

# Doctor of Philosophy

## DIVISION OF BIOLOGY

Oscar Alvizo (*Biochemistry and Molecular Biophysics*) B.S., University of California, Santa Cruz 2001.

Thesis: Computational Protein Design Force Field Optimization: A Negative Design Approach.

Meredith Howard Ashby (*Biochemistry and Molecular Biophysics*) B.S., Amherst College 1996.

Thesis: The Sea Urchin Regulome in Development.

Ulrik Ravnsborg Beierholm (*Computation and Neural Systems*) B.S., University of Copenhagen 1999; M.S., 2001.

Thesis: Bayesian Modeling of Sensory Cue Combinations.

John Andrew Bender (*Biology*) B.S., Montana State University 2001.

Thesis: Elements of Feed-forward and Feedback Control in *Drosophila* Body Saccades.

C. Titus Brown (*Biology*) B.A., Reed College 1997.

Thesis: Tackling the Regulatory Genome.

Seth Alexander Budick (*Biology*) B.A., Swarthmore College 1998.

Thesis: Resource Localization and Multimodal Flight Control in *Drosophila melanogaster*.

Michael Campos (*Computation and Neural Systems*) B.S., Northwestern University 2000.

Thesis: Eye Movements and Reward, Sequential States, and Context-Dependent Target Selection.

Scott A. Detmer (*Biology*) B.S., University of California, San Diego 1999.

Thesis: The Role of Mitofusin Proteins in Mitochondrial Fusion and Disease.

Jolene Sabrina Fernandes (*Biology*) B.Sc., Suffolk University 2000.

Thesis: Dissection of Gene Regulatory Networks Underlying Patterning and Morphogenesis in the *C. elegans* Vulva.

Nazli Ghaboosi (*Genetics*) B.A., University of California, Berkeley 1996.

Thesis: Genetic Inhibition of the Ubiquitin-Proteasome Pathway: Insights into Proteasomal Targeting.

Carl Gold (*Computation and Neural Systems*) A.B., B.S., Stanford University 1995; M.S., New York University 1999; M.S., Kings College London 2000.

Thesis: Biophysics of Extracellular Action Potentials.

Gregory Philip Henderson (*Biology*) B.S., University of California, Berkeley 2000.

Thesis: Ultrastructural Studies of Two Model Minimal Cells by Electron Cryotomography.

Christian John Hochstim (*Biology*) B.S., Yale University 1999.

Thesis: Pax6 Controls Astrocyte Positional Identity in the Spinal Cord.

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

*Doctor of Philosophy continued*

- Jean Jing Huang (*Biology*) B.A., Wellesley College 2001.  
Thesis: Acyl-Homoserine Lactone Quorum Signal Degradation by Soil and Clinical *Pseudomonas sp.*
- Vivek Jayaraman (*Computation and Neural Systems*) B.Tech., Indian Institute of Technology 1994; M.S., University of Florida 1996.  
Thesis: Neural Circuit Dynamics and Ensemble Coding in the Locust and Fruit Fly Olfactory System.
- Jongmin Kim (*Biology*) B.S., Pohang University 2000.  
Thesis: *In Vitro* Synthetic Transcriptional Networks.
- Jonathan Kyle Lassila (*Biochemistry and Molecular Biophysics*) B.A., Reed College 1997; M.S., Yale University 2000.  
Thesis: Methods for Computational Enzyme Design and Application to the Chorismate-Prephenate Rearrangement.
- Pei Yun Lee (*Biology*) B.S., University of California, Los Angeles 1999.  
Thesis: Function and Regulation of the *Strongylocentrotus purpuratus gatae* Gene.
- Carole Chih-Chen Lu (*Biology*) S.B., Massachusetts Institute of Technology 1999.  
Thesis: Cranial Neural Crest Cell Migration in the Avian Embryo and the Roles of Eph-A4 and Ephrin-A5.
- Davin Malasarn (*Biology*) B.S., University of California, Davis 2000.  
Thesis: Molecular and Environmental Studies of Bacterial Arsenate Respiration.
- Jennifer Pielstick Montgomery (*Biology*) B.A., Barnard College 1999.  
Thesis: The Effects of Behavioral Stress and Endothelin Receptor Antagonists on Cancer.
- Farshad Moradi (*Computation and Neural Systems and Computer Science*) M.D., Tehran University of Medical Sciences 2000.  
Thesis: Conscious Awareness Determined by Selective Gating of Information in Early Visual Areas.
- Eric Ardon Mosser (*Biology*) B.S., The Evergreen State College 1997.  
Thesis: Visualization of Cadherin-Cadherin Association in Living Cells.
- Gavin Erick Murphy (*Biochemistry and Molecular Biophysics*) B.S., University of Dallas 1999.  
Thesis: Cryoelectron Tomography of Bacteria and their Macromolecular Machines.
- Dylan Rhichard Nieman (*Computation and Neural Systems*) A.B., Harvard College 1998; M.D., University of Southern California 2006.  
Thesis: Postdiction and the Effects of Spatial, Temporal, and Feature Compatibility on Sensory Integration.
- Kerstin Preuschoff (*Computation and Neural Systems*) Dipl. Ing., Technical University of Berlin 2000.  
Thesis: Neural Representations of Expected Reward and Risk during Gambling.

*Doctor of Philosophy continued*

- Roger Revilla-i-Domingo (*Biochemistry and Molecular Biophysics*) M.Sc., University of Bristol 1998.  
Thesis: CIS-Regulatory Analysis of the Sea Urchin Delta Gene: Validating the Gene Regulatory Network Model for Early Micromere Lineage Specification.
- Tracy K. Teal (*Computation and Neural Systems*) B.S., University of California, Los Angeles 1997; M.S., 1999.  
Thesis: Studies of the Spatial Organization of Metabolism in *Shewanella oneidensis* and *Pseudomonas aeruginosa* Biofilms.

