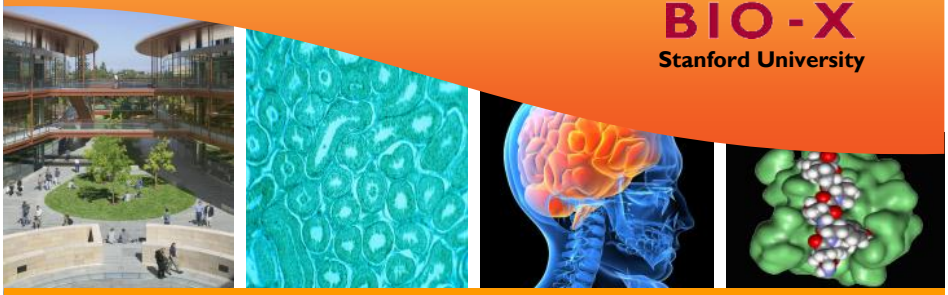
BIO-X

2012 Undergraduate Summer Research Program

BIO-X
Stanford University



Bio-X Undergraduate Research Program

The Bio-X Undergraduate Summer Research Program funds undergraduate research training through an award designed to support interdisciplinary undergraduate summer research projects. Awards are made through an application process available to any Bio-X affiliated faculty across campus (nearly 600 Faculty are affiliated with the Bio-X program). Student awardees receive a stipend equivalent to ten weeks of laboratory work.

The program is an invaluable opportunity for students to conduct hands-on research, learn how to carry out experiments in the laboratory, and develop the skills to read and analyze scientific literature. To date, 176 students have been awarded the opportunity to participate in the Bio-X Undergraduate Summer Research Program.

A unique component of the Bio-X Undergraduate Summer Research Program is the Undergraduate Research Talks given by the mentors of our student awardees. These weekly Faculty talks expose students to a variety of scientific fields and enrich their summer research experience. These talks are also open to the entire Stanford community. This is a unique opportunity for students to hear more about the broad range of research within Stanford, to meet faculty in a variety of scientific fields, and to meet each other as potential future collaborators and colleagues. In 2012, students listened to talks by 39 Faculty members, new areas of research to which they may not otherwise have been exposed. At the conclusion of the ten-week period, the students presented the results of their summer research experience in the form of a poster presentation open to the public.

Funding for the support of our undergraduate summer research program was provided by generous contributions from Marisa Arredondo, Pitch Johnson, Steve Krausz, The Rose Hills Foundation, and Dr. Carla Shatz, Director of Bio-X.

In 2012, we supported 49 participants, the largest group of undergraduate students in the history of the Bio-X Undergraduate Summer Research Program.

Undergraduate Summer Research Program Participants 2011

Bio-X Undergraduate Research Program

2012 Bio-X Undergraduate Research Talks given by Stanford Faculty:

June 27
Alejandro Sweet-Cordero "Functional analysis of the EWS/FLI-1 translocation"
Ian Gotlib "Understanding and reducing risk for depression"
Anthony Oro "Definitive genetic therapies for skin diseases"

July 6
Philip Beachy "Hedgehog signaling in development, disease, and regeneration"
Virginia Walbot "Origin of meiotic cells in plants"
May Han "Multiple sclerosis and brain autoimmunity"
Alex Dunn "The cell as machine: Understanding how cells detect and respond to mechanical information"

July 11
Gerald Crabtree "Engineering mice to study chromatin *in vivo"*
Stefan Heller "How our senses of hearing and balance work and what happens when they don't work"
James Gross "Emotion regulation"
Paul Khavari "Genomic reprogramming in stem cell differentiation and cancer"

July 18
Anne Brunet "Regulation of aging and longevity"
Sharon Pitteri "New strategies for the imaging of cancer"
Michael Hsieh "Studying an ancient enemy with 21st century tools: Vanquishing the world's deadliest worm"
Marius Wernig "Direct conversion of skin cells to neurons"

July 25
Calvin Kuo "Engineering cancer cells in 3D environments"
Stephen Montgomery "The genetics of gene expression"
C. Andrew Bonham "Transplantation of intestinal stem cells"
M. Bruce MacIver "The time-course of synaptic inhibition in human vs rat brain circuits"

August 1
Robert Chang "Peristat online visual field screening for glaucoma"
Michelle Monje-Deisseroth "Remodeling the brain's infrastructure: Mechanisms of postnatal neurodevelopment in health and disease"
Miriam Goodman "How do we feel? The mystery and importance of touch and what *C. elegans* can teach us about how it works:
Karen Parker "The role of oxytocin biology in the social impairments of autism"

August 8
Karl Deisseroth "Optogenetics: Development and application"
Mary Teruel "Using single-cell imaging and targeted mass spectrometry to uncover the feedback loops controlling differentiation"
Laura Attardi "Deconstructing p53 pathways *in vivo* using mouse models"
Allan Reiss "Integrating genes, brain and behavior in Fragile X (FXS) and Williams Syndromes (WS): The 'yin and yang' of social behavior"

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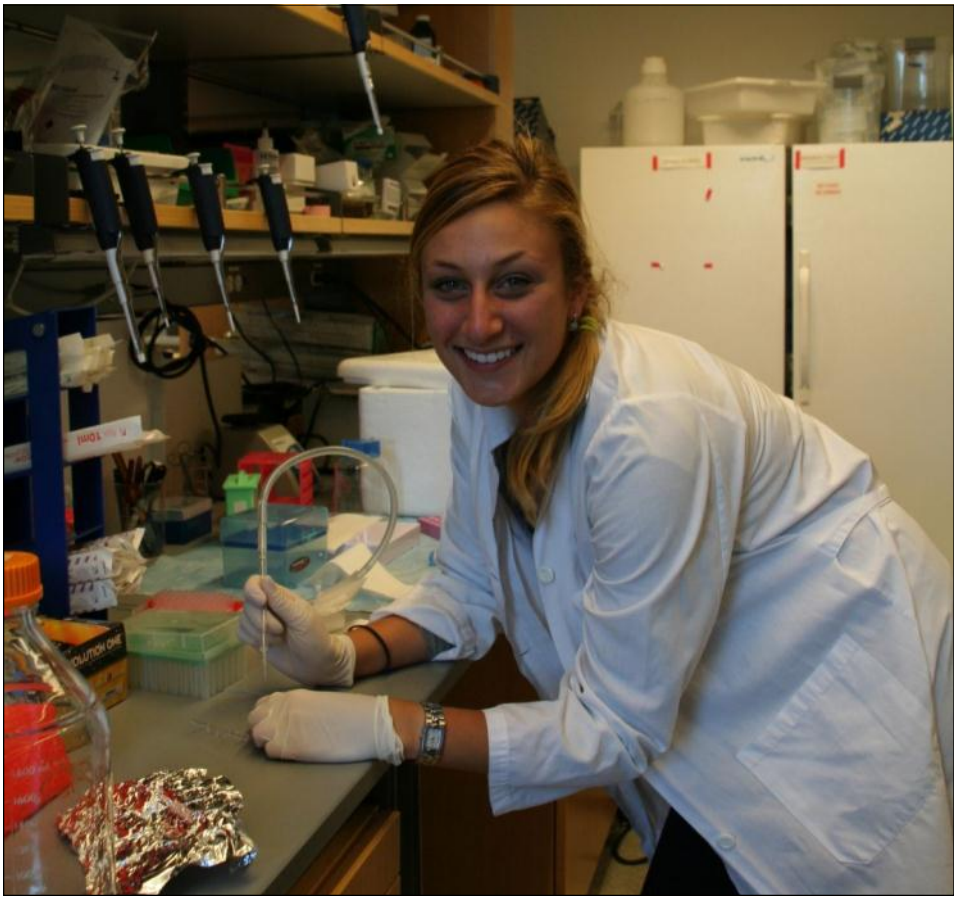
August 15
Anthony Norcia "Using EEG to image the dynamics of human vision"
Steven Block "Optical tweezers: Biophysics, one molecule at a time"
Josh Elias "Measuring dynamic proteomes with quantitative mass spectrometry"
Drew Nelson "Fatigue and residual stresses in bones and arteries"

August 22
Scott Delp "Dynamics of walking and running"
Olivia Martinez "Challenges and opportunities for the future in transplant Immunology"
Russ Altman "Understanding the interaction of genes and drugs"
Julie Theriot "Life on the inside: Secrets of bacterial pathogens"

August 29
Dean Felsher "Modeling and predicting therapeutic efficacy of cancer treatments"
Justin du Bois "Turning toxins into tools for ion channel studies"
Yanmin Yang "Calcium tips the balance"
Tom Quertermous "Dissecting the genetic risk for coronary heart disease"



Beckie Yanovsky completed her summer research training in Dr. Weissman's lab

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Prem Thottumkara completed his summer research training in Dr. Gambhir's lab

2012 Program Participants:

Brittany Bankston *Biomechanical Engineering*
Supported by: Steve Krausz and Marisa Arredondo
Mentor: Prof. Michael Hsieh, Urology

Brittany Bankston is going to be a junior this fall studying biomechanical engineering. She is originally from Naples, Florida, but she is having a wonderful time in California. In her free time she loves to sing with her a cappella group, go to the movies, and hang out in downtown Palo Alto. She is working in Dr. Hsieh's urology lab this summer studying the effects of Schistosomiasis on the bladder. This is her first time working in a lab, and she is thoroughly enjoying her summer experience.

