YOU'RE INVITED
MAY 17-20, 2018
WELCOME BACK!

REUNION
WEEKEND + 81ST ANNUAL
SEMINAR DAY

MAY 17-20, 2018

WELCOME BACK!
Reunion Alumni!

We are excited to welcome you back to campus to reconnect with your classmates, fellow Techers and the Institute through class events, seminars, division receptions and tours, House reunions and so much more!

We invite you to take time to visit with fellow classmates and friends at our central gathering spots throughout the weekend: relax in the living room or the garden of Alumni House or find a table on Beckman Mall to play board games, reminisce over yearbooks, or just to catch up on years past.

Alumni House
345 S. Hill Ave.
Thursday, May 17  10:00 a.m. – 5:00 p.m.
Friday, May 18  8:00 a.m. – 5:00 p.m.

Alumni Central
Tent, Beckman Mall
Saturday, May 19  8:30 a.m. – 5:30 p.m.
REUNION WEEKEND HIGHLIGHTS

Thursday
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Class of 1953 Lunch
President’s Reception
Class photos (p. 30)

Reunion Dinners for the classes of:
‘48, ’53, ’58, ’63, ’68

Friday
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Continental Breakfast
Caltech Architectural Tour
Half Century Club Luncheon
Class of ’68 Discussion Forum
Torchbearer Social
Caltech Fund Cocktail Party
Class photos (p. 30)

Reunion Dinners for the classes of:

After Party @ Tom Mannion’s

Saturday
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81st Annual Seminar Day
Distinguished Alumni Awards
All Alumni Lunch
Graduate Student Poster Session
SURF Reunion
LGBTQ+ Social

House Reunions: Avery, Fleming, Lloyd, Page

Sunday
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Class of 1953 Farewell Breakfast
Caltech Y Lunch
Caltech Athletics Celebration
Alumni of Color Luncheon

House Reunions: Blacker, Dabney, Ricketts, Ruddock

2018 REUNION VOLUNTEERS

Class of 1953
Dale Burger, Chair
Andy Boush
Les Earnest
Rolf Hastrup
Al Johnson
Tom Stockebrand

Class of 1958
Gordon Glattenberg
Mitchell Seidman
Dick Van Kirk
Daniel Wulff

Class of 1963
Michael Krieger

Class of 1968
Peter Cross
Henry DeWitt
Len Erickson
Les Fettig
Leslie G. Fishbone
Eric Garen
John Lehman
Rock Levinson
Craig Maxwell
Craig SanPietro
B. Thomas Soifer
Richard Wright
Charles Zeller

Class of 1978
Antonio Martinez

Class of 1983
Cheryl Robertson

Class of 1993
Linda Maepa

Class of 1998
Jason Sekanina

Class of 2003
Shang-Lin Chen

Class of 2008
Nathan Donnellan
Chris Gonzales
Peter Haderlein
Peter S. Hung
Sarah Stidham
Mary Wahl

Class of 2013
Nina Budaeva
Supriya Iyer
Rebecca Lawler
Jomya Lei
Collin Murphy
Brice Nzeukou
Brian Penserini
Christian Rivas
Stephen Schwee
# REUNION WEEKEND SCHEDULE

## THURSDAY  MAY 17

### CLASS REUNIONS ’48, ’53, ’58, ’63, ’68

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>11:30 a.m.</td>
<td><strong>Class of 1953 Lunch</strong> Join your classmates for a reunion lunch at Tom Mannion’s home.</td>
<td>Tom Mannion’s House, 400 S. Hill Ave. / $30</td>
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<td>5:00 p.m.</td>
<td><strong>Science vs. Intuition: Why Scientific Ideas Elude the Human Mind</strong></td>
<td>Baxter Lecture Hall</td>
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<td>6:00 p.m.</td>
<td><strong>President’s Reception</strong> President Thomas F. Rosenbaum and Professor Katherine T. Faber welcome</td>
<td>Tent, President’s House Lawn</td>
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<tr>
<td>7:30 p.m.</td>
<td><strong>Reunion Dinners for Classes of ’48, ’53, ’58, ’63, ’68</strong></td>
<td>Athenaeum, 551 S. Hill Ave. / $75</td>
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## FRIDAY  MAY 18

### Continental Breakfast

Enjoy the company of your classmates and fellow alumni over an al fresco breakfast in the garden.

*Alumni House, 345 S. Hill Ave. / $10*

### Campus Architectural Tour

Learn about the history of Caltech’s architecture from Romy Wyllie, author of *Caltech’s Architectural Heritage: From Spanish Tile to Modern Stone* and director of Caltech Architectural Tour Service (CATS). Then gain a new perspective (and discover some hidden treasures) through a campus walking tour led by members of CATS.

- 9:30 a.m. Tour departs from Alumni House
- 10:00 a.m. Illustrated Lecture (45 minutes)
- 10:45 a.m. Walking Tour (1 hour)
- 11:45 a.m. Tour ends at the Athenaeum

*Departs from Alumni House, 345 S. Hill Ave.*

### Computing and Mathematical Sciences ‘Meeting of the Minds’

Join faculty, students, and researchers for a discussion and poster session of ongoing research from undergraduates, graduate students, and faculty that explores the concept of “CS + X”: disrupting science and engineering with computational thinking. Research presented will be wide-ranging, featuring the intersection of fields such as quantum computing, molecular programming, machine learning, big data, robotics, and autonomous systems.

