Prof. Samantha Foley

Research Interests

Scientific Computing

High Performance Computing

Cloud Computing

Databases

Creating tools for teaching

Past Projects

- Past MSE and undergraduate research projects
  - DSLEUTH – parallelize an urban growth modeling program to run on multicore machines. Additional versions utilizing cloud technology, and Python
  - OnRamp – a web portal for running parallel programs for education
  - Concurrency Visualizer – a web application that demonstrates classic synchronization programs with a backend written in Go
  - Suite of GPU applications for learning about parallel computing
  - Interactive powerpoint tool for student engagement without needing a hardware device or account
  - Advising Chatbot – a web-based chatbot that is trained to answer questions about our CS&CPE programs.

Current and Potential Projects

- ***PySLEUTH (high-performance and Python versions of SLEUTH)***
  - Reimplement model in Python using high-performance libraries and have it run on OSPool
  - Develop and incorporate tools for post-processing
- ***SQL and Transaction Visualizer***
  - extend current MSE work with more features, and database sources. Depends on how far the current student gets with the work this year, but likely several areas to extend and improve.
- ***Advising Chatbot***
  - Students built an advising chatbot that worked, but it has not been taken beyond the proof-of-concept stage. Extend the project to be robust, accurate, and performant so we can deploy it.

I am always willing to work with students on their own project ideas.

Samantha Foley – sfoley@uwlax.edu - Wing 220



Dr. Mao Zheng
Nov. 2, 2026

https://www.cs.uwlax.edu/~mzheng

Research Interest

- Software Engineering
  - Software Testing
    - Specification-based testing(formal model, automation)
    - UML testing (informal model, scenario-based)
  - Software Model & Software Design
    - Context-aware computing
      - Context models
      - Design and implementation based on the model
      - Context-aware applications: mobile apps.
- AI / Machine Learning (??)

Past Projects

Machine Learning	Mobile App Development	Software Engineering
A Web Application for Sales Forecasting	Explore Mobile App Development with React Native	DataTracker: A Comprehensive Artifact Management Tool for Embedded Chiller Applications
Building a Stock Machine Learning Model using Numerai Dataset	Workout Track & Plan App	Launch Web Tool Document Generator from Legacy tool Spectrum to Generate Equipment Submittals
A Detection Tool for Traffic Objects	An Android App for Detecting Sleep and Pausing Media	
Tongue Diagnosis in Diabetes by Deep Learning	An Android UWL Campus Guide App (kotlin)	Test Case Generation from UML Models
Developing an Autonomous Driving Model Based on Raspberry Pi	A Ride Sharing Application: UberLite	A Web-based Testing Tool
Using Machine Learning to Play the Game Super Mario Kart	Context-based Mobile User Interface	A Design of the Test Engine
A Web Application for Restaurant Recommendations	A Mobile Application for Collecting Plant Observation Data	

Current Projects & Future Ideas

- Build a Front-Desk Chatbot for the office of International Education & Engagement

Looking for Students:

- Mobile App Development: Kotlin or React Native
- Software Models, Design, or Testing
- AI/Machine Learning

Interests

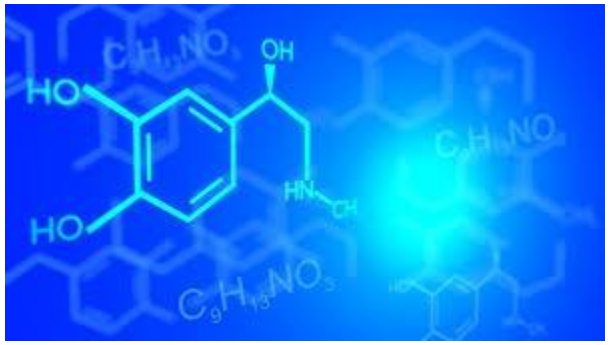
- Adaptive Mobile AI
  - Adaptive interfaces
- Privacy-preserving AI on personal devices
  - Train models without sharing raw data
  - Ensure the user's identity cannot be inferred from AI models
- Cross-Device Context and Ecosystem-level Awareness
  - Mobile devices coordinate other devices to infer richer context

