

Jonas Wagner

Curriculum Vitae

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Education

Since **The University of Texas at Dallas**

Fall 2020 PhD Mechanical Engineering

Concentration: Dynamic Systems and Controls

Overall GPA: 3.47

Fall 2016 - **University of Wisconsin-Platteville**

Spring 2020 B.S. Engineering Physics and B.S. Electrical Engineering

Emphasis: Control Systems, Minor: Mathematics

Overall GPA: 3.37

Teaching Experience

Spring 2023 **Team Mentor - UTDesign EPICS**

Erik Jonsson School of Engineering and Computer Science, The University of Texas at Dallas

- Mentored two five-person teams of undergraduate students
- Assisted nonprofit sponsors in defining the project requirements
- Aided students on technical aspects of their projects

Fall 2021 & **Teaching Assistant - Introduction to Mechanical Engineering I & II**

Spring 2022 Mechanical Engineering, The University of Texas at Dallas

Professors: Dr. Oziel Rios and Dr. Dani Fadda

- Instructed students in person on weekly labs and assignments
- Graded weekly deliverable and answered any grading related questions
- Collected and aggregated assignments for ABET Accreditation
- Developed new course activities and lectures for future semesters

Fall 2020 & **Teaching Assistant - Introduction to Mechanical Engineering I & II**

Spring 2021 Mechanical Engineering, The University of Texas at Dallas

Professors: Dr. Oziel Rios and Dr. Dani Fadda

- Managed discussion forums to answer student questions and provide supplementary instruction
- Graded weekly deliverable and answered any grading related questions
- Communicated with students via email and MS Teams to answer course-related questions

Spring 2020 **Lab Assistant - Introduction to Automatic Controls**

Electrical and Computer Engineering, University of Wisconsin-Platteville

Professor: Dr. Mehdi Roopaei

- Supervised and instructed junior and senior engineering students in control labs
- Transitioned DC-motor control labs into virtual Simulink-based labs (still used today)
- Provided students with video lectures for completing lab assignments virtually

- Fall 2019 **Lab Assistant - Introduction to Engineering Projects**
 Electrical and Computer Engineering, University of Wisconsin-Platteville
 Professor: Dr. Mehdi Roopaei
- Assisted in teaching first year undergraduate students through the Electrical Engineering Module
 - Guided students through a lab performing simple analysis and testing of amplifier circuits
- Dec 2019 **Guest Lecturer - FEA Automation Workshop**
 Engineering Physics, University of Wisconsin-Platteville
 Professor: Dr. Gokul Gopalakrishnan
- Hosted a workshop for automating FEA testing using ANSYS workbench
- Summer 2019 **Student Assistant - Online Course Development**
 Center for Distance Learning, University of Wisconsin-Platteville
 Professor: Dr. Mehdi Roopaei
- Assisted in the development of course materials for the online graduate course:
 Engineering 7310 - Control Systems Engineering I
- Fall 2016 - **Robot Design and Controls Mentor**
 Spring 2020 FIRST Robotics Competition Team 171, Platteville, WI
- Mentor High School students to design, build, and control robots for competition
 - Teach fundamental math and physics concepts while inspiring students to pursue STEM careers
 - Facilitate the logistics of traveling for competition and outreach events
 - Restructured the club administration to allow expansion of the organization to additional STEM programs throughout the area K-12 education system

Relevant Skills

Programming Experience

- Basic C/C++/C#, Mathematica
- Proficient Linux, Git, L^AT_EX
- Advanced PYTHON, numpy, matplotlib, MATLAB, Simulink

Engineering Tools

- Proficient AutoCAD, ANSYS Workbench, Solidworks, Autodesk Inventor

Teaching Tools

- Proficient Adobe Photoshop and Premier Pro, OBS Studio
- Advanced eLearning/Blackboard, MS Outlook/Word/Excel/Teams/PowerPoint/OneNote

Relevant Coursework

- Spring 2022 Optimal Control and Dynamic Programming
- Spring 2022 Real Analysis
- Spring 2022 Robust Control Systems · Multi-Agent Robotic Systems · Elementary Analysis II
- Fall 2021 Engineering Optimization · Elementary Analysis I
- Spring 2021 Nonlinear Systems · Convex Optimization · Dynamics of Complex Networks and Systems
- Fall 2020 Linear Systems · Optimal Estimation & Kalman Filters · Probability & Random Variables
- Spring 2020 Digital Signal Processing · Measurements and Instrumentation · Senior Design
- Fall 2019 Discrete Time Controls · Electric and Magnetic Fields
- Spring 2019 Modern Control Systems · Engineering Physics Sensors Lab · Analog Electronics

