

2020 RESEARCH CONFERENCE

Program in Biomedical Sciences & Engineering

UNIVERSITY OF CALIFORNIA, SANTA CRUZ



Held virtually

<https://ucsc.zoom.us/j/98824401581>

September 10, 2020, 9:00am - 1:30pm

Schedule of Events

- 8:50 AM **Sign-On (<https://ucsc.zoom.us/j/98824401581>)**
Please make sure your microphone is muted when logging on.
- 9:00AM **Welcome by PBSE Retreat Planning Committee**
- 9:15AM **New Faculty: Carol Greider, Ph.D.**
Distinguished Professor, MCDB
"Telomere Length Regulation"
- 9:30AM **New Faculty: Shaheen Sikandar, Ph.D.**
Assistant Professor, MCDB
"Understanding Functional Heterogeneity in Normal and Cancer Cells"
- 9:45AM **New Faculty: Michael Patnode, Ph.D.**
Assistant Professor, MICRO/METX
"Dietary Control of Interbacterial Competition in the Human Gut Microbiota"
- 10:00AM **Keynote: George M. Church, Ph.D.**
Professor of Genetics, Blatnavik Institute, Harvard Medical School
"Bioengineering from yoctogram to exagram"
- 11:00AM *15-minute break*
- 11:15AM **New Faculty: Sarah Loerch, Ph.D.**
Assistant Professor, CB3
"Structural Basis of Translational Control"
- 11:30AM **Haley Halasz, MCDB Grad Student, Carpenter Lab**
"Using High-throughput CRISPR screens to identify lncRNAs that control inflammation"

Schedule of Events

- 11:35AM **Carlos Diaz-Castillo, MICRO, Chamorro-Garcia Lab**
"Designing analytical approaches sensitive to genome compartmentalization and population diversity for epigenetic studies"
- 11:40AM **Lucas Seninge, BMEB, Haussler/Stuart Labs**
"Interpretable perturbation prediction in single-cell transcriptomics using deep learning"
- 11:45AM **Colin Kelly, CB3, Lokey Lab**
"Hundreds of membrane permeable lariat peptide scaffolds derived from mass-encoded libraries reveal an untapped chemical space"
- 11:50AM *15-minute break*
- 12:05PM **Kevin Johnson, MICRO, Ottemann Lab**
"Identification of ligands that block the normal chemotaxis response of an H. pylori immunomodulatory chemoreceptor"
- 12:10PM **Angela Amorello, CB3, Jurica Lab**
Title TBD
- 12:15PM **Stevie Nystrom, MCDB, Ares Lab**
"Hyperstabilizing the extended duplex between U2 snRNA and the pre-mRNA branchpoint region influences branchpoint usage"
- 12:20PM **Jordan Eizenga, BMEB, Paten Lab**
"Transcription analysis with spliced variation graphs"
- 12:30PM **Virtual Poster Session**
See pages 5-11 for detailed list of poster presentations.
A continuously-updated version is available [here](#).

Keynote Speaker

George M. Church, Ph.D.

Professor of Genetics, Blavatnik Institute, Harvard Medical School
Director of HMS NHGRI-Center of Excellence in Genomic Science
Director of the Personal Genome Project
Broad Institute & Wyss Harvard Institute of Biologically
Inspired Engineering



Church Lab: <http://arep.med.harvard.edu/gmc/>

This year's keynote speaker is George M. Church, Ph.D. He is a Professor of Genetics at Harvard Medical School and Director of PersonalGenomes.org, which provides the world's only open-access information on human Genomic, Environmental & Trait data (GET).

His 1984 Harvard PhD included the first methods for direct genome sequencing, molecular multiplexing & barcoding. These led to the first genome sequence (pathogen, *Helicobacter pylori*) in 1994. His innovations have contributed to nearly all "next generation" DNA sequencing methods and companies (CGI-BGI, Life, Illumina, Nanopore). This plus his lab's work on chip-DNA-synthesis, gene editing and stem cell engineering resulted in founding additional application-based companies spanning fields of medical diagnostics (Knome/PierianDx, Alacris, AbVitro/Juno, Genos, Veritas Genetics) & synthetic biology/therapeutics (Joule, Gen9, Editas, Egenesis, enEvolv, WarpDrive).