Michael Gerten

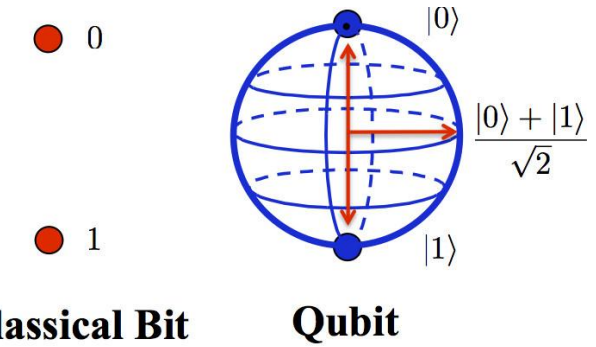
Assistant Professor

Emerging Domains of Computation

- Quantum Programming
- Molecular Programming



$$A \rightarrow 2B + C$$



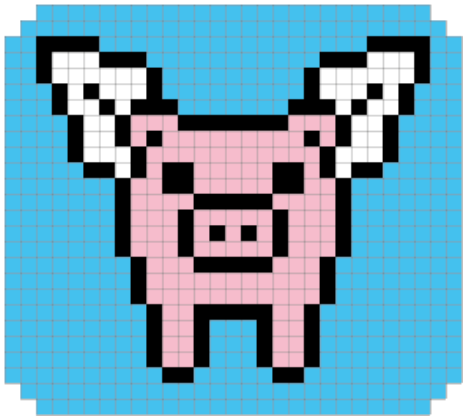

```
let f = (n : nat)(size : nat)(M : nat)(x : size) in
  match n with 0 =>   SKIP (x, 0)
m =>  f(m, size, M, x)
if M $ m then {  SR (x, size - m)
} else {  SKIP (x, m)
}

 end


  QFT (x, 0)
 f(na, size, m, x : size)
  RQFT x
```

Software Engineering Applications

- Software Testing
- Benchmarks of Model & Specifications
- Automated Program Repair







Lightning Talk

Dr. Hongyi Bian

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Nov-2026

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Research Interests

- Trustworthy AI/ML Systems
- Service Computing
- Ubiquitous Computing
- Situation-Aware Modeling

Looking for Students

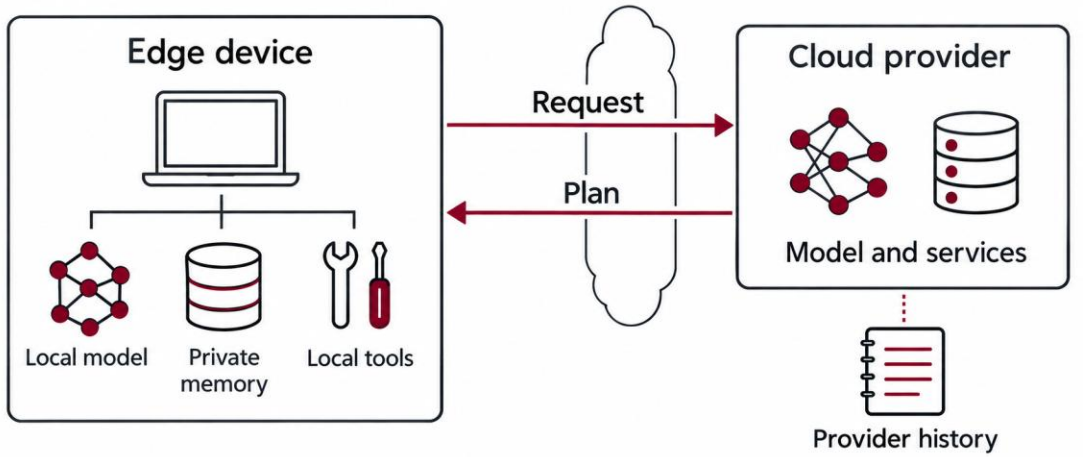
- Interests in ML/LLM systems, IoT, privacy, blockchain

