

PROFESSOR DI WU

✉ di.wu@ucf.edu

🏠 www.unarylab.com

📍 4328 Scorpius Street, Orlando, FL, 32816-2362, US

APPOINTMENT

Assistant Professor | *Electrical and Computer Engineering*
University of Central Florida

Aug. 2023 – Present
Orlando, FL, USA

Joint Assistant Professor | *Computer Science*
University of Central Florida

Aug. 2023 – Present
Orlando, FL, USA

EDUCATION

Doctor of Philosophy | *Electrical and Computer Engineering*
University of Wisconsin–Madison

Sep. 2017 – Jul. 2023
Madison, WI, USA

• Advisor: Joshua San Miguel

• Thesis: Power-Efficient Computer Architecture via Unary and Approximate Computing

🏆 **Harold Peterson Outstanding Dissertation Award**

Master of Engineering | *Microelectronics*
Fudan University

Sep. 2012 – Jan. 2015
Shanghai, China

Bachelor of Science | *Microelectronics*
Fudan University

Sep. 2007 – Jul. 2012
Shanghai, China

RESEARCH INTEREST

- Computer architecture
— efficiency, etc.
- Emerging computing
— unary, neuromorphic, quantum, etc.
- Domain specific acceleration
— AI, BCI, cryptography, etc.
- Heterogeneous system
— CXL, etc.

HONORS AND AWARDS

Harold Peterson Outstanding Dissertation Award [🔗](#)
UW–Madison

2024

Distinguished Artifact Evaluation Award [🔗](#)
ASPLOS

2024

Machine Learning and Systems Rising Star [🔗](#)
MLCommons

2023

Capstone PhD Teaching Award Nomination
UW–Madison

2022

Grainger Wisconsin Distinguished Graduate Fellowship

2022

1 of the 3 PhD students selected from College of Engineering, UW–Madison

Student Travel Award
ISCA

2022

Dissertator Travel Award (twice)
UW–Madison

2022

Ph.D. Forum Invitation
DAC

2021

IEEE Micro Top Pick [🔗](#)

2021

1 of the 12 publications selected from all computer architecture publications in 2020

Gerald Holdridge Outstanding Teaching Assistant Award
UW–Madison

2020

Chancellor's Opportunity Fellowship
UW–Madison

2019

Student Research Travel Award
UW–Madison

2019

Student Research Competition Travel Award
ASPLOS

2019

Student Travel Award
ASPLOS

2019

Qualcomm Innovation Fellowship Finalist [🔗](#)
Qualcomm

2019

Foxconn SmartCity Competition Winner
Foxconn

2019

Hiran Mayukh Award 	2018
UW–Madison	
Rising Star Award	2015
HiSilicon	
National Scholarship (ranking 1/67)	2015
Fudan University	
Excellent Student Union Leader	2010
Fudan University	
Third Prize Freshman Scholarship (ranking 3/45)	2007
Fudan University	