Shaughnessy Brown *Mechanical Engineering*
Supported by: Steve Krausz and Marisa Arredondo
Mentor: Prof. David Hovsepian, Radiology

Shaughnessy Brennan Brown is a rising junior in mechanical engineering. Her research is in interventional radiology at the Stanford Hospitals and Clinics, where she currently studies the effects of tract embolization during CT-guided lung biopsies on pneumothorax rates. She is particularly interested in the intersection between surgical device innovation and nanotechnology. In the future, she plans on graduate school in nuclear engineering before embarking on a combined MD/PhD. In the meantime, she enjoys sporting clays, flying, and practicing her Russian with friends.

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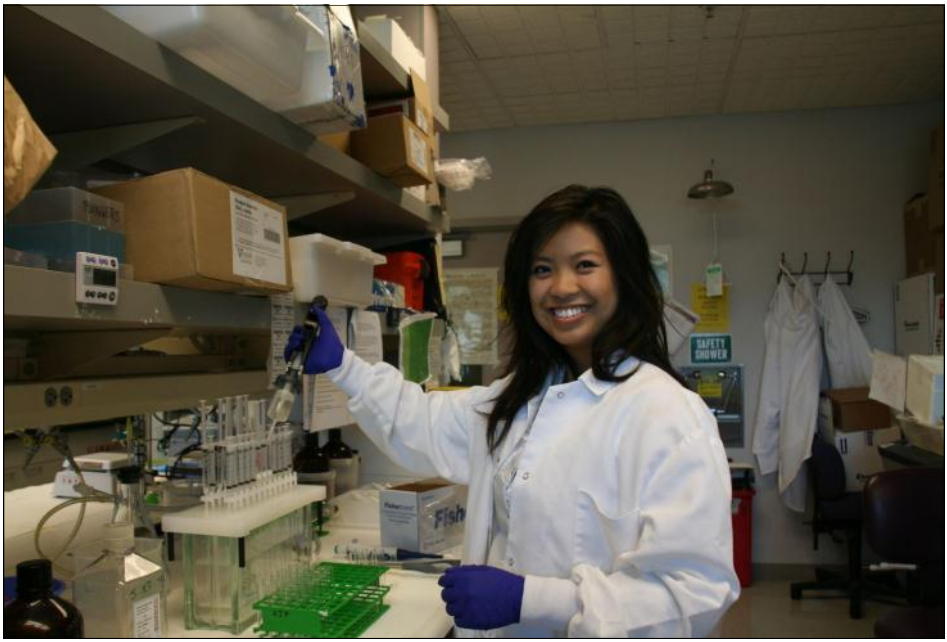
Victoria Chang *Biological Chemistry*
Supported by: Steve Krausz and Marisa Arredondo
Mentor: Prof. Gerald Crabtree, Pathology

Victoria is a rising junior from Maryland working in Dr. Gerald Crabtree's lab this summer. Previous work from the Crabtree lab has demonstrated that human astrocytes may be directly converted to neurons upon over-expression of two specific microRNAs. This summer, she is developing a dual reporter assay using time-lapsed fluorescence images of individual cells to monitor the conversion process at the single cell level. She is very interested in developmental biology and plans to pursue either a graduate degree in biology or a medical degree after graduation.

Dominique Dabija *Bioengineering*
Supported by: Steve Krausz and Marisa Arredondo
Mentor: Prof. Scott Delp, Bioengineering and Mechanical Engineering

Dominique Dabija is a rising senior majoring in bioengineering. This summer, she is working on clinical and biomechanical research in the Human Performance Lab. She is comparing new and traditional ACL intervention programs and working with Stanford athletes to determine and implement appropriate intervention strategies to reduce risk of injury in non-contact sports. More broadly, she is interested in easing people's suffering and improving their quality of life both by caring for them directly and by contributing to advances in medical treatments that can be leveraged by other medical practitioners to treat more people.



Amanda Manorot completed her summer research training in Dr. Parker's lab

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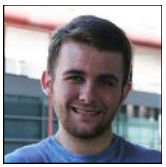
Nick Davis *Bioengineering*
Supported by: Steve Krausz and Marisa Arredondo
Mentor: Prof. Josh Elias, Chemical & Systems Biology

Nick Davis is a rising senior in the bioengineering honors program at Stanford. He is conducting his honors project in the Josh Elias Laboratory. In his research he seeks to apply desorption electrospray ionization (DESI), a mass spectrometry technique that he had previously developed to study transition-metal-catalyzed reactions, to monitor enzymatic reactions in real time. The ability to study kinase and phosphatase interactions on substrates and to observe product formation in real time with DESI could prove valuable to the burgeoning fields of top-down proteomics and protein engineering. Nick plans to pursue a PhD program in Bioengineering.



Brian Deutsch (*undeclared*)
Supported by: Steve Krausz and Marisa Arredondo
Mentor: Prof. Calvin J. Kuo, Medicine (Hematology)

Brian is a rising sophomore hailing from Southern California. He intends to pursue a major in biology with a minor in classics. He is an avid basketball fan who likes going to the movies with his girlfriend and enjoys terribly greasy food, bad jokes, and napping. He plans to go to medical school on the East Coast; however, he is waiting on inspiration and/or experience to dictate his specialty. This summer, Brian is working on a novel way to survey colorectal samples for copy-number variance.

Roxanne Diaz Caceres *Biology*
Supported by: The American Heart Association and Bio-X
Mentor: Prof. Thomas Quertermous, Medicine (Cardiovascular)

Roxanne is a senior from Lima, Peru majoring in biology. She has been working in the Quertermous laboratory since she transferred from a community college in Florida to Stanford University. Her research interests focus on the genetics of coronary heart disease. This summer she is investigating allele-specific differences in the TCF21 gene. TCF21 has been recently associated with coronary heart disease in the GWA study CARDIoGRAM in which the Quertermous lab participated. Roxanne plans to apply to MD/PhD programs while continuing to do research at the Quertermous laboratory.

Sadia Dimbil *Biological Sciences*
Supported by: Steve Krausz and Marisa Arredondo
Mentor: Prof. Alejandro Sweet-Cordero, Pediatrics

Sadia J. Dimbil is a rising senior majoring in biology with a concentration in neuroscience. She is currently conducting research on the phenotype of EWS knockdown and on the mechanism by which the protein EWS regulates RNA processing. The objective of this research is to gain insight into how the expression of the EWS/FLI-1 fusion protein promotes tumorigenesis. In general, Sadia is interested in cancer biology in addition to human physiology. She plans to pursue medical school after graduation.

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Grace Do *Biological Sciences*
Supported by: Pitch Johnson
Mentor: Prof. Renee Reijo Pera, Obstetrics & Gynecology

Grace is a rising senior from Chandler, Arizona. She is currently conducting research in Dr. Renee Reijo Pera's lab in the Institute of Stem Cell Biology and Regenerative Medicine. In Dr. Reijo Pera's lab, Grace is working with mouse and human embryos to investigate the epigenetic modifications that occur during embryogenesis. Through a better understanding of the role of epigenetics in embryo development, she hopes to be able to apply this knowledge to the generation of induced pluripotent stem cells. Upon receiving her bachelor's degree in biology, Grace plans on attending graduate school to further study stem cells.

Everett Frost *Bioengineering*
Supported by: Vice Provost of Undergraduate Education and Bio-X
Mentor: Prof. Yanmin Yang, Neurology

Originally from Los Angeles, Everett Frost is a rising senior majoring in bioengineering. His research in the Yang laboratory is focused on exploring binding and activity of microtubule associated proteins as related to neurodegenerative diseases. He is very excited about Bio-X and is thrilled to be working in the lab this summer. Some of his other interests include basketball, tennis, and Ike's sandwiches.

Andrea Goldstein *Biology (Neurobiology)*
Supported by: Bio-X
Mentor: Prof. Michelle Monje, Neurology

Andrea Goldstein, a rising junior, plans to major in biology with a specialization in neuroscience. This summer in Michelle Monje's lab, she is using optogenetics to stimulate the motor cortex and major motor pathways of developing mice in an attempt to influence the generation of new glial cells in the specific area of stimulation. In the future, she hopes to study whether this localized stimulation can reverse the damaging effects of chemotherapy and radiation on glial cell populations and the subsequent deficits in neurocognition including learning, memory, attention, and speed of information processing.

