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INSIDER

Newsletter for the Employees of Ames Laboratory ■ Volume 15, Number 5 ■ May 2004

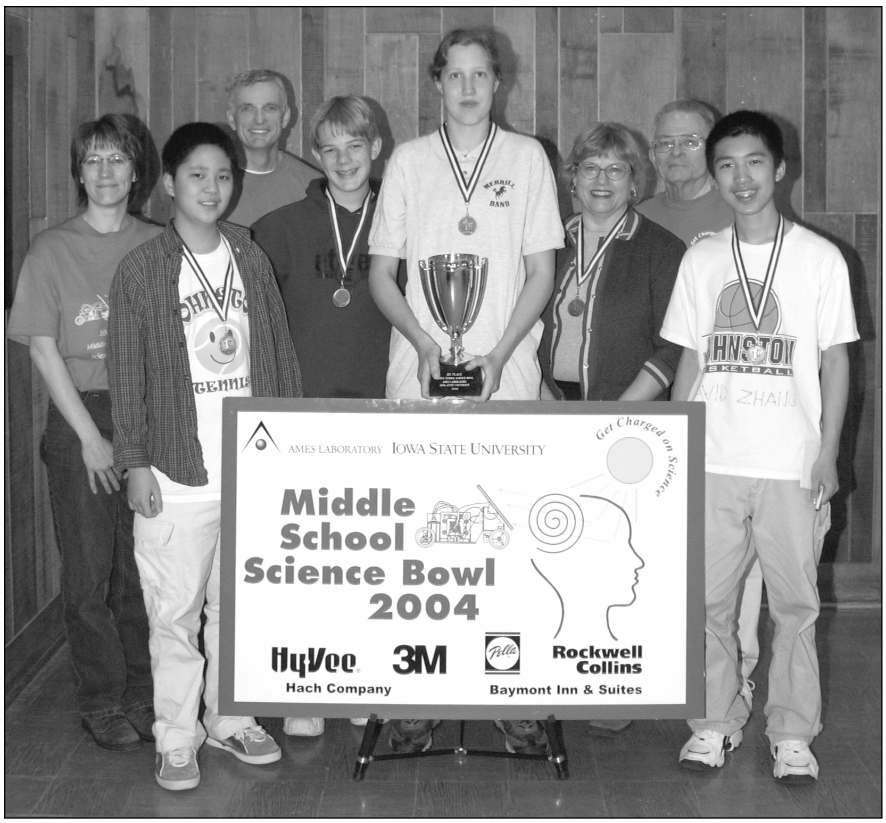
Inaugural Middle School Science Bowl a Huge Success

Students compete in fuel-cell car challenge and academic competition

Why haven't we always used fuel cells? Are all fuel cells the same size? Aren't solar cells expensive? These were just three of the many questions middle school students bombarded members of the Iowa State University solar car club, Team PrISUm, during their presentations on solar energy and hydrogen fuel cells at the inaugural Ames Laboratory/ISU Middle School Science Bowl.

Sixty students, their coaches and parents from 10 Iowa and two Minnesota middle schools descended upon ISU on Friday and Saturday, April 23-24, to build and race hydrogen fuel-cell cars *continued on page 4*

Middle school students can't wait to ask questions about how hydrogen fuel cells work.



Central Academy of Des Moines took top honors in the academic competition. Left to right: Cynthia Feller, Ames Lab Public Affairs; James Miao; Steve Karsjen, Ames Lab Public Affairs; Grant Nelson; Emma Van Winkle; Coach Susan Stroope; Tom Barton, Ames Lab director; and David Zhang.

Celebrating Great Service

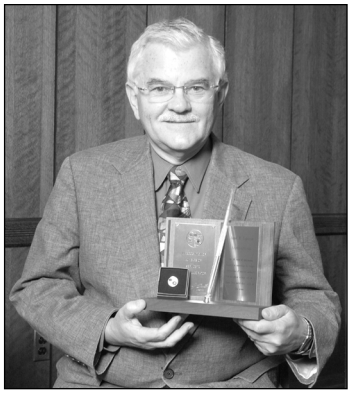
Employees honored for years of service to Lab

Ames Laboratory employees are recognized for their years of service to the Lab in five-year intervals, beginning with their tenth year of employment. The years add up — 10, 15, 20, 25. ... Many longtime employees might tell you that each subsequent five-year interval seems to pass much faster than the preceding one. But that's the way it is when you're hanging out with friends and family. And make no mistake, co-workers of 10 to 40 years most definitely rate as good friends and extended family.

