

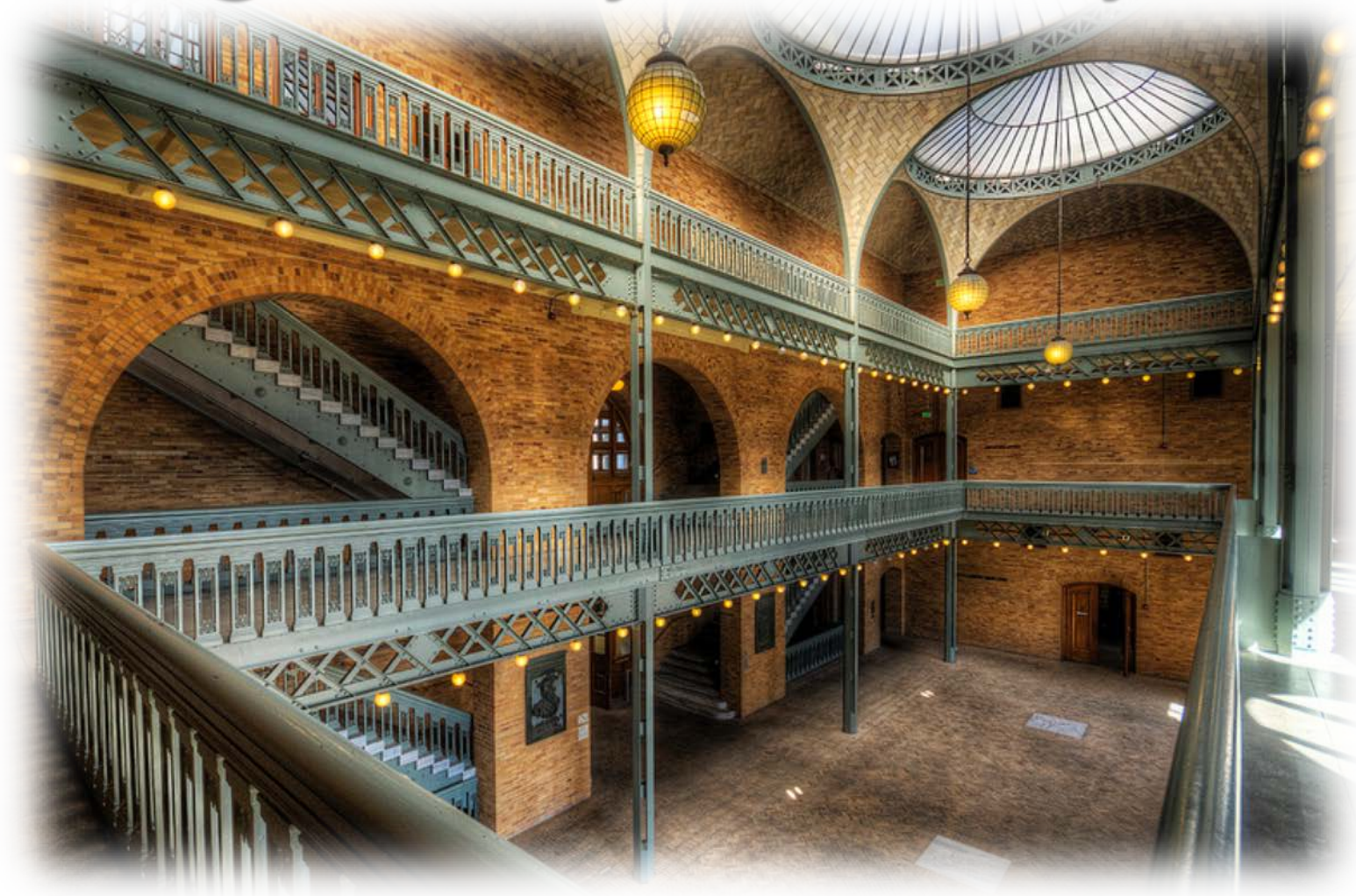


Materials Science and  
Engineering  
at the  
University of California,  
Berkeley

