March 2000

ON TARGET

THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY • A DEPARTMENT OF ENERGY FACILITY

Keppel wins State's

annual Outstanding Faculty Award

In their own words

goes on the record with Purchasing Manager Danny Lloyd

Salute to JLab's

15-year employees

Get ready for

Spring Arts Festival March 31

Into the machine

Polarized targets a complicated but rewarding business

by James Schultz

Performers who set plates spinning on top of long poles enraptured watchers of old-style television variety shows. Plate after precariously balanced plate was set in motion, until a dozen or more were wobbling, turning in the same direction many feet above the studio floor. The audience held its collective breath. When would gravity take its revenge? Usually, practice and perseverance paid off, with nary a piece of porcelain perishing.

For Jefferson Laboratory scientists and technicians, polarizing a target material by aligning the spin properties of its protons and neutrons offers some of the same challenges. "These targets operate in extreme environments — very high magnetic fields, very low temperatures, and ionizing radiation," says Chris Keith, a staff scientist in JLab's Cryogenic Polarized Target Group. "The trick is getting all the individual parts to work together, and at the same time. If any one component doesn't work, you don't have a viable experiment."

The majority of physics experiments at JLab involve unpolarized targets, usually liquid hydrogen or liquid deuterium, a hydrogen isotope. Unpolarized targets tolerate high beam current and, while they require effort and care to arrange, they don't present the same array of logistical challenges as do their polarized kin. Nevertheless, despite the difficulty of initiating and sustaining target polarization, these targets have unique advantages. A polarized target's spin alignment permits physicists to arrange the quarks inside neutrons and protons in the rough equiva-

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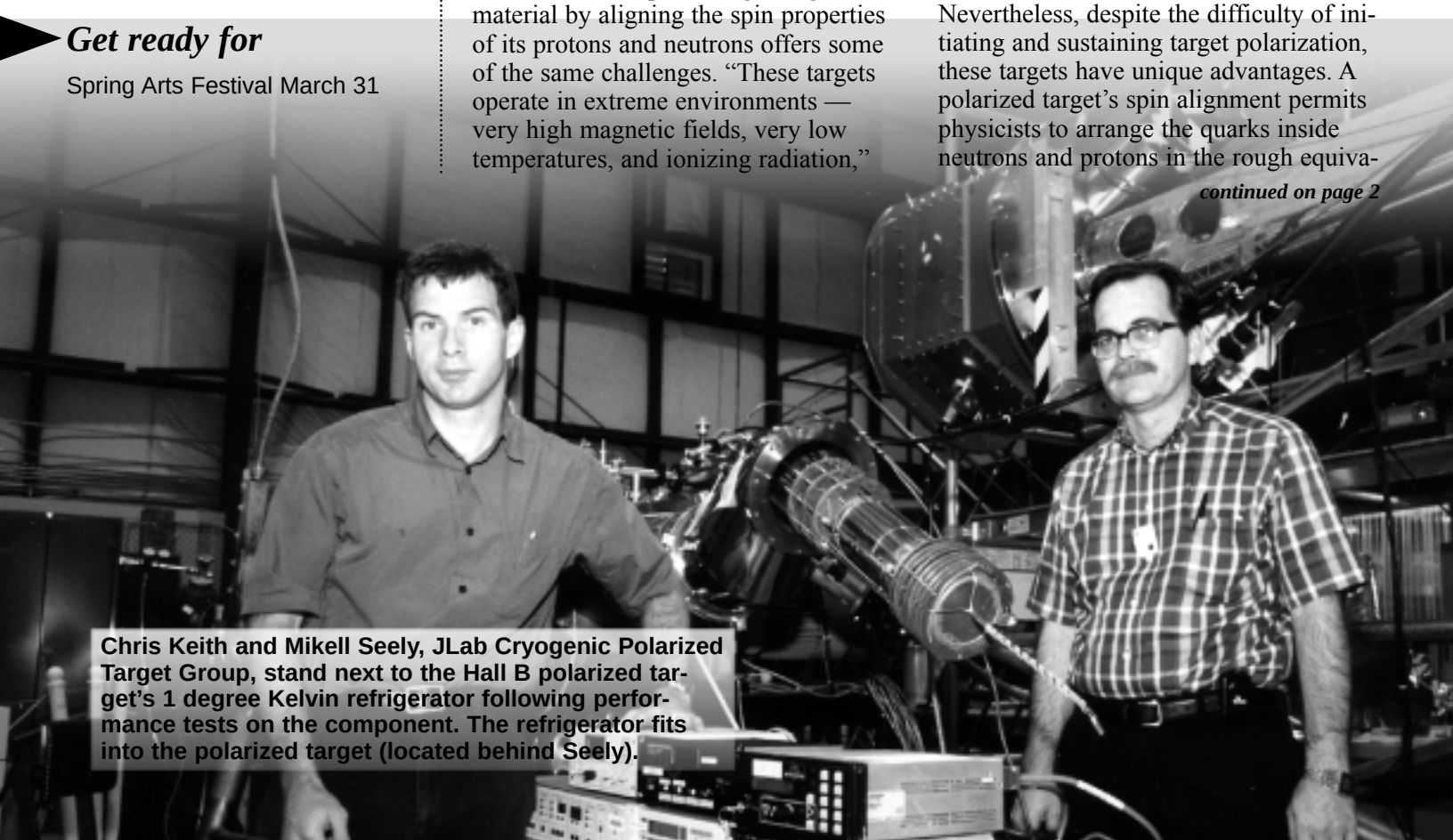

