

CALIFORNIA INSTITUTE OF TECHNOLOGY



One Hundred Twenty-Fifth

Commencement

June 14, 2019

125th Annual Commencement
CALIFORNIA INSTITUTE OF TECHNOLOGY

Friday, June 14, 2019
10 a.m.

ACADEMIC PROCESSION

Chief Marshal

Nai-Chang Yeh, Ph.D.

Marshals

Diana L. Kormos-Buchwald, Ph.D.

Konstantinos P. Giapis, Ph.D.

David Prober, Ph.D.

Peter Schroeder, Ph.D.

Maria Spiropulu, Ph.D.

Faculty Officers

Geoffrey A. Blake, Ph.D.

Richard M. Murray, Ph.D.

MARCHING ORDER

Candidates for the Degree of Bachelor of Science

Candidates for the Degree of Master of Science

Candidates for the Degree of Doctor of Philosophy

Faculty Officers

The Faculty

The Chairs of the Divisions

The Deans

The Vice Provost

The Provost

The Vice Presidents

The Trustees

The Commencement Speaker

The President

The Chair of the Board of Trustees

PROGRAM

| | |
|--|---|
| ORGAN PRELUDE | Leslie J. Deutsch, Ph.D. |
| PROCESSIONAL | The Caltech Convocation Brass, Percussion, and Organ Ensemble <i>Glenn D. Price, D.M.A., Conductor</i> |
| PRESIDING | David L. Lee, Ph.D. <i>Chair of the Board of Trustees California Institute of Technology</i> |
| COMMENCEMENT SPEAKER | France A. Córdova (Ph.D. '79) <i>Director, National Science Foundation</i> |
| CHORAL SELECTION “Gaudeamus Igitur” Traditional, Arranged by Dr. Deutsch <i>(Translation on page 62.)</i> | The Caltech Glee Club, the Caltech Convocation Brass, Percussion, and Organ Ensemble <i>Nancy Sulabian, M.M., Conductor</i> |
| CONFERRING OF DEGREES | Thomas F. Rosenbaum, Ph.D. <i>President Sonja and William Davidow Presidential Chair and Professor of Physics California Institute of Technology</i> |
| PRESENTATION OF CANDIDATES FOR DEGREES | |
| For the Degree of Bachelor of Science | Kevin M. Gilmartin, Ph.D. <i>Dean of Undergraduate Students</i> |
| For the Degree of Master of Science | Douglas C. Rees, Ph.D. <i>Dean of Graduate Studies</i> |

For the Degree of Doctor of Philosophy

| | |
|------------------------------------|--|
| Biology and Biological Engineering | Stephen L. Mayo, Ph.D. <i>Division Chair</i> |
| Chemistry and Chemical Engineering | Jacqueline K. Barton, Ph.D. <i>Division Chair</i> |
| Engineering and Applied Science | Guruswami Ravichandran, Ph.D. <i>Division Chair</i> |
| Geological and Planetary Sciences | John P. Grotzinger, Ph.D. <i>Division Chair</i> |
| Humanities and Social Sciences | Jonathan N. Katz, Ph.D. <i>Deputy Chair</i> |
| Physics, Mathematics and Astronomy | Fiona A. Harrison, Ph.D. <i>Division Chair</i> |

ANNOUNCEMENT OF AWARDS AND
CONCLUDING REMARKS

President Rosenbaum

ALMA MATER

“Hail CIT”

by Manton Barnes, B.S. '21
Arranged by Raymond Burkhart
*(The audience may join in;
lyrics are on page 63.)*

The Caltech Glee Club, the Caltech
Convocation Brass, Percussion, and
Organ Ensemble

RECESSIONAL

The Caltech Convocation Brass,
Percussion, and Organ Ensemble

Organ Postlude

“The Throop Institute March,”
composed by E. C. Kammermeyer
in 1900 for the Throop Institute
Guitar and Mandolin Society

Dr. Deutsch

Livestreaming of Caltech's 2019 commencement ceremony will begin shortly before 10 a.m. on Friday, June 14, at www.caltech.edu.

Follow along with the day's events on Facebook, Twitter, and Instagram. Share your photos and join the celebration by using #Caltech2019. (See page 64 for more information.)

ABOUT CALTECH

Caltech, founded in 1891, is a world-renowned science and engineering institute that marshals some of the world's brightest minds and most innovative tools to address fundamental scientific questions and pressing societal challenges.

A Caltech education is notable for its rigorous curriculum, close collaborations with faculty, and small class sizes. Caltech students work toward undergraduate and graduate degrees alongside their intellectual equals in an academic environment that emphasizes interdisciplinary teamwork, critical thinking, mutual support, and a deep understanding of core concepts and principles across fields.

Students graduate from Caltech prepared to become world leaders in science, engineering, academia, industry, and public service. Graduates are well trained in their ability to identify, analyze, and solve challenging problems within and across science and engineering disciplines, and are prepared to apply and communicate their expertise broadly throughout their professional careers.

An independent, privately supported institution, Caltech manages the Jet Propulsion Laboratory (JPL) for NASA. Together with JPL, Caltech is Pasadena's largest employer and a source of programs that benefit the entire region. Caltech also owns and operates the Seismological Laboratory, more than 50 research centers and institutes, and a global network of astronomical observatories, including the Palomar and W. M. Keck observatories. In addition, the Institute co-founded and co-manages the Laser Interferometer Gravitational-wave Observatory (LIGO).

Caltech's faculty, students, postdoctoral scholars, and staff produce transformative breakthroughs in fields ranging from quantum science and engineering to bioinformatics to energy and sustainability. Caltech faculty and alumni have earned national and international recognition, including 39 Nobel Prizes.

We celebrate today the 586 graduates who will earn 240 bachelor's degrees, 139 master's degrees, and 207 Ph.D. degrees, and who will contribute to Caltech's impressive legacy and record of achievement around the world.

ABOUT THE SPEAKER

Dr. France A. Córdova is a distinguished astrophysicist, director of the National Science Foundation (NSF), and Caltech alumna (Ph.D. '79).

“Córdova brings to the Institute perspectives on governmental and academic leadership, grounded in her scientific training at Caltech,” Caltech president Thomas F. Rosenbaum said in his announcement to the Caltech community.

Appointed by President Obama in 2014 to lead the NSF, Córdova has developed interdisciplinary initiatives that cut across fields of scientific discovery, technological innovation, and STEM education. An \$8.1 billion independent federal agency, the NSF maintains the competitive advantage of the United States through programs that empower future generations of scientists and engineers, and foster U.S. prosperity and global leadership.

Before assuming her position at the NSF, Córdova served as president of Purdue University; chancellor of the University of California, Riverside; and vice chancellor for research and professor of physics at the University of California, Santa Barbara.

Córdova served as NASA's chief scientist from 1993 to 1996; at the time, she was the youngest person to hold the position and the first woman to do so. Prior to joining NASA, Córdova was on the faculty of the Pennsylvania State University, where she chaired the Department of Astronomy and Astrophysics. She earned a Bachelor of Arts degree from Stanford University before heading to Caltech, where she received her Ph.D. in physics.

Córdova's scientific contributions have been in the areas of observational and experimental astrophysics, multi-spectral research on X-ray and gamma-ray sources, and space-borne instrumentation. Among the many awards she has received is NASA's highest honor, the Distinguished Service Medal.

CANDIDATES FOR DEGREES

Bachelor of Science

- Robert Abrahamson *Hermosa Beach, California* Computer Science
- Ayya Alieva *Moscow, Russia* Applied and Computational Mathematics and Computer Science
(Minor)
- Diandra Sophia Almasco *San Diego, California* Mechanical Engineering
- Ritwik Anand *Bangalore, India* Applied and Computational Mathematics
- Vaibhav Anand *Northbrook, Illinois* Computer Science and Business, Economics, and
Management
- Michelle Angelica Anthony *Jakarta, Indonesia* Computer Science
- Maitreyi Ashok *Simi Valley, California* Electrical Engineering
- Daniel Rimoli Assumpcao *Bellevue, Washington* Electrical Engineering
- Mia Margaret Dapon *Austria Monmouth Junction, New Jersey* Bioengineering
- Dillon Christopher Azzam *New York, New York* Computer Science and Business, Economics,
and Management
- Jack Robert Heller Banaszak *Bethesda, Maryland* Physics
- Richard William Barz Jr. *Castle Rock, Colorado* Chemistry and Business, Economics, and
Management
- Amarbold Batzorig *Woodside, New York* Mechanical Engineering and Computer Science
(Minor)
- Patricia Ann Beekman† *Waxhaw, North Carolina* Computer Science
- David Manuel Francisco Berger Maneiro *Calabasas, California* Biology
- Nishanth Sai Bhaskara *La Crescenta, California* Computer Science and Mathematics
- Aadyot Bhatnagar *San Jose, California* Computer Science
- Urmi Bhaumik *Yorba Linda, California* Mechanical Engineering
- William Curtis Bloomquist *Campbell, California* Computer Science
- Enrico Zandomeni Borba *Brazil* Computer Science
- Eitan Borgnia *Baltimore, Maryland* Mathematics
- Amine Boubezari *Santa Clara, California* Computer Science and Business, Economics, and
Management

† *Students whose names are followed by a dagger are close to completion and will receive diplomas at the end of the academic year in which all graduation requirements are met.*

‡ *Students whose names are followed by a double dagger had their degrees conferred after the previous year's commencement ceremony.*

Bachelor of Science continued

Nadine Claire Bradbury *La Jolla, California* Chemistry
Tatiana Brailovskaya *Moscow, Russia* Applied and Computational Mathematics
Steven Samuel Brotz *Santa Clarita, California* Computer Science
Mark Robert Burleson *Ladera Ranch, California* Chemistry
Lazarina Vyacheslava Butkovich *Blue Springs, Missouri* Chemical Engineering (Biomolecular)
Brent Edward Cahill *Laguna Beach, California* Computer Science
Benjamin Calvin *Shawnee, Kansas* Astrophysics
Elyzabeth Camacho *Bentonville, Arkansas* Physics
Claudia Canamas-Donnelly *Oliva, Spain* Mechanical Engineering
Michaelangelo Valentino Amedeo Caporale *Clayton, North Carolina* Applied and
Computational Mathematics
Zachary Chase *Hollywood, Florida* Mathematics
Mohar Chatterjee *Kolkata, India* Mechanical Engineering and Business, Economics, and
Management
Grace S. Chen *San Diego, California* Computer Science
Hannah Chen *Cherry Hill, New Jersey* Mechanical Engineering
Joshua Chen *Diamond Bar, California* Computer Science
May Guo Chen *Dublin, Ohio* Electrical Engineering
Richard Chen *Columbia, South Carolina* Computer Science
Kathleen Anne Chinetti‡ *Aurora, Illinois* Physics
Rohan Chakrabarti Choudhury *Cupertino, California* Computer Science
Jonathan Robert Clements *Fountain Valley, California* Bioengineering
Maria Luiza Velozo Coelho dos Santos *San Diego, California* Astrophysics
Jonathan Davidsohn Cotler *Maplewood, New Jersey* Chemical Engineering (Materials)
Daniel Joseph Cushey *Cleveland, Ohio* Astrophysics
Elise Margaret Cutts *Portland, Oregon* Geobiology
Adam Dai *Santa Barbara, California* Electrical Engineering and Computer Science (Minor)
Michelle Eleanor Dan *Potomac, Maryland* Geobiology and Environmental Science and
Engineering (Minor)
Gefei Dang *Nanjing, People's Republic of China* Mathematics
Catherine Day *San Jose, California* Biology
James Deacon *Santa Barbara, California* Mechanical Engineering and Computer Science
Julia Christiana Deacon *Santa Barbara, California* Computer Science
Brian Deng *Walnut, California* Applied and Computational Mathematics and Business,
Economics, and Management
Alexander Denko *Austin, Texas* Physics and Mathematics

Bachelor of Science continued

- Ashna Dhingra *Houston, Texas* Chemical Engineering (Process Systems)
- Andrew Ding *Princeton, New Jersey* Computer Science
- Weiyi Ding *Beijing, People's Republic of China* Physics and Computer Science (Minor)
- Zachary Edward Domanico *San Diego, California* Computer Science
- Anne Hobbs Dorsey *Norfolk, Virginia* Engineering and Applied Science
- Christopher Patrick Dosen *Centennial, Colorado* Mechanical Engineering
- Rohan Prashant Doshi *West Windsor, New Jersey* Electrical Engineering
- Jennifer Sophia Du *Carbondale, Illinois* Electrical Engineering and History
- Shweta Dutta *South Brunswick, New Jersey* Electrical Engineering and English (Minor)
- Elizabeth Marie Eiden *White Plains, New York* Geophysics
- Alix Guadalupe Espino *El Paso, Texas* Computer Science
- Helen Victoria Evans *Columbus, Ohio* Chemistry
- Luke Finnerty *Winnetka, Illinois* Astrophysics
- Grzegorz Flores *Massapequa Park, New York* Computer Science
- Zoey Alexandra Flynn *Anchorage, Alaska* Mechanical Engineering
- Wayne Ming Fong *Los Angeles, California* Electrical Engineering
- Rafael Fuego-Gomez *Houston, Texas* Computer Science
- Maya Hydrea Fuller *Alameda, California* Astrophysics and Planetary Science (Minor)
- Nikhil Ghosh *Sunnyvale, California* Computer Science
- Mary Victoria Giambrone *Chicago, Illinois* Computer Science
- Shaurya Gilani *Chicago, Illinois* Bioengineering
- Matthew Aaron Gladstone *Oak Park, California* Biology
- Claire Marie Goeckner-Wald† *Plano, Texas* Computer Science and History
- Kristen Eileen Goodfriend *Orange, California* Chemical Engineering (Biomolecular)
- Thomas Christopher Gorordo *Snobomish, Washington* Physics
- Michael Anthony Goulet *Houston, Texas* Computer Science and English
- Eshan Govil *Redwood City, California* Engineering and Applied Science (Computation and Neural Systems)
- Muskaan Goyal *Apple Valley, Minnesota* Chemical Engineering (Materials)
- Reeti Kiran Gulati *Winter Springs, Florida* Chemistry
- David Heath Gunby *Potomac, Maryland* Physics
- Evan Ryan Gunter *Berkeley, California* Computer Science and Mathematics and Philosophy
- Nikhil Kumar Gupta *Oak Hill, Virginia* Computer Science and Business, Economics, and Management and Information and Data Sciences (Minor)
- Melissa Gutierrez *Pico Rivera, California* Geochemistry and Environmental Science and Engineering (Minor)

