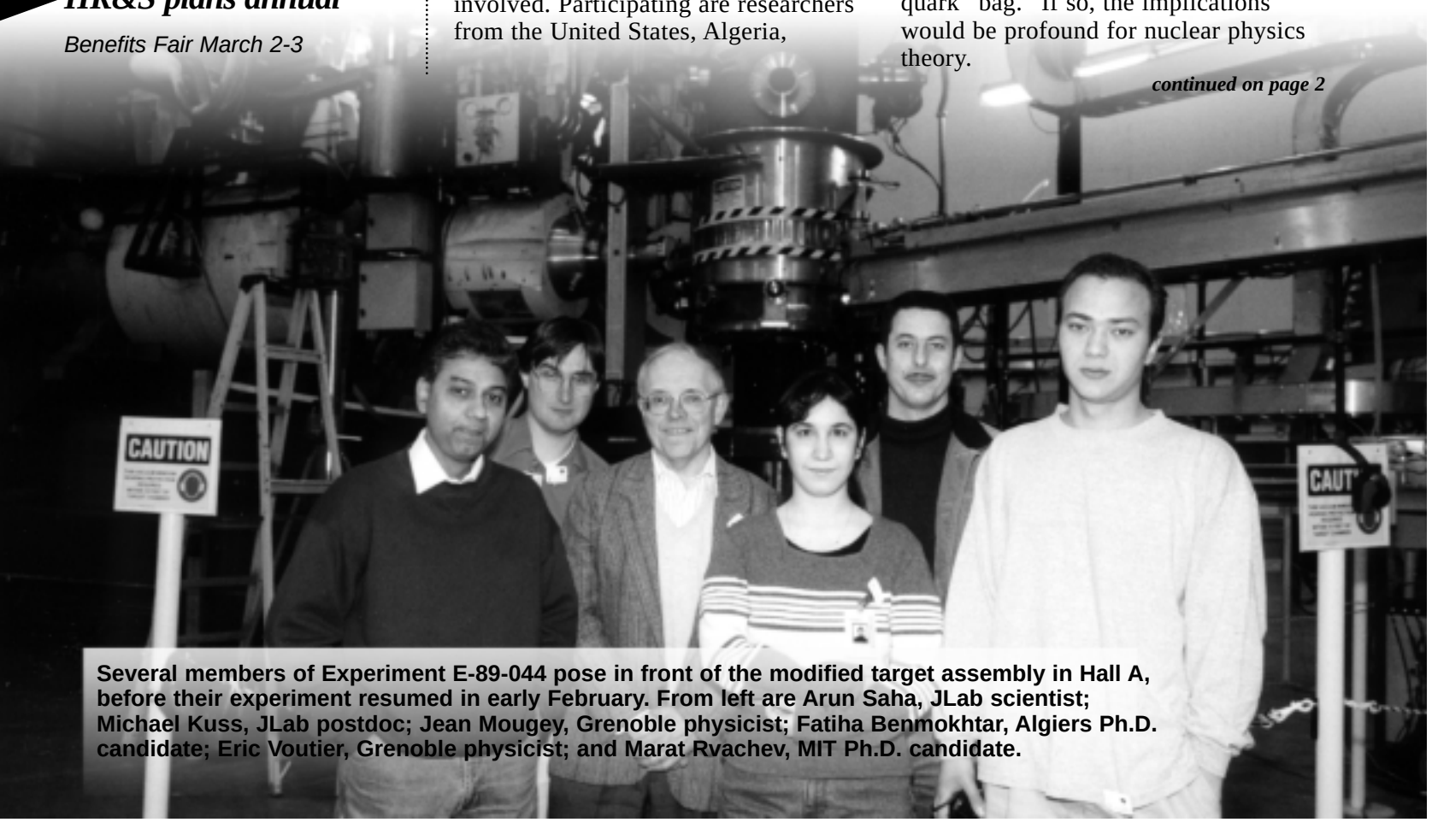
Experiment 10 years in the making off and running in Hall A

In 1989, the Berlin Wall came down and the post Cold War science scene was changing dramatically. That same year saw the planning completed for one of Jefferson Lab's original and defining research initiatives..