- 2:00 p.m. Keynote Talk, 105 Annenberg
- 3:00 p.m. Poster Reception, outdoor vicinity, north of building

*Annenberg Building (auditorium and outdoor vicinity)*

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The Mind’s Eye: Richard Feynman in Word and Image

In work and play, Richard Feynman was a distinctively visual thinker. The Caltech Archives is telling the story of Feynman’s life and physics by exhibiting the notes and artwork through which he shared his vision. Highlights include the early Feynman diagrams with which Feynman developed his Nobel Prize-winning contributions to quantum electrodynamics, illustrated lecture notes for the famous Feynman lectures on physics, sketches of colleagues and campus sites, and photographs of Feynman as a teacher, drummer, and amateur actor.

*Beckman Institute, Beckman Museum, Room 131*

Half Century Club Luncheon

The Half Century Club is a special group of Caltech undergraduate and graduate alumni who received their degrees 50 or more years ago. Join us to honor the Class of 1968 as its members join the Half Century Club on the occasion of their 50th Reunion.

- 12:00 p.m. Check in and refreshments
- 12:15 p.m. Program and induction of the Class of 1968
- 12:30 p.m. Lunch

*Tent, Athenaeum Lawn, 551 S. Hill Ave. / $30 alumni and guests Free for the members of the classes of ’48, ’53, ’58, ’63, ’68*

Discussion Forum: Engineering Democracy 4.0

Applied Political Technology: Review how networked Alums can advance regular web-based e-Voting on policy and budget priorities to surmount gridlock, dysfunction and factionalism. Transforming informed electoral mandates into actual governance outcomes. This drop-in discussion is sponsored by the Class of 1968.

*Questions: Les Fettig ’68, lesfettig@DemocracyCaltech68.com*

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FRIDAY MAY 18

2:30 p.m. – 4:30 p.m.
Undergraduate Admissions Office Campus Tour and Information Session
This campus tour offers an insider’s perspective on what makes Caltech unique—from its innovative curriculum and student traditions to its world-class faculty and legacy of pioneering research.
2:30 – 3:30 p.m. Tour
3:30 – 4:30 p.m. Information Session
Undergraduate Admissions Office, 383 S. Hill Ave.

2:30 p.m. – 3:30 p.m.
Huntington Estate Tour
An easy outdoor walking tour that covers the central area of the estate including the world-renowned galleries and gardens. Guests are welcome to stay and explore the gardens until closing.
1151 Oxford Rd, San Marino / $34

2:30 p.m. – 4:00 p.m.
Torchbearer Social
Join us for appetizers and beer tasting while reminiscing with friends and colleagues. Open to members of the Torchbearers Legacy Society.
Athenaeum Rathskeller, 551 S. Hill Ave.

3:00 p.m. – 5:00 p.m.
Applied Physics/Materials Science Laboratories Reception and Tours
Please join us for a reception with faculty and graduate students from Applied Physics and Materials Science. Tours will be available of our labs and facilities.
Lobby, Watson Laboratories

3:00 p.m. – 5:00 p.m.
Retirement Celebration & Reception for Barbara Green
Alumni are invited to join us as we celebrate the retirement of Associate Dean of Undergraduate Students, Barbara Green, after nearly 30 years of dedication and service at Caltech. Enjoy an inviting ambience with delicious appetizers while reminiscing with students and alumni.
Lobby, Center for Student Services

5:30 p.m. – 7:30 p.m.
Caltech Fund Cocktail Party
Reconnect with your fellow alumni and meet the Class of 2018. Enjoy delicious cocktails and appetizers, snap a photo in our fun photo booth and don’t miss out on your reunion class photo! Celebrating Caltech’s community of supporters, this reception is open to all.
Class reunion photos will be taken during the party. Schedule on page 30.
Athenaeum Lawn, 551 S. Hill Ave. / Open to all

REUNION DINNERS

7:30 p.m. – 10:00 p.m.
Class of 1968 Buffet Dinner
Alumni House, 345 S. Hill Ave. / $60

8:00 p.m. – 10:00 p.m.
Athenaeum, 551 S. Hill Ave.
$75, Classes of ’73–’03 / Free, Class of ’08 and $75, guests / Free, Class of ’13 and one guest

10:00 p.m. – 1:00 a.m.
The Caltech Glee Club and The Caltech Orchestra Spring Concert
Ramo Auditorium / Free admission
Questions: (626) 395-3295

10:00 a.m. – 12:00 p.m.
After Party @ Tom Mannion’s
Join Tom Mannion, your fellow recent alumni (Classes of ’93–’17), and current seniors from the Class of 2018 for a late-night hangout with tasty bites and beverages. Memorialize the evening in our photo booth!
Tom Mannion’s House, 400 S. Hill Ave.

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SATURDAY MAY 19

8:30 a.m. – 5:30 p.m.
81st Annual Seminar Day
Hear from some of Caltech’s radically inventive minds at this year’s Seminar Day when faculty from across all six divisions and JPL scientists share their latest discoveries. For the full schedule of lectures and abstracts, see pages 12–29.
Beckman Mall, Registration Tent

10:00 a.m. – 12:00 p.m.
Caltech Seismological Laboratory Exhibit Center
Caltech, along with the U. S. Geological Survey, UC Berkeley, and the California Geological Survey, is coordinating earthquake monitoring efforts under the California Integrated Seismic Network (CISN). We will display the project’s exciting capabilities, including an internet-based, real-time ground-shaking map called ShakeMap used by critical users of earthquake information and demonstrate the earthquake early warning system currently under development, as well as other ongoing research.
South Mudd, Seismo Lab Exhibit, First Floor

10:00 a.m. – 12:00 p.m.
Science and SWEets: Family Activity
Join the Caltech Society of Women Engineers (SWE) in introducing your kids to the wonderful world of science. From interactive demos to liquid-nitrogen ice cream, there are plenty of activities for all Techer families. After all, does ice cream have an age limit?
Beckman Mall, Registration Tent
The Mind’s Eye: Richard Feynman in Word and Image
See page 5 for exhibition details.
Beckman Institute, Beckman Museum, Room 131