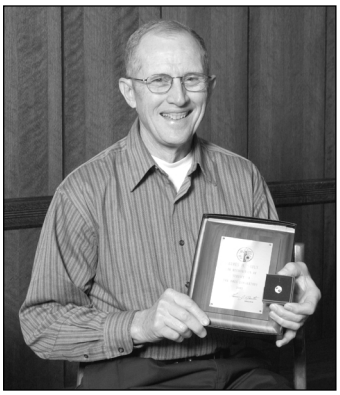
Several employees were honored for their years of service to Ames Laboratory at the annual Service Awards Luncheon in May. Acknowledging their contributions, Director Tom Barton thanked them, saying, "Your knowledge, experience and willingness to lead make it possible for Ames Laboratory to offer a quality product. You are the people who get things done, allow things to get done and tell others how to get things done."

Please take a minute to enjoy the new pictures added to the Laboratory's "family photo album" in 2004. ■

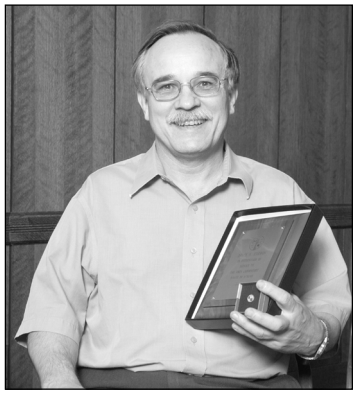
~ Saren Johnston



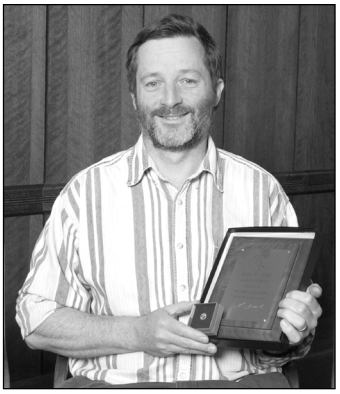
***40 Years** — James Espenson*
The inscription on Espenson's plaque reads: "For 40 years of outstanding research in unraveling the complex mechanisms of catalytic chemistry which has played a huge role in the Ames Lab's world-class status in this arena."



***35 Years** — Jim Safly*

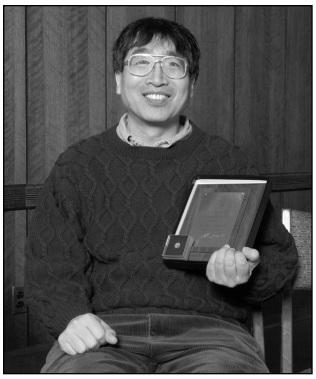


***30 Years** — Carol Mack, Bruce Harmon and Cathy Brendeland (not pictured)*



***25 Years** — Jim Evans. Not pictured: Charlie Burg, Steve Gilliland and Karen Huiatt.*

***25 years** — Shirley Standley*



***25 years** — Kai-Ming Ho*

***20 Years** — (front row, left to right) Saren Johnston and Diane DenAdel. (back row, left to right) Rebecca Shivvers and Pat Thiel. Not pictured: Karen Burk*

***15 Years** — (left to right) Tom Lograsso, Mike Vaclav, Anne Coffman, Terry Herrman, Cai-Zhuang Wang, Bob Terpstra and Kevin Dennis. Not pictured: Bud Ahrens, Ron Berrett, Bulent Biner, Alan Goldman, Roger Jones and Willie Martin.*

***10 Years** — (left to right) Brett Bode, Trevor Riedemann, Keith Schulke, Vladimir Antropov and Vitalij Pecharsky. Not pictured: Paul Canfield, Deb Evans, Cathy Hargis and Peggy Lee.*

Joseph Shinar, Ames Laboratory physicist and an Iowa State University professor of physics, has been named a recipient of a 2004 ISU Foundation Outstanding Achievement in Research Award. He was selected through the nomination and support of his peers. Shinar is a pioneer with strong national and international reputations in the experimental physics and fabrication of thin films of π-conjugated materials and organic light-emitting devices. His group has also pioneered optically-detected, electrical current-detected, and photoluminescence-detected magnetic resonance studies of the properties of the materials and devices. He has published more than 180 papers in scientific books and journals, received three patents, and given over 110 invited talks at institutions and at national and international conferences. His work is highly cited in the scientific literature.

