Anthony Hitchcock Thomas

ahth@ucdavis.edu
https://thomas9t.github.io

Academic Appointments

UC Davis

Assistant Teaching Professor – Electrical and Computer Engineering (July, 2024 - Present)

UC Berkeley

Postdoctoral Scholar – Redwood Center for Theoretical Neuroscience (September, 2023 - July, 2024)

Education

UC San Diego

PhD - Computer Science (September 2023)
- **PhD Committee**: Tajana Rosing (Chair), Sanjoy Dasgupta (Co-Chair), Kamalika Chaudhury, Alexander Cloninger, Tara Javidi
- **Research Areas**: Artificial intelligence, kernel methods, embedded systems
- **Dissertation Title**: *A Formal Perspective on Hyperdimensional Computing*

UC Berkeley

BS with High Distinction - Environmental Economics and Policy (2013) 3.9/4.00 GPA

Research Appointments

Intel Research

Summer Research Intern – Neuromorphic Computing Group (Summer 2022)
Summer Research Intern – Trusted and Distributed Intelligence Group (Summer 2021)

The Swiss Federal Institute of Technology, Lausanne (EPFL)

Visiting PhD Student – Embedded Systems Lab (July 2019–December 2019)

Teaching and Mentoring

Mentoring and Outcomes
- **Undergraduates and MS**: Namiko Matsumoto (PhD, UCSD and NSF graduate fellowship recipient), Fatemeh Asgarinejad (PhD, UCSD), Yilun Hao (MS, Stanford), Xin Sheng (MS, UCSD), Dhanush Nanjunda-Reddy (Cartesian Systems), Jonathan Zamora (BS, UCSD), Daryl Nakamoto, Lucy Lee

Teaching
- **Courses**: CSE 291 (Hyperdimensional Computing Seminar)
- **TA Positions**: CSE 166 (Image Processing), DSE 210 (Probability and Statistics in Python)
  - Positively recommended by 100% of students submitting evaluations

Grants

I have contributed significantly to the following successful proposals:
- Russel Sage Foundation: *Measuring Local Area Income Using Neural Networks Trained on Satellite Imagery*
- National Science Foundation: *Lifelong Learning with Hyperdimensional Computing*

Publications and Research

Selected Publications
- Arman Khachiyan, **Anthony Thomas**, Huye Zhou, Gordon H Hanson, Alex Cloninger, Tajana Rosing, and Amit Khandelwal. "Using Neural Networks to Predict Micro-Spatial Economic Growth" American Economic Review: Insights, vol. 4, np. 4, pp 491-506, 2022.
- **Anthony Thomas**, Sanjoy Dasgupta, and Tajana Rosing. "A Theoretical Perspective on Hyperdimensional Computing" Journal of Artificial Intelligence Research, vol. 72, pp. 215-249, 2021.
- **Anthony Thomas**, Amir Aminifar, and David Atienza. "Noise-resilient and interpretable epileptic seizure detection" 2020 IEEE International Symposium on Circuits and Systems (ISCAS), pp. 1-5, 2020, IEEE.
- **Anthony Thomas** and Arun Kumar. "A comparative evaluation of systems for scalable linear algebra-based analytics" Proceedings of the VLDB Endowment, vol. 11, no. 13, pp. 2168-2182, 2018, VLDB Endowment.

Additional Publications and Research

- Gopi Krishna-Jha, **Anthony Thomas**, Nilesh Jain, Sameh Gobriel, Tajana Rosing, and Ravi Iyer. "Mem-Rec: Memory Efficient Recommendation System using Alternative Representation." In Proceedings of The 15th Asian Conference on Machine Learning (to appear), PMLR 2023.

- **Anthony Thomas**, Sanjoy Dasgupta, Tara Javidi, and Tajana Rosing. "A Kernel Perspective on Hyperdimensional Computing." Under preparation.

- **Anthony Thomas**, Behnam Khaleghi, Gopi Krishna Jha, Sanjoy Dasgupta, Nageen Himayat, Ravi Iyer, Nilesh Jain, and Tajana Rosing. "Streaming Encoding Algorithms for Scalable Hyperdimensional Computing." arXiv preprint arXiv:2209.09868, 2022.

- Justin Morris, Hin Wai Lui, Kenneth Stewart, Behnam Khaleghi, **Anthony Thomas**, Thiago Marback, Baris Aksanli, Emre Neftci, and Tajana Rosing. "HyperSpike: HyperDimensional computing for more efficient and robust spiking neural networks." In 2022 Design, Automation & Test in Europe Conference & Exhibition (DATE), pp. 664-669. IEEE, 2022.

- Alireza Amirshai, **Anthony Thomas**, Amir Aminifar, Tajana Rosing, and David Atienza. "M2D2: Maximum-Mean-Discrepancy Decoder for Temporal Localization of Epileptic Brain Activities." IEEE Journal of Biomedical and Health Informatics (2022).

- Namiko Matsumoto, **Anthony Thomas**, Tara Javidi, and Tajana Rosing. "Hyperdimensional Computing and Spectral Learning." Association for Computing Machinery CogArch21 (2021).

- Fatemeh Asgarinejad, **Anthony Thomas**, and Tajana Rosing. "Detection of epileptic seizures from surface EEG using hyperdimensional computing." In 2020 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), pp. 536-540. IEEE, 2020.

- Behnam Khaleghi, Sahand Salamat, **Anthony Thomas**, Fatemeh Asgarinejad, Yeseong Kim, and Tajana Rosing. "Shearer: highly-efficient hyperdimensional computing by software-hardware enabled multifold approximation." In Proceedings of the ACM/IEEE International Symposium on Low Power Electronics and Design, pp. 241-246. 2020.

- Justin Morris, Mohsen Imani, Samuel Bosch, **Anthony Thomas**, Helen Shu, and Tajana Rosing. "CompHD: Efficient hyperdimensional computing using model compression." In 2019 IEEE/ACM International Symposium on Low Power Electronics and Design (ISLPED), pp. 1-6. IEEE, 2019.

- **Anthony Thomas**, Yunhui Guo, Yeseong Kim, Baris Aksanli, Arun Kumar, Tajana Rosing. "Hierarchical and distributed machine learning inference beyond the edge" 2019 IEEE 16th International Conference on Networking, Sensing and Control (ICNSC), pp. 18-23, 2019

Service

- **Reviewing**: JMLR, Neural Computation, ICALP, Frontiers in Big Data.