Ruilin (Ryan) Wu

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EDUCATION

Davidson College Expected May 2026

Bachelor of Science in Biology, Minor in Computer Science GPA: 3.85/4.0

Relevant Courses: Genetics, Algorithms, Machine Learning, , Linear Algebra, Data Visualization, Data Structures, Cell Biology, Biochemistry, Immunology, Organic Chemistry

RESEARCH

Identifying EOR-1 Binding Sites and Accessible Regions in Relation to NHR-25 Davidson, NC

Undergraduate Researcher under Prof. Deborah Thurtle-Schmidt May 2025 – Present

- Investigated the role of EOR-1 as a pioneer factor for NHR-25 in *C. elegans* using CUT&RUN and ATAC-seq
- Used Python, R, and Bash, developed an ATAC-seq analysis pipeline for sequence alignment and peak calling
- Optimized experimental protocols for CUT&RUN and ATAC-seq, enhancing nuclei viability during homogenization and increasing overall data quality
- Explored the development of a custom peak-caller for short reads under high signal-to-noise CUT&RUN datasets
- Presented research findings via poster presentations at the Davidson College Fall Research Symposium (2025) and ABRCMS 2025

Comparative Analysis of Human Lysozyme Fibrillation Kinetics Under Crowding Agent Davidson, NC

Undergraduate Researcher under Prof. Jeffrey Myers Jan 2025 – May 2025

- Conducted a comprehensive literature review on amyloid fibrillation and lysozyme fibrillation kinetic assays
- Evaluated the impact of saccharide and synthetic crowding agents on fibrillation kinetics through fluorescence assays of human lysozyme
- Compared the fibrillation kinetics of human and hen egg white lysozyme under different crowding agents
- Utilized sigmoidal regression and BLAST sequence alignement to analyze fibrillation rates and assess aggregation behavior

Localization and Function of TF *Sm49580* in *Schistosoma mansoni* Shanghai, China

Undergraduate Researcher under Dr. Jipeng Wang at Fudan University May 2024 – Aug 2024

- Performed RNAi screening of *Sm49580* in tegument cells of *S. mansoni* to analyze knockdown effects
- Collaborated with a team to perform weekly infections of mice with S. japonicum and S. mansoni, supporting in vivo studies
- Determined the tissue-specific expression of target genes in tegument using WISH & FISH
- Analyzed phenotypic patterns to elucidate the role of transcription factors in morphological and behavioral changes

PROJECTS

Predicting GO Subontologies Using Amino Acid Sequence Nov 2025 – Dec 2025

- Conducted a literature review on GO term prediction from protein sequences, focusing on current methodologies and landscape
- Generated protein sequence embeddings using the ProtTrans 5 language model and leveraged HPC resources for processing with subontology information
- Progressed modeling from baseline linear regression to advanced ensemble methods to better capture non-linear dependencies in the high-dimensionality dataset
- Optimized model performance via hyperparameter tuning, achieving an average 40% improvement on R^2 over standard linear baselines

Cancer Type Prediction with miRNA Marker Oct 2025 – Nov 2025

- Investigated discriminative learning for cancer categorization using real-world patient microRNA profiles
- Analyzed dataset cancer type distribution to inform weighted predictions for different cancer types
- Developed custom SVM and Random Forest models to classify data in both linear and non-linear regimes
- Achieved a harmonic F1-score of 0.97, representing a 30% accuracy improvement over the baseline model

Video Game Sales Visualization 1980-2020 Mar 2025 – May 2025

- Explored and transformed a complex, unfiltered dataset into an organized structure for pre-processing
- Developed interactive scatterplots and bar charts to visualize the distribution of game sales across parameters such as regions, publishers, and genres
- Optimized user experience with interface design and accessibility features, informed by feedback collected during piloting
- Facilitated potential data-driven decision making for optimizing video game design and sale strategies

LEADERSHIP & CAMPUS INVOLVEMENT

Department of Mathematics & Computer Science | *Grader of Calculus I and Linear Algebra* **|** Davidson, NC Sep 2024 – Present

- Graded homework and Mathematica lab assignments for ~50 students annually, assigned credits based on quantitative assessment
- Met biweekly with teaching professors to align on assessment standards and and discuss student feedback from grading, informing adjustments to teaching plans
- Delivered constructive feedback on student work to foster individual development and improve learning outcomes

The Davidson Generals All-Male A Cappella Group | *Secretary* | Davidson, NC Aug 2023 – Present

- Managed member attendance, maintained alumni connections, and performed a document-control on 100+ scores

- Coordinated and collaborated with vocal parts to demonstrate well-sounded harmony while singing Tenor I
- Performed in 6 major annual school events, including Parents' Weekend, HIV/AID Relief Show, Holiday Show, Live Thursday, Frolics, and Senior Appreciation Concert

The Davidson Men's Club Ultimate Frisbee | *Club Player* | Davidson, NC Aug 2022 – Present

- Attended training sessions for 8 hrs/week to advance techniques as a defensive line player
- Competed in 8 annual tournaments with D-I & D-III schools in North Carolina and adjacent States (Atlantic Coast region)

FELLOWSHIPS & AWARDS

Matthews Center Professional Development Fund – $500 2025
For attendance at ABRCMS 2025 | Matthews Career Center, Davidson College

Cynthia Grant Travel Award – $811 2025
For attendance at ABRCMS 2025 | Department of Biology, Davidson College

Vice President for Academic Affairs Award – $800 2025
For attendance at ABRCMS 2025 | Davidson College

Matthews Center Professional Development Fund – $750 2025
For attendance at MEDevice Boston 2025 | Matthews Career Center, Davidson College

SKILLS

- **Lab Skills:** ATAC-seq, CUT&RUN, RNA interference (RNAi) screen, Whole-mount *in-situ* hybridization (WISH & FISH), Bacterial transformation, DNA/RNA extraction, Epifluorescence & confocal microscopy, Live animal husbandry (mice)
- **Computational Skills:** NGS analysis, Genomics data visualization, Pipeline creation, ML prediction, algorithm development
- **Model Organism Experience:** *Caenorhabditis elegans, Schistosoma mansoni, Escherichia coli*
- **Software & Programming Languages:** Python, Bash, Java, R, C, JavaScript, D3.js, HTML, CSS