He has also pioneered new privacy, biosafety, ELSI, environmental & biosecurity policies. He is director of an IARPA BRAIN Project and NIH Center for Excellence in Genomic Science.

His honors include election to NAS & NAE & Franklin Bower Laureate for Achievement in Science. He has coauthored 537 papers, 156 patent publications & one book (Regenesis).

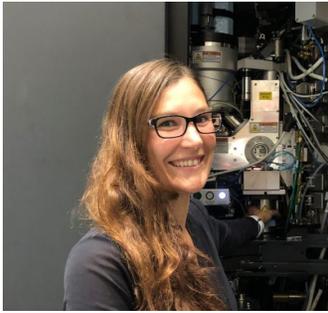
Welcome New PBSE Faculty!



Carol Greider, Ph.D.

Distinguished Professor, MCD Biology

Dr. Greider comes to us from Johns Hopkins University. She studies telomeres, critical structures that sustain the ends of chromosomes, and telomerase, the enzyme that maintains telomere length/sequence integrity.



Sarah Loerch, Ph.D.

Assistant Professor, Chemistry & Biochemistry

Dr. Loerch comes to us from postdoctoral training in Dr. Niko Grigorieff's lab at Janelia Research Campus. She studies translational regulation, or how a cell instructs ribosomes to make the right protein at the right time and in the right place.



Michael Patnode, Ph.D.

Assistant Professor, Microbiology & Environmental Toxicology

Dr. Patnode comes to us from postdoctoral training in Dr. Jeffrey Gordon's lab at Washington University at Saint Louis. His research studies syntropic relationships among members of the human gut microbiota as it relates to carbohydrate metabolism.



Shaheen Sikandar, Ph.D.

Assistant Professor, MCD Biology

Dr. Sikandar comes to us from postdoctoral training in Dr. Michael Clarke's lab at Stanford University. Her lab tackles questions pertaining to functional consequences of heterogeneity in stem cells in normal and cancer tissues.

Poster Session

Stephanie Aguiar, CB3 Grad Student, Chamorro-Garcia Lab

Title: Investigating the effect of in utero exposure to arsenic in metabolic disruption and inflammation

Zoom: <https://ucsc.zoom.us/j/96191233629>

Bio: I am a second year MCD PhD student working in the Chamorro-Garcia Lab in collaboration with the Forsberg lab. My research explores the developmental effects of in utero arsenic exposure while focusing on metabolic disruption and inflammation. When I'm not in the lab I enjoy running/hiking, playing ukulele, and hanging with my two cats, Coffee and Lemon.

Paola Angulo, Junior Specialist, Haussler/Salama Labs

Title: Unraveling the role of retrotransposons and KRAB zinc finger protein in early embryonic development across primates

Zoom: <https://ucsc.zoom.us/j/6045967514>

Bio: I am a 2nd year Junior Specialist in the Haussler/Salama Lab. My research focuses on retrotransposon, KRAB zinc finger proteins, and early embryonic development across primates. During my free time, I love to play soccer and fantasize about where I can travel after the pandemic.

Carlos Arevalo, MCDB Undergrad Student, Brooks Lab

Title: Characterizing and validating U2AF1 S34F-associated novel transcript isoforms

Zoom: <https://ucsc.zoom.us/j/98787983193>

Bio: I am a senior MCDB student working in Dr. Angela Brooks' lab. My research focuses on U2AF1 S34F, one of the most recurrent splicing factors mutations in lung adenocarcinoma, and the drivers events of cancer. When I am not in the lab I enjoy either go for a run or read a book.

Alex Bagi, BMEB Grad Student, Lowe/Haussler Labs

Title: tRNA and tRNA-derived small RNA Changes in Human Cortical Neurogenesis

Zoom: <https://ucsc.zoom.us/j/95569776817>

Bio: I am a 3rd year BME student co-advised in Todd Lowe's and David Haussler's labs. My research explores tRNAs and their non-translation roles in early neural development through cortical organoids, tRNA sequencing, and machine learning. I enjoy camping and hiking with my corgi (Jace).

