

QCBio Research Talks: Thank you to all presenters!

Fall 2020

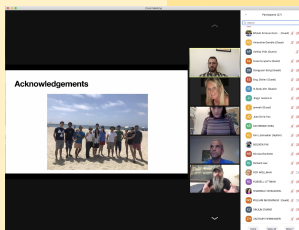
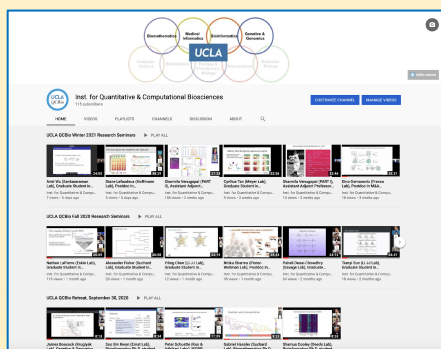
Fridays 11:00am & 11:30am

- **Dongyang Song** (Li JJ)
- **Ning Wang** (Hoffmann)
- **Marc Creixell** (Meyer)
- **Christa Caggiano** (Zaitlen)
- **Marta Shocket** (Savage)
- **Nicholas Bayley** (Graeber)
- **Henan Zhu** (Graeber & Nathanson)
- **Leihao Wei** (Hsu)
- **Arash Bellafard** (Golshani)
- **Nan Miles Xi** (Li JJ)
- **Tianyi Sun** (Li JJ)
- **Paheli Desai-Chowdhry** (Savage)
- **Yiling Chen** (Li JJ)
- **Nitika Sharma** (Pinter-Wollman)

Winter 2021

Fridays 11:00am & 11:30am

- **Dino Osmanovic** (Franco)
- **Sharmila Venugopal**, Faculty
- **Cyrillus Tan** (Meyer)
- **Tevfik Umut Dincer** (Ernst)
- **Iris Dror** (Plath)
- **Ariel Wu** (Sankararaman/Eskin)
- **Diane Lefaudeux** (Hoffmann)
- **Ivy Xiong** (Garfinkel)
- **Marcus Gallagher-Jones** (Rodriguez)
- **Nicolas Rochette** (Campbell-Staton)
- **Kexin Li** (Li JJ)
- **Igor Nikolskiy** (Wollman)
- **Maria Izabel Alves Cavassim** (Lohmueller)
- **Amandine Gamble** (Lloyd-Smith)
- **Will Shoemaker** (Garud)
- **Katherine Sheu** (Hoffmann)
- **Ali Pazokitoroudi** (Sankararaman)
- **Sam Christensen** (Roper)
- **Alexander Markowitz** (Boutros)



Spring 2021

Fridays 11:00am & 11:30am
4/2/21 to 6/4/21

Would you like to sign up to present your work In the Spring Quarter?

Please send an email at

QCBoffice@lifesci.ucla.edu

We will let you know what dates are still available

Check out our archived
videos:

- On the QCBio Website
<https://qcb.ucla.edu/events/list/?eventDisplay=past>
- On the QCBio YouTube Channel
https://www.youtube.com/channel/UCokAYrif_TaziPtmm614-5A

Prominent publications by QCBio Labs in 2020



❖ On Sleep

- **Don Vaughn's Time Magazine article:** "Why Do We Dream? A New Theory on How It Protects Our Brains"
- **Savage Lab:** Unraveling why we sleep: Quantitative analysis reveals abrupt transition from neural reorganization to repair in early development

❖ On Diagnosing Complex Diseases

- **Boutros Lab:** Sex differences in oncogenic mutational processes
- **Yang Lab:** Multitissue Multiomics Systems Biology to Dissect Complex Diseases
- **Zhou Lab:** Rapid diagnosis and comprehensive bacteria profiling of sepsis based on cell-free DNA
- **Sul Lab:** Contribution of common and rare variants to bipolar disorder susceptibility in extended pedigrees from population isolates
- **Hsu Lab:** Discovering and interpreting transcriptomic drivers of imaging traits using neural networks

❖ On Human Variation and Diversity

- **Ernst Lab:** ConsHMM Atlas: conservation state annotations for major genomes and human genetic variation
- **Chou Lab:** Diversity in biology: definitions, quantification and models