Chris Keith and Mikell Seely, JLab Cryogenic Polarized Target Group, stand next to the Hall B polarized target's 1 degree Kelvin refrigerator following performance tests on the component. The refrigerator fits into the polarized target (located behind Seely).

Polarized targets a complicated but rewarding business. . .

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lent of the same physical direction. In so doing, researchers are able to probe otherwise indiscernible quark-to-quark interactions, creating a unique magnifying window into the subatomic realm.

Experimentalist Don Crabb, a research professor of physics at the University of Virginia, says that, with spin alignment, chances increase that subatomic particles will interact in specific ways and that the results of those interactions will be more readily apparent. "Say you have a bale of hay with something buried at its center," he posits. "Shoot a bullet at it, and if it has a hard interior, the shot will ricochet off that interior in a certain way. If you can scatter off individual quarks, you can better understand how a proton or neutron is put together, and how the quarks are interacting to give an individual proton or neutron its properties."

Easier Said Than Done

Not all materials are suitable for polarization. Although experimenters at other facilities have sometimes used frozen alcohols, alignment can be quickly lost through repeated interactions with the Lab's electron beam. JLab's material of choice is ammonia. Once polarized, it tends to remain so, even at high beam current. Target preparation begins with the freezing of gaseous ammonia into a solid block. The block remains immersed in liquid nitrogen and is then crushed into miniature, rock-salt-like granules, which are meticulously spooned into half-inch-deep, dime-size containers. These small receptacles, affixed to a target "stick" and festooned with electronics, are made of a hydrogen-free type of plastic, specifically designed not to interfere with the experimenter's measurement of the target polarization using a technique known as nuclear magnetic resonance, or simply NMR.