PUBLICATIONS

Conference

- [1] LoAS: Fully Temporal-Parallel Datatflow for Dual-Sparse Spiking Neural Networks
Ruokai Yin, Youngeun Kim, Di Wu, Priyadarshini Panda
International Symposium on Microarchitecture, 2024
- [2] Evaluating Unary GEMM for Low-Precision AI: Toward Scalable Energy-Efficient DL Accelerators
Prabhu Vellaisamy, Harideep Nair, Di Wu, Shawn Blanton, John Paul Shen
IEEE Computer Society Annual Symposium on VLSI, 2024
- [3] ALISA: Accelerating Large Language Model Inference via Sparsity-Aware KV Caching
Youpeng Zhao, Di Wu, Jun Wang
International Symposium on Computer Architecture, 2024
- [4] Carat: Unlocking Value-Level Parallelism for Multiplier-Free GEMMs
Zhewen Pan, Joshua San Miguel, Di Wu
International Conference on Architectural Support for Programming Languages and Operating Systems, 2024
[Open-source artifact](#) 
 **Distinguished Artifact Evaluation Award**
- [5] uBrain: A Unary Brain Computer Interface
Di Wu, Jingjie Li, Zhewen Pan, Younghyun Kim, Joshua San Miguel
International Symposium on Computer Architecture, 2022
- [6] uSystolic: Byte-Crawling Unary Systolic Array
Di Wu, Joshua San Miguel
International Symposium on High-Performance Computer Architecture, 2022
[Open-source software: uSystolic-Sim](#) 
- [7] When Dataflows Converge: Reconfigurable and Approximate Computing for Emerging Neural Networks
Di Wu, Joshua San Miguel
International Conference on Computer Design, 2021
- [8] UNO: Virtualizing and Unifying Nonlinear Operations for Emerging Neural Networks
Di Wu, Jingjie Li, Setareh Behrooz, Younghyun Kim, Joshua San Miguel
International Symposium on Low Power Electronics and Design, 2021
- [9] Normalized Stability: A Cross-Level Design Metric for Early Termination in Stochastic Computing
Di Wu, Ruokai Yin, Joshua San Miguel
Asia and South Pacific Design Automation Conference, 2021
- [10] uGEMM: Unary Computing Architecture for GEMM Applications
Di Wu, Jingjie Li, Ruokai Yin, Hsuan Hsiao, Younghyun Kim, Joshua San Miguel
International Symposium on Computer Architecture, 2020
[Open-source software: UnarySim](#) 
 **Awarded 1 out of 12 IEEE Micro Top Picks 2021 from all computer architecture publications in 2020**
- [11] Approximate Hardware Techniques for Energy-Quality Scaling Across the System
Younghyun Kim, Joshua San Miguel, Setareh Behrooz, Tianen Chen, Kyuin Lee, Yongwoo Lee, Jingjie Li, Di Wu
International Conference on Electronics, Information, and Communication, 2020
- [12] SECO: A Scalable Accuracy Approximate Exponential Function Via Cross-Layer Optimization
Di Wu, Tianen Chen, Chienfu Chen, Oghenefego Ahia, Joshua San Miguel, Mikko Lipasti, Younghyun Kim
International Symposium on Low Power Electronics and Design, 2019
- [13] In-Stream Stochastic Division and Square Root via Correlation
Di Wu, Joshua San Miguel
Design Automation Conference, 2019

- [14] Convergence-Optimized Variable Node Structure for Stochastic LDPC Decoder
Qichen Zhang, Yun Chen, Di Wu, Xiaoyang Zeng, Yeong-luh Ueng
International Conference on Acoustics, Speech and Signal Processing, 2016
- [15] An Area-Efficient Architecture for Stochastic LDPC Decoder
Qichen Zhang, Yun Chen, Di Wu, Xiaoyang Zeng, Yeong-luh Ueng
International Conference on Digital Signal Processing, 2015
- [16] Latency-Optimized Stochastic LDPC Decoder for High-Throughput Applications
Di Wu, Yun Chen, Qichen Zhang, Lirong Zheng, Xiaoyang Zeng, Yeong-luh Ueng
International Symposium on Circuits and Systems, 2015
- [17] A High-Throughput LDPC Decoder for Optical Communication
Di Wu, Yun Chen, Yuebin Huang, Yeongluh Ueng, Lirong Zheng, Xiaoyang Zeng
International Conference on ASIC, 2013

Journal

- [1] uGEMM: Unary Computing for GEMM Applications
Di Wu, Jingjie Li, Ruokai Yin, Hsuan Hsiao, Younghyun Kim, Joshua San Miguel
IEEE Micro 41.3 (2021), pp. 50–56
 IEEE Micro Top Pick Issue 2021
- [2] In-Stream Correlation-Based Division and Bit-Inserting Square Root in Stochastic Computing
Di Wu, Ruokai Yin, Joshua San Miguel
IEEE Design & Test 38.6 (2021), pp. 53–59
- [3] Strategies for Reducing Decoding Cycles in Stochastic LDPC Decoders
Di Wu, Yun Chen, Qichen Zhang, Yeong-luh Ueng, Xiaoyang Zeng
IEEE Transactions on Circuits and Systems II: Express Briefs 63.9 (2016), pp. 873–877
- [4] An Efficient Multirate LDPC-CC Decoder With a Layered Decoding Algorithm for the IEEE 1901 Standard
Yun Chen, Qichen Zhang, Di Wu, Changsheng Zhou, Xiaoyang Zeng
IEEE Transactions on Circuits and Systems II: Express Briefs 61.12 (2014), pp. 992–996

