Working Together to Secure Caltech's Future

Thomas F. Rosenbaum

Strategic Planning Process

Caltech's Institute Academic Council* (IACC) periodically convenes to set the Institute's intellectual agenda. While each faculty member pursues her or his research agenda fettered only by the limits of their imagination, the Institute's leadership sets broad intellectual priorities to direct resource allocation in a manner that moves the Institute, as a whole, forward.

This intellectual agenda is: tethered to the Institute mission to educate and train the best and brightest minds to conduct discipline defining research for the benefit of humankind; informed by conversations at local faculty levels, by the Institute's principles, and by conversations among the IACC; and is set ultimately by the vision the President and Provost have for Caltech.

Once set, the intellectual agenda is shared with faculty, trustees, and administrators who will all play roles in realizing the strategic plan.

*includes the president, the provost, and the six division chairs

Hallmarks of Caltech's Vitality

- **EXCELLENCE**: Recruit and retain the most creative and original scholars; diversity and inclusion are essential components of excellence that ensure Caltech is the destination of choice for the world's best and brightest minds

- **AMBITION**: Intellectual fearlessness to define new schools of thought; leveraging Caltech's small size and intense focus on the most challenging questions in science and engineering

- **PERSPECTIVE**: Connect disciplines to impact society and transform the world for the benefit of humakind

OUTLINE

- Destination of Choice
- Discipline Defining Research
- Essential Role of a Campaign

“If you knew how much work went into it, you wouldn't call it genius. ”

— Michelangelo

Destination of Choice

- Graduate Fellowships
- Undergraduate Scholarships
- Named Postdoctoral Positions

Graduate Students

Vision of endowing *every* graduate student fellowship

- Moore $100M matching gift
  - unrestricted endowment
  - will get us almost half the way when completed
- Virtuous Circle

Undergraduate Scholarships

- Bolster need-blind admissions
- Eliminate student loans
- Increase support of international students to enhance global profile

Moore Match equivalent required to remain competitive

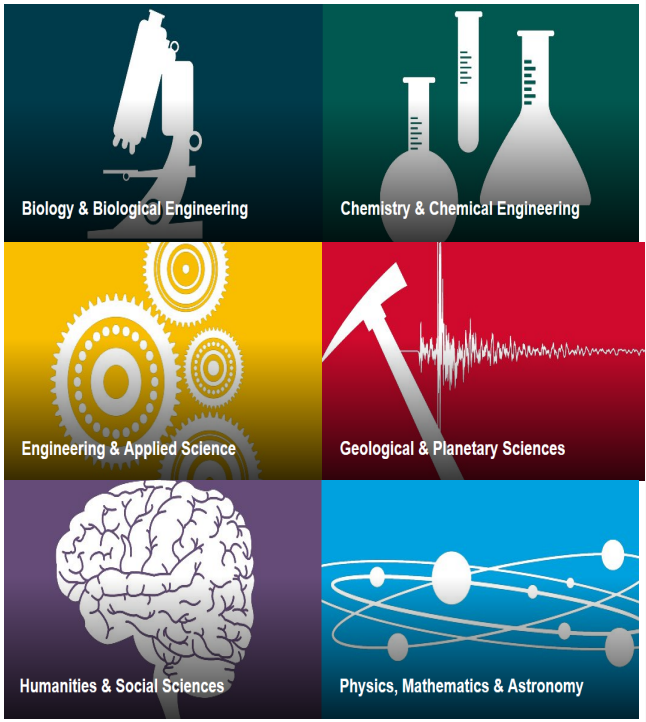
Presidential Career Enhancement Postdoctoral Scholarships

- Infuse multiple perspectives and experiences into the environment
- Build the pipeline
- Destination of choice for the most creative and original scholars in the world

Campaign Progress: Academic Support

22 Leadership Chairs Funded

- Presidential Leadership Chair
- Provostial Leadership Chair
- 6 Academic Division Leadership Chairs
- Student Affairs Leadership Chair
- 11 Research Center/Institute Leadership Chairs
- 2 Academic Department Leadership Chairs



15 Institutes / Centers / Initiatives Supported

6 Capital Projects Supported

1 Department Endowed

- Andrew and Peggy Cherng Department of Medical Engineering

Caltech

DISTINCTIVE RESEARCH POSTURE

"…Our greatest hopes could become reality in the future. With the technology at our disposal, the possibilities are unbounded…."

