

YONGCHENG MU

CS PH.D. CANDIDATE

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OBJECTIVE & SUMMARY

CS Ph.D. Candidate with deep research experience in Machine Learning, Computer Vision, and Large Multi-modal Models, specifically focusing on applications in Computational Biology and Health Informatics. Seeking an internship opportunity for **Summer 2026** in an AI-focused team to expand my skills in ML/DL.

RESEARCH & TEACHING EXPERIENCE

- **Research Assistant** – *Old Dominion University, Norfolk, VA* Oct. 2019 – Present
 - **Project 1: Nutritional Analysis using Large Multi-modal Models (LMMs)**
 - * Developed **DonateAndLearn**, an iOS application using SwiftUI that integrates LMMs to estimate nutrition from meal images, successfully collecting a proprietary dataset of real-word images, depth maps, and sensor information to assist in diabetes research.
 - * Benchmarked state-of-the-art LMMs against traditional deep learning baselines to evaluate zero-shot capabilities. Enhanced LMMs' performance by incorporating predicted physical information (weight estimation) from a end-to-end trained model, significantly improving nutrition estimation performance.
(*ResNet, Tensorflow, Keras, Python, LMMs, SwiftUI, Slurm, SAM2, Numpy, Pandas, PIL, OpenCV, image processing, Multi-task learning ...*)
 - **Project 2: Deep Learning for Cryo-EM Map Segmentation**
 - * Developed **DeepSSETracer** (ChimeraX-based plugin), a novel ChimeraX plugin and deep learning tool for segmenting secondary structures in 3D cryo-EM density maps, achieving significant accuracy improvements over baseline models.
 - * Designed a U-Net framework in PyTorch with custom loss functions, significantly improving the segmentation performance of protein secondary structures. Optimized training pipelines using CUDA and Slurm on HPC clusters to process complex 3D protein structures efficiently.
(*UNet, PyTorch, CUDA, Slurm, Python, C++, cryo-EM maps, Protein Data Bank*)
 - **Project 3: Technician & Research Assistant**
 - * Designed and fabricated programmable electronic equipment for bio-electrics research experiments at the ODU Research Foundation (Dept. of Bio-electrics, Oct 2019 - Jan 2021).
- **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

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| Languages: | Python, C++, LaTeX, HTML, Bash, Swift |
| Tools & Platforms: | Git, Unix, HPC Clusters, CUDA, Jupyter Notebook, VS Code, Google Colab, xCode |
| Neural Networks: | CNNs, RNN, Autoencoders, U-Nets, Transformers, GAN |
| Packages: | PyTorch, TensorFlow, Keras, Scikit-learn, Numpy, Scipy, Pandas, Matplotlib, PIL, OpenCV, SAM2, Mask-RCNN, ChimeraX |

EDUCATION

- **Ph.D. in Computer Science** – *Old Dominion University, Norfolk, VA* 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.