Kai Stewart

 kseuro | kaiwstewart | kai.w.stewart@gmail.com | 617.528.0353

WORK EXPERIENCE

Associate Computational Biologist II - Getz Lab, Broad Institute　　　　　July 2021 - Present

- Performed analysis of joint bulk RNA and whole exome sequencing data of diffuse large B-cell lymphomas (DLBCL) refractory to CAR-T cell therapy and identified mechanisms of treatment resistance and relapse, in collaboration with researchers at Dana-Farber Cancer Institute
- Built Docker based data processing tool for incorporation of terabyte scale genomic data into analysis of DLBCL whole exomes in order to boost study's statistical power
- Performed large scale analysis of 10x single-cell data of germline heterozygous BRCA1/2 mutated breast epithelial tissue and immune cells to identify pre-cancerous cellular expression programs, in collaboration with researchers as Massachusetts General Hospital
- Designed and implemented custom data processing pipeline to denoise formalin fixed paraffin embedded whole exome sequencing data and call copy number events
- Designed and implemented single-cell data pseudo-bulk analysis tool designed for fast, multi-tiered differential expression analysis

Associate Computational Biologist I - Getz Lab, Broad Institute　　　　　June 2020 - July 2021

- Characterized whole exome sequencing data using Cancer Genome Computational Analysis pipeline tools including GISTIC, MuTECT, AllelicCapSeg, and ABSOLUTE
- Performed data analysis of genome-wide CRISPR knockout screen in glioblastoma using MAGeCK algorithm to identify loss of $INF\gamma R$ signaling pathway as a mechanism of CAR-T resistance in solid tumors
- Researched current methods in single-cell data analysis and implemented published algorithms and tools for the analysis of 10x single-cell data
- Designed a chronology based workflow and results tracking system for projects to provide both high-level and detailed information on every aspect of an analysis

Undergraduate Research Assistant - Wongjirad Lab, Tufts University　　　June 2018 - May 2020

- Researched, developed, and tested deep learning models on particle detector data, including convolutional neural networks, Wasserstein-generative-adversarial neural networks, and auto-encoders, as part of the Micro-BooNE collaboration with FermiLab National Laboratory
- Presented model accuracy and prediction results at FermiLab Neutrino conference in Batavia, IL
- Extended deep learning research into honors physics thesis: "A Deep Convolutional Neural Network Approach to Liquid Argon Time Projection Chamber Image Synthesis"; nominated for 2019 Goldwater Scholarship on the basis of research quality

Undergraduate Research Assistant - Burch Lab, Boston College　　　　　June 2017 - August 2017

- Conducted National Science Foundation funded research in solid state physics in the context of topological semiconductors and presented research findings at NSF research symposium at Boston College
- Operated advanced equipment including liquid nitrogen refrigeration systems, helium-neon lasers, and argon atmosphere glove boxes
- Built custom electronics that improved experiment data collection

EDUCATION

2018 - 2020	B.Sc. Applied Physics **Tufts University**	*Summa cum Laude*; *Highest Thesis Honors*
2015 - 2017	A.A. Physics **Bunker Hill Community College**	*Highest Honors*

Publications

Larson, R.C. et al. (Apr. 2022). "CAR T cell killing requires the IFNγR pathway in solid but not liquid tumours". In: *Nature* 604, pp. 563–570. URL: https://www.nature.com/articles/s41586-022-04585-5.

Skills

Programming	Python, Bash, Docker, LaTeX, Git, Linux / Unix, Google Cloud Platform
Machine Learning	Experience implementing: CNN, GAN, AE using PyTorch
Bioinformatics	Whole genome analysis, whole exome analysis, bulk RNAseq analysis, 10x single-cell-seq analysis, SamTools, Scanpy, CellBender, Limma-Voom
Spoken Languages	English: *Fluent*, German: *Fluent*

Last updated: November 20, 2022