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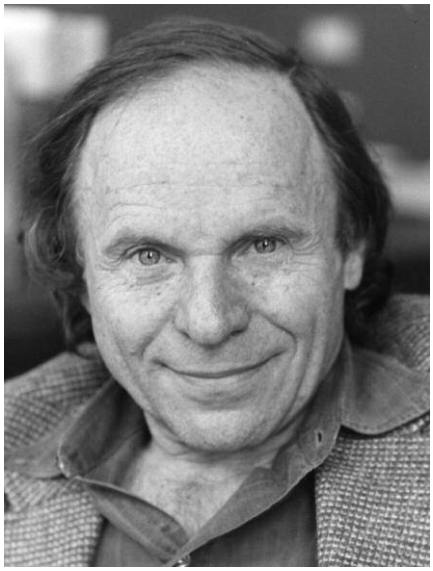
Founder of FAS and Manhattan Project Veteran Dies at 89

By Priscilla McMillan

Philip Morrison, a founder and former President of FAS, died on 22 April 2005 at the age of 89. A student of Robert Oppenheimer before World War Two, Morrison joined the Manhattan Project at 27 and was later professor of physics at Cornell University and the Massachusetts Institute of Technology (MIT). He was a brilliant writer, author of more than 1,500 book reviews for *Scientific American,* and an incandescent speaker on topics ranging from the search for extra-terrestrial intelligence to control of nuclear weapons.

Morrison grew up in Pittsburgh. Stricken by polio when he was four, he was bedridden during much of his childhood and taught himself to read. He loved building radios and hoped to become a radio engineer. But after enrolling at the University of Pittsburgh (later Carnegie Tech, now Carnegie-Mellon University), he discovered theoretical physics. He went to the University of California, Berkeley, as a graduate student in 1936, fell under the spell of Robert Oppenheimer, and became one of the acolytes who stuffed their belongings into a car each spring and followed their teacher to the California Institute of Technology (Caltech).

Those were Depression years and Morrison, sympathetic with unemployed farm workers in California and the Republican cause in Spain, joined the Communist Party in 1936 and remained until 1942. He later said that it was one of his Party duties to deliver evening



AIP Emilio Segrè Visual Archives

lectures on Marx and Lenin at a seedy Loew's movie theater in San Francisco. He received his Ph.D. in 1940 and, after a spell on the blacklist because of his left-wing activity, was hired by the University of Illinois.

He was there, in Urbana, at the end of 1942, when physicist Robert Christy invited him to join a super-secret project at Chicago's Metallurgical Laboratory. It was Morrison's introduction to the Manhattan Project.

Before the war ended he had held so many key jobs in the project that he was probably the single, best-informed witness to the making of the atomic bomb. In 1943, worried that the Germans might get the bomb before we did, he wrote a letter to General Groves, military director of the project, with suggestions as to how the intelligence might find out what the Nazis were up to. He was promptly summoned to Washington, DC, driven to an OSS safe house, and shown aerial photographs of the suspected Nazi installation at Joachimstahl. Even after his transfer to Los Alamos in 1944, Groves, convinced that Morrison's left-wing days, like Oppenheimer's, were behind him, kept him close by flying him back to Washington every few weeks to monitor Nazi

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Journal of the Federation of American Scientists

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About FAS
The Federation of American Scientists (FAS), founded October 31, 1945 as the Federation of Atomic Scientists by Manhattan Project scientists, works to ensure that advances in science are used to build a secure, rewarding, environmentally sustainable future for all people by conducting research and advocacy on science public policy issues. Current weapons nonproliferation issues range from nuclear disarmament to biological and chemical weapons control to monitoring conventional arms sales and space policy. FAS also promotes learning technologies and limits on government secrecy. FAS is a tax-exempt, tax-deductible 501(c)3 organization.

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A House That Pleases Home Buyers, Builders and Environmentalists

By Vicki Wolf

Construction will soon begin on a unique environmental housing project developed by the Federation of American Scientists (FAS) and the Citizens League for Environmental Action Now (CLEAN). The project brings together the scientific resources of FAS, Roger Rasbach's beautiful environmentally-friendly home designs and innovative Houston builders to create a home that is affordable, energy efficient, durable and safe.

"Houston, more than any other city, is desperately in need of low-cost, energy-efficient housing," says Jane Dale Owen, president of CLEAN and an FAS Director. "The Rasbach Provident Home is user-friendly, low-cost and exceedingly durable. Aside from being attractive, these homes will be the most practical in today's marketplace."

Houston is an excellent place to demonstrate that a home can please homebuyers, builders and environmentalists, according to Henry Kelly, FAS president. "Houston's climate presents challenges that must be met in many growing areas around the nation: high air-conditioning bills, safety concerns including resistance to hurricanes and strong storms, mold, termites, and other potential problems," Kelly says. "Houston is the perfect place to take a lead in the energy technologies of the future – technologies that make good business sense to builders, provide real quality for consumers, and a real contribution to solutions for national energy and environmental challenges."

