



Endowment Report Fiscal Year 2018

October 1, 2017, through September 30, 2018

Caltech



MEANINGFUL RETURNS OVER THE LONG RUN



I am very pleased to report that during fiscal year 2018* Caltech's total endowment grew by \$271 million to \$2.93 billion, while the endowment investment pool (those assets the Investment Office directly oversees) grew by nearly \$270 million to \$2.88 billion. Contributing to the growth were the continued success of Caltech's *Break Through* campaign, which was primarily responsible for generating cash additions to the endowment of \$162 million, and strong investment returns providing \$263 million. Over the last five years, growth in the endowment investment pool has allowed Caltech to increase its annual payout

in support of Institute activities by nearly 29 percent, from \$108 million in fiscal year 2014 to approximately \$139 million in fiscal year 2018. Cumulatively over those five years, distributions of \$609 million have provided nearly \$135 million in undergraduate and graduate financial aid—directly reducing the cost of attendance for over 90 percent of our students as they are trained to join the world's leaders in science, technology, and engineering.

The endowment investment pool enjoyed another year of solid performance—assisted by strong, though volatile, U.S. equity markets and very good returns from our private equity managers. On a consolidated basis, the endowment investment pool generated annualized returns of 10.0 percent, 11.1 percent, and 8.3 percent for the one-, three-, and five-year periods ended September 30, 2018. These figures exceeded our internal investment policy benchmark returns by 2.5, 2.1, and 1.7 percentage points, respectively. Importantly, over the last five years our investment returns have exceeded the endowment payout plus inflation, allowing us to grow the existing endowment funds on a real (after inflation) basis.

With the exception of our natural resources portfolio, which incurred some material write-downs on investments made many years ago, all of our major asset classes exceeded their respective benchmarks

for the 2018 fiscal year. In particular, our private equity investments, representing just over 15 percent of the endowment investment pool, provided a return of 22.8 percent, exceeding the benchmark by more than 4 percentage points. Similarly, our alternative securities managers, representing 29 percent of the endowment investment pool, provided a return of 7.9 percent, exceeding the benchmark by more than 3.6 percentage points. The alternative securities return is particularly satisfying, as we use this portfolio as a substitute for investment-grade fixed-income investments (of which we hold none). With careful portfolio construction, the alternative securities portfolio plays a defensive role, realizing a modest beta of under 0.3 to the equity market and having a bond-like volatility of under 4 percent. While this portfolio does not generally keep up with equity returns in bull markets, it has provided substantially higher returns than investment-grade bonds, which, for comparison, generated a -1.2 percent index return during fiscal year 2018.

Once again, Caltech's performance as compared to our college and university endowment peers was also quite good: Based upon data provided to Cambridge Associates by 138 institutions of higher education for the period ended September 30, 2018, Caltech's endowment investment pool performance placed it in the top 12 percent, 2 percent, and 14 percent for the one-, three-, and five-year periods, respectively. Only seven other higher education institutions in the survey placed in the top 15 percent in all three time periods.

One of the great challenges for investors is a device referred to as the Julian calendar. While it is convenient to have months, quarters, and years as part of our measurement system, unless you buy on the first day of the calendar period and sell on the last, an investment's published return is not the investor's realized return.

I mention this challenge because I often hear panicked investors lamenting their "losses" during certain periods of time. For example, the S&P 500

Caltech's Owens Valley Long Wavelength Array (OVRO-LWA) is a low-frequency radio interferometer composed of 288 crossed broadband dipole antennas that can image the entire visible sky every second. Located near Bishop, California, OVRO-LWA is part of the larger Owens Valley Radio Observatory, which is one of the largest university-operated radio observatories in the world. (Credit: Gregg Hallinan)



was down nearly 14 percent during the fourth calendar quarter of 2018. But imagine if you invested in the S&P 500 on March 9, 2009 (approximately the beginning of the nearly 10-year equity bull market that followed), and never looked at your account until December 31, 2018. With dividends reinvested, for every dollar invested in 2009, you would now find a little over \$3.50 (a 16.5 percent annualized return) in your account. That doesn't seem that bad to me. Did you actually "lose" 14 percent during the fourth calendar quarter of 2018? Only if you bought the S&P 500 index on October 1, 2018, and sold it on December 31, 2018. I suspect there are very few among you who did that.