In a congratulatory letter to Shinar, Provost Benjamin Allen said, "This (award) speaks volumes to your commitment to ISU, our students, and your dedication to the process of research." Shinar will receive the Outstanding Achievement in Research Award at the Fall Convocation and Awards Ceremony, Sept. 27. ■

Ricky Kendall, Ames Laboratory computational scientist and an Iowa State University adjunct professor in computer science, has been named a recipient of a 2004 Professional and Scientific Outstanding New Professional Award in the College of Liberal Arts and Sciences. The award recognizes P&S employees who have achieved excellence in their respective fields. Kendall is a world-renowned leader in the fields of computational science, theoretical and computational chemistry and high-performance computing. He has served as an outstanding mentor and role model for undergraduate and graduate students, as well as postdoctoral researchers, young professors and established scientists. He has designed and teaches a widely popular and effective computer science course that attracts undergraduates in computer science and engineering as well as graduate students in the physical sciences. Beyond ISU committees and activities, he is a member of the Executive National Energy Research Scientific Computer Center Users Group Committee and the Advisory Council at the National Energy Research Supercomputer Center. In 1999, Kendall received the R&D 100 Award for development of the Molecular Science Software Suite. He will receive the P&S Outstanding New Professional Award at the Fall Convocation and Awards Ceremony, Sept. 27. ■

George Kraus, director of Ames Laboratory's Biorenewable Resources Consortium and an Iowa State University chemistry professor has been designated as a University Professor. Kraus has been a member of the Iowa State faculty since 1976. His research interests include organic synthesis, bioagricultural chemistry and toxicology. He is the director of ISU's Center for Catalysis, has served as chair of ISU's chemistry department, and has demonstrated a strong commitment to teaching as well as research.

A University Professor must have acted as a change-agent to improve the quality with which the university carries out its mission as a land-grant university. Above all, to be designated as a University Professor, a faculty member must be an outstanding university citizen. Kraus will be honored by the university community during the 2004 Fall Convocation and Awards Ceremony, Sept. 27. ■

Victor Lin, an Ames Laboratory associate and an Iowa State University assistant professor of chemistry, has been honored with a 2004 College of Liberal Arts and Sciences Award for Early Achievement in Research. The award recognizes a faculty member who has demonstrated outstanding research activities, usually early in his or her professional career. Lin has designed and conducted cutting-edge research projects that require expertise in chemistry, physics, biology and materials science. Lin is actively engaged in interdisciplinary research to develop synthetic methods to multifunctionalize new inorganic mesoporous materials for various catalysis and biomedical applications. Lin will be formally recognized during the LAS Faculty/Staff Convocation, September 1. ■

National Safety Council Vice President of Safety and Health Programs Scott Kappmeyer, left, presents Ames Lab ESH&A Industrial Safety Specialist Shawn Nelson with an award for "outstanding achievement in accident prevention" during the 2003 calendar year. The award was made at the Iowa-Illinois Safety Council's 51st Professional Development Conference in Davenport on April 21-22.

Inaugural Middle School Science Bowl a huge success

continued from page 1

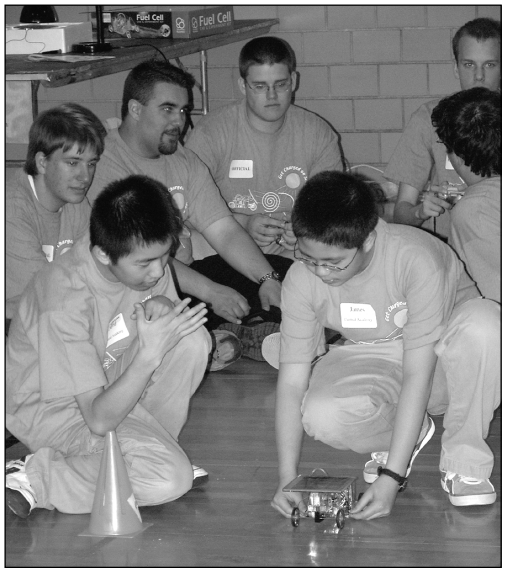
and then compete in a quiz-bowl competition. Friday afternoon's car-challenge kickoff got underway with opening comments from Larry Jones, Ames Lab associate metallurgist and science advisor for the Middle School Science Bowl, who asked the students, "Why are we so interested in helping you understand the importance of hydrogen as a potential fuel source?" His answer, "Because we are the Department of Energy (referring to the Lab's DOE status), and it's our responsibility to do so."

