CALIFORNIA INSTITUTE *of* TECHNOLOGY

One Hundred Seventeenth Annual Commencement

June 10, 2011

Cover: *Caltech's commencement ceremony,* by Joseph Stoddard

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CALIFORNIA INSTITUTE
of TECHNOLOGY

One Hundred Seventeenth
Annual Commencement

Friday Morning at Ten O'Clock
June Tenth, Two Thousand Eleven

IN HIS DIARY ENTRY of September 1, 1891, Pasadena philanthropist Amos Throop wrote, "Planted potatoes, cleaned a water pipe, husked the corn . . . In afternoon, saw Mr. Wooster and rented his block for five years . . . and hope I have made no mistake." Were he here today, Throop could rest assured in his decision. For the building of which he wrote, the Wooster Block, was rented for the purpose of establishing Throop University—the forerunner of Caltech.

In November of that year, Throop University opened its doors to 31 students and a six-member faculty. Could anyone have imagined then that the school would become a world center for science and engineering research and education? Perhaps . . . for in the first year, the board of trustees began to reconsider the mission of the school. In 1892, they decided to emphasize industrial training, and in 1893, reflecting this new focus, they renamed the school Throop Polytechnic Institute.

Throop might have remained just a good local school had it not been for the arrival in Pasadena of George Ellery Hale. A faculty member at the University of Chicago and a noted astronomer, Hale settled here in 1903. From that time until his death in 1938, he made significant contributions to Pasadena and Southern California: he established the Mount Wilson Observatory, raised funds for Palomar Observatory and its 200-inch telescope, participated in the creation of the Huntington Library, Art Collections, and Botanical Gardens, helped design the Civic Center in downtown Pasadena, and—perhaps his single greatest

achievement—set the course for the development of Throop into the California Institute of Technology, a school he envisioned as a scientific institution of the highest rank.

In 1913, Hale convinced Arthur Amos Noyes, professor of chemistry and former president of the Massachusetts Institute of Technology, to join him in Pasadena. With the arrival in 1917 of Robert Andrews Millikan, professor of physics at the University of Chicago, Hale had assembled the founders of the new institution. The world center of scientific and engineering research and education he had imagined soon took shape under a new name, the California Institute of Technology, administered by Millikan and enriched with the scientific talents of Noyes and his faculty colleagues.

And amazing things indeed have happened at Caltech over the years. Theodore von Kármán developed the principles that made jet flight possible, Charles Richter published his logarithmic scale for measuring the magnitude of earthquakes, and astronomer Maarten Schmidt discovered the nature of quasars. Here Linus Pauling determined the nature of the chemical bond, Max Delbrück conducted the studies of bacterial viruses that led to a new branch of biology called molecular genetics, Murray Gell-Mann theorized that all particles are made up of quarks and anti-quarks, and Roger Sperry developed new insights into the implications of right-brain and left-brain functions. And it was not just faculty but also Caltech alumni who came to have great impact on the world. Alumnus Charles Townes developed the laser; Chester Carlson invented Xerography; David Ho did landmark work in creating an effective AIDS drug treatment; Gordon Moore founded a semiconductor industry. Many alumni have gone on to make substantial marks in the business world, such as Simon Ramo and Ben Rosen, while others have become astronauts, university presidents, government leaders, and even authors, directors, and performance artists of note. Caltech's reach has certainly been wide and long-lasting.

Caltech today has a 124-acre campus and operates seven off-campus astronomical, seismological, and marine biological facilities, and also administers NASA's Jet Propulsion Laboratory. At present, the Institute has an enrollment of over 2,100 students, more than half of whom are in graduate studies; about 300 professorial faculty members, including five Nobel laureates and two Crafoord laureates; and about 75 research faculty members. Today, Caltech will award 235 students the B.S. degree; 117 students the M.S. degree; and 168 doctoral candidates the Ph.D. degree, for a total of 520 graduates—quite a leap from the one man and one woman who constituted the first collegiate graduating class of Throop Polytechnic Institute.

THESE TRIBAL RITES HAVE a very long history. They go back to the ceremony of initiation for new university teachers in medieval Europe. It was then customary for students, after an appropriate apprenticeship to learning and the presentation of a thesis as their masterpiece, to be admitted to the Guild of Masters of Arts and granted the license to teach. In the ancient University of Bologna, this right was granted by authority of the pope and in the name of the Holy Trinity. We do not this day claim such high authority.

As in any other guild, whether craft or merchant, the master's status was crucial. In theory at least, it separated the men from the boys, the competent from the incompetent. On the way to his master's degree, a student might collect a bachelor's degree in recognition of the fact that he was half-trained, or partially equipped. The doctor's degree was somewhat different. Originally indistinguishable from the master's, the doctor's gradually emerged by a process of escalation into a super magisterial role—first of all in the higher faculties of theology, law, and medicine. It will come as no surprise that the lawyers had a particular and early yen for this special distinction.

These graduations and distinctions are reflected in the quaint and colorful niceties of academic dress.

Of particular interest is the cap or mortarboard. In the form of the biretta, it was the peculiar sign of the master. Its use has now spread far beyond

that highly select group to school girls and choir boys and even to the nursery school. *Sic transit . . .*

The gown, of course, is the basic livery of the scholar, with its clear marks of rank and status—the pointed sleeves of the bachelor, the oblong sleeves of the master, the full sleeves and velvet trimmings of the doctor. The doctors, too, may depart from basic black and break out into many colors—Harvard crimson or Yale blue or the scarlet splash of Oxford.

Color is the very essence of the hood: color in the main body to identify the university; color perhaps in the binding to proclaim the subject of the degree—orange for engineering, gold for science, the baser copper for economics, white for arts and letters, green for medicine, purple for law, scarlet for theology, and so on. Size is a further variable, as the hoods tend to lengthen from the three feet of the bachelor to the four of the doctor. So the birds are known by their plumage.*

With this color and symbolism, which is medieval though mutated, we stage our brief moment of pageantry, paying homage to that ancient community of scholars in whose shadow we stand, and acknowledging our debt to the university as one of the great institutional constructs of the Middle Ages. While looking back, however, we also celebrate the achievements of this present generation of students and look forward to the future of these our younger colleagues, whom we now welcome to our midst.

David C. Elliot (1917–2007)
Professor of History, Emeritus

* *Black robes are traditionally worn by undergraduates; however, at Caltech, some students elect to wear a colored robe representing their student house.*

AHMED H. ZEWAIL, Caltech's Linus Pauling Professor of Chemistry and professor of physics, received the 1999 Nobel Prize in Chemistry. The honor came in recognition of his groundbreaking research that established the field of femtochemistry by enabling chemical reactions to be studied in real time, on a scale of one quadrillionth of a second. More recently, the renowned chemist and his group have developed four-dimensional electron microscopy for direct imaging of matter in 3-D and in time, with applications spanning physical and biological sciences.

In 2009, Zewail was appointed to President Obama's Council of Advisors on Science and Technology. That same year, he was named the first U.S. Science Envoy to the Middle East as part of a program created by the State Department to foster science and technology collaborations between the United States and nations throughout the Middle East, North Africa, and South and Southeast Asia. Since the revolution in Egypt in early 2011, he has played an active role in his home country's transition to a democratic state.

Zewail has long been a statesman and active participant in global affairs, particularly as they relate to science, education, and world peace. His commentaries on these global issues have appeared in the *International Herald Tribune*, the *New York Times*, the *Los Angeles Times*, the *Wall Street Journal,* and the *Financial Times,* among other publications. He has written more than 500 articles and books and has given public addresses all over the world.

His numerous honors include the Albert Einstein World Award of Science, the Benjamin Franklin Medal, the Robert A. Welch Award in Chemistry, the Leonardo da Vinci Award, the Wolf Prize, the King Faisal International Prize, and the American Chemical Society's highest honor, the Priestley Medal. He was awarded the Grand Collar of the Order of the Nile, Egypt's highest state honor, and was featured on postage stamps issued to honor his contributions to science and humanity. He holds honorary degrees from 40 universities around the world and is an elected member of many professional academies and societies, including the National Academy of Sciences, the American Philosophical Society, the Royal Society of London, and the Swedish, Russian, Chinese, and French Academies.

Zewail completed his early education in Egypt, receiving his Bachelor of Science and Master of Science degrees in chemistry from Alexandria University. He obtained a Ph.D. in chemical physics from the University of Pennsylvania and, after a postdoctoral fellowship at the University of California, Berkeley, joined the faculty at Caltech in 1976, and was granted tenure in 1978.

Academic Procession

Chief Marshal
Konstantinos P. Giapis, Ph.D.

Marshals
Geoffrey A. Blake, Ph.D.
Scott E. Fraser, Ph.D.
Melany L. Hunt, Ph.D.
Richard M. Murray, Ph.D.
Anneila I. Sargent, Ph.D.
Tapio Schneider, Ph.D.

Faculty Officers
Dennis A. Dougherty, Ph.D.
Sossina M. Haile, Ph.D.
Fiona Cowie, 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 Dean of Graduate Studies
The Provost
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 Convocations Brass and Percussion Ensemble *William W. Bing, M.M., Conductor*
Presiding	Kent Kresa *Chair of the Board of Trustees* *California Institute of Technology*
Commencement Speaker Revolutions in Science and Society	Ahmed H. Zewail, Nobel Laureate *Linus Pauling Professor of Chemistry and Professor of Physics* *California Institute of Technology*
Choral Selection "For the Splendor of Creation" Words by Carl P. Daw, Jr. Music by Gustav Holst (1874–1934) adapted from his 1916 orchestral suite, *The Planets* Arranged by Jameson Marvin *(Lyrics are on page 58.)*	The Caltech Glee Club *Nancy Sulahian, M.M., Music Director*
Conferring of Degrees	Jean-Lou Chameau, Ph.D. *President* *California Institute of Technology*

Presentation of Candidates for Degrees

For the Degree of Bachelor of Science	Anneila I. Sargent, Ph.D. *Vice President for Student Affairs*
For the Degree of Master of Science	Joseph E. Shepherd, Ph.D. *Dean of Graduate Studies*
For the Degree of Doctor of Philosophy	Joseph E. Shepherd, Ph.D.

Biology	Stephen L. Mayo, Ph.D. *Division Chair*
Chemistry and Chemical Engineering	Jacqueline K. Barton, Ph.D. *Division Chair*
Engineering and Applied Science	Ares J. Rosakis, Ph.D. *Division Chair*
Geological and Planetary Sciences	Kenneth A. Farley, Ph.D. *Division Chair*
Humanities and Social Sciences	Jonathan N. Katz, Ph.D. *Division Chair*
Physics, Mathematics and Astronomy	B. Thomas Soifer, Ph.D. *Division Chair*
ANNOUNCEMENT OF AWARDS AND CONCLUDING REMARKS	Jean-Lou Chameau, Ph.D. *President*
ALMA MATER "Hail CIT" By Manton Barnes, B.S. '21 *(The audience may join in; lyrics are on page 59.)*	The Caltech Glee Club, the Caltech Convocations Brass and Percussion Ensemble, and Organ
RECESSIONAL	The Caltech Convocations Brass and Percussion Ensemble
Organ Postlude "The Throop Institute March" Composed by E. C. Kammermeyer in 1900 for the Throop Institute Guitar and Mandolin Society	Leslie J. Deutsch, Ph.D.

Live streaming of Caltech's 2011 commencement ceremony will begin shortly before 10 a.m. on Friday, June 10, at http://ustream.tv/caltech.