Similarly, the Caltech Investment Office is keenly focused on identifying asset classes, specific investments, and

managers who can help us compound meaningful returns over the long run. Market pull-backs such as the one we experienced in the fourth calendar quarter of 2018 give us and our investment managers the opportunity to acquire assets at lower prices than just a few weeks before, providing a better starting point for meaningful, long-term returns.

Thank you, as always, for your continued support of Caltech and its endowment.

Scott H. Richland
Chief Investment Officer
March 2019

* October 1, 2017, through September 30, 2018

CALTECH'S ENDOWMENT: ENSURING VIABILITY AND VITALITY

Caltech's endowment provides perpetual funding to advance the Institute's mission of educational and scientific excellence, especially when economic fluctuations may constrain the availability of other public and private resources. Visionary donors have partnered with Caltech to create

endowments that support people, programs, and facilities across the Institute, and this support has helped spur breakthroughs in quantum computing, astronomy, gene therapy, enhanced drug delivery systems, neuroscience, robotics, artificial intelligence, sustainability science, and many other fields.

FY18: CASH ADDITIONS
TO ENDOWMENT

\$162M

The bulk of Caltech's endowment investment pool is made up of more than 1,400 privately donated funds. Caltech deposits the monies from each new endowment gift into the pool and invests strategically to preserve the inflation-adjusted purchasing power of the

original gift amount while generating returns that supply payouts year after year. Caltech manages its endowment with a focus on lasting results and responds nimbly to time-sensitive investment opportunities in order to honor donors' wishes for generations to come.

Endowment and the *Break Through* Campaign: Inspiring People and Ideas

Break Through: The Caltech Campaign seeks long-term results, and that is precisely why raising funds for endowment is one of the Institute's highest fundraising priorities. Caltech is a destination of choice for current and future scientists and engineers who aim to define new fields, create knowledge for the ages, and improve lives today. Endowment income makes it possible for Caltech to give these extraordinary scholars the resources and freedom to test their limits in the service of discovery, whatever the time frame and wherever the opportunities may lead.

Gifts to establish named professorships and leadership chairs enhance Caltech's competitive advantage in recruiting and retaining talented, innovative, and ambitious faculty who focus on areas of untapped opportunity and attack large and important challenges in new ways. Endowed scholarships make it possible for the brightest undergraduates from every background to fulfill their academic dreams at Caltech. Endowed fellowships give the Institute a discriminating edge in attracting outstanding graduate students and postdoctoral scholars who work directly with faculty members to develop new ideas and accelerate existing research while invigorating the campus community with new perspectives.

Flexible endowment is another potent form of philanthropy at Caltech. It enables the Institute to respond effectively to time-sensitive opportunities and direct funds to researchers who are tackling the most difficult questions in science and technology. It empowers Institute leaders to invest in areas where there is potential for transformative impact. Perhaps most important, it creates an environment where faculty and students know the Institute will support them as they pursue their best ideas; this knowledge, in turn, inspires creativity and the courage to push the boundaries of human understanding.



Caltech graduate student Colin Cook (MS '16) holds a glowing contact lens that could help prevent blindness in millions of people with diabetes.



