

# Celebrating the Life and

**E**MPLOYEES, retirees, and friends of Lawrence Livermore gathered earlier this year to celebrate the achievements of one of the Laboratory's pioneering scientists and greatest leaders. Recognized for six decades by presidents from Dwight D. Eisenhower to George W. Bush, Johnny Stuart Foster, Jr., was honored during a celebration on January 24 marking his 90th birthday, which occurred four months earlier on September 18, 2012.

In hosting the daylong celebration, Director Parney Albright called the Laboratory's fourth director "one of the truly great leaders of our nation" and "one of the founding and continuously guiding fathers" of Lawrence Livermore. Albright thanked him for a lifetime of contributions to the Laboratory, including counseling every succeeding Livermore director. In recognition of Foster's 70 years of service to the nation that established an unparalleled level of technical credibility, Director Albright announced the establishment of the Johnny Foster Medal for outstanding contributions to national security.

## Ernest O. Lawrence Protégé

A protégé of Livermore cofounder Ernest O. Lawrence, Foster is widely respected for his frank, impartial, and perceptive advice to national leaders covering a broad range of defense issues. One of the earliest physicists to arrive at the Laboratory from the University of California (UC) Radiation Laboratory in Berkeley, California, Foster was the first leader of Livermore's B Division (the group that focuses on the nuclear weapon's "primary" or so-called nuclear trigger). He later became director of the Laboratory in 1961. Foster wrote several classified technical papers during his Livermore career that remain the foundation of the entire U.S. nuclear deterrent. The September 1962 issue of *LIFE* magazine named him one of the 100 most important young men and women in the nation. In 1965, Foster was named director of Defense Research and Engineering for the Department of Defense, serving for eight years under former presidents Lyndon B. Johnson and Richard M. Nixon until 1973, when he became a vice-president of TRW, Inc.

After retirement in 1988, he joined the boards of directors of a number of corporations. Today, Foster is a member of several defense-related advisory committees and task forces. He also remains active as a national security consultant and continues to advise the Laboratory's senior leadership and technical workforce. He has won many awards for service to the nation, among them the E. O. Lawrence Award, the James Forrestal Memorial Award, three Department of Defense Distinguished Public Service Medals, the



Former Laboratory Director and long-standing national security adviser Johnny Foster, Jr., addressed friends and colleagues at a day celebrating his 90th birthday and a remarkable career.