DIVISION OF CHEMISTRY AND CHEMICAL ENGINEERING

- Theodor Agapie (*Chemistry*) S.B., Massachusetts Institute of Technology 2001.  
Thesis: Synthetic, Reactivity, and Mechanistic Studies Relevant to Olefin Oligomerization and Polymerization.
- Gitrada Arjara (*Chemistry*) S.B., Massachusetts Institute of Technology 2002.  
Thesis: Refolding a Beta-Barrel Membrane Protein.
- Katherine Emily Augustyn (*Chemistry*) B.A., Wesleyan University 2002.  
Thesis: Fundamental Mechanisms and Biological Applications of DNA-mediated Charge Transport.
- Ryan James Austin (*Biochemistry and Molecular Biophysics*) Sc.B., Brown University 2000.  
Thesis: Solving Molecular Recognition Problems with Evolvable Peptide Motifs.
- William Clifford Balcerski (*Chemistry*) B.S., M.S., Yale University 1999.  
Thesis: Applications of Semiconductor Photocatalysis for Both Degradation of Organics and Hydrogen Production.
- Derek William Bartlett (*Chemical Engineering and Biology*) B.S., Stanford University 2003; M.S., California Institute of Technology 2005.  
Thesis: An Engineering Approach to Cancer Therapy Using Systemically Delivered siRNA.
- Douglas C. Behenna (*Chemistry*) B.A., University of Pennsylvania 2000.  
Thesis: Progress Toward the Synthesis of (+)-Zoanthanol and the Development of an Asymmetric Tsuji Allylation Reaction.
- Jacob Myar Berlin (*Chemistry*) A.B., Harvard College 2001.  
Thesis: Design of Olefin Metathesis Catalysts: From Enantioselective Reactions to Tetrasubstituted Olefins.
- Jesse D. Bloom (*Chemistry*) B.S., The University of Chicago 2001.  
Thesis: Hidden Dimensions in Protein Evolution: Stability, Mutational Robustness, and Evolvability.
- Justin S. Bois (*Chemical Engineering*) B.Sc., University of Illinois at Urbana-Champaign 1999.  
Thesis: Analysis of Interacting Nucleic Acids in Dilute Solutions.

## *Doctor of Philosophy continued*

- Yuri Leonid Bunimovich (*Chemistry*) B.S., Cornell University 2000.  
Thesis: Silicon Nanowires as Biological Sensors and Highly Efficient Thermoelectric Materials.
- Jeffery Allen Byers (*Chemistry*) B.A., Washington University 2000.  
Thesis: Synthetic and Mechanistic Studies into the Kinetic Resolution of  $\alpha$ -olefins Using  $C_1$ - and  $C_2$ - Symmetric Zirconocene Polymerization Catalysts.
- Jang Wook Choi (*Chemical Engineering*) B.S., Seoul National University 2002.  
Thesis: Bistable [2]Rotaxane Based Molecular Electronics: Fundamentals and Applications.
- Lucía Fernández-Ballester (*Chemical Engineering*) B.S., Universidad de Alicante 2000; M.S., California Institute of Technology 2002.  
Thesis: Formation of Oriented Precursors in Flow-Induced Polymer Crystallization: Experimental Methods and Model Materials.
- Timothy William Funk (*Chemistry*) B.S., Gettysburg College 2000.  
Thesis: Chemo- and Stereoselective Olefin Metathesis in Small Molecule Synthesis.
- Niki Chiyomi Galownia (*Chemical Engineering*) B.S., Case Western Reserve University 2001; M.S., California Institute of Technology 2003.  
Thesis: Signaling in Context: Parsing the Adhesion-Dependence of Growth Factor Signaling.
- Nicole C. Goodwin (*Chemistry*) B.S., University of Delaware 2001.  
Thesis: Application of Iminium Activation Technologies To Natural Product Synthesis: Total Synthesis of the Spiculisporic Acids, Progress Towards the Total Synthesis of Cyliindrocyclophane F, and Formal Synthesis of Cyliindrocyclophane A.
- Nicholas A. Graham (*Chemical Engineering*) B.S., Washington University 2001; M.S., California Institute of Technology 2004.  
Thesis: Crosstalk Between Soluble Factors and Cell-Cell Interactions: Implications for Cell Cycle Control and Tumor Development.
- Jonathan Earl Green (*Chemistry*) B.S., University of California, Irvine 2002; M.S., California Institute of Technology 2005.  
Thesis: Ultra-dense Nano- and Molecular-electronic Circuits.
- Thomas W. Hamann (*Chemistry*) B.A., The University of Texas 1996; M.S., 2000.  
Thesis: Interfacial Electron-Transfer Reactions at Semiconductor Electrodes.
- Andrew Hejl (*Chemistry*) B.S., B.A., University of Illinois at Urbana-Champaign 2000.  
Thesis: Controlling Olefin Metathesis through Catalyst and Monomer Design.
- Daven Ker Henze (*Chemical Engineering*) B.S. (*Chemistry*), B.S. (*Chemical Engineering*), University of Washington 2001; M.S., California Institute of Technology 2004.  
Thesis: Forward and Inverse Analysis of Chemical Transport Models.
- Jiyong Heo (*Chemistry*) B.S., Seoul National University 1995; M.S., 1997.  
Thesis: Computational Studies of Orphan G Protein-Coupled Receptors.