They're supposed to just snap on.

Following Jones' comments and the Team PrISUm tutorials on solar and hydrogen fuel, it was on to the much-anticipated construction of hydrogen fuel-cell cars. Once given the OK, it didn't take long for the students to get their car kits opened and the parts laid out (some might say scattered) on the table. "I think this goes here," and "No, it goes here. Let me show you," were comments repeated frequently as the students assembled the myriad of wires, tubes and other parts to build the cars. Not surprisingly, with just a little help from Team PrISUm and other volunteers, the students had the hydrogen fuel-cell cars put together at break-neck speed. Once the cars were assembled, students learned how to operate them on solar power. Then they learned how solar power can be used to split water molecules to create both hydrogen and oxygen gas and also how the combining of hydrogen and oxygen in a fuel cell can generate electricity that can be used to power a car's motor.

Once the cars' hydrogen tanks were full, it was time to race the cars on the 10-meter track set up in the Forker Building gym. Racers were confronted by a few minor challenges during the competition, such as a wheel falling off one of the cars right before it got to the finish line (the car still won) and many cars veering off the track and needing some minor directional adjustment. Overall, however, the competition went off like clockwork. The unofficial award for the most interesting strategy went to the team that deposited its car at the starting line backwards. "Our solar club volunteer suggested we try it this way," said the team captain when questioned by race officials. The car went on to win that race and prompted at least one other team to adopt the strategy.

Miller Middle School of Marshalltown celebrates their victory in the fuel-cell car challenge.



Surrounded by members of Team PrISUm, Central Academy prepares their car for the start of a race.

At the end of the day, Miller Middle School of Marshalltown took top honors in the fuel-cell car challenge with Boone coming in second. "My son said it was his best day ever," said one appreciative parent about the fuel-cell car challenge.

After completing the car competition, the students received a short tour of the ISU campus from student guides provided by the ISU Admissions Office. Winding up at Gilman Hall, it was time to fill up on pizza. With full stomachs, the next treat for the students was a presentation by the ISU Society of Chemistry Undergraduate Majors, or SCUM. The club members' flashy chemistry presentation mesmerized the inquisitive students for almost an hour. Said one excited middle schooler during the presentation, "I'm coming to ISU just so I can be SCUM, too!"

Saturday brought a full day's worth of academic competition. The teams spent the greater part of the morning squaring off in a pool-play competition, with each team getting three matches. Late morning and part of the afternoon brought the all-important double elimination tournament to determine the winner of the academic competition. In the end, Des Moines Central Academy edged out Boone 96-64 to win the quiz-bowl part of the competition. The competition between Central and Boone was a rematch from the semifinals. Central Academy won the semi-final match 112-86. Boone then

A walking tour of campus led the students to Gilman Hall and apparently fueled their appetites.

Science Bowl Alumus Returns to Nationals

Former student competitor officiates at national competition

From the time he was a sophomore at Ankeny High School, Doug Fuller has been involved with the Ames Laboratory/ISU High School Science Bowl. He was a student competitor for three years during high school and captained the 1999 winning Ankeny team that went on to compete in the National Science Bowl that year in Washington, D.C.

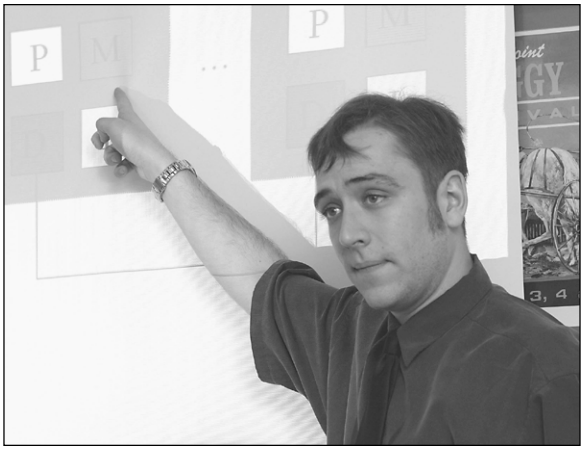
The D.C. trip might have seemed like the end of his Science Bowl "career," to Fuller, now an Ames Lab graduate assistant working in the Scalable Computing Lab. But the Lab's Public Affairs Office had other ideas. Discovering Fuller was enrolled as a freshman in computer science at ISU that same fall, Cynthia Feller, assistant Science Bowl coordinator, contacted him about volunteering for the January 2000 competition. Fuller agreed and has been a volunteer for the annual science event ever since. His skill at moderating for the competition and in guiding his volunteer team has earned him many compliments from coaches and their student teams during those years.

