

SURF Provides a Wave of Research Opportunities

For more than 30 years, undergraduates have traded summer breaks for opportunities to take part in Caltech's Summer Undergraduate Research Fellowships (SURF) program. This year, 402 Caltech students and participants from universities and colleges across the country took part in the 10-week SURF program, which provides a unique introduction to scientific and engineering research under the tutelage of world-renowned mentors. Research projects ranged from Patrick Xia's work with K. Mani Chandy, Simon Ramo Professor of Computer Science, in developing

mobile robots for radiation detection to Jane Chen SURF Fellow Laainam Chaipornkaew's study of South Bristol Mountain fault zone geology.

SURF aims to provide hands-on exposure to the research methods and collaborative efforts involved in tackling new challenges and reaching solutions. SURF students take on major research responsibilities, each with ongoing guidance from a mentor who serves as a research collaborator and source of support. What sets SURF apart from similar programs is that Caltech and JPL mentors are pioneers in science and engineering. Students have the rare opportunity to



Getting to Know a Couple of SURFers

Caltech students **Wesley Yu**, junior, and **Shruti Mishra**, sophomore, spent this summer in one of the Institute's most rewarding undergraduate programs—and both are glad for that.



Wesley Yu, SURF '09
Jack and Edith Roberts
SURF Fellow

SURFers, continued inside

interact closely with professors and JPL staff as they learn how to complete high-level research—a focused experience that may not be available during the busy school year.

SURF students also enjoy weekly seminars with Caltech faculty and JPL technical staff and a series of profession-

SURF Provides, continued inside



Homer J. Stewart (PhD '40)

SURF Supporter Homer J. Stewart

The late Caltech Professor of Aeronautics, emeritus, **Homer J. Stewart** had a remarkable career. Could he have predicted that a grade-school model airplane project would spark a fascination with aeronautics, and eventually lead him to join the JPL team that developed and launched Explorer I, America's first satellite to reach orbit?

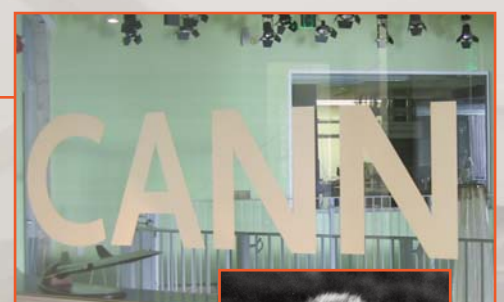
In his senior year at the University of Minnesota, a mentor urged Stewart to consider Caltech for graduate work in aeronautics. At Caltech, Stewart caught the attention of Theodore von Kármán, who asked him to teach a class in dynamic meteorology just prior to completion of his doctorate. This assignment led to a professorship in aeronautics (1942–1980).

Stewart also worked at the newly formed Jet Propulsion Laboratory (JPL). His systems engineering contributions during this period made him one of the pioneers in American rocketry. He left Caltech and JPL for two years (1958–1960) to join the newly formed NASA and head a planning group that provided White House staff with advice on the Apollo lunar program.

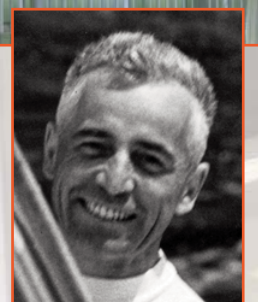
Throughout his education and career, Stewart was influenced by a number of important mentors. It is fitting that his estate is aiding SURF by funding two named SURF endowments—one related to space exploration and one focused on JPL research. Because Stewart named Caltech in his estate plan, generations of future students will have invaluable opportunities to learn from mentors of their own, gaining the sort of research experience that Caltech and JPL uniquely foster.