Now, more than a decade after its formal proposal, the Hall A "electro-disintegration at high momentum transfer" experiment is alive and thriving, having begun its run in December. Ten days of research have already been conducted and data taken. The run continues this month and will conclude in March. One hundred fifty physicists from all over the world are directly or indirectly involved. Participating are researchers from the United States, Algeria, China, France, Germany, Italy, Japan, the Netherlands, Russia, Slovenia, Ukraine, Israel, Sri Lanka, and Jordan.

These researchers are using the Lab's electron beam to shatter the atomic nucleus of a gaseous isotope of helium known as helium3. Hall A's pair of high-resolution spectrometers allows data to be gathered simultaneously on different types of subatomic particles, a process known as "in coincidence." The examination of what comes flying out in the aftermath — in this case, electrons and protons in coincidence — could redefine the understanding of nucleon interaction at extremely high rates of motion. Under such conditions, a nucleon pair could merge, forming a kind of supersized, six-quark "bag." If so, the implications would be profound for nuclear physics theory.

continued on page 2



Several members of Experiment E-89-044 pose in front of the modified target assembly in Hall A, before their experiment resumed in early February. From left are Arun Saha, JLab scientist; Michael Kuss, JLab postdoc; Jean Mougey, Grenoble physicist; Fatiha Benmokhtar, Algiers Ph.D. candidate; Eric Voutier, Grenoble physicist; and Marat Rvachev, MIT Ph.D. candidate.

Hall A experiment off and running . . .

continued from page 1

"It would be evidence of something that is not a nucleon as currently envisioned," says Marty Epstein, a professor of physics at California State University in Los Angeles and a co-spokesperson for the experiment. "It would have different properties. But that's very speculative at this point." (The other co-spokespersons are French physicist Jean Mougey, Arun Saha, a JLab staff scientist and Michael Kuss, a JLab postdoctoral candidate).

Aiming For A New Target

Since the Hall A experiment was first conceived, equipment upgrades and capabilities have continued. Specifically, the accelerator's continuous electron beam allows researchers to perform experiments that hitherto were impossible at laboratories with low duty factors. (JLab's continuous beam means it has a 100 percent duty factor.)

"Jefferson Lab is the place to conduct coincidence experiments," says Saha. "They are run more effectively here because of our high duty factor, new and higher beam energies and current stability, and enhanced data-collection proficiency."

Recently, the hall also benefitted from a newly redesigned target array. Experimenters have temporarily changed one of the trio of beer-can-shaped target containers for a target in the shape of a tuna can. This aluminum target is connected to a supply loop, which fills the container with a different type of gas or liquid as required. The "tuna can" installed for the current Hall A investigation holds gases under high pressure (such as helium3) and keeps them chilled to six degrees Kelvin, or minus 450 degrees Fahrenheit.

Boosting the beam energy has given experimenters even more ability to peer deeply and accurately into the atomic nucleus. Also, by increasing the rate at which data can be taken, the enhanced "luminosity" — defined as beam current times target density — is roughly analogous to amplifying a microscope's power.

Our basic concern is precision, say Marat Rvachev, a Massachusetts Institute of Technology Ph.D. candidate, and Douglas Higinbotham, an MIT postdoc, assisting with the experiment. "The real challenge is to achieve a precision of two or three percent in the cross sections. To do that, you need a 100-percent duty factor, and very precise beam energy and current. JLab achieves luminosities that most other labs can only dream about," Rvachev said.

While initial analysis from the December 1999 run has already begun, data from the current experimental period will be evaluated over the next two to three years. Although researchers have some idea of what they'll find, surprises are also possible. "It's not completely unknown territory. One has some idea of what to expect," Epstein says. "It's fundamental knowledge and certainly not a direct path from this kind of information to technological development. But, if we find something extremely anomalous, then all bets are off."

In summation, Saha said, "This experimental program brings to fruition the hopes and aspirations of a lot of physicists — both experimentalists and theorists — many who helped define the experimental equipment and setup of this laboratory. This experiment will address the needs of the few body physics community to explore extreme regions of kinematics with the most sophisticated tools in existence, and hopefully, open up new vistas in the exploration and definition of the atomic nucleus and its constituent components."