Alex Greaves (*undeclared*)
Supported by: Pitch Johnson
Mentor: Prof. Anthony M. Norcia, Psychology

Alex Greaves is a rising sophomore from the great state of Texas. He is hoping to double major in physics and psychology and is working this summer in the psychology department. He enjoys long walks on the beach and spends his spare time keeping up his Bonsai tree collection. Alex is currently doing research with Professor Anthony Norcia in the Stanford Vision and Neurodevelopment Lab.

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Casey Haaland *Electrical Engineering*
Supported by: Pitch Johnson
Mentor: Prof. Mary N. Teruel, Chemical & Systems Biology

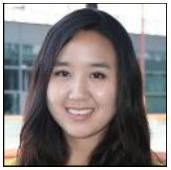
Casey Haaland is a rising sophomore and a potential electrical engineering major from Manhattan Beach, California. This summer he is researching methods to improve the efficiency of ion capture in mass spectrometers at the Teruel Lab. The end goal of improving the efficiency of mass spectrometers is to allow for the analysis of smaller, clinical samples. His primary areas of interest at Stanford are physics and mathematics as well as their applications.

Minsuk Hyun *Biology (Neuroscience)*
Supported by: Pitch Johnson
Mentor: Prof. Karl Deisseroth, Bioengineering, Psychiatry & Behavioral Sciences

Minsuk Hyun is a rising senior from Seoul, Korea. He is majoring in biology with a focus in neurobiology. In the Deisseroth Lab, Minsuk is currently developing new optogenetic targeting tools that will allow a more specific manipulation of neural circuits. He is interested in questions about how the brain and mind work and plans to apply to neuroscience graduate programs this fall.

Jesse Ikeme *Biology*
Supported by: Pitch Johnson
Mentor: Prof. H. Craig Heller, Biology

Jesse Ikeme is a rising senior majoring in biology with a focus in neurobiology. He is currently conducting research on the function of melanopsin, a nonvisual photopigment, and the integrative capacity of the mammalian nonvisual light response in Craig Heller's lab. Outside of the lab, Jesse enjoys playing basketball and singing with the Stanford Fleet Street Singers. He hopes to attend medical school in the future.



Candice Kim *Biology*
Supported by: Bio-X
Mentor: Prof. Paul Khavari, Dermatology

Candice Kim is a rising sophomore majoring in biology with a field of study in molecular and cellular biology. Candice's interest in research began in high school during which she worked at a USC dermatology lab studying the degenerative skin disease *Epidermolysis Bullosa*. At Stanford, she continues to pursue her interest in dermatology under the mentorship of Dr. Paul Khavari. Candice is currently working on a project that focuses on the inhibition of lymphocyte-specific PI3K isoforms in inhibiting the growth of Cutaneous T-Cell lymphoma cells. She plans to apply to medical school in the future.

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Ben King *Human Biology*
Supported by: Bio-X
Mentor: Prof. Allan L. Reiss, Psychiatry and CIBSR

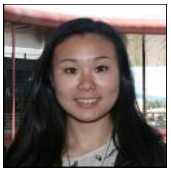
Ben King is a rising junior from Ames, Iowa. He is majoring in human biology with an emphasis in neuroscience and behavior. This summer, Ben is working at the Center for Interdisciplinary Brain Science Research under Dr. Allan Reiss on a double blind, placebo-controlled trial of Donepezil -- a novel drug intervention aimed at reducing cognitive and behavioral deficits in individuals with Fragile X syndrome.

Alexandra Kuhlmann *(undeclared)*
Supported by: Bio-X
Mentor: Prof. Julie Theriot, Biochemistry

Ali Kuhlmann is a rising junior from Dallas, Texas planning to double major in English and biology. This summer, Ali is continuing her research in Julie Theriot's lab, where she has worked since her freshman year. She works with the pathogen *Listeria monocytogenes*, a model organism for the study of actin-based motility and cytoskeleton dynamics. She is currently conducting a pharmaceutical assay to better understand the biochemical pathway of infection. Ali plans to pursue a career in either academics or medicine.

Jasmine Kyi *Human Biology*
Supported by: Bio-X
Mentor: Prof. May Han, Neurology

Jasmine Kyi is a rising sophomore and prospective human biology major from Yorba Linda, California in Orange County. Jasmine is working with Dr. Maya Desai in Dr. May Han's neurology lab studying multiple sclerosis. Hoping to attend medical school in the future, she is gaining experience this summer in a research lab with a project focusing on characterizing MS lesions using high-resolution, high-field MRI in correlation with immunohistochemistry staining. Outside of the lab, Jasmine enjoys playing basketball on Stanford's club team and spending time with friends.



Katherine Lee *Human Biology*
Supported by: Undergraduate Advising & Research and Bio-X
Mentor: Prof. Jill Helms, Surgery

Katherine Lee is a rising senior from Sacramento, CA. She is majoring in human biology, with a concentration in women's health, and minoring in Spanish. This summer, she is working on her honors project in the lab of Dr. Jill Helms. Her project seeks to gain functional insights into the structure of Wnt, a stem cell growth factor and potential tissue regenerative drug. Outside of science, Katherine is interested in women's health policy and Spanish literature. She plans to attend medical school after graduation.

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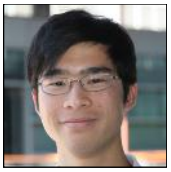
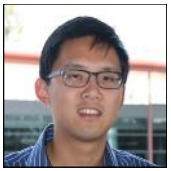


Eric Liaw *Biomedical Computation*
Supported by: Bio-X
Mentor: Prof. Anthony E. Oro, Dermatology

Eric Liaw, a rising junior majoring in biomedical computation, hails from the balmy shores of Hawaii. Under the guidance of Dr. Anthony Oro and Dr. Sandra Melo, he is exploring the promoter occupancy and dynamics of the transcription factor p63 -- the master regulator of epidermal stratification -- during early epidermal commitment. Outside of lab, you may find him reading, coding, singing (including for the elderly with the student group Side By Side), constructing wire sculptures, making bad science puns, or searching for tracheophytes and arthropods to examine and admire. Life fascinates him, and its mysteries he shall pursue in the years to come.

Kali Lindsay *Psychology*
Supported by: Bio-X
Mentor: Prof. Ian Gotlib, Psychology

Kali Lindsay is a senior majoring in psychology from San Diego, California. This summer Kali is working in Dr. Ian Gotlib's lab to assess the development of major depression and eating disorders in young girls and to determine how the predictive factors of these diseases might be related. She is interested in the clinical applications of research and in the prevention of psychiatric disorders. After Stanford, Kali hopes to attend a graduate program in clinical psychology.



Jonathan Lu *Human Biology*
Supported by: Bio-X
Mentor: Prof. Yanmin Yang, Neurology

Jonathan Lu is a rising senior from San Mateo, California. He is majoring in neurobiology. In Dr. Yanmin Yang's lab, Jonathan is researching the effect of mutant proteins in Huntington's disease on neuronal cell transport. He is interested in interdisciplinary approaches to imaging transport for live cells. The group's work with new microfluidic chambers is an exciting opportunity to study BDNF transport and can become a valuable future platform to test pharmaceutical drugs.

BIO-X

BIO-X AT STANFORD

TO EDUCATE...

TO DISCOVER....

TO INVENT....

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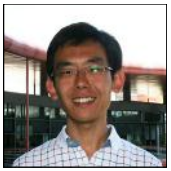
Svetlana Lyalina *Bioengineering and Computer Science*
Supported by: The Rose Hills Foundation and Bio-X
Mentor: Prof. Russ Altman, Bioengineering

Svetlana Lyalina is a rising senior from Thousand Oaks, California. She is majoring in bioengineering and computer science. This summer, she intends to use data mining techniques on electronic medical records to discover temporal patterns in descriptions of mental illness. After finishing her undergraduate degree, Svetlana would like to pursue a PhD in bioinformatics.

Amanda Manorot *Human Biology*
Supported by: Bio-X
Mentor: Prof. Karen Parker, Psychiatry & Behavioral Sciences

Amanda Manorot is a rising junior pursuing a bachelor's degree in human biology. Hailing from the heart of the Midwest, Amanda was born and raised in Des Moines, Iowa. This summer, she is working on a clinical trial investigating the administration of intranasal oxytocin as treatment for social deficits in children with autism. Outside of the lab, Amanda is interested in international health care, a topic she became passionate about after working on a project last summer in the Philippines and which she plans to pursue abroad next year at Oxford. In the future, she hopes to attend medical school.



Yifei Men *(undeclared)*
Supported by: Bio-X
Mentor: Prof. Anne Brunet, Genetics

Yifei is a rising sophomore from Singapore. A prospective biomedical computation major, Yifei is interested in the applications of computational tools to solving problems in biology. This summer, he is working in the Brunet lab, where he will study the link between metabolism and epigenetics in longevity. He will be working with the model organism *C. elegans* and looks forward to learning a variety of wet-lab and *in silico* techniques. After his undergraduate career, Yifei hopes to pursue a PhD and work in the field of biomedical sciences.