Bachelor of Science continued

- Nika Marsella Haleftiras *San Diego, California* Biology
- Nicholas Chase Haliday *Springfield, Virginia* Computer Science
- Clare Hao *Bothell, Washington* Computer Science
- Michael Jeffrey Hashe *Plano, Texas* Computer Science and Applied and Computational Mathematics
- Joey Hong *Campbell, California* Computer Science
- Bozhong Hu *San Francisco, California* Computer Science
- Tianyi Hu† *Qingdao, People's Republic of China* Engineering and Applied Science
- Yan Qi Huan *Republic of Singapore* Physics and Computer Science
- Cindy Huang *Vancouver, Canada* Mechanical Engineering
- Noah Allen Huffman *Littletown, Pennsylvania* Physics and Business, Economics, and Management
- Abraham Gabriel Hussain *Los Angeles, California* Computer Science
- Michael Vikiet Huynh *Simi Valley, California* Computer Science
- Daniil Valentinovich Ilyin† *Chicago, Illinois* Physics and Chemistry (Minor)
- Tiffany Ann Jager† *Dunkirk, New York* Computer Science
- Gyu Bin Jang *Moraga, California* Chemistry
- Sarah Jeoung *Lexington, Kentucky* Bioengineering
- Cherie Jia *Auckland, New Zealand* Computer Science
- Aya Jishi *Alhambra, California* Biology
- Katherine Marie Johnston *Livermore, California* Applied and Computational Mathematics
- Christopher Patrick Johnstone *Hudson, Ohio* Chemical Engineering (Biomolecular) and Computer Science (Minor)
- Maya Anusha Josyula *Cupertino, California* Mathematics and Computer Science (Minor)
- Luke William Juusola *Delano, Minnesota* Mathematics and Computer Science (Minor)
- Georgia Xerohemona Kafkoulis *Miami, Florida* Mathematics
- Hana Marissa Keller *Sammamish, Washington* Mechanical Engineering
- Dong Hyun Kim *Novi, Michigan* Electrical Engineering
- Suna Kim *Murphy, Texas* Mathematics
- Lydia Lazar Kivrak *Bryans Road, Maryland* Planetary Science
- Kai Christian Klocke *Portland, Oregon* Physics
- Joel Leonard Kosmatka *Encinitas, California* Mechanical Engineering
- Meera Krishnamoorthy *Saratoga, California* Electrical Engineering and Computer Science (Minor)
- Nikhil Krishnan *Philadelphia, Pennsylvania* Applied and Computational Mathematics
- Jonah Lev Krop *Santa Monica, California* Mechanical Engineering

Bachelor of Science continued

- Snigdha Kumar *Oak Hill, Virginia* Bioengineering
Christopher William Lamartina *Forest Hills, New York* Chemistry
Marcus Francois Lapeyrolerie *Cleveland Heights, Ohio* Applied Physics
Chih Chieh Lee *Encino, California* Computer Science
Hye Joon Lee *Seoul, Republic of Korea* Applied and Computational Mathematics
Renee Lee† *Seoul, Republic of Korea* Computer Science
Sara S. Lee *Closter, New Jersey* Bioengineering
Wen-Hua Lee *Taipei, Taiwan (ROC)* Chemical Engineering (Biomolecular)
Gideon Jack Leeper† *Brooklyn, New York* Mathematics
Chenyue Li *Hangzhou, People's Republic of China* Geophysics
Zixiao Li *Coppell, Texas* Electrical Engineering
Luke Liao *Palo Alto, California* Physics and Computer Science (Minor)
Charles Lien *Los Altos, California* Computer Science and Information and Data Sciences
(Minor)
Cody Lim *Los Angeles, California* Bioengineering
David Jimmy Lin *Los Angeles, California* Electrical Engineering
Abhishek Lingineni *Monroe Township, New Jersey* Computer Science and Business,
Economics, and Management and Philosophy (Minor) and Information and Data
Sciences (Minor)
Andre Liu *Novi, Michigan* Biology
Sophia Liu *Kildeer, Illinois* Electrical Engineering
John Frederick Lloyd *San Diego, California* Biology
Peter Carlton Lommen *Forest Grove, Oregon* Engineering and Applied Science (Materials
Science) and Geological and Planetary Sciences (Minor)
Dylan Lee Lu *Kingwood, Texas* Mechanical Engineering
Andrew Stephen Lucas† *San Gabriel, California* Chemical Engineering (Environmental)
Brian Ko-Hung Lue *The Woodlands, Texas* Chemistry
Filippos Lymperopoulos-Bountalis *Athens, Greece* Mechanical Engineering and History
and Computer Science (Minor)
Clara Anne MacFarland *Windsor, Colorado* Materials Science
Daniel Lewis Magley *Weaverville, North Carolina* Electrical Engineering
Chanukya Malla *Northville, Michigan* Computer Science
Michelle Kwan Lei Shan Marasigan *Elk Grove Village, Illinois* Mechanical Engineering
Nishad Maskara *Plainsboro, New Jersey* Physics and Computer Science (Minor)
Anirudh Mathukumilli *Highlands Ranch, Colorado* Computer Science
Jake Robert Mattinson *Northridge, California* Physics

Bachelor of Science continued

- Ishan Mazumdar *Plainsboro, New Jersey* Bioengineering
Kanan Kaushik Mehta *Lanham, Maryland* Mechanical Engineering
Walker Bruce Melton *Hinsdale, Illinois* Physics
Michael Sonny Miller *Highland Park, Illinois* Chemistry and Computer Science
Connor Kevin Moffatt *Charleston, West Virginia* Applied and Computational Mathematics
and Computer Science (Minor)
Kabir Auwal Mohammed *Winterville, North Carolina* Geobiology
Christopher Moon† *Los Angeles, California* Mathematics
Kana Julia Moriyama *Redmond, Washington* Mechanical Engineering
Marc Endre Mühleisen *Washington, District of Columbia* Physics and Mathematics
Tristan Dylan Née *Dallas, Texas* Computer Science
Charles Stewart Nelson *Clovis, California* Computer Science
Laura Maria Newport *Tenafly, New Jersey* Chemical Engineering (Biomolecular)
Danh Xuan Ngo *Garland, Texas* Chemistry
Derik Minh-Quang Nguyen *Anaheim, California* Electrical Engineering
Cormac Richard O'Neill *Melbourne, Australia* Mechanical Engineering and Aerospace
Engineering (Minor)
Suzanne Holly Oliver *Brockville, Canada* Mechanical Engineering and Computer Science
(Minor)
Julius Jacob Oppenheim *Montebello, New York* Chemistry
Umesh Janak Padia *Germantown, Maryland* Computer Science
Anusha Janardan Pai Asnodkar *Beaverton, Oregon* Physics
Jeffrey Pak *Irvine, California* Computer Science
Somasundara Pandian *Mandeville, Louisiana* Electrical Engineering
Ruchi Sandeep Pandya *Saratoga, California* Computer Science and Business, Economics, and
Management
Kinam Park *Savannah, Georgia* Computer Science
Vincent Insuh Park *Great Neck, New York* Business, Economics, and Management
Caroline Lee Paules *Thousand Oaks, California* Mechanical Engineering
Yashna Peerthum *Vacoas, Mauritius* Geochemistry
Changnan Peng *Shenzhen, People's Republic of China* Physics
Allison Nicole Penn *Lake Bluff, Illinois* Mechanical Engineering
Brittany Percin *Truckee, California* Biology
Isabella Carla Pestana *Miami, Florida* Chemical Engineering (Biomolecular)
Alyssa Noelle Poletti *Cherry Hill, New Jersey* Planetary Science and Environmental Science
and Engineering (Minor)

Bachelor of Science continued

Siddharth Prasad *Cupertino, California* Mathematics and Computer Science
Ethan Miller Pronovost *Reisterstown, Maryland* Computer Science and Mathematics
Shreya Ramachandran *Bangalore, India* Electrical Engineering
Anise Katapadi Rau *New York, New York* Astrophysics
Nicholas Evgenios Redd *Atlanta, Georgia* Applied Physics and Computer Science (Minor)
Tucker J. Reese *Kennett Square, Pennsylvania* Mechanical Engineering and English (Minor)
Julia Rachel Reisler *Plano, Texas* Computer Science
Alison Li Ren *Irvine, California* Bioengineering
Zhi Ren *Fremont, California* Mathematics
Peter Ian James Renn *Hamden, Connecticut* Mechanical Engineering
Anna Hei-Ming Resnick *Cerritos, California* Computer Science
Kelsi Meghan Riley *Bellevue, Washington* Computer Science
Charles Henry Ross *Pittsburgh, Pennsylvania* Physics
Aaron Conner Sartin *Apex, North Carolina* Computer Science and Economics
Madeline Duncan Schemel *Westport, Connecticut* Geochemistry
Michael Jonathon Seaman *Short Hills, New Jersey* Mathematics
Sophus Shackford *Edmond, Oklahoma* Electrical Engineering
Sunash Sharma *Lake Mary, Florida* Applied Physics and Computer Science
Aaron Hsuofeng Shih *Santa Monica, California* Chemical Engineering (Materials)
Kyung Min Shin *Johns Creek, Georgia* Computer Science and Business, Economics, and
Management and Information and Data Sciences (Minor)
Vaishnavi Shrivastava *Fremont, California* Computer Science
Kirby Sikes *Berkeley, California* Geophysics
Kavya Sreedhar *Lake Oswego, Oregon* Electrical Engineering and Business, Economics, and
Management
Akshay Kumar Srivastava *Apple Valley, California* Applied and Computational Mathematics
and Economics
Henry John Steiner *Petaluma, California* Mechanical Engineering and Aerospace
Engineering (Minor)
Maia Weiching Stiber *Kenmore, Washington* Computer Science
Madelyn Jane Stroder *Springfield, Missouri* Bioengineering
Paul Andrew Suffoletta *Danville, California* Mechanical Engineering
Hyung Ju (Terry) Suh *Seoul, Republic of Korea* Mechanical Engineering and Computer
Science
Neha Sunil *Sunnyvale, California* Mechanical Engineering
Gemma Rose Takahashi *San Jose, California* Geobiology

Bachelor of Science continued

Allison Young Tang *Walnut, California* Chemical Engineering (Biomolecular)
Kevin Jia Tat *Los Angeles, California* Computer Science
Aris Taychameekiatchai *Plano, Texas* Biology
Teresa Anh Tran *Irvine, California* Biology
Praful Krishna Vasireddy *Tulsa, Oklahoma* Electrical Engineering
Subhadra Vellore Vetrivel *Redmond, Washington* Computer Science
Andrew Zeyu Wang *Germantown, Maryland* Computer Science
Jessica Katherine Wang *San Diego, California* Bioengineering
Madelyn I-Hsuan Wang *Foster City, California* Engineering and Applied Science
(Computation and Neural Systems)
Max Wang† *Allen, Texas* Computer Science
Qifan Wang *Vancouver, Canada* Mechanical Engineering and Computer Science (Minor)
Felix Edward Weilacher *Penfield, New York* Mathematics
Alexander Dillon White *Carlsbad, California* Electrical Engineering
Sophie Rebecca Whitmeyer *Charlotte, North Carolina* Chemistry
Jonathan Willett *Edina, Minnesota* Mathematics
Bismark Wong *New York, New York* Mechanical Engineering
Brenda Wu *Rockville, Maryland* Chemistry
Emily Wu *Rochester, Minnesota* Physics
Matthew Enqi Wu *Naperville, Illinois* Computer Science
Timothy M. Wu *Irvine, California* Business, Economics, and Management
Yuxie Michelle Xiao *Memphis, Tennessee* Computer Science
Amy Yiting Xiong *Coralville, Iowa* Computer Science
Grace Xiong *Apex, North Carolina* Chemical Engineering (Materials)
Juliette Xiong *Phoenix, Arizona* Computer Science
Daniel Tian Xu *Berwyn, Pennsylvania* Electrical Engineering and Computer Science
(Minor)
Wenqing Xu *Boyd's, Maryland* Mathematics and Computer Science
Yaxin Xu *Cerritos, California* Chemical Engineering (Process Systems) and English (Minor)
Xiaohan Xue *Memphis, Tennessee* Physics and Computer Science (Minor)
Bianca Yang *San Diego, California* Computer Science
Julia Liu Yang *San Diego, California* Electrical Engineering
Kathleen Yang *Lexington, Kentucky* Electrical Engineering
Alejandro Jaime Yankelevich *Davis, California* Physics
Leyu Yao *Nanjing, People's Republic of China* Applied and Computational Mathematics
Alice Ruilin Zhai *La Cañada Flintridge, California* Applied and Computational Mathematics

Bachelor of Science continued

Max Zhan *Lexington, Kentucky* Physics and Computer Science (Minor)

Benjamin Zhao *Edmond, Oklahoma* Computer Science

Amy Yimeng Zhou *Glen Mills, Pennsylvania* Computer Science

Anne Zhou *Houston, Texas* Computer Science

Preston Zhou *Fremont, California* Physics

Master of Science

- Fatemeh Aghlmand (*Electrical Engineering*) B.S., University of Tehran 2008; M.S., Sharif University of Technology 2011.
- Fabio Kenji Arai (*Electrical Engineering*) B.S., California Institute of Technology 2018.
- Harpreet Singh Arora (*Applied Physics*) B.Tech., M.Tech., Indian Institute of Technology Bombay 2014.
- A. Taylor Baldwin (*Astrophysics*) B.S., Louisiana State University 2016.
- Aida Behmard (*Planetary Science*) B.S., Yale University 2015.
- Brett Berger (*Applied Physics*) B.S., Harvey Mudd College 2015.
- Camille Marie Bernal (*Materials Science*) B.S., University of California, San Diego 2016.
- Feng Bi (*Physics*) B.S., University of Science and Technology of China 2013.
- Ali Sina Booeshaghi (*Mechanical Engineering*) S.B., Massachusetts Institute of Technology 2017.
- Harriet Kate Brettle (*Planetary Science*) B.Sc., University of Warwick 2013.
- Parker Timothy Brown (*Space Engineering*) B.S., University of California, San Diego 2018.
- Robert Andrew Buarque de Macedo (*Applied Mechanics*) B.S., Carnegie Mellon University 2016.
- Fabricio Gianfranco Canales Escobedo (*Aeronautics*) B.Sc., Universidad Nacional de Ingeniería 2017.
- Yayaati Chachan (*Planetary Science*) B.A., M.Sc., University of Cambridge 2017.
- Celia S. Chari (*Materials Science*) B.A., Trinity College Dublin 2017.
- Rui Cheng (*Environmental Science and Engineering*) B.S., Sun Yat-sen University 2015; M.S., Lehigh University 2017.
- Yun-Ting Cheng (*Physics*) B.S., National Taiwan University 2014.
- Amyas Chew (*Physics*) S.B., Massachusetts Institute of Technology 2016.
- Laura Marie Chimiak (*Geochemistry*) B.A., Amherst College 2009.
- Devin Paul Cody (*Electrical Engineering*) B.S., Yale University 2017.
- Kyle Joshua Cook (*Aeronautics*) B.S., University of Utah 2018.
- Vincenzo Costanza (*Medical Engineering*) M.S., Swiss Federal Institute of Technology Zurich 2016.
- Mithi Alexa Caballes de los Reyes (*Astrophysics*) B.S., North Carolina State University 2016.
- Guannan Dong (*Geochemistry*) B.S., University of Science and Technology of China 2017.
- Theodore Marshall Donnell (*Chemistry*) B.A., Carleton College 2017.
- Madison Marie Douglas (*Geology*) S.B., Massachusetts Institute of Technology 2016.
- Dagny Fleischman (*Materials Science*) B.S., M.S., University of Pennsylvania 2012.
- Eric Michael Fries (*Physics*) B.S., University of Virginia 2015.
- Harold Jin Fu (*Chemical Engineering*) B.S., Cornell University 2016.
- Vatsa Bhupeshkumar Gandhi (*Aeronautics*) B.S., The University of Texas at Austin 2018.

