Willow Carretero Chavez

Computational Biologist · Software Engineer · Laboratory Scientist

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Education

Massachusetts Institute of Technology **Cambridge, MA**

B.S. in Biology — Cumulative GPA: **4.6** / 5.0 *Aug 2020 - Feb 2025*

- Coursework: Fundamentals of Programming, Math for CS, Topics in Systems and Computational Biology, Molecular Basis of Infectious Disease, Microbial Physiology, Molecular Biology, Cell Biology

Software Engineering Experience

Software Engineer (L3) **Seattle, WA**

Google *May 2025 - Present*

- Active contributor to JobSet, a Kubernetes-native API for deploying HPC and AI/ML workloads at scale
- Integrate and meticulously test new GPU/TPU accelerator models for Google Kubernetes Engine (GKE)
- Collaborate with team of 20+ engineers to provide direct support to customers running AI/ML workloads

Software Engineering Intern **Seattle, WA**

Google *May 2023 - Aug 2023, Jun 2024 - Aug 2024*

- Implemented horizontal scaling of the Kubernetes (cluster management system) control plane proxy in Golang, demonstrating ability to troubleshoot and improve complex data-intensive systems at scale
- Extended internal cluster developer tooling, deploying changes to world's largest fleet of Kubernetes clusters

Software Engineering Co-Op **Boston, MA**

Wayfair *Jan 2022 - Aug 2022*

- Implemented and deployed microservice APIs for data pipelines using Java, Python, PostgreSQL, and Kubernetes

Research Experience

Undergraduate Research Intern **Cambridge, MA**

Sinskey Lab — MIT Department of Biology *Feb 2023 - May 2023, Sep 2024 - Dec 2024*

- Conducted molecular (ddPCR), biochemical (Western blot, nanoparticle tracking analysis), and cell-based (ACE2$^+$ cell transduction) assays to verify proper assembly of SARS-CoV2 structural proteins into virus-like particles (VLPs)
- Quantified viral DNA, RNA, and capsid protein levels from a bioreactor-based adeno-associated virus (AAV) production platform using nanodrop, qPCR, and ELISA
- Performed routine laboratory tasks while following best practices: sterile buffer/media preparation, aseptic mammalian cell culture (HEK-293 cell line), data collection, and sample management

Undergraduate Research Intern **Cambridge, MA**

Jensen Lab — MIT Department of Chemical Engineering *Sep 2022 - Dec 2022*

- Expanded a method of chemo-enzymatic retrosynthesis in Python to enable greener synthesis pathways
- Presented poster at the 2022 MIT Machine Learning for Pharmaceutical Discovery and Synthesis Consortium

Early College Intern **New York, NY (Remote)**

D. E. Shaw Research *May 2021 - Aug 2021*

- Optimized accuracy of free energy perturbation (FEP) molecular dynamics simulations of ligand:receptor systems
- Created novel method of FEP network generation in Python using integer linear programming

Staff Research Associate **Chula Vista, CA**

Kufareva Lab — UC San Diego Skaggs School of Pharmacy *Oct 2019 - Dec 2020*

- Trained in mammalian tissue culture in a BSL-2 biosafety cabinet, performing cell viability assays and routine passaging of HEK-293 cells for protein expression studies
- Wrote toolkit to verify, validate, and visualize Boolean models of cell signaling networks in R and Python
- Explored literature on immune cell signaling pathways to create computational model and perturbation-response database of CCR2$^+$ monocyte chemotaxis
- Analyzed proteome-wide phosphorylation responses of CCR2$^+$ immune cells in response to CCL2 and inhibitor analogue treatment through linear modeling on mass spectrometry data

Publications

1. **Carretero Chavez, W.**; Krantz, M.; Klipp, E.; Kufareva, I. *kboolnet*: a toolkit for the verification, validation, and visualization of reaction-contingency (rxncon) models. *BMC Bioinformatics* **24**, 246 (2023).

Skills

Coding Languages	**Golang** · Python · R · Java · Bash · Rust · Julia
Developer Skills	**Kubernetes** · **Distributed computing** · Git · CI/CD pipelines · Linux · Docker
Lab Techniques	**Mammalian cell culture (BSL-2)** · **Western blot** · qPCR/ddPCR · ELISA
Soft Skills	Knows when to ask for help · Driven by results and data · Fast learner · Curious