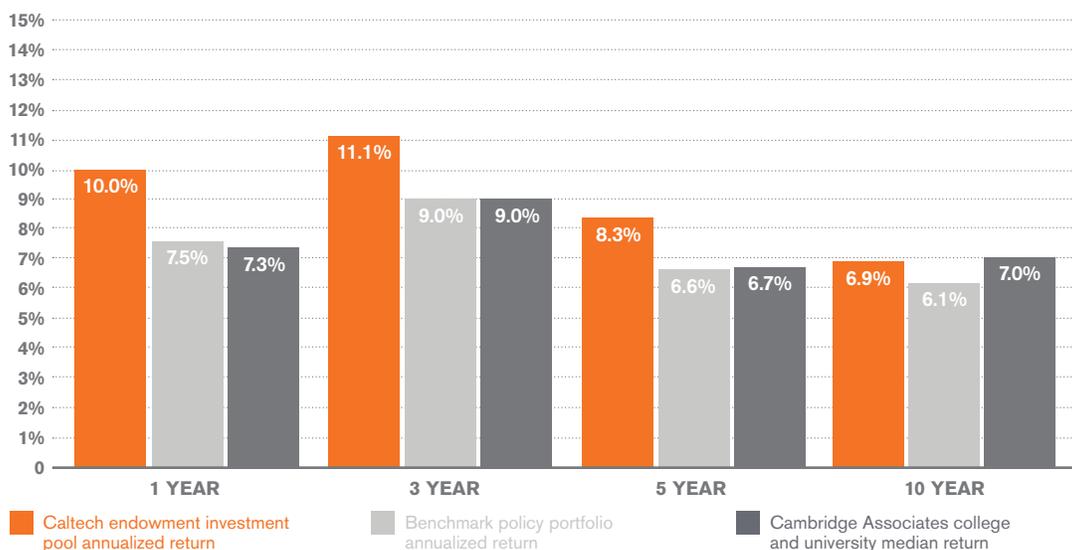
Caltech's newest undergraduate residence, the 211-bed Bechtel Residence—named in recognition of a gift from the S. D. Bechtel Jr. Foundation—officially opened its doors to students on September 17, 2018.

ENDOWMENT PERFORMANCE, FISCAL YEAR 2018

Endowment Investment Pool Return

As illustrated in the figure below, Caltech's endowment investment pool generated a 10.0 percent return for fiscal year 2018, exceeding its benchmark policy portfolio by 2.5 percentage points. For the three-, five-, and 10-year periods ended September 30, 2018, investment pool

returns beat their benchmarks by 2.1, 1.7, and 0.8 percentage points, respectively. Over the last five years, the excess value generated by this outperformance of the benchmarks was more than \$193.8 million.