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Current and Future Projects: Frameworks

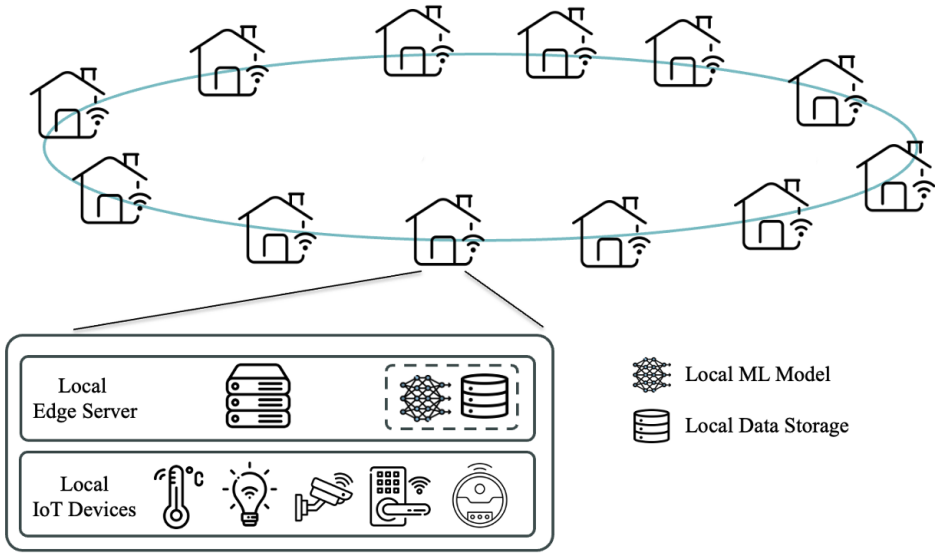
Privacy-Preserving Edge–Cloud Services

- Collaboration between large and small language models
- Data minimization and request obfuscation
- Privacy protection across service interactions
- Differential privacy



Personalized & Verifiable Collaborative Learning

- Personalized mutual learning and decentralized collaboration
- Cooperation incentives and game theory
- Blockchain and zero-knowledge proofs



Current and Future Projects: Applications

Smart Homes and IoT

- Situation awareness and personalized services
- Intelligent automation across connected devices

Agentic Service Computing

- LLM applications with APIs and external tools
- Automated workflows using LangChain and MCP

Digital Health and Assisted Living

- Wearable and ambient sensing
- Privacy-aware services for daily living



LIGHTNING TALK 2026

Generalizable EEG

Protocol generalization and channel independent classification across tasks



Dr. Rig Das

Assistant Professor
Computer Science & Computer Engineering
University of Wisconsin–La Crosse

EEG classification across tasks

BIOMETRICS

Who is this person?



Identity verification
A match to an enrolled user

BRAIN–COMPUTER INTERFACES

What movement is imagined?