More than a year of planning and testing has gone into the environmental housing project, known as the Rasbach Provident Home. The new home is named after the late Roger Rasbach, a Houston architect who is known for designing homes that harmonize beautifully with their natural surroundings, and are environmentally-friendly and energy efficient.

Rasbach worked with Jane Blaffer Owen and the New Harmony, Indiana, community to build the House of Tomorrow. This house reduced energy use by 50–70 percent over a conventional home; used many recycled materials in construction; is resistant to pests and has structural integrity to last a century or more.

> ***"Houston, more than any other city, is desperately in need of low-cost, energy-efficient housing," says Jane Dale Owen, president of CLEAN and an FAS Director.***

The long list of specifications for safety, efficiency and comfort for this Rasbach Provident Home was developed by FAS for building in developing as well as developed countries. The design and technology of this house:

- Reduces energy use 50-70 percent, compared to a conventionally constructed house
- Can be assembled more quickly than conventional houses, reducing construction costs
- Can be constructed without use of wood
- Is virtually termite-proof, fire-proof and mold-proof
- Does not release chlorofluorocarbons
- Is structurally sound to survive severe storms, hurricanes and earthquakes
- Can last a century or more with minimal maintenance
- Reproducible in other markets, using materials available worldwide, minimal imports, and realistic capital investments in facilities employing local labor

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The Future of the DOE Labs

By Henry Kelly

The Department of Energy's (DOE) system of national laboratories has been a critical part of the nation's security and civilian research infrastructure for more than 60 years. The labs play a key part in the economies of regions where high technology enterprises would otherwise never have existed. But the world in which the laboratories operate has been fundamentally transformed.

Instead of creative rethinking of the role of the labs to face 21st century challenges, we have seen heroic efforts to avoid any fundamental review. Each new scandal leads to another layer in an already thick encrustation of bureau cratic regulation. Pork barrel politics all but requires that funding be maintained for facilities in areas where private investment in high technology is unlikely. In too many cases, the lab's safest funding strategy has been to argue for national security and nuclear missions that justify maintaining the Cold War infrastructure. And poor states are not getting the kinds of spin-off benefits one would expect from such an enormous investment of federal R&D funds because these Cold War missions are least likely to create opportunities for local business development.

Instead of creative rethinking of the role of the labs to face 21st century challenges, we have seen heroic efforts to avoid any fundamental review.

Missing in all this is a basic rethinking of the advantage of government laboratories. What is the comparative advantage of the labs today? Can or should DOE fill a gap left by the decline of major corporate labs? Are they located in the right places, with the right missions, and the best links to academic and corporate interests?

The fact is we really don't know because we haven't seriously confronted these questions. Wasting money and incurring the opportunity cost of misallocating the talents of approximately 30,000 laboratory employees is bad enough. But our failure to rethink the role of the labs is dangerous if missions justified to sustain existing facilities distort national security or energy priorities. We have inadvertently created a powerful lobby for nuclear weapons that has, without question, led to the funding for nuclear weapons facilities far in excess of the investments that would have been made if spending for nuclear weapons were held to the kinds of standards that would be applied if they were an integral part of the Department of Defense (DOD) budget.

A Changed Landscape

The labs, like most great organizations, have a founding legend. The basic story is that during the crisis facing the U.S. at the beginning of the Second World War, some of the world's greatest scientists selflessly gave up promising academic careers and went to remote, secret facilities where they developed – in an astonishingly short time – a weapon so revolutionary that they helped end the war.

This achievement was a tough act to follow – perhaps it never can. But the idea that skilled scientists, working together in the unique intimacy of these remote labs, could save the Republic with a continuing series of spectacular inventions has been an enduring belief and retains enormous emotional and political power. While the founding narrative was essential to the ethos of the weapons labs, it carried over and helped provide the foundation for labs, like the accelerator centers, that did pure physics research. The political support for these facilities depended in no small measure on the implied link between basic research and security breakthroughs established in 1945.

The world has changed while the labs have not. They are saddled with a labyrinthine management system and infrastructure inherited from decades of tinkering but never real reform. The most dramatic change, of course, came with the end of the Cold War and new threats posed by rogue states and non-state actors. The demands of national security and homeland security were transformed with these events and dramatic developments in materials science, biology, information technology and other areas have reshaped scientific research priorities.

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The nation's research and development infrastructure has been transformed with enormous growth in corporate applied research and business-academic research partnerships. One major change is that the private sector has all but abandoned its former laboratory system in favor of focused, specialized facilities and new partnerships with universities and contractors. The legendary private laboratories funded by Bell, GE, Sarnoff, and IBM, which were the source of so many of the great inventions of the 20th century, have either disappeared or been rendered nearly unrecognizable through management changes. Increased defense spending has produced a huge collection of

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U.S. defense contractors offering spectacular R&D capabilities and equally spectacular political clout.