Fall 2018 Automatic Controls · Logic and Digital Design · Applied Mechanics
Spring 2018 Signals and Systems · Engineering Computation · Applied Optics

Awards

Spring 2022 UTD Jonsson School - Best Teaching Assistant in Mechanical Engineering
Spring 2022 UTD Jonsson School - Deans Teaching Fellowship
Spring 2021 UTD Mechanical Engineering - Outstanding Contributions to Undergraduate Education
Fall 2019 Undergraduate Research, Scholastic and Creative Activity (URSCA) Scholarship
Spring 2019 UW Platteville Prototype Hackathon - 3rd Place
Spring 2019 Foxconn Smart Cities Smart Futures Competition - Winner (Round 1 & 2)
Honorable Mention (Round 3)
Spring 2019 Undergraduate Research, Scholastic and Creative Activity (URSCA) Scholarship

Publications

J. Wagner and M. Roopaei (2020). “Edge Based Decision Making in Disaster Response Systems”. In: *IEEE - 10th Annual Computing and Communications Workshop and Conference*.
A. Fowler, E. Mutschelknaus, M. Roopaei, and **J. Wagner** (2019). “Learning in The Virtual Realm: A Platform for Immersive Engineering Education”. In: *International Journal of Advances in Electronics and Computer Science (IJAECs)*.

Presentations

Development of a Real-time Object Detection Platform for UAVs (2019). UW-Platteville PSSPL and UT-Dallas CRSS Lab Seminar.
Modeling of Silicon Nanomembrane Pressure Sensors (2019). UW-Platteville PSSPL and UT-Dallas CRSS Lab Seminar.
Research-Focused Summer: A summary of a productive and eventful summer of research (2019). UW Platteville Engineering Research Seminar.
Improving Disaster Response with a Network of Unmanned Aerial Vehicles (2019). UW-Platteville Prototype Hackathon.

Posters

J. Wagner, D. Kelm, C. Shackett, N. Hemenway, and G. Gopalakrishnan (July 2019). *A Comparison of Modeling Methods for Silicon Nanomembrane Pressure Sensors*. Wisconsin Science and Technology Symposium.
J. Wagner and M. Roopaei (May 2019). *Computer Vision at the Edge with Jetson Nano*. Department of Engineering Physics Poster Session.
J. Wagner and M. Roopaei (April 2019). *Use of Multi-Agent Networks for Disaster Response*. University of Wisconsin System Symposium.
D. Kelm, **J. Wagner**, C. Shackett, N. Hemenway, and G. Gopalakrishnan (April 2019). *Modeling the Behavior of Silicon Nanomembranes in MEMS Sensors*. University of Wisconsin System Symposium.
A. Drees, **J. Wagner**, B. Thronson, N. Shannon, D. Rohr, B. Wisinski, A. Heuermann and G. Gopalakrishnan (January 2019). *Shape Based Separation and Manipulation of Micro and Nanoscale Objects*. Regional Materials and Manufacturing Network Conference.

Graduate Research Experience

Fall 2022 - **Inferring Network Connections for System with Complex Dynamics**

Present Mechanical Engineering, The University of Texas at Dallas

Advisor: Dr. Justin Ruths

Inference of networks with more node dynamics

- Simulate and infer connectivity for networks with complicated node dynamics

Inference using sparsely sampled time-series data

- Applying network inference methods with sparsely sampled data

Inference

- Collaborate with Dr. Catherine Thorn from BBS to obtain neurological network measurements
- Use inference methods to study changes in neurological network structures

Summer 2020 - **Cyber Physical System Security - Theory, Simulation, and Implementation**

Present Mechanical Engineering, The University of Texas at Dallas

Advisor: Dr. Justin Ruths

System Uncertainty within CPS Security Theory

- Leveraging LPV and Polytopic systems account for uncertainty in current security theory

Simulation of Cyber-Physical Systems

- Developing Simulations of varying levels of complexity to model CPS and test theory

Physical Testbed Implementation of CPS Security Theory

- Developing a physical CPS testbed using industrial Emerson DeltaV PKController DCS

Undergraduate Research Experience

Fall 2018 - **Projects Involving Machine Learning and Virtual Reality**

Spring 2020 Electrical and Computer Engineering, University of Wisconsin-Platteville