*Doctor of Philosophy continued*

- Soon Hyeok Hong (*Chemistry*) B.S., M.S., Seoul National University 1999.  
Thesis: Improvement of Olefin Metathesis Efficiency through Understanding Catalyst Stability.
- Aditya Satish Khair (*Chemical Engineering*) M.E., Imperial College London 2001;  
C.A.S.M., University of Cambridge 2002.  
Thesis: Particle Motion in Colloidal Dispersions: Applications to Microrheology and Nonequilibrium Depletion Interactions.
- Nelly Khidekel (*Biochemistry and Molecular Biophysics*) B.A., Northwestern University 2000.  
Thesis: A Chemoenzymatic Strategy Toward Understanding *O*-GlcNAc Glycosylation in the Brain.
- Inchan Kwon (*Chemical Engineering and Chemistry*) B.S., Seoul National University; M.S., 1996; M.S., California Institute of Technology 2003.  
Thesis: Protein Engineering via Site-specific Incorporation of Nonnatural Amino Acids.
- Nathan Lamarre-Vincent (*Chemistry*) B.A., Carleton College 2000.  
Thesis: Identification and Functional Analysis of *O*-GlcNAc Glycosylation on the Transcription Factor cAMP-Response Element Binding Protein.
- Lori Wai Hang Lee (*Chemistry*) B.S., University of California, Berkeley 2000.  
Thesis: Chemical Scale Investigations of the Gating Mechanism of Ion Channels.
- Jian Liu (*Chemistry*) B.S., Fudan University 1997; M.S. 2000.  
Thesis: Microfluidic Devices for Genetic Analysis and Gene Expression Studies.
- Tao Liu (*Chemistry*) B.S., Peking University 2000.  
Thesis: Electrochemical Studies of Electron Transfer in DNA Films with Covalently Tethered Intercalators.
- Steven Wesley Millward (*Biochemistry and Molecular Biophysics*) B.A., The Johns Hopkins University 2000.  
Thesis: The Design, Synthesis, and Evolution of Macrocyclic mRNA Display Libraries Containing Unnatural Amino Acids.
- Andrew Keeler Mollner (*Chemistry*) B.S., University of California, Davis 2001.  
Thesis: Cavity Ringdown Spectroscopy Studies of Atmospheric Reactions: Peroxynitrous Acid Formation and Alkoxy Radical Isomerization.
- Nga Lee Ng (*Chemical Engineering*) B.E., Hong Kong University of Science and Technology 2002; M.S., California Institute of Technology 2004.  
Thesis: Chamber Studies of Secondary Organic Aerosol Formation.
- Yen Hoang Le Nguyen (*Chemistry*) B.S., Sweet Briar College 2001.  
Thesis: Wiring Inducible Nitric Oxide Synthase.
- Rachel K. Niemer (*Chemistry*) A.B., Bowdoin College 1999.  
Thesis: Computational Studies of the Structure and Function of Two Lipid-Activated G Protein-Coupled Receptors.

## *Doctor of Philosophy continued*

- Neal Robert Scruggs (*Chemical Engineering*) B.S., University of Kentucky 2001; M.S., California Institute of Technology 2003.  
Thesis: Coupling Polymer Thermodynamics and Viscoelasticity to Liquid Crystalline Order: Self-Assembly and Relaxation Dynamics of Block Copolymers in a Nematic Solvent.
- Soojin Son (*Chemical Engineering and Biology*) S.B., Massachusetts Institute of Technology 2000; M.S., California Institute of Technology 2002.  
Thesis: Biosynthetic Approaches to Protein Engineering Using Fluorinated Amino Acids.
- Julius Tsu-li Su (*Chemistry*) B.S. (*Biology*), B.S. (*Physics*), California Institute of Technology 1998.  
Thesis: An Electron Force Field for Simulating Large Scale Excited Electron Dynamics.
- Sarah Erin Tully (*Chemistry*) B.A., Barnard College 2000.  
Thesis: Synthesis and Biological Activity of Chondroitin Sulfate Biopolymers.
- Christine Terumi Ueda (*Chemistry*) B.A., Wesleyan University 2000.  
Thesis: Targeting Human Telomerase RNA via Biochemical and *in vitro* Selection Methods.
- Rafael Verduzco (*Chemical Engineering*) B.S., Rice University 2001; M.S., California Institute of Technology 2003.  
Thesis: Texture Transitions, Electro-Optics, and Dynamics of Polymer Liquid Crystal Gels with Novel Network Architectures.
- Ryan K. Zeidan (*Chemistry*) S.B. (*Chemical Engineering*), S.B. (*Chemistry*), Massachusetts Institute of Technology 2002.  
Thesis: Design of New Multifunctional Materials.
- Kechun Zhang (*Chemistry*) B.S., University of Science and Technology of China 2001.  
Thesis: Engineering Protein-based Materials through Coiled-Coil Motifs.

## DIVISION OF ENGINEERING AND APPLIED SCIENCE

- Ehsan Afshari (*Electrical Engineering*) B.Sc., Sharif University of Technology 2001; M.S., California Institute of Technology 2003.  
Thesis: Optotronics: Optically Inspired Electronics.
- Cédric Robert Anen (*Electrical Engineering*) Lic. Mathématiques, Université de Marne la Vallée 2000; Maîtrise mathémat, Université Paris VI 2001; Diplôme d'Ingenieur, École Supérieure d'Ingenieurs en Electrotechnique et Electronique 2002; M.S., California Institute of Technology 2003.  
Thesis: Neural Correlates of Economic and Moral Decision-Making.
- Andrea Martin Armani (*Applied Physics and Biology*) A.B., The University of Chicago 2001; M.S., California Institute of Technology 2003.  
Thesis: Chemical and Biological Sensing with Ultra-high-Q Microresonators.