Linde + Robinson Laboratory for Global Environmental Science Tour
Renamed in honor of alumnus Ronald K. Linde (MS ’62, PhD ’64) and his wife, Maxine, the Linde + Robinson Laboratory for Global Environmental Science sets new standards in green design, with innovations from heating, cooling, and air conditioning to a visionary repurposing of the historic solar telescope. Learn about the building’s unique features and the groundbreaking research taking place here.
60-minute tours depart from the Linde + Robinson East Patio, wheelchair access is via the north door

Sherman Fairchild Library Open House
Librarians will discuss trends in scientific communication, digital publishing, and the changing role of the 21st century research library. Please stop by with your questions.
Sherman Fairchild Library

All Alumni Lunch
Join fellow alumni under the big tent for a boxed lunch or feel free to bring your own picnic and spread out a blanket on the lawn.
Beckman Mall, Tent | $15

Graduate Student Poster Session
Graduate students from across divisions and options will present research posters on their cutting-edge science. Sponsored by the Graduate Student Council.
Beckman Institute, Outside Courtyard

Caltech Archives Open House
Come explore Caltech’s history! We’ll be displaying letters, laboratory notebooks, and other papers of Caltech scientists and engineers like Millikan, Noyes, Hale, Morgan, Feynman, Richter, von Kármán, and Mead, as well as rare books dating back to the Scientific Revolution. We’ll also offer behind-the-scenes tours of our collection storage.
Beckman Institute, Suite B215

The Joint Center for Artificial Photosynthesis Tours
These tours are full. Please check in at the registration tent to be added to the waitlist.
Jorgensen Lab, Lobby

SPECTRE Open House & Sci-Fi Film Screening
It’s the 30th anniversary of SPECTRE, Caltech’s student-run science fiction and fantasy library! Chat with club members, browse the library’s 10,000+ volumes, serials, autographed copies, and action figurines, and recommend your favorite book to the next generation of SF&F fans!
Two sci-fi films will also be screened: Interstellar (2014) at 12:30 p.m. and The Last Starfighter (1984) at 3:30 p.m.
SAC B145 & B143 (below the South Houses)

SURF Reunion
Since 1979, more than 4,000 Caltech students have participated in the Summer Undergraduate Research Fellowship (SURF) program. If you were a SURFer, or are a friend of the program, please join us to reconnect with former classmates, chat with current SURF students, and learn about what’s new in undergraduate research at Caltech.
Parsons-Gates Lawn / Open to all

Page House Reunion
We’ll kick off with a wine and beer reception, followed by a 3-course meal (prepared and served by students) and the evening will culminate with stories from alumni and current students.
Page Courtyard / $25
 Questions: Alex Wuschner, awuschne@caltech.edu

Fleming House Reunion
ALRIGHT! Fellow Flems, come thunder with the herd once more and enjoy a good old-fashioned Fleming dinner. Throw napkins, hear the bell rung, and of course float some frosh! FBT.
Fleming House / $50
Questions: Sakthi Vetrivel, svetrive@caltech.edu

Caltech LGBTQ+ Social
Join the Caltech Center for Diversity and the campus LGBTQ+ student organizations PRISM and oSTEM for an evening of cocktails, hors d’oeuvres, and intimate conversation. We will hold a short program highlighting this year’s achievements and the work of LGBTQ+ student organizations. Alumni, students, faculty, and friends are welcome to attend!
Alumni House, 345 S. Hill Ave.
## SATURDAY MAY 19

**Avery House Reunion**

Averites are invited to our annual Avery House Reunion! Enjoy food, music and the company of your fellow Averites—both current students and alumni.

*Avery Library*

Questions: Adrian Huang, ajhuang@caltech.edu

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**Lloyd House Reunion**

Lloyd dresses up for a snazzy night of casino games with alumni and students, and a fun auction at the end of the night. Additionally, there will be an open bar, live band, snacks and refreshments, and room to dance!

*Lloyd House Lounge*

Questions: Simon Ricci, sricci@caltech.edu

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**The Caltech Glee Club and The Caltech Orchestra Spring Concert**

*Ramo Auditorium / Free admission*

Questions: (626) 395-3295

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**Caltech Athletics Celebration**

Celebrate and commemorate the rich history of intercollegiate athletics at Caltech as we celebrate the achievements of our 2017–2018 scholar-athletes and induct the fifth class into our Hall of Honor. Learn more at gocaltech.com.

*Eagle Jones ’01*
*Alexis Johnson ’98*
*Michael Keating ’88*
*Randolph ’Randy’ Lewis ’72*
*John Walah ’60*
*1949 SCIAC Champion Men’s Tennis Team*
*Coach William “Fox” Stanton – Track & Field, Cross Country, Football*

*Ramo Auditorium / Free, no registration required*

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**Dabney House Reunion**

Join your fellow Darbs for light snacks, refreshments and games.

*Dabney House Courtyard*

Questions: Sophie Piao, spiao@caltech.edu

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**Ricketts House Reunion**

Beer and Brats will be returning again this year! The name says it all; come enjoy a House barbeque, complete with a kiddie pool (vegetarian food and non-alcoholic beverages will also be available).

*Ricketts Courtyard*

Questions: Sarah Steele, ssteele@caltech.edu

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**Blacker House Reunion**

An afternoon to enjoy tea, hors d'oeuvres, and conversation with alumni and current students.

*Blacker House*

Questions: Hannah Chen, mole-vp@blacker.caltech.edu

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**Ruddock House Reunion**

Ruddock House Reunion is always a great time! Rudds and their families come together to reminisce with their classmates, contemporaries, and current students about their time in Ruddock and at Caltech. Join us for food, stories, and fun.