CANS Update

Badging process begins for all Lab staff, contractors, users

- Central Alarm Notification System badging for staff and contractors begins in late February. Human Resources and Services has distributed flyers with the badging schedule, or you may review the schedule by going to www.jlab.org/news/ and clicking on "CANS Badging Schedule."
- Before getting a new badge, you must go to the Lab's Intranet page at http://mis.jlab.org and click on "My Page." Review and update your personal information and confirm your site access level and training. Call Bruce Ullman, Training and Development Manager, ext. 7170 to correct erroneous training information.
- Lab users will receive an e-mail from Shauna Cannella, User Liaison Office, by March 1, indicating when they will be scheduled for new badges. Any user who hasn't received a badging schedule by March 1 should call Cannella at ext. 6388.

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by James S

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Into the machine

EPICS software sees all, runs all for accelerator

by James Schultz

Tens of thousands of variables. Close to 25,000 accelerator-control components. About 100 Input/Output Controllers (IOCs). Twenty “console” computers. Two dedicated servers holding CEBAF accelerator files.

And just one major piece of software managing it all.

The Experimental Physics and Industrial Control System, EPICS for short, provides the infrastructure for the control, monitoring and archiving of Jefferson Lab’s myriad array of equipment. Without it, display screens would darken, alarms would remain silent and human monitors would be at a loss to know when and even if the electron beam was working.

“You physically couldn’t plug all the devices we have into one computer,” says Karen White, controls software group leader. “We have a highly distributed system, with control hardware spread out geographically. There’s just too much data for one workstation to handle. Plus, there are a lot of little programs. We have tons of applications circulating around doing basic functions. There’s nothing that compares to EPICS.”

Originally developed by programmers at Los Alamos and Argonne National Laboratories, EPICS is now in use at more than 100 sites worldwide. A kind of software “toolkit,” it provides sophisticated but reliable high-level programming capabilities. Want to set up easy-to-read screen information on beam energy? EPICS can handle the job. Have an end user who needs a specific interface? Not a problem with EPICS.

Code-writers, White says, love EPICS because of its versatility and robustness. EPICS users are constantly tweaking and improving it. Upgrades are free and refinements frequent. Since it was developed with federal government dollars, there is no licensing fee to pay for the latest EPICS version.

Karen White taking a break from a software tasking.

The Center of the Storm

At the Lab, EPICS is used to, among other duties, develop the programs that control and oversee the accelerator’s 2,200 magnets, monitor radio-frequency energies and the cooling capabilities of cryogenic systems, direct the injector guns, and track beam polarization and centering. In all, the EPICS-led control system continually monitors more than 200,000 “process variables” with information updated in thousandths of a second in some cases.

“Having the same control system throughout a lab is very unusual,” White asserts. “We don’t duplicate efforts here. It’s a lot more efficient because we’re able to control many devices with one system. We’re not reinventing the wheel.”

The Lab’s hierarchy of inter-equipment communications begins at the basic level with thousands of devices in the tunnel and elsewhere that enable the accelerator to run and perform with maximum efficiency. These devices are connected, by a variety of interfaces, to one hundred controllers, or IOCs, which communicate over a network to some 20 workstations in the Machine Control Center. It’s at the console level in the MCC where operators issue commands to implement a given action.

Group leader White works with a total of 17 programmers that are at the eye of the constant data storm, fine-tuning and taking corrective action as needed. Within the last two years, EPICS-related work has eased somewhat, if only because so much effort was spent early in the Lab’s existence to ferret out bugs and to ensure a quick extinction for any serious software glitches. And experience counts: many programmers have medium to long tenures at the Lab.

“These days, we only have a big problem — something that stops us from delivering beam for hours — once or twice a year,” White explains. And we rarely have to get up in the middle of the night to fix things.”

Much of the current work centers around upgrades. As new equipment is added, new experiments proposed and new demands placed on an already complex control system, so too must EPICS code be adjusted. In the meantime, programmers must maintain a constant vigil to keep Lab-wide systems up and running.

“It would be much easier to keep the system stable if we didn’t change things so often,” White says. “But because of the unique demands of the Lab — people, computers, software — we do have problems every so often. It’s certainly much better than it used to be.”