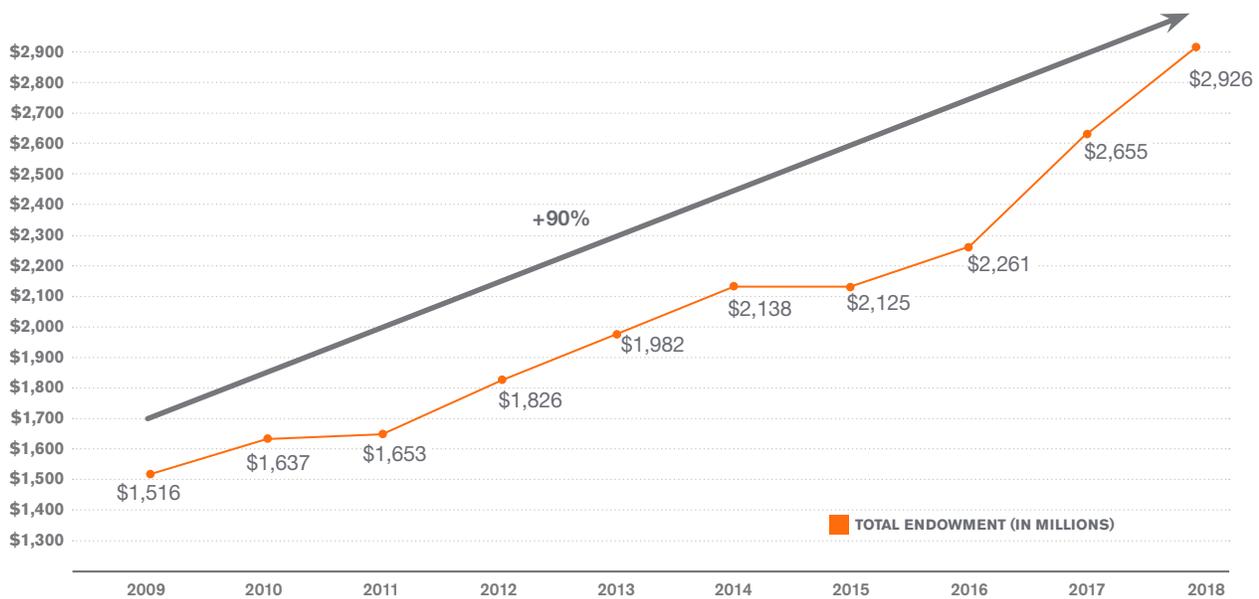


LAST FIVE YEARS:
\$135M
 in financial aid
 from endowment

Growth of the Total Endowment

The market value of Caltech's total endowment investment portfolio increased to \$2.926 billion by the close of fiscal year 2018. This increase was made possible by generous giving to endowed funds and strong performance from our real estate, private equities, and alternative securities asset classes. New gifts and investment gains are partially offset by endowment distributions. Since the end of fiscal year 2009, the beginning of the recovery from the 2008 financial crisis, Caltech's total endowment value (net of outflows) has grown at a compound annual rate of nearly 7.6 percent and has supported Caltech's research programs and people with over \$1.02 billion in payout.

FY18:
\$271 M
increase in total
endowment



Total endowment includes the investment pool and separately invested endowments.

Asset Class Allocation and Performance

Caltech's alternative securities portfolio performed well during fiscal year 2018, delivering a 7.9 percent return and beating its benchmark by 3.6 percentage points. Our private equity funds portfolio (which includes both venture capital and buyout funds) provided strong performance as well, up 22.8 percent and beating its benchmark by

4.0 percentage points. Despite write-downs in our energy portfolio due to declining oil and natural gas prices, our real assets portfolio (energy, real estate, and commodities)—up 11.7 percent and beating its benchmark by 2.5 percentage points—had an outstanding year.

| | Allocation (as of September 30, 2018) | FY 2018 Asset Class Returns | FY 2018 Benchmark Returns |
|------------------------------------|--|--------------------------------|------------------------------|
| Global developed markets equities | 27% | 11.3% | 11.2% |
| Emerging markets equities | 9% | -0.3% | -0.8% |
| Alternative securities | 29% | 7.9% | 4.3% |
| Private equity and venture capital | 15% | 22.8% | 18.8% |
| Real assets* | 13% | 11.7% | 9.2% |
| Global fixed income | 1% | -5.0% | -1.5% |
| Cash and other | 6% | 1.7% | 1.6% |

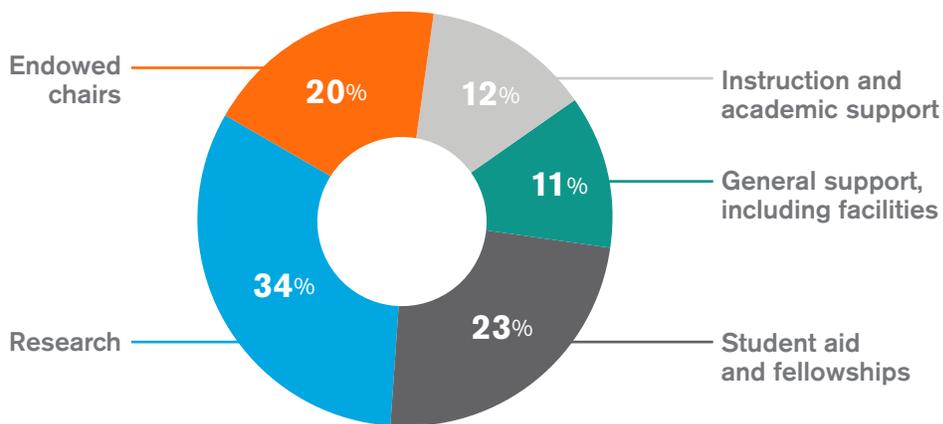
* Primarily real estate, energy, and commodities

ENDOWMENT PAYOUT, FISCAL YEAR 2018

Approximately \$139 million in endowment payout contributed nearly 22 percent of Caltech's operating budget in fiscal year 2018, supporting research and education in many valuable ways. Endowed fellowships, for example, afforded graduate students the freedom to pursue their passions without being unduly constrained

by a lack of funding. In addition, over the last three years, 44 current faculty members had new appointments to endowed professorships and leadership chairs, and the availability of endowed chairs played an important role in recruiting seven new outstanding faculty to Caltech.