CALTECH LEGACIES

Toronto Conservatory of Music graduate **Gordon L. Cann** planned to become a pianist and composer, but his enthusiasm for engineering took him down a different path. Following the conservatory, Cann's change in focus led him to the University of Toronto, where he graduated with a degree in engineering physics. Shortly thereafter, he contributed his engineering skills to the war efforts during World War II as a member of the Canadian Armament Research and Development Establishment. After the war, Cann earned both his MS and PhD in aeronautics at Caltech and helped develop plasma engines for the Air Force and NASA. Cann went on to establish Technion, Inc., which in time was sold and provided him with wealth he later bequeathed to Caltech. His bequest helped support the Guggenheim Aeronautical Laboratory renovation and funded the Gordon Cann Laboratory of Experimental Innovation, a state-of-the-art teaching lab. After a hands-on life—from music and arms research to his engineering career—Cann has given a new generation of aeronautics students an ideal context in which to test ideas and build knowledge.



Gordon Cann
Laboratory of
Experimental
Innovation



Gordon L. Cann
(MS '56, PhD '61)

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al-development workshops on topics ranging from the pursuit of research careers to continuing education. In addition, the SURF Student Advisory Council arranges a number of social activities such as field trips and weekly gatherings with faculty at local restaurants.

As the program progresses, students define and develop their projects in a process culminating in their final presentations during SURF Seminar Day. This year's SURF Seminar Day will be held on October 17, 2009, and provides students the opportunity to speak about their summer work to faculty, alumni, peers, parents, and friends. Please join us if you can!

SURF benefits tremendously from the generosity of those who have supported the program through outright and planned gifts that have established a number of named endowments. There are only a few named SURF

opportunities remaining under an anonymous matching challenge gift. To participate, a new commitment for at least \$75,000 will be matched with \$50,000 to meet the \$125,000 minimum to fully fund a new named SURF. Such outright gifts provide the much needed immediate support for the SURF program. Planned gifts, in turn, offer a unique opportunity to generate an income stream for you and your family today while assuring the program's future success. We extend our thanks to those who have contributed to the SURF program: yours is an investment with significant impact on the quality of undergraduate research at Caltech and beyond.

If you would like more information on how to support the SURF program, please contact our office at 626-395-2927.



Jane and Don (BS '57) Pinkerton

SURF Supporters Don and Jane Pinkerton

Following in his brother's footsteps, **Don Pinkerton** left his hometown of Burbank to attend Caltech. Since graduating with a degree in electrical engineering, Pinkerton has remained close to Caltech. Retired, he and his wife, **Jane**, involve themselves in many programs that support students. They have been particularly active in SURF, through financial support and Pinkerton's leadership on the board.

Pinkerton believes that the research opportunities SURF offers are integral to students' future careers. He notes that his own career path might have gone in a different direction had SURF existed during his undergraduate years: thinking back, he says, he would have enjoyed researching early transistor technology and chip design, which "was just at the forefront. At that time, just experimenting with transistor technology would have been exciting."

Since 2005, Pinkerton has been serving as a SURF Seminar Day session chair and judge. Session chairs introduce each student, monitor speaking time, and collect audience evaluations, while judges rate students' presentations. Though he's an electrical engineer, Pinkerton is—as he has had to assure students' family members—qualified to judge SURF's spectrum of topics: the judges aim to evaluate a student's ability to communicate research findings to an audience whose members range in their understanding of the subject, an invaluable skill.

In addition to being a SURF board member, Pinkerton is active in the Alumni Association and is on the Caltech Y board. He and Jane are Associates and joined the Torchbearers, Caltech's legacy society, in 2008 when they included the Institute in their estate plan.

Getting to Know

Continued from page 1

Wesley Yu was diagnosed with autism at age seven, and his condition led to a treatment hospitalization. Raised in Irvine, California, Yu is a recipient of the Caltech Signature Award in

"The people who support the SURF program here are really appreciated and invaluable to what we do."

annually to a high-school senior who demonstrates characteristics essential to the fields of science and technology. He explained that his research, and culture of curiosity, drew him to Caltech. In his first year of SURF, under the guidance of Professor Hoag, Yu focused his research on a class of compounds called batidine—a potent but powerful painkiller—binds with nicotinic receptors, which have been identified as potential targets for Alzheimer's disease, and schizophrenia, among others. This research may speed the development of new drugs for a wide range of neurodegenerative diseases.