Lights, camera, action

New video shines spotlight on Lab mission, special programs

The Public Affairs office is having footage shot for a new Lab video. Each year thousands of people visit Jefferson Lab — scientists, political leaders and the general public. However, only a few dozen of them get to walk through the accelerator tunnel or down into the experimental halls.

For the last couple years, most of these visitors have relied upon a Lab spokesperson's verbal description and still imagery to help them envision the equipment the Lab uses to conduct experiments. "Since we've become a fully operational lab, it has become more difficult for visitors to see our equipment, because it is running [and therefore off-limits] most of the time," points out Linda Ware, Public Affairs manager. "For many visitors, getting to see the accelerator and experimental halls, firsthand, greatly enhances their understanding of what we do."

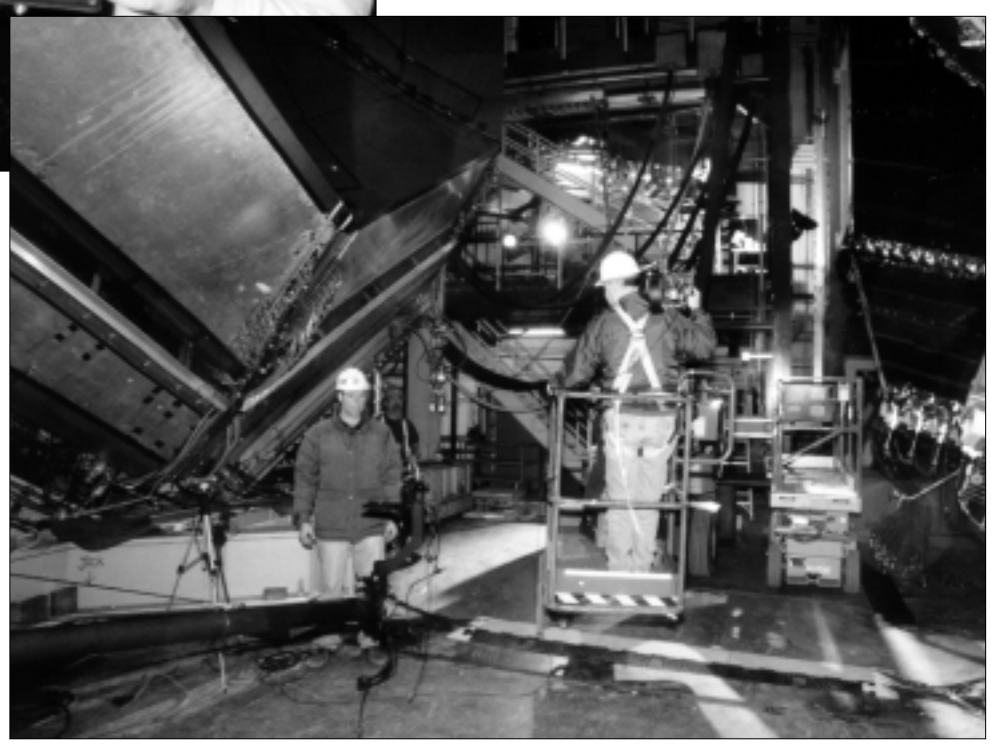
A video is a great way to share Jefferson Lab's mission and accomplishments, with visitors as well as more distant audiences. The 10 – 15 minute video will be for public use and highlight the accelerator, the Lab's physics and education programs, and the Free Electron Laser. "The video will educate and inform its audience. It is a great tool to tell the JLab story," Ware explained.

Tim Farrow Productions, of Richmond, is shooting the videotape. The Lab's last video was produced in 1993 and updated in '95. "It's just too out-of-date to show anymore," Ware said. "It is time for a new video."

Much of the videotaping took place during the January maintenance month, according to Ware. "It was the perfect opportunity to get current footage of the accelerator and the halls," she said. "The accelerator and hall staffs did a great job showing off the facilities to the film crew. We've got some fantastic footage for the video."

Footage in the Test Lab, Machine Control Center and FEL User Facility was also shot in February. The video should be finished by summer. Public Affairs will schedule a viewing of the completed video in the CEBAF Center auditorium. Copies for official use/distribution will be available through the Public Affairs office.

◀ David Haycox (left), director of cinematography, discusses a filming idea with his camera assistant, Scott Inge, during a break in Hall B filming.



