

## Schedule of Events

8:15 am	<b>Registration &amp; Breakfast</b> Please check-in at the Registration table prior to entering Bret Harte Hall & Breakfast	9:47 am	UCSC's Pathway to Becoming a Research University <b>Barry Bowman</b> , MCDB
9:00 am	<b>Opening Remarks &amp; Brief Overview of the Day</b>	10:05-10:25	<b>Break. Poster presenters hang posters</b>
<b>Session 1: Seth Rubin, Moderator</b>		<b>Session 2: Susan Carpenter, Moderator</b>	
9:05 am	How do bacteria sense their environment to cause disease? <b>Diana Romero</b> , Auerbuch Stone Lab, METX	10:25-11:25	<b>First Group of New Faculty</b> From raw reads to genomic medicine, an overview of the Computational Genomics Lab <b>Benedict Paten</b> , BME  Development of immunological tools against cancer <b>Nathalie Scholler</b> , BME  Studying mRNA and protein surveillance on and around the ribosome <b>Joshua Arribere</b> , MCDB
9:12 am	Noncoding RNAs in stem cells and cancer <b>Daniel Kim</b> , BME	11:25	Decision-making in bacteria: Lessons from a successful environmental pathogen <b>David Zamorano-Sánchez</b> , Yildiz Lab, MICRO
9:19 am	Wnt signaling in prostate basal cell differentiation <b>Cory Horton</b> , Wang Lab, MCDB	11:32	A Puma is a Mountain Lion is a Cougar is a Mountain Screamer <b>Nedda Saremi</b> , Green Lab, BME
9:26 am	Investigating human telomerase dynamics using smFRET <b>Linnea Jansson</b> , Stone Lab, CBB	11:39	The molecular basis of sensing cell growth <b>Akshi Jasani</b> , Kellogg Lab, MCDB
9:33 am	Genetic conflict has shaped the activity of transposable elements throughout primate evolution <b>Jason Fernandes</b> , Haussler Lab, BME	11:46	The role of IL7Ra in innate immune cell development <b>Atesh Worthington</b> , Forsberg Lab, BME
9:40 am	PCH-2: an essential regulator of spindle checkpoint strength in large cells <b>Lénaïg Défachelles</b> , Bhalla Lab, MCDB	11:53	MuvB interacts with nearby nucleosomes to repress gene expression of cell cycle promoters <b>Anu Asthana</b> , Rubin Lab, CBB

12:00 pm-2:00	<b>Lunch &amp; Poster Session</b>		
<b>Session 3: Karen Ottemann, Moderator</b>			
2:00- 2:40 pm	<b>Keynote Talk: Adventures in Cell Biology: Discovery of the Phage Spindle and Nucleus</b> <b>Prof. Joe Pogliano, UCSD</b>	4:31 pm	Full-length characterization of transcript isoforms to investigate cancer-associated mutations <b>Alison Tang</b> , Brooks Lab, BME
2:40 pm	A Modern Twist on Classical Genetics: Auxin Induced Degradation of Conserved Nuclear Hormone Receptors <b>Londen Johnson</b> , Ward Lab, MCDB	4:38 pm	Domoic acid affects bacterial growth <b>Marilou Sison-Magnus</b> , MICRO/Ocean Sciences
2:47 pm	Structural Requirements for Broadly Protecting Antibodies to the Respiratory Syncytial Virus G Protein <b>Stas Fedechkin</b> , Dubois Lab, BME	4:45 pm	How we can infer synthetic lethality to find new vulnerabilities in cancer. <b>Thomas Matthew</b> , Stuart Lab BME
2:54 pm	Finding the needle in a haystack: The ramifications of an endogenous CHO protease in the production of an HIV Vaccine <b>Sophia Li</b> , Berman Lab, BME	4:52 pm	Predicting Individual Transfer RNA Gene Activity using Population Genomics <b>Bryan Thornlow</b> , Lowe/Corbett Labs, BME.
3:01 pm	Evolution of Heterochromatin Domains in <i>Caenorhabditis</i> <b>Braden Larson</b> , Strome Lab, MCDB	4:59 pm	Understanding the Editor's Choices: Investigations into Splice Site Recognition <b>Julia Lopez</b> , Zahler Lab, MCDB
3:08 pm	Nanopore sequencing of DNA and RNA <b>Miten Jain</b> , Akeson Lab, BME		Announcement of Poster Prize winners
3:15 pm	Comparative Analysis of IGF2BP3 RNA-binding Specificity <b>Julia Philipp</b> , Sanford Lab, MCDB		
<b>3:22-3:37</b>	<b>Break, 15 minutes</b>	5:15	Cocktails
<b>Session 4: Camilla Forsberg, Moderator</b>			
3:37- 4:17 pm	<b><u>New Faculty Session 2</u></b> Proteins: from repurposed toxins to extremozymes <b>Paul Blum</b> , MICRO  Functional Characterization of Natural Products <b>John MacMillan</b> , CBB	7:00	Dancing
4:17 pm	The role of long noncoding RNA GAPLINC in macrophage differentiation and inflammation <b>Apple Vollmers</b> , Carpenter Lab, MCDB		
4:24 pm	Role of a microbial natural product to detoxify bacterial cells of formaldehyde <b>Aswad Khadilkar</b> , MacMillan Lab, CBB		