Amit Behera, Postdoc, Brooks Lab

Title: Identification of chromatin-splicing cross-talks induced by U2AF1-S34F to regulate cancer associated pathways

Zoom: <https://us02web.zoom.us/j/7599177938?pwd=SmZQNXYvVmtuNGpOR01TYWY4WGhMZz09>

Bio: I joined Brooks Lab as a postdoc this year in February. My previous research experience is mostly from JNCASR, Bangalore, India (doctoral and post-doctoral) in Molecular and Cell Biology with cancer and cellular differentiation models. Currently, I am focusing on investigating molecular details of cross-talks among chromatin, transcription and splicing events in the context of lung cancer with integration of functional genomics, molecular and cell biology.

Poster Session

Xian Chang, BMEB Grad Student, Computational Genomics Lab

Title: Giraffe: a short read mapper for genome graphs

Zoom: <https://ucsc.zoom.us/j/99234904101>

Bio: I am a fourth year BME student in the Computational Genomics Lab. I'm working on a project called vg, which aims to add variation to the human reference genome. Whereas a conventional reference genome represents just one copy of a genome, our representation contains sequences from a collection of genomes and will better reflect the genetic diversity of the human population.

Cecilia Cisar, BMEB Grad Student, Paten Lab

Title: Development of Pipelines for HuBMAP Spatial Transcriptomics Data

Zoom: <https://ucsc.zoom.us/j/8275710134>

Bio: I am a 2nd year BMEB student in Benedict Paten's lab, and my current research focuses on spatial transcriptomics. Outside of the lab I enjoy playing videogames and baking.

Daniel Droege, CB3 Grad Student, Johnstone Lab

Title: Progress towards an iron-porphyrin-based antidote for carbon monoxide poisoning

Zoom: <https://ucsc.zoom.us/j/96545109666>

Bio: I am a 3rd-year Chemistry and Biochemistry student working in the Johnstone lab. My research focuses on using iron porphyrins as an antidote for carbon monoxide poisoning. When I'm not in the lab, I enjoy hiking with my family.

Meghan Durham, MCDB Grad Student, Brooks Lab

Title: Using CRISPR/Cas9 to Identify Oncogenic Aberrant Splicing Events in Lung Adenocarcinoma

Zoom: <https://ucsc.zoom.us/j/4172952810>

Bio: I'm a fourth year MCD student in Angela Brooks's lab. The goal of my research is to find new cancer driver mutations that result from aberrant exon skipping in lung adenocarcinoma. I study this by using CRISPR/Cas9 targeting splice sites to force exon skipping events. When I'm not in lab, I enjoy hiking, backpacking, and finding delicious food to make.

Natalie Filippi, Junior Specialist, Haussler/Salama Labs

Title: Evolutionary arms races impact species specific phenotypes

Zoom: <https://us02web.zoom.us/j/5449967256?pwd=Y21NbnBvVloxazRDK3RsNEc0Zi9rdz09>

Bio: I'm a recent graduate working in the Haussler-Salama Lab. I study the evolutionary arms race of transposable elements and KRAB zinc-fingers, specifically ones that occur in the primate lineage. A fun fact about me is that during quarantine, my housemates and I decided to foster dogs.

Poster Session

Henry Gong, BMEB Grad Student, Stuart Lab

Title: Blockchain based data sharing platform for single cell and COVID-19 data

Zoom: <https://ucsc.zoom.us/j/92834058499?pwd=TIVJcDIEeWJITldPckFmVExBb3Y1QT09>

Bio: I am a 5th year BMEB student in Josh Stuart's lab, with research interested in single cell genomics and data sharing. My hobbies include board games and bicycle repair.

Ryan Hoffman, MCDB Grad Student, Haussler/Salama Lab

Title: Assembly of lateral ventricle forebrain organoids

Zoom: <https://ucsc.zoom.us/j/4681502413>

Bio: My research is focused on, what I like to call, the negative space of human brain development. Much like in art, negative space refers to the space around and within the subject of focus. For me, that subject is cerebral brain development and the negative space that shapes the brain is the ventricular-cerebrospinal fluid system. Other than research, I am an avid traveler #vanlife, a jazz guitarist, and I make my own clothes.

