



Winifred and Robert Gardner Sr. (BS '36).

Robert Gardner graduated from Caltech in 1936 and went to work in the oil industry, but in the 1950s he finally found what he really wanted: a hard problem to solve. He learned that rocket scientists needed manufacturers to customize a particular part (also used in the oil industry)—a corrugated, extendable and compressible tube called a metal bellows, which helps keep fluid lines sealed throughout the shaking, vibration, and temperature changes that occur during rocket launches and space travel. Scientists hoped to describe the mission conditions they anticipated and get a one-of-a-kind product that would perform perfectly with very few test runs.

Gardner felt that manufacturers were

A Caltech-Trained Problem-Solver is Honored by His Family

working by trial and error, with poor forecasting methods. Therefore, he developed analytical techniques to predict how each design parameter and operating requirement would affect performance, so that, with the right inputs, the first prod-

Gardner Bellows, she likes to say, “we wouldn’t be on the moon without Bob,” also sharing that the company’s specially designed bellows are a component in NASA’s Mars rover Curiosity.

“He was a problem-solver,” says his

“My contributions have been in appreciation of Caltech’s part in helping me develop my potentialities.”

uct off the line would work. He established Gardner Bellows Corporation in 1958, the year of NASA’s founding. The company developed bellows for all of the Apollo program’s three-stage launch vehicles. Each expendable stage was composed of engines that provided the millions of pounds of thrust necessary to transport a spacecraft module—sitting atop its launch vehicle—into space and ultimately to the moon. A continual stream of new challenges kept him working until the week before he passed away, in 2009. Gardner’s wife, Winifred, is proud of what her husband accomplished. When her friends ask about

daughter, Mardi Sossaman. She remembers him creating seemingly easy fixes for thorny scenarios. “That came from his schooling at Caltech,” she observes.

Her brother, Bob Jr., agrees. “His *Caltech-Trained Problem-Solver, continued on page 4*



Winifred Gardner, Mardi Sossaman, and Robert Gardner Jr.

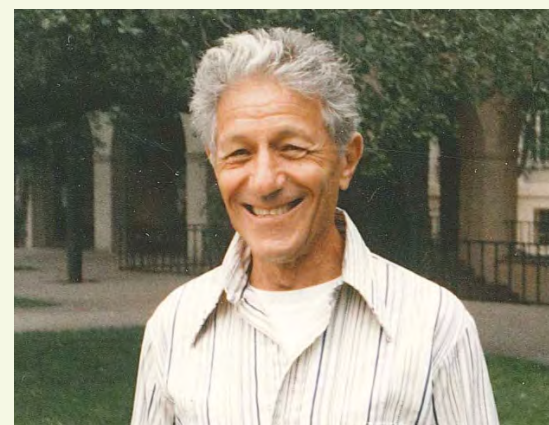
Caltech Legacies

Robert Abbey had many passions. He loved exercise, doing 75 push-ups a day at age 75 and skiing throughout his 80s. He traveled the Middle East and South America. He loved to dine out and dress down. He loved muscle cars and took friends in his retirement home out in a Mustang with zebra-striped seats. Yet amid these vivid pursuits, it was his modest, enduring love of science that ensured Abbey’s legacy.

As president of his high school science club, Abbey attended Watson lectures at Caltech. When life took him to UCLA and a career at Standard Oil, he stayed involved with Caltech and supported Summer Undergraduate Research Fellows. He saw Caltech as a place that

benefits society, and he held that it would find a cure for cancer and generally help people. Abbey created a bequest to Caltech that endowed a professorship after his passing in 2007.

Today, Robert M. Abbey Professor of Physics, Applied Physics, and Biological Engineering, Michael Roukes, invents nanoscale tools to advance medicine, brain science, and bioscience—work for which he recently won a National Institutes of Health Director’s Pioneer Award and the Chevalier de l’Ordre des Palmes Académiques from the Republic of France. As the Abbey Professor, Roukes built the first mechanical device that can measure the mass of molecules one at a time. Future instruments based



Robert Abbey.

on the same concept could help doctors monitor patients’ immune systems and diagnose certain cancers and diseases.

If the first few years of the Abbey Professorship—an endowment managed to last forever—hint at its future, Robert Abbey’s quiet love of science will bring about great benefit to humanity.

Torchbearers Gather at Caltech

A strong turnout—more than 60 of the 300 Torchbearers of Caltech—made for lively conversations and connections at the first annual Torchbearer Appreciation Luncheon. Held at the president’s home on April 27, the event featured a talk by John Eiler—the Robert P. Sharp Professor of Geology and professor of geochemistry—who shared his new method of learning about natural things by analyzing the distribution of isotopes in organic molecules, work celebrated for its potential impacts on fields ranging from geobiology to medicine. McLean Scholar, Katja Luxem, energized the crowd with stories about her work in India as a student in Caltech’s course on product design for the developing world.