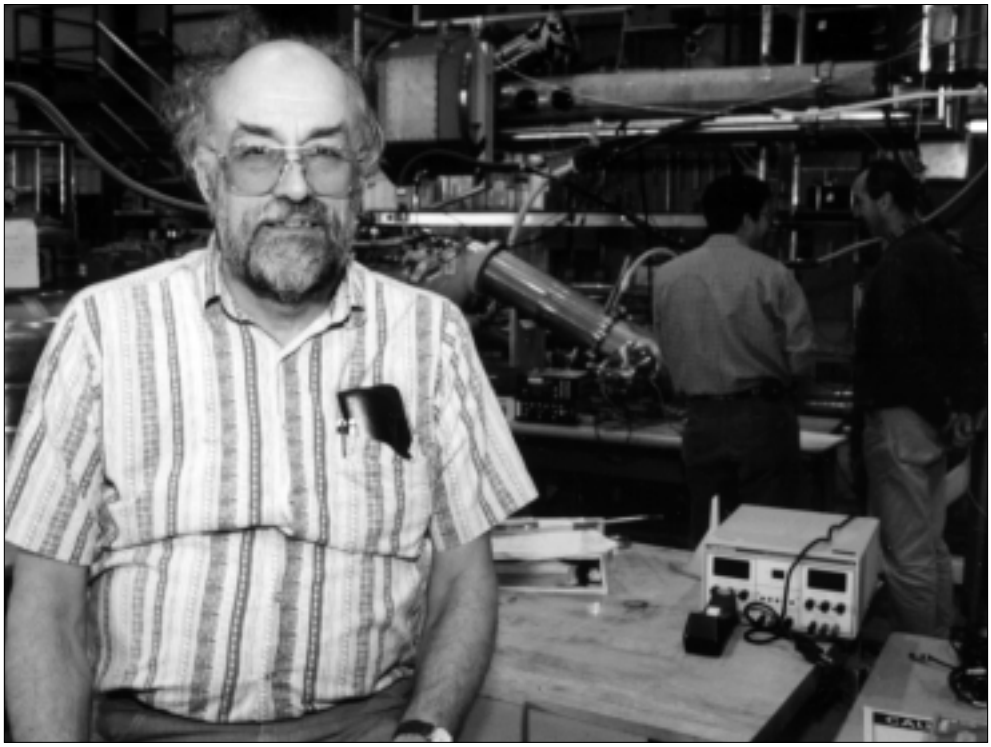
The target stick will eventually be inserted into a canister cooled by liquid helium to just one degree above absolute zero. In turn, the entire array must nestle close to the detectors that will record the quark interplay. Later, experimenters will begin the two-part process of spin alignment, first with a strong magnetic field and then with microwaves, to prepare the target for impact with the beam from the Lab's accelerator, which in turn will generate the subatomic events that will be weighed and analyzed.

If polarized target preparation seems a complex process, it is. The Lab's Polarized Target Group can take up to a year to fabricate and put into place the many pieces that, when fitted together, experimenters use over weeks and months to conduct physics research.

"Ideally the target system comes in completely configured, with refrigeration and magnets," says Mikell Seely, Polarized Target Group manager. "But we usually have to outfit it with polarization detectors, a microwave system, controls and a helium gas supply. We then have to install and maintain it. When these targets are up and running, you have to keep them running at all costs — whether it's weekends or two o' clock in the morning. If something goes wrong, you come in and fix it."

Currently, Seely, Keith, Crabb and co-workers from Genoa, Italy, are preparing a polarized target for a Hall B study slated to begin in September. It will be the third such polarized-target experiment conducted at JLab. The target array is being assembled in the Experimental Equipment Laboratory and is scheduled for a fully integrated test in April and May. The system will be literally wheeled over to Hall B in August to be wedded to the hall's CLAS detector, prior to the start of the experiment's five-month run.

"These are complicated systems," Keith says. "Even though they usually require some kind of care and feeding, we try to make them as robust as we can. Experimenters can't run their experiments if the target is always being repaired."



Don Crabb, research professor of physics at the University of Virginia, sits in front of the Hall B polarized target (module and tube above eye level) and a test apparatus used to check the polarized target's refrigerator (tube at shoulder level). Chris Keith, JLab staff scientist, and Marco Anghinolfi, a user from the University of Genoa, Italy, (background, left & right) discuss results from a refrigeration test.

Keppel wins award

HU professor, Lab scientist earns outstanding faculty award

Cynthia Keppel, JLab staff scientist and assistant professor of physics at Hampton University, received the Commonwealth of Virginia's Outstanding Faculty Award (OFA) for 2000. Keppel was one of 11 college faculty members — selected from 72 nominees — recognized during a ceremony at the State Capitol in Richmond on March 2.

