Michael Bertagna

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Education

M.S. Computer Science **Sep. 2024 – Dec. 2025 (Expected)**

Northwestern University – Evanston, IL

- Focus: Machine Learning and AI

B.S. Biochemistry and Molecular Biology; Minor in Computer Science **Aug. 2019 – Dec. 2022**

Chapman University – Orange, CA *3.90/4.00 GPA*

- Summa Cum Laude, Program Honors, Provost List, Dean's Merit Scholarship

Technical Skills

Programming Languages: Python, C++ , R
Data: SQL , Jupyter , Sklearn , PyTorch , Pandas , Numpy , SciPy , Excel
DevOps: version control (Git/Github), continuous integration (Github Actions, Jenkins), AWS, Docker, Slurm, Linux, Unix

Relevant Experience

Research Specialist 1 – The University of Chicago **Aug. 2023 – Sep. 2024**

Full-time (40 hours/week) — Python 3, R, Github, Slurm, RNA-Seq *Chicago, IL*

- Co-developed the Tetrahymena Gene Network Explorer in the Turkewitz Lab: tet.ciliate.org/gne.php
- Designed and implemented robust statistical pipelines to process and ensure the quality of genome-wide RNA-seq and microarray datasets across the Tetrahymena life cycle
- Applied unsupervised machine learning techniques to partition over 20,000 genes based on their co-normalized expression patterns, performing extensive hyperparameter tuning to optimize clustering outcomes
- Built an interactive dashboard with Bokeh, featuring dynamic figures and data panels for seamless exploration of results, enabling researchers to quickly generate genetic hypotheses through an accessible online platform

Software Engineer Intern – NASA Jet Propulsion Laboratory **Jun. 2022 – Aug. 2022**

Full-time (40 hours/week) — Python 3, MATLAB, Github *Pasadena, CA*

- Co-developed Coralign, an open-source suite of algorithms for coronagraph optics alignment and calibration, to advance space exploration efforts: https://github.com/nasa-jpl/coralign.git
- Designed a novel alignment algorithm that significantly improved calibration speed and supported all optical geometries
- Implemented a continuous integration (CI) pipeline, ensuring code quality through extensive unit tests with Pytest
- Optimized the time and space complexity of computer vision tasks in existing algorithms through rigorous theoretical analysis and empirical testing, enhancing performance and ensuring dependable, scalable solutions

Student Researcher – Chapman University **Dec. 2020 – Dec. 2022**

Part-time (15 hours/week) — Schrödinger Maestro, Gaussian 16, Python 3, Bash *Orange, CA*

- Developed mechanistic models of metal-catalyzed reactions using molecular dynamics simulations in the OMO Computational Chemistry Lab
- Generated, managed, and analyzed large volumes of cheminformatics data on a Linux-based supercomputer
- Automated data-related workflows for the lab, increasing efficiency and streamlining processes for all team members
- Presented research findings to experimental collaborators and at international and regional conferences, demonstrating how reagent optimization could increase medicinally relevant product yields to over 90% and support catalytic turnover

Relevant Publications

A. J. Eldorado Riggs, **Michael Bertagna**, Garreth J. Ruane, Eric J. Cady, David S. Marx, Sam P. Halverson, Samuel Miller, Kevin J. Ludwick, "Coralign: a software package for coronagraphic alignment and calibration," Proc. SPIE 12680, Techniques and Instrumentation for Detection of Exoplanets XI, 126802F (5 October **2023**); https://doi.org/10.1117/12.2677703

Relevant Coursework

Deep Learning
Machine Learning
Natural & Artificial Vision
Design & Analysis of Algorithms
Programming Parallel Processors
Scalable Software Architectures
Data Structures and Algorithms
Database Management
Introduction to Data Science
Advanced Linear Algebra
Linear Algebra
Biostatistics