## Biographies

### Keynote Speaker

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#### **Joe Pogliano, Professor, UC San Diego**

Joe Pogliano is a Professor of Biological Sciences at the University of California San Diego and cofounder of Linnaeus Bioscience Inc. He received B.S. degrees in Chemistry and Honors Biology from the University of Illinois, Champaign. He obtained a Ph.D. from Harvard Medical School where he studied cell division, outer membrane stress responses, antibiotic mechanism of action and protein secretion. As a postdoc at the University of California San Diego he studied cytoskeletal proteins involved in plasmid DNA segregation. He joined the UCSD faculty in 2003. Currently his lab focuses on using cell biological tools to study the recently discovered phage nucleus and to understand the mechanisms of action of new antibiotics. He and Kit Pogliano developed Bacterial Cytological Profiling (BCP) technology that provides a rapid method for screening for antibiotics and understanding their mechanisms of action and founded Linnaeus Bioscience, Inc. to commercialize this technology.



### New Faculty

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**Joshua Arribere, MCDB:** The Arribere Lab is a new lab in the MCDB department. We investigate the mechanisms by which cells repress unwanted or abnormal gene expression, so-called “quality control in gene expression.” Quality control protects cells from the harmful products of damage, stress, and errors, and failures in quality control are causally implicated in genetic diseases. The lab is focused on quality control at the level of RNAs and proteins, investigating several surveillance pathways that act on and around ribosomes. We use *C. elegans* as a model system, taking advantage of its powerful genetic and molecular biology tools (transgenesis, genetic screens, CRISPR/Cas9) coupled with computational approaches (e.g., deep-sequencing based analysis of gene expression). We are excited to learn how quality control mechanisms repress gene expression, as well as what quality control can teach us about ‘normal’ gene expression and regulation.

**Paul Blum, MICRO:** Dr. Paul Blum is a new Adjunct Professor in the Department of Microbiology and Environmental Toxicology. He is a microbiologist whose research program focuses on two topics: 1) therapeutic protein engineering and 2) genetics of microbial extremophiles with environmental applications. We use advanced protein engineering to create repurposed bacterial toxins for treating chronic pain. The extremophile projects involve synthetic biology studies of *Thermotoga maritima* (hyperthermophilic anaerobic bacterium) and evolutionary epigenetics of *Sulfolobus solfataricus* (thermoacidophilic archaeon).