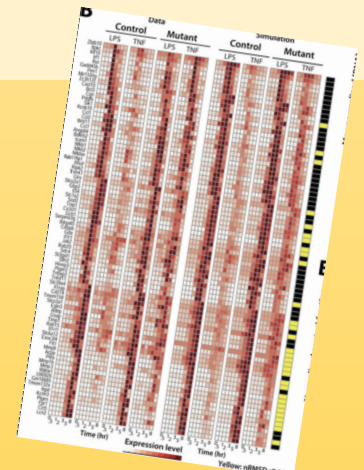
❖ On Aging

- **Pelligrini Lab:** The Epigenetic Pacemaker: modeling epigenetic states under an evolutionary framework
- **Sehl Lab:** The Effects of Anti-retroviral Therapy on Epigenetic Age Acceleration Observed in HIV-1-infected Adults
- **Jamshidi Lab:** Metabolome Changes during *In Vivo* Red Cell Aging Reveal Disruption of Key Metabolic Pathways

Click on the titles to read the full articles

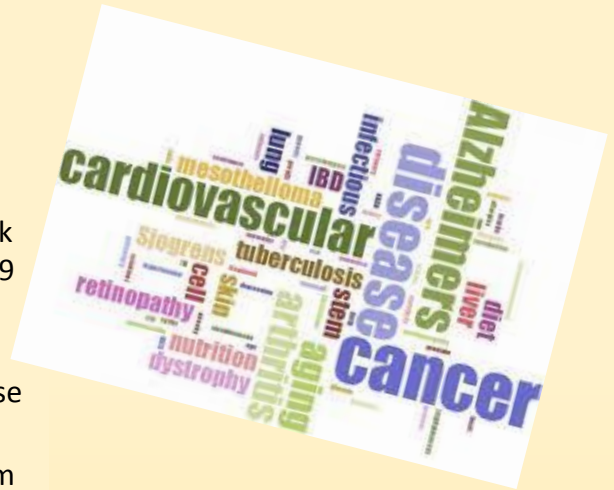
❖ On Cancer Research

- **Boutros Lab:** A practical guide to cancer subclonal reconstruction from DNA sequencing
- **Hoffmann Lab:** An incoherent feedforward loop interprets NF κ B/RelA dynamics to determine TNF-induced necroptosis decisions
- **Li Lab:** DORGE: Discovery of Oncogenes and tumor suppressor genes using Genetic and Epigenetic features



❖ On COVID Research

- **Lloyd-Smith Lab:**
 - Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1
 - Estimated effectiveness of symptom and risk screening to prevent the spread of COVID-19
- **Plath Lab:** Direct Exposure to SARS-CoV-2 and Cigarette Smoke Increases Infection Severity and Alters the Stem Cell-Derived Airway Repair Response
- **Bui Lab:** Biomedical REAL-Time Health Evaluation (BREATHE): toward an mHealth informatics platform



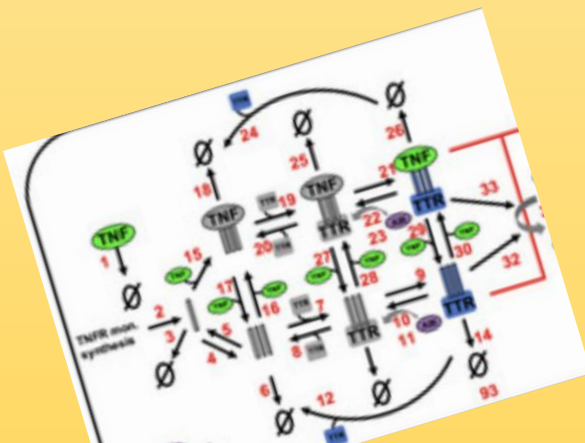
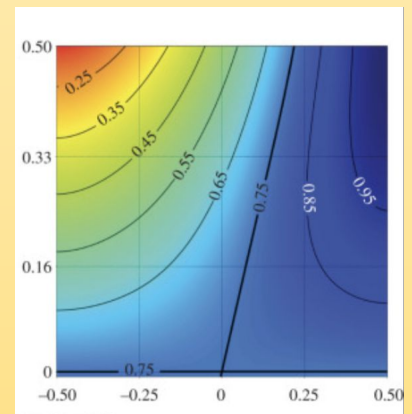
Click on the titles to read the full articles