▶ Tim Farrow, of Tim Farrow Productions, Richmond, shot video footage in Hall B at the end of the January upgrade and maintenance month. Here he talks with his director of cinematography, David Haycox, before Haycox goes aloft to shoot footage of Hall B's forward calorimeter (on left) while it was retracted (open).

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Every step of the way

Hummel completes marathon, aids leukemia research

Christine Hummel takes a break from work to show off her “finisher’s” medal.

What would it be like to finish a marathon, wondered Christine Hummel, Accelerator Division. The staff assistant didn’t know of many people who could boast the feat, which made her even more determined to tackle it. When she and a couple friends heard about the Leukemia Society of America’s Team in Training program, she found a way to realize her goal and help humanity at the same time.

Hummel was an avid sprinter in junior high and high school, but had never tackled distance running let alone the 26.2 miles of a marathon.

In August 1999 she joined the Leukemia Society’s Team in Training program. The Leukemia Society sponsors these teams across the country and around the globe. At the same time Hummel joined the Peninsula Team in Training, other chapters in Richmond, Roanoke and on the Southside started training. About a dozen individuals signed on with the Peninsula Team in Training program. They held group run/walks on Saturday mornings for the five months leading up to a marathon, and they each committed to a daily walk/run training regimen. At the end of the training program the Leukemia Society handles each group member’s travel arrangements to marathons of their choice.

In return the Team in Training members raise money for the Leukemia Society. Hummel wrote to family and friends, asking for their support, and she contacted a few local businesses. The Leukemia Society uses the money to conduct research into treatments and cures for blood-related cancers. During 1999, 24,000 Team in Training participants raised $61 million.

Most of Hummel’s training partners headed to Florida and a marathon at Disneyland on Jan. 9. However, Hummel and another teammate decided on the International Bermuda Marathon on Jan. 16. “People from all over the world were there,” Hummel said. “It was incredible. Half of the runners were from the Leukemia Society’s Team in Training program.”

“The weather was a pretty comfortable 60 degrees Fahrenheit, but I got rained on four times during the race,” she added.

Hummel finished the marathon in 7 hours, 14 minutes. “It takes a lot of dedication,” she said. You have to stick to the training schedule. Near the end of training, I was going out for 20-mile walks. It takes a lot of personal time, but I met a lot of great people. I don’t know if I’ll do another marathon anytime soon, but I had a great experience. I feel really great about what I did, and I will keep walking because it makes me feel so good.”

For information about the Leukemia Society of America Team in Training program, call Hummel at ext. 7613 or the Virginia Chapter of LSA at (757)838-9351.

Red Cross needs platelet donors now

The Red Cross urgently needs platelet donors, reports JLab’s platelet donation coordinator, Christine Hummel. Platelets are used for cancer treatments and only last for 5 days because they cannot be stored.

All platelet donations must be given at the Norfolk Red Cross. Due to driving time, registration, and actual donation time (1 1/2 - 2 hours), it takes a morning or afternoon to donate platelets. Anyone interested in becoming a platelet donor may get more information or schedule a donation session through Hummel, ext. 7613. A handful of people at the Lab are regular platelet donors; a few of them schedule their sessions for the same time so they can car pool to the Norfolk center.

With approval from their supervisor, Lab employees may take paid leave to cover the half-day it takes to make a platelet donation. The JLab Administration Manual says paid administrative leave may be used to provide a short period of paid time off for employees who make significant sacrifices of personal time for which they are otherwise uncompensated. And specifically, it says that any employee who gives blood, and doesn’t receive payment for the donation, may be granted paid leave by his or her supervisor for the period of time needed to give blood.

Get creative!

JAG plans Spring Arts Festival to show off Lab talent

The Jefferson Lab Activities Group is hosting a Spring Arts Festival on March 31. The festival is being planned as the Lab's spring event, and will feature artwork by Lab employees, users and family members.

"We wanted to try something new this year; and having an indoor Art Festival will alleviate dealing with the unpredictable spring weather," said Susan Esp, JAG co-chair. "We have many talented artists at the Lab and we thought an art festival for works done by employees, users, and our family members would be a big hit."

Joyce Miller, Physics, is spearheading the event. "Science in Art" will consist of an art show and a silent auction. The Art Fest will run from 3–6 p.m. March 31 and be held in the CEBAF Center Atrium and Rooms L102/104.