Advisor: Dr. Mehdi Roopaei

Disaster Response Applications (ML, Edge Analytics, and VR)

- Wrote several grant proposals (approx. \$15 K awarded) that funded research into the use of ML and edge analytics within a multi-agent framework for disaster response
- Developed a virtual framework to develop and test an object detection algorithm
- Working on training a neural network using the Darknet framework to perform object detection on a custom database
- Submitted a manuscript detailing this virtual framework to the IEEE 10th Annual Computing and Communication Workshop and Conference

Computer Vision at the Edge on a Jetson Nano

- Explored the Jetson Nano Platform and worked within a Linux environment
- Used existing tools to connect a CSI camera and detect faces using Haar classifiers

Applying VR to Education

- Assisted in the preliminary development of a VR framework for distance education
- Assisted other students in creating a dynamic system visualization platform to provide students with an interactive environment to understand dynamic system modeling

Exploring Unity ML Agents

- Worked with Unity ML Agents to learn about ML and reinforcement learning methods
- Used pre-trained ML models and explored how well agents could perform the same objective in modified virtual environments

- Spring 2019 **Implementing K-Means and EM-Algorithm in MATLAB and Python**
 - Spring - Electrical and Computer Engineering, University of Wisconsin-Platteville
 2020 Advisor: Dr. Hynek Boril
 Learned about fundamental statistical modeling and ML techniques while also learning Python
 ○ Implemented K-means Clustering and the EM-Algorithm to statistically model data
 ○ Used Windows Subsystem for Linux and Midnight Commander to run Python naively
- Fall 2018 - **Computational Analysis of MEMS Pressure Sensors**
 Summer Engineering Physics, University of Wisconsin-Platteville
 2020 Advisor: Dr. Gokul Gopalakrishnan
 Evaluated the limitations of different methods used for modeling the behavior of silicon nanomembranes for MEMS pressure sensing applications
 ○ Focused primarily on automating the computation and analysis process
 ○ Used ANSYS Workbench to perform FEM analysis on single crystalline silicon membranes under uniform pressure
 ○ Used Python (NumPy and pandas) to automate data analysis
 ○ Created plots to visualize data with matplotlib
- June 2019 **LabVIEW Programming of a Mobile Robot**
 Mechanical Engineering, University of the West of Scotland - Paisley
 Advisor: Dr. Luc Rolland
 Short-term study abroad research trip: Worked on developing a control algorithm for a sbRIO controlled robot that avoids obstacles and maps an environment autonomously

Industry Experience

- May 2018 - **Summer Employee - Blown Film Department**
 Aug 2018 Bemis Converter Films, Oshkosh, WI
 ○ Helped operators of Blown Film Machines during 12-hour shifts
 ○ Operated forklift to transport supplies and waste
 ○ Filed reports to insure quality and accuracy of film composition
- May 2017 - **Summer Employee - Press Department**
 Aug 2017 Bemis Specialty Films, Oshkosh, WI
 ○ Assisted in mounting for flexographic printing presses
 ○ Operated Tug to transport flexographic press cylinders
 ○ Organized mounting priorities for 12 machines during 12-hour shifts

Recent Volunteer Activities

- Since **Team Mentor**
 Spring 2022 UTDesign EPICS, Jonsson School of Engineering and Computer Science
- Since **Graduate Student Mentor**
 Spring 2022 Peer Mentoring Program, Jonsson School of Engineering and Computer Science
- Since Fall **Committee Member**
 2022 Strategic Planning Committee, Jonsson School of Engineering and Computer Science
- Fall 2016 - **Robot Design and Controls Mentor**
 Spring 2020 FIRST Robotics Competition Team 171, Platteville, WI
- Dec 2019 **Event Volunteer - Toy Modification**
 UW-Platteville Holiday Toy Hack

Oct 2019 **Virtual Reality Day for Kids**
Platteville Public Library

May 2018 **Event Volunteer - Robotics Demo**
College of Engineering, Math, and Science Expo

Extracurricular Activities

Since 2020 **F AE@UTD** - For Autistic Empowerment

Since 2021 **Choir** - Credo Community Choir

2016 - 2020 **FIRST Robotics** - FRC Team 171

2018 - 2020 **Society of Physics Students**

2017 - 2020 **Pioneer Maker Club**

2016 - 2020 **Choir** - University Singers & Singing Pioneers