Master of Science continued

- Hannalore Joy Gerling-Dunsmore (*Physics*) B.S., University of Maryland, College Park 2014.
- Leah Morgan Ginsberg (*Mechanical Engineering*) B.S., Georgia Institute of Technology 2016.
- Salvador Rey Gomez De La Cruz (*Aeronautics*) B.S., University of California, Berkeley 2018.
- Iuliia Gordiyenko (*Chemistry*) B.Sc., McGill University 2016.
- Josefine Berta Marie Graebener (*Space Engineering*) B.Eng., Aachen University of Applied Sciences 2017.
- Nian Guo (*Electrical Engineering*) B.Eng., The University of Hong Kong 2017.
- Daniel R. Guth (*Social Science*) B.S., California Institute of Technology 2016.
- Armian Hanelli (*Electrical Engineering*) A.S., Northern Virginia Community College 2014; B.S., Virginia Polytechnic Institute and State University 2016.
- Wade Daniel Hann-Caruthers (*Social Science*) B.S., California Institute of Technology 2016.
- Charles Jeffrey Hansen (*Chemical Engineering*) B.S., University of Pittsburgh 2017.
- Liam Frank Raven Heidt (*Aeronautics*) B.E., The University of Sydney 2017.
- Botao Hu (*Electrical Engineering*) B.S., Zhejiang University 2017.
- Sanle Hu (*Physics*) B.S., University of Science and Technology of China 2013.
- Yuping Huang (*Astrophysics*) B.A., Carleton College 2017.
- Mykyta Hulko (*Physics*) B.A., Cornell University 2013.
- Benjamin Rodo Idini Zabala (*Geophysics*) B.Sc., Universidad de Chile 2013; M.Sc., 2016.
- Prashant Gopalakrishnan Iyer (*Electrical Engineering*) B.Tech., Indian Institute of Space Science and Technology 2018.
- Zhe Jia (*Geophysics*) B.S., University of Science and Technology of China 2013; M.S., 2016.
- Gregory H Jones (*Chemistry*) B.S., The University of Tulsa 2016.
- Ghazaleh Kafaie Shirmanesh (*Applied Physics*) B.S., Sharif University of Technology 2012; M.S., 2014.
- Kousha Kalantari (*Electrical Engineering*) B.S., Sharif University of Technology 2013; M.S., Arizona State University 2017.
- Claudia Kenyon Kann (*Mechanical Engineering*) B.S., Rice University 2017.
- Raj Michael Katti (*Physics*) B.S., California Institute of Technology 2014.
- Areum Kim (*Applied Physics*) B.E., Chung-Ang University 2014; M.E., 2016.
- Eun Jong Kim (*Applied Physics*) B.S., Seoul National University 2016.
- Gunho Kim (*Mechanical Engineering*) B.S., Korea Advanced Institute of Science and Technology 2012.
- Kibeom Kim (*Biology*) B.A., Middlebury College 2012.
- Celeste Ritter Labeledz (*Geophysics*) B.S., University of Nebraska, Lincoln 2016.
- Joshua Max Lassman (*Space Engineering*) B.S., Pennsylvania State University 2018.
- Connor Tinghan Lee (*Space Engineering*) B.S., California Institute of Technology 2017.

Master of Science continued

- Dongil Lee (*Neurobiology*) B.S., University of Michigan, Ann Arbor 2010.
- Sangjun Lee (*Neurobiology*) B.S., Gwangju Institute of Science and Technology 2014.
- Chujun Lin (*Social Science*) B.S., Zhejiang University 2014.
- Junyu Liu (*Physics*) B.S., University of Science and Technology of China 2016.
- Menghan Liu (*Electrical Engineering*) B.Eng., Harbin Institute of Technology 2016.
- Yu Austin Liu (*Applied Physics*) B.S., Cornell University 2015.
- Yukai Liu (*Electrical Engineering*) B.S., Tsinghua University 2013.
- Joseph Jennings Lozier (*Physics*) B.S., Yale University 2011.
- Hangwen Lu (*Electrical Engineering*) B.S., Zhejiang University 2015.
- Éowyn Lucas (*Materials Science*) B.S., North Carolina State University 2017.
- Jie Luo (*Applied Physics*) B.S., The University of Hong Kong 2014.
- Brittany Nicole Lydon (*Mechanical Engineering*) B.S., University of Washington 2017.
- Jiajing Mao (*Physics*) B.S., University of Science and Technology of China 2016.
- Zachary R Mark (*Physics*) B.A., Oberlin College 2014.
- Nitika Marwaha (*Electrical Engineering*) B.E., Thapar University 2015.
- Paul Antoine Benoit Mazur (*Mechanical Engineering*) M.S., Georgia Institute of Technology 2012.
- Jihong Min (*Medical Engineering*) B.S., University of Illinois at Urbana-Champaign 2017.
- Anna Mitskovets (*Applied Physics*) B.S., Belarusian State University 2012; M.S., Karlsruhe Institute of Technology 2014; M.S., Aix-Marseille Université 2014.
- Widianto Putra Moestopo (*Mechanical Engineering*) B.S., University of Illinois at Urbana-Champaign 2017.
- Dustin Kurt Morris (*Geology*) B.S., Lafayette College 2017.
- Jack Broderick Muir (*Geophysics*) B.Phil., The Australian National University 2014.
- Nachiket Ramchandra Naik (*Mechanical Engineering*) B.S., Georgia Institute of Technology 2017.
- Luizetta Vadimovna Navrazhnykh (*Medical Engineering*) B.S., The University of Chicago 2016.
- Aurapat Ngamnithiporn (*Chemistry*) B.A., Carleton College 2015.
- Newton Nguyen (*Environmental Science and Engineering*) B.A., University of California, Berkeley 2016.
- Thong Quang Nguyen (*Physics*) B.S., The University of Texas at Dallas 2015.
- Chigozie Nri (*Bioengineering*) B.A., M.Sc., University of Cambridge 2013.
- Eric Ocegueda (*Mechanical Engineering*) B.S., University of California, Berkeley 2017.
- William Richard Palfey (*Geology*) B.S., Virginia Polytechnic Institute and State University 2017.
- Emily Hope Palmer (*Aeronautics*) B.S., The Johns Hopkins University 2018.

Master of Science continued

- Ayush Pandey (*Electrical Engineering*) B.Tech., M.Tech., Indian Institute of Technology Kharagpur 2017.
- Olivia Sabine Pardo (*Geophysics*) B.S., The University of Chicago 2017.
- Andrew Thomas Patterson (*Biology*) B.S., The University of Georgia 2014.
- Aaron Benjamin Pearlman (*Physics*) B.S., University of Maryland, Baltimore County 2010.
- Jacklyn M. Pezzato (*Astrophysics*) B.A., B.S., Swarthmore College 2017.
- Megan Elisabeth Phelan (*Materials Science*) B.S., Yale University 2015.
- Sean Nicholas Pike (*Physics*) Sc.B., Brown University 2015.
- Padmanabha Prasanna Simha (*Space Engineering*) B.Tech., Indian Institute of Space Science and Technology 2018.
- Yidan Qin (*Mechanical Engineering*) B.S., Washington University in St. Louis 2016.
- Cullen Mackenzie Quine (*Materials Science*) B.S., University of California, Los Angeles 2017.
- Karthik Ramachandran (*Chemical Engineering*) B.S., The University of Iowa 2012.
- Jamie Sue Rankin (*Physics*) B.S., University of Utah 2011.
- Peter Ian James Renn (*Aeronautics*) B.S., California Institute of Technology 2019.
- Kevin Patrick Roback (*Geology*) B.S., University of Michigan, Ann Arbor 2016.
- Jake Herschel Lebi Rochman (*Electrical Engineering*) B.A.Sc., University of Waterloo 2016.
- Julian P Rosker (*Electrical Engineering*) B.S., Georgia Institute of Technology 2018.
- Hyeongjoo Row (*Chemical Engineering*) B.S., Seoul National University 2017.
- Josef Matthew Sabuda (*Mechanical Engineering*) B.S., University of Illinois at Urbana-Champaign 2017.
- Megan Suzanne Schill (*Materials Science*) B.A., University of California, Merced 2015.
- Shane Shayan Shahrestani (*Medical Engineering*) B.S., University of California, Los Angeles 2016.
- Zhichao Shen (*Geophysics*) B.S., University of Science and Technology of China 2013; M.S., 2016.
- Yaseman Shiri (*Electrical Engineering*) B.S., Capitol Technology University 2017.
- Andrew Wills Singletary (*Mechanical Engineering*) B.S. (*Mechanical Engineering*), B.S. (*Nuclear and Radiological Engineering*), Georgia Institute of Technology 2017.
- Richard Daniel Smith (*Electrical Engineering*) B.S., The George Washington University 2015.
- Emma Sofia Sosa (*Geology*) B.S., Lafayette College 2017.
- Sarah Katherine Speed (*Biochemistry and Molecular Biophysics*) B.S., University of North Carolina at Chapel Hill 2015.
- Oliver Laurent Stephenson (*Geophysics*) B.A., M.Sc., University of Cambridge 2015.
- Benjamin Carter Stevens (*Mechanical Engineering*) B.S., Rose-Hulman Institute of Technology 2017.

Master of Science continued

- Shihan Su (*Electrical Engineering*) B.A., University of Nottingham 2010; M.Sc., Imperial College London 2011.
- Xin Su (*Electrical Engineering*) B.Eng., Tsinghua University 2017.
- Garret Chee-Anth Sullivan (*Electrical Engineering*) B.S., California Institute of Technology 2018.
- Alessio Tamborini (*Medical Engineering*) B.S., Boston University 2018.
- Ellande Tang (*Mechanical Engineering*) B.S., University of California, Berkeley 2017.
- Brian Martin Timar (*Physics*) B.A., University of California, Berkeley 2016.
- Brandon John Toy (*Electrical Engineering*) B.S., University of California, Los Angeles 2018.
- Alvita Eda Tran (*Computation and Neural Systems*) B.S., University of California, San Diego 2014.
- Rhondale Tso (*Physics*) B.S., Embry-Riddle Aeronautical University 2012.
- Maegan Lindsay Tucker (*Mechanical Engineering*) B.S., Georgia Institute of Technology 2017.
- Grant Van Horn (*Computer Science*) B.S., University of California, San Diego 2012; M.S., 2014.
- Shreyas Vissapragada (*Planetary Science*) B.A., Columbia University 2017.
- Renée Zurui Wang (*Geochemistry*) B.S., University of Southern California 2016.
- Ethan Francis Williams (*Geophysics*) B.S., Stanford University 2017.
- Yan (Echo) Wu (*Electrical Engineering*) B.S., The University of Tokyo 2016.
- Yu-Wei Wu (*Electrical Engineering*) B.S., National Taiwan University 2017.
- Kewei Xu (*Chemistry*) B.S., Syracuse University 2015.
- Sisir Yalamanchili (*Materials Science*) B.Tech., M.Tech., Indian Institute of Technology Bombay 2013.
- So-Yoon Yang (*Electrical Engineering*) B.S., Seoul National University 2017.
- Jason Miao Yu (*Chemistry*) B.S., University of California, Irvine 2017.
- Qicheng Zhang (*Planetary Science*) B.S., University of California, Santa Barbara 2017.

Doctor of Philosophy

DIVISION OF BIOLOGY AND BIOLOGICAL ENGINEERING

David Angeles Albores (*Biochemistry and Molecular Biophysics*) B.A., Cornell University 2013.

Thesis: A Theory of Genetic Analysis Using Transcriptomic Phenotypes.

Vineet Augustine (*Computation and Neural Systems*) B.S., M.S., Indian Institute of Science Education and Research, Kolkata 2013.

Thesis: Neural Architecture Underlying Thirst Regulation.

David Wagdi Basta (*Microbiology*) B.S., University of Nevada, Las Vegas 2010.

Thesis: Genetic Determinants of Growth Arrest Survival in the Bacterial Pathogen *Pseudomonas aeruginosa* and the Role of Proteases.

Jounhong Ryan Cho (*Computation and Neural Systems*) B.S., The Johns Hopkins University 2008; M.S.E., University of Pennsylvania 2009.

Thesis: Optical Imaging of Dopamine Dynamics and Decoding Its Role in Arousal and Salience.

Nicholas C Flytzanis (*Biology*) S.B., Massachusetts Institute of Technology 2010.

Thesis: From Single-Cell to Whole-Body: Developing a Molecular Neuroscience Toolkit.

Trevor Michael Fowler (*Bioengineering*) B.S., University of Washington 2007; M.S., 2008.

Thesis: Silicon Neural Probes for Stimulation of Neurons and the Excitation and Detection of Proteins in the Brain.

Luke Stephen Frankiw (*Molecular Biology and Biochemistry*) B.S., California Institute of Technology 2015.

Thesis: mRNA Splicing-Mediated Gene Expression Regulation in Innate Immunity.

Christopher Lee Frick (*Biochemistry and Molecular Biophysics*) B.S., Whitworth University 2012.

Thesis: How Single Cells Sense Smad3 Signal.

Peng He (*Genetics*) B.S., The University of Hong Kong 2012.

Thesis: The Changing Mouse Embryo Transcriptome at Whole Tissue and Single-Cell Resolution.

Matiar Jafari (*Biology*) B.S., University of California, Irvine 2011.

Thesis: Neural Correlates of Sensorimotor Control in Human Cortex: State Estimates and Reference Frames.

When more than one field of study is listed, the first is the major and the second and others are minors.