The labs recognized many of these changes and made valiant attempts to diversify into other missions in energy, the environment and commercial technology. Lawrence Berkeley National Laboratory (LBNL) managed to make the transition successfully because it had abandoned all defense research and was located at the edge of a great university. The National Renewable Energy Laboratory (NREL), in a suburb of Denver, had the opportunity to start from scratch and build corporate and university alliances. The Stanford Linear Accelerator (SLAC) has thrived because of its inextricable personnel links to a prominent academic institution, making it a magnet for international talent.

A thoughtful review of the value and missions of the DOE laboratory system is badly overdue.

But most of the other labs have struggled. When the end of the Cold War forced their hands, they developed an ambitious plan of technology transfer. The labs had successfully convinced the nation that they had a treasure trove of spectacular technology locked away behind security fences. They announced their willingness to open this treasure trove to American industry through Cooperative Research and Development Agreements (CRADAs). But, as my colleague Ivan Oelrich points out, when the curtain was lifted and industry allowed to look inside, the result was a near universal "so what?". There was little science in the labs that wasn't already better known to alert American companies.

The lab's ability to react to change has been limited in part by an endless series of self-inflicted wounds. They've endured a cadence of mission changes, mismanagement, new management and contract renegotiations. They've been through years of expensive efforts to cleanup waste in programs that mixed technical priorities with local, state, and national politics in ways that only Lewis Carroll could explain. And they have been plagued by a bizarre series of scandals, including tragic-comic searches for nonexistent computer disks and the disgraceful treatment of Taiwanese-American Wen Ho Lee. Each scandal has been followed by new procedures and top-down, random security rules. But the forces driving these debacles may be a symptom of the irreconcilable contradictions inherent in attempting to perpetuate a 50-year-old national security research model.

The New Rules

Finding the right role for national labs in the 21st century must begin by defining their comparative advantage among research institutions and approaches to research management. When should taxpayers consider sending funds to national laboratories instead of spending the money in other ways? The question of comparative advantage is not the same as asking whether the labs can do first rate research. Of course they can. The deeper question is whether the funding they receive could be used more productively if it were given to corporate and university research teams. A related question is whether federal funding sent to a state like Idaho or New Mexico could create more economic growth and more job opportunities if it were invested in local universities or research partnerships with local firms instead of fenced-off laboratories.

In some areas, the labs have a clear advantage. They are uniquely qualified to maintain large user facilities whose design and operation requires a sophisticated technical staff. This is particularly true when the equipment must be operated in remote locations for security or safety reasons. They can also support research that requires a long-term commitment by large technical teams — something that is extremely difficult to do in an academic setting.

Familiar answers, however, must be rethought in light of changed circumstances. New realities put the labs at a considerable disadvantage in comparison with other research alternatives.

First, it is difficult to house classified and unclassified research in the same facility. Researchers operate at a disadvantage if they are not able to participate freely and fully in the exploding networks of international research conducted through the internet and global grid computing. U.S. research teams are hamstrung if they can't invite foreign colleagues and students to participate in projects on short notice or if their publications face restrictions or delays. The paperwork required to get a non-U.S. citizen into a DOE facility is so horrendous that many researchers choose to meet off-site rather than go through the hassle. Foreign travel for DOE and laboratory staff is often a frustrating, slow and mysterious approval process. Research depends on networks of data and international travel and needed face time with colleagues – methods that depend on openness. Yet classified work at the national labs has become isolated from academic science.

Second, the role of science in nuclear weapons work has changed dramatically. The need to maintain unique weapons laboratories stems from the idea that the maintenance of nuclear weapons requires a special blend of the best scientific minds in the country and a secure facility. In reality, the need for basic science in the U.S. nuclear enterprise has declined as the tasks involved become more like routine engineering. One of the unstated justifications for the expensive devices in weapons labs has always been to lure young scientists to nuclear weapons design teams with the idea that the old band must be kept together in case we return to the glory days of weapons design. This tactic is hard to swallow (and isn't working in any event). Even if the U.S. decides to develop a new generation of "robust" weapons, they will be based on the most conservative and basic models and are unlikely to require the exquisite designs needed to

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squeeze every kiloton of yield out of low weight, low volume devices. In fact, it's likely that scientists with creative (and possibly unreliable) new ideas will be welcome, but in a process that will be dominated by hard-nosed engineering design teams.

Third, while the world is connected electronically, the physical proximity of academic and corporate research personnel and equipment is still important. Places like Silicon Valley in California, Route 128 in Boston, and the Research Triangle Park in North Carolina are legendary because they have reached a critical mass of talent and investment in equipment making it possible for someone with a new idea to assemble a brilliant, multidisciplinary team quickly, and purchase and maintain any kind of equipment. These centers are being duplicated around the world, with ambitious new efforts in China and India.