Bachelor of Science

Ioana Laura Aanei* *Onesti, Bacau, Romania* Chemistry
Zagid Abatchev *Boise, Idaho* Physics
Kiefer Pio Aguilar* *Lubbock, Texas* Bioengineering (Synthetic Biology)
Dallin Satoshi Akagi* *Draper, Utah* Computer Science
Anguel Tchavdarov Alexiev *Granada Hills, California* Chemistry
Shamili Allam *Union City, California* Bioengineering (Synthetic Biology)
Margaret Anastasia Allen *San Diego, California* Mechanical Engineering
Amit Alon *Haifa, Israel* Electrical Engineering
Arda Antikacioglu* *Istanbul, Turkey* Mathematics and Computer Science
Anuj Anil Arora* *Mumbai, India* Electrical Engineering and Business Economics and Management
Vishwaratn Asthana* *Miami, Florida* Bioengineering (Synthetic Biology)
Bamini Balaji * *New Delhi, India* Chemical Engineering (Biomolecular)
Ana Silvia Balibanu* *Cluj-Napoca, Romania* Mathematics
Neal Bansal *New Delhi, India* Engineering and Applied Science (Materials Science)
Rebecca Ann Barter *Poland Spring, Maine* Engineering and Applied Science (Computational and Neural Systems)
Donatela Elsa Bellone* *Miami, Florida* Chemistry
Yakov Ilich Berchenko-Kogan* *Raleigh, North Carolina* Mathematics and Control and Dynamical Systems (Minor)
Christopher Grant Berlind* *Brookline, New Hampshire* Computer Science
Christopher Bilinski* *Oceanside, California* Astrophysics and Business Economics and Management
Gary Allen Binder* *Minot, North Dakota* Physics
Timothy James Fornell Black* *Madison, Wisconsin* Mathematics
Brianne Marie Blakesley *Sacramento, California* Chemistry and History (Minor)
Clifford Alan Blakestad *Highlands Ranch, Colorado* Mathematics
Jason Charles Bland* *West Chester, Pennsylvania* Mathematics
Anton Mario Bongio Karrman *Santa Rosa, California* Applied and Computational Mathematics
Michael Alex Borisov *Chicago, Illinois* Electrical Engineering

* *Students whose names are followed by an asterisk are being graduated with honor in accordance with a vote of the faculty.*

† *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.*

Bachelor of Science *continued*

Edward Hing Bramston-Cook *Long Beach, California* Chemical Engineering (Process Systems)
Tristan Robert Brown* *Woodland Hills, California* Chemistry
Vanessa Marie Burns* *Roseburg, Oregon* Bioengineering (Synthetic Biology) and English (Minor)
Can Cai* *Plainsboro, New Jersey* Chemical Engineering (Materials)
Grayson Lee Chadwick* *Santa Barbara, California* Biology
Laainam Chaipornkaew* *Bangkok, Thailand* Geophysics
Deboki Chakravarti* *Plainview, New York* Bioengineering (Synthetic Biology) and English
Rishi John Chandy* *Coral Spring, Florida* Computer Science
Fei Chen* *Beaverton, Oregon* Electrical Engineering
Huiling Chen* *Republic of Singapore* Physics
Xi (Cece) Chen *Troy, Michigan* Mechanical Engineering
Christine Cheng* *Suzhou, People's Republic of China* Electrical Engineering
Benjamin J. Cherian† *San Jose, California* Applied Physics
Justine Xi-Yen Chia *Walnut Creek, California* Chemical Engineering (Biomolecular)
Abhiram Chivukula *Cary, North Carolina* Physics
Sean Seol Woong Choi* *South Pasadena, California* Computer Science and Business Economics and Management
Anthony Yu-Yong Chong *Saratoga, California* Computer Science
Laura Teh Cladek* *Oak Brook, Illinois* Mathematics
Jack Edward Cochran* *Baton Rouge, Louisiana* Engineering and Applied Science (Aeronautics)
Emma Grace Cohen* *Los Angeles, California* Mathematics
Arianne Xaviera Collopy *Urbana, Illinois* Chemistry
Perrin Thalia Sau Pung Considine *Beaverton, Oregon* Biology
Jeremy Coulter Davis† *Mesa, Arizona* Computer Science
Laura Jane Decker *Bridgewater, New Jersey* History
Ryan Arthur Denlinger* *Sacramento, California* Applied and Computational Mathematics
Tina Xin Ding *Walnut, California* Chemistry
Vu Quoc Dinh* *Anaheim, California* Biology
Susan Juel Dittmer* *Saint Charles, Illinois* Physics
Sherwin Doroudi *Mission Viejo, California* Economics
Janesha Dua* *New Delhi, India* Electrical Engineering
Sachith Anurudde Dunatunga* *Tucson, Arizona* Mechanical Engineering
Jeremy Ehrhardt *Hamilton Square, New Jersey* Computer Science
Fady Mohamed El-Gabalawy* *San Marino, California* Computer Science
Ryan Scott Elmquist* *Woodbury, Minnesota* Computer Science
Colin Michael Ely* *Sudbury, Massachusetts* Mechanical Engineering
Daniel Marc Erenrich* *West Palm Beach, Florida* Computer Science

Bachelor of Science *continued*

Nnoduka Chukwudile Eruchalu* *Nnobi, Anambra, Nigeria* Electrical Engineering
Benjamin Justus Faber* *Hays, Kansas* Physics
Daniil N. Feldman *Kew Gardens, New York* Astrophysics
Michelle Nora Filiba* *San Diego, California* Computer Science
Kristina Marie Flavier *Carlsbad, California* Chemistry
Paul Alan Fleiner *McKees Rocks, Pennsylvania* Physics
Christine Leonore Fuller* *Auburn, California* Mechanical Engineering
Sarvesh Garimella *Athens, Georgia* Planetary Science and Engineering and Applied Science (Environmental Science and Engineering)
Theresa Lynn Geiger* *Sleepy Hollow, Illinois* Chemistry
Casey Carter Glick* *Chico, California* Applied Physics and Geochemistry and History (Minor)
Prakhar Goel* *Dallas, Texas* Mathematics and Business Economics and Management
Keir Gonyea† *Naperville, Illinois* Mechanical Engineering
Scott Lee Goodfriend *Enterprise, Alabama* Chemical Engineering (Biomolecular)
Deepthi Gopal† *Bangalore, India* Physics
Sarah Danielle Griffis* *Crown Point, Indiana* Engineering and Applied Science (Environmental Science and Engineering)
Cameron Thomas Gross *Solon, Iowa* Engineering and Applied Science (Materials Science)
Hassan I. Guled *Mogadishu, Somalia* Economics and Applied and Computational Mathematics
Pallavi Kavita Gunalan *Salt Lake City, Utah* Bioengineering (Synthetic Biology) and English
Luke W. Guo* *San Diego, California* Electrical Engineering
Sonal Gupta *New Delhi, India* Computer Science
Daniel Riley Haas *Nashville, Tennessee* Physics
Tyler J. Hannasch* *Brentwood, Tennessee* Mechanical Engineering and Business Economics and Management
Kevin Alexander Hartman *Oak View, California* Chemical Engineering (Biomolecular)
Lucas Allan Hartsough* *Scottsdale, Arizona* Bioengineering (Synthetic Biology)
Joseph Cole Kelner Hershkowitz* *Arlington, Virginia* Mechanical Engineering
Albert Aibo Ho* *Naperville, Illinois* Mechanical Engineering
Sarah Louise Howell* *Oklahoma City, Oklahoma* Applied Physics
Guozhi Huang* *Nanjing, People's Republic of China* Mechanical Engineering
Li Hong Huang* *Cupertino, California* Computer Science
Alexander Chunhachatchawalkul Hudson* *Vancouver, Washington* Applied Physics
Ran Huo* *Scarsdale, New York* Physics
Nadia Iqbal *Williamsville, New York* Bioengineering (Synthetic Biology)
Jamie Lynn Jackson† *Germantown, Tennessee* Computer Science

Bachelor of Science *continued*

Ning-Jiun Jan *Howell, New Jersey* Bioengineering (Synthetic Biology)
Casey Jao* *Dayton, Maryland* Mathematics
James Malvern Hill Jester *Coronado, California* Electrical Engineering
Suyao Ji* *Qingdao, People's Republic of China* Electrical Engineering
Menglu Michelle Jiang* *Vancouver, Washington* Mechanical Engineering and Business Economics and Management
Kirit Sukrit Karkare* *Thousand Oaks, California* Physics and English (Minor)
Brett Harris Kassof *Baldwin, New York* Applied and Computational Mathematics
Lauren Christine Kendrick *Jacksonville, Florida* Applied Physics
Christopher Thomas Kennelly* *Munster, Indiana* Computer Science
Asif R. Khan* *Columbia, South Carolina* Electrical Engineering
Deyeon Kim *Seoul, Republic of Korea* Business Economics and Management and Political Science
Emily S. Kim* *Bellevue, Washington* Biology
Jeffrey Michael Kiner *Kirkland, Washington* Mathematics
Daniel Walter Kolodrubetz* *San Antonio, Texas* Physics
Pranay Dipak Kothari* *Sugar Land, Texas* Biology and Business Economics and Management
Jonathan David Krause* *Strongsville, Ohio* Computer Science
Jessie Ku* *Diamond Bar, California* Applied Physics
Pauline Juliet Ku† *River Grove, Illinois* Biology
Calvin Kuo* *Newton, Massachusetts* Mechanical Engineering and Computer Science
Benjamin Bernard Kurtz *Golden, Colorado* Physics
Manuel De Jesus Lagang, Jr.* *Pasadena, California* Computer Science
Anson Lam *Calgary, Alberta, Canada* Astrophysics
Thomas Jared Lampo* *Elmhurst, Illinois* Chemical Engineering (Biomolecular)
Alexander Moore Lapides* *Naperville, Illinois* Chemistry
Christina Esther Lee* *Saratoga, California* Computer Science
Dylan Lee *Corvallis, Oregon* Mechanical Engineering
Grace Yoon Lee† *Budang, Republic of Korea* Applied and Computational Mathematics
Joshua Warren Lee *Sherman Oaks, California* Applied Physics
Kyung Ha Lee* *Daegu, Republic of Korea* Physics
Mariya Levina* *Los Angeles, California* Geology
Stacy Michelle Levine *Northridge, California* Mechanical Engineering and Aerospace (Minor)
Garrett Darl Lewis *Albuquerque, New Mexico* Applied Physics and Political Science and Aerospace (Minor)
Bobo Li *Plano, Texas* Computer Science
Flora Mian Li* *Cerritos, California* Biology
Lily Li† *Irvine, California* Bioengineering (Synthetic Biology)

Bachelor of Science *continued*

Lin Li* *Tianjin, People's Republic of China* Mechanical Engineering
Lisha Li* *New York, New York* Applied and Computational Mathematics
Warren Liao *Cerritos, California* Engineering and Applied Science (Materials Science)
Dongkook Dennis Lim* *West Lafayette, Indiana* Biology
Jeffrey Thomas Lin* *Pleasanton, California* Mathematics and Physics
Joy Lin* *Diamond Bar, California* Geochemistry
Kurt James Litsch* *Ransom Canyon, Texas* Physics
Kyle Richard Littler *Mission Viejo, California* Computer Science
Hanna Ken-Yuin Liu* *Los Angeles, California* Geobiology
Joyce Liu* *Fremont, California* Chemical Engineering (Biomolecular)
Colin Murdoch Logan* *Austin, Texas* Applied and Computational Mathematics and Business Economics and Management
Dingchao Lu* *Fullerton, California* Electrical Engineering and Business Economics and Management
Helen Yu Luo* *Sammamish, Washington* Chemical Engineering (Biomolecular)
Erik Madsen* *Danville, California* Physics and Economics
Elizabeth Marie Mak* *Pasadena, California* Biology
Aliza Ilana Malz *New York, New York* Physics and History (Minor)
Faith Gregory Manary *San Diego, California* Mechanical Engineering and English
Sarah Epstein Marzen* *McLean, Virginia* Physics
Michael Vincent Maseda* *Tampa, Florida* Astrophysics and English
Maral Mazrooei *Irvine, California* Bioengineering (Synthetic Biology)
Gabriel Joel Mendoza* *El Paso, Texas* Independent Studies Program
Brian Ka-Jun Mok* *Temple City, California* Mechanical Engineering
Kevin D. Monajati *Rochester, New York* Mechanical Engineering
Joseph Ellis Moore, Jr. *Plant City, Florida* Applied and Computational Mathematics and Economics
Gerardo Antonio Morabito *Caracas, Venezuela* Mechanical Engineering
Evan Adrian Robjohn Murphy *Lutherville, Maryland* Computer Science
Chantal Lian Mustoe *Golden, Colorado* Chemistry and English (Minor)
Hoi Yee Nam* *Hong Kong, PRC* Mechanical Engineering
Karthik Narsimhan* *West Lafayette, Indiana* Chemical Engineering (Materials)
Priya Mehta Nayak* *Van Nuys, California* Physics
Ryan Lane Newton* *Austin, Texas* Mechanical Engineering and Business Economics and Management
Albert Han Ng* *Freehold, New Jersey* Electrical Engineering
Long Thanh Nguyen† *Houston, Texas* Mechanical Engineering
Viet Anh Nguyen Huu* *Warsaw, Poland* Chemical Engineering (Biomolecular)
Daniel Stuart Obenshain *Glyndon, Maryland* Computer Science and English (Minor)
Dongyoon Oh* *Seoul, Republic of Korea* Physics