Megan Mikhail *Biology*
Supported by: Stanford Undergraduate STEM Fellows Program and Bio-X
Mentor: Prof. Howard Y. Chang, Dermatology

Megan Mikhail is a rising junior majoring in biology and minoring in computer science. Though originally from Chicago, IL, she has lived in seven different states. She is currently studying a long non-coding RNA (lncRNA) involved in the inflammatory pathway in Dr. Howard Chang's lab. Megan was named a Stanford Undergraduate STEM Fellow last year and hopes to pursue an MD/PhD after graduating. When not in lab, she enjoys drinking tea with friends, spending time outdoors, and singing along to 80s music.

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Bojan Milic *Biology (Biochemistry/Biophysics) and Chemistry*
Supported by: Bio-X
Mentor: Prof. Steven M. Block, Applied Physics and Biology

Bojan Milic is a senior majoring in biology (biochemistry/biophysics) and chemistry. Born in Belgrade, Yugoslavia, and having spent his childhood in Kuwait, Bojan arrived at Stanford with an interest in the intersection between the physical and life sciences. During his freshman year, he joined the single-molecule biophysics laboratory of Professor Steven Block. Bojan's research is aimed at elucidating the mechanochemical properties of various constructs of kinesin, a dimeric motor protein, using laser-based gradient-force optical trapping. He intends to pursue graduate studies in biophysics or physical chemistry.

Katherine Murphy *Chemistry (biological option)*
Supported by: Bio-X
Mentors: Prof. Virginia Walbot, Biology and Prof. Lynette Cegelski, Chemistry

Katie Murphy is a rising sophomore and chemistry major from Oregon. This summer she researched corn plants in Dr. Virginia Walbot's lab in the biology department. In a collaboration with Dr. Lynette Cegelski's lab in the chemistry department, Katie utilized NMR as a means to analyze the cell wall compositions of different mutants to learn more about anther development in corn plants. Apart from her enthusiasm for science and plants, Katie enjoys tap dancing and the outdoors.

Julia Nguyen *Biology*
Supported by: Bio-X
Mentor: Prof. Thomas Krummel, Surgery

Julia Nguyen is a rising senior and biology major hailing from El Dorado Hills, California. Her research is focused on determining cancer cell lineage hierarchies within pancreatic ductal adenocarcinoma as well as identifying potential new targets for immunotherapies. She is interested in cancer biology, pathology, and physiology, and she hopes to have a career in biomedical research. Julia is also a student researcher with the Huntington's disease Outreach Project for Education at Stanford (HOPES), for which she regularly contributes and peer-edits articles.

John Pluvinage *Bioengineering*
Supported by: Bio-X
Mentor: Prof. Irving Weissman, Stem Cell Biology and Regenerative Medicine

John Pluvinage is a rising junior majoring in bioengineering. He is currently investigating potential therapeutic and diagnostic targets for myelodysplastic syndrome, a blood-forming stem cell disorder, in Dr. Irv Weissman's lab. John is interested in scientific research with direct clinical applicability. In particular, John would like to explore the use of novel engineering tools and devices in regenerative medicine. After graduation, John hopes to pursue a combined MD/PhD program.

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Charlotte Poplawski *Chemical Engineering*
Supported by: The Rose Hills Foundation and Bio-X
Mentor: Prof. Alex Dunn, Chemical Engineering

Charlotte Poplawski is a senior majoring in chemical engineering with additional focuses in neuroscience and psychology. Currently, she is researching how endothelial cells, the cells that line our blood vessels, sense and respond to different types of fluid flow, important factors in understanding health problems such as angiogenesis and aneurysms. Collaborating with the labs of Alex Dunn and Gerry Fuller, Charlotte is especially interested in how different biochemical inhibitors can be used to reverse engineer the mechanisms by which cells move and align themselves in response to their environment. In her research and everyday life, Charlotte loves to solve problems related to how people can live healthier and happier lives.

Edmund Posadas *Biology (Neurobiology)*
Supported by: Bio-X
Mentor: Prof. M. Bruce MacIver, Anesthesia

Hailing from San Diego, Edmund is a rising junior who is majoring in biology with a concentration in neurobiology. This summer Edmund is currently conducting research in Dr. MacIver's neuropharmacology lab in the Stanford School of Medicine. He is investigating ethanol's mechanism of action on GABA synapses in the hippocampus. When he's not in lab, Edmund enjoys eating, playing basketball, and playing darts. In the future, Edmund hopes to attend medical school.

Anand Rajan *Biology*
Supported by: The Rose Hills Foundation and Bio-X
Mentor: Prof. Marius Wernig, Stem Cell Biology

Anand Rajan is a rising sophomore from Southern California majoring in biology. He is currently working in the Wernig lab to create a neuronal model for Fragile X syndrome via cloning and stem cell techniques. Though this is his current focus, he is also interested in the development of drug delivery systems and gene silencing. In the future, he plans to apply to medical schools.

Katie Ricklin *Human Biology*
Supported by: Bio-X
Mentor: Prof. Stephen Montgomery, Pathology and Genetics

Katie Riklin is a rising senior majoring in human biology with a concentration in epidemiology and human health. She is interested in different factors that influence disease susceptibility and causation, including genetic variation. She is working in Stephen Montgomery's lab this summer using tools in bioinformatics to analyze variation in gene expression and dissect genotype to phenotype relationships. Katie is considering applying to medical school after Stanford. She is a member of the varsity sailing team at Stanford and also enjoys skiing, scuba diving, and the outdoors.

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Max Silverstein *(undeclared)*
Supported by: Bio-X
Mentor: Philip A. Beachy, Biochemistry

Max Silverstein is a rising sophomore planning to major in either biology or human biology. This summer, he will be doing research on stem cell biology in Dr. Philip Beachy's lab, specifically examining the role of the Hedgehog signaling protein. In general, Max is interested in cellular biology and physiology with plans to eventually study medicine. Outside the lab Max likes to snowboard and rides for the Stanford road cycling team.

Carolyn Sinow *Biology*
Supported by: Bio-X
Mentor: Prof. Laura D. Attardi, Radiation Oncology and Genetics

Carolyn Sinow is a junior at Stanford University. She is majoring in biology with a specific interest in genetics and molecular and cellular biology. Carolyn is excited to be part of the research effort at Stanford. This summer, she is working in the Attardi laboratory to characterize target genes of the p53 transcriptional regulator to better understand the p53 tumor suppression pathway. She has also conducted research on the accessibility of family planning methods in northern Peru.

Bryce Small *Biology*
Supported by: The Rose Hills Foundation and Bio-X
Mentor: Prof. Olivia Martinez, Surgery

Bryce Small is a rising senior from Santa Ynez, California. He is majoring in biology with a focus in neurobiology. This summer, Bryce is conducting research on neurons to potentially classify a binding partner of MHC Class I that regulates neuronal projection outgrowth in Dr. Martinez's lab. He is very interested in the clinical and pharmacological implications of research and plans to pursue medical school after graduation. Beyond science, Bryce plays club water polo for Stanford and is minoring in art.

Zahra Taji *Chemistry*
Supported by: Bio-X
Mentor: Prof. Justin Du Bois, Chemistry

Zahra is a rising junior from Iran, majoring in Chemistry. This summer in Justin Du Bois's lab, she is working on the synthesis of GTX-3 analogues, which can be used to study the structure and function of voltage-gated sodium ion channels. In addition, she is working on the synthesis of fluorescent compounds that can be used to further study these channels.

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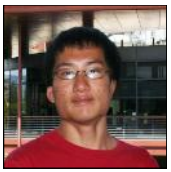
Prem Thottumkara *(undeclared)*
Supported by: Bio-X
Mentor: Prof. Sam (Sanjiv) Gambhir, Radiology

Prem Thottumkara is a rising sophomore and is currently undecided about his major. After working in organic synthesis at Western Illinois University for nearly seven years, he wanted to explore a new science and was intrigued by nanoscience and the chemistry behind it. He began working in Dr. Sam Gambhir's lab in January 2012 with Jesse Jokerst and has fallen in love with the new research. Prem is currently working on two different projects, both involving the use of Gold Nanorods (GNRs) for early ovarian cancer detection. These GNRs are either coupled with polyethylene glycol or wrapped in silicon for molecular imaging (ultrasound and MRI). Prem hopes to continue working in the Gambhir lab after the summer and wants to use this research experience and newfound knowledge for a future career in biochemical or pharmaceutical research.

Theodora Tran *Engineering (Product Design)*
Supported by: Bio-X
Mentor: Prof. Drew Nelson, Mechanical Engineering

Thea Tran is a rising senior majoring in product design. She is doing research on the impact of running form, bone health, and lifestyle factors on stress fractures. Through gait analyses and simulations, she is working to characterize the mechanical failure of bones; such research furthers knowledge that can be used to develop interventions that will help runners reduce their risk of injury. Thea is interested in health, dentistry, technological entrepreneurship, and medical causes in third world countries. Her hobbies include running, playing the harp, and photography.