Fourth, the era when government-funded technology was at the cutting edge is over. The U.S. military must get in line to purchase state-of-the-art microprocessors or gene sequencing equipment developed and sold for commercial markets. Given access to materials, it would be orders of magnitude easier to design a functional nuclear weapon using the basic 1945 designs, than to try to reproduce the technology of an Intel microprocessor plant of 2005. The complex management in place in most of the laboratories may not be compatible with modern research styles — environments that demand fast assembly of corporate and academic teams worldwide, and rapid decision-making. In fact, the labs have lost staff to the commercial sector, which pays better and offers more perks. The best computer people have gone to academia, big companies like HP, gaming companies and web startups such as Netscape.

While universities continue to do the lion's share of U.S. basic research, the bulk of all U.S. research is now supported by industry. Universities are sites of corporate-sponsored research, which then spins off clusters of creative new companies in, for example, biotechnology or optoelectronics. Lawrence Berkeley Laboratory (LBL) has been successful in pioneering many new concepts in energy because it is closely connected to a world-class university and developed ways to draw on the creative talents of businesses in Silicon Valley. LBL is a comparatively small, open facility — an atmosphere difficult to reproduce for labs in remote locations. Pacific Northwest Laboratory (PNNL) has shown it understands this problem by hiring people like Mike Davis who comes from a strong background in business, government, and public labs. But he is the exception, not the rule.

Fifth, scientific and technical development in today's most exciting research areas is difficult to anticipate, requiring an ability to draw quickly on a pool of consultants and equipment. The large, fast-paced commercial research centers are ideal environments for such work. The national weapons design labs, working under difficult bureaucratic constraints and isolated from the forces reshaping most of the rest of U.S. research, have often missed the boat in integrating interdisciplinary teams of specialists and are overstocked with nuclear and other engineers.

The current system does not make the best use of the scarce funding available for the physical sciences, it distorts national security priorities and it fails to make effective use of funds that could be used to promote regional economic growth and job creation.

Finally, labs in remote regions face growing difficulties in attracting young, diverse talent. It's difficult to attract such people to isolated sites when competing offers come from regions offering opportunities for continued education, industrial partnerships and employment prospects for spouses. Working conditions are frustrating as security rules proliferate. Visitors are shocked to learn that they cannot use wireless laptops, personal cell phones or PDAs in many labs. And strong biases imposed by management against researchers born abroad add further difficulty. The result is that such institutions tend to draw much of their new staff from regional and local universities.

Light at the Edge of the Briar Patch

The DOE labs are an essential part of the nation's research infrastructure. Instead of facing up to the key decisions needed to help them overcome a host of new problems and focus on topics where they can play an essential role, 21st century politics has managed only patchwork solutions designed to maintain existing facilities, with existing personnel, in existing locations.

This is understandable since efforts to build federal programs around civilian research objectives have not been noticeably effective unless they are targeted to specific health, energy, agricultural, or other missions (witness the fate of the Advanced Technology Program that was pilloried for doing applied work with corporate partners that would not have raised an eyebrow if it had a national security mission). Since other research organizations cannot compete in producing or maintaining nuclear weapons, weapons research makes a perfect rationale for a core set of labs. This has led to shameless arguments — including the argument that the National Ignition Facility was essential to the U.S. nuclear deterrent. It is a textbook example of the kinds of distortions that creep into national research management if the process starts with the goal of *preserving the status quo* instead of looking clearly at the real research needs of the nation and the kinds of management best matched to the state of the art in today's science and engineering research facilities. The result may be understandable but the inertia is not acceptable.

The current system does not make the best use of the scarce funding available

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The Future of the DOE Labs *(Continued from pg. 5)*

for the physical sciences, it distorts national security priorities and it fails to make effective use of funds that could be used to promote regional economic growth and job creation.

New research programs funded through the Department of Homeland Security (DHS) provided a superb opportunity to reflect on how best to manage new research — but it was a missed opportunity. Instead of contemplating how best to set priorities and manage the research, we've witnessed a frantic scramble for funding using all political methods available. The labs play this game with vigor and, since no one in Washington was in a position to second guess them, did a brilliant job of grabbing funds — often to finance on-going programs.

A thoughtful review of the value and missions of the DOE laboratory system is badly overdue. While some have suggested a process like a "base closing commission," a better approach would be to ask an experienced group of academic, federal and corporate research managers to assess complex research programs and provide concrete advice about how and when the labs can make the greatest contribution (and where they cannot). Given the reality that one of the implicit missions of the labs has been to provide economic stimulus to the areas where they are located, the group could also suggest options for using federal research funding to stimulate economic development in the states and regions involved. They should also provide guidance about the role the labs should play in a badly needed program to strengthen national investment in the physical sciences.