The contest is open to all Jefferson Lab employees, their family members, JLab users, and contract employees.

The maximum size of an entry will be 60" x 60" x 48". Two-dimensional work must be framed and wired for hanging. Artists who submit pieces of sculpture must provide their own pedestal. Each artist can provide up to three entries for viewing and judging; and the JAG hopes each artist will donate one piece to the silent auction.

Diana Blanchard Gross, curator of the Peninsula Fine Arts Center will judge the contest. Prize categories include painting (oil, acrylic, watercolor), photography, mixed media (graphics, fiber arts), sculpture, glass, and best in show.

The afternoon will include music and light hors d'oeuvres. JLab's own Keith Welch, Radiation Group, and his acoustic band, Sound Slide, will play easy-listening pop and rock music during the event; and caricature artist, Lawrence Ferbee, Stockroom, will be doing caricatures (black marker on regular paper). Proceeds from the silent auction and the caricatures will be donated to the Peninsula Fine Arts Center.

"Watch for the flyer we're sending out with the entry form and deadline information on it," Miller said. "We have so many wonderful artists at the Lab, we hope to have lots of participants for the festival."

The entry form deadline will be March 17. Completed works must be brought to the Lobby March 27 to allow for adequate set up time. Awards will be presented during the March 31 Arts Festival. All art work must be picked up by April 7. For more information about the event, contact Miller at ext. 7163 or Esp at ext. 7520.

Braving the raging storm

Plant Engineering team does outstanding snow removal job

A special thanks goes out to the Plant Engineering team that handled JLab snow removal during and after the region's late-January snowstorm.

Tom Briggs
Chuck Charlton
Jim Johnson
Todd Jones
Mike Lewellen
Don Seeley
Helmut Walter
Ed Winslow
Butch Hudgins and four employees of First Class Contracting

Each person spent 30-40 hours working snow removal during and after the storm, according to Winslow, snow removal project manager. "We started snow removal overnight on Sunday, Jan. 23 and didn't stop until we'd dug the Lab out of the Jan. 25 snowstorm," he recalled.

"It turned into a snow removal marathon; we didn't know what day it was when we finally finished. It kept us hopping, and definitely wasn't routine. It was fun for awhile, but," he added, "we've all had our fill of snow for this winter."

Snow accumulation on site ran between 8 and 10 inches. The team cleared the equivalent of seven miles of two-lane road in the process of making JLab's streets and parking lots passable (and that's not including the sidewalks); and they spread three tons of ice-melt chemical on paved areas.

"The roads on site were better than anywhere else on the Peninsula and this contributed to maintaining safe working conditions for all of the people trying to bring up the accelerator," complimented Andrew Hutton, Accelerator Division.

Thomas Hassler, Accelerator, added, "I know it was their job, but getting up at 2 or 3 a.m., driving to work in the dark, and braving the snow, sleet, and cold every minute while at work is not something most of us would care to do. My thanks for an outstanding job, to Ed Winslow, Tom Briggs, Don Seeley and all the others who plowed and treated the roads and walkways. Everyone who came to work was delighted to find they could drive on the roads, find a useful parking place and walk on the sidewalks."

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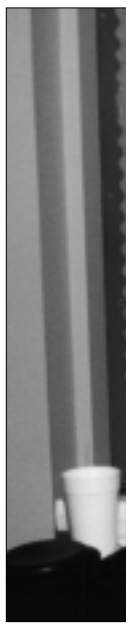

Milestones
for February 2000

Hello

Tanya Lanuzo, Assistant Librarian, Administration Division

Marc McMullen, Electronics Technician, Physics Division

Youri Sharabian, Hall B Staff Scientist, Physics Division

Goodbye

Ryland "Bobby" Barbour, Electrician, Accelerator Division (Retired)

Cheryl Batten, Medical Services Secretary, Administration Division

Tami Brown, Compensation and Benefits Administrator, Administration Division

Erich Feldl, Mechanical Project Engineer, Accelerator Division (Retired)

Joe Goodson, Self Assessment & QA Officer, Director's Office (Retired)

"Milestones" highlights the achievements of JLab staff and users, full-time and term new hires, separations and retirements. To submit staff or users' promotions, special honors and awards send information to magaldi@jlab.org or call ext. 5102.

