

YONGCHENG MU

CS PH.D. CANDIDATE

📞 (757) 201-5313 📩 ymu004@odu.edu 🌐 yongcheng123.github.io 💬 Yongcheng Mu 🤖 GitHub 🎓 Yongcheng Mu

OBJECTIVE & SUMMARY

Ph.D. Candidate in Computer Science focusing on Computational Biology and Health Informatics. Strong background in Machine Learning, Deep Learning, and Large Multi-Modal Models (LMMs). Experience in developing end-to-end AI solutions, including images-based nutrition estimation systems, 3D segmentation tools, and iOS applications. Seeking an AI/ML internship for Summer 2026.

RESEARCH & TEACHING EXPERIENCE

- **Graduate Research Assistant** – *Old Dominion University, Norfolk, VA* Oct. 2019 – Present

– Machine Learning and LMMs for Nutrition Analysis

- * Developed and deployed **DonateAndLearn**, an iOS application (SwiftUI) that utilizes LMMs for real-time dietary assessment.
- * Engineered a data collection pipeline to aggregate real-world meal images, depth maps, and sensor metadata, creating a proprietary dataset for machine learning research.
- * Benchmarked state-of-the-art LMMs against traditional deep learning baselines to evaluate zero-shot capabilities in nutrition analysis.
- * Trained a novel multi-task learning model to estimate food weight from meal image and depth map, significantly improving LMM accuracy by incorporating these physical constraints.

(*ResNet, Tensorflow, LMMs, SwiftUI, Slurm, SAM2, Numpy, Pandas, PIL, OpenCV, image processing, Multi-task learning*)

– Deep Learning for Cryo-EM Density Map (3D) Segmentation

- * Developed **DeepSSETracer**, a **ChimeraX**-based plugin and deep learning tool for the automatic segmentation of secondary structures in 3D cryo-EM density maps.
- * Designed and trained a **3D U-Net** framework with custom loss functions, achieved superior segmentation performance on protein structures compared to existing methods.
- * Optimized large-scale training pipelines using CUDA and Slurm on HPC clusters to efficiently process complex 3D volumetric data.

(*3D-UNet, PyTorch, CUDA, Slurm, Python, C++, cryo-EM maps, Protein Data Bank*)

- **Graduate Teaching Assistant** – *Old Dominion University, Norfolk, VA* Jan. 2021 – Present
- Introduction to Theoretical Computer Science (CS390), Data Analytics Cybersecurity (CS469), Foundations of Computing (CS500), Algorithms and Data Structures (CS600)

CORE COMPETENCIES & TECHNICAL SKILLS

Languages:	Python, C++, Swift, Bash, LaTeX, HTML, SQL
Deep Learning	PyTorch, TensorFlow, Keras, Transformer, LMMs, CNNs, U-Nets, Autoencoders
Data Science & Vision	OpenCV, Scikit-learn, Numpy, Pandas, Scipy, Matplotlib, PIL, SAM2, Mask-RCNN
Tools & Platforms:	Git, Linux/Unix, HPC Clusters (slurm), CUDA, Jupyter Notebook, VS Code, xCode

EDUCATION

- **Ph.D. in Computer Science** – *Old Dominion University, Norfolk, VA (GPA 4.0/4.0)* Expected Dec 2026
- Bioinformatics, Health Informatics, Deep Learning, Machine Learning, Large Multi-modal Models, Computer Vision

- **B.E. in Welding Technology and Engineering** – *Lanzhou University of Technology, China* Sep 2009 – Aug 2013

SELECTED PUBLICATIONS

- [ACM-BCB] **Yongcheng Mu**, et al. "Benchmarking and Improving Foundation Model Dietary Estimates from Meal Images". BCB '25: Proceedings of the 16th ACM International Conference on BCB, 2025.
- [Bioinformatics Advances] **Yongcheng Mu**, et al. "The combined focal loss and dice loss function improves the segmentation of beta-sheets in medium-resolution cryo-electron-microscopy density maps". Bioinformatics Advances, 2024.
- [Frontiers in Bioinformatics] **Yongcheng Mu**, et al. "A Tool for Segmentation of Secondary Structures in 3D Cryo-EM Density Map Components Using Deep Convolutional Neural Networks". Frontiers in Bioinformatics, 2021.