*Tom Mannion’s House, 400 S. Hill Ave.*

Questions: Siddharth Kurella, secretary@ruddock.caltech.edu

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## SUNDAY MAY 20

**Class of 1953 Farewell Breakfast**

Join your 1953 classmates for a breakfast and farewell hosted by Dale (BS ’53) and Suzanne Burger.

*Home of Dale and Suzanne Burger*

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**Caltech Y Lunch**

Open to all alumni who have fond memories of the Y and want to get updated on current activities. Stop by to enjoy good food, chat with friends, and share your favorite Y memory.

*Caltech Y Offices, 505 Wilson Ave., directly north of the Caltech Credit Union*

Questions: (626) 395-6163; caltechy@caltech.edu

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**Blacker House Reunion**

An afternoon to enjoy tea, hors d’oeuvres, and conversation with alumni and current students.

*Blacker House*

Questions: Sarah Steele, sstelee@caltech.edu

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**Ruddock House Reunion**

Ruddock House Reunion is always a great time! Rudds and their families come together to reminisce with their classmates, contemporaries, and current students about their time in Ruddock and at Caltech. Join us for food, stories, and fun.

*Tom Mannion’s House, 400 S. Hill Ave.*

Questions: Siddharth Kurella, secretary@ruddock.caltech.edu
8:30 a.m.  
Check-In and Continental Breakfast  
Tent, Beckman Mall

9:00 a.m.  
Session I

10:00 a.m.  
Session II

11:00 a.m.  
Session III – General Session

12:30 p.m. – 2:00 p.m.  
All Alumni Lunch  
Tent, Beckman Mall  |  $15

2:00 p.m.  
Session IV

3:00 p.m.  
Session V

4:00 p.m.  
Session VI

4:45 p.m. – 5:30 p.m.  
Wine and Cheese Reception  
Tent, Beckman Mall

**2018 SEMINAR DAY COMMITTEE**

Julie Jester Newman (BS ’14)  
Chair

Robert Gershman (BS ’62)  
Peter Groom (BS ’75)  
Jon Hamkins (BS ’90)  
Gregory Holk (MS ’91, PhD ’97)  
David Holtz (BS ’64)  
Justin Koch (BS ’15)  
Michael Krieger (BS ’63)  
Paul Levin (BS ’72)  
Oliver Losón (PhD ’14)  
Ira Moekatel (BS ’72)  
Jack Muir (PhD Candidate)  
Susan Murakami (BS ’75)  
Jeff Picard (BS ’15)  
Emilio Sovero (BS ’70, MS ’71, PhD ’77)  
Mike Stefanko (BS ’70)  
Gary Stupian (BS ’61)  
Nancy Thomas (PhD Candidate)  
Daniel Whelan (BS ’79, MS ’81, PhD ’85)  
David Zobel (BS ’84)

**THERE’S EVEN MORE!** For more events and activities on Seminar Day, browse the schedule on pp. 7–10.
<table>
<thead>
<tr>
<th>Location</th>
<th>Beckman Auditorium</th>
<th>Ramo Auditorium</th>
<th>Baxter Lecture Hall</th>
<th>155 Arms</th>
<th>201 E. Bridge</th>
<th>153 Noyes</th>
<th>119 Kerckhoff</th>
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</thead>
<tbody>
<tr>
<td><strong>9:00 a.m.</strong>&lt;br&gt;Session I</td>
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<td></td>
<td>Politics, Morality, and Innovation in Physical Science and Technology</td>
<td>Of Oxygen and Old Granites</td>
<td>The Story of Water on Mars</td>
<td>Deceiving the Superorganism: Infiltration of Ant Societies by Stealth Beetles</td>
<td>World's Fastest and Deepest-Penetration Cameras</td>
<td>The Extraordinary Journey: How Proteins Get Where They're Supposed To Go In Cells</td>
<td>Mapping Disasters from Space</td>
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<td></td>
<td>J. Buchwald</td>
<td>C. Bucholz</td>
<td>B. Ehlmann</td>
<td>J. Parker</td>
<td>L. Wang</td>
<td>T. Miller</td>
<td>S. Yun</td>
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<td><strong>10:00 a.m.</strong>&lt;br&gt;Session II</td>
<td>Toward the Robots of Science Fiction</td>
<td>How Good Cholesterol Protects Cell Membranes from Chemical Damage</td>
<td>The Story of Water on Mars</td>
<td>Ceres: A Unique Dwarf Planet in the Inner Solar System</td>
<td>Cosmic Fireworks</td>
<td>The Long Run Behavior of Random Walks</td>
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<td>A. Ames</td>
<td>J. Beauchamp (BS '64)</td>
<td>B. Ehlmann</td>
<td>C. Raymond</td>
<td>M. Kasliwal (MS '07, PhD '11)</td>
<td>O. Tamuz</td>
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<td><strong>11:00 a.m.</strong>&lt;br&gt;Session III</td>
<td>Distinguished Alumni Awards &amp; General Session</td>
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<tr>
<td></td>
<td>Welcome</td>
<td>Presentation of the Distinguished Alumni Awards</td>
<td>General Session</td>
<td>Keynote</td>
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<td></td>
<td>Chris Bryant (BS '95)</td>
<td>Thomas F. Rosenbaum President, Caltech Sonja and William Davidow Presidential Chair and Professor of Physics</td>
<td>Julie Jester Newman (BS '14) Chair</td>
<td>Growing Up Feynman Or: “Michelle, Where Do We Keep the Spoons Around Here?”</td>
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<td>Michelle Feynman</td>
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<td><strong>12:30 p.m.</strong></td>
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<td>How Good Cholesterol Protects Cell Membranes from Chemical Damage</td>
<td>Blue Sky Metropolis: The Aerospace Century in Southern California</td>
<td>Deceiving the Superorganism: Infiltration of Ant Societies by Stealth Beetles</td>
<td>Graduate Research Spotlight Talks</td>
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<td>P. Westwick</td>
<td>J. Parker</td>
<td>A. Ho</td>
<td>C. Kenseth</td>
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<td><strong>4:00 p.m.</strong>&lt;br&gt;Session VI</td>
<td>Ceres: A Unique Dwarf Planet in the Inner Solar System</td>
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<td>The Long Run Behavior of Random Walks</td>
<td>SURF Lecture Series</td>
<td>Learning From Jellyfish</td>
<td>Graduate Research Spotlight Talks</td>
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<td>A. Howard</td>
<td>O. Tamuz</td>
<td>J. Chan (BS '20) J. Gomez (BS '20)</td>
<td>L. Goentoro</td>
<td>J. Brake</td>
<td>A. Muthusamy</td>
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GENERAL SESSION  11:00 a.m. Beckman Auditorium

