Thomas Twomey

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Education

University of Michigan — Ann Arbor, MI
Computer Science and Engineering, PhD — *Aug. 2023 – Current*
Computer Science and Engineering, Masters of Science — *May 2025*
Advisors: George Tzimpragos, Ronald Dreslinski

Virginia Tech — Blacksburg, VA
College of Engineering, Bachelor of Science in Computer Science — *Aug. 2017 – Dec. 2020*
College of Science, Bachelor of Arts in Economics
Graduated Summa Cum Laude, Cumulative GPA: 3.95/4.00

Current Projects

Fast Frequency Modulation of GPUs for Virtual Inertia — Sep. 2025 – Current

- Exploring the use of dynamic frequency and voltage scaling (DVFS) to provide rapid changes in the power consumption of AI inference data centers as a service to the grid.

Online Learning with Neuromorphic Hardware — Jan. 2025 – Current

- Exploring temporal logic for power constrained neuromorphic hardware that can perform online learning.
- Targeting applications with sensors that exhibit input domain drift and models trained offline fail to adapt and offloading model updates is infeasible.

Past Projects

In-Sensor Computing with Temporal Logic — Sep. 2023 – May 2025

- Exploring the use of temporal logic (a scheme where information is represented as a timing delay) to perform compute in-sensor quickly and efficiently to reduce downstream communication costs.
- Designing CMOS image sensor with temporal feature identification and tracking for visual inertial odometry (VIO). VIO is a localization method used in robotics and AR/VR headsets.

Research Artifacts

SEAL: A Single-Event Architecture for In-Sensor Visual Localization
Ryan Hou, **Thomas Twomey**, ... Georgios Tzimpragos
International Symposium on Computer Architecture (ISCA), 2025

Dopamine and Serotonin in Human Substantia Nigra Track Social Context and Value Signals During Economic Exchange
Seth R. Batten, Dan Bang, Brian H. Kopell, ... **Thomas Twomey**, ... P. Read Montague
Nature Human Behaviour, February 2024

Noradrenaline Tracks Emotional Modulation of Attention in Human Amygdala
Dan Bang, Yi Luo, ... **Thomas Twomey**, ... P. Read Montague
Current Biology, November 2023

Deep Learning Architectures for FSCV, a Comparison
Thomas Twomey, Leonardo Barbosa, Terry Lohrenz, P Read Montague
Preprint, https://arxiv.org/abs/2212.01960

On the Characterization of the Performance-Productivity Gap for FPGA
Atharva Gondhalekar, **Thomas Twomey**, Wu-chun Feng
IEEE International High-Performance Extreme Computing (HPEC), 2022

Past Experience

Data Scientist / Machine Learning Engineer June 2021 – May 2023

Montague Lab : Fralin Biomedical Research Institute at Virginia Tech Carillon *Roanoke, VA*

- Developed, tested, and deployed ml models for the prediction of in-vivo neurotransmitter concentrations from human brain surgery participants and animal experiments.
- Developed software techniques to identify and suppress electrical noise from low amplitude voltammetry recordings
- Implemented and maintained automated in-vitro and in-vivo data processing pipelines for model training and interference. Incorporated automatic report generation with noise and validity checks.
- Designed automated/robotic in-vitro data collection apparatus to increase data collection throughput by an order of magnitude and to increase quality of the data.

Undergraduate Research Assistant Feb. 2020 – Dec. 2020

SyNeRGy Lab : Virginia Tech Department of Computer Science *Blacksburg, VA*

- Developed High Level Synthesis and Register Transfer Language implementations of computing kernels (Sobel Filter, K-means clustering, FFT) for quantification of performance / productivity trade-off

Volunteer Research Assistant Aug. 2020 – Dec. 2020

Dr. Yang Yi's Lab, Virginia Tech Department of Electrical and Computer Engineering *Blacksburg, VA*

- Assisted with investigation of Spiking Neural Networks (SNN) for FPGA
- Performed cursory literature survey of existing SNN architectures and hardware implementations
- Conducted limited simulation of SNN models with PyTorch based library

Volunteer Research Assistant Jan. 2019 – May 2019

Virginia Tech Department of Economics *Blacksburg, VA*

- Assisted with behavioral economics risk perception experiment
- Developed oTree(Django derivative) based web app for a behavioral economics experiment

Undergraduate Teaching Assistant Jan. 2019 – May 2019

Virginia Tech Department of Computer Science *Blacksburg, VA*

- Guided $\sim$ 100 students on projects related to Linux Environments, C programming, and x86 Assembly
- Provided extensive help debugging student code and promoted simple debugging techniques