*Doctor of Philosophy continued*

- John King-Tai Au (*Applied Physics*) B.Sc., Queen's University 1999; M.S., California Institute of Technology 2000.  
Thesis: An *Ab Initio* Approach to the Inverse Problem-Based Design of Photonic Bandgap Devices.
- Peter Babilo (*Materials Science*) B.S., University of California, Irvine 2001; M.S. California Institute of Technology 2003.  
Thesis: Processing and Characterization of Proton Conducting Yttrium Doped Barium Zirconate for Solid Oxide Fuel Cell Applications.
- Frederick Kiguli Balagadde (*Applied Physics*) B.A., Manchester College 2001; M.S., California Institute of Technology 2004.  
Thesis: Microfluidic Technologies for Continuous Culture and Genetic Circuit Characterization.
- Xiaoyan Robert Bao (*Applied Physics*) B.S., California Institute of Technology 2000.  
Thesis: Lost in a Crowd: Observations of Single DNA Knots and Single Mammalian Cells.
- Paul Edward Barclay (*Applied Physics*) B.A.Sc., University of British Columbia 2001; M.S., California Institute of Technology 2003.  
Thesis: Fiber Coupled Nanophotonic Devices for Nonlinear Optics and Cavity QED.
- Christophe Jean-Michel Basset (*Electrical Engineering*) Diplôme d'Ingénieur, École Supérieure d'Ingenieurs en Electrotechnique et Electronique 1998; M.S., California Institute of Technology 1998.  
Thesis: CMOS Imaging Technology with Embedded Early Image Processing.
- Nawaf Mohammed Bou-Rabee (*Applied and Computational Mathematics*) B.S., Rice University 2001.  
Thesis: Hamilton-Pontryagin Integrators on Lie Groups.
- Samuel Case Bradford V (*Civil Engineering and Geophysics*) B.S., University of California, Berkeley 1999; M.S., California Institute of Technology 2000.  
Thesis: Time-Frequency Analysis of Systems with Changing Dynamic Properties.
- Guillaume Alain Brès (*Mechanical Engineering*) Diplôme d'Ingénieur, École Centrale de Lyon 2001; M.S., The Pennsylvania State University 2002; M.S., California Institute of Technology 2005.  
Thesis: Numerical Simulations of Three-Dimensional Instabilities in Cavity Flows.
- Michal Amaris Brown (*Materials Science*) B.S., Florida A&M University 2001; M.S., California Institute of Technology 2003.  
Thesis: Measuring Stress in Thin-Film Substrate Systems Featuring Spatial Nonuniformities of Film Thickness and/or Misfit Strain.
- Lance Lin-Lan Cai (*Bioengineering*) B.S., University of California, Berkeley 2001.  
Thesis: Robotics Training Algorithms for Optimizing Motor Learning in Spinal Cord Injured Subjects.

*Doctor of Philosophy continued*

- Kate Marie Campbell (*Environmental Science and Engineering*) B.S., Georgetown University 2001; M.S., California Institute of Technology 2003.  
Thesis: Biogeochemical Mechanisms of Arsenic Mobilization in Haiwee Reservoir Sediments.
- Lijun Chen (*Control and Dynamical Systems*) M.S., Institute of Theoretical Physics 1998.  
Thesis: Wireless Network Design and Control.
- John Myun Choi (*Electrical Engineering*) B.S., State University of New York at Buffalo 1999; M.S., California Institute of Technology 2001.  
Thesis: Design, Fabrication, and Characterization of Semiconductor Transverse Bragg Resonance Lasers.
- Timothy Hahn Deut Chung (*Mechanical Engineering*) B.S., Cornell University 2001; M.S., California Institute of Technology 2002.  
Thesis: Intelligent Information-Gathering: Using Control for Sensing and Decision-Making.
- Lisa Cowan (*Materials Science and Chemistry*) B.S., California Institute of Technology 2001; M.S., California Institute of Technology 2005.  
Thesis: Superprotonic Solid Acid Phase Transitions and Stability.
- Samantha Hayes Daly (*Mechanical Engineering*) B.E., Dartmouth College 2001; M.S., California Institute of Technology 2002.  
Thesis: Deformation and Fracture of Thin Sheets of Nitinol.
- Kaushik Dayal (*Mechanical Engineering and Materials Science*) B.Tech., Indian Institute of Technology, Madras 2000; M.S., California Institute of Technology 2001.  
Thesis: Nonlocal Microstructural Mechanics of Active Materials.
- Joanna Lynn Dodd (*Materials Science*) B.S., California Institute of Technology 1999; M.S., University of California, Los Angeles 2002; M.S., California Institute of Technology 2004.  
Thesis: Phase Composition and Dynamical Studies of Lithium Iron Phosphate.
- Patrick Werner Dondl (*Applied and Computational Mathematics*) M.S., Technische Universität München 2002.  
Thesis: Structure and Evolution of Martensitic Phase Boundaries.
- Mostafa Said El-Khamy (*Electrical Engineering*) B.S., Alexandria University 1999; M.S., California Institute of Technology 2003.  
Thesis: New Approaches to the Analysis and Design of Reed-Solomon Related Codes.
- Mohamed Y. El-Naggar (*Mechanical Engineering and Applied Physics*) B.S., Lehigh University 2001; M.S., California Institute of Technology 2002.  
Thesis: Textured Ferroelectric Thin Films: Synthesis, Characterization, and Influence of Compositional Grading on the Dielectric Behavior.
- Amir Farajidana (*Electrical Engineering*) B.Sc., Sharif University of Technology 2001; M.S., California Institute of Technology 2002.  
Thesis: Performance Limits and Design Issues in Wireless Networks.