Couldn't we find ways to strengthen research partnerships around the first rate universities in these states that are better matched to today's national research needs?

Confusion about how to combine science and classified engineering projects at labs like Los Alamos has not been helpful. The commission should consider how much basic research can actually be conducted in a classified facility under today's circumstances. And they should consider whether private defense contractors are best suited for managing the applied engineering work that constitutes the bulk of homeland security and national security work — including work on the maintenance of nuclear weapons.

While it might not be possible for the group to make specific recommendations about each major lab, they could at least provide a set of criteria that federal managers should use to restructure these critical institutions.

Couldn't we find ways to strengthen research partnerships around the first rate universities in these states that are better matched to today's national research needs? Couldn't we build organizations eager to lobby for funds that supported the most critical national research priorities instead of clinging onto legacy missions? Can't we find a way to build a stronger constituency for research in the physical sciences and unclassified basic and applied research key to America's economic future?

It is important to get this right. Our failure to face up to this problem of lab management is not only wasteful — it's downright dangerous. ■

The Virtual Patient – An Innovative Training Simulation

By Monica Amarelo

On June 27–28, The Federation of American Scientists' Learning Federation Project brought together educational researchers, medical practitioners and video game developers for a workshop at the University of Maryland School of Medicine in Baltimore, MD, to discuss trends in simulation-based education and training programs in medicine and how best to make these learning systems easier to build.

The workshop, sponsored by Laerdel Medical Corporation and the Microsoft Corporation, will culminate in a research plan for the next generation of medical simulations and how to integrate advanced learning technologies into these systems for instructional use.

According to Kay Howell, Vice President of Information Technologies at FAS and Project Director of The Learning Federation, the workshop marks the first time experts in health education, medical training, information technology and the learning sciences met in a balanced representation from industry, post secondary institutions and federal program managers.

The generation of intelligent patient case scenarios is one of the primary research challenges in designing simulation-based practice and assessment environments. The long-term goal is to generate on-the-fly case scenarios tailored to meet specific learning objectives and personalized to the user. The research plan will define a framework to identify the features of video games and simulations that make them good learning tools and establish guidelines for linking scenario features with individual needs.

The Virtual Patient research plan will borrow from the successful approach of flight and military simulation-based training, as well as from traditional medical education approaches. Workshop participants identified challenges to engage, motivate and reward the student, along with meaningful and frequent feedback and coaching, as key capabilities that are highly desired for future learning systems.

The Virtual Patient research plan, or road map, will be published this fall and will be used to update The Learning Federation's comprehensive research road map for learning science and technology (www.fas.org/learnfed/). ■

Staff Update

Monica Amarelo
Director of Communications

Monica has worked in communications for more than ten years. She was previously employed by the communications departments of the Portuguese-American Leadership Council and the National Association of Home Builders. In 2001, she joined the news and information office at the American Association for the Advancement of Science where, in addition to promoting the association's programmatic activities, she developed the news-briefing program for the newsroom operation and managed more than 1,000 press registrants at the annual meeting. Prior to joining FAS, she was president of a science public relations firm, MAACOMM.

Anne Fitzpatrick
Strategic Security Project Manager

Dr. Anne Fitzpatrick came to FAS from Los Alamos National Laboratory where she served as a technical staff member in the nuclear weapons program and led collaborative projects with counterpart Russian nuclear laboratories and with other science institutions in Russia and Ukraine. Dr. Fitzpatrick received her Ph.D. in science and technology studies from Virginia Polytechnic Institute and State University. She is the editor of a book on the history of computing in the Soviet Union, *The Rise and Fall of Soviet Computing: A Witness' Story,* (in press, ME Sharpe: 2006), and a forthcoming article, "MESM and the Beginning of the Computer Era in the Soviet Union," (in press, *IEEE Annals of the History of Computing,* 2006). She is currently working on a book about high performance computing and the arms race, and an article on Chernobyl.

Steve Stewart
Operations Manager

Prior to FAS, Steve Stewart worked as the Director of Finance and Administration for the American Association of Exporters & Importers and at Reingold, a marketing consulting firm in Washington, DC. He also spent 15 years in leadership positions at an international non-profit organization, and worked for 12 years in the banking industry rising to the position of Chief Operations Officer.

Stephanie Loranger
Biology Issues Director

Stephanie Loranger left FAS in June to join the Nuclear Threat Initiative. While at FAS, Loranger worked on promoting the public understanding of threats from biological and chemical weapons. She also informed biology researchers about federal regulations meant to protect against misuse of their work.

Sarah Mason
Operations Manager

At the end of May, Sarah Mason joined the staff of George Washington University. She will be working at the university while pursuing a graduate degree in fine art and museum exhibits.