Yu is grateful for the guidance of Professor Dougherty and his co-mentor, Angela Blum, who were eager to educate. He believes that such experiences are essential to an undergraduate education. That SURF is the best opportunity for action. His research experience and desire to attend medical school led to a research career.

As a recipient of the **J. Edgar Hoover SURF endowment fellowship**, Yu applauds donors like Mr. and Mrs. Glanville, who made the difference between people who support the research and those who are appreciated and invaluable. "I can't be here without their support."

To read Shruti Mishra's blog post, visit <http://caltech.typepad.com>

Recognize this Alumnus?



1954 graduation portrait photo courtesy of Big T

This alumnus first heard about Caltech from his junior-high electrical-shop teacher, and a high-school math instructor who'd attended Caltech heightened his interest. One morning in the fall of 1950, he walked six blocks from home to the Pacific Electric Station in San Pedro, California, took the "Red Car" to Pasadena, and began his freshman year at Caltech. As he prepared to attend a Ricketts House luau one afternoon—coincidentally to be held in San Pedro—Richard Feynman stopped by to ask for directions to the same event, offering a ride in exchange for the information. Our alumnus obliged, but he asked Feynman for one stop on the way: to drop off laundry at his mother's house. He jokes, who else can call a Caltech legend his "laundry man"?

He focused on applied physics but also enjoyed humanities courses, and he made lifelong friends through Ricketts House activities. So enriching was his Caltech experience that he encouraged his childhood friend from San Pedro, Vince Marinkovich (BS '55), to attend. (They

were members of the infamous "Red Car" club, and he was known as "a place that teaches you to think" and "a place that teaches you to think" him well for his career at Bell Labs.

This alumnus has long served on the Alumni Association board and the Senior Alumni Association board and the Senior Alumni Association board, funded a charitable fund, and is a member of the Torchbearers of Caltech, the board of SURF. Memories of SURF: "What better way for me to give back and have an opportunity to support the cooperative efforts involved in SURF for nearly 50 years, **Carol Hassel** SURF Endowment in honor of **Vodopia's** work and generous support of my summer research experiences."

Support a Couple of SURFers

...ed with Kawasaki's dis-
...gratitude for the research
...s fueled his own efforts.
...ia, Yu received the
...in 2006, which is given

*Support the research
appreciated and
we do"*

...student who demon-
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...ins that it was the "faculty,
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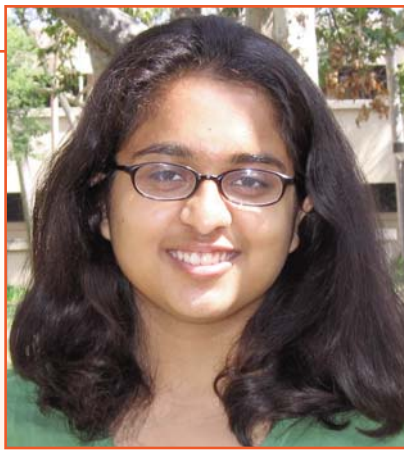
**Jack and Edith Roberts
Scholarship**, Yu is quick to
...nd Mrs. John H.
...endowment possible. "The
...research here are really
...e to what we do. I would-
...support," he admits.

... "SURFing, Bioengineering Style," visit
...m/caltech_as_it_happens/surfing-bioengineering-style/.

...ous Ricketts House Waiters.) He sees Caltech
...o solve problems" and believes it prepared
...ll Labs and Hughes Aircraft.
...supported Caltech. He served on the Alumni
...seminar Day committee, chaired several
...e gift annuity, and became a member of the
...President's Circle of the Associates, and the
...f college summer jobs sparked his interest in
...students to earn a stipend over the summer
...see firsthand what research is all about and
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...or of his mother. Alumnus **Samuel**
...sity will support many wonderful future
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...personal advisors on all legal, tax, or financial issues related to gift or personal matters.