Austin Hopiavuori, CB3 Grad Student, McKinnie Lab

Title: Investigating DabC: A Unique C-C Bond Forming Dioxygenase Involved in Algal Neurotoxin Biosynthesis

Zoom: <https://ucsc.zoom.us/my/ahopiavuori>

Bio: I am a 2nd year PhD student from Rochester, New York and my research focuses on biosynthetic pathway validation of neurotoxin-producing microalgae and structural/mechanistic interrogation of key enzymes within these pathways that perform interesting chemical transformations. Outside of the lab I enjoy tennis and playing various musical instruments.

Ti Lam, MCDB Grad Student, Kimmey/Partch Labs

Title: Heat-killed Streptococcus pneumoniae resets circadian clock of mouse lung fibroblasts via induction of clock protein PER2

Zoom: <https://ucsc.zoom.us/j/5760716686>

Bio: I am a second year MCD student, a member of Kimmey Lab in the METX department, and I am co-mentored by the Partch Lab in the CB3 department. My research focuses on the interplay between circadian rhythms, innate immunity and susceptibility to bacterial infection. In my free time, I enjoy cooking, journaling, and getting boba milk tea.

Cindy Liang, MCDB Grad Student, Brooks Lab

Title: Investigating the functional importance of aberrant isoforms in lung cancer

Zoom: <https://zoom.us/j/7382216583?pwd=ekFaNSs1U1I4bmluNnA1UGxSSjVPdz09>

Bio: I am a rising 3rd year MCD student in the Brooks lab. My research focuses on understanding how errors in the cell's splicing machinery may contribute to tumorigenicity. When I'm not in the lab, I make digital art focused on fantasy character design.

Poster Session

Brent Lindquist-Kleissler, CB3 Grad Student, Johnstone Lab

Title: Elucidating the Structure of Pentaphenylantimony

Zoom: <https://zoom.us/j/9769564387?pwd=3DK1JxVTlhY3ZpaWE0MElwdnFmYWVWRkQT09>

Bio: I am a 3rd year Chemistry student working in Tim Johnstone's lab. My research focuses on the synthesis and characterization of pentavalent antimony compounds with applications towards neglected tropical diseases. When I am not in the lab I love exploring nature on my bike or by foot.

Yueli Lily Liu, Postdoc, Wang Lab

Title: Modulation of the canonical Wnt activity by androgen signaling in prostate epithelial basal stem cells

Zoom: <https://zoom.us/j/7871614323>

Bio: I am a postdoc from Zhu Wang's lab. My research focuses on Wnt and AR signaling in prostate epithelial basal stem cells. I like painting, playing piano, biking on the flat road, patting cats and dogs during my free time.

Aidan Manning, BMEB Grad Student, Lowe Lab

Title: Nucleotide-resolution mapping of tRNA modifications using next-generation sequencing

Zoom: <https://ucsc.zoom.us/j/97804877650>

Bio: I am a 3rd-year BMEB student working in Todd Lowe's lab. My research focuses on developing a deeper understanding of the dynamics of tRNAs and tRNA-derived small RNAs and how dysregulation of these play roles in cancer progression. When I am not in the lab, I enjoy hiking, cooking, and cycling.

Francisco Mendez Diaz, MCDB Grad Student, Kellogg Lab

Title: Control of Cell Growth and Size

Zoom: <https://ucsc.zoom.us/j/98483012853?pwd=NWtkQ3VWNHkZkdWRyUEM5T0VJSmJ6UT09>

Bio: I am a fifth-year Ph.D. candidate in the MCD Biology track. I am currently in the Kellogg Lab, where we are interested in how cells control and measure their own growth and size. More specifically, we are interested in determining how cells coordinate the events that control growth with the progression of the cell cycle. To answer our research questions, we use budding yeast as our model of study. When I'm not in the lab, I love to spend my time with my wife Araceli and my daughter Isabel. I also enjoy watching baseball and going on family road trips.

Henry Moore, Undergrad Student, Lowe Lab

Title: Inferring and Visualizing RNA Modifications in Deep Sequencing Data

Zoom: <https://ucsc.zoom.us/j/4333506112>

Bio: I am going into my fourth year as a BME undergrad in Todd Lowe's lab. My research focuses on how tRNA modifications present themselves through misincorporated bases in deep sequencing data. When I'm not in the lab, I like to go mountain biking and I grow carnivorous plants.