*Doctor of Philosophy continued*

- Philip Xiao-Li Feng (*Electrical Engineering*) B.S., Tsinghua University 1996; M.S., 2001; M.S., California Institute of Technology 2002.  
Thesis: Ultra-high Frequency Nanoelectromechanical Systems with Low-Noise Ultra-high Technologies for Single-Molecule Mass Sensing.
- Jeffrey Paul Fingler (*Applied Physics*) B.S., University of Manitoba 2001; M.S., California Institute of Technology 2003.  
Thesis: Motion Contrast Using Optical Coherence Tomography.
- Vikram Gavini (*Mechanical Engineering*) B.Tech., Indian Institute of Technology, Madras 2003; M.S., California Institute of Technology 2004.  
Thesis: Electronic Structure Calculations at Macroscopic Scales.
- Radhika Gowaikar (*Electrical Engineering*) B.Tech., Indian Institute of Technology, Bombay 2001; M.S., California Institute of Technology 2002.  
Thesis: Wireless Networks: New Models and Results.
- Emilio Castaño Graff (*Aeronautics*) B.S., California Institute of Technology 2002; M.S., 2004.  
Thesis: On the Development of Defocusing Digital Particle Image Velocimetry with Full Characterization.
- Vijay Gupta (*Electrical Engineering*) B.Tech., Indian Institute of Technology, Delhi 2001; M.S., California Institute of Technology 2002.  
Thesis: Distributed Estimation and Control in Networked Systems.
- Marcelo Joel Guzmán (*Environmental Science and Engineering*) Licenciado en Química, Universidad Nacional de Tucumán 2000; M.S., California Institute of Technology 2004.  
Thesis: Photochemistry of Pyruvic Acid in Water and Ice.
- Alan Nicolás Hampton (*Computation and Neural Systems*) M.S., Instituto Balseiro 1999.  
Thesis: Model-Based Decision Making in the Human Brain.
- Yong Hao (*Mechanical Engineering*) B.E., University of Science and Technology of China 2001; M.S., California Institute of Technology 2002.  
Thesis: Numerical Study of Single-Chamber Solid Oxide Fuel Cells.
- John Shelby Harmon III (*Materials Science*) B.S., The University of Texas at Austin 2003.  
Thesis: Experimental Studies of Elasticity, Plastic Flow, and Anelasticity in Metallic-Glass-Forming-Liquids.
- Alex David Holub (*Computation and Neural Systems*) B.A., Cornell University 2000.  
Thesis: Discriminative vs. Generative Object Recognition: Objects, Faces, and the Web.
- Xun Jiang (*Environmental Science and Engineering*) B.S., Nanjing Institute of Meteorology 1998; M.S., Peking University 2001; M.S., California Institute of Technology 2003.  
Thesis: I: Interannual Variability of Stratospheric Ozone and Temperature.  
II: Seasonal Cycle of N<sub>2</sub>O.

*Doctor of Philosophy continued*

- Zhipu Jin (*Electrical Engineering*) B.A., Tsinghua University 1998; M.S., 2000; M.S., California Institute of Technology 2002.  
Thesis: Coordinated Control for Networked Multi-Agent Systems.
- Arash Kheradvar (*Bioengineering*) M.D., Tehran University 2000; M.S., Azad University 2002.  
Thesis: The Role of Vortex Ring Formation and Pressure Drop on Dynamics of the Left Ventricle during Diastole.
- Theresa Hiromi Kidd (*Aeronautics and Applied Physics*) B.S., University of Illinois at Urbana-Champaign; M.S., California Institute of Technology 2003.  
Thesis: Mechanical Characterization of Damage and Failure in Polymeric Foams and Glass/Epoxy Composites.
- Joseph Thomas Klamo (*Mechanical Engineering and Aeronautics*) B.S., The University of Michigan 2001; M.S., California Institute of Technology 2002.  
Thesis: Effects of Damping and Reynolds Number on Vortex-Induced Vibrations.
- Robert D. Kolasinski (*Mechanical Engineering*) B.S., Rutgers University 2000; M.S., California Institute of Technology 2001.  
Thesis: Fundamental Ion-Surface Interactions in Plasma Thrusters.
- Abbas Komijani (*Electrical Engineering*) B.S., Sharif University of Technology 1995; M.S., 1997.  
Thesis: Microwave Integrated Phased-Array Transmitters in Silicon.
- Yashashree Kulkarni (*Applied Mechanics*) B.Tech., Indian Institute of Technology, Bombay 2001; M.S., California Institute of Technology 2002.  
Thesis: Coarse-Graining of Atomistic Description at Finite Temperature.
- Wei Lai (*Materials Science*) B.S., University of Science and Technology of China 1998; M.S., 2001; M.S., California Institute of Technology 2004.  
Thesis: Impedance Spectroscopy as a Tool for the Electrochemical Study of Mixed Conducting Ceria.
- Marco Latini (*Applied and Computational Mathematics and Aeronautics*) B.S., Harvey Mudd College 2001.  
Thesis: Simulations and Analysis of Two- and Three-Dimensional Single-Mode Richtmyer-Meshkov Instability Using Weighted Essentially Non-Oscillatory and Vortex Methods.
- Lun Li (*Electrical Engineering*) B.S., Tsinghua University 1999; M.S., University of California, Berkeley 2001; M.S., California Institute of Technology 2002.  
Thesis: Topologies of Complex Networks: Functions and Structures.
- Mo Li (*Applied Physics*) B.S., University of Science and Technology of China 2001; M.S., University of California, San Diego 2003.  
Thesis: Very High Frequency Nanoelectromechanical Resonators and their Chemical Sensing Applications.