The award recognizes the finest among Virginia's college faculty for their demonstrated excellence in teaching, research and public service. Since the program's inception in 1986, 162 Virginia faculty members have received this honor. The State Council of Higher Education for Virginia (SCHEV) administers the Outstanding Faculty Award program.

At 37, Keppel is the youngest recipient in the history of the award, and is only the second assistant professor ever to receive the honor. She is the second professor from Hampton University to earn the award where her work includes Directorship of the Nuclear and Higher Energy Physics Research Center. Keppel has been with HU and JLab since 1995.

During the formal award presentation on the South Portico of the State Capitol, the 11 faculty members were honored by Governor James Gilmore and members of the General Assembly, the Governor's Cabinet, and the State Council of Higher Education for Virginia; as well as local education, business, and community leaders. The Outstanding Faculty Award recipients also were recognized on the floors of the Senate of Virginia and the Virginia House of Delegates. Afterward, the Governor and First Lady hosted an informal luncheon reception for the OFA recipients and invited guests at the Executive Mansion just east of the State Capitol building. Each OFA recipient was presented a $5,000 check at the reception.

Keppel said she and her family were very excited about winning the award. "It is quite a compliment," she commented. "My youngest son was so excited that he ran up to hold the plaque for me after the presentation."

After the award ceremony, Cynthia Keppel poses for a photo with Governor Jim Gilmore (left) and Virginia's Secretary of Education Will Bryant.

While Keppel doesn't plan on resting on her laurels, she and her family had planned a vacation at Disney World for early March, "But," Keppel explained, "that was planned long before I found out about the award."

"I am taking my friends out to dinner to celebrate," Keppel responded when asked how she was going to spend her award money. "This award is as much my research group's as it is mine. I'm taking them out for dinner and wine, so we can celebrate together. I would like to buy a hot tub," she added with a smile, "and hang my plaque so I can see it from the tub."

Keppel has received numerous grants from the National Science Foundation, and currently has two patents pending. She has developed an interactive physics demonstration program that has been used at many schools and museums around the country and was featured at the American Physical Society's National Centennial conference in Atlanta, Ga., last year. Her passion for teaching physics ranges from supervising Ph.D. candidates to working with elementary and high school students.

Keppel is known among her students and peers for her boundless energy and strong sense of focus. She is often described as a very imaginative and prolific researcher — advancing nuclear physics in both pure and applied research. A university colleague praised her for being "one of those unique individuals who is capable of pursuing world-class research without losing the passion for teaching students."

During the formal presentation ceremony, Governor Gilmore said, "Each of these exceptional men and women are remarkable teachers, productive scholars and active contributors to our Commonwealth's educational and civic vitality. This award recognizes the finest among Virginia's college faculty for demonstrated excellence in teaching, research and public service."

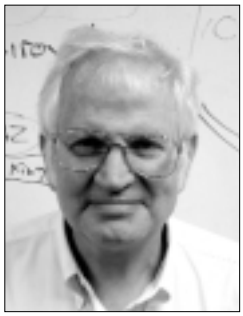
JLab salutes its 15-year employees!

At the November 1999 Service Awards ceremony, the Lab recognized its first group of employees to reach 15 years of service. This small group's dedication and loyalty were instrumental to the Lab's growth and development. Their efforts and accomplishments have helped make this Lab the success it is today. Here they share what they've enjoyed most over the years.

Dave Buckle
Physics
Sr. Programmer/Analyst

"I really like the people here and I enjoy my job. I do some physics, some programming — a lot of different things. I enjoy the variety in my job. I grew up on this spot; I was here before the Lab was built — doing experiments with simple accelerators. I've been writing [computer] code quite a while now, and every so often someone asks me for help with the old stuff like Fortran. There are lots of things going on here. I've always enjoyed BEAMS — talking to the kids — encouraging them to take some math and science so they can work at a place like this someday."