THE 2018 DISTINGUISHED ALUMNI AWARDS

The Caltech Distinguished Alumni Award is the highest honor the Institute bestows upon a graduate. Given in recognition of a particular achievement of significant value, a series of such distinctive achievements, or a career of noteworthy accomplishment, it celebrates the diverse impact of our alumni on science and society.

**Gary Demos**  (BS '71, Engineering and Applied Science)
*Image Essence LLC*
For his pioneering achievement in the development of computer-generated images (CGI) for use in motion pictures, and in digital film scanning and recording.

**Gary A. Flandro**  (MS '60, PhD '67, Aeronautics)
*Professor Emeritus, University of Tennessee Space Institute & Chief Engineer and Vice President, Gloyer-Taylor Laboratories*
For his seminal contributions to the design and engineering of multi-outer-planet missions, including the Grand Tour opportunity for the epic Voyager explorations.

**Jessica Tuchman Mathews**  (PhD '74, Biochemistry)
*Distinguished Fellow, Carnegie Endowment for International Peace*
For her contributions to shaping and advancing cooperation between nations on international policy, including nuclear proliferation, human rights, global health, and the environment.

**Arthur B. McDonald**  (PhD '70, Physics)
*Professor Emeritus, Queen's University*
For his discovery of neutrino oscillations and demonstrating that neutrinos have mass, which has changed our understanding of the building blocks of particle physics and of the cosmos as a whole. In 2015, Dr. McDonald was awarded the Nobel Prize in Physics.

**Ronald H. Willens**  (BS '53 Physics, MS '54 Mechanical Engineering, PhD '61 Engineering Science)
*Retired*
For his innovative and revolutionary contributions to advanced internet connectivity and telecommunications. He pioneered the Remote Authentication Dial-in User Service (RADIUS) as an access server authentication and accounting protocol, which was later adopted as Internet Engineering Task Force (IETF) standards.

KEYNOTE

GROWING UP FEYNMAN

Or: “Michelle, Where Do We Keep the Spoons Around Here?”

On May 11, 2018 we celebrate what would have been the 100th birthday of one of the most brilliant theoretical physicists and visionary thinkers of the 20th century, Richard Feynman (1918–1988). He was a scientist, Nobel Laureate, popular author, and beloved teacher and friend to many students. In addition to being a storyteller, an artist, an actor, an avid bongoist — and a father.

He is remembered for his assistance in the development of the atomic bomb, his fundamental contributions to quantum electrodynamics and his work as an advisor on the commission investigating the Challenger disaster.

But what about the personal side of this unique and multi-faceted icon? His daughter Michelle answers the oft-asked question: “What was it like to grow up with Richard Feynman as your father?”

Michelle Feynman

Michelle Feynman is the daughter of Richard Feynman. A graduate of Art Center College of Design, Michelle is the Assistant Director of Communications and a photographer at Polytechnic School. She lives with her family in Altadena, a few miles from where she grew up.

She has edited a collection of her father’s quotes called *The Quotable Feynman*, as well as *Perfectly Reasonable Deviations from the Beaten Track: The Letters of Richard P. Feynman*, a collection of letters to and from her father. Michelle has also gathered a compilation of her father’s artwork in a book entitled *The Art of Richard P. Feynman: Images by a Curious Character.*
TOWARDS THE ROBOTS OF SCIENCE FICTION

Science fiction has long promised a world of robotic possibilities. Achieving the promise of science fiction will require imbuing machines with the dynamic locomotion behaviors that humans display with deceptive ease—navigating everything from daily environments to uneven and uncertain terrain with efficiency and robustness. This talk will present the first steps toward achieving this goal on bipedal and humanoid robots with the result being dynamic and efficient locomotion displaying the hallmarks of natural human walking. The translation of these ideas to robotic assistive devices along with a wide range of safety-critical systems will be demonstrated with a view toward realizing the robots of science fiction.

HOW GOOD CHOLESTEROL PROTECTS CELL MEMBRANES FROM CHEMICAL DAMAGE

Hydroxyl radicals, also known as “nature’s detergent,” account for oxidative degradation of 90% of organic molecules released to the atmosphere from anthropogenic and natural sources. A variety of processes also create hydroxyl radicals in vivo, where they can cause oxidative damage to molecular components of cells and tissues. We have determined that cholesterol, typically 30 mole percent of the lipids in cell membranes, serves a non-sacrificial chemoprotective function, inhibiting the substantial chemical degradation that would otherwise occur.

OF OXYGEN AND OLD GRANITES

Both the atmosphere and solid earth underwent a major transformation c. 2.4 billion years ago. Atmospheric oxygen levels rose by multiple orders of magnitude and magmatic rocks fundamentally shifted in terms of both rock type and chemistry. However, the link, if any, between these two contemporaneous transitions is not well understood. In this talk, I will present my field-based research on a unique suite of granites, which have helped reveal connections between the atmosphere and the deep earth across this critical transition in Earth’s history.