Poster Session

Dennis Mulligan, BMEB Grad Student, Brooks Lab

Title: MESA: A Tool for Junction-Based Splicing Quantification

Zoom: <https://ucsc.zoom.us/j/98976283962>

Bio: I am a BME student in Angela Brooks' lab, transitioning from the MS to the PhD program. I develop computational tools for analyzing transcriptome sequencing data, specifically mRNA splicing, with applications for understanding cancer. Outside of my research, I like to spend time playing with my young kids. Before going to college I worked as a chef in San Francisco.

Gian Carlo Parico, CB3 Grad Student, Partch Lab

Title: A Tail of Night Owls: How the CRY1 tail regulates circadian rhythms

Zoom: <https://ucsc.zoom.us/j/93914081679>

Bio: I am a 5th year CB3 student in Carrie Partch's lab. My research focuses on how protein-protein interactions lead to 24-hour timekeeping within our cells. I am a current HHMI Gilliam Fellow (along with 3 other students in UCSC) and we are heavily invested in diversity and inclusion in the STEM field. Other than science and outreach, I love sharing my enjoyment of superheroes with my 3 year old son and 3 month old daughter.

Francesca Pavlovici, CB3 Grad Student, Millhauser Lab

Title: Prion Disease Research in the Millhauser Lab

Zoom: <https://ucsc.zoom.us/j/96782455342>

Bio: I am a 2nd-year CB3 student working in Glenn Millhauser's lab. My research focuses on elucidating novel pathogenic mechanisms of the prion protein by using NMR and EPR. When I'm not in the lab, I'm teaching Zumba!

Alessandra Rodriguez y Baena, MCDB Grad Student, Forsberg Lab

Title: Blood for life

Zoom: <https://ucsc.zoom.us/j/97743377784>

Bio: I am a third-year MCD student working in the Forsberg Lab. My research focuses on understanding inflammation-induced platelet differentiation and determining targets for reversing or delaying hematopoietic aging. I recently received a pre-doctoral fellowship from the Tobacco-Related Disease Research Program to study how nicotine causes hematopoietic stem cell dysfunction leading to an increased risk for cardiovascular diseases. When I am not in the lab, I enjoy trying new foods, spending time with family and friends, and investigating how I can adopt a pet raccoon.

Brandon Saint-John, BMEB Grad Student, Brooks Lab

Title: Add-seq: a novel method for detecting chromatin accessibility across long-ranges with nanopore sequencing

Zoom: <https://ucsc.zoom.us/j/95275676250?pwd=SURHNVFnL1ZsQk96aXFPSkJaZHRtUT09>

Bio: I'm a fifth year Ph.D Student interested in developing methods with long-read sequencing technologies. Outside the lab, as a Virginia native, I like to bike and explore various places across the Bay Area. I also enjoy rock climbing and surfing.

Poster Session

Mays Salih, MCDB Grad Student, Carpenter Lab

Title: HnRNP-A2/B1, an RNA processing protein as a novel regulator of the innate immune response

Zoom: <https://ucsc.zoom.us/j/95090122113?pwd=cDRWc3UrWVliQ0l4Y3ZiWStTcjlrZ09>

Bio: I am a third year graduate student at the Carpenter lab. In the lab I study the innate immune response regulation, outside of the lab I spend my time playing with my 5 year old son and we enjoy baking together.

Kayla Schimke, BMEB Grad Student, Vollmers Lab

Title: Identifying isoform-specific allelic imbalance in Drosophila interspecific hybrids with long-read RNA sequencing

Zoom: <https://ucsc.zoom.us/j/9010865180>

Bio: I am a second year BMEB student in the Vollmers lab. My research focuses on using long read technology to capture full length isoforms for a more complete transcriptome. Outside of research I have many hobbies, including photography, crafting and exploring.

Michelle Seiwald, Junior Specialist, Ares Lab

Title: A mutation in pre-ribosomal RNA processing factor NOB1 suppresses the temperature sensitive growth defect of a U2 snRNA branchpoint-interacting stem loop mutation

Zoom: <https://ucsc.zoom.us/j/93497710550>

Bio: I am a junior research specialist in the Ares Lab, and my research focuses on the mechanisms of splicing. Outside of my research, I like aquascaping, drawing, and going to the beach with my dog.

