Weifan Chen

857-800-3421 | Boston, Massachusetts, 02446 | <u>wfchen@bu.edu</u> |

EDUCATION

Boston University Computer Science Department
Boston, MA

Ph.D Candidate in Computer Science; GPA 3.69
Jan 2021 - present

- Embedded Systen; Cyber-physical system; Real-time computing; Heterogeneous platform development

Boston University Computer Science Department
Boston, MA

MSc in Artificial Intelligence; GPA 3.9
Sep 2019 - Dec 2020

- Artificial Intelligence: Image and video computing; Machine learning; Natural language processing
- System: Computing and operating system; Embedded system development; Network; Database
- Software: Functional programming

University of Wisconsin Madison Physics Department
Madison, WI

BS. In Physics; Math certificate; GPA 3.3
Sep 2013 - Dec 2016

- Mathematics: Linear Algebra; Calculus; College geometry;Statistics
- Physics: Classical mechanics and electrodynamics; Statistic; Quantum Mechanics; Thermal Physics

RESEARCH EXPERIENCE

Research Assistant in Cyber Physical System
Sep 2020 — Present

Boston University Cyber Physical System Lab
Boston, MA

- Theorize, implement, and test a paradigm in which a heterogeneous platform can achieve self-awareness in timeliness with near zero overhead. Master debug techniques such as ®ARM embedded trace, debug hardware from ®LAUTERBACH and skills in program control flow analysis. Cultivate skills in heterogeneous embedded system development on ®AMD platforms.
- Develop an on-chip debug system for ®ARM Embedded Trace Macrocell on a ®XILINX development board. Not only the system can partially replace an hardware tracer worthy 20,000$ on market, but also achieves better flexibility and functionality real-time environment.
- Co-develop a memory bandwidth regulator which can prevent timeliness violation by reducing multi-core program interference. The regulator also achieves significant low overhead compared with other state-of-the-art regulation mechanism. The work is in submission.
- Through various hardware designs and implementation on FPGA, developed skills in writing register-transfer-level code, such as Verilog.
- Teamwork with the principle investigator and participate the NSF grant application process.

Research Consultant
Jan 2020 — Jan 2023

Machine learning, Boston University Brain Image Lab
Boston, MA

- Teach and mentor other student researchers in analyzing biomedical data via machine learning techniques.
- Adapt and implement a state-of-the-art reinforcement learning backed evolutionary algorithm to model Alzheimer's disease. The model can classify different stage of the disease via analyzing bio-markers.
- Magnetic resonance imaging produces a wealth of bio-markers. I developed a 3D deep learning framework to analysis the MRI of Gulf War illness patients. The result is published.
- Work with the principle investigator and researchers to frame problems and set plans.

Student Research Assistant
Sep 2019 — Sep 2020

Computer Vision, Boston University Image and Video Computing Group
Boston, MA

TEACHING EXPERIENCE

Teaching Assistant
Fall 2020

CS320 : Functional Programming Language and Design
Boston University

Teaching Fellow
Fall 2023

CS350 : Fundamentals of Computing Systems
Boston University

Publication

- **W. Chen**, I. Izhbirdeev, D. Hoornaert, S. Roozkhosh, P. Carpanedo, S. Sharma, R. Mancuso, "Low-overhead Online Assessment of Timely Progress as a System Commodity", **Outstanding Paper Award**, in Proceedings of the 35th Euromicro Conference on Real-Time Systems (ECRTS) July 2023, Vienna, Austria.

- D. Oliveira, **W. Chen**, S. Pinto, R Mancuso, "Investigating and Mitigating Contention on Low-End Multi-Core Microcontrollers", Real-time And intelliGent Edge computing workshop (RAGE), June 2023, San Francisco, CA, USA.

- A. Zuepke, A. Bastoni, **W. Chen**, M. Caccamo, R. Mancuso, "MemPol: Policing Core Memory Bandwidth from Outside of the Cores", In Proceedings of the 29th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), May 2023, San Antonio, Texas, USA.

- Y. Guan, S. A. Ebrahimzadeh, C. Cheng, **W. Chen**, T. Leung, S. Bigornia, N. Palacios, M. O. Garelnabi, T. Scott, R. Bhadelia, K. L. Tucker, B. Koo, Association of Diabetes and Hypertension With Brain Structural Integrity and Cognition in the Boston Puerto Rican Health Study Cohort Neurology Mar 2022, 10.1212

- Guan Y.;Cheng C-H.; **Chen W**.;Zhang Y. et al. Neuroimaging Markers for Studying Gulf-War Illness: Single-Subject Level Analytical Method Based on Machine Learning. Brain Sci. 2020, 10, x

Presentations and Talks

The 35th Euromicro Conference on Real-time Systems	July 2023
Low-overhead Online Assessment of Timely Progress as a System Commodity	*Vienna, Austria*
Real-Time Pitch at ECRTS2023	July 2023
Demo on Timely Progress Assessment and Regulation on Xilinx MPSoC Ultrascale+ platform	*Vienna, Austria*
BU Computer Systems (BUCS) Seminar and Red Hat Colloquium	September 2023
Milestone Based Timely Progress Assessment	*Boston, MA*

Awards

Outstanding Paper Award	July 2023
The 35th Euromicro Conference on Real-time Systems	*Vienna, Austria*
Best Presentation Award	July 2023
The 35th Euromicro Conference on Real-time Systems	*Vienna, Austria*
Dean's List	September 2014
University of Wisconsin Madison Physics Department	*Madison, WI*
Ingersoll Physics Scholarship Award	September 2014
University of Wisconsin Madison Physics Department	*Madison, WI*

Service

CS PhD Social Activities Committee	Mar 2023 - Jan 2024
Member	*Boston University*

Selected Projects

System & Embedded
- Time progress assessment paradigm that can handle execution negative slack, and conduct timely correction.
- A memory bandwidth controller that utilizes low power real-time core to prevent the main core from memory bus contention.
- A simulator for analyzing the performance of multi-server system

Machine Learning & Deep Learning & Artificial Intelligence
- 3D convolutional neural networks specialized for brain MRI scan data
- A pipeline for key feature identification for neurological biomarkers via machine learning and evolution algorithm
- Multiple cell detection and tracking via computer vision techniques
- Using reinforcement learning algorithm as controller for drones

SELECTED SKILLS

Languages: Python, Java, C/C++, OCaml, Bash, SQL, MongoDB
Libraries: LLVM, PyTorch, TensorFlow, Sklearn, Pandas, Networkx
Hardware/Framework: Verilog, Xilinx Vivado/SDK/PetaLinux