❖ On Benchmarking Bioinformatics

- **Li Lab:** Benchmarking Computational Doublet-Detection Methods for Single-Cell RNA Sequencing Data

❖ On Epigenetic Control of Cell Function

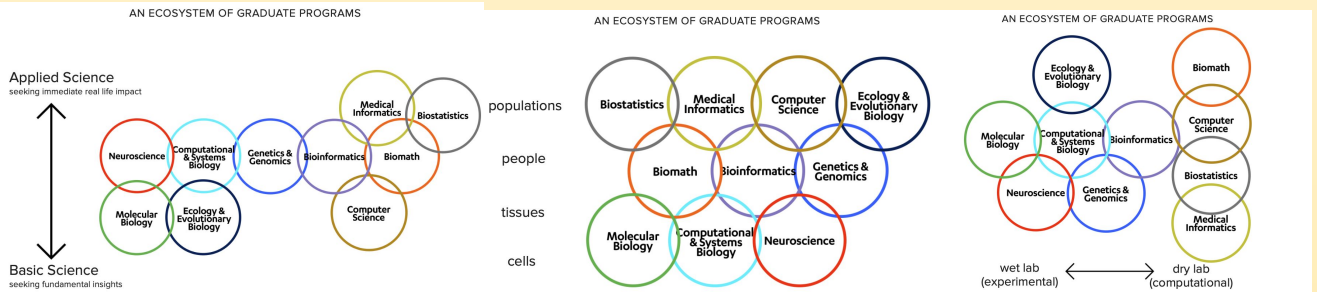
- **Hoffmann Lab:** Gene Regulatory Strategies that Decode the Duration of NF κ B Dynamics Contribute to LPS- versus TNF-Specific Gene Expression
- **Ernst Lab:** Identification and characterization of constrained non-exonic bases lacking predictive epigenomic and transcription factor binding annotations
- **Plath Lab:** Female human primordial germ cells display X-chromosome dosage compensation despite the absence of X-inactivation
- **Pellegrini Lab:** Interactions between core histone marks and DNA methyltransferases predict DNA methylation patterns observed in human cells and tissues



❖ By Collaboratory Postdocs

- **Alex Brummer:** Branching principles of animal and plant networks identified by combining extensive data, machine learning and modelling

Graduate Program Navigator now live!

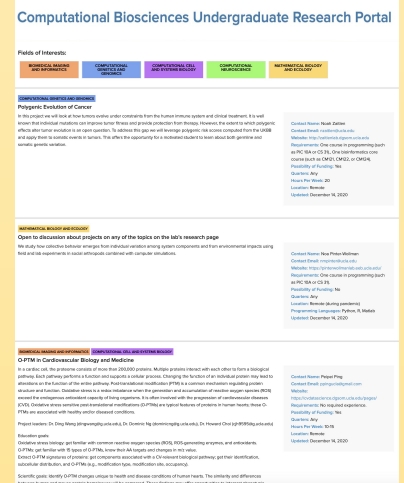


A new online overview and navigation tool that clarifies how different UCLA Graduate Programs are positioned within the ecosystem of Quantitative and Computational Biosciences. Each has distinct characteristics and draw a distinct set of applicants ! The Navigator is intended to assist prospective applicants in identifying the graduate program that best matches their background and interests. Check out the Graduate Program Navigator [here](#)

Undergraduate Research Portals

UCLA undergraduates have made valuable contributions to research while receiving valuable training. Bioinformatics and Computational Biology students have academic backgrounds and skills that can be phenomenally valuable to research labs. To match interested students to laboratories and projects, the Undergraduate Research Web-Portal at bioinformatics.ucla.edu has been valuable for years. In order to serve a broader student body and reach out to a broader community of potential faculty mentors, we have designed <https://qcb.ucla.edu/research-portal/>. Check it out [here](#).