Bachelor of Science *continued*

Wei Jian Ong* *Republic of Singapore* Chemistry
Jim Ouyang† *Chapel Hill, North Carolina* Computer Science
Aleksandr Palatnik* *Pewaukee, Wisconsin* Computer Science
Saurabh Kumar Pandey* *Rochester, Michigan* Applied and Computational Mathematics
Antanu Paul* *Pittsburg, Kansas* Applied and Computational Mathematics
Jeanne Yiwen Peng *New Orleans, Louisiana* Electrical Engineering
Kathryn A. Peters *Phoenix, Arizona* Business Economics and Management
Erik Axel Peterson* *Henderson, Nevada* Mathematics
Alan Michael Pezeshki* *Troy, Michigan* Chemical Engineering (Environmental)
Suzanna Marie Piatt *Ridgecrest, California* Mechanical Engineering
Andrey D. Poletayev* *Moscow, Russia* Chemistry
Andre Pradhana Tampubolon* *Jakarta, Indonesia* Applied and Computational Mathematics
Andrew John Price* *La Jolla, California* Applied Physics
Nicholas Elijah Price *Santa Clarita, California* Electrical Engineering
Sedona H. Price* *Fairbanks, Alaska* Physics
Sylvia Mary Puglisi† *Oxnard, California* Engineering and Applied Science (Computational and Neural Systems)
Kasra Rahbar *Houston, Texas* Electrical Engineering
Pradeep Ramesh* *Thousand Oaks, California* Applied Physics
Arjun Ravikumar* *Carlsbad, California* Bioengineering (Synthetic Biology)
Sara Elizabeth Renfrew* *Sewickley, Pennsylvania* Chemical Engineering (Materials)
Nicholas Rosa *Tupelo, Mississippi* Chemistry and Biology
Daniel Ethan Rosenberg* *Jupiter, Florida* Computer Science
Robert Alan Rosenberg *Santa Monica, California* Applied Physics
Jacqueline Dodds Rousseau* *San Jose, California* Physics and Business Economics and Management
Gregory Jacob Rubinstein* *Chapel Hill, North Carolina* Chemical Engineering (Materials) and Business Economics and Management
Aryan Safaie *Fountain Valley, California* Mechanical Engineering
Gerard Francis Salinas *Austin, Texas* Mechanical Engineering
Allison Jill Saltzman *Merrick, New York* Mechanical Engineering
Daniel Roland Sanchez *Miami, Florida* Chemistry
Karthik Venkataraman Sarma* *Burr Ridge, Illinois* Computer Science
Sanket Satpathy* *Bhubaneswar, Orissa, India* Electrical Engineering and Applied and Computational Mathematics
Joseph Adam Schmitz* *O'Neill, Nebraska* Electrical Engineering
Elliott Schneider* *Cos Cob, Connecticut* Physics
Rebecca Lynn Scholz* *Bend, Oregon* Biology
Nicholas Scianmarello* *Miami, Florida* Physics

Bachelor of Science *continued*

Jasmine Soria Sears† *Beaverton, Oregon* Applied Physics and English
Dongjin Seo* *Davis, California* Electrical Engineering
Michael Shafer *Thousand Oaks, California* Computer Science
Katherine Blackburn Shakman *Chicago, Illinois* Biology
Nitin Sharma* *Noida, India* Electrical Engineering
Dongying (Erin) Shen† *Shanghai, People's Republic of China* Chemical Engineering (Biomolecular)
Jing Shi* *Chongqing, People's Republic of China* Physics
Kedron Pyle Silsbee* *Mansfield, Connecticut* Physics
Marland Hoy Sitt* *Lititz, Pennsylvania* Electrical Engineering and Business Economics and Management
Alexandra Lauren Smith *La Cañada Flintridge, California* Mechanical Engineering
William Martin Steinhardt* *Princeton, New Jersey* Geophysics
William Insang Suh *Rancho Palos Verdes, California* Biology
Yuxiao Sun *Louisville, Kentucky* Chemistry
Yoon Chan Taak† *Seoul, Republic of Korea* Physics
Dalia Beth Taylor* *Lake Oswego, Oregon* Biology
Gloria Eve Tran* *Orange, California* Biology and English (Minor)
Ying-Ying Tran *Princeton Junction, New Jersey* Mathematics
Debbie G. Tseng *Danville, California* Biology
Brian Louis Ventura *Nacogdoches, Texas* Mechanical Engineering and History (Minor)
Kyle Joseph Verdone *Spring, Texas* Business Economics and Management
Pengcheng Wang* *Guangzhou, People's Republic of China* Biology and Chemistry
Richard Yufan Wang* *Taiwan, ROC* Mechanical Engineering
Yi Jenny Wang* *Wellesley, Massachusetts* Mechanical Engineering
Ziying Wang *Shanghai, People's Republic of China* Chemistry
Talia Michelle Weiss* *New Rochelle, New York* Bioengineering (Devices)
Kevin Thomas Welch *Austin, Texas* Bioengineering (Synthetic Biology) and English
Qing Yu Weng* *Charlotte, North Carolina* Biology and English
Christopher Michael Whelan *Dana Point, California* Physics
Christopher Joseph White* *Waldwick, New Jersey* Physics and Mathematics and Philosophy (Minor)
Claudia Anne Whitten *Dallas, Texas* Computer Science
Aaron Joseph Wilkowski *Woodland, California* Computer Science
Christopher Allen Wong* *Berkeley, California* Applied and Computational Mathematics
Fan Tony Wu* *Fort Collins, Colorado* Electrical Engineering
James Jiegang Wu *Miami, Florida* Applied and Computational Mathematics
Stephanie Marie Wuerth* *Newburgh, Indiana* Geochemistry and English
Patrick Jing Xia* *Wilmette, Illinois* Computer Science and Electrical Engineering

Bachelor of Science *continued*

Jenny Zhou Xiong *San Jose, California* Engineering and Applied Science (Computational and Neural Systems)
Fei Yang* *Houston, Texas* Mechanical Engineering and Control and Dynamical Systems (Minor)
Lili Yang* *Woodbury, Minnesota* Applied and Computational Mathematics and Business Economics and Management
Samuel Jialuo Yang* *San Dimas, California* Electrical Engineering
Wing-Hin Jonathan Yeung* *Jacksonville, Florida* Electrical Engineering
Cindy Xinxin You* *San Diego, California* Applied and Computational Mathematics
Alvin Yu* *Hacienda Heights, California* Physics
Matthew Chuck-Jun Yu* *San Jose, California* Electrical Engineering
Wesley Yung-Hsu Yu* *Irvine, California* Chemistry
Xinlin Yu *Cypress, Texas* Chemical Engineering (Biomolecular)
Erin Noelle Zampaglione *San Jose, California* Biology
Kun Zhu* *Apple Valley, California* Chemistry

Master of Science

David Gregory Abrecht *(Chemical Engineering)* B.S. *(Chemical Engineering),* B.S. *(Paper Science and Engineering),* North Carolina State University 2007.

Thomas Joachim Ader *(Geophysics)* Master of Astrophysics, Université Paul Sabatier 2008; Master of Space Engineering, École National Supérieure de l'Aéronautique et de l'Espace 2008; Diplôme, École Polytechnique 2009.

Thomas Friel Allen *(Mechanical Engineering)* B.S., University of California, Berkeley 2005.

Jeffrey Scott Amelang *(Mechanical Engineering)* B.S., Brigham Young University 2009.

Pankaj Arora *(Electrical Engineering)* B.Tech., Indian Institute of Technology, Roorkee 2008.

Chirranjeevi Balaji Gopal *(Materials Science)* B.Tech., Indian Institute of Technology, Madras 2009.

Kristin Diane Bergmann *(Geology)* B.A., Carleton College 2004.

Pinaky Bhattacharyya *(Civil Engineering)* B.Tech., Indian Institute of Technology, Bombay 2010.

Ersen Bilgin *(Physics)* B.A., Williams College 2006.

Neal Phillip Bitter *(Aeronautics)* B.S., Milwaukee School of Engineering 2010.

Laura Grace Book *(Physics)* B.S., University of Illinois at Urbana-Champaign 2007.

Peter Garrett Bridi *(Space Engineering)* B.S., Lehigh University 2010.

Steven Tai-hsiang Chao *(Chemistry)* B.A., B.S., The University of Texas at Austin 2008.

Jonathan Chiang *(Mechanical Engineering)* B.S., Cornell University 2010.

Clara Ji-Hyun Cho *(Materials Science)* B.S., Franklin Olin College of Engineering 2006.

Max Anton Cubillos-Moraga *(Applied and Computational Mathematics)* B.S. (*Mathematics*), B.S. *(Physics),* University of Maryland, College Park 2006.

Trevor William Currie *(Applied Mechanics)* B.E., Stevens Institute of Technology 2009.

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John Matthew Delacruz *(Computation and Neural Systems)* B.A., Dartmouth College 2004.

Steven Brian Demers *(Materials Science)* B.S., Cornell University 1996; M.S., University of Southern California 1997.

Lawrence Joseph Dooling *(Chemical Engineering)* B.S., University of Pennsylvania 2008.

Jin Yang Du *(Mathematics)* B.S., University of California, Los Angeles 2008.

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Hal S. Emmer *(Materials Science)* B.S.E., University of Pennsylvania 2009.

Joseph James Ensberg *(Chemical Engineering)* B.S., University of California, Irvine 2009.

Constantine Glen Evans *(Physics)* B.S., University of California, San Diego 2005.

William Fan *(Electrical Engineering)* B.S., California Institute of Technology 2010.

William Jason Fefferman *(Computer Science)* B.S., The University of Chicago 2008.

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Adi Wijaya Gani *(Electrical Engineering)* B.S., California Institute of Technology 2010.

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Master of Science *continued*

Marcella Mary Gomez *(Mechanical Engineering)* B.S., University of California, Berkeley 2008.

Jason Daniel Goodpaster *(Chemical Engineering)* B.S., University of Illinois at Urbana-Champaign 2008.

Liling Gu *(Physics)* B.S., University of Science and Technology of China 2008.

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Vanessa Mary Heckman *(Civil Engineering)* B.S., California Institute of Technology 2006.

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Serin Hong *(Mathematics)* B.S., Stanford University 2008; M.S., 2009.

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Andrea Bui Kanady *(Social Science)* B.A., University of California, Irvine 2008.

Jaclyn Kimble *(Social Science)* B.A., Yale College 2009.

Hao-Hsien Ko *(Electrical Engineering)* B.S., National Taiwan University 2007.

Adam Peter Kowalski *(Materials Science)* B.A., Lewis and Clark College 2008.

Henry Kozachkov *(Applied Physics)* B.A., New York University 2007.

Tian Lan *(Materials Science)* B.S., Nanjing University 2006.

George Sing-Ho Lee *(Electrical Engineering)* S.B. *(Computer Science),* S.B. *(Electrical Engineering),* Massachusetts Institute of Technology 2003.

Seung Ah Lee *(Electrical Engineering)* B.S., Seoul National University 2007; M.S., 2009.

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Joy Lin *(Geobiology)* B.S., California Institute of Technology 2011.

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Lauren Christine Montemayor *(Space Engineering)* S.B., Massachusetts Institute of Technology 2010.

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Megan Eve Newcombe *(Geology)* B.A., M.Sc., The University of Cambridge 2009.

Alexander Vinh Nguyen *(Electrical Engineering)* B.S., University of Rochester 2006; M.D., University of California, San Francisco 2010.

Nam Phuong Nguyen *(Electrical Engineering)* B.S., California Institute of Technology 2009.

Gina Marie Olson *(Aeronautics)* B.S., Rose-Hulman Institute of Technology 2010.

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Samet Oymak *(Electrical Engineering)* B.S., Bilkent University 2009.

Alex Hao-Yu Pai *(Electrical Engineering)* B.S., University of California, Berkeley 2009.

Narae Park *(Chemistry)* B.S., University of California, San Diego 2005.

Ryan Matt Pettibone *(Physics)* B.S. (*Mathematics*), B.S. (*Physics*), University of Rochester 2008.

Alison Martha Piasecki *(Geology)* S.B., Massachusetts Institute of Technology 2009.

Chaitanya Rastogi *(Electrical Engineering)* B.S., California Institute of Technology 2009.

Vishagan Ratnaswamy *(Space Engineering)* B.S. (*Applied Mathematics*), B.S. (*Mechanical Engineering*), New Jersey Institute of Technology 2009; M.S., 2010.

Alice Kristin Robinson *(Biology)* B.A., B.S., University of North Carolina, Chapel Hill 2009.

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Riccardo Schmid *(Physics)* B.A., Bowdoin College 2005.

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Master of Science *continued*

Shaunak Sen *(Control and Dynamical Systems)* B.Tech., Indian Institute of Technology, Kanpur 2003.

Yao Sha *(Applied and Computational Mathematics and Electrical Engineering)* B.S., Peking University 2005.

Constantine Sideris *(Electrical Engineering)* B.S., California Institute of Technology 2010.

Kathryn Marie Stack *(Geology)* B.A., Williams College 2008.

John Bradley Steeves *(Space Engineering)* B.Sc., University of Saskatchewan 2010.

Daniel Aaron Stolper *(Geobiology)* A.B., Harvard College 2008.

Dustin Phillip Summy *(Aeronautics)* B.S., The University of Texas 2010.

Federico Tadei *(Social Science)* B.A., Università di Torino 2006; M.A., 2008; M.A., Collegio Carlo Alberto 2009.

Melissa Midori Tanner *(Mechanical Engineering)* S.B., Massachusetts Institute of Technology 2009.

Brett Joseph Teeple *(Physics)* B.Sc. (*Mathematics*), B.Sc. (*Physics*), University of Calgary 2008.