Fuller's success prompted Feller to suggest to National Science Bowl organizers that he be invited to officiate at that event as a Science Bowl alumnus. So, Fuller returned to D.C. to help with the National Science Bowl in 2003. He was invited back this spring for the 2004 national competition at which he moderated, served on the question appeals board and presented one of the Saturday Science Seminars.

"The National Science Bowl offers great exposure for the students who attend because it gives them the opportunity to hear from noted experts in various fields," says Fuller. "This exposure suggests that you really can do science, that it really does make a difference, and that there are exciting careers available in science."

Fuller's science seminar targeted the explosive evolution of high-performance computing and the use of cluster computing to more economically achieve supercomputing power. Fuller admits that he made some last-minute adjustments to his presentation when he discovered that he would be in the third round of speakers.

"The students were coming to my talk after having just attended two 75-minute seminars, so I recalled what Cynthia and Saren (Johnston) had said before I left for Nationals about involving the students and getting them to participate in the session," he says. "I had a math puzzle up on the overhead projector when they first came into the room, and that challenged them right away to come up with a solution."



Doug Fuller discusses cluster computing during a Saturday Science Seminar at the National Science Bowl competition in Washington, D.C., earlier this month.

Fuller says he also worked in some breaks for the students to get up and move around and then gave them a very difficult math logic puzzle to work on in small groups during the last 15-20 minutes of the seminar. "They were able to solve it," he says, adding that he was tremendously impressed with the knowledge and skills the students possess.

It seems that turnabout is still fair play, even at a national science competition. At the end of his seminar, one of the students gave Fuller a tough math puzzle, and, yes, he was able to solve it.

Fuller says he's enjoyed his volunteer experiences at the National Science Bowl very much and that he'll definitely return in 2005 if he's invited. "I'm absolutely impressed with the students who attend the competition," he says. "Plus, it gives me the chance to evangelize on computer science." ■

~ Saren Johnston

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won its consolation match 62-48 over Urbandale to set up the rematch. "Obviously, we were saving all our brain power for today," chuckled the Central coach, referring to her team's loss in the previous day's fuel-cell car competition. Urbandale finished third in the academic competition, and Solon was fourth.

Top winners of both the fuel-cell car and academic competitions received trophies. The winner of the academic competition will now represent our region at the DOE's National Middle School Science Bowl, June 17-20, in Golden, Colo. As for the regional competition held at ISU, many of the students made a special point of telling event staff how much they enjoyed their two-day stay. Said the coach from Ordean Middle School in Duluth, Minn., "We'd love to come back." ■

~ Steve Karsjen

As the Boone team discovers, four heads are better than one when it comes to figuring out the answer to a bonus question.

May 2004

THE LINK

IPRT works for Iowa

News from the Institute for Physical Research and Technology

VRAC Hosts International Workshop

Researchers from around the world presented the latest findings in immersive projection technology at a recent conference hosted by IPRT's Virtual Reality Applications Center at Howe Hall. The 8th International Immersive Projection Technology Workshop, held May 13-14, drew more than 100 attendees from a variety of professional fields. It was organized by VRAC and the Fraunhofer Institute of Industrial Engineering, Stuttgart, Germany. The event was successful, says Carolina Cruz-Neira, event co-chair and associate director of VRAC, and provided participants the opportunity to experience and share the most up-to-date achievements in immersive projection technology, both from research and commercial efforts.

Immersive projection technologies rely on computer-generated images and sound to create environments that can be experienced as "real" to users. The technology takes on a variety of forms, from wall-length panoramic screens to room-sized virtual reality theaters. The goal is to "immerse" users in a simulated environment and, in most cases, let them interact with it. Immersive projection technology is being applied across an ever-growing range of areas, including engineering design, virtual prototyping, architecture and art as well as manufacturing simulation, robotics, flight simulation, medicine, scientific visualization and education.