Prof. Daryl C. Chrzan, Chair  
Prof. Lane W. Martin, Vice Chair



## MSE @ UC Berkeley – Virtual Cal Day 2020





## 1868 – Charter Year for UC Berkeley

- Initially Three Technical Colleges
  - College of Mining  $\longrightarrow$  **MSE is 152 years old!**
  - College of Mechanics
  - College of Civil Engineering

## Berkeley, 1874

## Pheobe Apperson Hearst (1842-1919)

- Married George Hearst; one son (William Randolph)
- First woman Regent of UC
- 1891 – Funds scholarships for women @ Cal
- 1891 – Funds competition for “campus architectural plan”
- At Oxford University, at the time strapped for funds, a Latin orator said:



"There is brought a report that in California there is already established a university furnished with so great resources that even to the architects (a lavish kind of men) full permission has been given to spare no expense. Amidst the most pleasant hills on an elevated site, commanding a wide sea view, is to be placed a home of Universal Science and a seat of the muses."



## John Galen Howard

- Funded with \$900,000 (>\$22M today) from Pheobe Apperson Hearst to erect first building under architectural plan

## Hearst Memorial Mining Building



- Dedicated in memory of George Hearst “a plain honest man and a good miner”





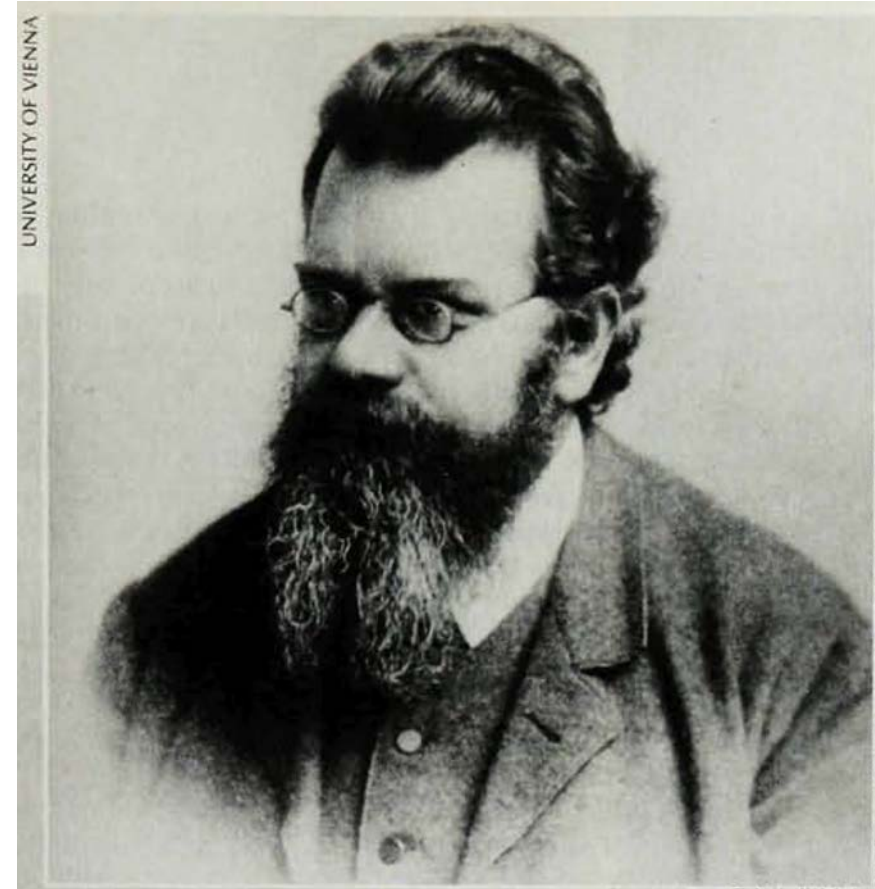
## Rich history...