Marion Yolande Thomas *(Geology)* Licence, Université de Bretagne Occidentale 2005; M.S., 2007.

Margaret Winkler Thompson *(Chemistry)* B.A., Wellesley College 2008.

Sally June Tracy *(Materials Science)* B.A., Occidental College 2008.

Dmitriy Tseliakhovich *(Astrophysics)* B.S., Belarusian State University 2006; M.S., Carleton University 2008.

Carlos Ventura Piazza *(Space Engineering)* Ingeniero Aeronáutico, Escuela Superior de Ingenieros Universidad de Sevilla 2010.

Thomas Vezin *(Aeronautics)* Diplôme d'Ingénieur, École Polytechnique 2010.

Sameer Sudhir Walavalkar *(Applied Physics)* B.S., The University of Michigan 2004.

Claire Marie Waller *(Geology)* B.S., Virginia Polytechnic Institute and State University 2008.

Esther Sue Wang *(Electrical Engineering)* B.S., California Institute of Technology 2009.

Liang Wang *(Electrical Engineering)* B.E., Huazhong University of Science and Technology 2009.

Yu Hui Wang *(Electrical Engineering)* B.A.Sc., University of British Columbia 2010.

Devin Thomas Wiley *(Chemical Engineering)* B.S., University of Arizona 2007.

Charles Stanley Wojnar *(Aeronautics)* B.S., University of Illinois at Urbana-Champaign 2010.

Shuang Xie *(Electrical Engineering)* B.S., California Institute of Technology 2009.

Yuan Xuan *(Aeronautics)* Diplôme d'Ingénieur, École Polytechnique 2010.

Francisco Antonio Zabala *(Control and Dynamical Systems)* B.S., California State University, Fullerton 2007.

Daniel Roszhart Zehr *(Space Engineering)* B.S., University of Kansas 2010.

Chengshan Zhou *(Electrical Engineering)* B.S., California Institute of Technology 2009.

Doctor of Philosophy

DIVISION OF BIOLOGY

Nicholas R. Ballor *(Biochemistry and Molecular Biophysics)* B.S., Michigan Technological University 2005; M.S., California Institute of Technology 2009.
Thesis: Hydrogenases and Hydrogen Sensors in the Symbiotic Microbial Communities of Wood-Feeding Termites.

Matthew Edward Barnet *(Biochemistry and Molecular Biophysics)* B.S., California Institute of Technology 1999.
Thesis: Dynamics of Sea Urchin Gastrulation Revealed by Tracking Cells of Diverse Lineage and Regulatory State.

Charles Walter Bugg *(Biochemistry and Molecular Biophysics)* A.A., Mississippi Gulf Coast Community College 1997; B.S., University of Southern Mississippi 2000; M.S., California Institute of Technology 2004.
Thesis: Domain Organization of Mutant Huntingtin Fibrils.

Janet Chow *(Biology)* B.S., University of California, Los Angeles 2006.
Thesis: A Pathobiont of the Mammalian Microbiota Balances Intestinal Inflammation and Colonization.

Sagar S. Damle *(Biology)* B.S., University of California, Los Angeles 1998.
Thesis: A Study of Information Processing in the Sea Urchin Embryo by Rewiring Mesodermal Gene Regulatory Networks and cis-Regulatory Analysis of Skeletogenic Regulators.

Barbara Karmen Kraatz Fortini *(Biology)* B.S., California Institute of Technology 2002.
Thesis: Biochemical and Genetic Studies of Genomic Stability.

Tara Adele Gomez *(Biology)* B.S., University of California, Los Angeles 2005.
Thesis: Mutational Analysis of Ubiquitin Shuttle Receptor Docking Sites on the 26S Proteasome.

Anne Christina Hergarden *(Biology)* B.S., University of Texas at Austin 1997.
Thesis: The Role of Peptidergic Neurons in the Regulation of Satiety in *Drosophila*.

Steven Gregory Kuntz *(Biochemistry and Molecular Biophysics)* B.S., University of California, San Diego 2003.
Thesis: *h/h-1* and the *C. elegans* Body Wall Muscle Transcriptional Differentiation Network.

Oren N. Schaedel *(Biology)* B.A., Technion – Israel Institute of Technology 2005.
Thesis: Dynamic Regulation of the Dauer Decision.

Arbel David Tadmor *(Biochemistry and Molecular Biophysics)* B.S., Technion – Israel Institute of Technology 1997; M.S., Weizmann Institute of Science 2007.
Thesis: Phage-Host Interaction in Nature.

Sarah Lynn Tulin *(Biology)* B.S., The Johns Hopkins University 2003.
Thesis: Analysis of *Drosophila* Fibroblast Growth Factor Functional Domains.

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

Lawrence A. Wade *(Molecular Biology and Biochemistry)* B.A., California State University, Fullerton 1980.
Thesis: An Evanescent Perspective on Cells.

Liming Wang *(Biology)* B.S., Peking University 2005.
Thesis: Genetic and Neural Regulation of Aggressive Behavior in *Drosophila melanogaster*.

Catherine Marie Ward *(Biochemistry and Molecular Biophysics)* B.S., North Carolina State University 2003.
Thesis: *Medea* Selfish Genetic Elements as Tools for Altering Traits of Wild Populations: A Theoretical Analysis.

DIVISION OF CHEMISTRY AND CHEMICAL ENGINEERING

Habibullah Ahmad *(Chemistry)* B.S., Bowling Green State University 2003.
Thesis: Microfluidic Platforms for Quantitative, Multiplexed Protein Detection.

Andrew Harris Babiskin *(Chemical Engineering)* B.S., University of Maryland, College Park 2003; M.S., California Institute of Technology 2005.
Thesis: Development of RNA-based Genetic Control Elements for Predictable Tuning of Protein Expression in Yeast.

Steven M. Baldwin *(Chemistry)* B.S., M.S., Bucknell University 2002.
Thesis: Investigation of the Role of Hydrides in Zirconocene Catalyzed Olefin Polymerization.

Peigen Cao *(Chemistry)* B.S., Suzhou University 1996; M.S., 1999.
Thesis: Surface Chemistry at the Nanometer Scale.

Mike Ming Yu Chen *(Chemical Engineering)* B.S. University of California, Berkeley 2002.
Thesis: Directed Evolution of Cytochrome P450 for Small Alkane Hydroxylation.

Yvonne Yu-Hsuan Chen *(Chemical Engineering and Biology)* B.S., Stanford University 2004; M.S., California Institute of Technology 2007.
Thesis: Genetic Control of T-Cell Proliferation with Synthetic RNA Regulatory Systems.

Puneet Singh Chhabra *(Chemical Engineering and Environmental Science and Engineering)* B.S. *(Mathematics),* B.S. *(Chemical Engineering),* University of Illinois at Urbana-Champaign 2005; M.S., California Institute of Technology 2007.
Thesis: Studies of Chamber Organic Aerosol using an Aerodyne High-Resolution Time-of-Flight Aerosol Mass Spectrometer.

Chung Hang Jonathan Choi *(Chemical Engineering)* B.S., Stanford University 2005; M.S., 2006.
Thesis: Pharmacological Behavior of Systemically Administered Nanoparticles of Defined Properties: Mechanistic Investigations at the Organ, Tissue, and Cellular Levels.

Doctor of Philosophy *continued*

Paul Gregory Clark *(Chemistry)* B.S., Pacific Lutheran University 2005.
Thesis: Synthesis of Interlocked Molecules by Olefin Metathesis.

Peter Michael Clark *(Chemistry)* B.A., Cornell University 2004.
Thesis: New Tools for Studying *O*-G1cNAc Glycosylation and Chondroitin Sulfate Proteoglycans and Studies on the Roles of *O*-G1cNAc Glycosylation on the Transcription Factor CREB.

John D. Crounse *(Chemistry)* B.S., Andrews University 1999.
Thesis: Atmospheric Reactive Trace Gas Observations in Field and Chamber Studies using CF_3O^- Chemical Ionization Mass Spectrometry.

Jillian Lee Dempsey *(Chemistry)* S.B., Massachusetts Institute of Technology 2005.
Thesis: Hydrogen Evolution Catalyzed by Cobaloximes.

John Andrew Enquist, Jr. *(Chemistry)* B.S., University of California, San Diego 2004.
Thesis: Total Synthesis of Cyanthiwigin Natural Products via Double Asymmetric Catalytic Alkylation and Investigations into the Nature of Double Asymmetric Processes.

Russell J. Ernst, Jr. *(Biochemistry and Molecular Biophysics)* B.S., University of Notre Dame 2001.
Thesis: The Biological Activity of Rhodium Metalloinsertors.

Vivian Eleanor Ferry *(Chemistry)* B.S., The University of Chicago 2006.
Thesis: Light Trapping in Plasmonic Solar Cells.

Anthony G. Fitch *(Chemistry)* B.S., University of Nebraska at Kearney 2002.
Thesis: The Photoelectrochemistry of Solution Grown Zinc Oxide Nanowire Arrays.

Andreas Gahlmann *(Chemistry)* B.S., University of Portland 2005.
Thesis: Ultrafast Electron Diffraction: Pulsed Laser Desorption Enables Time-Resolved Structural Determination of Thermally Labile Chromophores.

Edgardo García-Berríos *(Chemistry)* B.S., University of Puerto Rico 2004.
Thesis: Investigation of Composites of Carbon Black and Metallocycles, and Functionalized Transition-Metal Nanoparticles as Chemiresistive Vapor Sensors.

Shelby Brooke Hutchens *(Chemical Engineering)* B.S., Oklahoma State University 2004; M.S., California Institute of Technology 2006.
Thesis: Deformation Behavior and Mechanical Analysis of Vertically Aligned Carbon Nanotube (VACNT) Bundles.

Joyce Huynh *(Chemical Engineering)* B.S., University of California, Berkeley 2006; M.S., California Institute of Technology 2009.
Thesis: Factors Governing Photodynamic Cross-Linking of Ocular Coat.

Peera Jaru-Ampornpan *(Biochemistry and Molecular Biophysics)* B.A., University of Pennsylvania 2005.
Thesis: Post-translational Membrane Protein Targeting by the Chloroplast Signal Recognition Particle.

Doctor of Philosophy *continued*

David Knapp *(Chemistry)* B.A., Columbia University 2001.
Thesis: Chemistry and Electronics of the Ge(111) Surface.

Keiichiro Kushiro *(Biochemistry and Molecular Biophysics)* B.S., Cornell University 2004.
Thesis: Directing Cellular Traffic Using Geometric and Biomolecular Signal Alterations.

Kyle Matthew Lancaster *(Chemistry)* B.A., Pomona College 2005.
Thesis: Outer Sphere Effects on the Copper Sites of *Pseudomonas Aeruginosa* Azurins.

I-Ren Lee *(Chemistry)* B.S., National Tsing Hua University 1998; M.S., 2000.
Thesis: Femtosecond Time-resolved Spectroscopy of Gas-phase Anions: Electron Solvation and Isolated Chromophore Dynamics.

Mary W.C. Louie *(Chemical Engineering and Materials Science)* B.S., University of California, Berkeley 2005; M.S., California Institute of Technology 2007.
Thesis: Electrocatalysis in Solid Acid Fuel Cells.

Sandy Ma *(Chemistry)* B.S., Stanford University 2004.
Thesis: Progress toward the Cortistatin A Carbocyclic Core and the Development of the Catalytic Enantioselective Alkylation of 3-Helooxindoles.

Michael E. Meyer *(Chemistry)* B.S., California State Polytechnic University, Pomona 2002.
Thesis: Palladium(II)-Catalyzed Oxidation Reactions in Natural Product Synthesis: Efforts toward Bielschowskysin and Phalarine.

Alexander James Minden Miller *(Chemistry)* B.S., The University of Chicago 2005.
Thesis: Emissive Monocopper Amidophosphine Complexes and Lewis Acid-Assisted Reductive Coupling of Carbon Monoxide.

Katy Ann Muzikar *(Chemistry)* B.S., University of California, San Diego 2005.
Thesis: Repression of DNA-Binding-Dependent Glucocorticoid Receptor-Mediated Gene Expression.

Joshua Henry Palmer *(Chemistry)* B.S., New York University 2006.
Thesis: Iridium Corroles: Synthesis, Properties, and Electronic Structure.

John Wilson Phillips *(Biochemistry and Molecular Biophysics)* B.S., M.S., Yale University 2002.
Thesis: Biological Activity of a Py-Im Polyamide Androgen Receptor Antagonist.

Imogen Mary Pryce *(Chemical Engineering and Applied Physics)* B.S., The Ohio State University 2006; M.S., California Institute of Technology 2008.
Thesis: Resonant Metallic Nanostructures for Active Metamaterials and Photovoltaics.

Havala Olson Taylor Pye *(Chemical Engineering and Environmental Science and Engineering)* B.S.,University of Florida 2005; M.S., California Institute of Technology 2007.
Thesis: Investigations of Global Chemistry-Climate Interactions and Organic Aerosol Using Atmospheric Modeling.