*Doctor of Philosophy continued*

- Xin Liu (*Control and Dynamical Systems*) B.E., Beijing University of Aeronautics and Astronautics 1997; M.S., 2000.  
Thesis: Robustness, Complexity, Validation and Risk.
- Boonrat Lohwongwatana (*Materials Science*) B.S., Northwestern University 2000; M.S., California Institute of Technology 2002.  
Thesis: Development, Characterization, and Applications of Gold and Platinum Bulk Metallic Glasses.
- Laurence Loumes (*Aeronautics*) Diplôme d'Etudes Universitaires Générales, Université de Provence 1999; Licence Mecanique, 2000; M.E., École Centrale de Lyon 2003; M.S., California Institute of Technology 2003.  
Thesis: Multilayer Impedance Pump: A Bio-Inspired Valveless Pump with Medical Applications.
- George Manuel Maltezos (*Electrical Engineering*) B.S., Columbia University 2001; M.S., California Institute of Technology 2003.  
Thesis: Microfluidic Devices for Accessible Medical Diagnostics.
- Alfredo Martínez Estrada (*Control and Dynamical Systems*) B.S. (*Mathematics*), B.S. (*Physics*), University of Houston 1996.  
Thesis: A Treatise on Econometric Forecasting.
- Sotirios Konstantinos Masmanidis (*Applied Physics*) B.Sc., University College London 2001; M.S., California Institute of Technology 2003.  
Thesis: Piezoelectric and Magnetoelastic Strain in the Transduction and Frequency Control of Nanomechanical Resonators.
- Mortada Mehyar (*Electrical Engineering*) B.S., National Taiwan University 2001; M.S., California Institute of Technology 2003.  
Thesis: Distributed Averaging and Efficient File Sharing on Peer-to-peer Networks.
- Shu Miao (*Materials Science*) B.S., Tsinghua University 1999; M.S., 2002; M.S., California Institute of Technology 2004.  
Thesis: Electronic Structure and Bonding in Energy Storage Materials.
- Scott Brian Miserendino (*Electrical Engineering*) B.S., The Johns Hopkins University 2002; M.S., California Institute of Technology 2003.  
Thesis: A Modular Microfluidic Approach to Nano High-Performance Liquid Chromatography with Electrochemical Detection.
- Judith Mitrani-Reiser (*Applied Mechanics*) B.S., University of California, Berkeley 2000; M.S., University of Florida 2001.  
Thesis: An Ounce of Prevention: Probabilistic Loss Estimation for Performance-Based Earthquake Engineering.
- Bradford S. Morris (*Aeronautics and Astronomy*) B.Sc., University of Alberta 2001; M.S., California Institute of Technology 2002.  
Thesis: Charge-Exchange Collision Dynamics and Ion Engine Grid Geometry Optimization.

*Doctor of Philosophy continued*

- Seyed-Maziar Motahari (*Mechanical Engineering*) B.S., University of Tehran 1996; M.S., 1997; M.S., California Institute of Technology 2005.  
Thesis: Study of Constitutive Behavior of Ferroelectrics via Self-Consistent Modeling and Neutron Diffraction.
- Christopher Andre Mouton (*Aeronautics and Social Science*) B.S., The University of Texas at Austin 2001; M.S., California Institute of Technology 2002.  
Thesis: Transition between Regular Reflection and Mach Reflection in the Dual-Solution Domain.
- Matthew Mokihana Muto (*Civil Engineering*) B.S., Harvey Mudd College 2000; M.S., California Institute of Technology 2001.  
Thesis: Application of Stochastic Simulation Methods to System Identification.
- Shreesh Pranesh Mysore (*Control and Dynamical Systems and Neurobiology*) B.S., Indian Institute of Technology, Madras 1997; M.S., The Pennsylvania State University 1999.  
Thesis: Structural Plasticity in Neuronal Networks.
- Abbas Nasiraei Moghaddam (*Bioengineering*) B.S., University of Tehran 1995; M.S., 1998.  
Thesis: Measurement and Analysis of Structure and Function of Myocardium in Embryonic and Adult Heart.
- Arun Sridhar Natarajan (*Electrical Engineering*) B.Tech., Indian Institute of Technology, Madras 2001; M.S., California Institute of Technology 2003.  
Thesis: Millimeter-Wave Phased Arrays in Silicon.
- AnnMarie Polsenberg Thomas (*Mechanical Engineering*) S.B., Massachusetts Institute of Technology 2001; M.S., California Institute of Technology 2002.  
Thesis: Exploration into the Feasibility of Underwater Synthetic Jet Propulsion.
- Joyce Kai See Poon (*Electrical Engineering*) B.Sc., University of Toronto 2002; M.S., California Institute of Technology 2003.  
Thesis: Active and Passive Coupled-Resonator Optical Waveguides.
- Steven Edmund Pracko (*Applied Physics*) B.A., Northwestern University 1995; M.S., California Institute of Technology 1998.  
Thesis: Laser Induced Fluorescence Measurements of Spheromak Plasmas.
- Chaitanya Kumar Rao (*Electrical Engineering*) B.S., University of Melbourne 2001; M.S., California Institute of Technology 2002.  
Thesis: Asymptotic Analysis of Wireless Systems with Rayleigh Fading.
- Michael Bernard Reiser (*Computation and Neural Systems*) B.S., University of Florida 2000; M.S., University of California, Berkeley 2002.  
Thesis: Visually Mediated Control of Flight in *Drosophila*: Not Lost in Translation.
- Christine Esber Richardson (*Applied Physics*) B.S., The Johns Hopkins University 1998; M.S., Stanford University 2000.  
Thesis: Low-Temperature Hot-Wire Chemical Vapor Deposition of Epitaxial Films for Large-grained Polycrystalline Photovoltaic Devices.

*Doctor of Philosophy continued*

- Michael Thomas Rubel (*Aeronautics and Applied and Computational Mathematics*) M.S., M.E., Rutgers University 1998; M.S., California Institute of Technology 1999.  
Thesis: A Theory of Stationarity and Asymptotic Approach in Dissipative Systems.
- Jennifer Lynn Ruglovsky (*Applied Physics*) B.S., Cornell University 2002; M.S., California Institute of Technology 2004.  
Thesis: Correlating Microscopic Ferroelectric Properties and Macroscopic Thin Film Device Performance.
- Elijah Bodhi Sansom (*Bioengineering*) B.S., The University of Arizona 2000.  
Thesis: Experimental Investigation on Patterning of Anchored and Unanchored Aligned Carbon Nanotube Mats by Fluid Immersion and Evaporation.
- Rebecca Beth Schulman (*Computation and Neural Systems*) S.B., Massachusetts Institute of Technology 1999.  
Thesis: The Self-Replication and Evolution of DNA Crystals.
- Nicole Smith Downey (*Environmental Science and Engineering*) B.S., Beloit College 2001; M.S., California Institute of Technology 2004.  
Thesis: Soil Uptake of Molecular Hydrogen and Remote Sensing of Soil Freeze and Thaw.
- Kazuo Sone (*Aeronautics and Applied and Computational Mathematics and Computer Science*) B.E., Kyoto University 1999; M.S., Georgia Institute of Technology 2000.  
Thesis: Modeling and Simulation of Axisymmetric Stagnation Flames.
- Abhishek Tiwari (*Electrical Engineering*) B.Tech., Indian Institute of Technology, Kanpur 2001; M.S., California Institute of Technology 2003.  
Thesis: Geometrical Analysis of Spatio-temporal Planning Problems.
- Angela Colleen Tooker (*Electrical Engineering*) S.B. (*Computer Science*), S.B. (*Electrical Engineering*), Massachusetts Institute of Technology 2000; M.Eng., 2002.  
Thesis: Development of Biocompatible Parylene Neurocages for Action Potential Stimulation and Recording.
- Christopher Thomas Veazey (*Materials Science*) B.S., Pacific University 2001; M.S., California Institute of Technology 2003.  
Thesis: Amorphous Metallic Foam: Synthesis and Mechanical Properties.
- Robert Joseph Walters (*Applied Physics*) B.S., Harvey Mudd College 2001; M.S., California Institute of Technology 2003.  
Thesis: Silicon Nanocrystals for Silicon Photonics.
- Bingwen Wang (*Mechanical Engineering*) B.Eng., Tsinghua University 1998; M.S., California Institute of Technology 2001.  
Thesis: Information-Theoretic Methods for Modularity in Engineering Design.
- Yajuan Wang (*Environmental Science and Engineering*) B.S., Tsinghua University 1999; M.S., California Institute of Technology 2003.  
Thesis: Studies on Environmental Relevance of Quorum Sensing Signal Decay.

