

# Weifan Chen

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## EDUCATION

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### **Boston University Computer Science Department**

Boston, MA

*Ph.D Candidate in Computer Science; GPA 3.69*

*Jan 2021 - present*

- Embedded System; 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

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### **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 <sup>®</sup>ARM embedded trace, debug hardware from <sup>®</sup>LAUTERBACH and skills in program control flow analysis. Cultivate skills in heterogeneous embedded system development on <sup>®</sup>AMD platforms.
- Develop an on-chip debug system for <sup>®</sup>ARM Embedded Trace Macrocell on a <sup>®</sup>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

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### **Teaching Assistant**

Fall 2020

*CS320 : Functional Programming Language and Design*

*Boston University*

### **Teaching Fellow**

Fall 2023

*CS350 : Fundamentals of Computing Systems*

*Boston University*

## PUBLICATION

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- D. Oliveira, **W. Chen**, S. Pinto, R. Mancuso, "Shared Resource Contention in Low-end MCUs: A Reality Check and the Quest for Timeliness", in Proceedings of the 36th Euromicro Conference on Real-Time Systems (ECRTS) July 2024, Lille, France.
- A. Zuepke, A. Bastoni, **W. Chen**, M. Caccamo, R. Mancuso, "MemPol: Polling-Based Microsecond-Scale Per-Core Memory Bandwidth Regulation", Real-Time Systems 2024.
- **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, Best Presentation 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

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

## AWARDS

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

## SERVICE

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<b>CS PhD Social Activities Committee</b>	Mar 2023 - Jan 2024
<i>Member</i>	<i>Boston University</i>

## SELECTED PROJECTS

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### 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

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**Languages:** Python, Java, C/C++, OCaml, Bash, SQL, MongoDB

**Libraries:** LLVM, PyTorch, TensorFlow, Sklearn, Pandas, Networkx

**Hardware/Framework:** Verilog, Xilinx Vivado/SDK/PetaLinux