Alison Tramba
Housing Technology Project Intern

Alison Tramba is a third year student at the University of Virginia pursuing an undergraduate degree in Systems Engineering and American Studies. In her ten weeks at FAS, she will complete a white paper on the housing project and work with the team constructing the Rasbach model home in Houston, Texas. ■

Board of Directors Meeting – 10 June 2005

The FAS Annual Board of Directors Meeting was held on 10 June 2005, at Smith & Wollensky in Washington, DC. The FAS directors reviewed recent developments and shared thoughts on the future of the organization.

During the official business meeting, the directors voted unanimously to expand the maximum number of Board members from 18 to 25. FAS President Henry Kelly explained that this change to the bylaws was a continuation of the recent merger of the Federation of American Scientists and the FAS Fund.

The directors also increased the scope of responsibilities of the Director of Operations. The board members endorsed new check signing procedures, allowing the operations director the ability to sign checks for less than $500.

The FAS directors welcome Lee Fikes to serve a three-year term as a distinguished member of the FAS Board. Fikes is the President and CEO of the Leland Fikes Foundation in Dallas, Texas, which concentrates on advancing medical research, health services, education, and scientific integrity.

A review of FAS programmatic activities was presented by staff. Mark Schleicher, Learning Technologies Project Manager, provided updates for the Learning Technologies Projects, with specific focus on training against terror with the Mass Casualty Incident Response model. Vice President of the Strategic Security Project Ivan Oelrich gave a brief overview of recent initiatives before introducing Anne Fitzpatrick. Fitzpatrick recently joined the FAS staff from Los Alamos National Laboratory, and spoke to the board about issues regarding nuclear testing. The Housing Technology Project presentation was made by Henry Kelly.

The luncheon keynote, Legislative Director and Chief Counsel to Senator Joseph Lieberman (D-CT) William B. Bonvillian, spoke on how science and technology projects are organized. His comments highlighted the discoveries made in Menlo Park and Bell Labs, and innovations developed through DARPA.

The afternoon focused on the future direction of FAS, with presentations made by Barbara Silby on expanding the vision and building revenue for the association. FAS board member David Foster, provided an overview of his experience working with direct mail campaigns and presented a project to support future development goals. Monica Amarelo proposed several ideas for improving communications between FAS and its various audiences. One new development is the monthly e-newsletter to the Board of Directors.

We thank all of the FAS Board of Directors for their time and continued support, and look forward to working with them throughout the year. ■

FAS in the News

July 22, 2005

An article in the **Christian Science Monitor** featured America's struggle with privacy rights vs. national security in the context of future congressional reauthorization of the Patriot Act. Staff writer Brad Knickerbocker quoted the FAS Project on Government Secrecy, "In the absence of clear guidelines and effective oversight, the U.S. military is becoming increasingly involved in domestic operations, including surveillance activities that blur the traditional distinction between foreign intelligence and domestic security."

July 17

The **Los Angeles Times Magazine** ran a cover story on hybrid vehicles. With oil prices setting records at more than $60 per barrel, our economy supporting regimes that indulge Islamic radicalism, and global warming threatening to turn Orlando into beachfront property, electric automobiles are looking more and more attractive. The article refers back to a report written by Joesph J. Romm for FAS on electric vehicles (EVs). "Since most vehicle use is for relatively short trips, even a relatively modest all-electric range of 20 or 30 miles could allow these vehicles to replace a substantial portion of gasoline consumption and tailpipe emissions."

July 16

Ivan Oelrich, Vice President of the FAS Strategic Security Project, was quoted by **The Kansas City Star** in a story on the history of the first atomic bomb and the future of nuclear weapons programs. Oelrich believes decreasing the U.S. stock to as few as 200 nuclear weapons would deter any country from launching a nuclear attack. "Whenever anybody talks about how we've reduced our nuclear weapons, they're using the Cold War as a benchmark," Oelrich was quoted. "That's ridiculous. Those levels are not relevant today. Today's leaders ought to ask, 'How many do we need?' "

Summer 2005

Issues in Science and Technology featured an article by FAS President Henry Kelly titled, "Games, Cookies, and the Future of Education." The piece examines how advanced information technologies can reshape learning through interactive simulations and offers hope of improving education in the U.S. FAS supports the Digital Opportunity Investment Trust (DO IT) Act which proposes the creation of an independent federal agency to manage the applied research priorities identified by academic and corporate groups.

July 4

Scott Shane of **The New York Times** reported on the sharp increase in the number of classified documents by the government. Driven by fears of terrorism, government secrecy has reached a historic high, with federal departments classifying documents at the rate of 125 per minute. A record 15.6 million documents were classified last year, nearly double the number in 2001. Steven Aftergood, director of the FAS Project on Government Secrecy, sought C.I.A. budgets for 1947 to 1970. A judge gave him only the 1963 budget, because it had already been released. ''I don't know any intelligence professional who says, 'I'll stake my integrity on the need to protect the 1962 intelligence budget." But a C.I.A. spokesman, Paul Gimigliano, said that releasing even old budgets could prove a slippery slope. "The budget remains classified to prevent America's adversaries from piecing together the national security priorities set for the C.I.A.," he said. "This is not secrecy for secrecy's sake."