**John MacMillan, CB3:** Dr. John MacMillan started as a Professor in the Department of Chemistry and Biochemistry in July 2017. Prior to UCSC, he was on the faculty of the Department of Biochemistry at the University of Texas Southwestern Medical from 2007 to 2017. His research program is focused on the discovery and functional characterization of natural products. The laboratory uses a variety of techniques, spanning synthetic chemistry, microbiology and molecular biology to probe and understand how natural products can be used as therapeutic agents (oncology and infectious disease) as well as to understand the endogenous role of these molecules. He is the leader of the NIH funded Center for High Content Functional Annotation of Natural Products that aims to develop and implement new methods to interrogate small molecules, particularly botanicals, dietary supplements and natural products.

**Benedict Paten, BME:** Dr. Benedict Paten is a new assistant professor in the Department of Biomolecular Engineering at UCSC. He directs the Computational Genomics Lab (<https://cgl.genomics.ucsc.edu/>), an interdisciplinary group of scientists, engineers and students within the UCSC Genomics Institute broadly focused on challenges in genome inference, big data, and precision medicine. Benedict was previously a postdoctoral scholar and then research scientist with Dr. David Haussler at UCSC. He did his graduate work with Dr. Ewan Birney at the European Bioinformatics Institute in Cambridge in the UK.

**Nathalie Scholler, BME:** Dr. Nathalie Scholler is a new Associated Adjunct Professor in the Department of Biomolecular Engineering at UCSC. She is Director of Cancer Immunology at SRI International, Menlo Park, CA, since 2013. Her laboratory is expert in screening yeast-display platforms to identify novel molecular tools (scFv recombinant antibodies and llama-derived

nanobodies) for cancer diagnostic and in vivo imaging. Her team also develops novel strategies based on the activation of adaptive and/or innate immunity to prevent ovarian cancer.

## *Lightning Talk Speakers*

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### **Session 1**

**Diana Romero, MICRO, Auerbuch Stone Lab:** I am a fourth year MICRO graduate student. I am currently studying how bacterial pathogens optimize the expression of the Type Three Secretion System in response to iron and oxygen availability. I am also interested in understanding the mechanism by which bacteria sense environmental changes during infection.

**Daniel Kim, BME:** The Kim lab aims to elucidate the functions of noncoding RNAs in stem cells and cancer using genomic and genome engineering technologies.

**Cory Horton, MCDB, Wang Lab:** I am a second year MCD graduate student. I use transgenic mouse models to study properties of prostate stem cells and their role in cancer development and progression. I am currently investigating the effect of aberrant Wnt signaling in basal stem cells. In my free time, I enjoy mountain biking and disc golfing in the beautifully diverse Santa Cruz wilderness.

**Linnea Jansson, MCDB Student, M. Stone Lab:** I am a fifth year MCD grad student working in the Stone lab. I am interested in the dynamics and conformational changes that occur during telomerase catalysis. When I am not thinking about telomerase (which is rarely) I enjoy hiking and camping and dogs.

**Jason Fernandes, BME, Genomics Institute, Haussler Lab:** I am a postdoc in David Haussler's "wet" lab directed by Sofie Salama. I'm interested in how evolution occurs on a molecular level. Specifically, I'm studying how battles between transposable elements and transcriptional repressors have shaped human-specific aspects of evolution. Besides the lab, I can probably be found at a journal club or talk where there is free food.

**Lénaïg Défachelles, MCDB, Bhalla Lab:** I am a third year postdoc. I'm interested in the Spindle Assembly Checkpoint, and I'm currently working to understand how its strength can depend on the size of the cell. I arrived here two years ago, from France, so when I'm not doing science I enjoy hiking, biking, and discovering California.

**Barry Bowman, MCDB:** With a B.A. from the University of Wisconsin-Milwaukee and a PHD from the University of Michigan, Barry Bowman focused on genetics and biochemistry. After postdoctoral training at Yale University he came to UCSC as an assistant professor in 1979. His research, in the Department of Molecular, Cell and Developmental Biology is devoted to understanding the internal structure of cells. He formally retired last year, but continues to be active in his research lab.