### Ludwig Eduard Boltzmann

- Austrian physicist/philosopher; statistical mechanics
- Visited and taught during summer of 1905
- Quoted as saying about Berkeley...

“the loveliest place one can imagine”

“Unlike Berkeley, Stanford University is laid out in a unified, architecturally attractive scheme that seems to me quite unsuitable for educational purposes.”



from “A German Professor’s Trip to el Dorado” – Boltzmann  
Published in *Physics Today*



## Reason No. 1: Outstanding Educational Program



### UC Berkeley

- #1 (or 2!?! ) Public University (USNWR, Acad. Ranking of World Univ. – #5 overall)
- \*UCLA = #11 (Acad. Ranking of World Univ.)

### UC Berkeley / College of Engineering

- #3 Engineering school in the world (USNWR)

### Materials Science & Engineering Dept.

- #4 / #2 Ugrad/Graduate (USNWR)
- #5 Program (QS World University Rankings)
- #2 Program (Shanghai Rankings)

Students obtain a cutting-edge education grounded in critical foundational concepts and mixed with state-of-the-art information on:

- Ceramics
- Metals
- Polymers
- Electronic Materials
- Biomaterials

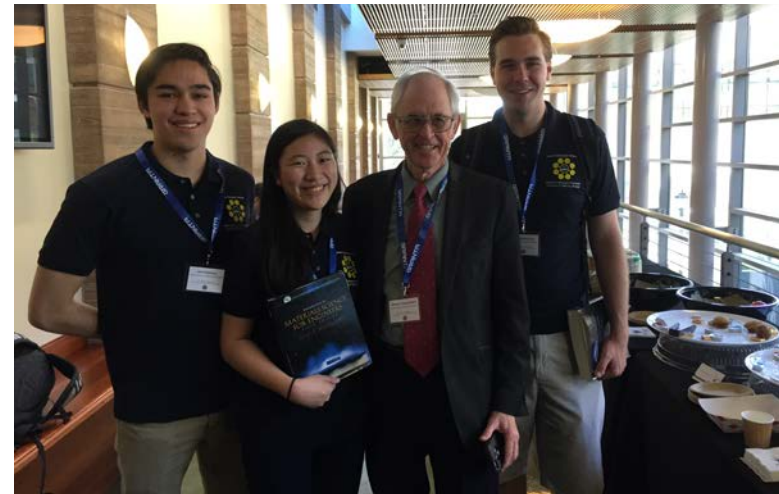


## Reason No. 2: Top Students

### Undergraduate program:

- **Incoming class size:** 45-50
- **Total = 170-180** (B.S. + Joint)
  - MSE Major: 144
  - Joint Majors: 20 → MechE, ChemE, EECS, BioE, NE
- **Top students, striving for greatness**
  - SATs: 600-800 (averages in 700s)
  - Average GPA: 4.51/4.0
  - Comprehensive review to find the best
- **Incoming class make-up (typical)**
  - Male – 65.7% | Female – 34.3%

**Graduate program:** 142 Ph.D., 31 M.S. students



# Department of Materials Science and Engineering

UNIVERSITY OF CALIFORNIA, BERKELEY | COLLEGE OF ENGINEERING



## Reason No. 3: Outstanding Educators

Faculty size - 18 (core)

- 3 Asst. Professors
- 2 Assoc. Professors
- 13 Professors
- 7 Named Professors
- 6 Nat. Acad. of Eng.
- 3 Nat. Acad. of Sci.
- 3 PECASE
- 1 MacArthur "Genius"



Zak Al Balushi



Mark Asta



Daryl Chrzan



Tom Devine



Gerd Ceder



Oscar Dubon



Kevin Healy



Lane Martin



Phil Messersmith



Andrew Minor



Ahmad Omar  
(Starts 2021)