Doctor of Philosophy continued

- Tahmineh Khazaei (*Bioengineering*) B.A.Sc., University of Toronto 2009; M.A.Sc., 2011.
Thesis: Metabolic Bi-Stability and Hysteresis in a Model Microbiome Community.
- Kibeom Kim (*Systems Biology*) B.A., Middlebury College 2012.
Thesis: Memory and Decoding in Signaling Transduction Pathways.
- Anupama Lakshmanan (*Bioengineering*) B.E., National University of Singapore 2010.
Thesis: Engineering Acoustic Protein Nanostructures for Non-Invasive Molecular Imaging Using Ultrasound.
- James Siho Lee (*Biology*) B.S., California State University, Los Angeles 2010.
Thesis: The Genomics of Stress-Induced Life Cycle Decisions in Nematodes.
- Russell DeRieux Lewis (*Bioengineering*) B.S., University of California, San Diego 2014.
Thesis: Evolution and Characterization of Carbene Transferases for Cyclopropanation and Carbon-Silicon Bond Formation.
- Jonathan C. Liu (*Genetics*) B.S., The Johns Hopkins University 2009; M.S., 2011.
Thesis: Engineering and Application of cGAL, a GAL4 Bipartite Expression System for *Caenorhabditis elegans*.
- Harry James Rogan Nunns (*Systems Biology*) B.A., University of California, Berkeley 2012.
Thesis: Linearity in Cell Signaling Pathways.
- Pradeep Ramesh (*Bioengineering*) B.S., California Institute of Technology 2011.
Thesis: Imaging and Control of Engineered Cells Using Magnetic Fields.
- Catherine Elizabeth Schretter (*Biology*) B.A., University of Virginia 2011.
Thesis: Microbial Modulation of Host Locomotion.
- Zixuan Shao (*Bioengineering*) B.S., University of California, San Diego 2012.
Thesis: Biological Responses to Therapeutic Treatments of Human Vascular Diseases.
- Pei-Yin Shih (*Biology*) B.S., National Taiwan University 2006; M.S., 2008.
Thesis: The Ethology of Stress in Nematodes.
- Vipul Singhal (*Computation and Neural Systems*) B.Eng., Imperial College London 2010.
Thesis: Modeling, Computation, and Characterization to Accelerate the Development of Synthetic Gene Circuits in Cell-Free Extracts.
- Haoqing Wang (*Biochemistry and Molecular Biophysics and Computational Science and Engineering*) B.S., The Hong Kong University of Science and Technology 2013.
Thesis: Structure and Dynamics of HIV-1 Env Trimer.
- Lynn Donglin Yi (*Systems Biology*) A.B., Harvard College 2012.
Thesis: Statistical Methods for Gene Differential Expression Analysis of RNA-Sequencing.

Doctor of Philosophy continued

DIVISION OF CHEMISTRY AND CHEMICAL ENGINEERING

Jordan Casey Beck (*Chemistry*) Sc.B., Brown University 2014.

Thesis: Reaction Development for the Total Syntheses of the Terpenoid Natural Products (+)-Psiguadial B, (+)-Rumphellaone A, and (-)-Isodocarpin.

Antoinette Elisabeth Maria Blom (*Chemistry*) B.S., University of Technology Delft 2009; M.Sc., Leiden University 2012.

Thesis: Functional Evaluation and Development of Novel Agonists and Modulators of Neuronal Ion Channels.

Catriona Emily Wilson Blunt (*Chemistry*) B.A., Smith College 2012.

Thesis: Noncovalent Interactions of Silent Agonists Binding to the Nicotinic Acetylcholine Receptor -and- Investigation into Expanding the Substrate Scope and Improving the Efficiency of Organic Photochemical Protecting Groups.

Emily Elizabeth Blythe (*Biochemistry and Molecular Biophysics*) B.A., Grinnell College 2012.

Thesis: Characterization of Adaptor Binding and Substrate Processing by VCP/p97.

Kelsey M. Boyle (*Chemistry*) B.S., University of Minnesota 2013.

Thesis: Exploring the Biological Activity of Rhodium Metalloinsertors.

Eric William Burkholder (*Chemical Engineering*) B.S., Cornell University 2014; M.S., California Institute of Technology 2016.

Thesis: Single Particle Motion in Active Matter.

Wen Chen (*Biochemistry and Molecular Biophysics*) B.S., Peking University 2012.

Thesis: Proteomics Profiling and Functional Characterization of *Caenorhabditis elegans* Excreted/Secreted Proteins.

Un Seng Chio (*Chemistry*) B.A., Cornell University 2012.

Thesis: Mechanistic Bases for Privileged Capture and Unidirectional Targeting of Tail-Anchored Proteins by the Get3 ATPase.

Nicholas Glenn William Cowper (*Chemistry*) B.Sc., Queen's University 2010.

Thesis: The Development of a Synthetic Strategy Toward Oxazine-Containing Natural Products Enabled by Novel Copper Catalysis.

Amanda Grantz Pansing (*Chemical Engineering*) B.S., Rose-Hulman Institute of Technology 2008; M.S., California Institute of Technology 2010.

Thesis: Aerosol Particle Measurements: Strategies for Health-Relevant Data Collection and Analysis.

Denise Christine Grünenfelder (*Chemistry*) B.A., Boston University 2010.

Thesis: Synthetic Strategies for the Total Synthesis of Acutumine Alkaloids and the Development of Radical Deoxychlorination Reactions.

Doctor of Philosophy continued

- Arthur Han (*Chemistry*) B.A., Columbia University 2013.
Thesis: Synthetic Strategies for the Total Synthesis of the Ryanoid and Isoryanoid Diterpenes.
- Kareem Imad Hannoun (*Chemistry*) B.S., The University of Chicago 2013.
Thesis: Mechanistic Study of Cu-Mediated, Photoinduced C–S Bond Formation and Demonstration of Electrochemical Ammonia Production by a Surface-Attached Iron Complex.
- Samuel Hin-Yuen Ho (*Chemistry*) B.S., University of California, Berkeley 2013.
Thesis: Chemical Tools for Protein Imaging in Live Bacterial Cells.
- Julie Lyn Hofstra (*Chemistry*) B.S., California State University, Fullerton 2014.
Thesis: Development and Mechanistic Studies of Ni-Catalyzed Asymmetric Reductive Cross-Coupling Reactions.
- Yufeng Huang (*Chemical Engineering*) B.S., M.S., Rensselaer Polytechnic Institute 2012.
Thesis: Computational Heterogeneous Electrochemistry — From Quantum Mechanics to Machine Learning.
- Ferdinand Michael Huber (*Biochemistry and Molecular Biophysics*) B.S., Ludwig Maximilian University of Munich 2011; M.S., 2013.
Thesis: Molecular Basis for Ribosomal Protein Protection from Cellular Degradation.
- Aileen Oyama Hui (*Chemistry*) B.S., University of California, Berkeley 2008.
Thesis: Atmospheric Peroxy Radical Chemistry Studied by Infrared Kinetic Spectroscopy.
- Yu-Hsien Hwang-Fu (*Chemistry*) B.S., National Taiwan University 2011.
Thesis: Dynamic Regulations of Co-translational Protein Targeting by the Signal Recognition Particle Receptor in *E. coli* and Human.
- John Bryce Jarman (*Chemistry*) B.S., University of California, Berkeley 2012.
Thesis: Chemical Tools for the Control of Biological Systems.
- Jong Hun Kang (*Chemical Engineering*) B.S., Seoul National University 2009; M.S., 2014; M.S., California Institute of Technology 2017.
Thesis: I. Shape Selectivity of Small-pore Molecular Sieves for the Methanol-to-Olefins Reaction and II. Synthesis and Topotactic Transformation of Germanosilicate CIT-13.
- Joey Dongjin Kim (*Chemical Engineering*) B.S., University of Delaware 2012; M.S., California Institute of Technology 2014.
Thesis: Effects of Branching on Conformation, Crystallization, and Self-Assembly of Polymers.
- Mark T. Kozlowski (*Chemistry*) B.S., University of Pittsburgh 2012.
Thesis: Use of Recombinant Self-Associating Proteins for Altering Cellular Fate and Behavior.
- Alexis Anna Kurmis (*Chemistry*) B.A., Columbia University 2013.
Thesis: Activity of Py-Im Polyamides in Anti-Androgen Resistant Prostate Cancer Models.

Doctor of Philosophy continued

- Heui Beom Lee (*Chemistry*) B.S., University of Pennsylvania 2013.
Thesis: Electronic Structure and Spectroscopy of Tetranuclear Mn_4O_4 and $CaMn_3O_4$ Complexes as Models of the Oxygen Evolving Complex in Photosystem II.
- Jae Ho Lee (*Chemistry*) B.A., Cornell University 2010.
Thesis: Mechanisms of Co-Translational Protein Targeting by Mammalian SRP.
- Steven Anthony Loskot (*Chemistry*) B.S., Seattle University 2014.
Thesis: Applications of the Enantioselective Allylic Alkylation Toward the Synthesis of Complex Natural Products.
- Choon Heng Low (*Chemistry*) B.Sc., Imperial College London 2012.
Thesis: Hemilabile, Non-Innocent (Poly)arylene Donors for Accessing Novel Reactivity at Transition Metal Centers.
- Carson Douglas Matier (*Chemistry*) B.Sc., University of Alberta 2013.
Thesis: Copper and Nickel Catalysis for the Construction of Novel C-N and C-C Bonds.
- Ivan A. Moreno-Hernandez (*Chemistry*) B.S., University of Nebraska, Lincoln 2014.
Thesis: Earth-Abundant Metal Oxides for Anodic Reactions in Acidic Electrolytes.
- Richard Albert Mosesso (*Chemistry*) Sc.B., Brown University 2014.
Thesis: Mechanistic Investigations of Receptor Signaling via Canonical and Non-Canonical Amino Acid Mutagenesis.
- Ahmad Khalid Omar (*Chemical Engineering*) B.S., The University of Texas at Austin 2013; M.S., California Institute of Technology 2015.
Thesis: Dynamics, Mechanics and Stability of Physical Gels.
- Dan Ilya Piraner (*Biochemistry and Molecular Biophysics*) B.S., Purdue University 2012.
Thesis: Tunable Thermal Bioswitches as a Control Modality for Next Generation Therapeutics.
- Kelsey Elizabeth Poremba (*Chemistry*) B.A., College of the Holy Cross 2014.
Thesis: Development of Nickel-Catalyzed Asymmetric Reductive Cross-Coupling Reactions.
- Eric Praske (*Chemistry*) B.S., Pitzer College 2013.
Thesis: Intramolecular Hydrogen-shift Reactions of Peroxy Radicals.
- Asher Raphael Preska Steinberg (*Chemistry*) B.A., Brandeis University 2013.
Thesis: How Polymers Shape the Physicochemical Environment of the Gut.
- Karthik Ramachandran (*Chemical Engineering*) B.S., The University of Iowa 2012.
Thesis: Bioresorbable Vascular Scaffolds Gain Ductility, Resistance to Hydrolysis, and Radial Strength via a Unique Poly L-lactide Microstructure.
- Christopher John Reed (*Chemistry*) B.S., Idaho State University 2013.
Thesis: Activation of Nitric Oxide and Water by Transition Metal Clusters Relevant to Active Sites in Biology.

Doctor of Philosophy continued

- Justin Charles Rolando (*Chemistry*) B.A., University of Colorado at Boulder 2009.
Thesis: Bioanalytical Tools to Develop Rapid Diagnostics and Study Physiology.
- Jessica Sampson (*Chemistry*) B.S., The University of Chicago 2013.
Thesis: Nuclearity and π - π Interaction Effects on Olefin Polymerization and Coordination Chemistry.
- Nathan Garrett Schoepp (*Chemistry*) B.S., University of California, San Diego 2011; M.S., 2013.
Thesis: Phenotypic Antimicrobial Susceptibility Testing Based on Nucleic Acid Analysis.
- Kevin Shen (*Chemical Engineering*) B.S., Yale University 2011; M.S., California Institute of Technology 2015.
Thesis: Conformations and Charge Fluctuations in Polyelectrolyte Solutions.
- Matthew David Smarte (*Chemistry*) B.S., University of Maryland 2012.
Thesis: Kinetic and Spectroscopic Studies of Atmospheric Intermediates.
- Alexander Wang Sun (*Chemistry*) B.S., University of Pennsylvania 2012.
Thesis: Stereoselective Synthesis of Diazaheterocycles by Decarboxylative Asymmetric Allylic Alkylation.
- Nicholas Adam Swisher (*Chemistry*) B.S., University of North Carolina at Chapel Hill 2010.
Thesis: Synthesis, Characterization and Reactivity of "Reverse Pyridine" Bis(phosphinite) Pincer Complexes.
- Annelise C. Thompson (*Chemistry*) B.S., Denison University 2013.
Thesis: Interfacial Behavior of 2D Materials in Devices for Solar Fuels and Sensing Applications.
- David Paul Walton (*Chemistry*) B.S., Millersville University 2012.
Thesis: General Strategies for Visible-Light Decaging Based on Quinone Photochemistry.
- Belinda B. Wenke (*Biochemistry and Molecular Biophysics*) B.A., Mount Holyoke College 2011.
Thesis: The Many Roles of the Nitrogenase Iron Protein.
- Alice Rose Wong (*Chemistry*) B.A., Swarthmore College 2013.
Thesis: Total Syntheses of the C₁₉ Diterpenoid Alkaloids (-)-Liljestrandisine and (-)-Liljestrandinine.
- Kevin Kaichuang Yang (*Chemical Engineering*) B.S., The Ohio State University 2011.
Thesis: Probabilistic Protein Engineering.
- Helen Yu (*Chemistry*) B.S., University of California, Berkeley 2011.
Thesis: Subunit Selective Degradation of WIZ, a Lenalidomide- and Pomalidomide-Dependent Substrate of E3 Ubiquitin Ligase CRL4^{CRBN}.
- Hyun Gi Yun (*Chemistry*) B.S., University of Wisconsin-Madison 2012.
Thesis: Structural and Biochemical Studies of Enzymes in Bacterial Glycobiology.

Doctor of Philosophy continued

- Ruijie Zhang (*Chemistry*) B.S., The University of Chicago 2013.
Thesis: Engineering Heme Proteins for Olefin and Carbon-Hydrogen Bond Functionalization Reactions.
- Yandong Zhang (*Chemistry*) B.S., Tsinghua University 2011; M.S., 2013.
Thesis: Highly Multiplexed Imaging of *E. coli* Chromosome and Sensitive Detection of Single-cell Protein.
- Andy Zhou (*Biochemistry and Molecular Biophysics*) B.S., Miami University 2012.
Thesis: Investigations of DNA-Mediated Redox Signaling between *E. coli* DNA Repair Pathways.

DIVISION OF ENGINEERING AND APPLIED SCIENCE

- Dvin Artashes-Boghos Adalian (*Applied Physics*) B.S., California Institute of Technology 2009.
Thesis: Development and Dynamics of Microfabricated Enzymatic Biosensors.
- Ehsan Arbabi (*Electrical Engineering*) B.S., University of Tehran 2010; M.S., 2013; M.S., California Institute of Technology 2017.
Thesis: Metasurfaces: Beyond Diffractive and Refractive Optics.
- Joshua Harris Brake (*Electrical Engineering*) B.S., LeTourneau University 2013; M.S., 2014; M.S., California Institute of Technology 2016.
Thesis: Seeing Through the Fog: Using Scattered Light to Peer Deeper into Biological Tissue.
- Jeremy Jean Brouillet (*Applied Physics*) B.A., Dartmouth College 2013; M.S., California Institute of Technology 2016.
Thesis: Graphene-Mediated Light-Matter Interaction.
- Maxim A. Budninskiy (*Applied and Computational Mathematics*) B.S., M.S., Lomonosov Moscow State University 2013.
Thesis: Geometry-Driven Model Reduction.
- Colton Robert Bukowsky (*Materials Science*) B.S., Arizona State University 2011.
Thesis: Scalable Nanophotonic Light Management Design for Solar Cells.
- Jaebum Chung (*Electrical Engineering*) B.S., Cornell University 2013; M.S., California Institute of Technology 2016.
Thesis: Computational Imaging: A Quest for the Perfect Image.
- Colin Andrew Cook (*Medical Engineering*) B.A.Sc., University of Toronto 2012; M.S., The Johns Hopkins University 2014; M.S., California Institute of Technology 2016.
Thesis: Phototherapeutic Devices for the Treatment of Diabetic Retinopathy.
- Andre Fernando de Castro da Silva (*Mechanical Engineering*) Engenheiro Aeronáutico, Instituto Tecnológico de Aeronáutica 2010; M.S., 2013; M.S., California Institute of Technology 2016.
Thesis: An EnKF-based Flow State Estimator for Aerodynamic Problems.