### **Session 2**

**David Zamorano-Sánchez, METX, Yildiz Lab:** I was born in Mexico city but grew up in the tropical city of Acapulco. I earned a bachelor's degree in Basic Biomedical Research and a PhD in Science from the "Universidad Nacional Autónoma de México". I moved to beautiful Santa Cruz in 2013 to work as a postdoc under the supervision of Fitnat Yildiz. My main research interests are bacterial genetics and signal transduction. My main life interests are my family, friends and sports.

**Nedda Saremi, BME, Greenpiro Lab:** I am a fourth year graduate student. I grew up in Southern California and preface any multi-lane thoroughfare with "the". I received my BS and MS in biochemistry at UC Riverside. After a few years of boiling salt treated plants in Nitric acid at the USDA, I ventured to Santa Cruz to study animal genomes. Outside of the sharktank, I play soccer, make wine floats, and watch The Bachelor.

**Akshi Jasani, MCDB, Kellogg Lab:** I am starting my fifth year in the MCD grad program. I am interested in understanding how yeast cells are able to coordinate their rate of growth as they progress through the cell cycle. We use a combination of various biochemical, genetics and microscopic techniques to investigate the underlying protein and lipid signals that help coordinate growth control to the cell cycle.

**Atesh Worthington, MCDB, Forsberg Lab:** I am a second year graduate student. I am interested in the differences between fetal and adult hematopoiesis and am currently investigating the role of different genes on the development of the innate immune system. I actually did my undergrad here at UCSC and loved it so much I came back for grad school! When I'm not in the lab, I'm either at a music show or in the water!

**Anu Asthana, CB3, Rubin Lab:** I'm a second year graduate student in CB3 and I'm interested in mechanisms involved in cell cycle gene expression. I'm currently studying how the MuvB complex regulates certain cell cycle promoters. Outside the lab, I like to hike, paint and cook.

### **Session 3**

**Londen Johnson, MCDB, Ward Lab:** I am a second-year MCD graduate student. I am interested in how gene regulation controls cellular behaviors during development. Currently, I am investigating how two conserved nuclear hormone receptors coordinate complex cellular events in parasitic and non-parasitic nematodes. Outside of the lab, I enjoy swimming, sewing, and riding my 650 cc V-Star cruiser.

**Stas Fedechkin, CB3, DuBois Lab:** I started my research career at Western Washington University, where I completed a master's degree focused on studying the structure and function of proteins involved in infection by *shigella flexneri*. I also studied the effects of oxidative damage on DNA and its effects on structure, dynamics and enzymatic repair. Currently, I'm studying the structure and function of viral attachment glycoproteins and their role in infection and pathogenesis of Respiratory Syncytial Virus. I enjoy cycling, surfing and hiking.

**Sophia Li, CB3, Berman Lab:** I'm a second year grad student in Phil Berman's lab. I did my undergrad at UCSD in bioengineering and worked in the pharmaceutical industry before coming back to school. Our lab focuses on enhancing the ability of an HIV vaccine to elicit broadly neutralizing antibodies and large-scale protein production necessary for immunizations and clinical trials. I've recently picked up skiing in the past few years and am looking forward to the snow this winter!

**Braden John Larson, MCDB, Strome Lab:** I am a third year MCDB PhD candidate. I am fascinated by the vast diversity of life. This drive to understand how animals and plants produce such a wide array of shapes has led me to study evolutionary developmental biology (Evo-devo). In the Strome lab I am investigating how heterochromatin domains change and evolve between species using *C. elegans* and its close relative *C. briggsae*. Outside of lab I am an Outreach Officer with UCSC WiSE, an entomologist, a bone collector, a succulent neglect-er, a karaoke-er, and a board gamer.