POLITICS, MORALITY, AND INNOVATION IN PHYSICAL SCIENCE AND TECHNOLOGY

Controversy over the claims of science today roils the public sphere, particularly in the United States. This is not new. The pressures of politics, the desire to be first in innovation, moral convictions, and the potential dangers of unwitting error are all factors that have long been at work in both science and technology. We’ll examine several historical cases to better understand the dynamics that propel controversy.
### Bethany Ehlmann
*Professor of Planetary Science*
*Jet Propulsion Laboratory Research Scientist*
*Geological and Planetary Sciences*

**THE STORY OF WATER ON MARS**

Water is essential for life as we know it, and “following the water” has been the guiding principle for NASA’s landers, rovers, and orbiters for the last decade. My group’s work focuses on learning about Mars’ environment, climate, and potential habitats for life by studying the signs of watery environments in minerals and rocks. We’ve learned that ancient Mars was much like ancient Earth around the time of life’s origins.

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<td>9:00 a.m.</td>
<td>I</td>
<td>Bob Gersham</td>
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<td>Gregory Holk</td>
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### Andrew Howard
*Professor of Astronomy*
*Physics, Mathematics and Astronomy*

**SEARCHING FOR EARTH-LIKE PLANETS**

The search for extrasolar planets has uncovered a dizzying array of planetary systems. We have found new planet types — lava worlds and super-Earths — as well as planets orbiting more than one star. We will tour this diverse landscape with attention to planets similar to the Earth in their size, mass, and temperature. The recent discoveries give us tantalizing clues as to how our Solar System formed and point the way to detailed characterizations of atmospheres and compositions of Earth-like worlds using the next generation of telescopes.

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### Lea Goentoro
*Assistant Professor of Biology*
*Biology and Biological Engineering*

**LEARNING FROM JELLYFISH**

Did you know that if you tear one arm off a jellyfish, all the remaining arms will migrate around the body until the animal is symmetrical again? Or that despite having no brain, a jellyfish can apparently sleep? Jellyfish may seem remote from humans, but they have provided unexpected insights with potential implications for human health and technology: inspiring new smart materials, giving glimpses into the most ancient forms of sleep, and contributing to our dream of regenerating limbs.

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### Mansi Kasliwal (MS '07, PhD '11)
*Assistant Professor of Astronomy*
*Principal Investigator, GROWTH (Global Relay of Observatories Watching Transients Happen)*
*Physics, Mathematics and Astronomy*

**COSMIC FIREWORKS**

Our dynamic Universe is adorned by cosmic fireworks: energetic and ephemeral beacons of light that are a million (nova) to a billion (supernova) times brighter than our sun. On August 17, 2017, we witnessed cosmic fireworks unlike anything we had seen before. We saw two neutron stars merge and emit both gravitational waves and electromagnetic radiation spanning the gamma-rays, X-rays, ultra-violet, optical, infrared and radio. The astrophysics of the new fireworks suggests we are seeing the cocoon of a jet break out. The astrochemistry of the new fireworks suggests they serve as cosmic mines where various elements in the periodic table (e.g., Gold, Platinum, Uranium, Neodymium) are synthesized.

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**Thomas Miller**  
*Professor of Chemistry*  
*Chemistry and Chemical Engineering*

**THE EXTRAORDINARY JOURNEY:**  
*How Proteins Get Where They’re Supposed to Go In Cells*

Although proteins are synthesized only in specialized cellular locations, they are destined for delivery to all corners of the cell — and beyond. A key step in this delivery process is the efficient transport, or translocation, of the newly synthesized proteins across cell membranes, which involves a delicate balance between molecular processes. Recent studies offer high-resolution glimpses into the translocation process, but many fundamental aspects of its mechanism and regulation remain poorly understood. Miller’s presentation will focus on his lab’s efforts to computationally simulate the protein translocation process and to predict ways of controlling the targeting and delivery of proteins for therapeutic or biotechnological applications.

**Joseph Parker**  
*Assistant Professor of Biology and Biological Engineering*

**DECEIVING THE SUPERORGANISM:**  
*Infiltration of Ant Societies by Stealth Beetles*

What allows a freeloading outsider to don a disguise and infiltrate a tight-knit society? Extreme evolution. By means of rapid and dramatic behavioral, anatomical, and chemical adaptations, rove beetles can assimilate into ant colonies — normally fiercely xenophobic — and exploit their social hosts undetected. This remarkable group of parasites, the most species-rich family in the animal kingdom, provides a paradigm for studying other complex symbioses.

**Carol Raymond**  
*Dawn Mission Principal Investigator*  
*Jet Propulsion Laboratory*

**CERES: A UNIQUE DWARF PLANET IN THE INNER SOLAR SYSTEM**

Understanding how our solar system formed and where and when habitable environments existed are key questions to address the uniqueness of Earth and its life. The ion-propelled Dawn mission explored two fossils from the earliest epoch of our solar system’s history — the protoplanet Vesta and dwarf planet Ceres — to understand the conditions and processes at the dawn of our solar system. At Ceres, the mission has gathered evidence of geologic activity and clues pointing to an ancient subsurface ocean, placing Ceres in the important class of objects with astrobiological potential. This talk will present the highlights of Dawn’s 10-year exploration of the main asteroid belt and the fascinating dwarf planet Ceres.
Sang-Ho Yun  
Geophysicist and Radar Engineer  
Jet Propulsion Laboratory

**MAPPING DISASTERS FROM SPACE**

Modern satellite and cloud computing technology enables rapid production of damage maps after natural disaster events. Radar sensors mounted on Earth-orbiting satellites can “see” through clouds, day and night, with high enough sensitivity to detect individual house level damage. At NASA’s Jet Propulsion Laboratory and the California Institute of Technology, we have been developing a system to automatically generate such damage maps for major earthquakes, volcanoes, landslides, wildfires, hurricanes, floods, and tornadoes.