Workshop

- [1] Synergizing Error Suppression, Mitigation and Correction for Fault-Tolerant Quantum Computing
Yanzhang Zhu, Siyuan Niu, Di Wu
2024 IEEE Workshop on Quantum Intelligence, Learning & Security, collocated with International Conference on Trust, Privacy and Security in Intelligent Systems, and Applications (2024)
- [2] Exploration of Unary Arithmetic-Based Matrix Multiply Units for Low Precision DL Accelerators
Prabhu Vellaisamy, Harideep Nair, Di Wu, Shawn Blanton, John Paul Shen
Workshop on Unary Computing, collocated with International Conference on Architectural Support for Programming Languages and Operating Systems (2024)
- [3] xBrain: Brain-Like Computing for Explainable Brain-Computer Interfaces
Queenly Xie, Prabhu Vellaisamy, Di Wu
Young Architect Workshop, collocated with International Conference on Architectural Support for Programming Languages and Operating Systems (2024)
- [4] T-MAC: Temporal Multiplication with Accumulation
Zhewen Pan, Di Wu, Joshua San Miguel
Young Architect Workshop, collocated with International Conference on Architectural Support for Programming Languages and Operating Systems (2022)

INVITED TALKS

Salvage Deep Learning Efficiency: A Unary Computing Approach	Oct. 2024
Case Western Reserve University	Cleveland, OH, USA
Salvage Deep Learning Efficiency: A Unary Computing Approach	Aug. 2024
Peking University	Virtual
Salvage Deep Learning Efficiency: A Unary Computing Approach	Mar. 2024
University of Minnesota Twin Cities	Minneapolis, MN, USA
Salvage Deep Learning Efficiency: A Unary Computing Approach	Nov. 2023
University of Louisiana at Lafayette	Virtual
Unary Computing for Power-Efficient Computer Architecture	Jul. 2023
AMD Research	Virtual
Unary Computing for Power-Efficient Computer Architecture	Feb. 2023
University of Central Florida	Orlando, FL, USA

Unary Computing for Power-Efficient Computer Architecture University of California, Los Angeles	Nov. 2022 Virtual
uBrain: A Unary Brain Computer Interface University of Central Florida	Nov. 2022 Virtual
Unary Computing for Power-Efficient Computer Architecture University of California, Santa Barbara	Oct. 2022 Virtual

EMPLOYMENT

Research Assistant Department of Electrical and Computer Engineering, UW–Madison	Sep. 2017 – Jul. 2023 Madison, WI, USA
Research Intern Cerebras Systems	May 2022 – Sep. 2022 Sunnyvale, CA, USA
Research Intern Cerebras Systems	May 2020 – Sep. 2020 Sunnyvale, CA, USA
Research Intern Meta (Formerly Facebook)	May 2019 – Sep. 2019 Palo Alto, CA, USA
Digital Circuit Engineer HiSilicon	Mar. 2015 – May 2017 Shanghai, China
Research Assistant State Key Laboratory of ASIC and System, Fudan University	Sep. 2012 – Jan. 2015 Shanghai, China