June 28

The Washington Post reveals that more than 3,300 Congressional Research Service (CRS) reports gathered by the Federation of American Scientists, the National Council on Science and the Environment, the library at the University of Maryland's law school, the Franklin Pierce Law Center in New Hampshire, the National Memorial Institute for the Prevention of Terrorism, and The Center for Democracy and Technology are now available free-of-charge at http://www.opencrs.com. The coveted but elusive reports are produced by a public policy research arm of Congress. CRS, which boasts hundreds of analysts and a $100 million budget, produces hundreds of briefs each year on a wide range of topics.

June 10

Steven Aftergood, director of the FAS Project on Government Secrecy, was interviewed by the **Village Voice.** The feature, titled "Who Loves the Sun?," describes Aftergood as a man who has spent almost 15 years grappling with and defining the many ways the U.S. hides information. The article tells of how Aftergood sued the government to disclose its yearly intelligence budget four times.

June 3

Voice of America featured Hoot Haddock and ThermaSave Homes in a story on the building industry. With 100 million homeless people on the planet and 31 percent of the world's urban population living in slums, the world is facing a housing crisis. And armed conflicts drive thousands of people into refugee camps, where housing is inadequate. ThermaSave Homes manufactures panels of polystyrene foam – better known as Styrofoam – commonly seen in coffee cups. Rachel Jagoda, former FAS Project Manager for Housing Technology, was quoted saying foam houses are a natural for earthquake-prone regions, from the Andes to Afghanistan. FAS thinks the polystyrene technology could go a long way toward solving the affordable housing crisis here in the U.S. and abroad.

June 3

FAS President Henry Kelly wrote a Letter to the Editor that appeared in **The Washington Post** titled, "Bad Time to Limit Research." Kelly commented on the difference between past U.S. policy of increasing federal investment in research and education to meet competitive threats, and today's response of cutting federal research budgets in critical areas. "It's difficult to see that the nation's leaders, who should be reacting to new challenges by strengthening — not cutting — federal research, understand the extent to which our prosperity, security and ability to meet national aspirations for health care and the environment depend on innovation," wrote Kelly. ■

progress. Morrison helped put together the implosion bomb tested in the New Mexico desert in July 1945, and flew to Tinian to assemble the bomb dropped on Nagasaki on August 9. Afterwards he and Robert Serber were sent by Oppenheimer to assess the damage to Hiroshima and Nagasaki. Horrified by the human misery he saw there, Morrison resolved that a major war must never be fought again.

He was a brilliant writer, author of more than 1,500 book reviews for Scientific American, and an incandescent speaker on topics ranging from the search for extra-terrestrial intelligence to control of nuclear weapons.

Upon returning to Los Alamos from Japan, he and his colleagues formed the Association of Los Alamos Scientists (ALAS). The group joined with scientists from Chicago and Oak Ridge to form the Federation of Atomic Scientists (FAS) and successfully lobbied Congress to establish civilian, rather than military, control over the atomic enterprise. Morrison was at the heart of the effort, much sought after as a speaker before Congress and the public.

After the war, he accepted a teaching offer from Cornell University over a comparable offer from Berkeley, in part because he thought his past Party affiliation would be less of a burden at a private college than at a state university, and in part because he did not truly like theBerkeley emphasis on big-machine physics. Even at Cornell, however, he did not escape politics, nor did he try. He voted for Henry Wallace for President in 1948, made frequent speeches about the necessity of avoiding war with the Soviet Union and, on occasion, shared a platform with the black actor and singer Paul Robeson, who was known to be close to the Communist Party. After Senator Joseph McCarthy began his rise in 1950, the Cornell administration, under pressure from its trustees, urged Morrison to curtail his public activities. Morrison tried to comply, but repeatedly overstepped. The university held back from firing him but delayed promoting him to full professor until 1956, when his colleagues in the physics department refused to nominate any other candidate until Morrison had his professorship.Meanwhile, in 1953, he was called before the Senate Internal Security Subcommittee and asked in secret session about Oppenheimer. Morrison took what was called the "diminished Fifth": he was willing to answer questions about himself, but not about anybody else. He thereby chose a path very different from that of Oppenheimer when, in the 1940's, he had named several former students (although not Morrison) as onetime Communists or fellow travelers. The discovery that the man he worshipped had "named names" nearly broke Morrison's heart, and he seems to have struggled with it for the rest of his life.