Pitch in, join coed softball team

Any Lab staff, users, and family members (must be 16 or older) interested in playing coed softball this season may sign up now. A sign up sheet is available in User Liaison, room L107 in CEBAF Center; or an individual may send an e-mail to kchok@jlab.org. Player registration fees are $10 per person. All games will be played on Friday nights. Practice sessions start at the end of February. The season will begin the week of March 20. For more information, contact Karen Hokansson at ext. 5111.

Lab plans 'Take Our Children to Work Day' for April 27

The children of Jefferson Lab employees are invited to Take Our Children to Work Day on Thursday, April 27.

Third through 8th graders (8-13 year olds) are invited to participate in this year's half-day event. Lab youth, parents and escorts will meet in the CEBAF Center Lobby for juice and a breakfast snack (at 8 a.m.), before the day kicks off in the auditorium at 8:30.

This year's event will revolve around a series of role model or mentor visits. (Lab staff discussing and demonstrating aspects of their jobs in their work areas). After the role model visits, youngsters will return to the auditorium for a group activity, then have lunch with their parents at noon. Registration forms and electronic registration will become available in March. Anyone interested in helping with this year's event may call Jan Tyler, Education Program Manager, ext. 7164.

Dust off those sneakers; get ready for annual Run-A-Round

It's time to dust off those tennis shoes and start getting ready for the annual Run-A-Round, reminds JLab Activities Group co-chair, Susan Esp. "Now is the time to start training for the May 4 fun run," she said.

Nearly 300 Lab employees, users and family members took part in last year's event. Entry forms and more information about the Run-A-Round will become available in late March and April.

Update

Food Safari

There is such a thing as a free lunch! Winners from the Feb. 9 Food Safari free-lunch drawing were Richard Lebed, Arun Saha, and L.A. "Butch" Dillon-Townes. Eurest Dining Services sponsored the Food Safari, attended by more than 250 Lab staff and users. Those attending sampled a variety of snacks, breakfast foods, desserts, entrees, sandwiches, soups, side dishes and beverages presented by the 10 visiting vendors. Here JLW (John L. Wood, Sales) representatives prepare to make gyros.

Benefits Open Enrollment starts Feb. 28

The Lab's annual Open Enrollment period for all regular and term employees runs from February 28 to March 10, according to Kisha Owens, Human Resources & Services.

"Unsure about what options are available," she asks. "Want to change your health or dental elections? Well, the Human Resources Benefits Fair 2000 is the place to be." Human Resources & Services is hosting a Benefits Fair on Thursday, March 2, from 2 – 6 p.m. and Friday, March 3 from 9 a.m. – 2 p.m. in the VARC Lobby (Bldg. #28).

The following carriers will be available to answer individual's benefits questions:

- Trigon Blue Cross Blue Shield (Keycare, Healthkeepers and Indemnity)
- Optima (Sentara)
- Delta Dental
- Cigna (Short-Term Disability and Life Insurance)
- TIAA-CREF
- REACH Employee Assistance Program (EAP)
- Riverside Wellness and Fitness Center
- Langley Federal Credit Union
- Sam's Club
- Price Costco

"Even if you aren't changing your elections you still must return an election form." Owens reminds Lab staff. "So come to the Benefits Fair, even if you don't have any questions. You can return your election form and find out what's new."

Benefits enrollment packages are sent to all regular and term employees via interoffice mail. For more information about the Benefits Fair and Open Enrollment, visit the Human Resources & Services Web page at www.jlab.org/hr or call Owens at ext. 7068.

bright spot on the web

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Editor's note: If you have or know of a Web Site that could be informative or useful to Jefferson Lab staff, call the public affairs office at ext. 7689 or e-mail Linda Ware (ware@jlab.org).

In celebration of Black History Month, web spot visits http://creativefolk.com/blackhistory.html this month. The Web page is a clearing house for Web sites highlighting African-American history, culture, events, and people. From this page a browser may delve into the origins of Black History Month, Martin Luther King Day, and Kwanzaa, or check out traditional music, legacies, or scientific achievements. Several hypertext links connect to Web sites developed especially for youth.

ON TARGET

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