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Lihong Wang  
Bren Professor of Medical Engineering and Electrical Engineering  
Engineering and Applied Science

**WORLD’S FASTEST AND DEEPEST PENETRATION CAMERAS**

We developed compressed ultrafast photography (CUP) to record 10 trillion frames per second, 10 orders of magnitude faster than commercially available camera technologies. CUP can tape the fastest phenomenon in the universe, namely, light propagation, and can be slowed down for slower phenomena such as combustion. We also developed photoacoustic tomography (PAT) to peer deep into biological tissue. PAT provides in vivo omniscale functional, metabolic, molecular, and histologic imaging across the scales of organelles through organisms.

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Peter Westwick  
Director, Aerospace History Project, Huntington-USC Institute on California and the West  
The Huntington Library, Art Collections, and Botanical Gardens

**BLUE SKY METROPOLIS:**

*The Aerospace Century in Southern California*

Southern California as we know it would not exist without aerospace. Over the twentieth century the aerospace industry transformed the region into a sprawling high-tech nexus. Southern California aerospace helped the U.S. win both World War II and the Cold War; its commercial aircraft and communications satellites enabled globalization; and its contributions to space exploration continue to challenge our imagination. Based on the Aerospace History Project, a major initiative of the Huntington-USC Institute on California and the West, this talk will survey the aerospace century, looking at the region’s influence on aerospace and aerospace influences on the region including special challenges its history poses to modern scholarship.
Jonathan Chan (BS ’20)  
*Doris S. Perpall SURF Speaking Competition  
First Place*

**EXPLOITING THE ELECTRO-OPTIC EFFECT TO PROBE TOPOLOGICAL PHASE TRANSITIONS**

The Pockels (Electro-Optic) Effect allows us to control the polarization of light refracted out of a crystal. We exploit this feature to turn a Pockels Cell into an optical chopper, to improve the signal-noise ratio of a pump-probe setup. Ultimately, this approach fails due to the piezo-electricity of the crystal, though the Pockels Cell can and will be used in future setups to help study novel and exotic materials.

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Doris S. Perpall SURF Speaking Competition  
Second Place

**KEEP IT DRY**

A big problem in solar desalination is the buildup of corrosive salts in the seawater channel. Superhydrophobic surfaces and carbon nanotubes can potentially repel these salts because their surface structures support an air layer in between the surface-seawater interface. Over time, however, this air layer unavoidably becomes wet due to thermodynamics, reducing the surface’s ability to repel salt. We addressed this problem by identifying irregular structures that upon being wetted, can regenerate an air layer while fully immersed underwater.

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Anna Ho  
G3; Option: Astrophysics  
Physics, Mathematics and Astronomy

** STELLAR DETECTIVES: 
*Investigating the Catastrophic Deaths of Stars* 

The fate of a star — how it lives, how it dies, and the corpse it leaves behind — depends primarily on its mass. High-mass stars explode as supernovae and leave behind a neutron star or a black hole. In rare cases, accretion onto the rapidly rotating black hole acts as an “engine” that launches a jet of relativistic matter. We are investigating these “engine-driven” explosions using a network of robotic telescopes around the world and in space, centered at Caltech’s Palomar Observatory. Our discoveries will teach us how matter behaves in conditions too extreme for our laboratories on Earth.

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Christopher Kenseth  
G3; Option: Chemistry  
Chemistry and Chemical Engineering

**PULLING MOUNTAINS OUT OF THICK AIR**

Throughout the Los Angeles Basin, one cannot help but notice the air. On most days, one can see the air but not the San Gabriel Mountains. By and large, airborne particles, collectively termed atmospheric aerosol, are responsible for this view-obscuring pollution that reduces our air quality, impacts our climate, and adversely effects our health. Through a combination of advanced mass spectrometric, chromatographic, and synthetic techniques, my research seeks to decipher the molecular composition, origins, and formation mechanisms of atmospheric aerosol that are essential to unraveling its impacts on climate, air quality, and health.
Josh Brake  
G4; Option: Electrical Engineering  
Engineering and Applied Science  

SEEING THROUGH THE FOG  
Seeing through the human body with visible light is often thought to be the stuff of science fiction. While jellyfish and a small number of other animals have transparent bodies, the tissue of the vast majority of animals is opaque to visible light, making it difficult to see deep inside their bodies. The physical principle which causes this opacity is the same principle which makes it difficult to see through fog. In this talk, I will describe our recent work to develop and apply techniques which enable us to beat this opacity and focus light deep inside opaque media like biological tissue.

Anand Muthusamy  
G2; Option: Chemistry  
Chemistry and Chemical Engineering  

DRUGS IN THE BRAIN, INSIDE-OUT  
Brain function involves precise communication within circuits of nerve cells. When a drug—either from natural sources, or from a chemist—enters the scene, it can create specific distortions. Classical experiments show that neural drugs act by binding to their receptors on the outside of the cell membrane. But how does addiction arise from nicotine or opioid use? How do most antidepressants take weeks to work? A big hint: drugs can also enter cells. We have little data—but many ideas—about the consequences of this entry. I discuss novel fluorescent biosensors and imaging techniques that visualize the mechanisms underlying neural drug actions.