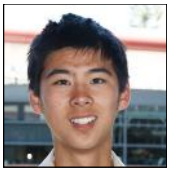
Tony Tzeng *Biology*
Supported by: Bio-X
Mentor: Prof. Stefan Heller, Otolaryngology

Tony Tzeng is a rising senior from Lafayette, Louisiana. He is majoring in biology and minoring in history. In Dr. Stefan Heller's lab, he is currently researching live cell staining with phalloidin, a well-known biomarker for auditory hair cells. Last summer, he also conducted research concerning auditory hair cell regeneration, characterizing the Sox2-CreER system in transgenic mice as a tool for studying inner ear support cells. Outside of lab, he enjoys table tennis, frisbee, and reading.

Dyvon Walker *Human Biology*
Supported by: Vice Provost of Undergraduate Education and Bio-X
Mentor: Prof. C. Andrew Bonham, Surgery

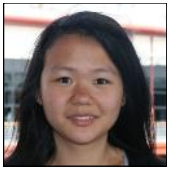
Dyvon Walker is a rising sophomore from Colorado Springs, Colorado majoring in human biology. He is currently conducting research in the Kuo Lab on the manipulation of the protein called GPR124 in order to treat stroke. He is implementing surgical techniques to induce stroke in mice in order to gain further knowledge of the function of this protein. Dyvon is interested in human biology and physiology in general and plans to apply to medical school in pursuit of a career in surgery.

Bio-X Undergraduate Research Program



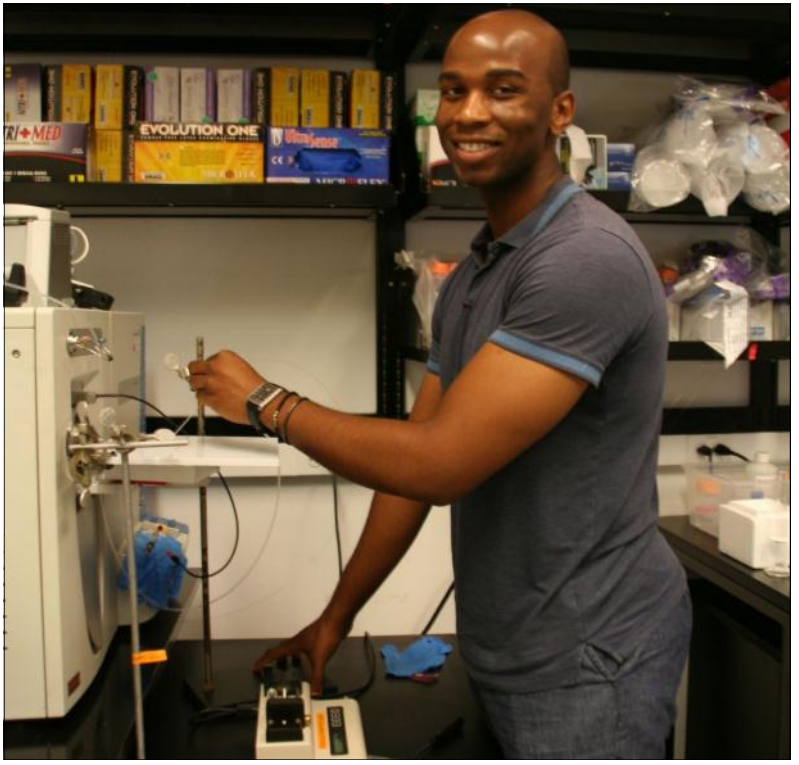
Sean Wang *(undeclared)*
Supported by: Bio-X
Mentor: Prof. Robert T. Chang, Ophthalmology

Sean Wang is a rising sophomore from South Pasadena, California planning to major in biology. Under the guidance of Dr. Robert Chang at the Byers Eye Institute, Sean is currently researching clinical applications of an online computer program, *Peristat*, as a scalable and cost-effective form of automated glaucoma screening. Among many hobbies, he is interested in ophthalmology, social entrepreneurship, telemedicine, and gerontology. After graduation, he intends to pursue medical school and eventually become an eye surgeon.



Virginia Wang *(undeclared)*
Supported by: Bio-X
Mentor: Prof. Miriam B. Goodman, Molecular & Cellular Physiology

Virginia Wang is a rising sophomore from Austin, Texas. She is studying the fascinating neural networks of *Caenorhabditis elegans* and their role in thermal compensation and homeostasis maintenance in the Goodman Lab this summer. Virginia is enjoying her time at Stanford and will probably declare a biology major next year.



Nick Davis completed his summer research training in Dr. Elias's lab

Bio-X Undergraduate Research Program

Undergraduate Summer Research Program Participants 2011

Whitney Wells *Human Biology (Computer Science minor)*
Supported by: Bio-X
Mentor: Prof. James Gross, Psychology

Whitney is a senior majoring in human biology and minoring in computer science. Through the HumBio program, she has enjoyed studying psychology from an interdisciplinary perspective and next year will go to Oxford to do a tutorial on abnormal psychology. She is currently doing research in Dr. James Gross's lab, studying emotion regulation in adolescents with Autism Spectrum Disorders. Her project combines a wide range of techniques to look for differences in emotion regulation--from qualitative interviews with parents to fMRI analysis of brain activation during emotion regulation tasks. She hopes that this research will one day benefit autism therapies.

Wyatt Woodson *Bioengineering*
Supported by: Bio-X
Mentor: Prof. Gary Steinberg, Neurosurgery

Wyatt Woodson is an undergraduate majoring in bioengineering at Stanford. Having been interested in biotechnology since early in his high school career, Wyatt found himself drawn to Stanford's programs and the many opportunities that Stanford offers. Wyatt worked with companies such as Complete Genomics and Gilead Sciences, but after starting research in a neurosurgery lab on campus working with optogenetic techniques in stroke models, he found an interest in research that will likely lead him to pursue a PhD.

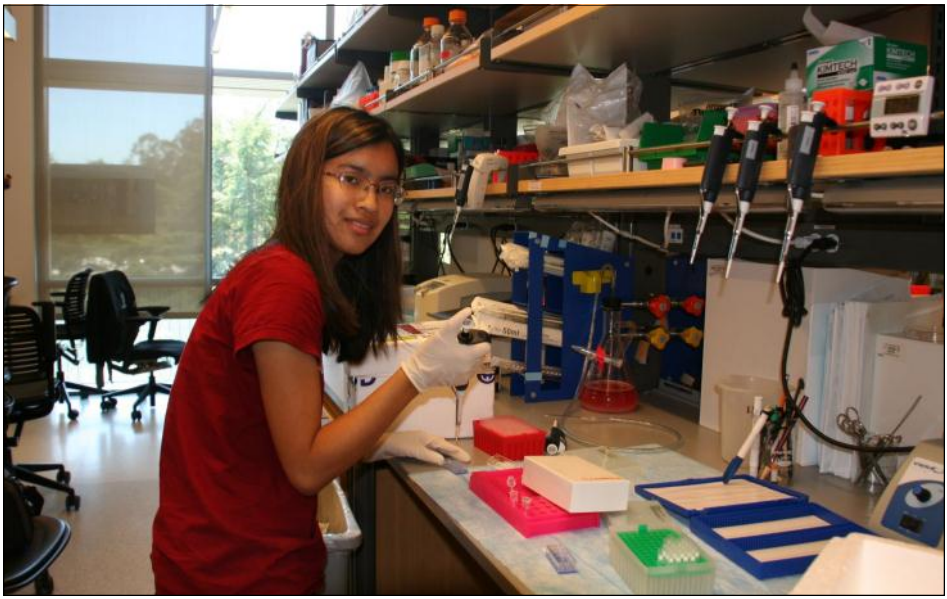
Bio-X Undergraduate Research Program

Beckie Yanovsky *Biology*
Supported by: Bio-X
Mentor: Prof. Irving L. Weissman, Stem Cell Biology and Regenerative Medicine

Beckie Yanovsky is a rising biology major at Stanford. She is working in Dr. Irv Weissman's lab on identifying pancreatic nueroendocrine cancer stem cells and developing potential therapies. She plans to continue this project throughout the next year for her senior honors thesis. Beckie recently returned from a quarter abroad in Australia, where she conducted a published research project on the effects of ocean acidification on sea hare larval organisms. Beckie is extremely active in the Stanford community as a volunteer with Camp Kesem, student manager at Stanford's Visitor Information Services, and Residential Computer Consultant. Outside of academics she enjoys traveling, adventuring, and the great outdoors. Beckie hopes to pursue a combined career of medicine and research and is very excited for the many opportunities ahead.

Christine Yost *Biology (Honors)*
Supported by: The Rose Hills Foundation and Bio-X
Mentor: Prof. Dean Felsher, Medicine (Oncology and Pathology)

Christine is a rising senior from Seal Beach, California, majoring in biology and minoring in German studies. She has been a member of the Felsher Lab for the past year, and this summer she is studying the role of Myc in senescence in Bcr-Abl- and Ras-induced lymphoma. Christine will apply to medical school next year, intending to pursue a career in clinical research oncology. Christine co-captains the Stanford Women's Club Volleyball team and in her free time loves catching waves with her dad, her lifetime surfing buddy.