— Stephen Hawking

DISTINCTIVE RESEARCH POSTURE

Developing new schools of thought

– Understanding the Universe
  - telescopes, gravity waves, planetary probes

– Science, Technology and Human Health

– Computation at disciplinary interfaces
  - e.g. biology, seismology, quantum science and engineering

– Energy and the Global Environment

Understanding the Universe

Understanding the Universe

- What makes up 95 percent of the universe (dark energy, dark matter)?
  - TMT
  - Space telescopes
- Detecting ripples in the fabric of space time
  - Advanced LIGO, 100 years after GRT
- Are we alone?
  - Interrogate atmospheres of planets orbiting faraway stars
  - Trips to icy worlds (Titan, Europa, Enceladus)

Science and Technology for Human Health

Fundamental Questions about Life on Earth

- How do single cells become systems (humans)?
- How does the brain work?
- What controls behavior in a cell? System? Humans?

- No single discipline can span the intellectual challenges – a Caltech advantage
  - NIH BRAIN grants (neurotechnology focus)
    - 6 *here* of 58 funded
    - 2 in BBE (plus CCE, EAS, PMA)

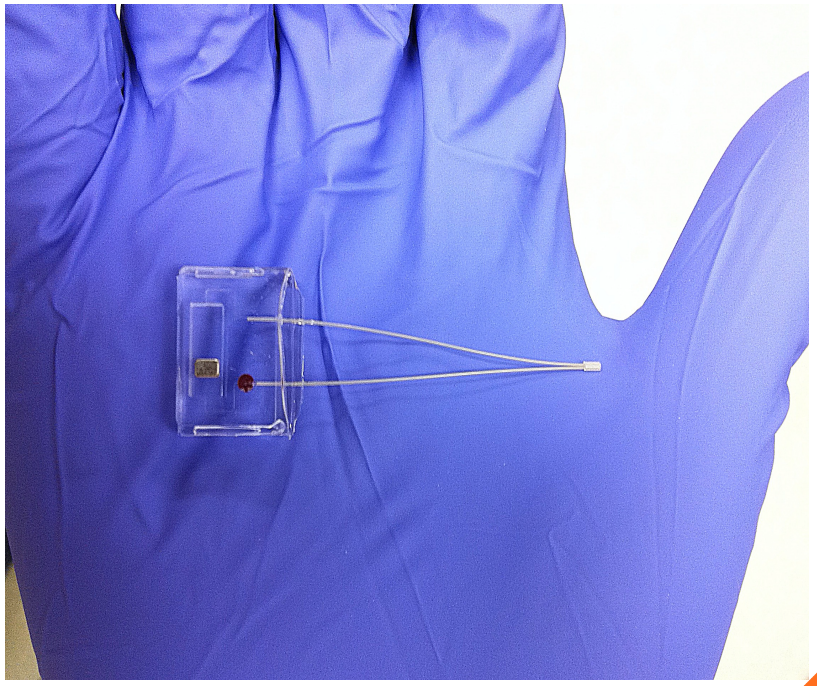
Science and Technology for Human Health

Marshal insights from different disciplines

– Scientists, engineers, clinicians, entrepreneurs

– Medical Engineering evolved from EE ➔

– Lihong Wang, recruited from Wash. U Medicine
  - Photo-acoustic imaging

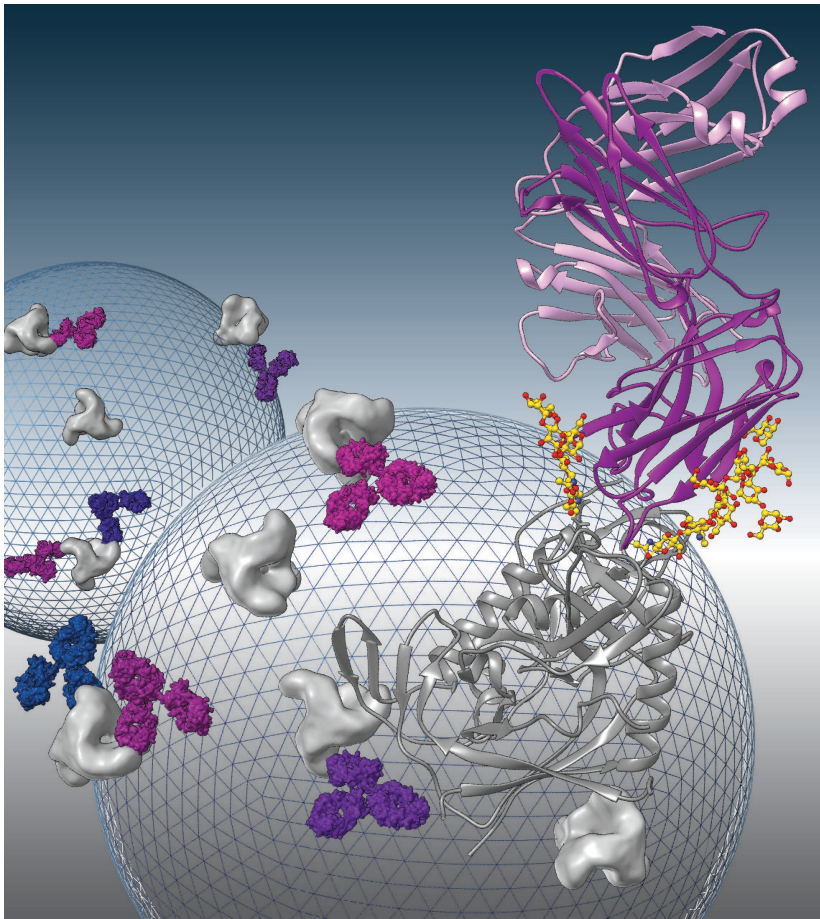


(Implant for chronic ear ringing, M. Gharib)

Science and Technology for Human Health

Develop a distinct presence in a crowded field

- **Mastery of basic science**
  - *Broadly neutralizing antibodies (bNAbs) are a promising protein protector against HIV*
- **Provide easy transit to application and back**



COMPUTATION AND THE DISCIPLINES

"Data, data everywhere,
but not a thought to think."

~ Mathematician John Allen Paulos

- Underlying frameworks and theories essential

- Leads to fundamental progress in Computer Science and across the Institute

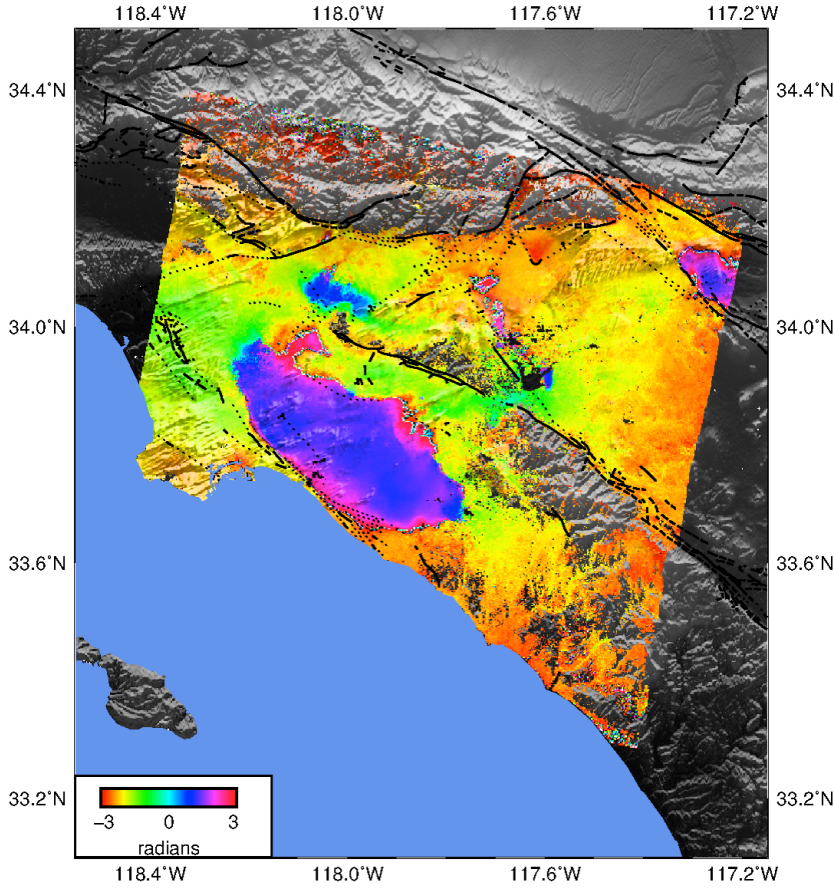
Computation and the Disciplines

Seismology

Determine the structure of the earth by analyzing ambient noise

Environmental seismology:

- Increased computational power and sensor concentration

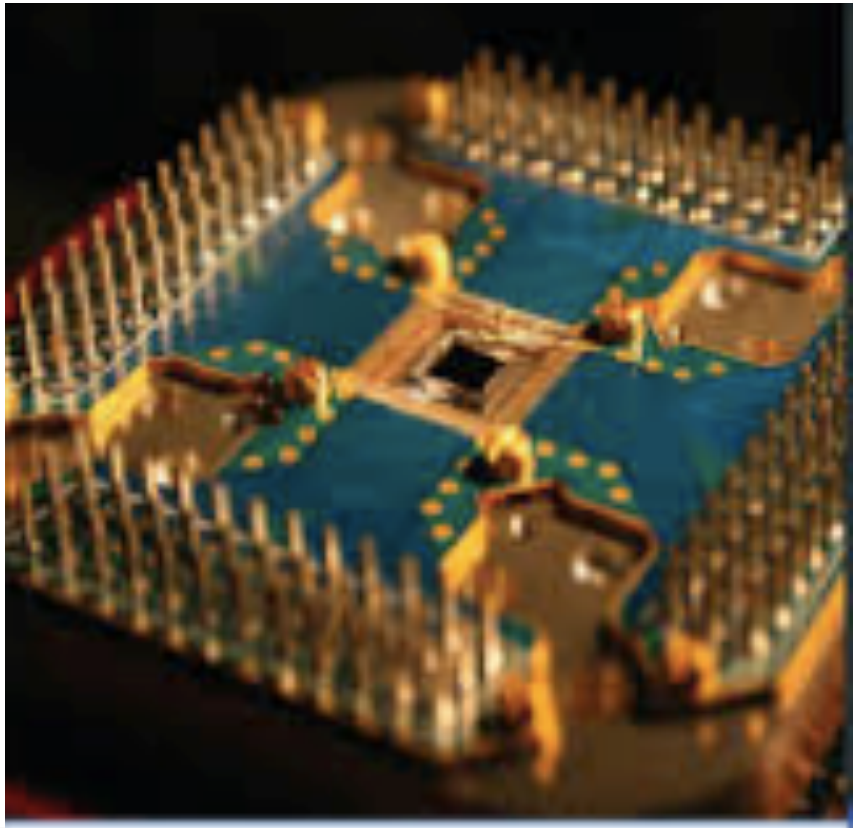


Computation and the Disciplines

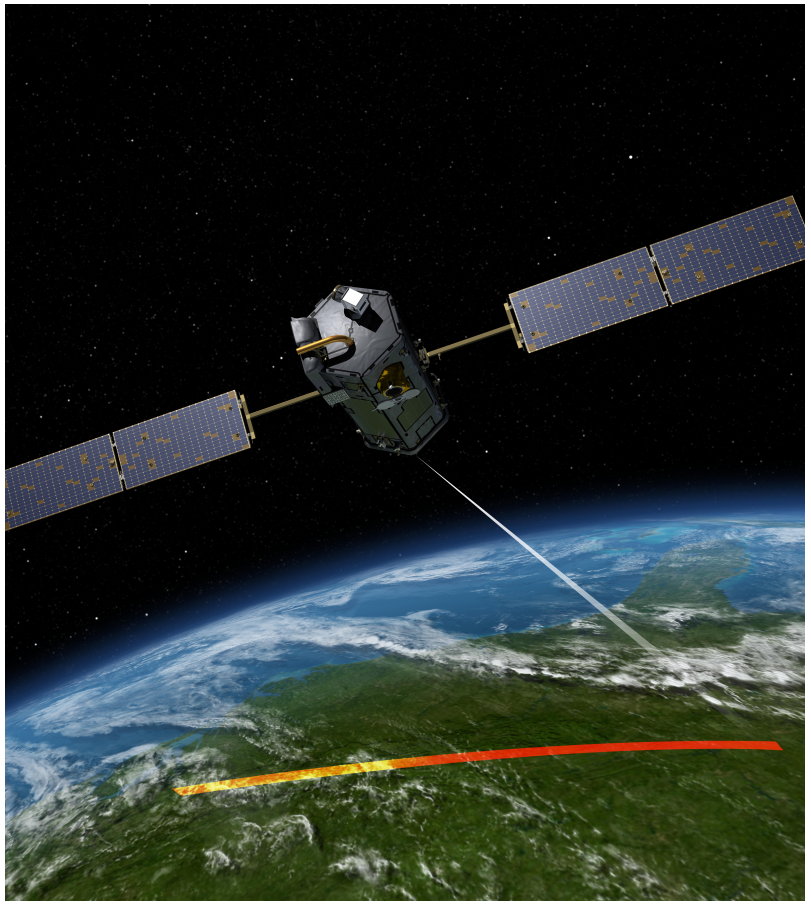
Quantum Science and Engineering

Realizing the next generation of Moore's law through quantum computation

- Parallelism: Unparalleled computing power
- Simulating nature and materials



Energy and the Global Environment



Energy and the Global Environment