To list your undergraduate research project(s), please contact Beverlee @ baturner@g.ucla.edu



Update on Survey of Computational Resource Needs

The results of a survey of all biosciences laboratory at UCLA conducted in the summer of 2020 are quite remarkable. There is a wealth of data from more than 200 laboratories. Here is a snapshot:

1. 54% of Research effort is computational, and PI's expect this fraction to rise
2. <12% of labs report <20% computational effort
3. >60% of labs have no computational person, but wish they did
4. Lab personnel learn quantitative analysis skills primarily from other trainees and collaborators (although they also take workshops, courses, etc)
5. PIs want to recruit as many computational students who learn biology, as biology students who learn computational methods.
6. All areas of computational Biology are impacted but particularly those in cell biology, physiology, neuroscience. There is a huge need for computational biology talent for projects beyond nucleic acid data types; e.g. imaging and dynamical behavior.

B.I.G. Summer 2021

The Bruins in Genomics (B.I.G.) Summer Research Program is an 8-week full-time immersion program for undergraduates interested in learning about Bioinformatics, Computational Biology and Genomics — and developing some of the skill-sets that are critical for 21st century Biological and Biomedical Research, and Precision Medicine. For more information on B.I.G. Summer, please visit our webpage: <https://qcb.ucla.edu/big-summer/>

June 21 to August 13, 2021

- This year's highly competitive applicant pool yielded a very diverse group of promising summer scholars!
- About 435 applications were submitted by the 3/1/21 deadline: a record!
- We are expecting to have a class of 80 students: 50% women and 33% URM
- BIG 2021 will be entirely remote: we will extend last year's success!

We are pleased to announce that several of our BIG SUMMER Alumni will be joining us this fall to begin their doctoral studies! A B.I.G. THANKS to our dedicated BIG SUMMER Faculty and mentors!



⇒ **Tyler Laws**, 2019 BIG SUMMER Alumnus. PI: Tom Vallim, Mentor: Jenny Link. Abstract: [Transcriptome analysis of mice treated with anit-miR-144](#)
Will join Cell & Developmental Biology (CDB)

Call for B.I.G. SUMMER mentors (Faculty & postdocs/graduate students)

Faculty mentors and direct research mentors (graduate students, postdocs) are key to the success of B.I.G. Summer! If you wish to participate and have a rewarding mentoring experience this summer please contact Beverlee Turner at baturner@ucla.edu. We appreciate your support of the BIG SUMMER mission and look forward to working with you.

B.I.G. Summer Students at the 2020 SACNAS and ABRCMS Conferences



Sandy Kim
BIG Summer '20
Eric Deeds Lab
SACNAS Presenter



Alanna Stewart Johnson
BIG Summer '20
Xia Yang Lab
ABRCMS Attendee



Irika Sinha, BIG Summer '20
Xia Yang Lab
ABRCMS 2020 Presentation Award
Neuroscience



Nathan Siu, BIG Summer '20
William Speier Lab
ABRCMS 2020 Presentation Award
Computational and Systems Biology



Judith Landau
BIG Summer '20
Eric Deeds Lab
ABRCMS Presenter

UCLA Institute for Quantitative & Computational Biosciences

CONGRATULATIONS to Dr. David Wong, Associate Dean for Research in Dentistry, for a NIH grant that will support 20 BIG Summer students for the next few years!

BIG Summer alumni spotlight



⇒ **Niko Darci-Maher**, 2019 BIG SUMMER Alumnus, is currently working with both Dr. Serghei Mangul and Dr. Paivi Pajukanta on different projects and has presented his research at several conferences.



⇒ **Ivan Salladay-Perez**, 2020 BIG SUMMER Alumnus. PI: Hilary Collier, Mentors: H. Collier, Eric Deeds. Abstract: [A Quantitative Approach to Study the Rates of Autophagosome Formation and Degradation for Fibroblasts in Cellular Quiescence](#)
Will join Cell & Developmental Biology (CDB).

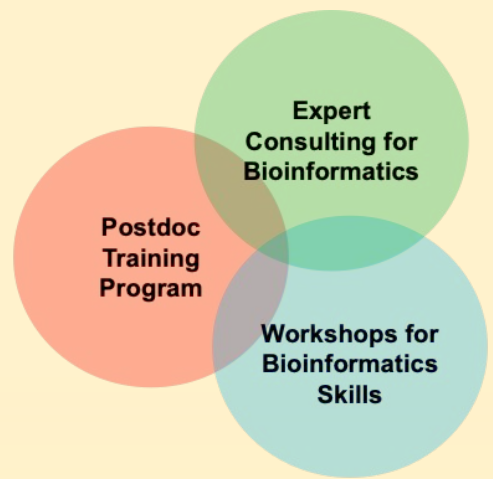


⇒ **Nathan Siu**, 2020 BIG SUMMER Alumnus. PI and Mentor: William Speier. Abstract: [Estimating limbal stem cell densities in corneal tissue imaging in ImageJ](#)
Will join Informatics Medical

A B.I.G. thank you to our dedicated mentors!