Christine Anne Romano *(Chemistry)* B.S., The University of Chicago 2005.
Thesis: DNA-Mediated Charge Transfer between [4Fe-4S] Cluster Glycosylases.

Doctor of Philosophy *continued*

Caroline Thalia Abdunnur Saouma *(Chemistry)* S.B., Massachusetts Institute of Technology 2005.
Thesis: Iron Mediated Reduction Schemes for Dinitrogen and Carbon Dioxide.

Valerie J. Scott *(Chemistry)* B.S., Brandeis University 2005.
Thesis: Investigations of C-H Activation and the Conversion of Methanol to Triptane.

Yao Sha *(Chemistry)* B.S., Peking University 2005.
Thesis: The Mechanisms of the Fuel Cell Oxygen Reduction Reaction on Pt and Other 8-11 Column Metal Surfaces.

Jai Anand Pattur Shanata *(Chemistry)* B.A., Cornell University 2005.
Thesis: Single-Molecule Studies of Ion Channels Expressing Unnatural Amino Acids.

Nathaniel Haynes Sherden *(Chemistry)* B.S. *(Chemistry),* B.S. *(Computer Science),* The University of Chicago 2004.
Thesis: Mechanistic Investigations into the Palladium-Catalyzed Decarboxylative Allylic Alkylation of Ketone Enolates using the PHOX Ligand Architecture.

Chang Ho Sohn *(Chemistry)* B.S., Seoul National University 2006.
Thesis: New Reagents and Methods for Mass Spectrometry-based Proteomics Investigations.

Kathleen Marie Spencer *(Chemistry)* B.S., Villanova University 2005.
Thesis: Constraining Anthropogenic and Biogenic Emissions using Chemical Ionization Mass Spectrometry.

Kana Takematsu *(Chemistry)* B.A. *(Chemistry),* B.A. *(Physics),* B.S., The University of Chicago 2004.
Thesis: Cavity Ringdown Spectroscopy of the Nitrate and Peroxy Radicals.

James A. Van Deventer *(Chemical Engineering)* B.S., Stanford University 2004; M.S., California Institute of Technology 2007.
Thesis: Biophysics and Protein Engineering with Noncanonical Amino Acids.

Ophir Vermesh *(Chemistry)* B.S., Stanford University 2001; M.S., 2002.
Thesis: Highly Informative Analytical Platforms for Rapid, Non-Invasive Diagnosis and Stratification of Patients with Cancer.

Don Walker *(Chemistry)* B.S., Southern University and A&M College 2003.
Thesis: Corrole Sensitized Solar Cells.

Charlotte A. Whited *(Chemistry)* B.S., University of Delaware 2006.
Thesis: Tuning Nitric Oxide Synthase: Investigating the Thiolate "Push" and No Release.

Fan Yang *(Chemistry)* B.S., University of Science and Technology of China 2004.
Thesis: Biochemical and Biophysical Characterizations of Immunoglobulin Superfamily Receptors Neogenin and L1.

Jennifer Chuen-Hsien Yang *(Biochemistry and Molecular Biophysics)* B.S., California Institute of Technology 2000.
Thesis: Following Motion of Early Heart Development at the Cellular Level Using Confocal Microscopy in Transgenic Quail Embryos.

DIVISION OF ENGINEERING AND APPLIED SCIENCE

Mohamed Alaa El-Dien Mahmoud Hussein Aly *(Electrical Engineering)* B.Sc., Cairo University 2003; M.S., California Institute of Technology 2007.
Thesis: Searching Large-Scale Image Collections.

Marco Andreetto *(Electrical Engineering)* Laurea, University of Padova 2001; M.S., California Institute of Technology 2005.
Thesis: Unsupervised Learning of Categorical Segments in Image Collections.

Stephen Becker *(Applied and Computational Mathematics)* B.A., Wesleyan University 2005.
Thesis: Practical Compressed Sensing: Modern Data Acquisition and Signal Processing.

Catherine Elizabeth Beni *(Applied and Computational Mathematics)* A.S., Riverside Community College 2002; B.S. University of California, Los Angeles 2005.
Thesis: Simulation Capabilities for Challenging Medical Imaging and Treatment Planning Problems.

Nicholas Sebastian Boechler *(Aeronautics)* B.S., Georgia Institute of Technology 2007; M.S., California Institute of Technology 2008.
Thesis: Granular Crystals: Controlling Mechanical Energy with Nonlinearity and Discreteness.

Ryan Morrow Briggs *(Materials Science)* B.S., Colorado School of Mines 2005; M.S., 2006; M.S., California Institute of Technology 2008.
Thesis: Hybrid Silicon Nanophotonic Devices: Enhancing Light Emission, Modulation, and Confinement.

Evan Cornell Brown *(Materials Science)* B.E., University of California, Irvine 2006; M.S., California Institute of Technology 2008.
Thesis: Electrochemically Deposited Ceria Structures for Advanced Solid Oxide Fuel Cells.

Justin Brown *(Mechanical Engineering)* B.S., University of New Mexico 2007; M.S., California Institute of Technology 2008.
Thesis: High Pressure Hugoniot Measurements in Solids using Mach Reflections.

David Isaac Buchfuhrer *(Computer Science)* B.S., Harvey Mudd College 2006; M.S., California Institute of Technology 2008.
Thesis: Limits on Computationally Efficient VCG-Based Mechanisms for Combinatorial Auctions and Public Projects.

Doctor of Philosophy *continued*

Jae-Woo Choi *(Electrical Engineering)* B.S., California Institute of Technology 2004; M.S., 2005.
Thesis: Surface Optofluidic Implementations towards the Development of a Biosensor.

William C. Chueh *(Materials Science)* B.S., California Institute of Technology 2005.
Thesis: Electrochemical and Thermochemical Behavior of $CeO_{2-\partial}$.

Ahmed Ettaf Elbanna *(Civil Engineering and Applied Mechanics)* B.S. Cairo University 2003; M.S., 2005; M.S., California Institute of Technology 2006.
Thesis: Pulselike Ruptures on Strong Velocity-Weakening Frictional Interfaces: Dynamics and Implications.

Claire Elizabeth Farnsworth *(Environmental Science and Engineering)* B.S. Washington University 2005; M.S., California Institute of Technology 2007.
Thesis: Processes Controlling the Fate and Transport of Trace Metals in the Subsurface during Changing Redox Potential.

Sawyer Buckminster Fuller *(Bioengineering and Control and Dynamical Systems and Electrical Engineering)* S.B., Massachusetts Institute of Technology 2000; S.M., 2003.
Thesis: Steady As She Goes: Visual Autocorrelators and Airspeed Feedback in the Reflexive Control of Flight Dynamics in Fruit Flies and Robotics.

Luca Giacchino *(Electrical Engineering)* Laurea di Primo Livello, Politecnico Di Torino 2003; Laurea, 2005; M.S., California Institute of Technology 2007.
Thesis: MEMS Electrolytic Inchworms for Movable Neural Probe Applications.

Ryan G. Gomes *(Computation and Neural Systems)* B.S., University of California, Berkeley 2001.
Thesis: Towards Open Ended Learning: Budgets, Model Selection, and Representation.

Marcial Gonzalez *(Aeronautics and Materials Science)* Mechanical Engineer, Universidad de Buenos Aires 2002; M.S., California Institute of Technology 2006.
Thesis: Energy and Force Stepping Integrators in Lagrangian Mechanics.

Si-ping Han *(Materials Science)* B.S., California Institute of Technology 2003; M.S., 2006.
Thesis: DNA Directed Self-Assembly of Carbon Nanotube Structures.

Rizal F. Hariadi *(Applied Physics)* B.S., Washington State University 2002.
Thesis: Non-equilibrium Dynamics of DNA Nanotubes.

Scott Patrick Hersey *(Environmental Science and Engineering)* B.A., B.S., Rice University 2006; M.S., California Institute of Technology 2008.
Thesis: Studies of Aerosol Composition and Hygroscopicity.

Chia-Lung Hsieh *(Electrical Engineering)* B.S., National Taiwan University 2002; M.S., 2004; M.S., California Institute of Technology 2007.
Thesis: Imaging with Second-Harmonic Generation Nanoparticles.

Doctor of Philosophy *continued*

Ray Kui-Jui Huang *(Electrical Engineering)* B.S., Cornell University 2005; M.S., California Institute of Technology 2006.
Thesis: Flexible Neural Implants.

Daniel Esteban Hurtado Sepulveda *(Mechanical Engineering and Applied and Computational Mathematics)* Licenciado, Pontificia Universidad Católica de Chile 2002; Ingéniero Civil, 2003; M.S., California Institute of Technology 2007.
Thesis: Multiscale Modeling of Microcrystalline Materials.

Nachiket Ganesh Kapre *(Computer Science)* B.E., Government College of Engineering, Pune 2002; M.S., California Institute of Technology 2005.
Thesis: $Spice_2$: A Spatial, Parallel Architecture for Accelerating the SPICE Circuit Simulator.

Edward A. Keehr *(Electrical Engineering)* S.B., Massachusetts Institute of Technology 2001; S.M., 2002.
Thesis: Techniques for Mixed-Signal Linearization and Large Signal Handling in Radio-Frequency Receiver Circuits.

Gretchen Keppel-Aleks *(Environmental Science and Engineering)* S.B., Massachusetts Institute of Technology 2004; M.S., California Institute of Technology 2006.
Thesis: Constraints on the Global Carbon Budget from Variations in Total Column Carbon Dioxide.

Christopher Kovalchick *(Mechanical Engineering)* B.S., The Johns Hopkins University 2006; B.M., Peabody Conservatory 2006; M.S., California Institute of Technology 2007.
Thesis: Mechanics of Peeling: Cohesive Zone Law and Stability.

Alan Jake-Man Kwan *(Environmental Science and Engineering)* B.S., University of California, Berkeley 2000.
Thesis: Investigating Sources and Sinks of Organic Aerosols: NO_3-initiated Oxidation of Isoprene and Heterogeneous Oxidation of Organic Aerosol.

Andrew G. Lamperski *(Control and Dynamical Systems)* B.S., The Johns Hopkins University 2004.
Thesis: Hierarchies, Spikes, and Hybrid Systems: Physiologically Inspired Control Problems.

Javad Lavaeiyanesi *(Control and Dynamical Systems)* B.E., Sharif University of Technology 2003; M.A.Sc., Concordia University 2007.
Thesis: Large-Scale Complex Systems: From Antenna Circuits to Power Grids.

Francisco López Jiménez *(Aeronautics)* M.E., University of Seville 2006; M.S., California Institute of Technology 2007.
Thesis: Mechanics of Thin Carbon Fiber Composites with a Silicone Matrix.

John Allen Meier *(Mechanical Engineering)* B.S., Stanford University 2006; M.S., California Institute of Technology 2007.
Thesis: A Novel Experimental Study of a Valveless Impedance Pump for Applications at Lab-On-Chip, Microfluidic, and Biomedical Device Size Scales.

Doctor of Philosophy *continued*

Ashley Moore *(Control and Dynamical Systems)* B.S., University of Colorado 2006; M.S., California Institute of Technology 2007.
Thesis: Discrete Mechanics and Optimal Control for Space Trajectory Design.

Marcos Nahmad Bensusan *(Control and Dynamical Systems and Biology)* Licenciatura, University Autonoma Metropolitana 2002; M.Sc., McGill University 2005.
Thesis: Interpretation and Scaling of Positional Information during Development.

Fabien Georges André Paulot *(Environmental Science and Engineering)* B.S., École Polytechnique 2005.
Thesis: Insights into the Isoprene Photochemical Cascade.

Luigi Emanuele Perotti *(Mechanical Engineering and Applied and Computational Mathematics)* Laurea, Politecnico di Milano 2004; M.S., California Institute of Technology 2006.
Thesis: Modeling the Behavior of Fiber Reinforced Sandwich Structures Subjected to Underwater Explosions.

Concetta Pilotto *(Computer Science)* Laurea, University of Roma "La Sapienza" 2003; M.S., California Institute of Technology 2007.
Thesis: Local-to-Global in Multi-Agent Systems.

Yaniv Plan *(Applied and Computational Mathematics)* B.A., University of California, Berkeley 2004.
Thesis: Compressed Sensing, Sparse Approximation, and Low-Rank Matrix Estimation.

Celia Reina Romo *(Aeronautics)* M.E., University of Seville 2006; M.S., École Centrale Paris 2006; M.S., California Institute of Technology 2007.
Thesis: Multiscale Modeling and Simulation of Damage by Void Nucleation and Growth.

Naresh Satyan *(Electrical Engineering)* B.Tech., Indian Institute of Technology, Madras 2005; M.S., California Institute of Technology 2007.
Thesis: Optoelectronic Control of the Phase and Frequency of Semiconductor Lasers.