Franz Gross
Physics, Staff Scientist;
Dean of Research and Graduate Studies
College of William and Mary



"I began working on the development and planning for JLab in 1980, long before it was approved, funded, or even named! I have felt like a proud parent as the laboratory was constructed, began operation, and finally matured. I love the science we do, and have enjoyed playing a small role in building this laboratory to do this science. The quality of the data we produce exceeds all expectations, and the excellence of our scientific program is recognized around the world. This would not be possible without the dedication of so many, and being a part of this wonderful team is very satisfying. I look forward to resuming full-time theoretical work at the lab this summer, and to being a part of this adventure for several years to come."

Henry Whitehead,
Accelerator
Senior Electronics Technician

"It's been a privilege working here. I worked on the development of the original quartercryo and cryomodule design. I take pride in the tunnel; I helped build every cryomodule in the accelerator. Now we're developing and testing the horizontal test bed (the quartercryo) for the new 7-cell cavities. It's been a great experience — cryomodule development is at the heart of the machine. I've seen a lot of changes in cryomodule development. I've worked with many nice people and really enjoyed the job."

Sylvia Smith
Administration
Financial Services Specialist

"The best part of my job is the interaction with different people. I'm not stuck behind the computer all the time. My job has so many good points. There was a time when everyone fit in this building (the VARC) and I knew everyone here. Boy, has it changed! Now I go to CEBAF Center for an event and I wonder, 'who are all of these people.' I know many people who worked here years ago and have gone on to other jobs. On occasion they'll stop by and ask if Sylvia is still here. It's always so good to see them again!"

Joan Campbell
Administration
Material Services Coordinator & Property Manager

"The best part of my job is interacting with such a variety of people inside and outside of the Lab. I enjoy focusing on our customers' needs and handling all the unique jobs that come through the door. No two days are the same. I'm in and out of the office a lot; it's nice not being stuck behind a desk. Jefferson Lab has given me the opportunity to advance in my job and I'm grateful for that."

Don Seeley
Administration
Plant Engineering Supervisor

"Every day is different; there's always something new going on. I enjoy being around people. Everyone who knows me knows I enjoy joking around with people. But when it comes to maintaining Lab facilities, I like making people happy!"

Roy Whitney
Administration
Associate Director

"The dynamic collaboration between our talented staff and Users to operate a world class facility is the fulfillment of the vision that brought me to the Peninsula. Every day we are producing world class science and technology development. I am proud to have been part of the tremendous accomplishments and growth of the Lab over the past fifteen years and I look forward to the continuing creativity and innovation that brings Jefferson Lab world-wide recognition and praise."

Estelle Seeley
Administration
Business Services Buyer

"It's been exciting seeing the Lab grow — from groundbreaking to now. I feel good about what I do and pleasing our customers. I always try to get as much done in a day's time as possible. I work with many of the Lab's Users to make sure they get what they need, and it makes me feel good at the end of the day to know I've given my all."

In their own words

On the record with Purchasing Manager Danny Lloyd

Interview by James Schultz

I started working at the Lab in November 1987, while I was on terminal leave from the Air Force. I was lucky enough to know several people at the Lab who were former Air Force members and when they heard I was going to retire, they made me an offer I couldn't refuse. I knew it was about time to retire from the Air Force, but with six young kids, I needed a good job lined up.

With all those kids, I used to fill up the Lab's annual children's Christmas party. At that time, JLab was small enough — about 100 people — to fit everybody into one house. I remember going to Hermann [Grunder's] house for the children's Easter egg party. Hermann would dress up like a bunny for Easter egg hunts and give out eggs to the kids. It was a lot of fun.

When I got here, we had VARC, Trailer City and the Test Lab. That was it. When you see all the progress over the last 12 years, it's pretty amazing. For me, the hardest thing at first was trying to figure out what to wear each day. In the military, you're programmed to wear a uniform. I had to buy dress shirts, ties, that sort of thing.