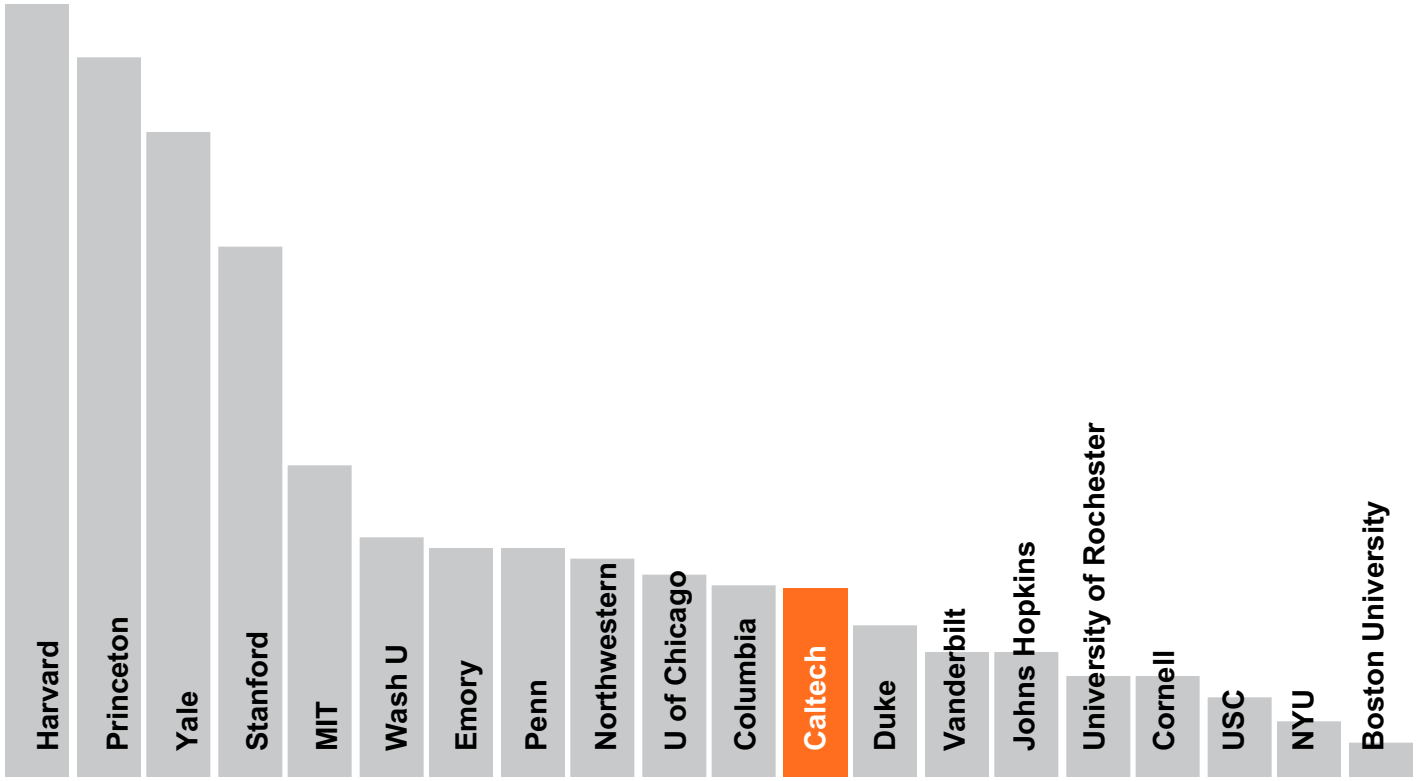
Structures in place
to exploit the Caltech advantage

- Linde Center for Global Environmental Science
  - Measuring and modeling the state of the world
- Resnick Sustainability Institute
  - Translation into interventions
- JCAP & the Space Solar Power Initiative
  - Bountiful fuel and energy from sunlight
  - CO_2 mitigation

“The future belongs to those who believe in the beauty of their dreams.”

