YONGCHENG MU

CS PH.D. CANDIDATE

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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 constrains.
      (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.