For example, one of the conference's featured speakers, Geoffrey Dorn, executive director of the BP Center for Visualization at the University of Colorado, discussed the state of immersive projection technology and virtual reality in the oil exploration industry. Dorn explained how some applications, such as designing well paths, are making great use of virtual reality.

Attendees of the International Immersive Projection Technology Workshop view a three-dimensional display at an vendor exhibit. The workshop was hosted by IPRT's Virtual Reality Appplications Center in Howe Hall.

However, he also discussed how sociological, economic and technical issues impede upon the widespread use of virtual reality in the energy industry.

During his keynote address, Jose Encarnacao, a pioneer in graphics, interactive systems and virtual reality from the Fraunhofer Institute, highlighted work his research team has done to build an ultra-high resolution, stereo projection wall. The system uses 48 LCD projectors to create an image of 6,104 pixels x 3,060 pixels at a size of five meters wide and two-and-a-half meters tall.

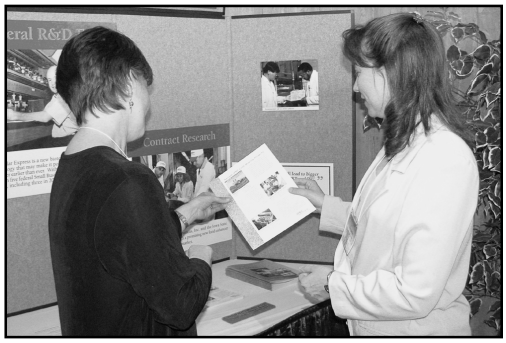
In addition to IPT's guest speakers, individual sessions covered many realms related to immersive projection technology. For example, one presenter outlined efforts to create a multi-viewer stereo display. Another researcher summarized his team's work to build a compact, mobile virtual reality system for office workspaces. Sessions also covered systems, software, user studies, application development tools and interactions. Finally, attendees visited an exhibit area to see the latest display, computing and virtual reality offerings from commercial vendors.

CNDE's Thompson Goes Extreme

R. Bruce Thompson (right) demonstrates nondestructive evaluation techniques to two 8th-grade students at Southeast Polk Junior High while Iowa Governor Tom Vilsack (second from left) and Sylvia Clark (left), executive director of the NEC Foundation of America, look on.

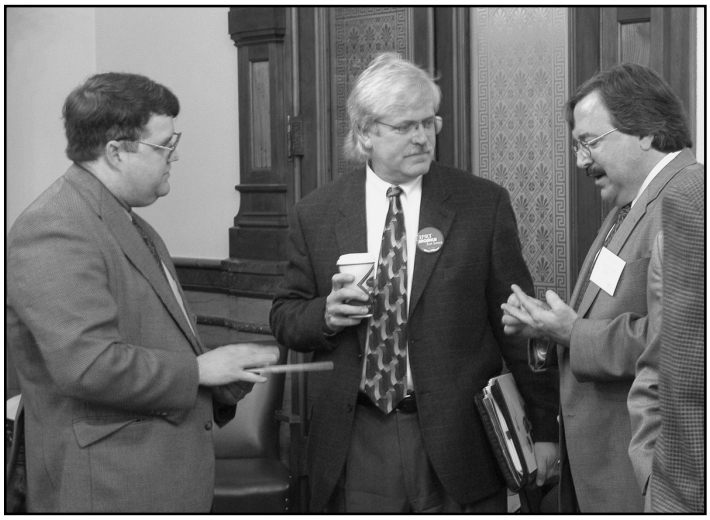
Governor Tom Vilsack and Silvia Clark, executive director of the NEC Foundation of America, recently accompanied R. Bruce Thompson, CNDE director and ISU engineering professor, on visits to Southeast Polk Junior High School in Runnells, Iowa, and Woodrow Wilson Middle School in Council Bluffs, Iowa. The visits were part of NEC Extreme Science, a program organized by the NEC Foundation to bring together middle-school students and teachers with America's most accomplished scientists and engineers to introduce students to the wonders of science and technology. According to the *Council Bluffs Nonpareil* newspaper, Woodrow Wilson 8th-grade teacher Ed Stacy said the visit was a wonderful opportunity for his students to get a firm grasp on science. "With this opportunity, kids are able to get the fact that science is real and is all around them."

