WAMIA SAID

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EDUCATION

Bachelor of Arts | ***Major: Computer Science*** — Aug 2020 – May 2023
University of Virginia — Charlottesville, VA
GPA: 3.88/4.0

Governor's School @ Innovation Park | ***High School Dual Enrollment*** — Aug 2022 – June 2024
George Mason University — Manassas, VA
Specialized STEM regional program for selected high school students

RESEARCH EXPERIENCE

Blood Immune Cell Atlas Project — Sept 2023 – Present
Massachusetts General Hospital | Broad Institute of MIT & Harvard — Boston, MA
Supervisor: Alexandra Chloe Villani

- Co-leading analysis of a 25+ million peripheral blood mononuclear cell (PBMC) single-cell multiomics (gene expression, surface protein, T-cell receptor) dataset across 5000+ healthy and disease donors spanning 40 conditions as part of Blood Immune Cell Atlas project, which aims to map all existing cell subsets in circulation with a frequency of $>0.001\%$
- This project builds on the hypothesis that distinct immune cell subsets can be uncovered through the lenses of studying a large range of immune-related diseases and is being done as part of the larger Human Cell Atlas (https://www.humancellatlas.org) endeavor, aiming to chart all the cells of the human body to gain insights into cellular diversity and putative targets for personalized medicine
- Spearheaded improvements in data workflows by refining integration strategies and validating statistical approaches, facilitating more efficient downstream analyses that will scale to 25 M PBMC dataset
- Next three projects are subprojects within this project

Blood Cell Atlas Pilot

- Built and optimized pipeline to perform technical batch correction and data integration of 3.5 M PBMCs from 421 donors across 9 autoimmune conditions, 2 related checkpoint-inhibitor toxicities, and healthy controls with scalability in mind
- Developed framework for cell annotation and qualitative/quantitative readouts to assess quality of data integration in terms of removing technical artifacts and preserving biology
- Annotated 62 broad cell subsets across immune cell lineages (i.e. CD8+ T cells, CD4+ T cells, NK cells, B cells, myeloid cells)
- Benchmarked multiple abundance analysis tools and applied complementary approaches of scCODA and Milo to identify shifts in subset abundance associated with several diseases or specific diseases as compared to healthy controls
- Uncovered shared and distinct gene programs associated with 11 immune-related diseases using gene programs tools such as cNMF, HotSpot & Spectra
- Defined 10 biologically relevant CD4+ regulatory T cell subsets including inteferon, quiescent, and effector Treg subpopulations using unbiased clustering. Analysis results suggested that 3 of these populations were associated with disease
- Uncovered subpopulation-specific antibodies using surface protein CITE-Seq data for flow cytometry validation of 3 novel Treg populations
- Presented pipeline and results as posters at several conferences (see below)

Human Cell Atlas Version 1 Integration Effort

- Applying integration & annotation pipelines built for pilot described above to integrate 14 independently published COVID-19 and healthy donor single-cell datasets spanning 9 M PBMCs
- Accelerated leiden clustering (via rapids-singlecell package) and integration steps by refactoring code to run on a GPU
- Collaborating with team of scientists from 4 other international institutions (Spain, United Kingdom, Germany, Singapore) to finalize an annotatable final object to be used at HCA Immune Bionetwork Annotation Jamboree

Surface Protein CITE-seq Data Integration Pipeline

- Streamlined integration of single-cell surface protein expression data generated from CITE-Seq (Cellular Indexing of Transcriptomes and Epitopes) which measures paired surface protein and gene expression on the same cell via Muon package
- Experimented with multiple normalization techniques such as CLR and DSB
- Overlayed surface protein expression on embeddings within gene expression space to translate findings to canonical immunology
- Presented pipeline to peers at lab meeting

Investigation of Dopamine Diffusion on Edge of Pristine Graphene Sheets Aug 2022 – May 2023
University of Virginia Charlottesville, VA
Supervisor: Kateri DuBay

- Built simulations in LAMMPS molecular dynamics software and visualized in VMD
- Examined simulation results using Python scripts to insightfully modify graphene edge to optimize dopamine diffusivity in neurotransmitter-detection electrodes

Analysis of Sigma Complexes, Aryl Hydrides & Associated Transition States of Tungsten-Bound Arenes Dec 2020 – May 2022
Charlottesville, VA
University of Virginia
Supervisor: Dean Harman

- Investigated the reactivity of polycyclic arenes with a metallic coordination bond to an electron-rich tungsten-complex
- Utilized Gaussian computational software to model structures and determine energies of various intermediates and transition states for tungsten-bound arenes
- Analyzed computational data to understand mechanism of Diels-Alder reactions of these arenes