Shaunak Sen *(Control and Dynamical Systems)* B.Tech., Indian Institute of Technology, Kanpur 2003; M.S., California Institute of Technology 2011.
Thesis: Regulatory Consequences of Bandpass Feedback in a Bacterial Phosphorelay.

Sormeh Shadbakht *(Electrical Engineering)* B.S., Sharif University of Technology 2004; M.S., California Institute of Technology 2006.
Thesis: Entropy Region and Network Information Theory.

Young Shik Shin *(Bioengineering)* B.S., Seoul National University 2002; M.S., 2004; M.S., California Institute of Technology 2006.
Thesis: Micro- and Nanotechnology-Based Platforms to Study Biology at Small Scale: From DNAs to Single Cells.

Doctor of Philosophy *continued*

Michael Lee Silva *(Aeronautics and Geology)* B.S., University of California, San Diego 2005; M.S., California Institute of Technology 2006.
Thesis: Damage Evolution in Composite Materials and Sandwich Structures under Impulse Loading.

Merrielle Therese Spain *(Computation and Neural Systems)* B.S., University of California, Los Angeles 2005.
Thesis: Modeling and Predicting Object Attention in Natural Scenes.

Olive Remington Stohlman *(Aeronautics)* B.S., Carnegie Mellon University 2006; M.S., California Institute of Technology 2007.
Thesis: Repeatability in Joint-Dominated Deployable Masts.

Phanish Suryanarayana *(Aeronautics)* B.Tech., Indian Institute of Technology, Madras 2005; M.S., California Institute of Technology 2006.
Thesis: Coarse-Graining Kohn-Sham Density Functional Theory.

Molei Tao *(Control and Dynamical Systems and Physics)* B.S., Tsinghua University 2006.
Thesis: Multiscale Geometric Integration of Deterministic and Stochastic Systems.

Andrew Allen Tchieu *(Aeronautics)* B.S., University of California, San Diego 2004.
Thesis: The Development of Low-Order Models for the Study of Fluid-Structure Interactions.

Ali Vakili *(Electrical Engineering)* B.S., Sharif University of Technology 2004; M.S., California Institute of Technology 2006.
Thesis: Random Matrix Recursions in Estimation, Control and Adaptive Filtering.

David Ashley Van Valen *(Applied Physics)* S.B., Massachusetts Institute of Technology 2003.
Thesis: Case Studies in Quantitative Biology: Biochemistry on a Leash and a Single-Molecule Hershey-Chase Experiment.

Gabriela Natalia Venturini *(Aeronautics and Chemistry)* Chemical Engineer, Universidad de Buenos Aires 2004; M.S., California Institute of Technology 2006.
Thesis: Topics in Multiscale Modeling of Metals and Metallic Alloys.

Udi Benjamin Vermesh *(Bioengineering)* B.S., Emory University 2003.
Thesis: Technologies for Protein Analysis and Tissue Engineering, with Applications in Cancer.

Svitlana S. Vyetrenko *(Applied and Computational Mathematics)* B.S., National Taras Shevchenko University of Kyiv 2003; M.S., University of Arkansas 2005; M.S., California Institute of Technology 2008.
Thesis: Network Coding for Error Correction.

Sameer S. Walavalkar *(Applied Physics)* B.S.E., The University of Michigan 2004.
Thesis: Optical, Mechanical, and Electronic Properties of Etched Silicon Nanopillars.

Geoffrey Ward *(Aeronautics)* B.S., University of Arizona 2005; M.S., California Institute of Technology 2006.
Thesis: The Simulation of Shock- and Impact-Driven Flows with Mie-Grüneisen Equations of State.

Ching-Chih Weng *(Electrical Engineering and Applied and Computational Mathematics)* B.S., National Taiwan University 2004; M.S., California Institute of Technology 2007.
Thesis: The Roles of Majorization and Generalized Triangular Decomposition in Communication and Signal Processing.

Jerome S. White, Jr. *(Computer Science)* B.S., Rensselaer Polytechnic Institute 2003; M.S., California Institute of Technology 2008.
Thesis: Receive Buffer Dynamics and OS Scheduling.

Michael Lon Winterrose *(Materials Science and Applied Physics)* B.S., Washington State University 2004; M.S., California Institute of Technology 2007.
Thesis: Quantum Mechanical Simulation and X-Ray Scattering Applied to Pressure-Induced Invar Anomaly in Magnetic Iron Alloy.

Yue Yang *(Aeronautics)* B.E., Zhejiang University 2004; M.S., China Academy of Science 2007.
Thesis: Lagrangian and Vortex-Surface Fields in Turbulence.

Roseanna N. Zia *(Mechanical Engineering and Chemical Engineering)* B.S.M.E., University of Missouri 1995; M.E., The University of Michigan 1999; M.S., California Institute of Technology 2008.
Thesis: Individual Particle Motion in Colloids: Microviscosity, Microdiffusivity, and Normal Stresses.

DIVISION OF GEOLOGICAL AND PLANETARY SCIENCES

Benjamin Kimball Harrison *(Geochemistry)* B.A., Carleton College 2003.
Thesis: Microbial Colonization of Minerals in Marine Sediments – Method Development and Ecological Significance.

Alexander G. Hayes *(Planetary Science and Geology)* B.A., Cornell University 2003; M.E., 2004; M.S., California Institute of Technology 2008.
Thesis: Hydrocarbon Lakes on Titan and Their Role in the Methane Cycle.

YoungHee Kim *(Geophysics)* A.B., University of California, Berkeley 2002; M.S., Seoul National University 2004; M.S., California Institute of Technology 2008.
Thesis: Properties of the Subduction System in Mexico.

Le Kuai *(Planetary Science and Environmental Science and Engineering)* B.S., Nanjing University 2003; M.S., Iowa State University 2006; M.S., California Institute of Technology 2008.
Thesis: I. Retrieval of Atmospheric Carbon Dioxide from High-Resolution Spectra. II. Interannual Variability of the Stratospheric Quasi-Biannual Oscillation.

Doctor of Philosophy *continued*

Megan E. Schwamb *(Planetary Science)* B.A., University of Pennsylvania 2006; M.S., California Institute of Technology 2008.
Thesis: Beyond Sedna: Probing the Distant Solar System.

Michelle Marie Selvans *(Geophysics)* B.A., University of Colorado at Boulder 2004; M.S., California Institute of Technology 2008.
Thesis: Geophysical Investigations of Near-Surface Structure on the Earth and Mars.

Sonja Spasojevic *(Geophysics)* B.S., University of Belgrade 2001; M.S., University of Houston 2003.
Thesis: Dynamics of Long-Term Sea-Level Change and Vertical Motion of Continents.

DIVISION OF HUMANITIES AND SOCIAL SCIENCES

Ian Michael Krajbich *(Behavioral and Social Neuroscience)* B.S., California Institute of Technology 2005; M.S., California Institute of Technology 2008.
Thesis: Neurometrically Informed Mechanism Design and the Role of Visual Fixations in Simple Choice.

Andrea Robbett *(Social Science)* B.S., Haverford College 2005; M.S., California Institute of Technology 2008.
Thesis: Experiments on the Dynamics of Community Formation.

DIVISION OF PHYSICS, MATHEMATICS AND ASTRONOMY

Yacine Ali-Haimoud *(Astrophysics)* Diplôme d'Ingénieur, École Polytechnique 2006; M.S., California Institute of Technology 2008.
Thesis: A New Spin on Primordial Hydrogen Recombination and a Refined Model for Spinning Dust Radiation.

Miguel Angel Bandrés Motola *(Physics)* B.S., Tecnológico de Monterrey 2002; M.A., State University of New York at Stony Brook 2005.
Thesis: Superconformal Chern-Simons Theories and Their String Theory Duals.

Ersen Bilgin *(Physics)* B.A., Williams College 2006; M.S., California Institute of Technology 2011.
Thesis: Simulation of Strongly Correlated Quantum Many-Body Systems.

Jason Nathaniel Bode *(Physics)* B.A., Knox College 1997; M.S., California Institute of Technology 2010.
Thesis: Black Hole Mergers and Their Electromagnetic Counterparts.

Kyung Soo Choi *(Physics)* B.S., State University of New York, Stony Brook 2006.
Thesis: Coherent Control of Entanglement with Atomic Ensembles.

Doctor of Philosophy *continued*

Michael Isaac Cohen *(Physics)* B.Sc., University of Canterbury 2003; M.S., California Institute of Technology 2010.
Thesis: Topics in Gravitation – Numerical Simulations of Event Horizons and Parameter Estimation for LISA.

David Andrew Doll *(Physics)* B.A., B.S., University of North Carolina-Chapel Hill 2005; M.S., California Institute of Technology 2009.
Thesis: Measurement of the Rare Transition $b \to s\gamma$ using the Complete *BABAR* Data Set.

Timothy Ryan Dulaney *(Physics)* B.S. *(Mathematics),* B.S. *(Physics),* University of Maryland, College Park 2006.
Thesis: Beyond the Standard Cosmology: Anisotropic Inflation and Baryophilic Dark Matter.

Hernan G. Garcia *(Physics)* B.S., University of Buenos Aires 2003.
Thesis: Transcriptional Regulation by the Numbers.

Heather Mary Gray *(Physics)* B.S., University of Cape Town 2001; B.Sc., 2002; M.S., 2003; M.S., California Institute of Technology 2007.
Thesis: The Charged Particle Multiplicity at Centre of Mass Energies from 900 GeV to 7 TeV Measured with the ATLAS Experiment at the Large Hadron Collider.

Mehmet Selim Hanay *(Physics)* B.S., Sabanci University 2003.
Thesis: Towards Single-Molecule Nanomechanical Mass Spectrometry.

Alexander I. Himmel *(Physics)* B.S., Harvey Mudd College 2006.
Thesis: Antineutrino Oscillations in the Atmospheric Sector.

Nathan Oken Hodas *(Physics)* B.A., Williams College 2004.
Thesis: Nonlinear Dynamics of Nanoscale Systems.

Mansi M. Kasliwal *(Astrophysics)* B.S., Cornell University 2005; M.S., California Institute of Technology 2007.
Thesis: Bridging the Gap: Elusive Explosions in the Local Universe.

Arthur Elias Lipstein *(Physics)* B.S., Columbia University 2006.
Thesis: Integrability of $N = 6$ Chern-Simons Theory.

David López Mateos *(Physics)* S.B., Massachusetts Institute of Technology 2005; M.S., California Institute of Technology 2007.
Thesis: Measurement of Multi-jet Production Cross Section at a Center-of-Mass Energy of 7 TeV at the Large Hadron Collider with the ATLAS Detector.

Joel Ryan Louwsma *(Mathematics)* B.S., The University of Michigan 2004.
Thesis: Extremality of the Rotation Quasimorphism on the Modular Group.

Milivoje Lukic *(Mathematics)* B.Sc. *(Astrophysics),* University of Belgrade 2006; B.Sc. *(Mathematics),* 2007; M.S., California Institute of Technology 2010.
Thesis: Spectral Theory for Generalized Bounded Variation Perturbations of Orthogonal Polynomials and Schrödinger Operators.

Doctor of Philosophy *continued*

Prabha Mandayam Doddamane *(Physics)* B.S., University of Madras – Ethiraj College 2004; M.S., Indian Institute of Technology, Madras 2005.
Thesis: Emerging Paradigms in Quantum Error Correction and Quantum Cryptography.

Zachary Louis Marshall *(Physics)* B.A., University of California, Berkeley 2005; M.S., California Institute of Technology 2007.
Thesis: A Measurement of Jet Shapes in Proton-Proton Collisions at 7.0 TeV Center-of-Mass Energy with the ATLAS Detector at the Large Hadron Collider.

Paul Nelson *(Mathematics)* A.B., Princeton University 2006.
Thesis: Some New Aspects of Mass Equidistribution.

Pinkesh Kiritbhai Patel *(Physics)* B.S., Drexel University 2005; M.S., California Institute of Technology 2009.
Thesis: Search for Gravitational Waves from a Nearby Neutron Star using Barycentric Resampling.

Kerstin M. Perez *(Physics)* B.A., Columbia University 2005; M.S., California Institute of Technology 2008.
Thesis: Inclusive Jet Cross Sections in Proton-Proton Collisions at 7.0 TeV Center-of-Mass Energy with the ATLAS Detector at the Large Hadron Collider.

Rory James Perkins *(Physics)* B.S., Carnegie Mellon University 2004.
Thesis: Experimental and Analytical Studies of Merging Plasma Loops on the Caltech Solar Loop Experiment.

Anthony Robert Pullen *(Physics)* B.S., Southern University and A&M College 2004.
Thesis: A Survey of Results in Modern Precision Cosmology.

Yonathan Schwarzkopf *(Physics)* B.Sc., Tel Aviv University 2005; M.Sc., Weizmann Institute of Science 2006.
Thesis: Complex Phenomena in Social and Financial Systems: From Bird Population Growth to the Dynamics of the Mutual Fund Industry.