## *Doctor of Philosophy continued*

- Xiaoliang (David) Wei (*Computer Science*) B.S., Tsinghua University 2001; M.S., California Institute of Technology 2004.  
Thesis: Microscopic Behavior of Internet Congestion Control.
- Masumi Yamada (*Civil Engineering and Geophysics*) B.E., Kyoto University 2001; M.E., 2003; M.S., California Institute of Technology 2004.  
Thesis: Early Warning for Earthquakes with Large Rupture Dimension.
- Byung-Jun Yoon (*Electrical Engineering*) B.S.E., Seoul National University 1998; M.S., California Institute of Technology 2002.  
Thesis: Signal Processing Methods for Genomic Sequence Analysis.
- Xin Yu (*Computer Science*) B.Eng., Tsinghua University 2000; M.S., California Institute of Technology 2002.  
Thesis: Reflection and Its Application to Mechanized MetaReasoning About Programming Languages.
- Lei Zhang (*Applied and Computational Mathematics*) B.S., Peking University 1999; M.S., Chinese Academy of Sciences 2002.  
Thesis: Metric Based Upscaling for Partial Differential Equations with a Continuum of Scales.
- Zhaoyu Zhang (*Electrical Engineering and Applied Physics*) B.S., University of Science and Technology of China 1998; M.S., 2001; M.S., California Institute of Technology 2006.  
Thesis: Towards Functional Miniaturized Lasers.
- Siyang Zheng (*Electrical Engineering*) B.S., Tsinghua University 1996; M.S., The Pennsylvania State University 2000; M.S., California Institute of Technology 2004.  
Thesis: On-Chip Blood Count.

## DIVISION OF GEOLOGICAL AND PLANETARY SCIENCES

- Vala Hjörleifsdóttir (*Geophysics*) B.S., University of Iceland 1999.  
Thesis: Earthquake Source Characterization Using 3D Numerical Modeling.
- Yongqin Jiao (*Geobiology*) B.S., University of Science and Technology of China 2001.  
Thesis: Physiological and Mechanistic Studies of Phototrophic Fe(II) Oxidation in Purple Non-sulfur Bacteria.
- Robert Evans Kopp III (*Geobiology*) S.B., The University of Chicago 2002; M.S., California Institute of Technology 2005.  
Thesis: The Identification and Interpretation of Microbial Biogeomagnetism.
- Liming Li (*Planetary Science*) B.S., Nanjing University 1998; M.S., Peking University 2001; M.S., California Institute of Technology 2004.  
Thesis: Dynamics of the Jovian Atmosphere from Observation and Theory.
- Sarah Ann Miller (*Geochemistry*) B.A., Wellesley College 2000; M.S., California Institute of Technology 2003.  
Thesis: Alkaline Earth Element Partitioning in Simplified Magmatic Systems.

## *Doctor of Philosophy continued*

Elisabeth Sophia Nadin (*Geology*) B.S., University of Rhode Island 1998; M.S., California Institute of Technology 2001.

Thesis: Structure and History of the Kern Canyon Fault System, Southern Sierra Nevada, California.

Julie Ann O'Leary (*Geochemistry*) B.S., University of Wisconsin 1999.

Thesis: Hydrogen Isotope Geochemistry of the Mantle: Constraints from Back Arc Basin Basalts and Mantle Xenoliths.

Zhimei Yan (*Geophysics*) B.S., Peking University 1996; M.S., 1999; M.S., California Institute of Technology 2001.

Thesis: Regional Mapping of the Crustal Structure in Southern California.

### DIVISION OF HUMANITIES AND SOCIAL SCIENCES

Delia Ruth Grigg Bailey (*Social Science*) B.A., University of South Carolina 2002; M.S., California Institute of Technology 2004.

Thesis: Essays on Causal Inference and Political Representation.

Jon Xabier Eguia Egusquiza (*Social Science*) Licenciatura, Universidad de Málaga 2002; M.S., California Institute of Technology 2004.

Thesis: A Theory of Elections and Voting Blocs.

Lauren Elizabeth Feiler (*Social Science*) B.A., Mount Holyoke College 2000; M.S., California Institute of Technology 2004.

Thesis: Behavioral Biases in Information Acquisition.

Sarah Anne Hill (*Social Science*) B.S., Texas A&M University 2002; M.S., California Institute of Technology 2004.

Thesis: The Pursuit of Equality through Education Finance Reform.

Ming Hsu (*Social Science*) B.A., University of Arizona 2001.