The QCBio Collaboratory

The mission of the QCBio Collaboratory is to provide computational research support to projects initiated by experimentalists. This mission pursued at three levels: (i) collaborative support or consulting work, (ii) workshops to convey commonly used bioinformatics skills for the analysis of Next Gen Sequencing data, (iii) the QCB Bioinformatics Core offers a semi-automated workflow for common types of analyses of next generation sequencing data. These activities are supported by the QCB Collaboratory postdoctoral fellows, who are selected from a broad applicant pool for renewable annual appointments.



Introducing New Collaboratory Fellows:



Diane Lefaudeux is an assistant specialist in the Signaling Systems Lab of Professor Alexander Hoffmann. She obtained a double engineering degree in 2013 from École Centrale Paris in France and Universität Stuttgart in Germany. Diane's research focus on understanding and modeling RNA expression. Her main expertise is in computational biology, mathematical modeling, and translational research.

Dr. Xinjun Zhang (Jun) is a Postdoctoral Fellow in the Lohmueller lab in the Department of Ecology and Evolutionary Biology. Jun's research lies at the intersection of empirical population genetics and statistical methods development, where she is particularly interested in the dynamics between admixture and selection. Currently, she is working on developing machine learning-based methods for the inference of adaptive introgression and dominance on the human genome. Jun earned a Ph.D. in Anthropological Genetics from UC Davis.



The Collaboratory Workshops:

- Intro to Unix command line
- Intro to Python
- Using NGS Analysis Tools
- Advanced Python
- Intro to MATLAB
- Intro to R and Data Visualization
- Library Prep for NGS
- Intro to Cytoscape
- Bacterial Genomics
- Single-Cell RNA-seq with Python
- Metagenomics Analysis with Python & R
- Intro to Modern Statistics with R
- BS-seq DNA Methylation Analysis with Hoffman 2 and R
- RNA-seq I Analysis
- RNA-seq II Analysis
- Variant Calling with GATK
- Advanced Cytoscape
- Galaxy for NGS



Dr. Daniel (Sung-min) Ha is a Postdoctoral Fellow at the Xia Yang Lab in the Department of Integrative Biology and Dr. Ha research focuses on Bacterial Epidemiology and interest Involves host-microbiome interaction using multi-omics systems biology approach. He earned a Bachelor in Mathematics and Genetics & Biotechnology at the University of Toronto in Canada, and a Ph.D. at Seoul National University in South Korea.

Dr. Shawn Cokus is an Associate Researcher in the Department of Molecular, Cell, and Developmental Biology. Dr. Cokus has been doing bioinformatics at UCLA since 2002, and his interests include methods for BS-Seq, RNA-Seq, Hi-C, and protein-protein Interaction prediction. His recent work focuses on de novo genome assembly and annotation. Dr. Cokus earned a Ph.D. in Mathematics from the University of Washington.



Check out our Spring 2021 Workshops here:
<https://qcb.ucla.edu/collaboratory/schedule-of-workshops/>

QCBio Ongoing Projects

❖ Introducing the “Journey Talks”

What does science really look like? Journey Talks will describe the winding career paths of some of your most successful scientists: important training experiences, important decisions, important successes, and failures.

Are you interested to present? Please send an email to qcboffice@lifesci.ucla.edu

❖ Interested in private sector careers?

- ❖ for postdocs and for graduate students
- ❖ join the planning committee!

❖ Coming soon: Equity, Diversity & Inclusion

- ❖ new QCBio EDI webpage
- ❖ resources, information, initiatives, awards
- ❖ interested in contributing?

❖ QCBio Retreat Planning

- ❖ Sept 21, 2021 - will it be in-person?
- ❖ Interested in joining the planning committee?

We would love to get your input and suggestions to implement those projects!

Please contact Caroline at qcboffice@lifesci.ucla.edu

Your QCBio Team: Caroline, Beverlee, Eloy, Matteo and Alex