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In 1964, he moved to MIT and in 1973 was named Institute Professor. He was a much-loved, inspiring teacher and, hoping to empower others by helping them understand science, he and his wife Phylis branched into film. They wrote and narrated "Powers of Ten" with Charles and Ray Eames and, in 1987, produced the six-part PBS series "The Ring of Truth." Even the post-polio syndrome with which he was stricken in the 1980's failed to slow him down and he retained his wide-open curiosity until the end. He kept his optimism, too. His last book, written with his MIT colleague Kosta Tsipis, was called "Reason Enough to Hope." ■

Priscilla Johnson McMillan is an associate of the Davis Center for Russian Studies at Harvard University. Her articles have appeared in the *New York Times, Harper's Magazine,* and *Scientific American.* Her recent book, published in July 2005, is on the history of the Manhattan Project and the Oppenheimer hearing of 1954, "The Ruin of J. Robert Oppenheimer and the Birth of the Modern Arms Race."

Attention FAS Members

In our continuing effort to provide the FAS community with timely articles about national security policy, learning technologies and other areas of science and technology policy, we are inviting members to submit proposals for articles (maximum of 1,000 words).

Selection of articles is at the discretion of the Editor and completed articles will be peer-reviewed.

Please provide us with your full mailing address, including email in all correspondence.

Proposals should be sent to: Editor, *PIR,* Federation of American Scientists, 1717 K Street, NW, Suite 209, Washington, DC 20036, or to press@fas.org. ■

One of the features of the Rasbach Provident Home that makes it unique, energy efficient and easy to build is the structural insulated panel technology called Thermasave panels. The panels have an expanded polystyrene (EPS) core with cement coating. The Thermasave panels have passed rigorous test requirements established by the Uniform Building Code, which dictates standards for building in the United States. The Federation of American Scientists (FAS) also conducted additional tests that confirmed structural and fire safety under extreme conditions. The panels are solid with no space or cavities for mold or decay to develop.

"Houston's climate presents challenges that must be met in many growing areas around the nation: high air-conditioning bills, safety concerns including resistance to hurricanes and strong storms, mold, termites, and other potential problems," says Henry Kelly, President of FAS.

Energy efficiency is one of the outstanding features of Rasbach Provident Home. "The building is so energy efficient – it's like an Igloo cooler with walls six inches thick and roof ten inches thick," says Joe Ecrette, building contractor on the project. Most conventionally built homes need one ton of air conditioning for every 400 to 500 square feet. According to Ecrette, the Rasbach Provident Home needs only one ton of air conditioning for every 1,000 square feet.

Pre-assembled panels make the home quick and easy to build for significant savings in construction costs. With foundation in place, a 1,500 square foot home takes three to four workers and less than a week to assemble.

In addition to the special construction of the house, the project brings in new technology for saving resources and energy costs. "Top scientists in the country have been analyzing the plumbing system, water heating, air conditioning, duct work layout, electrical system and lighting technology to make overall efficiency of the operation of the house remarkable," Ecrette says.

For example, roof systems reflect heat, rather than absorb it; double-pane windows save energy; and a technologically advanced heating and air conditioning system provides optimal indoor air quality with minimal energy costs.

In conventional homes, the water has to run for several minutes before hot water is available, and more than a quart of water can be wasted with every shower or bath. The water heating system of the Rasbach Provident Home will deliver hot water to the shower in seconds rather than minutes and saves money, energy and water. "The house will have an instant water heating source," says Henry Grissom, architect who is adapting the Rasbach design for this project. "No hot water tank will be used. When you turn on the tap, the heating source comes on to heat the water," he adds.

Grissom says the energy-efficiency of this home will reduce energy costs so that low-income home owners are less likely to default on their loan payment. Up to 30 percent of low-income homeowners default on home loans because they cannot afford to pay both the utility bills and the monthly mortgage payment.

FAS and the team building the Rasbach Provident Home will work with the U.S. Department of Energy's Building America program and the Department of Housing and Urban Development's Partnership for Advanced Technology in Housing program to monitor costs, energy use, indoor air quality and other characteristics of the home as part of an ongoing research project to study and design the best housing technology for environments in the United States and around the world.

Henry Kelly says. "Houston is the perfect place to take a lead in the energy technologies of the future – technologies that make good business sense to builders, provide real quality for consumers, and a real contribution to solutions for national energy and environmental challenges.

"We will have hard-headed proof that you can build a safe, energy-efficient home that is entirely affordable," says Kelly, FAS president. "This is an approach that will make perfect sense to the construction industry, and should make environmentalists and home buyers happy."

In addition to being an incredibly sensible, safe and efficient house, Kelly adds that it will be a very lovely place to live. "You will want to move into this home," he says.

The Rasbach Provident Home is being built at 205 Payne Street in Houston as a demonstration of this energy efficient, environmental-friendly technology. The cost of this house is expected to be around $70 a square foot with amenities that make it comparable to homes in the neighborhood. Cost for building a home with the same technology and construction can be as low as $50 a square foot, depending on amenities and décor. Construction is planned to begin in August. ■

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