Doctor of Philosophy continued

- Arnold Durel Deffo Nde (*Aeronautics*) B.S. (*Aerospace Engineering*), B.S. (*Mathematics*), Wichita State University 2013; M.S., California Institute of Technology 2014.
Thesis: A Line-free Method of Monopoles for 3D Dislocation Dynamics.
- Chandru Dhandapani (*Aeronautics*) B.Tech., Indian Institute of Technology Madras 2014; M.S., California Institute of Technology 2015.
Thesis: Using the Force: Applications and Implications of Turbulence Forcing Terms in Direct Numerical Simulations.
- Jeffrey Andrews Edlund (*Computation and Neural Systems*) B.S., California Institute of Technology 2004.
Thesis: Numerical Investigation of Spinal Neuron Facilitation with Multi-electrode Epidural Stimulation.
- Ioannis Filippidis (*Control and Dynamical Systems*) Diploma, National Technical University of Athens 2011.
Thesis: Decomposing Formal Specifications into Assume-Guarantee Contracts for Hierarchical System Design.
- Dagny Fleischman (*Materials Science*) B.S., M.S., University of Pennsylvania 2012.
Thesis: Nanophotonic Structures: Fundamentals and Applications in Narrowband Transmission Color Filtering.
- Zhongzheng Fu (*Control and Dynamical Systems*) B.S., The University of Hong Kong 2011.
Thesis: Representations of Action Monitoring and Cognitive Control by Single Neurons in the Human Brain.
- Nikola Zlatkov Georgiev (*Mechanical Engineering and Applied and Computational Mathematics and Electrical Engineering*) B.E., University of Edinburgh 2013; M.S., California Institute of Technology 2015.
Thesis: Towards High Performance Robotic Actuation.
- Adenike Monsurat Giwa (*Materials Science*) B.Sc., University of Ibadan 2010; M.S., California Institute of Technology 2016.
Thesis: Microstructure and Small-Scale Deformation of $Al_{0.7}CoCrFeNi$ High-Entropy Alloy.
- Pedro Pablo Guerrero Vela (*Space Engineering and Electrical Engineering*) Ingeniero, University of Seville 2011; M.S., California Institute of Technology 2012.
Thesis: Plasma Surface Interactions in LaB_6 Hollow Cathodes with Internal Xe Gas Discharge.
- Linqi Guo (*Computing and Mathematical Sciences*) B.Sc., The Chinese University of Hong Kong 2014.
Thesis: Impact of Transmission Network Topology on Electrical Power Systems.
- Bassam Mohamad Helou (*Applied Physics*) B.S.E., University of Toronto 2011.
Thesis: Testing Alternative Theories of Quantum Mechanics with Optomechanics, and Effective Modes for Gaussian Linear Optomechanics.

Doctor of Philosophy continued

- Brian Daffern Hong (*Electrical Engineering*) B.S., University of California, Los Angeles 2013; M.S., California Institute of Technology 2014.
Thesis: Periodically Disturbed Oscillators.
- Cecilia Huertas Cerdeira (*Aeronautics*) Ingeniero, Universidad Politécnica de Madrid 2014; Ingenieur, M.S., École Nationale Supérieure Mécanique et d'Aérotechnique 2014; M.S., California Institute of Technology 2015.
Thesis: On the Dynamics of Flat Plates in a Fluid Environment: A Study of Inverted Flag Flapping and Caudal Fin Maneuvering.
- David Pham Huynh (*Aeronautics*) B.S., The Ohio State University 2013; M.S., California Institute of Technology 2014.
Thesis: Spatio-Temporal Response of a Compliant-Wall, Turbulent Boundary Layer System to Dynamic Roughness Forcing.
- Siddharth Jain (*Electrical Engineering*) B.Tech., M.Tech., Indian Institute of Technology Kanpur 2013.
Thesis: Decoding the Past.
- Vatsal A Jhalani (*Applied Physics*) B.S., University of California, Berkeley 2013.
Thesis: Light Emission and Ultrafast Carrier Dynamics in III-V Semiconductors from First Principles.
- Mahmoud Kalaei (*Applied Physics*) B.S., Sharif University of Technology 2011; M.S., California Institute of Technology 2018.
Thesis: Superconducting Electromechanical and Nanophotonic Devices for Quantum Measurement and Conversion.
- Seyedeh Mahsa Kamali (*Electrical Engineering*) B.S., University of Tehran 2012; M.S., California Institute of Technology 2017.
Thesis: Dielectric Metasurfaces from Fundamentals to Applications.
- Christian Kettenbeil (*Space Engineering*) Diploma, Dresden University of Technology 2013; M.S., California Institute of Technology 2014.
Thesis: Dynamic Strength of Silica Glasses at High Pressures and Strain Rates.
- Laura Kim (*Materials Science*) B.S., California Institute of Technology 2013.
Thesis: Novel Light Emitting Mechanisms Originating from Graphene Plasmons Near and Far from Equilibrium.
- Jonathan Miners Kindem (*Applied Physics*) B.A., Reed College 2013; M.S., California Institute of Technology 2017.
Thesis: Quantum Nanophotonics with Ytterbium in Yttrium Orthovanadate.
- Junlong Kou (*Electrical Engineering*) B.S., Nanjing University 2010; M.S., California Institute of Technology 2014.
Thesis: Tailoring Thermal Radiation from Near Field to Far Field.

Doctor of Philosophy continued

Siddhant Kumar (*Aeronautics*) B.Tech., Indian Institute of Technology Delhi 2014; M.S., California Institute of Technology 2016.

Thesis: An Enhanced Maximum-Entropy Based Meshfree Method: Theory and Applications.

Yu-Hung Lai (*Applied Physics*) B.S., National Taiwan University 2011; M.S., California Institute of Technology 2016.

Thesis: Microresonator Brillouin Laser Gyroscope.

Lei Li (*Electrical Engineering*) B.S., Harbin Institute of Technology 2010; M.S., Washington University in St. Louis 2016.

Thesis: Multi-Contrast Photoacoustic Computed Tomography.

Max Louis Lifson (*Materials Science*) B.A., B.E., Dartmouth College 2011; M.S., California Institute of Technology 2016.

Thesis: Electromechanical Properties of 3D Multifunctional Nano-Architected Materials.

Kelly Ann Weekley Mauser (*Applied Physics*) B.S., Colorado State University 2013; M.S., California Institute of Technology 2016.

Thesis: Resonant Thermoelectric Nanophotonics: Applications in Spectral and Thermal Sensing.

Paul Antoine Benoit Mazur (*Mechanical Engineering*) M.S., Georgia Institute of Technology 2012.

Thesis: Controlling the Buckling Behavior of Bilayered Systems.

Jonathan Philip Morgan (*Aeronautics*) B.S., Georgia Institute of Technology 2011; M.S., California Institute of Technology 2012.

Thesis: Linear and Non-linear Interactions in a Rough-Wall Turbulent Boundary Layer.

Yorie Nakahira (*Control and Dynamical Systems*) B.S., Tokyo Institute of Technology 2012.

Thesis: Connecting the Speed-Accuracy Trade-Offs in Sensorimotor Control and Neurophysiology Reveals Diversity Sweet Spots in Layered Control Architectures.

Noah Andrew Olsman (*Control and Dynamical Systems*) B.S., University of Southern California 2012.

Thesis: Architecture, Design, and Tradeoffs in Biomolecular Feedback Systems.

Stefan Thomas Omelchenko (*Materials Science*) B.S., The Pennsylvania State University 2012; M.S., California Institute of Technology 2018.

Thesis: Towards a Net-zero Carbon Energy System: High Efficiency Photovoltaics and Electrocatalysts.

Haemin Paik (*Materials Science*) B.S., Korea Advanced Institute of Science and Technology 2011; M.S., California Institute of Technology 2016.

Thesis: Development of Electrocatalysts in Solid Acid Fuel Cells.

Doctor of Philosophy continued

- John Zhen Fu Pang (*Computing and Mathematical Sciences*) B.S., Nanyang Technological University 2013.
Thesis: Online Platforms in Networked Markets: Transparency, Anticipation and Demand Management.
- Gregory Paul Phlipot (*Space Engineering*) B.S., Arizona State University 2014; M.S., California Institute of Technology 2015.
Thesis: A Fully-Nonlocal Quasicontinuum Method to Model the Nonlinear Response of Periodic Truss Lattices.
- Carlos Mauricio Portela G. (*Mechanical Engineering*) B.S., University of Southern California 2013; B.A., 2014; M.S., California Institute of Technology 2016.
Thesis: Fabrication, Mechanical Characterization, and Modeling of 3D Architected Materials upon Static and Dynamic Loading.
- Jin Qian (*Materials Science*) B.S., Rice University 2014; M.S., California Institute of Technology 2018.
Thesis: From Quantum Mechanics to Experimental Observables: Computational Investigations of Energy-Related Heterogeneous Catalysts.
- Vishagan Ratnaswamy (*Aeronautics*) B.S., New Jersey Institute of Technology 2009; M.S., 2010; M.S., California Institute of Technology 2011.
Thesis: Constraining the Mantle's Rheology Using Methods in Uncertainty Quantification.
- Andrew Beyer Robbins (*Materials Science*) B.S., Cornell University 2013; M.S., California Institute of Technology 2016.
Thesis: Exploring Microscopic Thermal Transport Properties of Molecular Crystals with Simulations and Experiments.
- Nicholas E Scianmarello (*Electrical Engineering*) B.S., California Institute of Technology 2011; M.S., 2012.
Thesis: Oxygen Transporter and Generator Devices to Treat Diabetic Retinopathy.
- Kevin Qing Shan (*Control and Dynamical Systems*) B.S., M.S., Stanford University 2010.
Thesis: Sparse Deconvolution with Applications to Spike Sorting.
- Aubrey Michael Shapero (*Electrical Engineering*) B.S., M.S., Stanford University 2013.
Thesis: Long Term Implantable Pressure Sensors.
- Jian Shi (*Civil Engineering and Geophysics*) B.E., Tsinghua University 2011; M.S., Georgia Institute of Technology 2014.
Thesis: Improving Site Response Analysis for Earthquake Ground Motion Modeling.
- Yong Sheng Soh (*Applied and Computational Mathematics*) B.A., University of Cambridge 2011.
Thesis: Fitting Convex Sets to Data: Algorithms and Applications.

Doctor of Philosophy continued

- Akshay Sridhar (*Space Engineering*) B.S., University of Canterbury 2012; M.S., California Institute of Technology 2014.
Thesis: Large-Eddy Simulation of Turbulent Boundary Layers with Spatially Varying Roughness.
- Wei Lin Tan (*Materials Science and Geochemistry*) Sc.B., Brown University 2011; M.S., Stanford University 2012.
Thesis: Polycrystalline Perovskite Ferroelectrics: Microstructural Origins of the Macroscale Electromechanical Response.
- Yujie Tang (*Electrical Engineering*) B.S., Tsinghua University 2013; M.S., California Institute of Technology 2015.
Thesis: Time-Varying Optimization and Its Application to Power System Operation.
- Ottman Aeman Tertuliano (*Materials Science*) B.S., Columbia University 2013; M.S., California Institute of Technology 2015.
Thesis: Small-scale Deformation and Fracture of Hard Biomaterials.
- Nathan Hoover Thomas (*Materials Science*) B.A., Amherst College 2013; M.S., California Institute of Technology 2015.
Thesis: Passive and Active Control of Radiative Heat Flow.
- Jonathan Ross Thompson (*Materials Science*) B.S., The University of Texas at Austin 2008.
Thesis: Unconventional Approaches to Structured Semiconductors.
- Luís Phillippe Costa Ferreira Tosi (*Mechanical Engineering*) B.S., Cornell University 2009; M.S., 2010; M.S., California Institute of Technology 2015.
Thesis: Fluid-Structure Instability in an Internal Flow Energy Harvester.
- Abbas Davud Tutcuoglu (*Space Engineering*) M.S., École Centrale de Lyon 2014; M.E., Imperial College London 2015; M.S., California Institute of Technology 2016.
Thesis: Stochastic Multiscale Modeling of Dynamic Recrystallization.
- Grant Richard Van Horn (*Computer Science*) B.S., University of California, San Diego 2012; M.S., 2014.
Thesis: Towards a Visipedia: Combining Computer Vision and Communities of Experts.
- Jean-Christophe Veilleux (*Aeronautics*) B.E., Université Laval 2012; M.S., 2014; M.S., California Institute of Technology 2015.
Thesis: Pressure and Stress Transients in Autoinjector Devices.
- Vidyasagar (*Aeronautics*) M.Eng., Imperial College London 2014; M.S., California Institute of Technology 2015.
Thesis: Predicting Microstructural Pattern Formation Using Stabilized Spectral Homogenization.

Doctor of Philosophy continued

Cong Wang (*Aeronautics*) B.S., National University of Singapore 2013; M.S., California Institute of Technology 2014.

Thesis: On the Manipulation of a Turbulent Boundary Layer by Unsteady Boundary Conditions.

Nicholas Joseph Weadock (*Materials Science*) B.S., University of Maryland, College Park 2013; M.S., California Institute of Technology 2015.

Thesis: Addressing Thermodynamic Inefficiencies of Hydrogen Storage in Transition Metal Hydrides.

Yuchen Wei (*Space Engineering*) B.E., Beihang University 2010; M.S., California Institute of Technology 2014.

Thesis: Deployable Piezoelectric Thin Shell Structures: Concepts, Characterization and Vibration Control.

Xiaoxing Xia (*Materials Science*) B.A., The University of Chicago 2013.

Thesis: Adaptive and Reconfigurable Architected Materials Driven by Electrochemistry.

Sisir Yalamanchili (*Materials Science*) B.Tech., M.Tech., Indian Institute of Technology Bombay 2013.

Thesis: Light Management in Photovoltaics and Photoelectrochemical Cells Using Tapered Micro and Nano Structures.

Fred Chae-Reem Yang (*Materials Science*) B.S., University of California, Berkeley 2013; M.S., California Institute of Technology 2015.

Thesis: High Temperature Electron-Phonon and Magnon-Phonon Interactions.

Jin Yang (*Mechanical Engineering*) B.E., Tsinghua University 2013; M.S., California Institute of Technology 2014.

Thesis: Fast Adaptive Augmented Lagrangian Digital Image Correlation.

Qifan Yang (*Applied Physics*) B.S., Peking University 2013; M.S., California Institute of Technology 2016.

Thesis: Nonlinear Physics in Soliton Microcombs.

Juba Ziani (*Computer Science*) B.S., École Supérieure d'Électricité 2011; M.S., Columbia University 2012; M.S., California Institute of Technology 2017.

Thesis: Data: Implications for Markets and for Society.