# Contributions of Johnny Foster

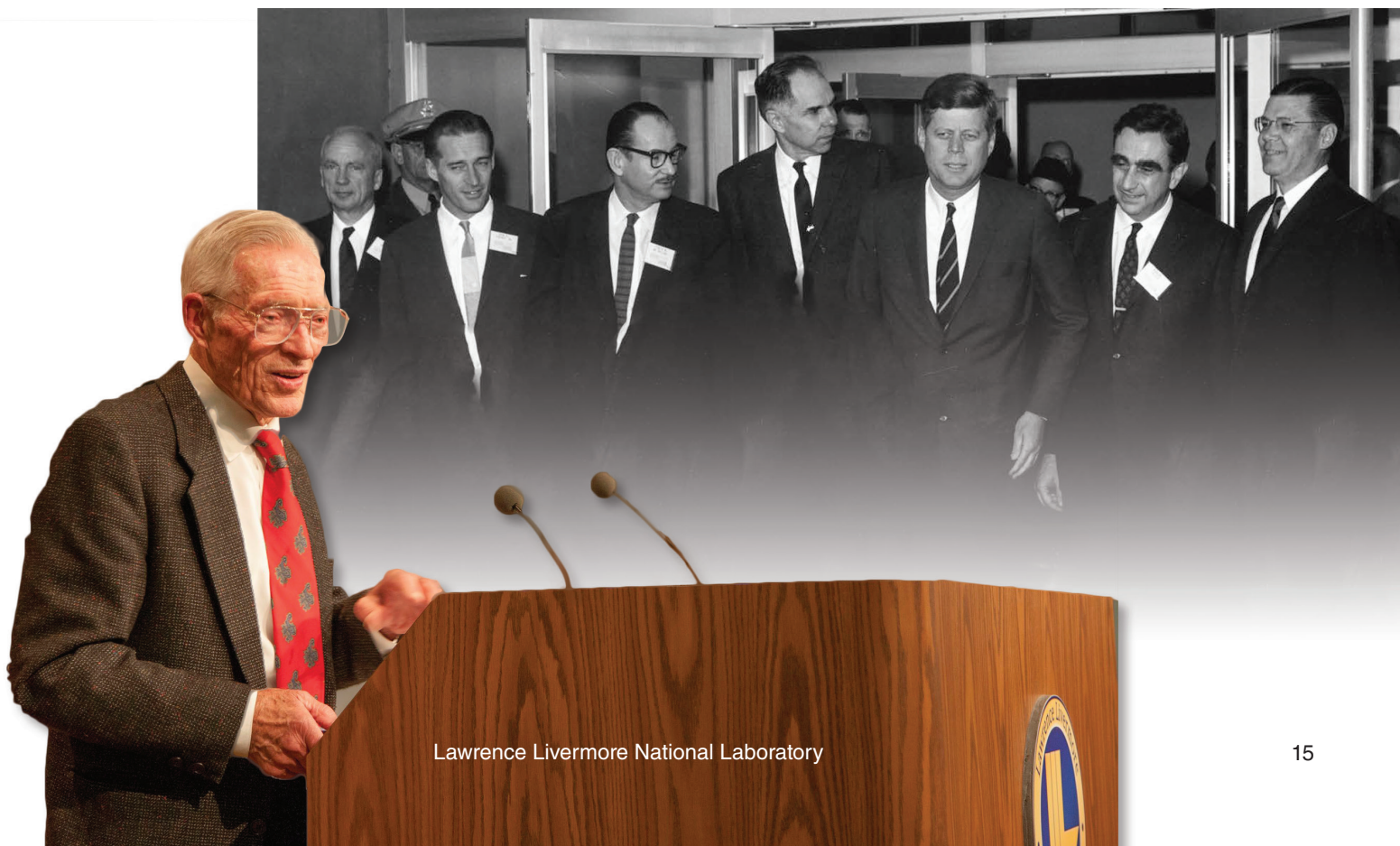
Founders Award from the National Academy of Engineering, the Enrico Fermi Award, and the Department of Defense Eugene G. Fubini Award.

## Celebration Comprised Two Main Events

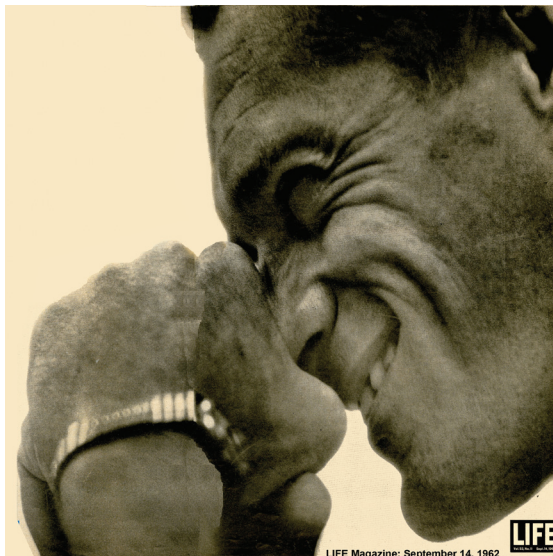
The first event of the day began with a roundtable discussion of technical challenges for Livermore's early nuclear weapons program and current national security challenges. (See the box on p. 17.) A second afternoon event honored Foster's lifetime of leadership with notable speakers that included Ellen Tauscher, former congressional representative and Under Secretary of State for Arms Control and International Security; Harold Agnew, former director of Los Alamos National Laboratory; Miriam John, former vice president of Sandia National Laboratories; and Mike May, Bruce Tarter, and George Miller, former directors of Livermore. A prerecorded tribute by U.S. Air Force General (Retired) Larry Welch of the Department of Defense was also played. Finally, Foster discussed his experiences as scientist, Laboratory director, and adviser and shared his thoughts about the Laboratory's and the nation's future. Between the morning and afternoon events, Foster met with young Livermore weapons scientists.