Space Chow



Kim Bentley (right), a technology transfer associate with IPRT Company Assistance, speaks to an attendee at the NASA Food Technology Commercial Space Center Symposium held in April. The center is managed by ISU's College of Agriculture; IPRT is a collaborating partner.

Legislative Breakfast...



Carey Novak (right), a technology transfer associate with IPRT Company Assistance, and Craig Shore (left), president of Creative Composites, Brooklyn, Iowa, discuss the company's products with Sen. Jack Hatch of Des Moines during the IPRT legislative breakfast. The March event took place at the Iowa State Capitol to inform legislators about IPRT's economic development efforts. Representatives of seven companies such as Creative Composites explained to more than 60 legislators how IPRT has assisted their company.

...and Lunch, Too

Iowa Rep. Lisa Heddens from Ames (right) makes a point during the Ames Chamber of Commerce annual Legislative Luncheon. Ames Chamber members and five Ames-area state legislators attended the March event held at IPRT.

The IPRT LINK is published four times per year by the Institute for Physical Research and Technology at Iowa State University. Editor: Robert Mills; Photographer: Denny Sailsbury. Please direct newsletter questions and comments to: Robert Mills, IPRT, 111 TASF, Iowa State University, Ames, IA 50011 rmills@iastate.edu.

DOL-DOE Traveling Resource Center to Assist Current and Former Nuclear Weapons Workers in Ames, Iowa

A joint U.S. Department of Labor and U.S. Department of Energy Traveling Resource Center will be in the Ames area during the week of June 21st. Representatives from DOL and DOE will be on hand in Iowa to assist individuals with filing claims under the Energy Employees Occupational Illness Compensation Program Act (EEOICPA).

The program became effective on July 31, 2001, and provides two different types of assistance. Eligibility and benefits differ in each program. The DOL administers the first program, Part B, which provides a lump sum compensation of up to $150,000 and payment of medical expenses to current and former DOE employees and DOE contractor employees who suffer from specific diseases — radiogenic cancers, beryllium disease and chronic silicosis. Qualified survivors of deceased covered employees are also eligible for the lump-sum compensation benefit.

Part D of the EEOICPA, which is administered by DOE, helps DOE contractor employees or their survivors apply for state workers compensation benefits for job-related illnesses caused by workplace toxic exposures. Toxin-related illnesses could include such diseases as: asbestosis, liver disease, nervous system disorders, non-cancerous respiratory or kidney disease, heavy metal poisoning, and certain reproductive disorders.

Iowa is home to three facilities listed by DOE as nuclear weapons producers: Ames Laboratory, Bendix Aviation (Pioneer Division), and the Iowa Ordnance Plant. Ames Laboratory is located on the Iowa State University campus in Ames, Iowa. During the Manhattan Project, researchers at Iowa State perfected a magnesium reduction process, producing pure uranium metal that quickly became the industry standard. Iowa State was one of the first organizations to supply metallic uranium used as fuel for the first self-sustaining chain reaction at the University of Chicago. The Iowa Ordnance Plant, also known as The Burlington Assembly Plant, was built in 1947 as a final warhead assembly plant. Assembly functions that were performed by Los Alamos at Sandia Base in New Mexico were transferred to Burlington in 1949. Burlington continued to perform this work until 1974. The Burlington Plant also made high explosive main charges for nuclear weapons from 1947 to 1974. The Atomic Energy Commission may have also performed weapons modifications, stockpile sampling, new material system testing, repairs, and weapons retirement activities at the plant. In 1974, the AEC closed out its activities at the plant and transferred all functions to the Pantex Plant in Amarillo, Texas.

Workers or survivors who need help filling out claim forms can schedule appointments at the Traveling Resource Center by calling, **toll-free, (800) 861-8608**, or drop in during the hours listed below.

Tuesday — Thursday, June 22-24
8:30 a.m — 6 p.m.

Hampton Inn
1400 Souh Dayton Avenue
Ames, IA 50010

INSIDER

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Address comments to:
Editor, ***INSIDER***
111 TASF
Ames, IA 50011-3020
515/294-9557
FAX 515/294-3226

Address correction requested
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Photographer Dennis Sailsbury

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