It hasn't been too long ago that we combined Procurement and Finance into one department called Business Services. We are made up of three groups: Accounting, Payroll/Travel, and Procurement. We have three sections within Procurement. In my section, I have several key responsibilities. I'm in charge of all supply buying up to $100,000, and I supervise four people. I'm also the JLab credit card coordinator, and the Lab's Small Business Manager.

Small business is the nation's economic backbone. The majority of jobs come from small business. My most important responsibility as the Lab's Small Business Manager is to ensure that small business, minority-owned and woman-owned businesses get a fair opportunity to work with us. We have small business participation goals that we negotiate every year with DOE. In the last 10 years, we met or exceeded all our goals every year except one, in 1997. Accomplishing those goals is a Lab-wide team effort. We achieved them because of everyone's support, from the planning stage to the actual ordering.

We have a new program coming online this year, the Mentorship/Protégée Program. We'll sign agreements with minority and women-owned businesses to provide them with technical and marketing help, and references for financial aid. The goal of the program is to promote economic and technological growth, foster the establishment of long term business relationships and increase the number of small disadvantaged, 8(a), or women-owned businesses that receive DOE, other federal and commercial contracts. If you have a good vendor with a good reputation, you want to encourage that vendor. We want something that won't fade away.

We built the credit-card program up from scratch. We got DOE approval in June 1995 and purchases started in October 1995 with 23 cardholders and $200,000 in annual charges. Now it's up to $3 million in charges per year and we have 140 cardholders on site. It is a tool we provide to better respond to our customers' needs as well as relieving us of the nickel and dime stuff, which allows us to concentrate on the more complex procurements and administration.

Our next big effort is to make credit-card shopping mostly obsolete by enabling employees to order directly online, on our web site. We currently have seven catalogs online, offering a million items, such as small tools, shop supplies, software and hardware, electronics and office supplies. In a few months we're planning to offer an additional 800,000 or more items, including clean-room supplies, valves and fittings, scientific and lab supplies, vacuum components, metals and optics. Eventually we should also make available electrical and plumbing items. The advantage for us is that we're getting volume discounts and we don't have to go out and shop multiple places. You look up a part, check the price, press a few buttons, and it's ordered. Electronic commerce is really taking off. The employee response has been tremendous. There will always be a need for a purchase [credit] card, but I really want to decrease its use.

My goal as a manager is to ensure that my people treat everyone they deal with, on the phone or in person, as the most important customer they have. Our whole job is customer support. We question everything we do. We ask ourselves: Why are we doing this task? Is there a way to do it better? I coach Little League baseball and AAU girls' basketball. You lose as a team and you win as a team. Just like you have a basketball or baseball team, you have a Business Services team. Each individual is different and needs and wants different things. You have to understand what motivates people.

We're a lot bigger now, but I still think of us as family. If I have an issue or problem, I know I could go to Hermann Grunder. There's an open-door policy throughout the Lab. At other places that would be unheard of. This is a well-run laboratory. We have an attitude that nothing is impossible. We have a reputation that we can get it done. And we do get it done.

I enjoy my work and I really like the people. The Lab is one of the best places I've ever worked. Otherwise I wouldn't have stayed as long as I have.

Milestones
for February 2000

Hello

Ronald Angello, Controls Technician, Accelerator Division

Vicki Barnett, Medical Services Secretary, Administration Division

Michael Bevins, Design Engineer, Accelerator Division

Timothy Cannella, Procurement Administrator, Administration Division

Karen Congiu, Procurement Administrator, Administration Division

Edward Daly, Mechanical Engineer, Accelerator Division

Robert Diggs, Electronics Technician, Accelerator Division

Lee Ann Sironen, Executive Secretary, Administration Division

Gregory Smith, Staff Scientist, Physics Division

Katherine Wilson, Design Engineer, Accelerator Division

"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.