"Johnny was instrumental in shaping the Laboratory as we know it today," said Miller. "He helped create the focus on technical excellence, innovation, and critical thinking that characterizes the culture of the Laboratory." This culture, Miller suggested, reflected what Foster learned at Berkeley under Professor Lawrence. They worked on technically risky but highly important programs and "established an informal management

Foster recalled the formation of a Livermore branch of the University of California Radiation Laboratory in Berkeley. (The Radiation Laboratory was later renamed the Ernest O. Lawrence Radiation Laboratory after the death of Lawrence in 1959.) In the background is a photo of a historically significant 1962 visit to the Berkeley site by President John F. Kennedy. The visit included (from left) Norris Bradbury, director of the laboratory in Los Alamos; Foster, director of the Livermore site; Edwin McMillan, director of the Berkeley site; Glenn Seaborg, chairman of the Atomic Energy Commission; President Kennedy; Edward Teller, cofounder and former director of Livermore; Secretary of Defense Robert McNamara; and Harold Brown, director of Defense Research and Engineering (not shown).







(top) The September 14, 1962, issue of *LIFE* magazine was devoted to "One Hundred of the Most Important Young Men and Women in the United States." (bottom) *LIFE* selected Foster as one of them. (Courtesy of *LIFE*.)

style based on competence and trust and teams of scientists and engineers."

Miller pointed to Foster's "extraordinarily broad" national security interests and noted that under Foster's directorship, the Laboratory's inertial confinement fusion, biology, and intelligence programs were born. "The breadth of his knowledge and his expertise in the national security arena have made him an invaluable asset to policy makers in Washington, led to his appointment to leadership positions in the Department of Defense, and later recruitment by industry," Miller said. "His technical accomplishments are remarkable, and his words ring as true to me today as they did more than 40 years ago. He continues to be an inspiration to all of us."

May said, "Johnny and his colleagues essentially revolutionized the way the U.S. stockpile would look from then on, in particular the SLBM [submarine-launched ballistic missile]." May noted that B Division always remained "Johnny's pride and joy. I learned more about leadership from Johnny than I have from anyone else. He knew how to motivate people so they contributed more than they ever knew they could contribute. Above all, he has never lost his faith and his belief in the Lab's mission and its importance."

### Competing with Los Alamos

Agnew declared, "The best thing that ever happened to LANL [Los Alamos National Laboratory] was the founding of Livermore." He explained, "We were fat and sassy. We thought we knew everything. All of a sudden, we realized we didn't when Livermore, Johnny, and his compatriots started to compete."

Agnew recalled a historic meeting in 1956 to discuss the U.S. Navy's desire to arm its submarines with ballistic missiles but of a much smaller size than land-based missiles. At the meeting, both Los Alamos and Livermore leaders gave presentations on what they considered possible for meeting the Navy's requirements. Livermore cofounder Edward Teller presented an imaginative solution that Los Alamos scientists did not consider feasible. However, Foster, along with his A Division counterpart and future Laboratory Director Harold Brown, helped turn Teller's concept into reality by leading an intense development effort at the young laboratory that produced a warhead suitable for the Navy's Polaris submarine fleet.

"That was the beginning of the Navy's nuclear deterrent program," said Agnew. "It was Johnny who ran with the ball, and that really shook up things at Los Alamos and changed the attitude there about how one would design future warheads."