Junho Suh *(Physics)* B.S., Seoul National University 2001.
Thesis: Coupled Dynamics of a Nanomechanical Resonator and Superconducting Quantum Circuits.

Ian Sorensen Sullivan *(Physics)* B.A. *(Mathematics),* B.A. *(Physics),* University of Oregon 2003; M.S., 2004.
Thesis: CIBER: A Near-Infrared Probe of the Epoch of Reionization.

Matthew C. Sumner *(Physics)* A.B., Harvard College 1996.
Thesis: Optimizing End-to-End System Performance for Millimeter and Submillimeter Spectroscopy of Protostars: Wideband Heterodyne Receivers and Sideband-Deconvolution Techniques for Rapid Molecular-Line Surveys.

Tiam Hock Tay *(Physics)* B.S., National University of Singapore 2000.
Thesis: Variational Studies of Exotic Bose Liquid, Spin Liquid, and Magnetic Phases.

Doctor of Philosophy *continued*

Nahid Walji *(Mathematics)* B.A., Cambridge University 2002; M.Sc., Imperial College London 2005.
Thesis: Supersingular Distribution, Congruence Class Bias, and A Refinement of Strong Multiplicity One.

Chao Zhang *(Physics)* B.S., University of Science and Technology of China 2002.
Thesis: Precision Measurement of Neutrino Oscillation Parameters and Investigation of Nuclear Georeactor Hypothesis with KamLAND.

Dapeng Zhang *(Mathematics)* B.S., Peking University 2003; M.S., 2006.
Thesis: Projective Dirac Operators, Twisted K-Theory, and Local Index Formula.

Yue Zou *(Physics)* B.S., Tsinghua University 2004.
Thesis: Quantum Phases and Phase Transitions in Disordered Low-Dimensional Systems: Thin Film Superconductors, Bilayer Two-Dimensional Electron Systems, and One-Dimensional Optical Lattices.

Prizes and awards are listed only for those students receiving degrees in 2011, and include prizes and awards received by them in previous years.

FREDERIC W. HINRICHS, JR., MEMORIAL AWARD

Awarded to the seniors who, in the opinion of the undergraduate deans, have made the greatest undergraduate contribution to the welfare of the student body and whose qualities of leadership, character, and responsibility have been outstanding.

2011 Timothy James Fornell Black, Andrew John Price

MABEL BECKMAN PRIZE

Awarded to an undergraduate woman upon completion of her junior or senior year in recognition of demonstrated academic and personal excellence, contributions to the Institute community, and outstanding qualities of character and leadership.

2011 Menglu Michelle Jiang, Elizabeth Marie Mak

GEORGE W. HOUSNER AWARD

Formerly the Sigma Xi Award, awarded to a senior selected for an outstanding piece of original scientific research.

2011 Erik Madsen, Kedron Pyle Silsbee

MILTON AND FRANCIS CLAUSER DOCTORAL PRIZE

Awarded to the Ph.D. candidate whose research is judged to exhibit the greatest degree of originality as evidenced by its potential for opening up new avenues of human thought and endeavor as well as by the ingenuity with which it has been carried out.

Name of recipient to be announced at commencement.

The prizes above are announced at the commencement ceremony.

UPPER CLASS MERIT PRIZE (ROSALIND W. ALCOTT MERIT SCHOLARSHIP, CARNATION SCHOLARSHIP, AND JOHN STAUFFER MERIT SCHOLARSHIP)

Caltech awarded the Upper Class Merit Prize, funded by the Carnation Merit Award Fund, for academic excellence to undergraduates. The prize was based solely on merit (selection was made on the basis of grades, faculty recommendations, and demonstrated research productivity), with no consideration given to need or any other nonacademic criteria.

2008	*Alexander Chunhachatchawalkul Hudson*	
2009	*Yakov Ilich Berchenko-Kogan*	*Elizabeth Marie Mak*
	Alexander Chunhachatchawalkul Hudson	*Sarah Epstein Marzen*
	Erik Madsen	
2010	*Kiefer Pio Aguilar*	*Daniel Walter Kolodrubetz*
	Grayson Lee Chadwick	*Erik Madsen*
	Fei Chen	*Elizabeth Marie Mak*
	Suyao Ji	*Karthik Venkataraman Sarma*
	Asif R. Khan	*Dongying (Erin) Shen*
	Emily S. Kim	*Wesley Yung-Hsu Yu*

AXLINE MERIT SCHOLARS

These scholarships, which were renewable contingent on academic performance, were awarded to selected freshmen whose record of personal and academic accomplishment was judged outstanding among incoming freshmen.

2008	*Yakov Ilich Berchenko-Kogan*	*Susan Juel Dittmer*
	Timothy James Fornell Black	*Sarah Louise Howell*
	Fei Chen	*Elizabeth Marie Mak*

	Sarah Epstein Marzen	*Wesley Yung-Hsu Yu*
	Gabriel Joel Mendoza	
2009	*Yakov Ilich Berchenko-Kogan*	*Elizabeth Marie Mak*
	Timothy James Fornell Black	*Sarah Epstein Marzen*
	Fei Chen	*Gabriel Joel Mendoza*
	Susan Juel Dittmer	*Wesley Yung-Hsu Yu*
	Sarah Louise Howell	
2010	*Yakov Ilich Berchenko-Kogan*	*Elizabeth Marie Mak*
	Timothy James Fornell Black	*Sarah Epstein Marzen*
	Fei Chen	*Gabriel Joel Mendoza*
	Susan Juel Dittmer	*Wesley Yung-Hsu Yu*
	Sarah Louise Howell	

APOSTOL AWARD FOR EXCELLENCE IN TEACHING IN MATHEMATICS

In 2010, the mathematics option set up the Apostol Teaching Award, named in honor of Tom Apostol, who was a great teacher at Caltech for over 50 years. These three to five awards are given each year to recognize excellence in teaching by graduate and undergraduate teaching assistants.

2011 *Paul Nelson*

CHARLES D. BABCOCK AWARD

Awarded, by vote of the aeronautics faculty, to a graduate student whose achievements in teaching or other assistance to students have made a significant contribution to the aeronautics department.

2008 *Celia Reina Romo*

2009 *Christopher Kovalchick*

2010 *Olive Remington Stohlman*

ROBERT P. BALLES CALTECH MATHEMATICS SCHOLARS AWARD

Awarded to the mathematics major entering his or her senior year who has demonstrated the most outstanding performance in mathematics courses completed in the student's first three years at Caltech.

2010 *Jason Charles Bland*

WILLIAM F. BALLHAUS PRIZE

Awarded to aeronautics students for outstanding doctoral dissertations.

2011 *Justin Brown*

ERIC TEMPLE BELL UNDERGRADUATE MATHEMATICS RESEARCH PRIZE

Awarded to one or more juniors or seniors for outstanding original research in mathematics.

2011 *Jeffrey Thomas Lin*

BHANSALI PRIZE IN COMPUTER SCIENCE

Awarded to an undergraduate student for outstanding research in computer science in the current academic year.

2011 *Karthik Venkataraman Sarma*

AMASA BISHOP SUMMER STUDY ABROAD PRIZE

Awarded to 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.

2009 *Laainam Chaipornkaew*

2010 *Gloria Eve Tran*

RICHARD G. BREWER PRIZE IN PHYSICS

Awarded to the freshman with the most interesting solutions to the Physics 11 "hurdles," in recognition of demonstrated intellectual promise and creativity at the very beginning of his or her Caltech education.

2008 *Grayson Lee Chadwick*

ROLF D. BUHLER MEMORIAL AWARD IN AERONAUTICS

Awarded to an aeronautics student for outstanding academic achievement in the master's program.

2007 *Celia Reina Romo*

2011 *Neal Phillip Bitter*

FRITZ B. BURNS PRIZE IN GEOLOGY

Awarded 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.

2009 *Laainam Chaipornkaew*

2011 *William Martin Steinhardt*

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

Awarded to a student receiving a Doctor of Philosophy degree for an outstanding doctoral dissertation in applied mathematics or pure mathematics.

2011 *Stephen Becker, Yaniv Plan, Molei Tao*

CENTENNIAL PRIZE FOR THE BEST THESIS IN MECHANICAL AND CIVIL ENGINEERING

Awarded each year to a candidate for the degree of Doctor of Philosophy in applied mechanics, civil engineering, or mechanical engineering 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. The prize consists of a citation and a cash award of $1,000 and was established with gifts from alumni following the Mechanical Engineering Centennial Celebration in 2007.

2011 *Justin Brown*

RICHARD BRUCE CHAPMAN MEMORIAL AWARD

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

2011 *Yue Yang*

DONALD S. CLARK MEMORIAL AWARD

Awarded 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.

2010 *Karthik Venkataraman Sarma, Fei Yang*

THE DONALD COLES PRIZE IN AERONAUTICS

Awarded to the graduating Ph.D. student in aeronautics whose thesis displays the best design of an experiment or the best design for a piece of experimental equipment.

2011 *Nicholas Sebastian Boechler*

DEANS' CUP AND STUDENT LIFE AND MASTER'S AWARDS

Two awards, selected by the deans, the director of student life, and the master of student houses, presented to undergraduates whose concern for their fellow students has been demonstrated by persistent efforts to improve the quality of undergraduate life and by effective communication with members of the faculty and administration.

2009 *Alexander Chunhachatchawalkul Hudson*

2010 *Karthik Venkataraman Sarma, Dean's Cup*

Joy Lin, Dean's Cup

Daniel Stuart Obenshain, Student Life and Master's

2011 *Lucas Allan Hartsough, Dean's Cup*

Wesley Yung-Hsu Yu, Dean's Cup

Flora Mian Li, Student Life and Master's

Paul Alan Fleiner, Student Life and Master's

William Martin Steinhardt, Student Life and Master's

Jenny Zhou Xiong, Student Life and Master's

DEMETRIADES-TSAFKA-KOKKALIS PRIZE IN ENTREPRENEURSHIP OR RELATED FIELDS

Awarded annually for 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.

2008 *John Matthew Delacruz*

2011 *Vivian Eleanor Ferry*

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

Awarded annually to 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.

2011 *William C. Chueh*

DEMETRIADES-TSAFKA-KOKKALIS PRIZE IN NANOTECHNOLOGY OR RELATED FIELDS

Awarded annually to 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.

2011 *Shelby Hutchens*

CONSTANTIN G. ECONOMOU MEMORIAL PRIZE

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

2007 *Yvonne Yu-Hsuan Chen*

2008 *Chung Hang Jonathan Choi*

EVERHART DISTINGUISHED GRADUATE STUDENT LECTURER AWARD

Awarded to a graduate student who has demonstrated exemplary presentation ability and graduate research.

2010 *Marcos Nahmad Bensusan*

2011 *Mansi Manoj Kasliwal, Roseanna Nellie Zia*

DORIS EVERHART SERVICE AWARD

Awarded 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 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.

2010 *Menglu Michelle Jiang*

2011 *Qing Yu Weng*

LAWRENCE L. AND AUDREY W. FERGUSON PRIZE

Awarded to the graduating Ph.D. candidate in biology who has produced the outstanding doctoral thesis for the past year.

2011 *Liming Wang*

RICHARD P. FEYNMAN PRIZE IN THEORETICAL PHYSICS

Awarded to a senior on the basis of excellence in theoretical physics.

2011 *Gary Allen Binder*

HAREN LEE FISHER MEMORIAL AWARD IN JUNIOR PHYSICS

Awarded to a junior physics major who demonstrates the greatest promise of future contributions in physics.

2010 *Sarah Epstein Marzen*

HENRY FORD II SCHOLAR AWARD

Awarded either to the engineering student with the best academic record at the end of the third year of undergraduate study, or to the engineering student with the best first-year record in the graduate program.

2010 *Luke Wang Guo*

JACK E. FROEHLICH MEMORIAL AWARD

Awarded to a junior in the upper five percent of his or her class who shows outstanding promise for a creative professional career.

2010 *Erik Madsen, Elizabeth Marie Mak*

GRADUATE DEANS' AWARD FOR OUTSTANDING COMMUNITY SERVICE

Awarded to a Ph.D. candidate who, throughout his or her graduate years at the Institute, has made great contributions to graduate life and whose qualities of leadership and responsibility have been outstanding.

2011 *David Andrew Doll, Tara Adele Gomez, Jai Anand Pattur Shanata, Roseanna N. Zia*

GEORGE W. AND BERNICE E. GREEN MEMORIAL PRIZE

Awarded to the undergraduate student who, in the opinion of the division chairs, has shown outstanding ability and achievement in creative scholarship.

2009 *Grayson Lee Chadwick*

2011 *Elliott Schneider*

LUCY GUERNSEY SERVICE AWARD

Awarded to one or two students who have provided exceptional service to the Caltech Y and/or the community, are involved with service projects, have demonstrated leadership in community and volunteer service efforts, and who exemplify a spirit of service.