Julia Nguyen completed her summer research training in Dr. Krummel's lab

Bio-X Undergraduate Research Program

2012 Poster Titles

"*S. haematobium* Egg-Induced Microvascular Permeability in the Bladder"
Brittany Bankston[1], Kim Thai[3], Daniela Brisset[3], Michael Hsieh[2]
Departments of Biomechanical Engineering[1] and Urology[2] and School of Medicine[3], Stanford University

"Factors Influencing Pneumothorax Rate during CT-Guided Lung Biopsy: Patient Outcomes and Impacts of Tract Embolization"
Shaughnessy Brennan Brown[1], Andrew Tran[3], Jarrett Rosenberg[2], David Hovsepian[4]
Departments of Mechanical Engineering[1] and Radiology[2] and School of Medicine[3], Stanford University; Department of Radiology[4], Stanford University Medical Center

"Direct Conversion of Astrocytes to Neurons through Overexpression of MicroRNAs at the Single Cell Level"
Victoria Chang[1,2], Alfred Sun[1,2], Gerald Crabtree[1,2]
Howard Hughes Medical Institute[1] and Department of Developmental Biology[2], Stanford University

"ACL Injury Prevention in Female Basketball Players"
Dominique Dabija[1], Rebecca Shultz[2], Scott Delp[1], Jason Dragoo[2]
Departments of Bioengineering[1] and Orthopedics[2], Stanford University

"Probing Enzymatic Reactions with Desorption Electrospray Ionization Mass Spectrometry (DESI-MS)"
Nick Davis[1], Joshua Elias[2]
Departments of Bioengineering[1] and Chemical & Systems Biology[2], Stanford University

"A Novel Approach to Surveying Colorectal Samples for Copy-Number Variance"
Brian Deutsch[1], Lincoln Nadauld[1], Laura Miotke[1], Rowza Rumma[1], Hanlee Ji[1], Calvin Kuo[1]
Department of Oncology[1], Stanford University

"Mechanism of TCF21 Regulation by Coronary Heart Disease Associated Variation at 6q23"
Roxanne Diaz-Caceres[1], Nicholas Leeper[1], Azad Raiesdana[1], Clint Miller[1], Thomas Quertermous[1]
Division of Cardiovascular Disease Research[1], Stanford University

"The Phenotype of EWS Knockdown through Cell-Cycle and Immunofluorescence Analysis in the Context of DNA Damage"
Sadia Dimbil[1], Bethsaida Nieves[1], Alejandro Sweet-Cordero[1]
Department of Pediatrics[1], Stanford University

"Characterization of Epigenetic Reprogramming in Early Mouse and Human Embryogenesis"
Grace Do[1], Mark Wossidlo[1], Renee Reijo Pera[1]
Institute for Stem Cell Biology and Regenerative Medicine[1], Stanford University

"Developing an *In Vitro* Platform for Investigating Microtubule Interactions"
Everett Frost[1], Michael T. Maloney[2], Yanmin Yang[2]
Departments of Bioengineering[1] and Neurology[2], Stanford University

Bio-X Undergraduate Research Program

2012 Poster Titles continued

"The Role of Neuronal Activity in Oligodendrocyte Precursor Cell Proliferation and Differentiation"
Andrea Goldstein[1], Erin Gibson[1], Michelle Monje[1]
Department of Neurology[1], Stanford University

"Short Term Experience-Dependent Plasticity in Human Visual Cortex"
Alex S. Greaves[1], Faraz Farzin[1], Anthony M. Norcia[1]
Department of Psychology[1], Stanford University

"Intelligent Selection Reaction Monitoring to Increase Throughput and Sensitivity in Low Abundant Protein Quantification"
Casey Haaland[1], Robert Ahrends[1], Kyle Kovary[1], Mike Bogan[2], Mary Teruel[1]
Department of Chemical & Systems Biology[1] and SLAC[2], Stanford University

"New *In Vivo* Optogenetic Targeting Strategy"
Minsuk Hyun[1,2], Joanna Mattis[1,5], Lief Fenno[1,5], Charu Ramakrishnan[1], Karl Deisseroth[1,3,4]
Departments of Bioengineering[1], Biology[2], and Psychiatry & Behavioral Sciences[3], Howard Hughes Medical Institute[4], and Neuroscience Program[5], Stanford University

"The Integrative Capacity of the Nonvisual Response to Light in Mice"
Jesse Ikeme[1], Fanuel Muindi[1], H. Craig Heller[1]
Department of Biology[1], Stanford University

"The Effect of PI3K Inhibition on Cutaneous T-Cell Lymphoma (CTCL) Growth"
Candice Kim[1], Alexander Ungewickell[1, 2, 3], Paul Khavari[1]
Departments of Dermatology[1], Hematology[2], and Oncology[3], Stanford University

"FreeSurfer Analysis in a Randomized Controlled Trial of Donepezil in Fragile X Syndrome"
Benjamin King[1,2], Mira M. Raman[1,2], Mai Manchanda[1,2], Allan L. Reiss[1,2]
Center for Interdisciplinary Brain Sciences Research[1] and Department of Psychiatry & Behavioral Sciences[2], Stanford University

"Donor Cell Line Dependent Variation in *listeria monocytogenes* Infection"
Alexandra Kuhlmann[1], Michelle Rengarajan[1], Julie Theriot[1]
Department of Biochemistry[1], Stanford University

"Cellular and Molecular Profiles of Sphingosine-1-Phosphate Receptor1 (S1P1) Signaling in Experimental Autoimmune Encephalomyelitis and Correlation with High Resolution Magnetic Resonance Imaging"
Jasmine Kyi[1], Maya K. Desai[1], Christopher S. Garris[1], Jason Hsu[2,3], Yingxiang Huang[1], Lauren Tang[1], Brian Rutt[2], May H. Han[1,4]
Departments of Neurology & Neurological Sciences[1], Radiology[2], and Electrical Engineering[3] and Interdepartmental Program in Immunology[4], Stanford University

"Investigating Cysteine Residues in Wnt3a: Structural Insights into a Novel Tissue Regenerative Drug"
Katherine Lee[1,2], Girija Dhamdhere[2], Jill A. Helms[2]
Departments of Human Biology[1] and Surgery[2], Stanford University

Bio-X Undergraduate Research Program

2012 Poster Titles continued

"Assessing p63 Dynamics in Early Human Skin Development"
Eric J. Liaw[1], Sandra P. Melo[1], Anthony E. Oro[1]
Program in Epithelial Biology[1], Stanford University

"Predicting the Development of Eating Disorders in Young Girls at Familial Risk for Depression"
Kali F. Lindsay[1], Hannah W. Burley[1], Katharina Kircanski[1], Ian H. Gotlib[1]
Department of Psychology[1], Stanford University

"Examining Axonal Transport in Huntington's Disease Using Microfluidic Chambers"
Jonathan Lu[1], Michael T. Maloney[1], Yanmin Yang[1]
Department of Neurology[1], Stanford University

"Detecting Temporal Patterns in Clinical Descriptions of Mental Illness"
Svetlana Lyalina[1,2], Bethany Percha[3], Nigam Shah[3,4], Russ B. Altman[1,4,5]
Departments of Bioengineering[1], Computer Science[2], Biomedical Informatics[3], Medicine[4], and Genetics[5], Stanford University

"Intranasal Oxytocin Treatment for Social Deficits in Children With Autism"
Amanda Manorot[1], Dean S. Carson[1], Antonio Y. Hardan[1], Karen J. Parker[1]
Department of Psychiatry & Behavioral Sciences[1], Stanford University

"Elucidating the Role of COMPASS/ASH-2 H3K4 Trimethylation Complex in Dietary Restriction and Longevity of *C. elegans*"
Yifei Men[1], Shuo Han[1], Anne Brunet[1]
Department of Genetics[1], Stanford University

"Function of a Novel Non-Coding RNA in the TNFa-induced Inflammatory Response"
Megan Mikhail[1], Nicole Rapicavoli[1], Kun Qu[1], Jiajing Zhang[1], Howard Y. Chang[1]
Department of Epithelial Biology[1], Stanford University

"Probing the Effects of Neck-Linker Length Modulation on Kinesin Mechanochemistry"
Bojan V. Milic[1,2], Johan O. L. Andreasson[3], Steven M. Block[1,4]
Departments of Biology[1], Chemistry[2], Physics[3], and Applied Physics[4], Stanford University

"Understanding Maize Anther Development Using Solid State NMR"
Katherine Murphy[1], Rachel Egger[1], Lynette Cegelski[2], Virginia Walbot[1]
Departments of Biology[1] and Chemistry[2], Stanford University

"Endothelial Cells Sensing and Responding to Disturbed Flow"
Charlotte Poplawski[1], Maggie Ostrowski[1], Gerald Fuller[1], Alex Dunn[1]
Department of Chemical Engineering[1], Stanford University