Torchbearers help the Institute provide excellent resources for its outstanding scientists and students—people like Eiler and Luxem—with the result that Caltech is a leader in world-changing achievement. The Torchbearers of Caltech includes alumni and friends who support Caltech through planned gifts of any kind, from provisions in their wills to real estate gifts to charitable gift annuities that provide life income. These gifts make up a substantial portion of private contributions to Caltech—crucial, flexible funds to support pioneering educational and research efforts.

Obtain details on next year’s luncheon, tentatively scheduled for April, or on the Torchbearers of Caltech by contacting giftplanning@caltech.edu or (626) 395-2927.



Left: Michael Mann (BS '60, MS '61). Right: John Wimpres (MS '48) and Jain-Ming "James" Wu (MS '59, PhD '65).



Carla Lowinger, Frederic Selleck (BS '49), and former president Jean-Lou Chameau.



Jim Ehlers, Thomas Tyson (BS '54, PhD '67), and Alice Tyson.



Left: John Eiler, Robert P. Sharp Professor of Geology and professor of geochemistry. Right: Katja Luxem (class of 2014).



Lynn Glover Jr. (MS '64), June Glover, and Oliver Mueller.



June Fee and Doreen Mason.



Lynn Fulmer, Malcolm Cloyd, Stephen Toner (BS '79, PhD '87), and Ritsuko Toner.

Secrets of a Would-Be Philanthropist

Anyone might daydream about becoming a philanthropist and making an impact many decades into the future. But is that nothing more than a fantasy for those with relatively modest means and a family to consider? Most might think so, but Caltech's gift planning staff knows otherwise. They use their knowledge of planned giving tools to help people support education and research that can change the world, working in person with those who live in greater Los Angeles as well as many other cities, and by phone with other potential givers.

One planned giving supertool goes by the name "charitable remainder unitrust." Donors make a gift to Caltech by creating such a trust and funding it with real estate, stocks that have gained value, cash, or other assets. They receive an immediate income tax deduction for the present value of Caltech's remainder interest in the trust, and they save capi-

tal gains taxes on any appreciated assets they put in the trust (these tax benefits help explain why such trusts are irrevocable). Then the trust, which is overseen by professional investment managers, pays donors and their family members or other designated beneficiaries an annual income for life or for a set term of years. Payments are a fixed percentage of the trust's annually adjusted net fair-market value, starting at 5 percent. Donors can make additional contributions that can trigger new income tax deductions, capital gains savings, and increases in the size of payouts. At the end of the beneficiaries' lives or the trust's set term, the remainder passes to Caltech.

This kind of trust is just one of the tools that fantasy philanthropists can use to transform into real ones—people who help Caltech carry out its work to educate future leaders, expand knowledge, and benefit society.

Recognize This Alumnus?

This alumnus almost chose a different path in life before he discovered that Caltech interested him. He

planned to attend MIT, but his grandfather, a Caltech faculty member, suggested that he consider Caltech as well. He did and was intrigued by the opportunity to explore a wide mix of disciplines and to enjoy Caltech's high degree of interaction.

A born explorer, he finished a BS, MS, and PhD at Caltech in physics (1951), mechanical engineering (1952), and electrical engineering (1962), respectively—following his diverse interests, but accidentally preparing himself perfectly for his five-decade career in cryogenics. He spent several years as an assistant professor at Caltech. During his tenure, he spent a year as a visiting professor at the Indian Institute of Technology in Kanpur, India, developing the first ultralow temperature laboratory in the country. He later moved to the Jet Propulsion Laboratory, where he developed experiments and technologies for astrophysical detectors that work in space at a fraction of a degree above absolute zero. After retiring, he became a visiting associate, working on cryogenics for instruments that detect the universe's most ancient light.

Beyond serving as his base camp, Caltech became a core component of his personal and philanthropic life. At JPL he met Bernadette, his first wife and the mother of his five children. After she

passed, he later met Doreen, his current spouse, while on the board of the Caltech Y. Every week, he hits the Caltech track, where he raced 60 years ago. He is a life member of the Alumni Association and has served as its president. He and Doreen enjoy activities with the Associates and the Torchbearers—recently attending the Torchbearer's luncheon (see "Torchbearer's Gather," left). They have contributed to areas that inspire them, supporting Caltech's astronomical observatories, a graduate fellowship in global environmental science, and improvements to the South Houses and the Athenaeum. When they inherited stocks from his father, they quickly established a charitable remainder unitrust (see "Secrets," above), ensuring an income tax deduction, capital gains tax savings, a lifetime income, and—most important to them—a flexible gift for Caltech.

This alumnus chose to put no restrictions at all on Caltech's use of that gift. He wanted to help Caltech respond to interesting possibilities as they arise. With his own life so well served by that policy, "that's the way to go," says **Peter Mason**.



Photo courtesy of Big T.