Nathan Stein  
G3; Option: Planetary Science  
Geological and Planetary Sciences  

TROUBLE IN PARADISE:  
The Impact of Hurricane Irma on a Modern Carbonate Platform  
On September 7, 2017, the category 5 Hurricane Irma slammed into the Turks and Caicos with sustained wind speeds of 175 MPH. Sitting directly in the path of the eye was a small, low-lying, uninhabited island that was the subject of detailed drone-based mapping just one month before. The serendipitous timing of this event allowed us to probe in great detail the impact of hurricanes on carbonate platforms. I will present field observations that address several fundamental questions: what changes during powerful storms, how does the system recover, and how is it reflected in the rock record?

Sofia Quinodoz  
G5; Option: Biology  
Biology and Biological Engineering  

HOW IS THE NUCLEUS OF THE CELL ORGANIZED SIMILAR TO THE CITY OF LOS ANGELES?  
Mapping How the Genome is Packaged Inside the Cell  
Biologists have been fascinated for decades by a central question: how do 3 billion bases of DNA, spanning 6 feet end-to-end, become compacted 360,000 times to fit into a nucleus of a cell? At first glance, it must seem this immense amount of DNA is randomly shoved into each cell—much like a bowl of spaghetti. However, the ~20,000 genes in the genome are actually highly organized inside the nucleus. We find that the genome is organized around different “hubs” inside the nucleus—much like Los Angeles is organized around hubs of freeways transporting people to different locations.
When is my reunion class photo?
Class photos take place before reunion dinners. Please report to the west steps of the Athenaeum by your appointed time, listed below:

Thursday, May 17
- Class of 1948 7:15 p.m.
- Class of 1953 7:20 p.m.
- Class of 1958 7:20 p.m.
- Class of 1963 7:25 p.m.
- Class of 1968 7:25 p.m.

Friday, May 18
- Class of 1973 6:45 p.m.
- Class of 1978 6:50 p.m.
- Class of 1983 6:55 p.m.
- Class of 1988 7:00 p.m.
- Class of 1993 7:05 p.m.
- Class of 1998 7:10 p.m.
- Class of 2003 7:15 p.m.
- Class of 2008 7:20 p.m.
- Class of 2013 7:25 p.m.

Where can I see photos from the weekend?
Visit the Caltech Alumni Association website at alumni.caltech.edu/reunion after the event.

How can I share my experience on social media?
We invite you to share your photos, videos, and thoughts from Reunion Weekend and Seminar Day using our hashtag:

#CaltechAlumni

Follow the Caltech Alumni Association on social media!

@CaltechAlumni

Where can I purchase Caltech memorabilia?
Visit the Caltech Store in their temporary location:
Millikan Library, 1st Floor.

Present your name badge for a 20% discount.

Thursday – Friday 9:00 a.m. – 5:30 p.m.
Saturday 10:00 a.m. – 5:00 p.m.

What are the dining options on campus?

Café at the Broad
Thursday – Friday 7:45 a.m. – 2:30 p.m.

Chandler Café
Thursday – Friday 7:00 a.m. – 3:30 p.m., 5:30 p.m. – 8:30 p.m.
Saturday – Sunday 9:00 a.m. – 3:00 p.m.

Red Door Marketplace (next to Chandler Café)
Thursday – Friday 7:30 a.m. – 1:00 a.m.
Saturday 12:00 p.m. – 8:00 p.m.
Sunday 3:00 p.m. – 1:00 a.m.

Is there wireless access?
Free wireless internet is available through the Caltech Guest network.
No password is needed.

Can I use the gym while I am in town?
Yes! Present your name badge at the Braun Athletic Center to receive the $10/day drop-in rate.

Thursday – Friday 6:00 a.m. – 10:30 p.m.
Saturday – Sunday 8:00 a.m. – 8:00 p.m.

How can I find out who’s attending?
Please visit the website at alumni.caltech.edu/reunion and click on See Who’s Coming. Attendee lists can be sorted by name, class year, or event — just click the drop down menu to make your selections. Additionally, there will be class lists at the Seminar Day registration tent on Saturday.

Is there childcare available?
Kids Klub Pasadena is offering childcare during the Weekend for children 2 – 12 years old. Please visit alumni.caltech.edu/faqs for more details.

How can I share my feedback and suggestions regarding Reunion Weekend and Seminar Day?
We would love to consider your feedback. Please go to alumni.caltech.edu/evaluation to share.
PARKING

Thursday, May 17 – Friday, May 18

Street Parking
Street parking is available on Hill Ave. between California and Del Mar Blvds. (Two-hour limits are not in effect these days.)

Holliston Parking Structure
with free permit
Guests can get their free parking permit at the pay station located on the third floor near the east stairwell.
1. From the main screen, select All-Day Permit
2. Press the # button
3. Enter code 2227921

This code will be valid all day on May 17 and 18. Users will not be charged.

Saturday, May 19 – Sunday, May 20

Parking Structures
Parking is available in the following Caltech structures and lots (permits are not necessary on these days):
- California Blvd. (underground)
- Wilson Ave.
- Holliston Ave.

Valet parking at the Athenaeum
Valet parking is available at the Athenaeum for the President’s Reception, Class Dinners, Fund Party, and Half Century Club Luncheon
Mark Your Calendars Now for

**Reunion Weekend 2019**  
May 16-19, 2019


Interested in volunteering to help out with your reunion? Class reunion committees are forming now. Contact Emily Fischer for more information at efischer@caltech.edu or (626) 395-1462.

82nd Annual Seminar Day  
May 18, 2019

[alumni.caltech.edu/reunion](http://alumni.caltech.edu/reunion)

Now Taking Nominations for the

**2019 Distinguished Alumni Awards**

Submit your nomination by August 24, 2018.

Selections are made by the President of Caltech based on recommendations from a committee comprising faculty, staff, and alumni; the President’s recommendations are confirmed by the Board of Trustees.

For more information, and to submit a nomination, go to:  

[alumni.caltech.edu/daa-nominate](http://alumni.caltech.edu/daa-nominate)