Chenguang Zhao, PhD

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EXPERIENCE

St. Ambrose University Jan 2024 - present
Tenure-track Assistant Professor
Computer and Information Sciences Department

EDUCATION

University of Miami *Dec 2023*
Ph.D. in Computer Science
Supervisor: Dr. Zheng Wang
Dissertation: Deep learning approaches for predicting protein functions, inferring protein model qualities, and understanding the relationships between 3D genome and protein functions

The University of Southern Mississippi *May 2019*
M.S. in Computer Science
Thesis: An improved algorithm to measure the semantic similarity between gene ontology terms

Southwest Jiaotong University *May 2015*
B.E. in Transportation

RESEARCH INTERESTS

My research interests lie in bioinformatics, specifically in developing and applying machine learning methods in the topics such as protein function prediction, protein structure prediction, 3D genome analysis, and biological network analysis.

PEER-REVIEWED JOURNAL AND CONFERENCE ARTICLES

* These authors contributed equally to the work.

1. Stewart, R.*, **Zhao, C.***, Liu, T., & Wang, Z. PICNIC: refinement of AlphaFold2 tertiary structure predictions using deep 3D residual neural networks. In 2024 IEEE International Conference on Bioinformatics and Biomedicine (BIBM). IEEE. (acceptance rate: 22%) (click here)

2. **Zhao, C.**, Liu, T., & Wang, Z. (2024). PANDA-3D: protein function prediction based on AlphaFold models. *NAR Genomics and Bioinformatics*, 6(3), lqae094. (click here)

   - This work was designated as the **Editor's Choice** by the journal. Only 16% of research articles receive this distinction.

3. Siciliano, A. J.*, **Zhao, C.***, Liu, T., & Wang, Z. (2024). EGG: Accuracy Estimation of Individual Multimeric Protein Models Using Deep Energy-Based Models and Graph Neural Networks. *International Journal of Molecular Sciences*, 25(11), 6250. (click here)

4. **Zhao, C.**, Liu, T., & Wang, Z. (2022). Predicting residue-specific qualities of individual protein models using residual neural networks and graph neural networks. *Proteins: Structure, Function, and Bioinformatics*, 90(12), 2091-2102. (click here)

   - MASS2 and LAW are the **best** and **second-best** single-model methods in the local QA category of **CASP14** according to our evaluations using the CASP14 official criteria.

5. **Zhao, C.**, Liu, T., & Wang, Z. (2022). Functional Similarities of Protein-Coding Genes in Topologically Associating Domains and Spatially-Proximate Genomic Regions. *Genes*, 13(3), 480. (click here)
    - This work was selected as the **Feature Paper** by the journal.
6. **Zhao, C.**, Liu, T., & Wang, Z. (2022). PANDA2: protein function prediction using graph neural networks. *NAR Genomics and Bioinformatics*, 4(1), lqac004. (click here)
7. Zhou, N., Jiang, Y., Bergquist, T. R., Lee, … **Zhao, C.**, ... & Salakoski, T. (2019). The CAFA challenge reports improved protein function prediction and new functional annotations for hundreds of genes through experimental screens. *Genome biology*, 20(1), 1-23. (click here)
8. Liu, T., Porter, J., **Zhao, C.**, Zhu, H., Wang, N., Sun, Z., ... & Wang, Z. (2019). TADKB: Family classification and a knowledge base of topologically associating domains. *BMC genomics*, 20(1), 1-17. (click here)
9. **Zhao, C.**, & Wang, Z. (2018). GOGO: an improved algorithm to measure the semantic similarity between gene ontology terms. *Scientific reports*, 8(1), 1-10. (click here)
10. Wang, Z., **Zhao, C.**, Wang, Y., Sun, Z., & Wang, N. (2018). PANDA: Protein function prediction using domain architecture and affinity propagation. *Scientific reports*, 8(1), 1-10. (click here)

CONFERENCE PRESENTATIONS:

1. **Zhao, C.**, Liu, T., and Wang, Z., PANDA-3D: protein function prediction based on AlphaFold models. Poster presented at *GLBIO 2025*, Minneapolis, Minnesota.
2. **Zhao, C.**, Liu, T., and Wang, Z., Protein function prediction using graph neural network. Poster presented at *the Computing Day of the University of Miami 2023*, Miami, FL.
3. **Zhao, C.**, Liu, T., and Wang, Z., Functional similarity of protein-coding genes in topologically associating domains and long-range spatially proximate chromatin regions. *MCBIOS 2021*, online virtual.