John noted that Foster was instrumental in starting Sandia's California facility. In the mid-1950s, Foster was making regular 12- to 15-hour trips to Sandia's headquarters in Albuquerque, New Mexico. He suggested as an efficiency measure that managers

send some Sandia people to Livermore where they could use the empty barracks across the street from Lawrence Livermore as an “initial base camp.” Within three years, the first contingent of about a dozen Sandia people had grown to 1,000 people working in Livermore.

### Never Stopped Learning

In a videotaped message, General Welsh recounted his first meeting with Foster 45 years ago, when Welsh was a young major. In discussing a proposed aircraft development program with Foster, Welsh said, “I probably learned more in 1 hour than in the previous 10 years.” He also noted, “Foster was relentless about the need to examine your assumptions, look at programs to see what

you had missed and what could go wrong that you hadn’t thought of.” Over the years, Foster became the “go-to person” for difficult defense-related problems. “He never stopped learning, he never stopped digging, and he never stopped giving great advice. Dr. Johnny Foster is a great American. He’s a great leader, and he’s a great friend.”

Calling him “the world’s greatest single-person red team [experts providing an impartial review of a system or strategy],” Tarter described Foster’s arguments as “always persuasive, often forceful, but never strident and never apocalyptic.” Tarter, who led the planning for the event, wrote in an invitation to employees, “To understand where we’re going and understand the enduring spirit of the Lab, it is important to know where we came from. Johnny

### Reuniting B Division Leaders

The morning session celebrating Johnny Foster featured a roundtable that reunited 9 of Livermore’s 10 living B Division leaders. (See the photo at right.) The wide-ranging discussion covered key weapon-design challenges during Livermore’s formative years as well as issues current scientists face in keeping the nation’s aging nuclear forces reliable, safe, and secure. Bruce Goodwin called Foster “my number one technical hero.” He added, “There were three technical ideas that transformed nuclear weapons, that miniaturized nuclear weapons, and they came from this Laboratory, and Johnny wrote those papers.”

The impact of those papers, said Michael Anastasio, was “the validation of Lawrence Livermore as a real nuclear weapons institution.” What’s more, all the modern features of nuclear weapons were invented, developed, and demonstrated by “Johnny and his team” in the early to mid-1950s. “If you think of the tools they had available to them, it was pretty remarkable they were able to achieve what they did, but the inspiration came from Johnny himself,” Anastasio said.

Participants also credited Foster for inspiring efforts to develop safety features into warhead designs that make it nearly impossible for a nuclear detonation to occur if a weapon is dropped or fired on. Anastasio added that one of Foster’s greatest achievements was mentoring several generations of weapons scientists and leaders, and he counted himself one of Foster’s many disciples.

In later reflections on the day honoring Foster, Mike Dunning noted that at the age of 90, Foster still consults on special projects for Livermore’s Weapons and Complex Integration Principal



A morning session featured a roundtable that reunited 9 of the 10 living B Division leaders. (from left) Foster was joined by Michael May, former director of Livermore; Richard Wagner, former assistant to the Secretary of Defense for Atomic Energy; George Staehle; Steven Cochran; Michael Anastasio, former director of Lawrence Livermore and Los Alamos national laboratories; Bruce Goodwin, associate director at large for National Security Policy and Research; Charles McMillan, director of Los Alamos; and the moderator Mike Dunning, current B Division leader.

Directorate and B Division. “It’s like he’s part of our team,” he said. “Johnny remains a very inspirational figure.” As an example, during the day Foster found time to meet with early-career weapons scientists, who “came out of the meeting glowing,” Dunning reported.

Foster is emblematic of the spirit that put Livermore on the global map. We owe him a debt of gratitude.”

In 2008, Tarter was a member of a group charged by then Congresswoman Tauscher, chair of the Strategic Subcommittee of the House Armed Services Committee, to write a report on the future of the nation’s strategic weapons. Tarter recalled that Foster was instrumental in helping the politically divided group reach consensus.