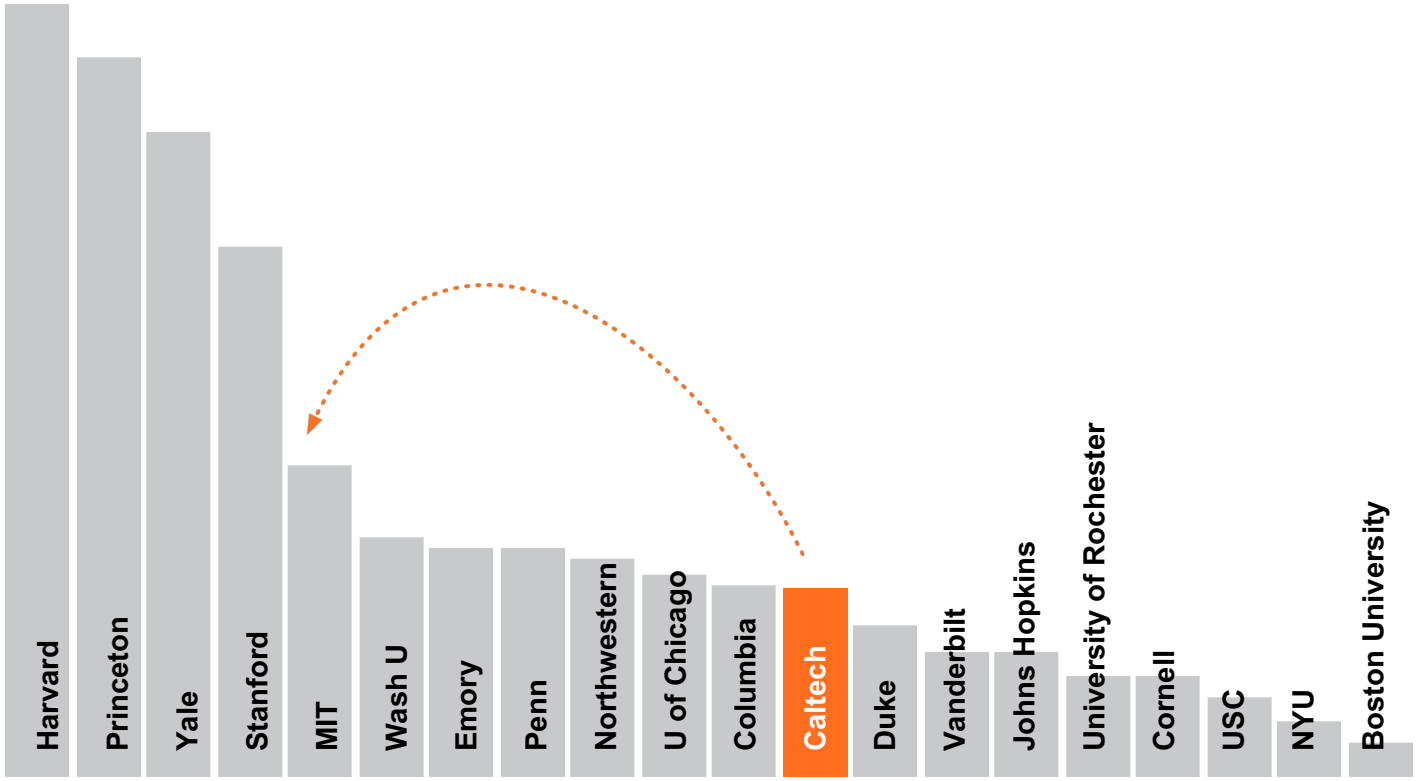
— Eleanor Roosevelt

Double the Endowment: $5B



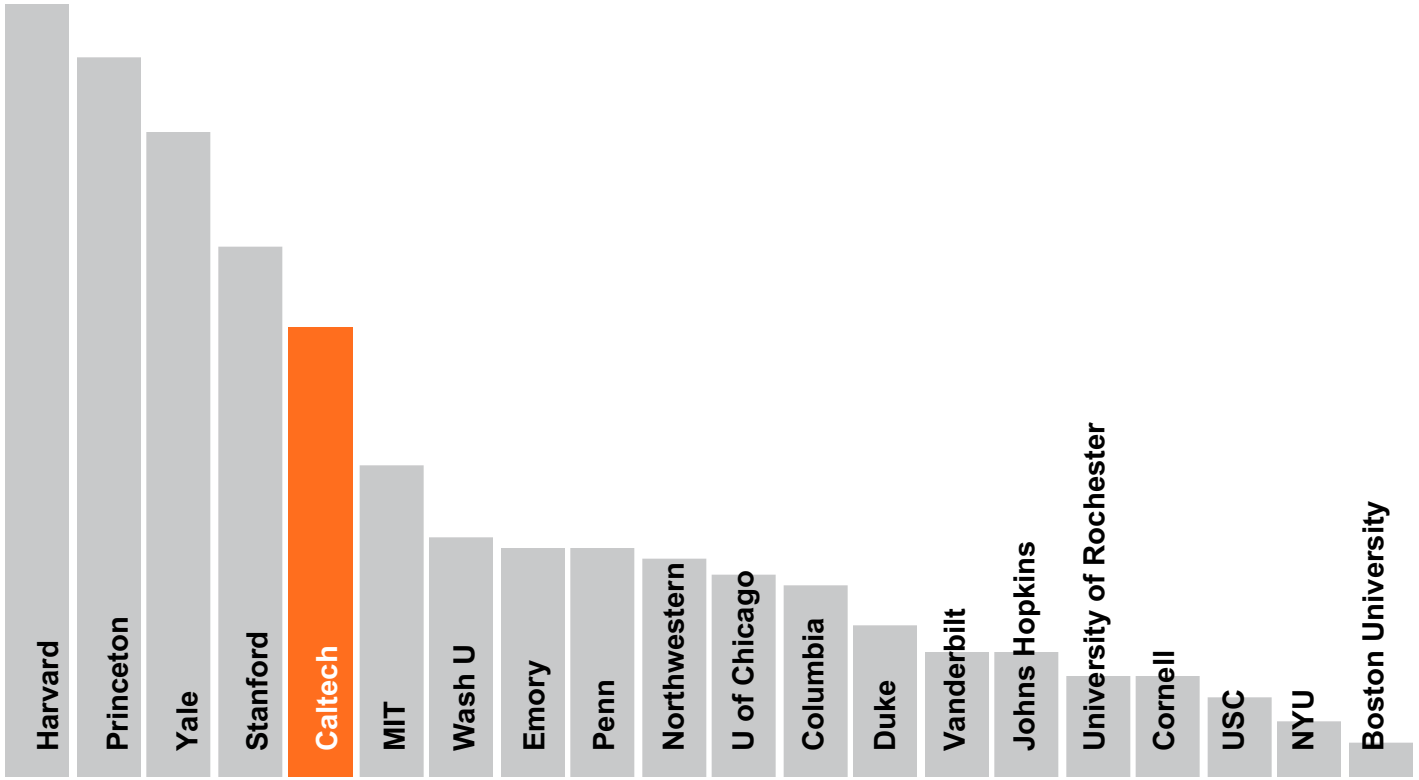
Endowment per faculty member

Double the Endowment: $5B



Endowment per faculty member

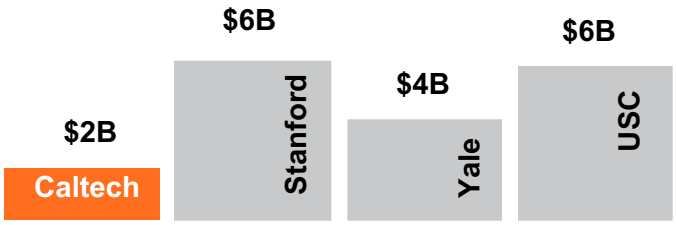
Double the Endowment: $5B



Endowment per faculty member