Kristin Persson



R. Ramesh



Robert Ritchie



Mary Scott



Junqiao Wu



Ting Xu



Jie Yao

*Without materials, there is no engineering*

[mse.berkeley.edu](http://mse.berkeley.edu)



# Department of Materials Science and Engineering

UNIVERSITY OF CALIFORNIA, BERKELEY | COLLEGE OF ENGINEERING



## Joint Faculty



A. Paul Alivisatos



Jillian Banfield



Robert Birgeneau



Frances Hellman



Peidong Yang

## Adjunct Faculty



Joel Ager



Miguel Salmeron



Haimei Zheng

## Lecturers



Chris Kumai



Matthew Sherburne

**A world-class education and research opportunities with leaders in the field**



**Because continuing educational improvement is our goal →  
a center for MSE education innovation**



Hosted the 7<sup>th</sup> North  
American Materials  
Education Symposium

Faculty-taught courses, cutting-  
edge concepts brought into the  
classroom, experts in the  
classroom and beyond





## Reason No. 4: Excellent Student Advising and Service

### MSE Student Services Advisors



Ms. Ariana Castro



Ms. Medina Kohzad



Prof. Tom Devine



Prof. Kevin Healy



Prof. Junqiao Wu



Prof. Ting Xu

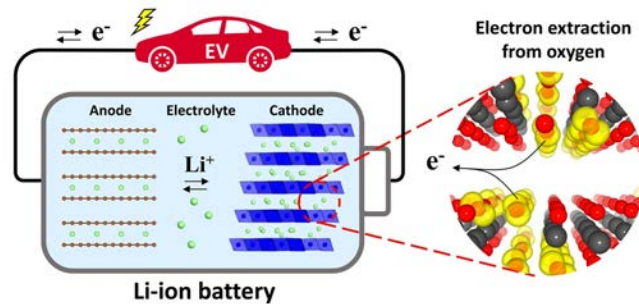
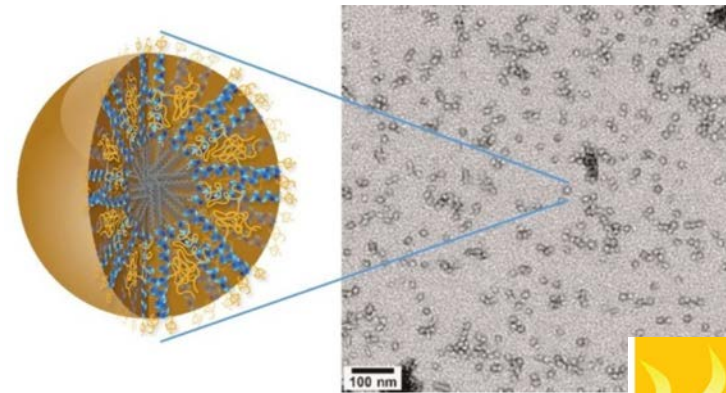
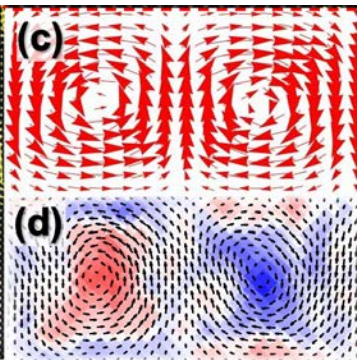
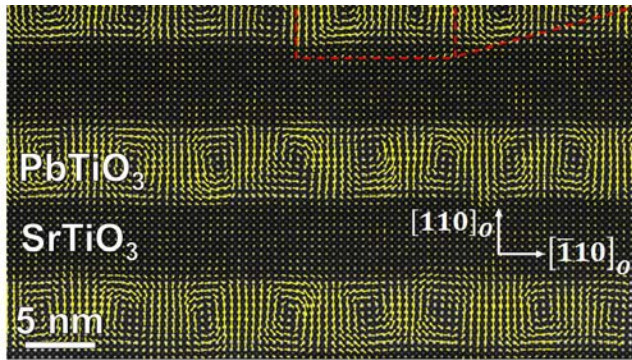