**Miten Jain, BME, Akeson Nanopore group:** I am a recent BMEB graduate/new postdoc. My research interests involve biological applications requiring DNA and RNA long reads, and understanding nucleotide modifications. I work on technology and software development, and then apply that to biological questions. My hobbies include music, radio shows, travel, and technology.

**Julia Philipp, MCDB, Sanford Lab:** I am a second year MCD graduate student. I'm interested in RNA bioinformatics, and am currently working to understand how RNA-protein interactions contribute to oncogenesis and alternative splicing.

### **Session 4**

**Apple Cortez Vollmers, MCDB, Carpenter Lab:** I am a second year graduate student. I am interested in characterizing the role of long noncoding RNAs in innate immunity, and currently am working to elucidate the mechanism of GAPLINC in regulating inflammatory response genes. In my free time, I enjoy watching John Wick, rock climbing, and spending time with my dog Kona.

**Aswad Khadiikar, Chemistry, Macmillan Lab:** I am a postdoctoral scholar with research interest in plant biochemistry, cancer biology and natural products that have promising biological activity. Currently, I am studying a novel mechanism of formaldehyde detoxification that utilizes induction of reactive natural products upon formaldehyde stress followed by a non-enzymatic nucleophilic dimerization with formaldehyde to render formaldehyde inactive. When I am not doing science I am cooking dishes from global cuisine or camping in the wilderness.

**Alison Tang, BMEB, Brooks Lab:** I'm looking at altered splicing in SF3B1 mutated CLL samples using ONT long reads and Illumina short reads. I'm interested in understanding/using/developing long read and Hybrid-seq methods to make biological discoveries in cancers, among other genetic diseases. I like hiking, doing jigsaw puzzles, and drinking pearl milk tea.

**Marilou Sison-Mangus, MICRO/Ocean Sciences:** I am an assistant professor at the Ocean Sciences Department. I study the evolutionary and ecological roles of environmental and host-associated microbiomes using diatom and zooplankton as hosts systems. One of the key areas being investigated in my lab is the chemical and molecular synthesis of the neurotoxin, domoic acid, in the marine diatom *Pseudo-nitzschia*. In my free time, I read sci-fi books and watch cartoons and animé.

**Thomas Matthew, BME, Stuart Lab:** I want to find more druggable targets in cancer. I use a variety of molecular clues and some computational power to infer the presence synthetic lethality -- or gene products that cause death in a particular cancer cell. When I'm not searching for targets, my wife and I are looking for the tastiest sushi in the Bay Area and beyond!

**Bryan Thornlow, BME, Lowe/Corbett Labs:** I am a second year BME graduate student. I'm interested in the evolution and regulation of non-coding RNA genes, particularly human transfer RNAs, and am currently exploring correlations between variation in tRNA flanking regions and tRNA gene activity, in the absence of gene expression data. When I'm not doing science, I enjoy listening to music, watching basketball and playing board games.

**Jessie MNG Lopez, MCDB, Zahler Lab:** After initially training as an illustrator, and a first career in K-8 special education, I made the jump to biology. I attended Cal State Northridge where I studied a neuronal pathway that directs a protective sleep-like behavior in worms. For my master's degree, I worked on an effort to grow stem cells into oligodendrocytes as a treatment for white matter stroke. Currently, I am studying the spliceosome, a large, complex molecular machine which edits mRNA transcripts prior to their export from the nucleus. I am looking at how the spliceosome decides where to cut the boundaries between exons and introns. When not in lab I enjoy karaoke, making art, and hanging out with my dog.

## THANK YOU!

The 2017 PBSE Research Conference Planning Committee would like to thank the many individuals, organizations, and departments whose efforts have made this event a success!

### Generous Donors

*Lindsay Hinck, Ph.D.*

Professor, Molecular, Cell and Developmental Biology and Director, Institute for the Biology of Stem Cells

### 2017 PBSE Research Conference Faculty Planning Committee

Karen Ottemann, METX (Lead), Susan Carpenter, MCDB, Camilla Forsberg, BME, Seth Rubin, CBB

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