Coming from West Lafayette, Indiana, Shruti Mishra, the 2009 **Edward W. Hughes SURF Fellow**, had to shrug off a bit of homesickness to spend her first summer on campus. Attending Caltech was among her dreams, however, and she came for the research. Under the guidance of Frances Arnold, Dick and Barbara Dickinson Professor of Chemical Engineering and Biochemistry, Mishra's research focused on the directed evolution of fungal cellulose toward improved hydrolysis of cellulose. Her lab work focused on the creation of better cellulase enzymes through a mutation process, which resulted in an improved enzyme. Cellulase is a component in the breakdown of cellulose, the most abundant carbon compound on Earth—which, when broken down, can be used in biofuel production. While this process is costly and not ready for commercial use, Mishra's research may contribute to the creation of



Shruti Mishra, SURF '09
Edward W. Hughes SURF Fellow

*"If you are a Caltech student, it
would be a crime not to do SURF
at least once"*

a cost-effective process. Throughout the 10-week program, Mishra kept a detailed blog to share her SURF experience and research progress, which was an excellent exercise, she notes, in making her work accessible to a diverse audience.

Yu and Mishra are appreciative of the unique opportunities the SURF program provides. As Mishra puts it: "If you are a Caltech student, it would be a crime not to do SURF at least once." The interactions with professors and access to labs, both agree, add a rich layer to the undergraduate experience that little can match.



Samuel Vodopia (BS '54)

Gifts by Will

The generosity and foresight of Caltech alumni and friends benefit the Institute. Below are just a few of the many people who have contributed to Caltech over the years.

Donald B. (BS '29) and **Ruth H. Milliken** have provided for Caltech through an unrestricted bequest of more than \$988,000.

The Institute has received an unrestricted bequest of \$369,700 from the estate of **Calvin E. Kempton** (BS '46).

Caltech has received \$270,000 from the estate of **William E. Leonhard**, to fund the Mr. and Mrs. William E. Leonhard Merit Scholarship Fund.

From the estate of **Hugh F. Colvin** (BS '36), the Institute has received \$270,000 to support the Colvin Fund for Research Initiatives in Biomedical Sciences.

Torchbearers

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

A. Richard (BS '61, BS '62, MS '63)

Sophia Su-hwei Yen

Fred (BS '47, MS '48, PhD '53) and

Gretchen Eimer

Ruth B. Roth and Frederick J. Kubik

Sangtae Kim (BS '79, MS '79)

(one member wishes to remain anonymous)

Did You Know...

New to our website is the Legacy Planner™ tool, which allows you to design your own gift plan. It takes your goals and assets into account, leads you down a decision tree, and points to the planned gift that best meets your needs. This is an interactive way to gain a general understanding of planned giving at your leisure. Please visit our website www.giving.caltech.edu/gp and click Gift Planning Tools, then select Legacy Planner™.



Contact Us

For more information about the stories featured in this issue of *Techniques*, or for other questions about deferred gifts, please contact the Office of Gift Planning:

Nichole Baker, CFP, CSPG, Director

Phone: 626-395-2927

E-mail: giftplanning@dar.caltech.edu

On the Web: giving.caltech.edu/gp

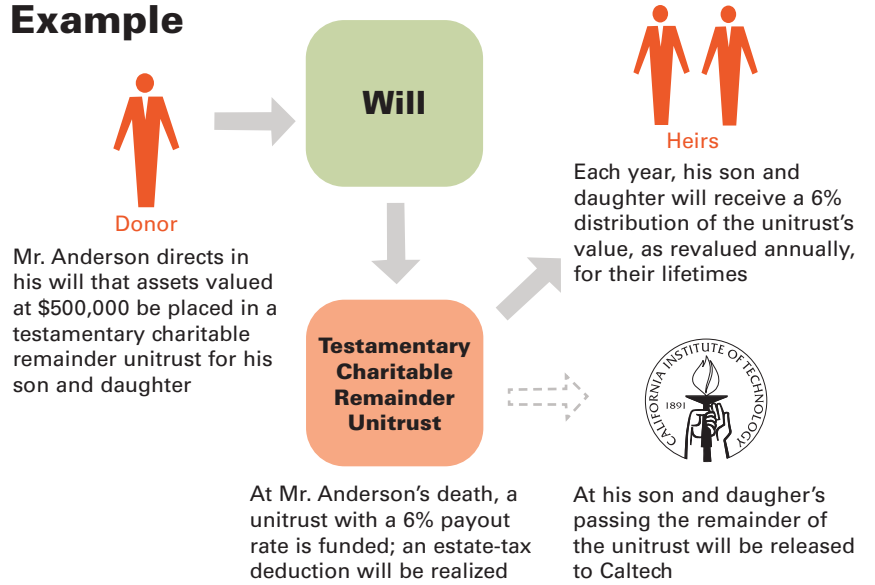
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Provide Support for Your Heirs and Caltech

Testamentary charitable remainder trusts (testamentary CRTs) can help donors establish reliable income for their heirs, reduce estate taxes, and create a legacy at Caltech. This technique particularly helps donors who wish to make a meaningful gift to Caltech while retaining the ability to provide for heirs and address special needs. A testamentary CRT is created through specific bequest language—Caltech can suggest wording—in the donor’s will or living trust. Upon the donor’s passing, the estate transfers assets to the trustee of the testamentary CRT (which can be Caltech), who coordinates the funding of the CRT and the beneficiary payments that follow. After the heirs have passed away, the CRT value is distributed to Caltech.

Under current federal law, if a donor’s total estate exceeds the applicable exemption during the year the donor passes away, the excess is taxable at the current gift tax rate. The current federal estate-tax exemption is \$3.5 million per individual (\$7 million per married couple). The tax is repealed for 2010, but a sunset provision schedules the return of the

Example



tax in 2011 with only a \$1 million exemption per person. Donors with taxable estates who establish testamentary CRTs receive an estate-tax charitable deduction, which may lower their tax due if the deduction brings the total taxable estate below the prevailing federal estate-tax exemption amount.

If you or your professional advisors would like more information about this strategy, please contact Nichole Baker at 626-395-2927 or giftplanning@caltech.edu.

RECOGNIZE THIS ALUMNUS?

Continue inside for more

Ricketts

This alumnus has certainly left behind him a record that the folks back in San Pedro can be proud of. Besides serving as Ricketts executive vice president in his senior year, he did time on the Board of Control, lettered in frosh football and track, held a class office, and was a member of the Beavers and IRE. After graduation he would reluctantly go to work.

Class of '54

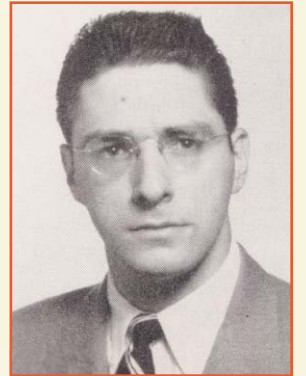


Photo courtesy of Big T

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Time is Running Out!

If you are age 70 1/2 or older, you can make a direct tax-free gift from your IRA.

This tax law expires on **December 31, 2009.**

Please contact us at 626-395-2927 to discuss your options.



Watch Caltech Streaming Videos

Near or far, keeping up-to-date with what is happening on campus is as easy as visiting Caltech’s Streaming Theater page and browsing from the following categories:

- Science and Technology—includes the Watson Lecture Series
- Campus Life—view events including Caltech’s commencement ceremony
- Society and Culture—covers a range of topics affecting the world



<http://today.caltech.edu/theater>