DIVISION OF GEOLOGICAL AND PLANETARY SCIENCES

Kangchen Bai (*Geophysics and Applied and Computational Mathematics*) B.S., Nanjing University 2013; M.S., California Institute of Technology 2016.

Thesis: Dynamic Earthquake Source Modeling and the Study of Slab Effects.

Doctor of Philosophy continued

- Sang Chen (*Geochemistry*) B.S., Peking University 2012; M.S., University of Michigan, Ann Arbor 2014.
Thesis: Understanding Geochemical Tracers in Deep-sea Corals from a Biomineralization Perspective.
- Zachary Erickson (*Environmental Science and Engineering*) B.A., St. Olaf College 2012; M.S., California Institute of Technology 2017.
Thesis: Physical Processes Leading to Export of Fixed Carbon Out of the Surface Ocean.
- Florian Hofmann (*Geology*) B.S., Ludwig Maximilian University of Munich 2011; M.S., 2013.
Thesis: Iron-Oxide Geochronology to Constrain the Formation of Soils and Paleosols.
- Yuanlong Huang (*Environmental Science and Engineering*) B.S., Fudan University 2011.
Thesis: Development of Methods to Study Secondary Organic Aerosol.
- Xiaolin Mao (*Geophysics*) B.S., Nanjing University 2013.
Thesis: Understanding Lithosphere and Mantle Dynamics with Numerical Models Constrained by Observations.
- Hayden Bryce Dutcher Miller (*Geochemistry*) B.A., Colorado College 2010.
Thesis: Stable and Radiogenic Isotope Studies of Iron-oxides as Paleoenvironmental and Tectonic Archives.
- Rachel Ann Morrison (*Geophysics*) B.S., University of Nevada, Reno 2012.
Thesis: Equations of State, Sound Velocities, and Thermoelasticity of Iron-Nickel-Silicon Alloys in the Earth's Inner Core.
- Xiaozhou Ruan (*Environmental Science and Engineering and Applied and Computational Mathematics*) B.S., Ocean University of China 2013; M.S., California Institute of Technology 2015.
Thesis: Oceanic Bottom Boundary Layers and Abyssal Overturning Circulation.
- Nancy Helen Thomas (*Planetary Science*) B.S., University of Washington 2014; M.S., California Institute of Technology 2016.
Thesis: Remotely Sensing Aqueous Alteration on Mars: Innovative Statistical and Analytical Methods for Large Spectral Datasets.
- Giuliana Augusta Viglione (*Environmental Science and Engineering*) B.S., Columbia University 2013; M.S., California Institute of Technology 2015.
Thesis: Dynamics of Southern Ocean Mixed Layers.
- Rebecca Amber Witkosky (*Geology*) B.S., California State University, Northridge 2013.
Thesis: Tectonics in Nevada and Southern California: Subsidence of the Ediacaran Johnnie Formation, Cumulative Offset Along the Lavic Lake Fault, and Geomorphic Surface Development Along the Southern San Andreas Fault.

Doctor of Philosophy continued

DIVISION OF HUMANITIES AND SOCIAL SCIENCES

Nicholas Joseph Adams-Cohen (*Social Science*) B.A., University of California, Santa Barbara 2011; M.A., Stanford University 2014; M.S., California Institute of Technology 2016.

Thesis: New Perspectives in Political Communication.

Hamed Hamze Bajgiran (*Social Science and Mathematics*) B.S. (*Computer Engineering*), B.S. (*Mathematics*), Sharif University of Technology 2008; M.S., California Institute of Technology 2010.

Thesis: Essays On Decision Theory.

Chujun Lin (*Social Science*) B.S., Zhejiang University 2014.

Thesis: Understanding How People Make Trait Attributions from Faces.

Hao Zhao (*Social Science*) B.A., Peking University 2012; M.Phil., The Chinese University of Hong Kong 2014.

Thesis: Essays on Economics of Groundwater Resource Management.

DIVISION OF PHYSICS, MATHEMATICS AND ASTRONOMY

Marin Mallory Anderson (*Astrophysics*) B.A., University of California, Berkeley 2011; M.S., California Institute of Technology 2014.

Thesis: Adventures Through Time and Phase Space: Characterizing the Dynamic Radio Sky, from MHz to GHz, from Seconds to Years.

Scott Alexander Barenfeld (*Astrophysics*) B.S., University of Rochester 2012; M.S., California Institute of Technology 2014.

Thesis: New Insights into Circumstellar Disk Evolution in the Era of ALMA.

Kevin Michael Canice Barkett (*Physics*) B.S., North Carolina State University 2012.

Thesis: Computational Methods for Gravitational Wave Physics: Spectral Cauchy-Characteristic Extraction and Tidal Splicing.

Pavaman Bilgi (*Aeronautics*) B.Eng., Monash University 2010; M.S., California Institute of Technology 2012.

Thesis: Optimization of CCD Charge Transfer for Ground and Space-Based Astronomy.

Sung Bong Chun (*Physics*) B.S., California Institute of Technology 2013.

Thesis: Quantum Groups and Integralities in Chern-Simons Theory.

Songming Du (*Physics and Computer Science*) B.S., University of Science and Technology of China 2013.

Thesis: Fundamental Physics Through Gravitational Waves: From No-Hair Theorem to Quantum Structures of Black Holes.

Michael William Eastwood (*Astrophysics*) B.S., Rice University 2012; M.S., California Institute of Technology 2014.

Thesis: Searching for the Cosmic Dawn with the Hyperfine Structure Transition of Hydrogen.

Doctor of Philosophy continued

Tal Einav (*Physics*) B.S., Rice University 2012.

Thesis: Taming the Molecular Dance: Harnessing Statistical Mechanical to Quantitatively Characterize Allosteric Systems.

Andrei Frimu (*Mathematics*) S.B., Massachusetts Institute of Technology 2012.

Thesis: $\Gamma(p)$ -Level Structure on p -Divisible Groups.

Dmitri Gekhtman (*Mathematics*) A.B., Harvard College 2014.

Thesis: Two Holomorphic Extremal Problems in Teichmüller Theory.

Sarah Elizabeth Gossan (*Physics*) M.Phys., Cardiff University 2012.

Thesis: Core-Collapse Supernova Physics in the Multi-Messenger Era.

Michael Yvan Grudić (*Physics*) B.Sc., Memorial University of Newfoundland 2014.

Thesis: The Role of Stellar Feedback in Star Cluster Formation.

Matthew Thomas Edwin Heydeman (*Physics*) B.S., California Institute of Technology 2013.

Thesis: Supersymmetric Scattering Amplitudes and Algebraic Aspects of Holography from the Projective Line.

Maximiliano Isi Bañales (*Physics*) B.S., Loyola Marymount University 2014.

Thesis: Fundamental Physics in the Era of Gravitational-Wave Astronomy: The Direct Measurement of Gravitational-Wave Polarizations and Other Topics.

Jae Hong Kim (*Physics and Computer Science*) B.S., State University of New York at Stony Brook 2013; M.S., California Institute of Technology 2018.

Thesis: Measurement of $R(D)$ and $R(D^*)$ Using Semileptonic Tags and Hadronic τ Decays.

Io Kleiser (*Astrophysics*) B.A., University of California, Berkeley 2011.

Thesis: Modeling Rapidly Fading Supernovae as Nickel-Free Core-Collapse Explosions of Extended Helium Stars.

Murat Koloğlu (*Physics*) B.A., Williams College 2012.

Thesis: Light and Heat: Nonlocal Aspects in Conformal Field Theories.

William Zachary Korth (*Physics*) B.S., University of Florida 2009.

Thesis: Mitigating Noise in Interferometric Gravitational Wave Detectors.

Nathaniel Lawless Hughes (*Mathematics*) B.S., Chapman University 2014.

Thesis: A Comparison of p -adic Motivic Cohomology and Rigid Cohomology.

Nicha Leethochawalit (*Astrophysics*) B.S., The University of Chicago 2013; M.S., California Institute of Technology 2018.

Thesis: Spectroscopy of Galaxies: Evolution of Escape Fractions, Metallicity Gradients and Stellar Metallicity.

Cheng-Ju Lin (*Physics*) B.S., National Taiwan University 2011.

Thesis: Surviving Quantum Chaos: Weak Thermalization, Prethermalization and Quantum Many-Body Scar States.

Doctor of Philosophy continued

- Gregory Scott MacCabe (*Physics*) B.S., University of North Carolina at Chapel Hill 2013; M.S., California Institute of Technology 2018.
Thesis: Phonon Dynamics and Damping in Three-Dimensional Acoustic Bandgap Cavity-Optomechanical Resonators.
- Michael Trevor McAneny (*Physics*) B.S., Georgetown University 2014.
Thesis: Aspects of Quasi-Single Field Inflation.
- Maria Okounkova (*Physics*) A.B., Princeton University 2014.
Thesis: Numerical Relativity beyond General Relativity.
- Matthew Edward Orr (*Physics*) B.S., University of Southern California 2014; M.S., California Institute of Technology 2017.
Thesis: Spatially Resolved Star Formation in Cosmological Zoom-in Simulations: Understanding the Role of Feedback in Scaling Relations.
- Lucas Sky Peng (*Physics*) B.S., National Taiwan University 2013.
Thesis: Clocked Atom Delivery to a Photonic Crystal Waveguide: Simulations and Experiments.
- Jamie Sue Rankin (*Physics*) B.S., University of Utah 2011.
Thesis: Voyager 1 Observations of Galactic Cosmic Ray Anisotropies in the Local Interstellar Medium.
- Alexander Karas Ridgway (*Physics*) B.S., University of Maryland, College Park 2014.
Thesis: Imprints of Massive Scalars on Primordial Non-Gaussianities.
- Surabhi Sachdev (*Physics*) B.Tech., Indian Institute of Technology Bombay 2013; M.S., California Institute of Technology 2017.
Thesis: Searching for Gravitational Waves from Compact Binary Coalescences in Advanced LIGO Data.
- Denise Marie Schmitz (*Astrophysics*) B.S., University of Washington 2014; M.S., California Institute of Technology 2016.
Thesis: A Perturbative Model for the Intrinsic Alignments of Galaxies.
- Daniel A. Siebel (*Mathematics*) B.S., Heinrich Heine University of Düsseldorf 2011; M.S., University of Oxford 2012.
Thesis: Special Values of Zeta-Functions for Proper Regular Arithmetic Surfaces.
- Kung-Yi Su (*Physics*) B.S., National Taiwan University 2010.
Thesis: Stellar Feedback, AGN Feedback and Fluid Microphysics in Galaxy Evolution.
- Jim Tao (*Mathematics*) A.B., Princeton University 2014.
Thesis: Analysis on Vector Bundles over Noncommutative Tori.

Doctor of Philosophy continued

Min-Feng Tu (*Physics*) B.S., National Tsing Hua University 2010; M.S., California Institute of Technology 2018.

Thesis: Transport Signatures of Spin-Orbit Coupling in Graphene-Based Materials.

Alexander Michael Turzillo (*Physics*) B.A., The University of Chicago 2013; M.S., California Institute of Technology 2017.

Thesis: Short-Range Entangled Phases of Fermions.

Vijay Varma (*Physics*) B.E., M.S., Birla Institute of Technology and Science, Pilani 2014.

Thesis: Black Hole Simulations: From Supercomputers to Your Laptop.

Zitao Wang (*Physics and Computer Science*) B.S., The Hong Kong University of Science and Technology 2013.

Thesis: Topological Phases of Matter: Exactly Solvable Models and Classification.

Christopher David White (*Physics*) B.S., Rice University 2013.

Thesis: Numerical Methods for Many-Body Quantum Dynamics.

William Schuyler Whitney (*Physics*) B.A., Cornell University 2012.

Thesis: Electrically-Tunable Light-Matter Interactions in Quantum Materials.

PRIZES AND AWARDS

Prizes and awards are listed only for those students participating in commencement this year, and include prizes and awards received by them in previous years.

MABEL BECKMAN PRIZE

Given in memory of Mabel Beckman's many years of commitment to Caltech's educational and research programs, this prize is awarded to an undergraduate woman who, upon completion of her junior or senior year at Caltech, has achieved academic excellence and demonstrated outstanding leadership skills, a commitment to personal excellence, good character, and a strong interest in the Caltech community.

2019 Subhadra Vellore Vetrivel

FREDERIC W. HINRICHS, JR., MEMORIAL AWARD

This award, established by the Board of Trustees, is in memory of Frederick W. Hinrichs, Jr., who served for more than 20 years as dean and professor at Caltech. In remembrance of his honor, courage, and kindness, the annual award is given to the senior (or seniors) who, throughout their undergraduate years, made the greatest contribution to the student body and whose qualities of character, leadership, and responsibility have been outstanding. At the discretion of the dean, more than one award may be made in any year.

2019 Christopher Patrick Johnstone, Kavya Sreedhar

GEORGE W. HOUSNER PRIZE FOR ACADEMIC EXCELLENCE AND ORIGINAL RESEARCH

This prize is given annually to a senior (or seniors) in the upper 20 percent of their class who have demonstrated excellence in scholarship and in the preparation of an outstanding piece of original scientific research. The students are selected by the deans and the Undergraduate Academic Standards and Honors Committee. This prize is made possible by a gift from the late George W. Housner, Carl F Braun Professor of Engineering, Emeritus.

2019 Julius Jacob Oppenheim

MILTON AND FRANCIS CLAUSER DOCTORAL PRIZE

This prize is given to a Ph.D. candidate* whose thesis is judged by a committee of the Faculty Board to exhibit significant new work, ingenuity, and originality, and to have the greatest potential to open new avenues of human thought and endeavor.

** Name of recipient to be announced at commencement.*

The previous four prizes are announced at the commencement ceremony.

AMORI DOCTORAL PRIZE IN CMS

Established in 2017 by Michael Amori (MS '07), this prize honors outstanding dissertations in the computing and mathematical sciences during the current academic year. Awardees are selected by a committee of computing and mathematical sciences faculty each spring.

2019 *John Zhen Fu Pang*

APOSTOL AWARD FOR EXCELLENCE IN TEACHING IN MATHEMATICS

Named in honor of Tom Apostol, who taught at Caltech for over 50 years, this award recognizes excellence in teaching by graduate and undergraduate teaching assistants in mathematics.

2015 *Andrei Frimu, Daniel A. Siebel*

2016 *Nathaniel Lawless Hughes*

CHARLES D. BABCOCK AWARD

Voted on by members of the aeronautics faculty, this award is given to a graduate student whose achievements in teaching or other assistance to students have made a significant contribution to the aeronautics department.

2016 *Arnold Durel Deffo Nde, Vidyasagar, Jonathan Philip Morgan*

2018 *Cecilia Huertas Cerdeira*

ROBERT P. BALLE CALTECH MATHEMATICS SCHOLARS AWARD

This award is given to the mathematics major finishing their senior year who has demonstrated the most outstanding performance in mathematics courses completed in the student's time at Caltech.

2018 *Zachary Chase*

2019 *Gefei Dang*

WILLIAM F. BALLHAUS PRIZE

This prize recognizes aeronautics students for outstanding doctoral dissertations.