TEACHING AND MENTORING

Instructor EEE3342C (Digital Systems), UCF	Fall 2024
EEL5796 (Big Data Computer Architecture and Systems), UCF	Spring 2024
ECE697 (Capston Project in Machine Learning and Signal Processing), UW–Madison	Summer 2023
Teaching Assistant ECE554 (Digital Engineering Lab), UW–Madison	Spring 2022
ECE454 (Mobile Computing Lab), UW–Madison	Fall 2021
ECE454 (Mobile Computing Lab), UW–Madison	Fall 2020
ECE554 (Digital Engineering Lab), UW–Madison	Spring 2020
ECE554 (Digital Engineering Lab), UW–Madison	Fall 2019
ECE554 (Digital Engineering Lab), UW–Madison	Spring 2019
ECE554 (Digital Engineering Lab), UW–Madison	Fall 2018
ECE552 (Introduction to Computer Architecture), UW–Madison	Fall 2018
Guest Lecturer ECE757 (Advanced Computer Architecture II), UW–Madison	Spring 2021
ECE757 (Advanced Computer Architecture II), UW–Madison	Spring 2020
ECE752 (Advanced Computer Architecture I), UW–Madison	Spring 2019

PROFESSIONAL SERVICE

Panelist NSF Medium Panel in Division of Computer and Network Systems (CNS)	2024
IEEE Workshop on Quantum Intelligence, Learning & Security (QUILLS)	2024
Committee Organizing Chair of Workshop on Architecting Error Corrected Quantum Computers (ARQTEC)	2025
Organizing Chair of Undergrad Panel on “Charging STEM Career” at UCF	2024
Organizing Chair of Workshop on Unary Computing (WUC)	2024
Organizing Committee of Quantum Computing for Drug Discovery Challenge at ICCAD	2023
Program Committee of ISCA	2024, 2025
Program Committee of HPCA	2024, 2025
Program Committee of IISWC	2023
Program Committee of ISPASS	2024, 2025
Program Committee of IPDPS	2025
Program Committee of ICCAD	2024
Program Committee of DAC PhD Forum	2024
Program Committee of ICCD	2023, 2024
Program Committee of ICRC	2024
Program Committee of ICA3PP	2023
Program Committee of IEEE Workshop on Quantum Intelligence, Learning & Security (QUILLS)	2024
Program Committee of Young Architect Workshop (YArch)	2023, 2024
Program Committee of ASPLOS Artifact Evaluation	2020, 2021
Program Committee of MICRO Artifact Evaluation	2021
Mentor	

UCF IEEE Engineering in Medicine and Biology Society (EMBS) Student Branch Chapter	2024
Computer Architecture Long-term Mentoring (CALM)	2024
Young Architect Workshop (YArch)	2023
Undergrad Architecture Mentoring Workshop (uArch)	2023, 2024
MICRO – “Meet a Senior PhD Student”	2020

Journal Reviewer

ACM Transactions on Architecture and Code Optimization (TACO)
ACM Transactions on Embedded Computing Systems (TECS)
ACM Transactions on Reconfigurable Technology and Systems (TRETs)
IEEE Transactions on Circuits and Systems I (TCAS-I)
IEEE Transactions on Computers (TC)
IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)
IEEE Signal Processing Letters (SPL)
Journal of Network and Computer Applications (JNCA)

FUNDING

AMD AI & HPC Fund	2024
AMD	
AMD Fund for Academic Research (Unrestricted Gift)	2024
AMD	\$100,000

FORMER STUDENTS

Parker McLeod	2024
AMD Orlando	Full-time
Tyler Goldsmith	2024
AMD Orlando	Full-time
Mustafa Nisar	2024
AMD Toronto	Co-op
Zhewen Pan	2022
Department of Electrical and Computer Engineering, UW–Madison	PhD
Ruokai Yin	2021
Department of Electrical Engineering, Yale University	PhD

REFERENCE

Professor Joshua San Miguel jsanmiguel@wisc.edu	PhD advisor University of Wisconsin–Madison
Professor Younghyun Kim younghyun.kim@wisc.edu	PhD committee member University of Wisconsin–Madison
Professor John Paul Shen jpshen@cmu.edu	Carnegie Mellon University
Professor Timothy Sherwood sherwood@cs.ucsb.edu	University of California, Santa Barbara
Professor Ulya R. Karpuzcu ukarpuzc@umn.edu	University of Minnesota, Twin Cities