



Caltech Associates

discovering  
tomorrow  
today



fall | winter  
**2024**

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Isabella Faith  
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**On the cover.** This fall, the Associates will join Nobel Laureate and Caltech President Emeritus **David Baltimore** for an epicurean tour of California Wine Country in Napa and Sonoma Counties. Along the way, we'll learn about the sciences of enology (winemaking), viticulture (grape cultivation), aquaculture (marine farming), and caseiculture (cheesemaking).

Some narratives about our programs may be provided by the **Caltech Science Exchange**.



## Dear Associates Members and Friends,

Our fall/winter calendar includes many exciting events, and I'm delighted to share it with you.

Last year, we began including more "experiential" programs in locations that add dimension to the presentation topic. This season, we start in September with three such events in Pasadena, Orange County, and Northern California.

Before our tour of the Jet Propulsion Laboratory, **José Andrade** will brief us on a mission to study the asteroid Apophis as it passes closer to Earth than any asteroid in recorded history. During our visit to the Monterey Bay Aquarium, **Jess Adkins** will explain a novel technology to convert carbon emissions into common seawater elements. And at Mission San Juan Capistrano, severely damaged in an 1812 earthquake, **Nadia Lapusta** will describe new methods to interpret and predict seismic activity.

In October, we'll hear from two professors in Caltech's Humanities & Social Sciences division working

on research into human behavior in complementary ways. In New York, **Colin Camerer** will introduce the subject of neuroeconomics, the study of the biological basis for how we make complex choices. In Northern California, **Kirby Nielsen** will present her research into why humans often deviate from objectively rational decisions. These professors use multi-disciplinary investigations to help us better understand human behavior and avoid detrimental outcomes.

This has been a banner year for Associates membership growth, with more than 80 new households joining since October 2023. If you are among our new members, welcome! We hope you will find our events are stimulating opportunities to learn and make new friends.

On behalf of the Institute, thank you for your generous support. Your membership gifts contribute critical funding that helps recruit and retain the brightest minds and provides the latest tools to further their research. Associates events connect you to the discoveries that you helped make possible. I hope to see you soon!

Warmest regards,

**Catherine E. Reeves**  
Executive Director





## NORTHERN CALIFORNIA

# Carbon-Neutral Cargo Ships

Saturday, September 21, 2024, 1:00 pm • Monterey Bay Aquarium

Burning fossil fuels has led to excessive carbon dioxide (CO<sub>2</sub>) atmospheric concentrations, a principal cause of climate change. Cargo ships contribute approximately one gigaton—about 3 percent—of global carbon emissions each year. Nature buffers CO<sub>2</sub> excesses through a reaction with calcium carbonate (CaCO<sub>3</sub>), a compound found in limestone, chalk, and seashells. When CO<sub>2</sub> and CaCO<sub>3</sub> react, the result is calcium ions and bicarbonate, both of which are common in ocean water.

**Jess Adkins**, the Smits Family Professor of Geochemistry and Global Environmental Science, and his partners at Calceara are working on chemical reactors that harness this reaction and convert and release carbon emissions safely and permanently into the ocean as saltier water. The technology may help speed progress toward a carbon-neutral economy.

## PASADENA

# Tour of JPL

Thursday, September 12, 2024, 10:00 am • The Athenaeum and JPL

Founded by Caltech researchers and now managed by the Institute, NASA's Jet Propulsion Laboratory (JPL) is a leader in robotic space exploration.

Our program will begin with brunch at The Athenaeum and a presentation by **José E. Andrade**, the George W. Housner Professor of Civil and Mechanical Engineering. On April 13, 2029, Apophis, an asteroid the size of five football fields, will make the closest “flyby” of an asteroid in recorded history. Professor Andrade will describe an upcoming mission to map the surface and interior of Apophis, taking advantage of a rare opportunity to study an asteroid in such proximity to Earth.

Following the presentation, we'll depart by chartered coach for our private afternoon tour of JPL, where we'll visit the mission control center and spacecraft assembly facility.





## ORANGE COUNTY

# The Earthquake Machine

Thursday, September 26, 2024, 10:30 am  
Mission San Juan Capistrano

The San Andreas and other faults in California separate two tectonic plates that slowly move in opposite directions. The faults remain locked for many years and then catch up in sudden rupture events perceived as earthquakes. These occasional fast motions co-exist with much slower fault slips.

**Nadia Lapusta**, the Lawrence A. Hanson, Jr., Professor of Mechanical Engineering and Geophysics, will explain how laboratory-derived friction laws and sophisticated numerical models can reproduce all stages of past fault behavior in remarkable detail. This research brings us closer to understanding earthquake physics and new ways to assess seismic hazards.



## PASADENA

# Mt. Wilson Observatory

Thursday, October 10, 2024, 5:00 pm • San Gabriel Mountains

Enjoy dinner and an evening of stargazing with private access to the 100-inch telescope at the historic Mt. Wilson Observatory. Conceived by renowned astrophysicist and Caltech founder George Ellery Hale in 1904, Mt. Wilson Observatory is home to some of the most important telescopes in the development of modern astronomy.

## PASADENA

# President's Circle Dinner

Wednesday, October 23, 2024, 5:00 pm • The Athenaeum

President's Circle members are invited to join **William "Bil" Clemons**, the Arthur and Marian Hanisch Memorial Professor of Biochemistry, for dinner before his Watson Lecture that evening. Professor Clemons will discuss his background and research interests and answer questions from attendees. President's Circle members may request VIP seating for the Watson Lecture.