Allocation of \$139 Million Payout



Endowed Professorships: Recognizing and Supporting Intellectual Leaders

Small and selective by design, Caltech invests heavily in talented, ambitious, and innovative minds, and endowed professorships enhance the Institute's ability to support the work of outstanding scientists and engineers. Named professorships, the highest honor Caltech gives individual faculty members, recognize scholarly achievement and generate funds faculty may use to pursue their best ideas and mentor generations of leaders in science and technology.

For Pamela Bjorkman, appointment to the David Baltimore Professorship has personal significance as well. In the mid-2000s, Nobel laureate and then-Institute president David Baltimore, now the Robert Andrews Millikan Professor of Biology, proposed a new method to combat HIV infection. The immune system's natural response to HIV is generally inadequate, but by "engineering immunity," scientists could deliver effective antibodies via gene therapy. The notion inspired Bjorkman. She wanted to design antibodies the virus had not evolved against because they did not exist in nature. She partnered with Baltimore on a grant from the Bill and Melinda Gates Foundation and recently developed antibody-based molecules that are better than our bodies' defenses at neutralizing HIV.

Announced as part of David Baltimore's 80th birthday celebration, the Baltimore Professorship was established with a \$5 million gift from the Eli and Edythe Broad Foundation. Longtime Caltech benefactors Eli and Edythe Broad created the endowment to honor Baltimore and his lifelong mission of advancing the study of life sciences.





Endowed Scholarships: Linking Past, Present, and Future

When Max J. Kay (BS '73) and Naida Shaw created an endowed scholarship at Caltech in November 2017, they fulfilled two important personal goals. First, they gave new generations of undergraduates a chance to experience the challenges and rewards of a Caltech education and to benefit from the extraordinary opportunities that education affords. Second, they honored their friend Stanley E. Whitcomb (BS '73) for his contributions to the LIGO (Laser Interferometer Gravitational-wave Observatory) Laboratory. Whitcomb joined the project in 1980 and over the years was involved in nearly every phase of the effort to build LIGO, from concept development to installation to data analysis and management.

The couple's gift to endow the Dr. Stanley E. Whitcomb Scholarship also supports one of the *Break Through* campaign's highest priorities: making Caltech's degree programs financially accessible. Only 6 percent of institutions nationwide admit students on a need-blind basis. Caltech is one of them. Scholarship funds help ensure that the most talented and promising students can enroll at Caltech, regardless of their families' financial means.



Frances Arnold (center), the Linus Pauling Professor of Chemical Engineering, Bioengineering and Biochemistry and director of Caltech's Donna and Benjamin M. Rosen Bioengineering Center, received the 2018 Nobel Prize in Chemistry. Here, she poses with some of her students during a campus celebration held in her honor.



The team reacts after receiving confirmation that the InSight (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) lander successfully touched down on the surface of Mars. (Credit: NASA/JPL-Caltech)

INVESTMENT PRINCIPLES

Asset Allocation Strategy

The asset allocation policy for Caltech's endowment investment pool emphasizes diversification across asset classes, investment styles, and geographic locations, striving to achieve strong long-term investment performance while avoiding highly concentrated risks. Strategic asset allocation ranges are established by Caltech's Investment Committee and are subject to periodic review. In addition, tactical adjustments are made by the Investment Committee and the Investment Office in response to current or anticipated shorter-term market conditions.

At the end of fiscal year 2018, the endowment investment portfolio was tactically underweight in traditional investment-grade fixed income and real assets and overweight in global developed markets equities and private equity relative to our strategic allocation guidelines. The underweight position in fixed income (which has been the case for nearly 10 years) continued due to the low level of interest rates and the expectation that rates would begin to increase as world economies continue to recover from the 2008 financial crisis; the real assets' underweight position reflects low commodities prices and the large amount of successful realizations in our real estate portfolio during fiscal year 2018.