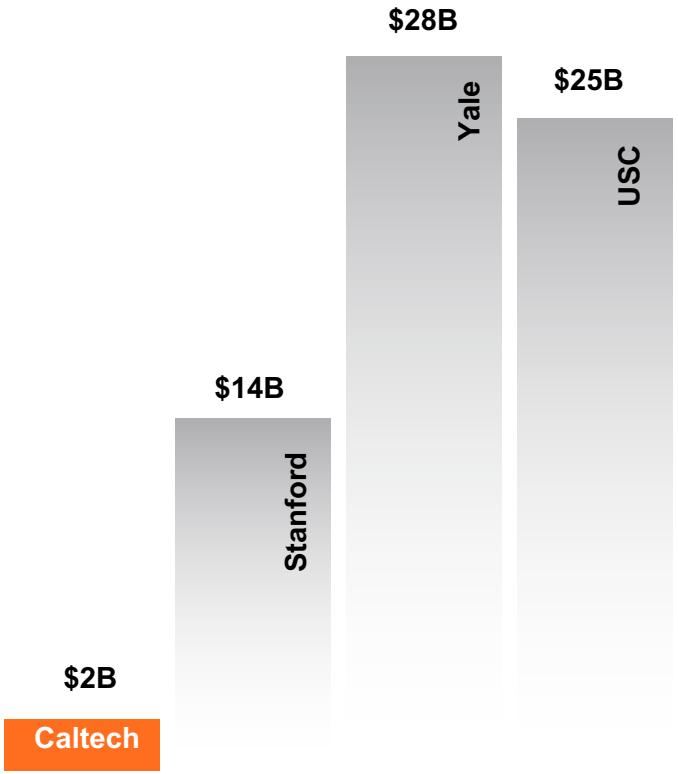
Building Capacity

Campaign Goals



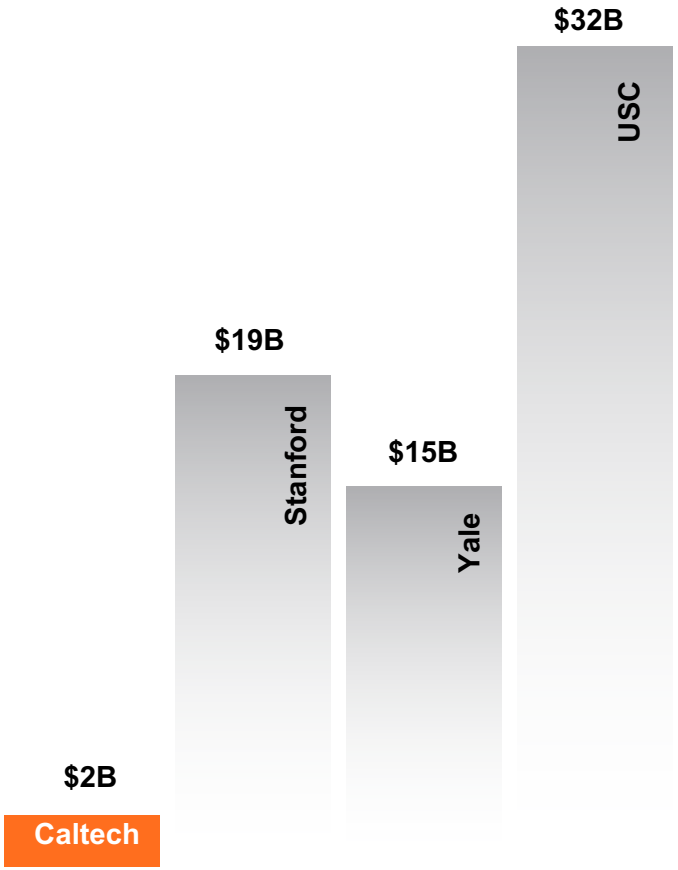
Building Capacity

Dollars per Faculty Member



Building Capacity

Dollars per Graduate



Caltech

The Bottom Line

The Institute is a dynamic thing.

It can’t stand still.

- A. O. Beckman

Rankings

Academic reputation

International presence

Graduation and retention rates

Publications, impact, citations, and awards

Student-faculty ratio

Admissions test scores

Times Higher Education

#1

(36%)

(33%)

(7.5%)

(4.5%)

US News & World Report

#10

(30%)

(22.5%)

(12.5%)

(1%)

QS World University

#5

(40%)

(20%)

(10%)

GRUP / Shanghai

#7

(90%)

Caltech