Arya Kaul *Boston, MA*

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Education

Harvard Medical School

PhD in Bioinformatics and Integrative Genomics *Aug '19 – Present*

Member of the Baym Lab in the Departmene for Biomedical Informatics

University of California, San Diego

B.S. Bioengineering: Bioinformatics (GPA: 3.6) *Sep '15 – Jun '19*

Selected Coursework: Algorithms for Scalable Biological Data Analysis, Big Data in Computational Molecular Biology, Network Biology & Biomedicine, Medical and Population Genetics

Publications & Presentations

1. Ritika Dutta, Bruce Tiu, Arya Kaul, Bryan Mitton, and Kathleen M. Sakamoto. Creb increases chemotherapy resistance through regulation of the dna damage repair pathway in aml cells. *Blood*, 126(23), Dec 2015
2. B. Mitton, H.-D. Chae, K. Hsu, R. Dutta, G. Aldana-Masangkay, R. Ferrari, K. Davis, B. C. Tiu, A. Kaul, N. Lacayo, and et al. Small molecule inhibition of camp response element binding protein in human acute myeloid leukemia cells. *Leukemia*, 30(12):2302–2311, Dec 2016
3. Galip Gurkan Yardimci, Hakan Ozadam, Michael E. G. Sauria, Oana Ursu, Koon-Kiu Yan, Tao Yang, Abhijit Chakraborty, Arya Kaul, Bryan R. Lajoie, Fan Song, and et al. Measuring the reproducibility and quality of hi-c data. *Genome Biology*, 20:57, Mar 2019
4. Arya Kaul, Sourya Bhattacharyya, and Ferhat Ay. Identifying statistically significant chromatin contacts from hi-c data with fithic2. *Nature Protocols*, 15(3):991–1012, Mar 2020
5. Arya Kaul, Huidong Chen, Samantha Morris, and Luca Pinello. Identifying meta-clonal trajectories in lineage tracing datasets. Presented at the National Human Genome Research Initative, Mar 2020

Research Experience

Baym Lab — Department of Biomedical Informatics, Harvard Medical School

PhD Student *Sep '20 – Present*

Computationally studying ancient Klebsiella strains for antibiotic resistance

Price Lab — School of Public Health, Harvard Medical School

Rotation Student *Jun '20 – Aug '20*

Identified genomic regions under purifying selection and found informative information for the heritability of common traits. Also developed regions undergoing sex-specific purifying selection.

Baym Lab — Department of Biomedical Informatics, Harvard Medical School

Rotation Student *Apr '20 – Jun '20*

Analyzing ancient Klebsiella strains for antibiotic resistance

Sunyaev Lab — Department of Biomedical Informatics, Harvard Medical School

Rotation Student *Jan '20 – Apr '20*

Analyzed the Undiagnosed Disease Network for splicing gain of function mutations

Pinello Lab — Cancer Center, Massachusetts General Hospital

Rotation Student *Oct '19 – Dec '19*

Developed distance metrics to compute meta-clonal trajectories in single cell lineage tracing datasets.

Bafna Lab — Department of Computer Science, UC San Diego

Computational Research Assistant *Jun '18 – Jun '19*

Developed computational pipeline to identify co-occurring segments of extrachromosomal DNA between cancer samples.

Sunyaev Lab — Department of Biomedical Informatics, Harvard Medical School

Computational Research Assistant *Jun '18 – Aug '18*

Developed a computational tool, NovaSplice to predict novel splice sites due to single nucleotide polymorphisms that fall within non-coding DNA regions. Additionally, developed Simdigree, a computational tool to simulate pedigrees to study the overlap between monogenic and polygenic rare diseases.

Ay Lab — Vaccine Discovery, La Jolla Institute for Allergy and Immunology

Computational Research Assistant *Jun '16 – Jun '19*

Implemented a Python based fast matrix balancing algorithm (HiCKRy) for contemporary chromatin conformation capture techniques. Coded in Numpy and Scipy. Additionally, became lead software developer of Fit-Hi-C.