"Lineage Hierarchies in Pancreatic Ductal Adenocarcinoma"
Julia Nguyen[1], Rebecca Yanovsky[1], Ryan Chow[1], Geoffrey W. Krampitz[2], Jeffrey A. Norton[2], Thomas M. Krummel[2], Irving L. Weissman[1]
Institute of Stem Cell Biology and Regenerative Medicine[1] and Department of Surgery[2], Stanford University

Bio-X Undergraduate Research Program

2012 Poster Titles continued

"Granulocyte-Macrophage Progenitors Acquire the Ability to Evade Phagocytosis in High-Risk Myelodysplastic Syndrome by Differential Expression of Calreticulin and CD47"
John V. Pluvinage[1], Wendy W. Pang[1,2], Elizabeth A. Price[3], Kunju Sridhar[3], Peter L. Greenberg[3], Stanley L. Schrier[3], Irving L. Weissman[1,2]
Institute for Stem Cell Biology and Regenerative Medicine, Ludwig Center for Stem Cell Research[1] and Departments of Pathology[2] and Medicine[3], Stanford University

"Ethanol Actions on GABA Synapses in Hippocampal Slices"
Edmund Posadas[1], Beza Dagne[1], Melis Sunay[2], M. Bruce MacIver[2]
Departments of Biology[1] and Anesthesia[2], Stanford University

"rAAV Mediated Gene Editing in Human Stem Cells"
Anand Rajan[1], Samuele Marro[1], Marius Wernig[1]
Department of Stem Cell Research[1], Stanford University

"Assessing Regulatory Variation Using Allele-Specific Expression"
Katie Riklin[1], Mark Piercy[2], Mauro Palo[2], Xin Li[2], Konrad Karczewski[3], Alexis Battle[4], Stephen Montgomery[2]
Departments of Human Biology[1], Pathology[2], Biomedical Informatics[3], and Computer Science[4], Stanford University

"Hedgehog Signaling Pathway Activation in the Hematopoietic Niche"
Max Silverstein*, Wan-Jin Lu[1], Phillip A. Beachy[1]
(*undeclared) Institute for Stem Cell Biology and Regenerative Medicine, Howard Hughes Medical Institute[1], Stanford University

"Elucidating the Role of the Non-Coding RNA Neat 1 in p53-Mediated Cell Cycle Arrest and Apoptosis"
Carolyn Sinow[1], Stephano S. Mello[1], Laura Attardi[1]
Department of Radiation Oncology[1], Stanford University

"Role of MHC Class I Interactions with Ly49 in Neuronal Growth"
Bryce Small[1], Lori Phillips[1,2], Olivia Martinez[1]
Departments of Surgery[1] and Neurosurgery[2], Stanford University

"Synthesis of Guanidinium Toxin Analogs for Sodium Ion Channel Study"
Zahra Harati Taji[1], James Walker[1], Arun Thottumkara[1], Justin Du Bois[1]
Department of Chemistry[1], Stanford University

"Multimodal Gold Nanorods for *In Vivo* Imaging of Ovarian Cancer"
Prem Thottumkara[1], Jesse Jokerst[1], Adam Cole[1], Sam Sanjiv Gambhir[1]
Molecular Imaging Program[1], Stanford University

"Identifying Modifiable Risk Factors for Stress Fractures in Distance Runners"
Thea Tran[1], Adam Tenforde[2], Adam Daoud[2], Jenny Yon[1], Michael Fredericson[2], Drew Nelson[1]
Department of Mechanical Engineering[1] and School of Medicine[2], Stanford University

Bio-X Undergraduate Research Program

Undergraduate Summer Research Program Participants 2012

Bio-X Undergraduate Research Program

2012 Poster Titles continued

"Characterizing the Effects of Intracellular Phalloidin on Human Embryonic Kidney (HEK) Cells in the Presence of Latrunculin B and Y27632"
Tony Tzeng[1], Robert Durruthy-Durruthy[2], Mirko Scheibinger[2], Stefan Heller[2]
Departments of Biology[1] and Otolaryngology[2], Stanford University

"Investigating the Role of Rspondins and GPR124 in CNS Angiogenesis"
Dyvon Walker[1], Junlei Chang[1], Teresa Reyes[1,2], C. Andrew Bonham[3], Calvin Kuo[1,2]
Departments of Hematology[1], Cancer Biology[2], and Surgery[3], Stanford University

"Peristat Online Visual Field Screening for Glaucoma"
Sean K. Wang[1], Robert T. Chang[1]
Department of Ophthalmology[1], Stanford University

"Thermosensory Neurons Maintain Homeostasis in *C. elegans*"
Virginia Wang[1], Sam Lasse[1], Miriam Goodman[1]
Department of Molecular & Cellular Physiology[1], Stanford University

"Emotion Regulation in Adolescents with Autism Spectrum Disorders"
Whitney Wells[1], Andrea Samson[2], Antonio Hardan[3], James Gross[2]
Departments of Human Biology[1], Psychology[2], and Psychiatry & Behavioral Science[3], Stanford University

"Optogenetic Stimulation of Motor Cortex Neurons Promotes Recovery After Stroke"
Wyatt J. Woodson[1,2], Michelle Y. Cheng[1,4,5], Eric H. Wang[1], Stephanie Wang[1], Guohua Sun[1], Alex G. Lee[3], Lief Fenno[2], Karl Deisseroth[2,3], Gary K. Steinberg[1,4,5]
Departments of Neurosurgery[1], Bioengineering[2], and Psychiatry[3], Stanford Stroke Center[4], and Stanford Institute for Neuroinnovation and Translational Neurosciences[5], Stanford University

"Neuroendocrine Tumor Cancer Stem Cells and Immunotherapies"
Rebecca Yanovsky[1], Julia Nguyen[1], Geoffrey W. Krampitz[2], Jeffrey A. Norton[2], Thomas M. Krummel[2], Irving L. Weissman[1]
Institute of Stem Cell Biology and Regenerative Medicine[1] and Department of Surgery[2], Stanford University

"Examining the Role of MYC in BCR-ABL- and RAS-Induced Lymphoma upon Oncogene Inactivation"
Christine Yost[1], Yulin Li[2], Dean Felsher[2]
Departments of Biology[1] and Division of Oncology (Departments of Medicine and Pathology)[2], Stanford University

To view the poster titles of previous Bio-X USRP participants, visit:

http://biox.stanford.edu/grant/urawards.html

Bio-X Undergraduate Research Program

2011 Bio-X Undergraduate Research Talks given by Stanford Faculty:

June 15
Fan Yang "Engineering biomaterials for directing stem cell differentiation and tissue regeneration"
Matthew Scott "Developmental biology and cancer"
Theo Palmer "New neurons in learning, memory and forgetting"

June 22
Gavin Sherlock "Watching yeast change: Using genomics to understand the adaptive landscape"
Hanlee Ji "Next generation human disease genetics through digital genome analysis"
Carlos Bustamante "Genomic insights into the great human diasporas"

June 29
Alan Cheng "Development and function of the mammalian cochlea"
James Chen "Zebrafish models of regeneration"
Serafim Batzoglou "When will everyone be sequenced?"
Aaron Straight "Organizing and segregating the genome"

July 6
Russell Fernald "How does behavior change the brain?"
Daniel Rubin "Imaging informatics: from pixels to biomedical meaning"
Richard Zare "Fun with nanoparticles"
Vijay Pande "Folding@home: Pushing the limits of molecular simulation"

July 13
Calvin Kuo "Gastrointestinal tissue engineering"
Chaitan Khosla "Biological Chemistry or Chemical Biology?"
Ron Levy "Using the immune system to treat cancer"
Jill Helms "Modeling the salamander: using developmental signals to enhance tissue regeneration"

July 20
Raphael Guzman "Intravascular stem cell therapy for experimental neonatal hypoxia"
Hongjie Dai "Nanomaterials for detection, imaging and therapy"
Paul Khavari "How cancers arise"
Antonio Hardan "Pivotal response group treatment studies for parents of young children with autism"

July 27
Carla Shatz "Releasing the brake on neural plasticity"
Julie Theriot "Mechanics and dynamics of cell motility"
Christina Smolke "Programming cellular behavior with RNA controllers"
Peter Maxim "Motion management in radiotherapy"

August 3
Marius Wernig "Direct induction of neuronal cells from fibroblasts"
Julien Sage "The RB gene family in stem cells and cancer initiation"
Bruce MacIver "Using EEG to measure loss of consciousness in fighter jet pilots"
Kalanit Grill-Spector "Neural basis of face, body, and object recognition in the human brain"

Bio-X Undergraduate Research Program

August 10
Yanmin Yang "BPAG1n4: a sensory neuron's sustainer"
Ben Barres "What do astrocytes do?"
Mary Teruel "Understanding PI3K signaling and variation in the control of fat cell function"
Sam Gambhir "Imaging cancer using molecular spies"