Motor imagery classification
For example, left versus right hand

The generalization problem

Recording conditions change

Protocol

Eyes open, eyes closed, motor imagery

Channels

Sensor count, position and missing signals

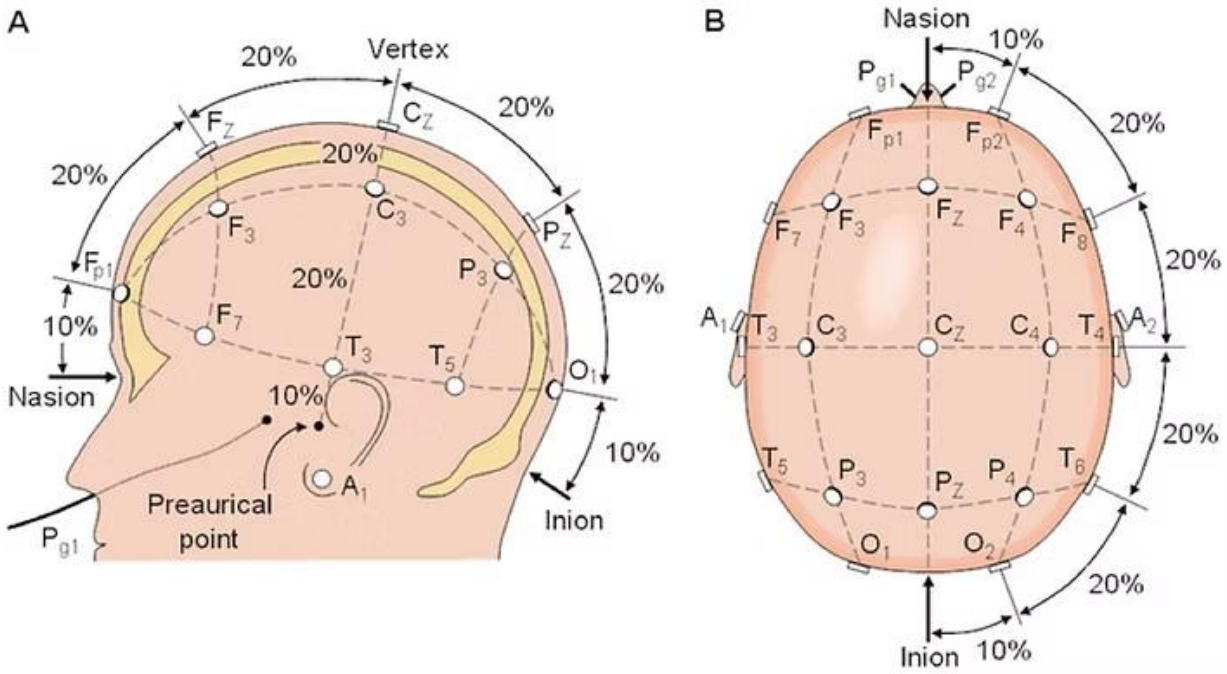
Person + session

Different users and recording days

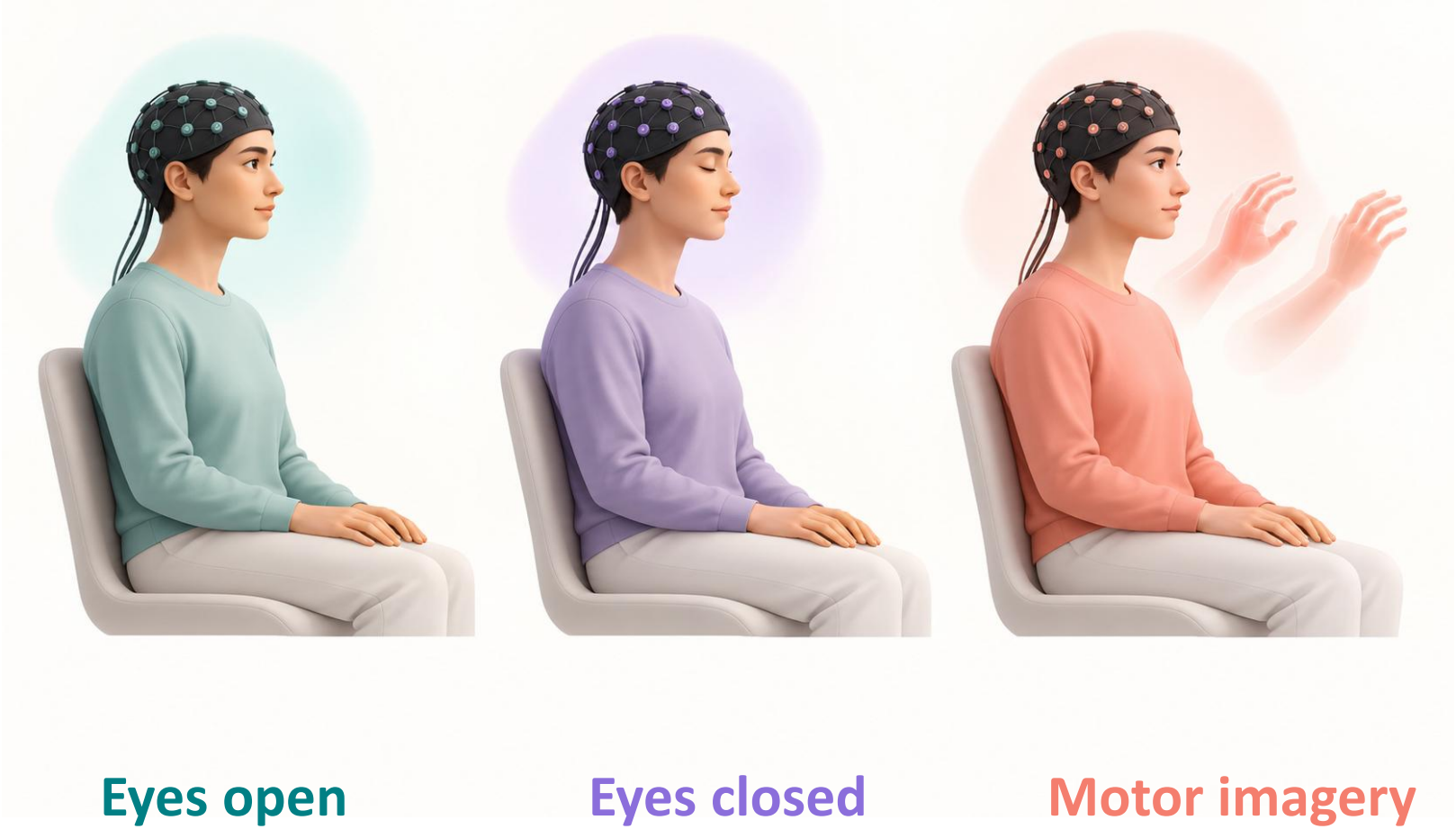
Device + site

Different hardware and acquisition settings





Generalization across EEG protocols



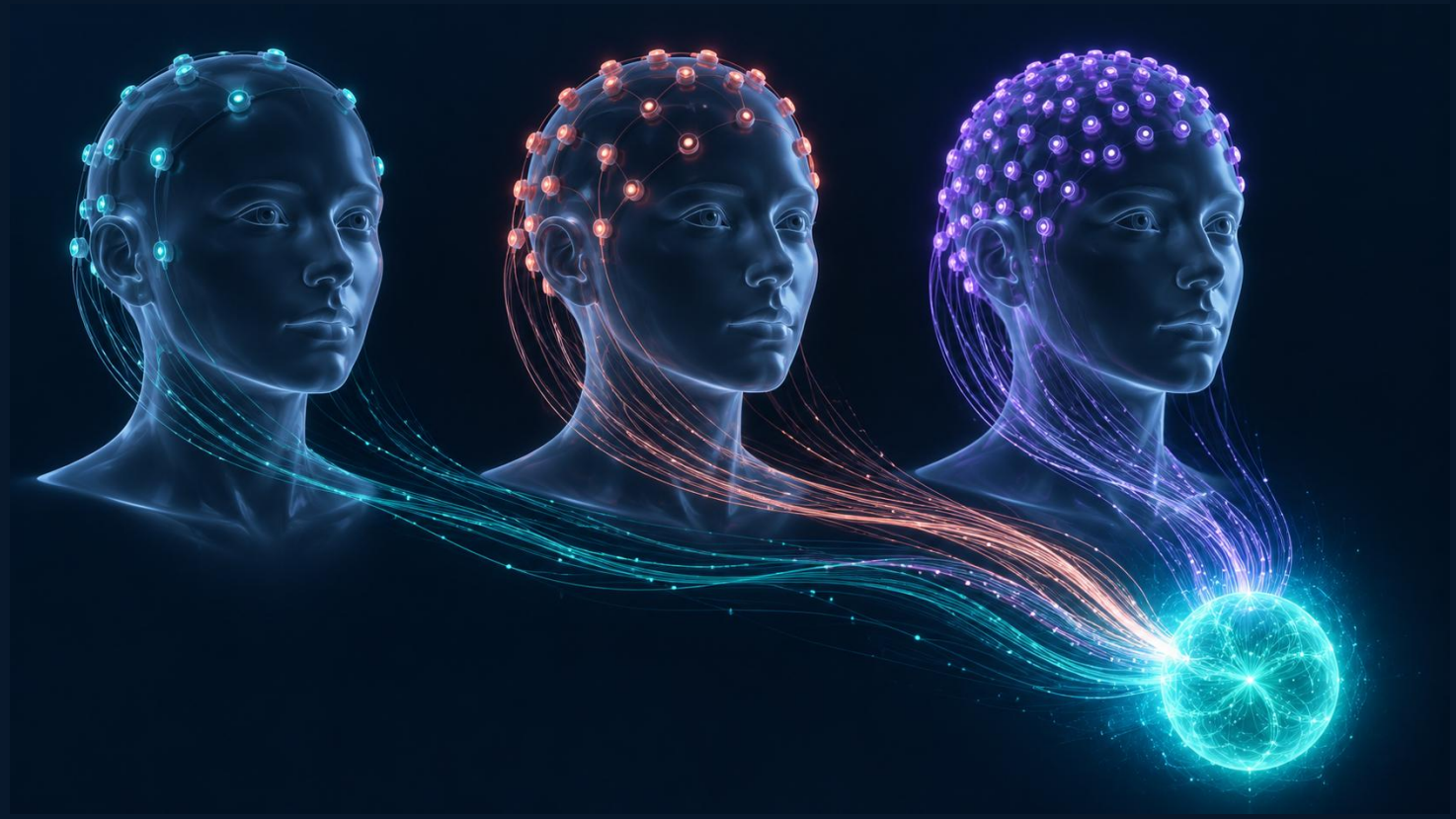
Research goal: identity features that persist across recording conditions

Classification with flexible channel inputs

01 **Encode each channel**

02 **Combine available sensors**

03 **Learn an output for each task**



Design goal: flexible inputs without fixing one channel count or order

Electrode coverage still affects the information available to the model

Evaluation on unseen recordings

Each claim needs its own held-out test

Generalization claim	What changes at test time	What we report
Across sessions	Recording day	Verification EER
Across people	Participant	Balanced accuracy for MI
Across protocols	Recording condition	Performance per protocol
Across channel layouts	Sensor subset or montage	Performance vs. coverage
Across datasets	Acquisition source or site	External test performance

Test data stays outside training and model selection

Research directions at UWL

EEG biometrics

Verification across sessions,
protocols and devices



Motor imagery classification

Decoding imagined movement
in people outside the training set



NeuroID

UWL–Mayo Seed Grant 2025–2026 Parkinson’s disease and RBD research

Collaboration opportunities



g.Nautilus EEG system

Toward reliable EEG classification across recording settings

Clinical EEG datasets

Robust learning and evaluation

Student research projects

Dr. Rig Das

rdas@uwlax.edu

Technical scope and limits

Term	Meaning in this talk
Protocol generalization	Transfer to an unseen recording condition for a defined task
Channel independence	Accept variable channel sets with an appropriate spatial representation
Subject independence	Evaluate on people absent from training
Learning across tasks	Reuse an encoder with a classifier and labels for each task

A flexible input format does not establish generalization by itself