Becca Spangler, CB3 Grad Student, Ward/Partch Labs

Title: A Worm's Perspective on Early Birds: Exploring the Link between Conserved Biological Timing Mechanisms

Zoom: <https://us02web.zoom.us/j/83811741806?pwd=OVZTWIVZSVk5QVYxdUdpeGFTQzBmQT>
passcode: worms

Bio: I am a third year student being co-mentored by Carrie Partch and Jordan Ward. My research focuses on studying the biochemical characteristics of proteins known to be essential for temporal coordination of *C. elegans* development, LIN-42 and NHR-23. My dog's name is Mowgli and he wants to be your friend.

Carrie Tambo & Peter Ngoi, CB3 Grad Students, Rubin Lab

Title: Biochemistry, the Cell Cycle, and the Rubinites

Zoom: <https://ucsc.zoom.us/j/99385264884>

Bios: *Peter:* I am a 2nd year CB3 student working in Seth Rubin's lab. My research focuses on degradation mechanisms of cell cycle transcription factors. When I'm not in the lab I enjoy exploring new places and walking my dog. *Carrie:* I am a 5th year graduate student working on the G1/S phase transition of the cell cycle, specifically the mechanism and regulation of Cyclin Dependent Kinases and their Cyclin binding partners. When not in the lab, I am on a food/cooking adventure or at the beach with my dogs.

Poster Session

Alison Tang, BMEB Grad Student, Brooks Lab

Title: Creating a variant-aware isoform detection pipeline for nanopore sequencing reads

Zoom: <https://ucsc.zoom.us/j/8609650109>

Bio: I am a 5th year BME student in Angela Brooks lab. I'm developing computational methods for nanopore sequencing to help investigate the relationship between A-to-I editing, alternative splicing, and tumorigenesis. Besides research, I enjoy hiking, playing ping pong poorly, and eating Asian food.

Qiuxia Tang, BMEB Grad Student, Lowe Lab

Title: Discovery of a novel role for tRNA genes in the regulation of VAC14 transcription

Zoom: <https://ucsc.zoom.us/j/93140302168>

Bio: I am a 3rd year BME student working in Todd Lowe's lab. My research focuses on tRNA gene transcriptional interference for the nearby protein-coding genes. When I'm not in the lab, I enjoy hiking and cooking.

Tiffany Thisner, MCDB Grad Student, Kimmey Lab

Title: Dual RNA-Seq of *Streptococcus pneumoniae* in Blood

Zoom: <https://ucsc.zoom.us/j/91476642474>

Bio: I'm a 2nd year MCD student in the Kimmey Lab. My research focuses on host-pathogen factors that influence variability in infection outcome. Outside of lab, I enjoy adventuring, making art, and chilling at home watching movies.

Alexis Thornton, BMEB Grad Student, Brooks Lab

Title: Using Expression-based Variant Impact Phenotyping (eVIP) to Characterize Cancer Variants

Zoom: <https://ucsc.zoom.us/j/6739272537>

Bio: I'm a 4th year BME student in Angela Brooks' lab. My research focuses on predicting the functional impact of somatic mutations in cancer using RNA-seq data. I enjoy surfing, cycling, and photography.

Kate Voitiuk, BMEB Grad Student, Haussler Lab

Title: Remote-controlled electrophysiology platform for long-term organoid recording and stimulation experiments

Zoom: <https://ucsc.zoom.us/j/2381272761>

Bio: I am a 2nd-year BMEB student in the Haussler Lab. My research involves creating hardware and software to connect neural tissues to computers. The goal is to study how computation, memory, and learning is performed in the brain through massively scalable software-driven experiments on 3D neural cell cultures. I also enjoy hiking, reading science fiction, and philosophy.



Thank you to our Research Conference Planning Committee!

Vicki Auerbuch-Stone, Professor, METX/MICRO

Russ Corbett-Detig, Professor, BMEB

Theo-Alyce Gordon, Graduate Advisor, BMEB

Rohinton Kamakaka, Professor, MCDB

Grace Kistler-Fair, Graduate Advisor, MCDB

Karen Meece, Graduate Advisor, CB3/CHEM

Seth Rubin, Professor, CB3/CHEM

Travis Wiggans, Department Manager, METX/MICRO

**We look forward to seeing you all again
next year, when we are hopefully back at
our usual venue: Roaring Camp!**



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