TEACHING

Instructor, St. Ambrose University

- CSCI-185-A, Script Programming
  Spring 2024, Spring 2025, Spring 2026
- CSCI-250-A, Introduction to Cybersecurity
  Spring 2024, Fall 2024, Spring 2025, Fall 2025, Spring 2026
- CSCI-281-A, Discrete Structures
  Fall 2024, Fall 2025
- CSCI-294-A, Contemporary Programming
  Spring 2025
- CSCI-295-A, Programming II
  Fall 2025
- CSCI-300-A, Systems Analysis and Design
  Fall 2024
- CSCI-310-A, Data Structure
  Spring 2026
- CSCI-330-A, Web Programming
  Fall 2025
- CSCI-393-A, Algorithm Design and Analysis
  Spring 2024, Spring 2026
- CSCI-400-A, Programming Language Concepts
  Fall 2024
- CSCI-480-A, AI-powered Protein Prediction
  Spring 2025 (Self-developed course)

- CSCI-490-B, Ind. Study in Computer Science
  Spring 2025
- CSCI-600-A, Systems Analysis and Design in the Enterprise
  Spring 2024

Guest lecturer, University of Miami

- CSC548/648, Problem Solving in Bioinformatics
  Spring 2023

Teaching assistant, University of Miami

- CSC315, Introduction to Python for Scientists
  Fall 2020
- CSC314, Computer Organization and Architecture
  Fall 2020

FUNDING

- Stoffel Fund, $20,000, St. Ambrose University, "Advanced algorithms to infer protein functions using structures", May 2024
- Undergraduate Summer Research Institute, $5600, St. Ambrose University, "Apply Deep Learning Algorithms on Estimating the Accuracy of Quaternary Structure of a Protein", April 2024
- Faculty Development Fund, $1,000, St. Ambrose University, "Conference Paper Presentation", April 2024

ACADEMIC SERVICE

Journal Reviewer

- Artificial Intelligence Review (Impact factor: 12.0)
- Computational and Structural Biotechnology Journal (Impact factor: 4.5)
- PLOS Computational Biology (Impact factor: 3.8)
- BMC Genomics (Impact factor: 3.5)
- PLOS ONE (Impact factor: 2.9)
- Frontiers in Genetics (Impact factor: 2.8)

Conference Program Committee

- IEEE International Conference on Bioinformatics and Biomedicine (BIBM): 2024, 2025

Scholarly Leadership

- IEEE St. Ambrose University Student Branch Coordinator

UNIVERSITY SERVICE

St. Ambrose University

- The CIS Department Assessment Activities Review, April 2024
- The CIS Department Educational Policies Review, April 2024
- The CIS Department Faculty Finance Review, March 2024
- Visit Day: Academic & Student Services Fair, introducing the programs offered by the Computer and Information Sciences Department to and answering questions from Colin Kramer's family, Sep 2024
- Visit Day: Academic & Student Services Fair, introducing the programs offered by the Computer and Information Sciences Department to and answering questions from Nick Becker's family, Oct 2024
- Visit Day: Academic & Student Services Fair, introducing the programs offered by the Computer and Information Sciences Department to and answering questions from Jessica and her mom, Nov 2024
- The CIS Department Computer Science Program Alignment, Fall 2024
- Stoffel Fund Committee, Fall 2024

HONORS AND AWARDS:

- Award of Academic Merit University of Miami 2023

COMPETITION RESULTS

- The 4th round of Critical Assessment of protein Function Annotation algorithms (CAFA), 2020
  Our method (lab04 Model 1) ranks **1st** in MFO Smin and **2nd** in MFO Fmax
- The 14th round of Critical Assessment of Structure Prediction (CASP), 2020
  Our methods (MASS2 and LAW) are the **best** and **second-best** single-model methods in the local QA category of CASP14 according to our evaluations using the CASP14 official criteria

ADVISING STUDENTS

- De Jongh Walter, St. Ambrose University, Undergraduate research assistant, Summer 2024
- Eli Tisor, St. Ambrose University, Undergraduate research assistant, Summer 2024
- Kareti Srivalli, St. Ambrose University, Undergraduate research assistant, Summer 2024
- Ethan Vortriede, St. Ambrose University, Undergraduate research assistant, Summer 2024
- Ashwin Parab, Purdue University & Pleasant Valley High School, Visiting undergraduate research assistant, Summer 2024
- Advising 14 undergraduate students majoring in Computer Science and Cybersecurity, Since Fall 2024