For her part, Tauscher called Foster “Indispensable Johnny on the Spot.” She said, “You and your name have become synonymous with credibility, honesty, integrity, and just being the best.” Tauscher also recalled Foster’s key role in working across partisan lines to produce the strategic future report, which served as a “primer” for the most recent Department of Defense Nuclear Posture Review.

### Belonging to the “Lawrence Family”

Clearly moved by the day of accolades and warm thanks for a career spanning seven decades, Foster remarked, “The day has been total immersion for me, and I’m humbled, and I don’t know how to handle it.”

Following military service in World War II, where he worked on radar countermeasures, Foster joined the UC Radiation Laboratory (now Lawrence Berkeley National Laboratory) as a graduate student under Professor Lawrence. At the Radiation Laboratory, he spent most of his time building accelerators used to discover new subatomic particles, nuclear isotopes, and nuclear interactions. “These folks were shaking the tree of knowledge, and the isotopes were falling down in droves,” he said.

Foster recalled the Radiation Laboratory employees as being “one big family.” As head of the family, Professor Lawrence noticed one day that Foster was riding a motorcycle and ordered him to get rid of it because he had gone “too many mean free paths [the average distance a moving particle or molecule travels between collisions].” Foster said that many of the characteristics that make Lawrence Livermore unique, such as following the matrix management approach (forming collaborative teams of physicists, chemists, engineers, and others), were inherited from Lawrence and his Berkeley laboratory.

The decision to start a second nuclear weapons lab had followed several years of controversy over whether to have a competitive weapons laboratory. Lawrence and Teller decided to site such a lab at an abandoned naval air base in Livermore and organize it as a branch of the Radiation Laboratory in Berkeley. In 1952, Foster was among the first group of scientists to arrive from Berkeley. The fledgling scientific group, which included first Laboratory Director Herb York, May, Teller, and others, was charged with

taking nuclear design approaches different from those adopted by Los Alamos.

Foster said, “The Livermore Lab was established in the midst of a heated political and military controversy and always faced the threat of being shut down, and that helped provide the incentive to perform so well.” In fact, the first two tests of a Livermore warhead, a novel but risky design, were embarrassing failures. However, within a few years, the new laboratory was deemed a worthy competitor to Los Alamos, and many of Livermore’s design breakthroughs are still reflected in the current U.S. strategic arsenal. Foster refused to take major credit for those successes. “A lot of people had a hand in those projects, and their successful execution was because of the hard work of dozens and in some cases thousands of people.”

In discussing the Laboratory’s pioneering contributions to the nation over the past half-century, Foster mentioned advances in many fields of science and technology. As examples, he cited controlled thermonuclear reactors, the magnetic mirror concept for fusion energy, ballistic missile defense, defensive weapons using high-energy particle beams, x-ray lasers (the only weapon condemned by a Russian leader, he noted), Brilliant Pebbles (the center of the Strategic Defense Initiative that helped lead to the Soviet Union breakdown), the Clementine mission to the moon, Project Plowshare (clean thermonuclear explosives for civilian applications), ultrahigh-power and energy lasers, communication with submerged submarines, computer modeling of Earth’s weather patterns, supercomputer efforts, underground nuclear power reactors, and computer-aided design.

Looking to the future, Foster said, “It should be the responsibility of the leaders of this Lab to accept the burden of the initiative to stimulate the Laboratory to come up with game-changing innovations in science, technology, processes, and products.” He commented, “Life is tough. But we all remember what the tough characteristically do when the going isn’t easy. It’s up to you to help the folks in Washington, D.C., to improve processes and see the relevance of what we do for national security.” He added, “The Lab must use its record of accomplishments to continue attracting the best and the brightest.”  
—Arnie Heller

**Key Words:** B Division, Ernest. O. Lawrence, Johnny Stuart Foster, Jr., Lawrence Radiation Laboratory, Los Alamos National Laboratory, Nuclear Posture Review, nuclear weapons, Sandia National Laboratories, University of California (UC) Radiation Laboratory.

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