Prof. Lane Martin  
Chief Under-graduate Advisor

- In-house Student Services Advisor → Your advocate and a “one-stop” for all academic needs
- Each year there is a committee of advisors available to you
- Open-door policy, advising before scheduling, one-on-one advising sessions as needed, etc.
- Engineering Student Services in COE



## Reason No. 5: World-Class Research



Potential Battery Game Changer

JCESR Researchers at Berkeley and the Electrolyte Genome Project.

**MORE**

Kristin Persson  
Thrust Principal Investigator, JCESR

Home About Apps Documentation API Login

### The Materials Project

Harnessing the power of supercomputing and state of the art electronic structure methods, the Materials Project provides open web-based access to computed information on known and predicted materials as well as powerful analysis tools to inspire and design novel materials.

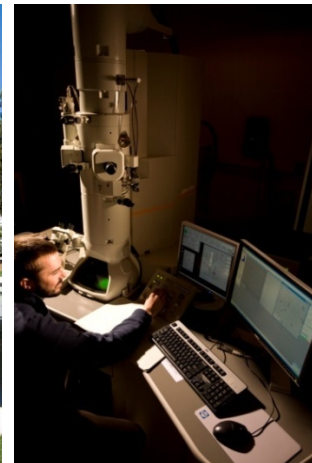
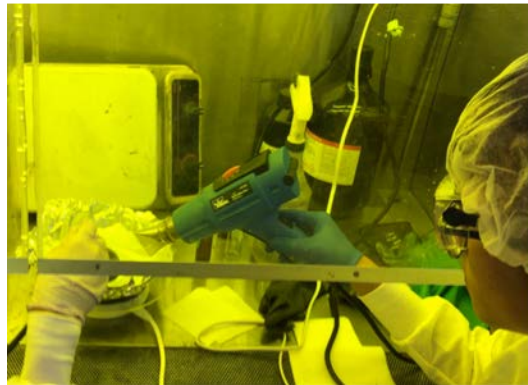
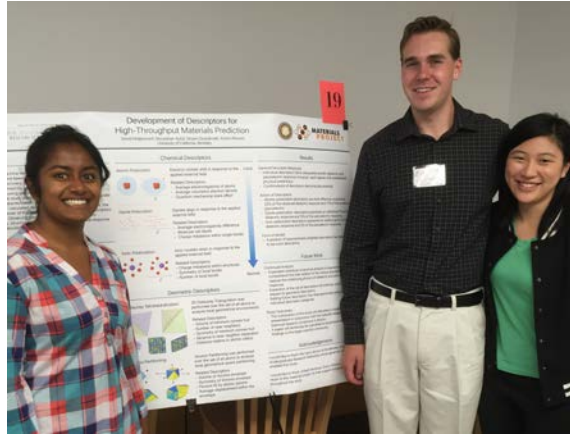
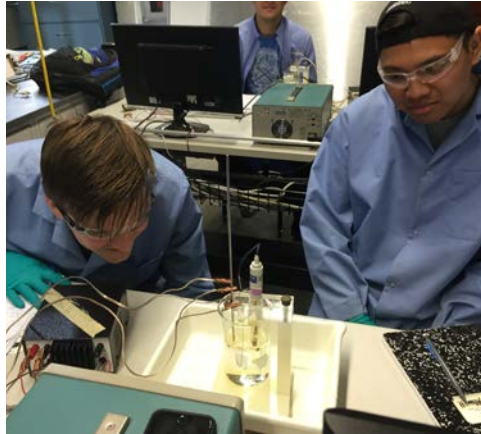
[Learn more](#) [Tutorials](#) [Sign In or Register](#) to start using