2019 *Cecilia Huertas Cerdeira, Jean-Christophe Veilleux*

ERIC TEMPLE BELL UNDERGRADUATE MATHEMATICS RESEARCH PRIZE

This prize is given to one or more juniors or seniors for outstanding original research in mathematics.

2019 *Zachary Chase*

2019 *Felix Edward Weilacher*

THE BHANSALI FAMILY PRIZE IN COMPUTER SCIENCE

Established in 2001 by Vineer Bhansali (B.S. '87, M.S. '87) in memory of his grandfather, Mag Raj Bhansali, this prize is given to an undergraduate student for outstanding research in computer science in the current academic year. Awardees are selected by a committee of computer science faculty.

2019 *Zachary Chase*

2019 *Siddharth Prasad*

BHANSALI FAMILY DISSERTATION PRIZE IN COMPUTER SCIENCE

Established in 2018 by Vineer Bhansali (B.S. '87, M.S. '87) in memory of his grandfather, Mag Raj Bhansali, this prize is given to honor outstanding dissertations in computer science, broadly defined, during the current academic year. Awardees are selected by a committee of computer science faculty each spring.

2019 *Juba Ziani*

AMASA BISHOP SUMMER STUDY ABROAD PRIZE

This prize is given to one or more freshmen, sophomores, or juniors to fund summer study abroad in an organized program with the aim of gaining exposure to foreign language and international issues or cultures, including global issues in the sciences and engineering.

2016 *Elyzabeth Camacho*

2016 *Weiyi Ding*

RICHARD G. BREWER PRIZE IN PHYSICS

This prize recognizes a freshman with the most interesting solutions to the Physics 11 “hurdles,” demonstrating intellectual promise and creativity at the very beginning of their Caltech education.

2016 *Yan Qi Huan*

ROLF D. BUHLER MEMORIAL AWARD IN AERONAUTICS

This award is given to an aeronautics student for outstanding academic achievement in the master’s program.

2019 *Sakvador Gomez*

FRITZ B. BURNS PRIZE IN GEOLOGY

This prize is given to an undergraduate who has demonstrated both academic excellence and great promise of future contributions in the fields represented by the Division of Geological and Planetary Sciences.

2017 *Michelle Eleanor Dan*

2018 *Elise Margaret Cutts*

THE W.P. CAREY & CO., INC., PRIZE IN APPLIED MATHEMATICS

This prize is given to a Ph.D. candidate for an outstanding doctoral dissertation in applied mathematics or pure mathematics.

2019 *Yong Sheng Soh*

BONNIE CASHIN PRIZE FOR IMAGINATIVE THINKING

Awarded annually, this prize is given to the entering freshman who wrote the most imaginative essays in the application for their freshman admission.

2015 *Elise Margaret Cutts, Daniel Tian Xu*

CENTENNIAL PRIZE FOR THE BEST THESIS IN MECHANICAL AND CIVIL ENGINEERING

This prize, awarded annually to a Ph.D. candidate in applied mechanics, civil engineering, or mechanical engineering, is given to a student whose doctoral thesis is judged to be the most original and significant by a faculty committee appointed annually by the executive officer for mechanical and civil engineering. This prize was established with gifts from alumni following the Mechanical Engineering Centennial Celebration in 2007.

2019 *Carlos Mauricio Portela G.*

RICHARD BRUCE CHAPMAN MEMORIAL AWARD

This award is given to a graduate student in hydrodynamics who has distinguished himself or herself in research in the Division of Engineering and Applied Science.

2019 *David Pham Huynh, Xiaozhou Ruan, Luis Phillipe Costa Ferreira Tosi*

BEN P.C. CHOU DOCTORAL PRIZE IN IST

This prize recognizes outstanding doctoral dissertations in the broad area of information science and technology. The prize was established by Ben P.C. Chou's wife, June, and his son, Scott (B.S. '86), as a lasting tribute to his lifetime dedication to the pursuit of scholarly research and foregoing personal gain in favor of always doing the right thing for society.

2019 *Yong Sheng Soh*

ROBERT F. CHRISTY PRIZE FOR AN OUTSTANDING SENIOR IN THEORETICAL PHYSICS

This prize is awarded annually to a senior who has demonstrated excellence in theoretical physics through research and/or coursework. Established in 2018, this prize honors the memory of Robert F. Christy, former provost and professor of theoretical physics at Caltech.

2019 *Nishad Maskara*

ROBERT F. CHRISTY PRIZE FOR AN OUTSTANDING DOCTORAL THESIS IN THEORETICAL PHYSICS

This prize is given annually to a student who has produced an outstanding thesis in theoretical physics. Established in 2018, this prize honors the memory of Robert F. Christy, former provost and professor of theoretical physics.

2019 *Michael Yvan Grudić, Cheng-Ju Lin*

DONALD S. CLARK MEMORIAL AWARD

This award is given to two juniors in recognition of service to the campus community and academic excellence. Preference is given to students in the Division of Engineering and Applied Science and to those in chemical engineering.

2018 *Christopher Patrick Johnstone, Kavya Sreedhar*

DONALD COLES PRIZE IN AERONAUTICS

This prize is given to the graduating Ph.D. student (or students) in aeronautics whose thesis displays the best design of an experiment or the best design for a piece of experimental equipment.

2019 *David Pham Huynh, Cong Wang*

FRANCE A. CÓRDOVA GRADUATE STUDENT FUND

This fund provides resources for one to three graduate students annually to support research-related expenses. Each awardee shall be recognized as either a Neugebauer, Garmire, or Tombrello Scholar. Preference shall be given to student(s) studying broadly in areas in which professors Gerry Neugebauer, Gordon Garmire, and Thomas Tombrello made contributions.

2016 *Sarah Elizabeth Gossan, Garmire Scholar*

2016 *Michael William Eastwood, Neugebauer Scholar*

2018 *Nicha Leethochawalit, Neugebauer Scholar*

2018 *Alexander Karas Ridgway, Garmire Scholar*

JAMES A. CULLEN MEMORIAL FELLOWSHIP FUND

This memorial fund is awarded annually to a graduate student or students who have demonstrated outstanding academic achievement in physics.

2018 *Michael Yvan Grudić*

DEANS' CUP AND STUDENT LIFE AWARDS

These two awards are presented to undergraduates whose concern for their fellow students has been demonstrated by their persistent efforts to improve the quality of undergraduate life and by effective communication with members of the faculty and administration.

2018 *Umesh Janak Padia, Student Residential Life Award*

Danh Xuan Ngo, Student Residential Life Award

2019 *Mark Robert Burleson, Deans' Cup*

Mohar Chatterjee, Student Residential Life Award

Jennifer Sophia Du, Student Residential Life Award

Alice Ruilin Zhai, Student Residential Life Award

David Manuel Francisco Berger Maneiro, Student Residential Life Award

DEMETRIADES-TSAFKA-KOKKALIS PRIZE IN ENTREPRENEURSHIP OR RELATED FIELDS

This prize, awarded annually, recognizes the best business plan or proposal, start-up, thesis, publication, discovery, or related efforts by student(s) in entrepreneurship or related fields at the Institute in the preceding 12 months. This prize is made possible by a gift from Anna Kokkalis Demetriades and Sterge T. Demetriades (Eng. '58).

2018 *Colin Andrew Cook*

2019 *Nicholas C Flytzanis*

DEMETRIADES-TSAFKA-KOKKALIS PRIZE IN BENIGN RENEWABLE ENERGY SOURCES OR RELATED FIELDS

This prize, awarded annually, recognizes a Ph.D. candidate for the best thesis, publication, discovery, or related efforts in benign renewable energy sources or related fields at the Institute in the preceding 12 months. This prize is made possible by a gift from Anna Kokkalis Demetriades and Sterge T. Demetriades (Eng. '58).

2019 *Linqi Guo*

DEMETRIADES-TSAFKA-KOKKALIS PRIZE IN BIOTECHNOLOGY OR RELATED FIELDS

This prize, awarded annually, recognizes a Ph.D. candidate for the best thesis, publication, or discovery in biotechnology or related fields at the Institute in the preceding 12 months. This prize is made possible by a gift from Anna Kokkalis Demetriades and Sterge T. Demetriades (Eng. '58).

2019 *Anupama Lakshmanan*

DEMETRIADES-TSAFKA-KOKKALIS PRIZE IN NANOTECHNOLOGY OR RELATED FIELDS

This prize, awarded annually, recognizes a Ph.D. candidate for the best thesis, publication, or discovery in nanotechnology or related fields at the Institute in the preceding 12 months. This prize is made possible by a gift from Anna Kokkalis Demetriades and Sterge T. Demetriades (Eng. '58).

2019 *Seyedeh Mahsa Kamali*

CONSTANTIN G. ECONOMOU MEMORIAL PRIZE

This prize is awarded to a chemical engineering graduate student distinguished by outstanding research accomplishments and exemplary attitude while fulfilling candidacy requirements for the Ph.D. degree.

2015 *Abmad Khalid Omar*

EVERHART DISTINGUISHED GRADUATE STUDENT LECTURER AWARD

This award recognizes graduate students for their exemplary presentation skills and research ability. Awardees participate in the Everhart Lecture Series, a forum that is meant to encourage interdisciplinary interaction among graduate students and faculty, to share ideas about recent research developments.

2016 *Catherine Elizabeth Schretter*

2018 *Maximiliano Isi Bañales, Seyedeh Mahsa Kamali, Anupama Lakshmanan*

DORIS EVERHART SERVICE AWARD

This award is given annually to an undergraduate who has actively supported and willingly worked for organizations that enrich not only student life, but also the campus and/or the community as a whole, and who has, in addition, exhibited care and concern for the welfare of students on a personal basis. The award was established in 1999 by Martin and Sally Ridge in honor of Doris Everhart.

2019 *Melissa Gutierrez*

LAWRENCE L. AND AUDREY W. FERGUSON PRIZE

This prize is awarded to the graduating Ph.D. candidate in biology who has produced the most outstanding doctoral thesis for the past year.

2019 *Vineet Augustine*

RICHARD FEYNMAN PRIZE IN THEORETICAL PHYSICS

This prize is awarded to a senior on the basis of excellence in theoretical physics.

2018 *Changnan Peng*

2019 *Walker Bruce Melton*

HAREN LEE FISHER MEMORIAL AWARD IN JUNIOR PHYSICS

This recognizes a junior physics major who demonstrates the greatest promise of future contributions in physics.

2018 *Walker Bruce Melton*

HENRY FORD II SCHOLAR AWARD

This award recognizes either the engineering student with the best academic record at the end of the third year of undergraduate study or the engineering student with the best first-year record in the graduate program.

2018 *Yidan Qin*

JACK E. FROEHLICH MEMORIAL AWARD

This award, established by the family and friends of the late Jack E. Froehlich (B.S. '47, M.S. '48, Ph.D. '50), who did his undergraduate and graduate work at Caltech and was later the project manager for Explorer I for the Jet Propulsion Laboratory, provides an award to a junior in the upper 5 percent of their class who shows outstanding promise for a creative professional career. The student is selected by the deans and the Undergraduate Academic Standards and Honors Committee.

2018 *Hyung Ju (Terry) Sub*

GRADUATE DEAN'S AWARD

This award is given to a Ph.D. candidate or candidates who, throughout their graduate study at the Institute, have made great contributions to graduate life and whose qualities of leadership and responsibility have been outstanding.

2019 *Chandru Dhandapani, Annelise C. Thompson*

BERNICE E. GREEN MEMORIAL PRIZE

This prize, awarded annually, recognizes an undergraduate student in any class for original research, an original paper or essay, or other evidence of creative scholarship beyond the normal requirements of specific courses. The student is selected by the deans and the Undergraduate Academic Standards and Honors Committee.

2018 *Julius Jacob Oppenheim*

2019 *Yeorgia Xerohemona Kafkoulis*

DAVID M. GRETHER PRIZE IN SOCIAL SCIENCE

This prize, awarded annually by a committee of social science faculty, rewards outstanding performance and creativity by an undergraduate who has completed one of the social science options. The prize was established by Susan G. Davis in recognition of David M. Grether's contributions to econometrics and experimental economics and his service to the Division of the Humanities and Social Sciences.

2019 *Noah Allen Huffman, Akshay Kumar Srivastava*

JOHN H. HALL MEMORIAL SCHOLARSHIP

This prize recognizes an outstanding undergraduate student in geological and planetary sciences.

2018 *Michelle Eleanor Dan*

HANS G. HORNUNG PRIZE

This prize is awarded for the best oral Ph.D. defense presentation by a student advised by aerospace faculty. The decision is made by a committee of students who attend all thesis presentations for the year.

2019 *Jean-Christophe Veilleux*

PATRICK HUMMEL AND HARRY GRAY TRAVEL FUND

Established as a joint gift from Carla and Paul Hummel, Patrick Hummel, and Shirley and Harry Gray, Caltech's Arnold O. Beckman Professor of Chemistry and founding director of the Beckman Institute, the endowed fund supports undergraduate travel opportunities that promote professional and leadership development and broaden students' perspectives as engaged, responsible citizens of the world.

2018 *Katherine Marie Johnston*

2019 *Kai Christian Klocke*

BIBI JENTOFT-NILSEN MEMORIAL AWARD

This award recognizes a junior or senior who exhibits outstanding qualities of leadership and who actively contributes to the quality of student life at Caltech.

2019 *Jake Robert Mattinson*

SCOTT RUSSELL JOHNSON PRIZE FOR EXCELLENCE IN GRADUATE STUDIES

This prize is awarded to continuing graduate students for excellence in one or more of the following: extraordinary progress in research, excellence in teaching, or excellent performance as a first-year graduate student.

2015, 2018 *Dmitri Gekhtman*

SCOTT RUSSELL JOHNSON GRADUATE DISSERTATION PRIZE IN MATHEMATICS

This prize is awarded for the best graduate dissertation in mathematics.

2019 *Dmitri Gekhtman*

KALAM PRIZE FOR AEROSPACE ENGINEERING

This prize, made possible by Dr. Abdul Kalam, the 11th president of India and an aerospace engineer, is awarded to a student in the aerospace engineering master's program whose academic performance was exemplary and who shows high potential for future achievements at Caltech.

2019 *Padmanabha Prasanna Simha*

DR. JAMES KING JR. STUDENT DIVERSITY AWARD

This award recognizes individuals who stand out as strong supporters of diversity within the Caltech student body. The award is named in honor of Dr. King, who was the first African American to receive a Ph.D. from Caltech in chemical physics (at that time it was chemistry and physics), and was the assistant laboratory director at JPL. King had a reputation for mentoring students and encouraged diversity in the Caltech student body.

2019 *Sophus Shackford*

D. S. KOTHARI PRIZE IN PHYSICS

This prize is awarded to a graduating senior in physics who has produced an outstanding research project during the year.

2019 *Yan Qi Huan*

MARGIE LAURITSEN LEIGHTON PRIZE

This prize is awarded to one or two undergraduate women who are majoring in physics or astrophysics, and who have demonstrated academic excellence.