OTHER PROJECTS

Prediction of Cellular Drug Response from Bulk RNAseq Data of Breast Cancer Cell Lines Using Machine Learning Methods Apr 2023 – May 2023
Charlottesville, VA

- Iteratively developed a convolutional neural network model to predict GI50 drug response from gene expression data and evaluated performance using k-fold cross-validation to be $<5\%$ error
- Analyzed feature importance from three other hyperparameter tuned regression models (partial least squares regression, support vector machine, random forest regressor) to determine genes with the greatest impact on drug response

Modeling Likelihood of Receiving COVID-19 Booster Vaccine Sep 2022 – Dec 2022
ML4VA Submission Charlottesville, VA

- Processed and analyzed Census HPS data to build a classifier for vaccination statuses
- Explored and tuned various machine learning models to attain >85% test set F-1 scores
- Strategized plan for increasing vaccination rates by evaluating feature importances
- Awarded Second Place at ML4VA Expo

Inequity & Healthcare Algorithms: Novel, Budding, Dangerous, but Resolvable Jan 2022 – Jan 2023
Published Academic Essay Charlottesville, VA

- Composed public-facing essay that reflected on history of medical racism and how algorithmic bias can perpetuate healthcare inequity
- Published in Parlor Press' The Lived Experience of Democracy: Criticizing Injustice, Building Community Anthology

And That's on Period Oct 2020
Girls Hoo Hack 2020 Hackathon Submission Charlottesville, VA

- Tackled stigma around periods and empowered young girls through an interactive educational website that teaches them more about their body
- Designed using HTML, CSS, & JavaScript during 36-hour hackathon
- Awarded Best Female Empowerment Hack & Honorable Mention for Best Overall

Work Experience

Associate Computational Biologist Sept 2023 – Present
Massachusetts General Hospital | Broad Institute of MIT & Harvard Boston, MA

- See Research Projects

Software Engineering Intern May 2022 – Aug 2022
Google Seattle, WA

- Collaborated with cross-functional Chrome Shopping team on full-stack development project
- Designed and led implementation of new feature on Android Chrome
- Integrated endpoint with UI to build feature that gives users insights into coupon availability

STEP Intern May 2021 – Aug 2021
Google Sunnyvale, CA (Remote)

- Designed & developed monitoring stack for product in Cloud Network Intelligence Center
- Implemented alerting features & created dashboard for internal monitoring using Python
- Exposed gRPC API in C++ & defined Spanner database to give users access to monitoring data
- Other involvements: Google iOS app team co-designer, Google GHC Scholarship Recipient, Responsible Healthcare AI session, gWiC Summit, C++ @ Google class

Leadership

President Mar 2022 – Apr 2023
Girls Who Code UVA Charlottesville, VA

- Oversaw executive team's planning of hackathon, career fair, educational workshops, and social events for 100+ member club
- Led initiative to host first annual charity banquet where $1700 was raised for local charity
- Maintained strong relationships with industry reps, faculty, and other student organizations
- Awarded Student Engagement Programming Award for consistently hosting impactful events for the UVA community

Events Coordinator May 2022 – May 2023
Bengali Student Organization Charlottesville, VA

Hackathon Director Mar 2021 – Mar 2022
Girls Hoo Hack Hackathon | Girls Who Code UVA Charlottesville, VA

- Spearheaded event planning, marketing, and outreach efforts for 36-hr hybrid-style hackathon
- Hosted 270+hackers, 22 workshops/activities, $20,000+in prizes, and 12 industry sponsors

External Outreach Director Sep 2020 – May 2021
College Science Scholars Council Charlottesville, VA

Conferences and Poster Presentations

Uncovering the Cellular Drivers of Health and Disease Through Blood Cell Atlas of 25M cells | *Broad Institute Scientific Retreat* Dec 2024
Boston, MA
Wamia Said*, Adrien Antoinette*, Jacquelyn Nestor*, Rachelly Normand, Sergio Aguilar, Nandini Samanta, Sidney Martin, Roya Best, Hoang Anh Tran, Kamil Slowikowski, Neal Smith, Thomas Chen, Isabela Kernin, Courtney Ambrose, Alice Tirard, Kian Hong Kock, Michaela F. Mueller, Ana-Maria Cujba, Dejan Juric, Ryan J. Sullivan, Genevieve M. Boland, John Stone, Eilish Dillon, Devin King, Andrew Luster, Kerry Reynolds, Maureen Leonard, Tanuja Chitnis, Malte D. Luecken, Kevin Wei, Deepak Rao, Michelle Rengarajan, Pritha Sen, Nir Hacohen, Holger Heyn, Shyam Prabhakar, Gary Reynolds, Alexandra-Chloé Villani