Gleeson Lab — Department of Neurosciences, UC San Diego

Biological Research Assistant — *Oct '15 – Apr '17*

Performed Whole Exome Sequencing (WES) and Whole Genome Sequencing (WGS) to investigate the molecular mechanism between WNT secretion levels in early embryonic development and microcephaly through in vitro and in vivo models. Developed knowledge of a variety of Wet Lab techniques: DNA extraction and sequencing, CRISPR, and DNA Gels.

Sakamoto Lab — School of Medicine, Stanford University

Biological Research Assistant — *Jun '14 – Aug '15*

Analyzed the role of CREB in conferring chemo resistance to Acute Myeloid Leukemia (AML) cells through Trypan Blue and Luciferin activity assays. Optimized Western Blots and conducted qPCR analyses to study the pathway of Ribosomal s6 Kinase for potential therapeutic targets to treat AML.

Professional Activities

GSAS Environental Action Team — Harvard

Treasurer — *Jan '19 – Sep '20*

Organized the finances of GrEAT. In addition, organized a sub-group dedicated to reducing Harvard's emissions.

Graduate Science Policy Group — Harvard

DC Trip Co-coordinator — *Nov '19 – May '20*

Organized a trip to Washington D.C. for policy interested graduate students at Harvard. Cancelled due to the global COVID-19 pandemic.

Graduate Student Council — Harvard

Finance Committee Member — *Nov '19 – Feb '19*

Helped delegate financial rewards to Harvard Graduate student groups.

HPREP — Harvard

Media Director — *Nov '19 – Feb '19*

Started by the Student National Medical Association (SNMA), HPREP is a nation-wide high school science enrichment program aimed at recruiting African-American, Native American, and Latino high school students into the science and health professions. As Media Director, I managed visual documentation of HPREP's 2019 program.

Undergraduate Bioinformatics Club — UC San Diego

A community of undergraduate bioinformaticians at UC San Diego serving to strengthen, expand, and support UCSD's bioinformatics program.

President — *Apr '17 – Present*

Created a community service collaboration with Illumina, initiated planning for a future Bioinformatics Department within the Jacobs School of Engineering , and grew mentorship program participation 4-fold.

Vice President of External Affairs — *Jun '16 – Apr '17*

Organized a year-long speaker series where faculty members and industry leaders within bioinformatics could advise our member base. These included talks from leaders in academia, such as, Dr. Trey Ideker and Dr. Pavel Pevzner. As well as, speakers in industry, ranging from large companies like Illumina to promising startups like Animantis.

Biomedical Engineering Society — UC San Diego

Lab Expo Co-Chair — *Mar '16 – Jun '18*

Oversaw the planning and hosting of UCSD's largest on-campus research fair with a goal to increase appreciation of science and stress the importance of an interdisciplinary mindset in science. Planned and implemented attendee recruiting efforts that resulted in event registration increasing from under 200 to 500+ attendees. Presenters came from 7 diverse departments and presented research ranging from Bioengineering to pure Mathematics.

Health Hack '17 — UC San Diego

Finalist — *Mar '17*

Annual interdisciplinary two-day hackathon seeking solutions for health care delivery and refugee health. 35 proposals submitted. Our team devised a Raspberry Pi based, RFID solution to address family separation during the refugee experience.

Skills

Computer Science: Shell, Python, Rust, Go, R, C++, LaTeX, UNIX, HTML/CSS, git
Wet Lab: Western Blots, DNA gels, Tissue Culture, DNA Extraction/Sequencing, CRISPR

Awards and Honors

AWS Scientific Research Grant Awarded $9,400 in AWS credits for application of NovaSplice to the Undiagnosed Disease Network.

Halicioglu Data Science Institute Undergraduate Fellowship HDSI Fellowship. Awarded $2,500 in September 2018 for research proposed with Dr. Bafna.

Warren Undergraduate Honors Society Honors Society. Awarded for academic excellence at UC San Diego's Warren College.