2009 *Tara Adele Gomez*

2010 *David Andrew Doll*

2011 *Casey Jao, Hanna Ken-Yuin Liu*

ARIE J. HAAGEN-SMIT MEMORIAL AWARD

Awarded to a sophomore or junior in biology or chemistry who has shown academic promise and who has made recognized contributions to Caltech.

2010 *Wesley Yung-Hsu Yu*

ALEXANDER P. AND ADELAIDE F. HIXON PRIZE FOR WRITING

Awarded annually in recognition of the best writing in freshman humanities courses.

2008 *Erik Madsen*

HANS G. HORNUNG PRIZE

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.

2011 *Nicholas Sebastian Boechler*

BIBI JENTOFT-NILSEN MEMORIAL AWARD

Awarded to an upperclass student who exhibits outstanding qualities of leadership and who actively contributes to the quality of student life at Caltech.

2011 *Donatela Elsa Bellone*

SCOTT RUSSELL JOHNSON GRADUATE DISSERTATION PRIZE IN MATHEMATICS

Awarded for the best graduate dissertation in mathematics.

2011 *Milivoje Lukic, Paul Nelson*

SCOTT RUSSELL JOHNSON PRIZE FOR EXCELLENCE IN GRADUATE STUDY IN MATHEMATICS

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.

2007 *Paul Nelson*

2008 *Paul Nelson*

2010 *Serin Hong, Paul Nelson*

SCOTT RUSSELL JOHNSON PRIZE FOR EXCELLENCE AS A FIRST-YEAR GRADUATE STUDENT

2010 *Serin Hong*

SCOTT RUSSELL JOHNSON UNDERGRADUATE MATHEMATICS PRIZE

Awarded for the best graduating mathematics major. Special consideration is given to independent research done as a senior thesis or SURF project.

2011 *Yakov Ilich Berchenko-Kogan, Jason Charles Bland*

KALAM PRIZE FOR AEROSPACE ENGINEERING

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. This prize was made possible through the generosity of Dr. Abdul Kalam, the 11th president of India, himself an aerospace engineer.

2011 *Subrahmanyam Duvvuri, Daniel Roszhart Zehr*

D. S. KOTHARI PRIZE IN PHYSICS

Awarded to a graduating senior in physics who has produced an outstanding research project during the year.

2011 *Erik Madsen*

MARGIE LAURITSEN LEIGHTON PRIZE

Awarded to one or two undergraduate women who are majoring in physics or astrophysics, and who have demonstrated academic excellence.

2009 *Sedona H. Price*

HARRY LEITER MEMORIAL MECHANICAL ENGINEERING PRIZE

Awarded to a candidate for the degree of Bachelor of Science in mechanical engineering who has demonstrated extraordinary creativity as judged by a faculty committee appointed each year by the executive officer for mechanical engineering. The prize consists of a citation and a cash award and was made possible by a gift from Dr. Symme Leiter.

2011 *Colin Michael Ely*

THE LEMELSON-MIT CALTECH STUDENT PRIZE

Awarded through an annual competition to a senior or graduate student who has created or improved a product or process, applied a technology in a new way, redesigned a system, or in other ways demonstrated remarkable inventiveness. The winner receives $30,000.

2009 *Ophir Vermesh*

LIBRARY FRIENDS' SENIOR THESIS PRIZE

This prize was established in 2010 to recognize a senior thesis that exemplifies scholarly research, including the effective use of library resources and other bibliographic materials. A $1,200 cash award accompanies the citation. The senior thesis is an extensive, independent written work usually undertaken during a senior thesis course series. The university librarian and the Friends of Caltech Libraries oversee the evaluation and nomination process and make

recommendations to the Undergraduate Academic Standards and Honors Committee for final selection. At the discretion of the Friends of Caltech Libraries, more than one award, or none, may be made in any year.

2011 *Hanna Ken-Yuin Liu*

MARI PETERSON LIGOCKI ('81) MEMORIAL AWARD

Awarded to a student who has improved the quality of student life at Caltech through his or her personal character.

2011 *Saurabh Kumar Pandey*

DOROTHY B. AND HARRISON C. LINGLE SCHOLARSHIP

This prize, which was renewable contingent on academic performance, was awarded to an incoming freshman in recognition of interest in a career in science or engineering, outstanding academic record, demonstrated fair-mindedness, and unquestioned integrity.

2008, 2009, 2010 *Wesley Yung-Hsu Yu*

THE HERBERT NEWBY MCCOY AWARD

Awarded to chemistry doctoral students for outstanding contributions to the science of chemistry.

2011 *Peigen Cao*
Peter Michael Clark
Jillian Lee Dempsey
John Andrew Enquist
Alexander James Minden Miller

MARY A. EARL McKINNEY PRIZE IN LITERATURE

Awarded to undergraduate students for excellence in writing, in two categories: poetry and prose fiction.

2009 *Ryan Arthur Denlinger*

2010 *Casey Carter Glick*

2011 *Perrin Thalia Sau Pung Considine*

ROBERT L. NOLAND LEADERSHIP SCHOLARSHIP

Awarded to 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.

2010 *Elizabeth Marie Mak, Andrew John Price*

2011 *Dongkook Dennis Lim, Faith Gregory Manary, Karthik Venkataraman Sarma*

RODMAN W. PAUL HISTORY PRIZE

Awarded to a junior or senior who has displayed an unusual interest in and talent for history.

2010 *Elizabeth Marie Mak*

PRESIDENT'S SCHOLARS

These scholarships, which were renewable contingent on academic performance, were awarded to selected freshmen to promote the breadth and diversity of the Caltech undergraduate student body.

2007	*Kevin Alexander Hartman*	*Aliza Ilana Malz*
2008	*Kiefer Pio Aguilar*	*Mariya Levina*
	Gary Allen Binder	*Aliza Ilana Malz*
	Jeremy Coulter Davis	*Maral Mazrooei*
	Kristina Marie Flavier	*Jasmine Soria Sears*
	Christine Leonore Fuller	*Gloria Eve Tran*
	Kevin Alexander Hartman	
2009	*Kiefer Pio Aguilar*	*Mariya Levina*
	Gary Allen Binder	*Aliza Ilana Malz*
	Jeremy Coulter Davis	*Maral Mazrooei*
	Kristina Marie Flavier	*Jasmine Soria Sears*
	Christine Leonore Fuller	*Gloria Eve Tran*

2010	*Kiefer Pio Aguilar*	*Mariya Levina*
	Gary Allen Binder	*Aliza Ilana Malz*
	Jeremy Coulter Davis	*Maral Mazrooei*
	Kristina Marie Flavier	*Jasmine Soria Sears*
	Christine Leonore Fuller	*Gloria Eve Tran*
2011	*Aliza Ilana Malz*	

HOWARD REYNOLDS MEMORIAL PRIZE IN GEOLOGY

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 student life at Caltech.

2009 *Casey Carter Glick*

HERBERT J. RYSER MEMORIAL SCHOLARSHIPS

Awarded to undergraduate students for academic excellence, preferably in mathematics.

2010 *Jason Charles Bland, Yakov Ilich Berchenko-Kogan*

SAN PIETRO TRAVEL PRIZE

Awarded to sophomores, juniors, or seniors to fund adventurous and challenging summer travel experience that expands the recipients' cultural horizons and knowledge of the world.

2009 *Dongkook Dennis Lim*

2010 *Donatela Elsa Bellone, Colin Michael Ely, Stephanie Marie Wuerth*

2011 *Ryan Lane Newton, Tyler J. Hannasch*

ELEANOR SEARLE PRIZE IN LAW, POLITICS, AND INSTITUTIONS

The Eleanor Searle Prize was established in 1999 by friends and colleagues to honor Eleanor Searle. The prize is awarded annually to an undergraduate or graduate student whose work in history or the social sciences exemplifies Eleanor Searle's interests in the use of power, government, and law.

2009 *Erik Madsen*

ERNEST E. SECHLER MEMORIAL AWARD IN AERONAUTICS

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

2009 *Nicholas Sebastian Boechler*

RENUKA D. SHARMA AWARD

Awarded to a sophomore chemistry major for outstanding performance during his or her freshman year.

2009 *Wesley Yung-Hsu Yu*

DON SHEPARD AWARD

Awarded to 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.

2007 *Rebecca Ann Barter*

2008 *Hanna Ken-Yuin Liu*

2009 *Vanessa Marie Burns*

2010 *Donatela Elsa Bellone, Saurabh Kumar Pandey, Arjun Ravikumar*

HALLETT SMITH PRIZE

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

2011 *Stephanie Marie Wuerth*

JOHN STAGER STEMPLE MEMORIAL PRIZE IN PHYSICS

Awarded to a graduate student in physics for outstanding progress in research as demonstrated by an excellent performance on the oral Ph.D. candidacy examination.

2007 Zachary Louis Marshall

PAUL STUDENSKI MEMORIAL FUND PRIZE

A travel grant awarded to a Caltech undergraduate who would benefit from a period away from the academic community in order to obtain a better understanding of self and his or her plans for the future.

2011 Laura Jane Decker

ALAN R. SWEEZY PRIZE IN ECONOMICS

Awarded to a senior who has shown unusual interest in and talent for economics.

2010 Erik Madsen

FRANK TERUGGI MEMORIAL AWARD

Awarded to an undergraduate student who honors the spirit of Frank Teruggi's life through participation "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."

2010 Donatela Elsa Bellone

CHARLES AND ELLEN WILTS PRIZE

Awarded to a graduate student for outstanding independent research in electrical engineering leading to a Ph.D.

2011 Edward Arthur Keehr

For the Splendor of Creation

For the splendor of creation that draws us to inquire,
For the mysteries of knowledge to which our hearts aspire,
For the deep and subtle beauties which delight the eye and ear,
For the discipline of logic, the struggle to be clear,
For the unexplained remainder, the puzzling and the odd:
For the joy and pain of learning, we give you thanks, O God.

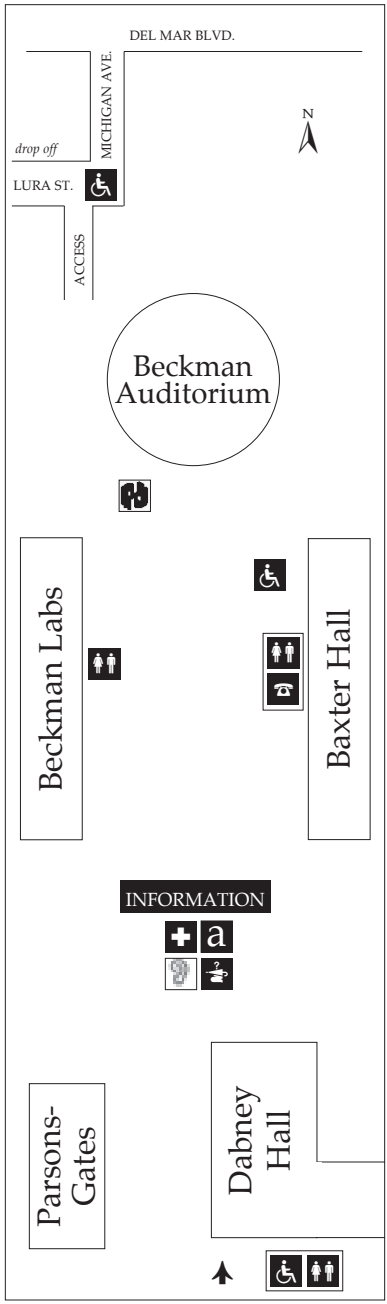
For the scholars past and present whose bounty we digest,
For the teachers who inspire us to summon forth our best,
For our rivals and companions, sometimes foolish, sometimes wise,
For the human web upholding this noble enterprise,
For the common life that binds us through days that soar or plod:
For this place and for these people, we give you thanks, O God.

Hail CIT

(Caltech alma mater)

By Manton Barnes, B.S. '21

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.



SERVICES FOR COMMENCEMENT GUESTS

PUBLIC TELEPHONES are available in Baxter Hall.

RESTROOMS are available in Baxter Hall, Beckman Labs, and Dabney Hall.

FIRST AID SERVICES are available at the Information Center.

LOST AND FOUND items may be reported and/or claimed at the Information Center.

ATHENAEUM luncheon tickets will be on sale at the Information Center from 8 to 10 a.m.

SPECIAL SERVICES FOR PERSONS WITH DISABILITIES

ASSISTIVE LISTENING DEVICES are available at the Information Center. A driver's license or state-issued ID card is required.

LARGE-TYPE PROGRAMS (abridged) are available at the Information Center.

AMERICAN SIGN LANGUAGE (ASL) interpreters are stationed at the west front of the ceremony seating area.

PEOPLE WHO USE WHEELCHAIRS, and their guests, will find a special section near the east front of the ceremony seating area.

RESTROOMS ACCESSIBLE TO PEOPLE WHO USE WHEELCHAIRS are located on the first floors of Dabney Hall and Baxter Hall.