## Reason No. 6: Excellent Opportunities for Undergraduate Research

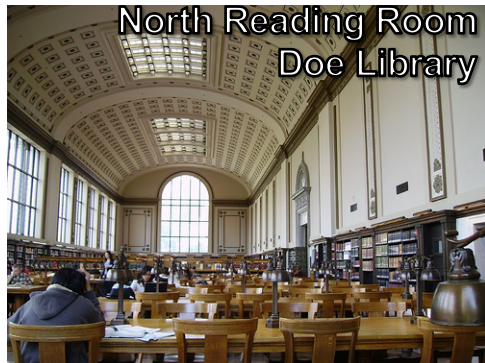
*Outstanding research facilities*



*Outstanding students doing cutting-edge work*



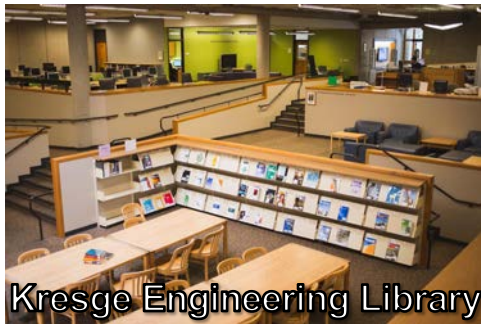
## Reason No. 7: Excellent Facilities and Resources



North Reading Room  
Doe Library

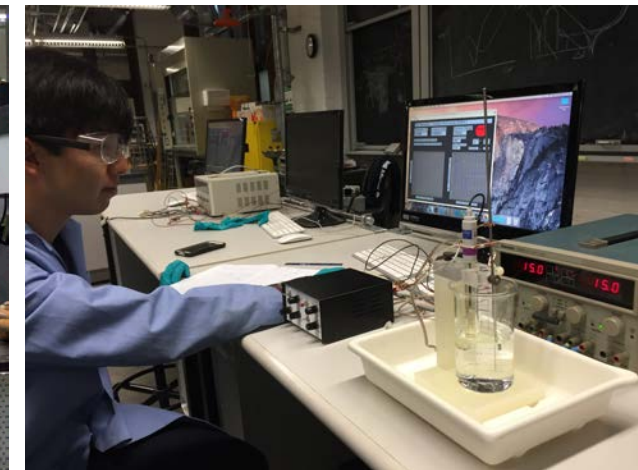


MakerSpace, Jacobs Hall



Kresge Engineering Library

### *Undergraduate teaching laboratory facilities*



b. Makerspace  
Moffitt Library

# Department of Materials Science and Engineering

UNIVERSITY OF CALIFORNIA, BERKELEY | COLLEGE OF ENGINEERING



Campus

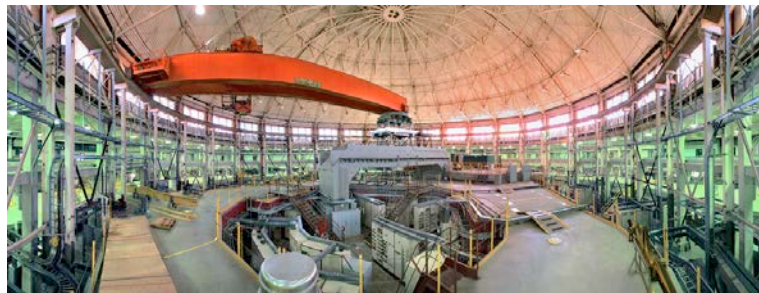
Marvell Nanofabrication Laboratory



QB3, Stanley Hall



Lawrence Berkeley National Laboratory



Advanced Light Source

National Center for Electron Microscopy



Molecular Foundry

National Energy Research Scientific Computing Center



*Without materials, there is no engineering*

[mse.berkeley.edu](http://mse.berkeley.edu)