2017 *Emily Wu*

JOHN O. LEDYARD PRIZE FOR GRADUATE RESEARCH IN SOCIAL SCIENCE

This prize, awarded annually by a committee of social science faculty, rewards the best second-year paper by a graduate student in social science or social and decision neuroscience. The prize was established by Susan G. Davis in recognition of John O. Ledyard's dedication to developing graduate students as independent researchers and his service to the Division of the Humanities and Social Sciences.

2017 *Hamed Hamze Bajgiran*

LIBRARY FRIENDS' SENIOR THESIS PRIZE

This prize was established by the Friends of the Caltech Libraries in 2010 to recognize senior theses that exemplify research and the effective use of library information resources. The university librarian and the Friends of the Caltech Libraries oversee evaluation and make recommendations to the Undergraduate Academic Standards and Honors Committee for final selection.

2019 *Daniel Rimoli Assumpcao, Allison Young Tang*

MARI PETERSON LIGOCKI '81 MEMORIAL AWARD

This award is given to a student who has improved the quality of student life at Caltech through their personal character.

2019 *Kabir Aurwal Mohammed*

GORDON MCCLURE MEMORIAL COMMUNICATIONS PRIZE

This prize is awarded to one or more undergraduate students for excellence in essay writing in three subjects: English, history, and philosophy.

2019 *Nishad Maskara*

THE HERBERT NEWBY MCCOY AWARD

This award is given to one or more chemistry doctoral students for outstanding contributions to the science of chemistry.

2019 *Ferdinand Michael Huber, Asher Raphael Preska Steinberg*

MARY A. EARL MCKINNEY PRIZE IN POETRY AND PROSE FICTION

This prize is awarded to one or more undergraduate students for excellence in writing in two categories: poetry and prose fiction.

2019 *Mohar Chatterjee, Prose*

MECHANICAL ENGINEERING AWARD

This award recognizes a B.S. candidate in mechanical engineering whose academic performance has demonstrated outstanding original thinking and creativity, as judged by a faculty committee appointed each year by the executive officer for mechanical engineering.

2019 *Neha Sunil*

MERCK INDEX AWARD

This award is given to one or more graduating students who have demonstrated outstanding achievement in the field of chemistry.

2019 *Reeti Kiran Gulati, Brian Ko-Hung Lue*

JAMES MICHELIN SCHOLARSHIP

Given in memory of geologist James Michelin, who worked in the oil fields of Southern California in the 1930s and dreamed of returning to college at Caltech, this annual prize recognizes one or more undergraduate students for their contributions to the field of geology or geophysics.

2019 *Chenyue Li*

ROBERT L. NOLAND LEADERSHIP AWARD

This award is given to one or more undergraduate students who exhibit qualities of outstanding leadership, which are most often expressed as personal actions that have helped other people and that have inspired others to fulfill their capabilities.

2019 *Yeorgia Xerohemona Kafkoulis, Sophus Shackford, Madelyn I-Hsuan Wang*

DR. NAGENDRANATH REDDY BIOLOGICAL SCIENCES THESIS PRIZE

This prize is awarded to the female Ph.D. candidate in the Division of Biology and Biological Engineering who has produced the most outstanding thesis in the biological sciences during the past year.

2019 *Tahmineh Khazaei*

HOWARD REYNOLDS MEMORIAL PRIZE IN GEOLOGY

This prize is awarded to a sophomore or junior who demonstrates the potential to excel in the field of geology and who actively contributes to the quality of Caltech student life.

2017 *Elise Margaret Cutts*

HERBERT J. RYSER MEMORIAL SCHOLARSHIP

This scholarship is awarded to undergraduate students for academic excellence, preferably in mathematics.

2017 *Zachary Chase*

2018 *Gefei Dang, Felix Edward Weilacher*

SANPIETRO TRAVEL PRIZE

This prize is awarded to one or more sophomores, juniors, or seniors to fund an adventurous and challenging summer travel experience that expands the recipients' cultural horizons and knowledge of the world.

2018 *May Guo Chen, Meera Krishnamoorthy*

2019 *Catherine Day, Nika Marsella Haleftiras, Noah Allen Huffman,
Maria Luiza Velozo Coelbo dos Santos, Madeline Duncan Schemel,
Madelyn Jane Stroder, Teresa Anh Tran*

RICHARD P. SCHUSTER MEMORIAL PRIZE

This prize is awarded to one or more juniors or seniors in chemistry or chemical engineering on the basis of financial need and academic promise.

2019 *Danh Xuan Ngo, Julius Jacob Oppenheim*

ERNEST E. SECHLER MEMORIAL AWARD IN AERONAUTICS

This award recognizes an aeronautics student who has made the most significant contribution to the teaching and research efforts of GALCIT (Graduate Aerospace Laboratories of the California Institute of Technology). Preference is given to students working in structural mechanics.

2018 *David Pham Huynh, Arnold Durel Deffo Nde, Akshay Sridhar, Cong Wang*

DR. FRED SHAIR AWARD FOR PROGRAM DIVERSITY

This award is given to one or more individuals who stand out as strong supporters of programs that increase the diversity and pluralism in practice at Caltech. Dr. Shair was a member of the chemical engineering faculty; one of his great accomplishments and contributions to the Institute was the creation of the Summer Undergraduate Research Fellowships (SURF) program in 1979. He later included high-achieving students from campuses across the country in an effort to support equity in access to Caltech's research communities.

2019 *Melissa Gutierrez*

RENUKA D. SHARMA AWARD

This award recognizes a sophomore chemistry major for outstanding performance during their freshman year.

2017 *Reeti Kiran Gulati, Brian Ko-Hung Lue*

C. S. SHASTRY PRIZE

This prize is awarded to a sophomore Ph 11 alumnus, majoring in physics, to provide support for a summer research project conducted at Caltech. The winner is chosen based on passion, curiosity, and demonstrated ability.

2017 *Walker Bruce Melton*

DON SHEPARD AWARD

This award is given one or more students who would find it difficult, without additional financial help, to engage in extracurricular and cultural activities. The recipients are selected on the basis of their capacity to take advantage of and to profit from these activities rather than on the basis of their scholastic standing.

2016 *Kanan Kaushik Mehta*

2017 *Nika Marsella Halefiras, Kinam Park*

2018 *Michaelangelo Valentino Amedeo Caporale, Clara Anne MacFarland*

HALLETT SMITH PRIZE

This prize, established in 1997 to commemorate Professor Hallett Smith's long career as one of the 20th century's most distinguished Renaissance scholars, is awarded annually by the literature faculty to the undergraduate student who writes the finest essay on Shakespeare.

2018 *Reeti Kiran Gulati*

PENELOPE W. AND E. ROE STAMPS IV LEADERSHIP SCHOLAR AWARDS PROGRAM

This awards program recognizes and rewards exceptional students who exemplify leadership, perseverance, scholarship, service, and innovation.

2015, 2016, 2017, 2018 *Sara Lee*

2015, 2016, 2017, 2018 *Andre Liu*

2013, 2014, 2015, 2016, 2017 *Vincent Park*

JOHN STAGER STEMPLER MEMORIAL PRIZE IN PHYSICS

This prize is awarded annually to a graduate student in physics for outstanding progress in research as demonstrated by an excellent performance on the oral Ph.D. candidacy exam.

2018 *Maria Okounkova*

R. BRUCE STEWART PRIZE FOR EXCELLENCE IN TEACHING

This prize is awarded annually to a graduate teaching assistant in physics who demonstrates, in the broadest sense, unusual ability, creativity, and innovation in undergraduate and graduate classroom or laboratory teaching.

2017 *Min-Feng Tu*

PAUL STUDENSKI MEMORIAL FUND

This travel grant is awarded to a Caltech undergraduate who would benefit from time away from the academic community in order to obtain a better understanding of self and of their plans for the future.

2016 *Daniil Valentinovich Ilyin*

2019 *Jake Robert Mattinson, Anise Katapadi Rau*

FRANK TERUGGI MEMORIAL AWARD

This award was established in 1998 by friends and classmates of the late Frank Teruggi, a Caltech undergraduate who was murdered in Chile in 1973 during the military coup led by Augusto Pinochet. The annual award honors the spirit of Frank's life, especially "in the areas of Latin American Studies, radical politics, creative radio programming, and other activities aimed at improving the living conditions of the less fortunate."

2018 *Melissa Gutierrez*

TAUSSKY-TODD MATHEMATICS PRIZE FUND

This prize provides support to a female undergraduate math major for a summer experience to enrich their mathematical education.

2018 *Yeorgia Xeroheмона Kafkoulis, Suna Kim*

MORGAN WARD PRIZE

This prize is awarded to a freshman or sophomore who submits the best problems and solutions in mathematics.

2016 *Siddharth Prasad*

2017 *Zachary Chase*

FREDRICK J. ZEIGLER MEMORIAL AWARD

This award recognizes an outstanding sophomore or junior in pure or applied mathematics for their excellence in scholarship as demonstrated in class activities or in the preparation of an original paper or essay in any subject area.

2018 *Zachary Chase*



Congratulations to the Class of 2019! We are honored to welcome you to the global community of Caltech alumni, over 24,000 strong, and to have you as the newest members of the Caltech Alumni Association (CAA).

For more than 100 years, Caltech alumni have earned their degrees and proceeded to make a profound and positive impact on the world. We are confident you will do the same, and we know that future Techers will be inspired by your achievements.

Your Caltech degree provides you a place among and access to one of the most accomplished alumni networks of any institution. Wherever you go, in whatever life stage you find yourself, your fellow alumni will always be there to support you. The CAA will help you stay in touch with this vibrant community and help you realize the full potential of your extended family, personally and professionally.

Your Caltech alumni community is proud of you. We encourage you to get involved with your fellow Techers through CAA programs and events in person and online. Please visit alumni.caltech.edu to see what the CAA can provide for you.

Chris Bryant (BS '95)

President, Board of Directors
Caltech Alumni Association
alumni.caltech.edu

ACADEMIC REGALIA AT CALTECH

The symbolism in the academic regalia worn by graduates at commencement dates back many centuries. Although some aspects of the costume vary among academic institutions, many basic elements are similar. The cap or mortarboard is based on the medieval biretta worn by scholars and artists. The gown's cut and velvet trimming indicate academic rank. The doctoral hood may display the academic field of the wearer's degree and the institution from which it was received. In addition, tassels, cords, and medallions denote various honors awarded by the institution or academic societies.

At commencement, the assortment of colors in academic regalia is on full display. Faculty members are adorned in robes, the colors of which correspond to the scholar's *alma mater*. However, at the time of graduation, most Ph.D. recipients are draped in doctoral hoods that are trimmed in blue velvet, signifying a doctor of philosophy degree, and lined in the colors of the institution conferring the degree.

Caltech graduates receiving a doctorate wear a black velvet cap, robes trimmed in blue velvet and a blue velvet doctoral hood lined in a chevron pattern of orange and white. Those receiving a bachelor's or master's degree wear a simple black gown and a black mortarboard or cap.

In addition to these traditional items, an undergraduate may also choose to wear a colored stole to the graduation ceremony. While orange stoles denote Caltech pride, other colors may be chosen to represent the undergraduate's residential affiliation.

There are currently eight undergraduate houses at Caltech: **Avery**, **Blacker**, **Dabney**, **Fleming**, **Lloyd**, **Page**, **Ricketts**, and **Ruddock**. And there are three undergraduate residences: **Bechtel**, **Marks**, and **Braun**.

- A *white stole or a purple and white tassel* designates **Avery House**; Avery's house color is white.
- The students of the **Bechtel, Marks, and Braun residences** who affiliate with a house may choose to wear that house's tassel or stole.
- A *silver stole or a black and white tassel* designates **Blacker House**; Blacker's house color is black.
- A *green stole or tassel* designates **Dabney House**; Dabney's house color is green.
- A *red stole or tassel* designates **Fleming House**; Fleming's house color is red.
- A *gold stole or a yellow and white tassel* designates **Lloyd House**; Lloyd's house color is gold.
- A *blue stole or tassel* designates **Page House**; Page's house color is blue.
- A *maroon stole or tassel* designates **Ricketts House**; Ricketts's house color is maroon.
- A *navy blue stole or tassel* designates **Ruddock House**; Ruddock's house color is navy blue.

GAUDEAMUS IGITUR (LET US REJOICE, THEREFORE)

The song *Gaudeamus igitur* has become an academic standard, sung around the world at graduations and other university ceremonies. Some verses of this anthem go back to 13th-century France, where they appear in a Latin hymn on the transitory nature of life. By the middle of the 18th century, students at German universities had combined the original medieval verses with new ones—including the now famous opening verse that begins *Gaudeamus igitur, iuvenes dum sumus* (“Let us rejoice, therefore, while we are young”)—to create a song that celebrated youth and the student life, in all of its highbrow (and lower-brow) aspects. In the mid-19th century, the song crossed the Atlantic to Yale, where still more verses were added for use at academic ceremonies.

Since then, verses have been added or subtracted for different occasions. The song also has been translated into many different languages, sometimes faithfully, sometimes quite imaginatively.

The verses sung at today’s ceremony (which have been translated as closely as possible from Latin into English) combine the youthful energy and irreverent attitude towards authority that characterize Caltech students with a ringing endorsement of the academic enterprise to which they are devoted. The verses celebrate the Institute and the community of scholars—past, present, and future—who have done and will continue to do its work.

| | |
|--------------------------|---------------------------------------|
| Gaudeamus igitur | Let us rejoice, therefore, |
| Iuvenes dum sumus. | While we are young. |
| Post iucundam iuventutem | After a pleasant youth |
| Post molestam senectutem | After a troubling old age |
| Nos habebit humus. | The earth will have us. |
| Ubi sunt qui ante nos | Where are they who, before us, |
| In mundo fuere? | Were in the world? |
| Vadite ad superos | Go to the heavens |
| Transite in inferos | Cross over into the infernal re-gions |
| Hos si vis videre. | If you wish to see them. |
| Vivat academia! | Long live the academy! |
| Vivant professores! | Long live the professors! |
| Vivat membrum quodlibet; | Long live each student; |
| Vivant membra quaelibet; | Long live the whole community; |
| Semper sint in flore. | For ever may they flourish! |
| Alma Mater floreat, | May our Alma Mater flourish, |
| Quae nos educavit; | Who taught us; |
| Caros et commilitones, | Who gathered together |
| Dissitas in regiones | Dear ones and comrades, |
| Sparsos, congregavit. | Scattered in remote places. |

Translation by Warren C. Brown, Convocations Chair

HAIL CIT

(Caltech alma mater)

arranged by Raymond Burkhart

In Southern California with grace and splendor bound,
Where the lofty mountain peaks look out to lands beyond,
Proudly stands our Alma Mater, glorious to see;
We raise our voices proudly, hailing, hailing thee.
Echoes ringing while we're singing over land and sea,
The halls of fame resound thy name, noble CIT.



JOIN THE CELEBRATION ON SOCIAL MEDIA!

Include #Caltech2019 in your posts, and visit commencement.caltech.edu for more on the day's events. We also hope you'll follow us on Facebook (facebook.com/californiainstituteoftechnology), Twitter (@caltech), and Instagram (@caltechedu).