August 17
Steven Block "Single molecule biophysics"
Joe Wu "Clinical hurdles of pluripotent stem cell therapy"
Scott Delp "Dynamics of running"
Judith Frydman "Molecular origami: protein folding and misfolding in the cell"

Undergraduate Summer Research Program Participants 2010

Bio-X Undergraduate Research Program

2010 Bio-X Undergraduate Research Talks given by Stanford Faculty:

June 16
Jennifer Cochran "Engineered Protein Therapeutics and Diagnostic Agents Inspired by Nature"
Jill Helms "Saving the Cheerleader, Saving the World: What Can Regenerative Medicine Really Achieve?"
Paul Brown "3-D Digital Anatomy"

June 23
KC Huang "How Bacteria Get Into Shape"
Joseph Lipsick "Epigenetic Regulation by Proteins Encoded by Cancer Genes"
Liqun Luo "Studying Imprinting Chromosome by Chromosome in Mice"

June 30
Daphne Koller "Machine Learning for Systems Biology and Medicine"
Manpreet Singh "Prevention of Early Onset Bipolar Disorder: Clues from Genetics and Neurobiology"
Bruce MacIver "Using EEG to Measure Loss of Consciousness in Fighter Jet Pilots"

July 7
Vijay Pande "Folding@home: Pushing the Limits of Molecular Simulation"
Gerald Fuller "Creating a Cellular Pied Piper"
Tobias Meyer "Systems Biology of Cell Migration"

July 14
Shaul Hestrin "Definition of Cortical Circuits"
Marius Wernig "Direct Conversion of Fibroblasts to Neurons"
Michael Longaker "Stem and Progenitor Cell Recruitment Following Injury"

July 21
Theo Palmer "Stem Cell Therapies for Neurological Disease"
Fan Yang "Stem Cell and Biomaterials Engineering for Tissue Regeneration"
Matt Scott "Controlling Growth of the Cerebellum"

July 28
Suzanne Pfeffer "How the Golgi Works"
Joachim Hallmayer "The Genetics of Autism and Pervasive Developmental Disorders"
Richard Zare "Making Nanoparticles for Drug Delivery"
Annelise Barron "Toxic Granulocyte Peptides of Innate Immunity: Disease Culprits, Hiding in Plain Sight?"

August 4
Joseph Wu "Clinical Hurdles of Pluripotent Stem Cell Therapy"
Anne Brunet "Mechanisms of Aging and Longevity"
Karen Parker "Oxytocin Biology and the Social Deficits of Autism Spectrum Disorders"

August 11
Merritt Maduke "Inhibiting Chloride Transport: Why and How"
Jianghong Rao "Building Molecules to Spy on Cells"
Michael Clarke "Regulation of Self Renewal in Stem Cells"

August 18
Marc Levenston "Biophysical and Biochemical Cues in Controlling Cell Behavior"
Alan Pao "Development of a New Class of Aquaretics for the Treatment of Hyponatremia"
Karl Deisseroth "Optogenetics: Development and Application"

Bio-X Undergraduate Research Program

2009 Bio-X Undergraduate Research Talks given by Stanford Faculty:

June 24
Zev Bryant "Engineering Molecular Motors"
Sarah Heilshorn "Designing New Medical Materials for Stem Cell Transplantation"
Dmitri Petrov "Studies of Molecular Adaptation"

July 1
Miriam Goodman "Using *C. elegans* to Understand Pleasant and Painful Touch Sensation"
Geoff Gurtner "Understanding the Role of Progenitor Cell Mediated Repair Following Injury"
Cliff Wang "Evaluation of Combinatorial Gene Expression in Lymphocytes"

July 8
Carla Shatz "Brain Tuning"
Matthew Bogyo "Applications for Small Molecules in the Study of Protease Function"

July 15
Judith Frydman "Protein Folding and Misfolding in the Eukaryotic Cytosol"
Michael Longaker "Adipose-derived Cells for Skeletal Tissue Engineering"
Charles Taylor "Biomechanical Factors in Vascular Disease"

July 22
Kevan Yamahara "California Beach Sands - Reservoirs for Fecal Indicator Bacteria"
Margaret Fuller "Regulation of Self-renewal and Differentiation in Adult Stem Cell Lineages"
Suchi Saria "Towards Holistic Diagnostic Models"

July 29
Helen Blau "Bioengineering Stem Cell Fate"
Jill Helms "Wnt-mediated Tissue Regeneration"
Steve Quake "Turning the Spotlight to Dark Matter in Biology"

August 5
Matthew Scott "Genetic Control in Development and Disease"
John Huguenard "Dissecting Neural Circuitry One Cell at a Time"

August 12
Richard Zare "Cell, Cell, Cell!"
Michael Clarke "Molecular Regulation of Self Renewal"

August 19
Patrick Ng "Vaccines for the Treatment of Lymphomas"
Theo Palmer "Functional Roles for New Neurons in Old Neural Networks"
Raphael Guzman "Multimodality Imaging in Stroke Stem Cell Therapy"

August 26
Joachim Hallmayer "Genetics of Autism"
Kang Shen "Small Connections in Tiny Worms: Molecular Mechanisms of Synapse Formation"

Bio-X Undergraduate Research Program

Some student comments about the program:

2009 cohort

This program…gave me a chance to explore an area which I may not have otherwise explored. I am very grateful for the opportunity and the chance to hear speakers from such a diversity of fields.

- Philip Bulterys

The process of composing and presenting a poster was an experience that has made me a more well-rounded scientist. It is not enough to propose and carry out experiments if you cannot clearly and enthusiastically relate the findings to others in different fields.

- Xavier Gaeta

[The program] provided me the unique experience of formulating research questions and thinking critically about my project. I think that the Bio-X research program really affords students the opportunity to get a hands-on experience to apply concepts learned in classes in real-life situations and thereby buttress the material in textbooks.

- Debbie Lee

The program provided structure and support as I approached my research project last summer. I now realize that science is a collaborative effort, and it is sometimes important to reach out to peers and other labs when questions arise.

- Melanie Major

2010 cohort

Awesome! I have never thought that I would have a chance to talk to Professor Carla Shatz about my research. I have been to my friends' different research programs' poster sessions, but I really liked Bio-X the most because the audiences were more professional than the other undergraduate research programs. I was able to get really good comments and suggestions for my future research and had great conversations with different people. Also, just communicating with other people [about] my research was such a great experience.

- Minsuk Hyun

I will take away not only skills in many lab techniques, but also a better understanding of the patience and persistence that goes into scientific discovery. Honest and thorough research definitely takes time, finesse, and understanding.

- Claire Durkin

I learned the value of carefully planning future experiments in detail. The clearer the picture I have of what I am attempting to do will help me greatly in successfully carrying out my experiments and also [in] troubleshooting problems should any arise. I love to learn, and these seminars were action-packed with fascinating science. I especially appreciated how eclectic the range of topics was.

- Khang Dinh

Bio-X Undergraduate Research Program

2011 cohort

This program definitely showed me how hard it can be to come up with and execute an original project but also showed me some of the benefit that can occur from such hard work.

- Isaac Kauvar

The program reminded me of the excitement of pursuing an original research question and also of the significant amount of time and resources required to address such a question… Most of the methods and techniques that I learned are applicable to other areas of biomedical research.

- Michael Davies

I found my experience at the poster session to be especially gratifying. It was so wonderful to have other scientists at all different levels (undergrad students, grad students, postdocs, etc.) ask great questions that really made me reexamine my own project… In addition, I really enjoyed speaking with scientists who were genuinely interested in my project as it relates to their own project. It was great to be able to compare experimental techniques and talk about the aims, progress, and current results of each other's projects.

- Annie Tran

The program gave me a great appreciation for the sheer amount of research occurring just at Stanford. It was wonderful to be surrounded by peers who were all working on such interesting projects. I had definitely not been surrounded by such a motivated group of students in any previous grant program. The weekly lectures were very useful in providing me with directions and techniques to apply to my own project.

- Sam Lawrence

I gained valuable experience working in a lab, learning to think like a scientist, and having interactions with faculty, post docs, etc. who were very willing to talk about my project and were very supportive.

- Chen Lossos

The generosity of the Bio-X [program] helped me better understand (1) how research can be so rewarding and (2) what research looks like on a day-to-day basis. The foundation of Bio-X and of the USRP clarified how interdisciplinary yet focused modern research can be. I anticipate that my newly acquired familiarity with the laboratory environment and culture of research will contribute to the success of my future research endeavors.

- Andy Nguyen

One of the most rewarding parts of the program was the ability to hear from different professors from various scientific fields. It revolutionized the way I think about research as it demonstrated how interdisciplinary research and science are.

- Lily Saadat

The program taught me that scientific research is diverse, detailed, and rewarding.

- Edmund Posadas

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BIO-X

To learn more about the Bio-X program at Stanford, please visit the Bio-X website at:
http://biox.stanford.edu

Undergraduate Summer Research Program Participants 2009

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