Get in on fun; take part in Art Fest auction

Everyone may participate in the Silent Auction at the JLab Spring Arts Festival. There will be a bidder registration table in front of CEBAF Center rooms L102/104 at the March 31 event. The auction will last from 3:30 – 4:30 pm so bidding will be fast and furious. All proceeds from the auction will be donated to the Peninsula Fine Arts Center.

Several Lab artists who are exhibiting at the festival will be donating some of their works to the auction. However, if you're not an artist but have other skills to offer — these can also be auctioned! If you're a good cook, you could donate a dinner for two or a Sunday brunch, homemade brownies or a birthday cake, and we can auction that. Maybe you make silk flower arrangements, candles or homemade soaps. We can auction these, too! Dance lessons, dog training — you get the idea — if you do it and can provide it, we can auction it!

If there is nothing you'd like to make or donate for the auction, you can still participate in the event and have a great time. Bring your checkbook and put a bid on something special — made by one of your colleagues. Outbid the person next to you and you'll take home a thing of beauty and support the Peninsula Fine Arts Center at the same time.

The deadline for donations is Friday, March 24. Individuals may donate via the online donation form linked to the JAG web page. Contact Joyce Miller (ext. 7163 or e-mail miller@jlab.org) or Susan Esp (ext. 7520 or e-mail esp@jlab.org) for more information.
by Joyce Miller, Physics Event Chairperson

Location changes for Children's Day

The welcome location for the Lab's April 27 Take Our Children To Work Day has changed. 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 VARC Lobby for juice and a breakfast snack (at 8 a.m.), before the day kicks off in the Education Program classrooms 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 VARC for a group activity, then have lunch with their parents at noon. Registration forms and electronic registration will become available in late March. Anyone interested in helping with this year's event may call Jan Tyler, Education Program Manager, ext. 7164.

Update

Safe & Secure

General Eugene Habiger (far left), DOE's director of the Office of Security and Emergency Operations, visited JLab on March 3. He was pleased and refreshed by the openness and candor of Lab leadership and staff in discussing the Lab's security issues and concerns, reported Bill Nay, DOE Security Management team leader. General Habiger was particularly impressed by the pride and enthusiasm of Lab staff, and called the "All Hands" meeting a highlight of the visit and JLab staff members would agree. Here he tours Hall A with Hall A Leader Kees De Jager, Bill Nay, Public Affairs Manager Linda Ware and John Przysucha, DOE Office of Special Projects.

Exhibition features science, technology in art

To celebrate Women's History Month, the Peninsula Fine Arts Center is hosting Womentek — a multimedia art show featuring the works of 14 female artists.

The exhibition runs from March 25 – June 4 and includes such varied, high-tech media as digital prints, mechanical sculpture, raku sculpture with holograms, computer-manipulated performance video, Internet/CD-ROM work and kinetic light art.

The nationally traveling exhibit features women using science and technology in their art. The opening reception, set for March 25, is open to the public and includes free refreshments from 5:30–7:30 p.m., according to Diana Blanchard Gross, PFAC curator.

The Fine Arts Center is open Monday – Saturday, 10 a.m. – 5 p.m. (on Thursdays the center stays open until 9 p.m.), and Sundays from 1–5 p.m. Admission is free; donations are appreciated.

The Fine Arts Center is located at 101 Museum Dr., Newport News. (Turn left onto Jefferson Ave. when leaving the Lab, turn right onto J. Clyde Morris Blvd., cross Warwick Blvd.) Call 596-8175 for more information, or visit the Fine Arts Center web page at www.pfac-va.org/.

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).

This month web spot looks at Women's History Month web sites. The National Women's History Project Web site at www.nwhp.org/month.html includes a variety of information on current events and special activities honoring women's accomplishments from the last century. In addition, it offers a classroom activity kit, background information, the president's proclamation, extensive historical links, and a women's history quiz. One of the questions is about physicist Chien-Shiung Wu (1912–1997) who earned both the National Science Medal and the internationally respected Wolf prize for her scientific research. Her most famous experiment showed that conservation of parity could be violated in nature.

ON TARGET

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