

CHARLIE LI

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EDUCATION

Washington University in St. Louis

Bachelor of Science, Computer Science / Biology Second Major with Specialization in Genomics and Computational Biology / Chemistry Minor

Expected: May 2027

- **GPA:** 4.00/4.00
- **Honors:** Dean's List (Fall 23, Spring 24, Fall 24, Spring 25)
- **Relevant Coursework:** Geometric Computing for Biomedicine, AI for Chemistry, Biochemistry, Endocrinology, Algorithms & Data Structures, Software Development

RESEARCH EXPERIENCE

Losos Lab (Evolutionary Biology) | St. Louis, MO

Research Assistant

Aug 2025 - Present

- Investigate the determinism of host-microbiome co-evolution using *Anolis* lizards as a model system.
- Perform wet-lab extraction and sequencing of 16S rRNA genes from excrement samples.
- Analyze microbial taxonomic and functional diversity utilizing bioinformatics tools including QIIME2 and PICRUSt2.

Held Lab (Structural Biology) | St. Louis, MO

Research Assistant

Jan 2024 - May 2025

- Engineered a Python pipeline to analyze residue-scale solvent exposure dynamics across the entire Protein Data Bank (PDB).
- Correlated crypticity with residue properties and post-translational modifications to characterize protein domains with distinct structural behaviors.
- Conducted mechanistic analysis of the redox regulation of UNC-49, a GABA receptor, using GROMACS simulations.
- Performed trajectory manipulation and PCA feature extraction using MDAnalysis to characterize geometric and energetic landscapes of receptor activation.

CLINICAL RESEARCH & EXPERIENCE

St. Louis Children's Hospital (PEMRAP) | St. Louis, MO

Pediatric Emergency Medicine Research Associate

Jan 2025 - Aug 2025

- Screened emergency department track boards to identify eligible candidates for active clinical trials.
- Recruited and consented over 300 patients and families for studies regarding resource availability.
- Collaborated with PIs and physicians to ensure research protocol adhered to clinical workflows and ethics compliance.

Barnes Jewish Hospital | St. Louis, MO

Emergency Department Shadowing & Cardiovascular Volunteer

May 2024 - Aug 2025

- **Shadowing (Emergency Dept.):** Observed full cycle of emergency care, including triage, trauma stabilization, and discharge planning. Gained exposure to decision-making under high-pressure constraints and EHR utilization.
- **Volunteer (Cardiovascular Procedure Center):** Managed patient intake and discharge logistics. Acted as a liaison between nursing staff and patient families to stream communication during procedures.

LEADERSHIP & SERVICE

WashU Stem Education Association | St. Louis, MO

Co-Chair, Question Writing Committee

Aug 2023 - Present

- Lead a committee of 10 students to craft original, high-level chemistry problems for an annual national high school competition.
- Manage weekly workflow, peer-review cycles, and grading logistics.

World Bird Sanctuary | St. Louis, MO

- Provided husbandry and rehabilitation care for injured birds of prey, demonstrating attention to detail and long-term commitment to organismal biology.
- Educated public visitors on raptor conservation and biology.

Volunteer Birdkeeper

May 2024 - Aug 2025

FEATURED PROJECTS

https://github.com/P-mandevillei/CSE-5504_Project

Automated Neuron Segmentation from 2pFLIM Imaging

- Designed a web interface for batch segmentation of neuron somas from 2pFLIM images.
- Implemented classic geometric algorithms, including morphological operations, marching squares contouring, PCA and SVD-ICP alignment, and Laplacian deformation.
- Achieved 85 - 90% mean accuracy compared to manual segmentations.

<https://github.com/P-mandevillei/chem-4050-5050>

Molecular Simulations

- Implemented the grand canonical Monte Carlo Metropolis algorithm from scratch.
- Analyzed competitive surface adsorption in Haber-Bosch ammonia synthesis.
- Built and performed coarse-grain molecular dynamics simulation in plain Python.
- Characterized the phase transition of a polymer chain.

https://github.com/P-mandevillei/CHEM-5080_Project

Protein Crypticity Prediction with Machine Learning

- Developed a hybrid machine learning pipeline to predict cryptic sites from Protein Data Bank data.
- Achieved 87% ROC-AUC on test set.
- Analyzed feature importance with SHapley Additive exPlanations.

SKILLS

- **Programming:** Python, R, C/C++, Java, SQL, Mathematica
- **Web Development:** HTML/CSS/JavaScript (TypeScript), PHP, React, Flask, MongoDB
- **Packages & Tools:** MDAnalysis, scikit-learn, PyTorch, PyMOL, QIIME2, PICRUSt2
- **Laboratory Techniques:** PCR, Gel Electrophoresis, DNA Extraction, Titration, Chromatography
- **Languages:** Chinese (Native), English (Fluent)