Single-cell dissections of circulating immune networks driving health and diseases | *Human Cell Atlas General Meeting* Oct 2024
Milan, Italy
Wamia Said*, Jacquelyn Nestor*, Rachelly Normand, Sergio Aguilar, Adrien Antoinette, Nandini Samanta, Sidney Martin, Roya Best, Hoang Anh Tran, Kamil Slowikowski, Neal Smith, Thomas Chen, Isabela Kernin, Courtney Ambrose, Alice Tirard, Kian Hong Kock, Michaela F. Mueller, Ana-Maria Cujba, Dejan Juric, Ryan J. Sullivan, Genevieve M. Boland, John Stone, Eilish Dillon, Devin King, Andrew Luster, Kerry Reynolds, Maureen Leonard, Tanuja Chitnis, Malte D. Luecken, Kevin Wei, Deepak Rao, Michelle Rengarajan, Pritha Sen, Nir Hacohen, Holger Heyn, Shyam Prabhakar, Gary Reynolds, Alexandra-Chloé Villani

Immunology-driven semi-automatic annotation of single-cell data using machine learning approaches | *Human Cell Atlas General Meeting* Oct 2024
Milan, Italy
Adrien Antoinette*, Sergio Aguilar*, Wamia Said, Rachelly Normand, Jacquelyn Nestor, Nandini Samanta, Sidney Martin, Roya Best, Hoang Anh Tran, Kamil Slowikowski, Pragya Rawat, Neal Smith, Thomas Chen, Isabela Kernin, Courtney Ambrose, Alice Tirard, Kian Hong Kock, Michaela F. Mueller, Ana-Maria Cujba, Dejan Juric, Ryan J. Sullivan, Genevieve M. Boland, John Stone, Eilish Dillon, Devin King, Andrew Luster, Kerry Reynolds, Maureen Leonard, Tanuja Chitnis, Malte D. Luecken, Kevin Wei, Deepak Rao, Michelle Rengarajan, Pritha Sen, Nir Hacoheni, Holger Heyn, Shyam Prabhakar, Alexandra-Chloé Villani, Gary Reynolds

Blood Cell Atlas: Recapitulated Biology & Novel Signals In Autoimmune Diseases & Associated irAEs Using Single-Cell Genomics | *Irving Cancer Immunology Innovation Retreat* — July 2024, Boston, MA

Wamia Said*, Jacquelyn Nestor, Michelle Rengarajan, Rachelly Normand, Sergio Aguilar, Nandini Samanta, Sidney Martin, Roya Best, Hoang Anh Tran, Adrien Antoinette, Courtney Ambrose, Alice Tirard, Pritha Sen, Dejan Juric, Ryan J. Sullivan, Genevieve M. Boland, John Stone, Maureen Leonard, Tanuja Chitnis, Kevin Wei, Deepak Rao, Andrew Luster, Kerry Reynolds, Gary Reynolds, Alexandra-Chloe Villani

Honors and Awards

Lawn Resident — Aug 2022 – May 2023
Awarded to 54 students in their final year of undergraduate study who have shown unselfish service and achievement in their respective fields of activity and academics to live on the historic Lawn

Echols Scholar — Aug 2020 – May 2023
Awarded to ∼200 students to draw together a diverse community of students united by their potential for significant intellectual engagement at UVA and beyond

College Science Scholar — Aug 2020 – May 2023
Awarded to ∼12 students that have shown exceptional work and dedication to research

Google Grace Hopper Celebration Scholarship Recipient — Oct 2021
Recognized by Google for achievements and dedication in computing and awarded scholarship to attend the world's largest gathering of women in tech

Woolen Scholarship Recipient — Oct 2021
Awarded to two rising second year Echols Scholars

Skills

Programming Languages: Python, R, C++, Java
Single-Cell Analysis: Scanpy, AnnData, Muon, Harmony, scVI, Leiden, DESeq2, Limma, scCODA, Milo, cNMF, HotSpot, Souporcell, Rapids-Singlecell, CellRanger
Computational Chemistry: LAMMPS, VMD, Gaussian
Python (Other): scikit-learn, matplotlib, seaborn, Tensorflow, PyTorch, pandas, numpy
Technical (Other): Linux, HPC, Conda, Git, NVIDIA GPU, Bash Scripting, Arduino, Android, Protobuf, gRPC, Spanner