Endowment Liquidity

Caltech's endowment investment pool is closely managed and monitored for liquidity. We define liquidity as the ability to realize and access cash from an investment in a timely manner. Liquidity is desirable for five primary reasons:

1. The portfolio has financial obligations such as investment fund capital calls, which often must be satisfied with relatively short notice.
2. Implementing changes in tactical and/or policy allocations requires liquidity.
3. From time to time, unusual investment opportunities arise—driven by market or other forces—that cannot be seized without liquidity.
4. In periods of economic downturn, the endowment investment portfolio must be prepared for a potential reduction in cash inflows while maintaining its payout to the Institute, which is essential to achieving Caltech's mission.
5. Unrestricted endowment investment pool funds may need to be tapped to assist in maintaining operating continuity in cases of emergency or financial disruption.

The Caltech endowment investment pool is quite liquid, with more than 20 percent of the assets currently convertible to cash within one to two weeks and nearly 29 percent convertible to cash within a calendar quarter under normal circumstances. The Institute's additional sources of liquidity currently include substantial funds that have been raised from issuing bonds over the last five years as well as committed lines of credit provided by commercial banks.

MANAGEMENT OF THE ENDOWMENT INVESTMENT PORTFOLIO

The Caltech Investment Office reports jointly to the Institute's president and the Board of Trustees' Investment Committee, which has primary responsibility for setting investment policy, overseeing policy implementation, and approving major investments. The committee meets at least quarterly to discuss and review asset allocation, investment policies, new investments, and portfolio performance and interacts frequently between meetings to discuss specific investments and other opportunities as they arise. The members bring extraordinary expertise in both specific asset classes and the investment industry in general.

The Investment Office

The Investment Office develops recommendations on investment policies, strategies, and asset allocation for review and approval by the Investment Committee. With the general guidelines in place, the Investment Office then identifies investments and what it considers to be best-in-class asset managers around the world who can effectively implement the adopted investment strategies. The office focuses on medium- to long-term performance,

identifying global trends and investment opportunities that may develop over many years. While quarter-to-quarter performance is closely monitored, and appropriate portfolio adjustments are made from time to time, the primary goal is to earn long-term rates of return that support the annual endowment payout and maintain its inflation-adjusted purchasing power, allowing it to support Caltech's activities for generations to come.

INVESTMENT COMMITTEE MEMBERS

Joshua S. Friedman, Chair

Co-Founder, Co-Chairman, and Co-Chief Executive Officer, Canyon Partners, LLC

Dr. Ronald K. Linde (MS '62, PhD '64), Vice Chair

Vice Chair, Caltech Board of Trustees
Independent Investor
Chair, The Ronald and Maxine Linde Foundation
Founder and Former Chief Executive Officer, Envirodyne Industries, Inc.

B. Kipling Hagopian, Member

Managing Partner, Apple Oaks Partners, LLC

G. Bradford Jones, Member

Founding Partner, Redpoint Ventures

Dr. David L. Lee (PhD '74), Member

Chair, Caltech Board of Trustees
Managing General Partner, Clarity Partners, L.P.

A. Michael Lipper, Member

President and Chief Executive Officer, Lipper Advisory Services

Li Lu, Member

Founder and Chairman, Himalaya Capital

Dr. Thomas F. Rosenbaum, Member

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Timothy J. Sloan, Member

Retired Chief Executive Officer and President, Wells Fargo & Company

Susan Schnabel, Advisory Participant

Co-Founder and Co-Managing Partner, aPriori Capital Partners

Robert V. Sinnott, Advisory Participant

Co-Chairman, Kayne Anderson Capital Advisors

Lance N. West (MS '83), Advisory Participant

Retired Chairman and Chief Executive Officer, Centerbridge Partners Europe, L.L.P.

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COVER: (top left) Konstantin Batygin, assistant professor of planetary science and Van Nuys Page Scholar, who, with Professor Mike Brown, found evidence for the existence of Planet Nine; (top right) Viviana Gradinaru, professor of neuroscience and biological engineering, Heritage Medical Research Institute Investigator, and director of the Center for Molecular and Cellular Neuroscience in the Tianqiao and Chrissy Chen Institute for Neuroscience at Caltech; (bottom, from left) graduate students Nathan Schoepp, Eric Liaw, and Emily Savelle and research technician Matt Cooper, who, as members of the Ismagilov research group at Caltech, study ways to combat antibiotic resistance.