Torchbearers of Caltech

In recent months, Caltech has added 20 new members to the Torchbearers Honor Roll:

Don L. (MS '59, PhD '62) and Nancy R. Anderson

Frank L. (BS '80) and Jane F. Bernstein

Philip L. Coleman (BS '66)

R. Dysart (BS '53, MS '54) and Patricia A. CoNine

Winston Garth

S. Joseph Poon (BS '74, PhD '78)

John G. Price (BS '60)

Jeffrey D. Pugh (MS '84, PhD '88) and Jennifer E. Stern (PhD '88)

Charles R. Quick Jr. (MS '74)

Benjamin (BS '54) and Donna Rosen

Thomas P. (MS '68, PhD '77) and Elizabeth A. Santoro

Luojia Wang (PhD '97) and Cathy Zhu Steven W. Wicklund

Five Torchbearers wish to remain anonymous.

Estate Gifts

The generosity and foresight of alumni and friends is crucial to Caltech's success. Below are just a couple of the many individuals who have supported Caltech through estate gifts.

L. Ivan Epstein (BS '40, MS '41) provided for the Institute through an unrestricted bequest of \$25,000.

From the estate of **Robert L. Peeler (BS '48)** Caltech received a bequest totaling \$3,225,500, which will establish the Robert and Amelia Peeler Scholarship Fund.

Contact Us

Techniques is published by Caltech's Office of Gift Planning. For more information about the stories featured in this issue or for questions about deferred gifts, please contact the Office of Gift Planning:

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Caltech-Trained Problem-Solver

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Caltech background is really the basis of the company. He could analyze these bellows structures where literally nobody else could. He was just better at that than anybody. The engineering of this particular product happens to be very difficult. He did his Caltech thing and just made it work.”

Bob Sr. himself credited Caltech for his success and made an effort to support and reconnect with his alma mater when the company was well established and he had more free time. He and Winifred joined the Associates and came with Bob Jr. to as many campus events as they could. They celebrated his 95th birthday at the side of then president Jean-Lou Chameau at an Associates Garden Party. And they worked with Caltech development staff member Mark Reinecke to endow the Robert I. (BS '36) and Winifred E. Gardner Scholarship Fund and the Robert I. and Winifred E. Gardner SURF Endowment, relishing conversations with the students who benefited from them. They also contributed to the renovation of Fleming



Bob Jr. and Bob Sr. during the early stages of developing a new bellows.

House (where Bob could still point out his room). In recognition of their generosity, the house's computer room was named in their honor. In a letter to Mark, Bob said, “My contributions have been in appreciation of Caltech's part in helping me develop my potentialities.” After Bob Sr. passed away, Winifred endowed a second named scholarship.

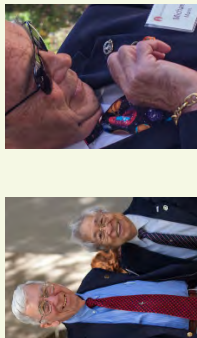
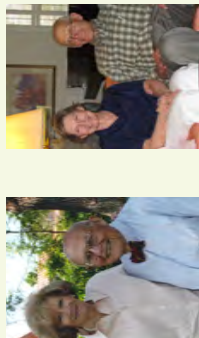
Now, Mardi and Bob Jr.—both enjoying second careers with Gardner Bellows—have designed a bequest to Caltech in honor of their father, with Winifred's strong support. The bequest

passes the value of their inheritance to Caltech after their lifetimes.

The gift will create an endowment with a powerful, long-lasting impact, endowing the Robert Gardner Professorship in the Division of Engineering and Applied Science. Remaining funds will be allocated toward endowments for a Gardner Family postdoctoral fellowship, graduate fellowships, and a discovery fund in mechanical engineering (the program from which Bob Sr. graduated)—a complete package to help Caltech attract brilliant engineers to its faculty.

Asked about the important inventions and social benefits he imagines arising from this gift, Bob Jr. laughs and demurs. “That's sort of Caltech's problem—and they're good at solving that problem, too! One of the things that Mark shared with us was that the ability to attract really key faculty members continues the school's traditions—it's a very high priority at Caltech. We are just planning on supporting that. How it will actually pan out—I don't have any idea! Except that's what Caltech does. They attract these incredible faculty members that inspire these incredible students, and that's Caltech. It is special—there isn't another school like it.”

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Recognize This Alumnus?

This alumnus came to Caltech from Waterbury, Vermont. A resident of Blacker House, he made sailing his chief avocation with the hope of sailing around the world in his 22-foot sailboat. He was treasurer of ASCIT and lettered in both track and cross-country. One and a half years spent in the Air Force conditioned him for the job of Upper Presidential's UCC. He typified the browbeaten physicist and was interested in aeronautics graduate work. (Information courtesy of Big T)



Photo courtesy of Big T.

'51
 Class of

See inside for more.