## Reason No. 8: Career Opportunities

### Jobs

Alphabet Energy\*  
Amazon  
Apple  
Applied Materials  
Bayer Healthcare  
Baxter  
Biotech Company  
Boston Consulting Gp.  
BP  
CBRITE  
Chevron  
Dow  
DPR Construction  
Dupont  
EnerNOC  
Exponent  
Exxon  
First Solar  
Form Factor

Google  
Hewlett Packard  
Intel  
Imerys  
Imprint Energy\*  
Jet Propulsion Lab.  
Johnson & Johnson  
Lam Research  
Lockheed Martin  
Micron Technology  
Millipore Sigma  
Northrup Grumman Sp.  
PlantPV  
Primus Power  
SpaceX  
Tesla  
Thermo Fisher Sci.  
Valero

### Graduate Schools

Caltech  
Cambridge  
Carnegie Mellon  
Columbia Univ.  
Cornell Univ.  
GaTech  
Harvard  
MIT  
Northwestern  
Oxford  
Purdue Univ.  
Stanford

UC Berkeley  
UC Irvine  
UCLA  
UCSB  
UCSD  
Univ. of Florida  
Univ. of Illinois, Urbana-Champaign  
Univ. of Michigan  
Univ. of Minnesota  
Univ. of Pennsylvania  
Univ. Southern Cali.

### Professional Schools

Law – Univ. of Michigan, Univ. of New Mexico  
Finance – UC Berkeley

**Break down: 40-50% Jobs | 40-50% Graduate School (Tech.) | 5-10% Other**





## Reason No. 9: Close-knit Departmental Community

- A “small school” feel, in a “big school” environment
- Peer-to-peer support → MSEA, advising, mentoring, information...
- Opportunities to get involved → Expand your horizons
- Opportunities to give back to your community

**Find your home in MSE @ UCB**





## Reason No. 10: Because you can never start working on getting that great parking spot too early...



Photo courtesy of Dick Dunbar



The only school with enough Nobel Laureates to have to have a special parking permit for them...



## Tailoring your education to you...

### Reworked curriculum in MSE

- New curriculum designed to provide flexibility – reduced requirements, increased electives → You decide what you want to learn in upper level

### 5 Year B.S. / M.S.

- For MSE @ UC Berkeley **undergraduates only**
- **Unique program** → 4 (B.S.) + 1 (M.S.) year program
- **Professionally oriented** → Prepares students for careers in eng./eng. management within business, government, industrial sectors
- **Interdisciplinary study** → independent research coupled to coursework
- **Individualized education** in research/presentations and professional development (resumes, interviewing, negotiating,...)

### Joint Majors and Minors

- Stand at the intersection of fields and disciplines
- Different from Double Majors, designed to be completed in 4 years
- MSE + MechE, ChemE, EECS, BioE, NE | Minors in many fields