Thesis: Three Correlated Essays on the Neural Foundations of Economic Decision-Making.

Debrah C. Z. Meloso (*Social Science*) B.S., Universidad Católica Andres Bello 1998; M.S., Universidad Autònoma de Barcelona 2000.

Thesis: Prices, Holdings, and Learning in Financial Markets. Experiments and Methodology.

Deborah Elizabeth Sinclair (*Social Science*) B.S., University of Redlands 2002; M.S., California Institute of Technology 2004.

Thesis: Political Networks.

### DIVISION OF PHYSICS, MATHEMATICS AND ASTRONOMY

Panagiotis Aliferis (*Physics*) B.S., National University of Athens 2000; M.S., The University of Michigan 2002; M.S., California Institute of Technology 2005.

Thesis: Level-Reduction and the Quantum Threshold Theorem.

## *Doctor of Philosophy continued*

- George Dana Becker (*Astrophysics*) B.A., University of Virginia 1999.  
Thesis: A High-Resolution Study of the High-Redshift Intergalactic Medium.
- Andrew John Berglund (*Physics*) B.A., Dartmouth College 2000.  
Thesis: Feedback Control of Brownian Motion for Single-Particle Fluorescence Spectroscopy.
- Mihai Bondarescu (*Physics*) Diploma de Licenta, West University of Timisoara 2001;  
Diplom, Freie Universität Berlin 2001; M.S., California Institute of Technology 2003.  
Thesis: Topics in General Relativity.
- Parsa Hassan Bonderson (*Physics and Mathematics*) B.S., University of California, Los Angeles 2000; M.S., California Institute of Technology 2002.  
Thesis: Non-Abelian Anyons and Interferometry.
- Edward Tann Chen (*Physics*) A.B., Harvard College 1995.  
Thesis: Radiative Leptonic  $B$  Decays.
- Songye Chen (*Physics*) B.S., Peking University 1998; M.S., University of Houston 2000.  
Thesis: Structural Dynamics by Ultrafast Electron Crystallography.
- Megan Elizabeth Eckart (*Physics*) B.A., University of California, Berkeley 2000; M.S., California Institute of Technology 2002.  
Thesis: Measurements of X-ray Selected AGN and Novel Superconducting X-ray Detectors.
- Rebecca Joan Erwin (*Physics*) B.A., Amherst College 2002.  
Thesis: Neutrino Mass Constraints on Electroweak Parameters.
- Hua Fang (*Physics and Electrical Engineering*) B.S., Peking University 2000.  
Thesis: Topics in Gravitational Physics: Tidal Coupling in Gravitational Wave Searches and Mach's Principle.
- Paul Daniel Grayson (*Physics*) S.B. (*Mathematics*), S.B. (*Physics*), Massachusetts Institute of Technology 2001.  
Thesis: The DNA Ejection Process in Bacteriophage.
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Thesis: Constraints on Physics beyond the Standard Model and Its Observable Effects.
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Thesis: Nonlinear Nanoelectromechanical Systems.
- Geoffrey Mark Lovelace (*Physics*) B.S., University of Oklahoma 2002.  
Thesis: Topics in Gravitational-Wave Physics.
- Dónal O'Connell (*Physics*) B.A., Trinity College, Dublin 2000; M.Sc., 2001; M.S., California Institute of Technology 2003.  
Thesis: Unusual Signs in Quantum Field Theory.

*Doctor of Philosophy continued*

- Ryan Christopher Ogliore (*Physics*) B.A., Claremont McKenna College 2000; M.S., California Institute of Technology 2002.  
Thesis: The Sulfur, Argon, and Calcium Isotopic Composition of the Galactic Cosmic Ray Source.
- Robert Philip Owen (*Physics*) B.S., University of Utah 2001.  
Thesis: Topics in Numerical Relativity: The Periodic Standing-Wave Approximation, the Stability of Constraints in Free Evolution, and the Spin of Dynamical Black Holes.
- Roberto Carlos Pelayo (*Mathematics*) B.A., Occidental College 2002.  
Thesis: Diameter Bounds on the Complex of Minimal Genus Seifert Surfaces for Hyperbolic Knots.
- Jonathan Robin Pritchard (*Physics*) B.A., M.Sc., Cambridge University, Pembroke College 2002.  
Thesis: Extracting the Cosmic History from Diffuse Backgrounds.
- Carlos H. Salazar-Lazaro (*Mathematics*) B.S., Rensselaer Polytechnic Institute 1999.  
Thesis: Association Schemes, Codes, and Difference Sets.
- Michael Phillip Salem (*Physics*) B.S., Case Western Reserve University 2002; M.S., California Institute of Technology 2004.  
Thesis: Topics in Theoretical Particle Physics and Cosmology.
- Janet D. Scheel (*Physics*) B.S., University of Illinois at Urbana-Champaign 1991; M.S., Cornell University 1994; M.A.T., 1995.  
Thesis: Rotating Rayleigh-Bénard Convection.
- Alicia Margarita Soderberg (*Astrophysics*) B.S., Bates College 2000; M.Sc., University of Cambridge 2001.  
Thesis: The Many Facets of Cosmic Explosions.
- John Kenton Stockton (*Physics*) B.S., Stanford University 1999.  
Thesis: Continuous Quantum Measurement of Cold Alkali-Atom Spins.
- Benjamin Francis Toner (*Physics*) B.S., The University of Melbourne 2001; M.S., California Institute of Technology 2004.  
Thesis: Quantifying Quantum Nonlocality.
- Ramon van Handel (*Physics*) M.Sc., Vrije University 2002.  
Thesis: Filtering, Stability, and Robustness.
- Peng Wang (*Physics*) B.S., Beijing University 2001.  
Thesis: Neutrino Mass Implications for Physics Beyond the Standard Model.
- Min Yang (*Physics and Social Science*) B.S., Peking University 1998; M.S., California Institute of Technology 2005.  
Thesis: Submillimeter Surveys of Galaxy Samples.