**NORTHERN CALIFORNIA**

# Rational Decision-Making

Saturday, October 26, 2024, 6:00 pm • Los Altos Golf and Country Club

Economic models often assume rational decisions, but a large body of evidence suggests that humans systematically deviate from benchmarks. These deviations can have significant consequences, such as discrimination.

Professor of Economics and William H. Hurt Scholar **Kirby Nielsen** will explain how a multidisciplinary approach is crucial for understanding human behavior. Through the interplay between decision theory and empirical evidence—and by combining tools from economics, psychology, biology, and neuroscience—we gain insight into individuals’ perceptions of uncertainty and the fundamental suppositions underlying how we model human decision-making. Professor Nielsen’s research aims to learn about these departures from rationality to identify ways to help people make better decisions and improve policy recommendations.

**NEW YORK CITY**

# Neuroeconomics

Thursday, October 24, 2024, 6:00 pm • Convene New York

When social sciences began to flourish in the 1970s, we could only guess how brains make complex decisions, such as economic choices. Today, in the field of neuroeconomics, we have increasingly sophisticated tools and methods to study the biological basis of self-control and decision-making.

Understanding neural circuitry may enable us to increase self-control and better understand, predict, and limit harmful collective behavior such as stock market exuberance and price bubbles.

**Colin Camerer**, the Robert Kirby Professor of Behavioral Economics, T&C Chen Center for Social and Decision Neuroscience Leadership Chair, and director of the T&C Chen Center for Social and Decision Neuroscience, will discuss findings and tools such as brain imaging using fMRI and eye tracking that records what people are looking at and their biological reactions.





PASADENA

## Holiday Luncheon

Thursday, December 12, 2024, 11:00 am  
The Athenaeum

Our annual holiday luncheon is one of our most popular events and an opportunity to gather with faculty, friends, and fellow Associates in the cheerful ambiance of The Athenaeum's festive decor.

This year, **Jean-Laurent Rosenthal**, the Rea A. and Lela G. Axline Professor of Business Economics and director of the Ronald and Maxine Linde Institute of Economic and Management Sciences, asks, "Why Do Entrepreneurs Want Control?" From Elihu Thomson and Herbert Dow in the late nineteenth century to Steve Jobs a hundred years later, many entrepreneurs have been stymied by their investors. Professor Rosenthal's presentation will explore why investors and entrepreneurs often clash and, thus, why control matters.

His research focuses on two critical variables that affect control: the cost of capital and legal rules that enable entrepreneurs to prevail even when, under "one-share, one-vote" governance, power would rest with their investors.

VIRTUAL

## Solving Chemical Riddles

Tuesday, November 19, 2024, 11:30 am • Via Zoom

The world is made of molecules. Any invention that involves the synthesis of a molecule, whether it be a new drug to treat cancer or a new designer molecule for an LED screen, has synthetic chemistry at its core. As such, synthetic chemistry is a common thread between disparate fields such as medicine, materials science, and energy research.

**Sarah Reisman**, Bren Professor of Chemistry and the Norman Davidson Leadership Chair in the Division of Chemistry and Chemical Engineering, is working on new methods to make small molecules with big impact. She will discuss current investigations in synthetic organic chemistry and describe how this research is integral to discovering and creating new medicines.

# Happy New Year!

# 2025



## NORTHERN CALIFORNIA

# President's Circle Dinner

Saturday, January 11, 2025, 5:00 pm  
San Francisco

Caltech President **Thomas F. Rosenbaum** and Professor **Katherine T. Faber** will visit the Bay Area to celebrate President's Circle members and their generous support of Caltech and share recent Institute highlights.



## ORANGE COUNTY

# Reading the Genome

Tuesday, January 14, 2025, 6:00 pm • Location to be determined

A fundamental goal of genetics is the ability to look at the sequence of a genome—the DNA instructions found in cells—and understand the differences between species and individuals. The better we become at “reading” the genome, the better we can understand fundamental biology, address genetic diseases to improve human, animal, and plant health, and ultimately “write” genomes for biotechnology applications.

**Paul Sternberg**, Bren Professor of Biology and the William K. Bowes Jr. Leadership Chair in the Division of Biology and Biological Engineering, will share his view of the state of the art in genetics. He will discuss how genome analysis, systematic genome editing, and data science, such as artificial intelligence, coupled with conceptual understanding (the old-fashioned “feel for the organism”), work together to allow unprecedented progress in genetics and its applications.





## Vietnam 2025

May 10 to 21, 2025, with optional two-day extension to Cambodia

From the sparkling waters of Halong Bay to the majestic Imperial City in Hue and the floating markets of the Mekong Delta, Vietnam is an enchanting confluence of history, culture, and vibrant modernity.

Join us for a 12-day journey through this vibrant Southeast Asian nation with **Brian Jacobson**, professor of visual culture.

## Tour Highlights

- Explore historic cultural landmarks, including the Temple of Literature, palaces of the Nguyen Dynasty, Thien Mu Pagoda, and Hoi An's UNESCO-listed Ancient Town.
- Sail stunning Halong Bay on a luxury overnight cruise with a flyover in a Cessna Grand Caravan seaplane.
- Relax and recharge in premium accommodations at Sofitel Metropole Hanoi, Silk Path Grand Hue Hotel and Spa, and private villas at the Four Seasons Resort The Nam Hai Hoi An.

Scan to view the tour  
brochure and full itinerary







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California Institute of Technology  
1200 E. California Blvd.  
MC 5-32  
Pasadena, CA 91125  
[associates.caltech.edu](http://associates.caltech.edu)

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