## We take the value of education seriously...

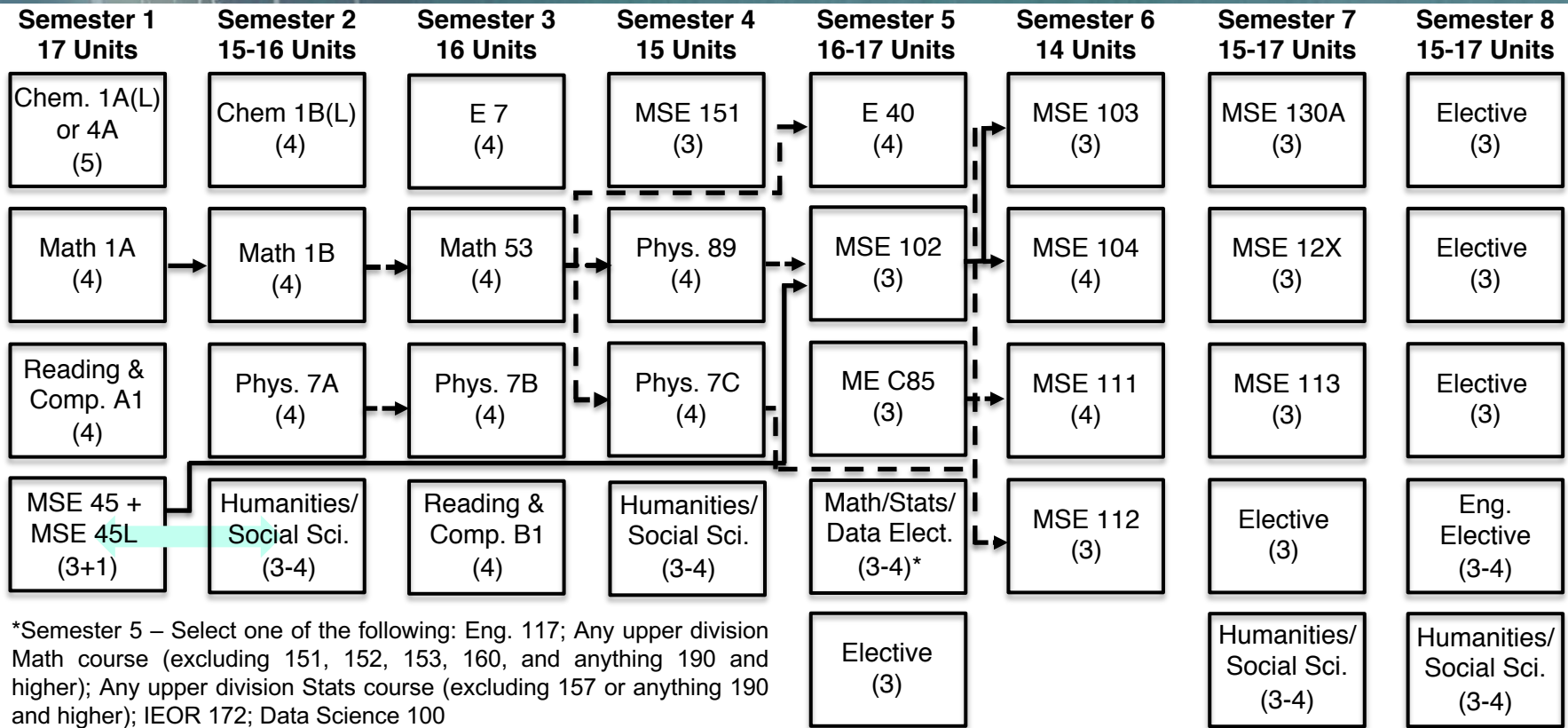
	UC Berkeley Residents	UC Berkeley Non-Residents	Stanford (2019-2020)
Tuition and fees	<b>\$14,254</b>	<b>\$44,008</b>	<b>\$52,857</b>
Books & supplies	<b>\$870</b>	<b>\$850</b>	<b>\$1,245</b>
Room & board	<b>\$17,220</b>	<b>\$17,220</b>	<b>\$16,433*</b>
Personal & Misc.	<b>\$1,876</b>	<b>\$1,876</b>	<b>\$2,130</b>
<b>TOTAL ESTIMATED COSTS</b>	<b>\$34,220 (dorm)</b>	<b>\$63,954 (dorm)</b>	<b>\$72,665 (dorm)</b>

\*Standard allowance for all aid applicants; actual may be higher

## A University built by the people, for the people of California, the Nation, and the World...

# Department of Materials Science and Engineering

UNIVERSITY OF CALIFORNIA, BERKELEY | COLLEGE OF ENGINEERING



## 5 Year B.S. / M.S. → For MSE & UC Berkeley undergraduates only

- 4 (B.S.) + 1 (M.S.) year program → unique program
- M.S. → professionally-oriented, prepares students for careers in eng./eng. management within the business, government, and/or industrial sectors
- Emphasizes interdisciplinary study → independent project coupled to coursework



Thank you for your time.

Questions?