SARAH AGUASVIVAS MANZANO

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SKILLS

C/C++ ⋄ cmake ⋄ Python ⋄ MATLAB ⋄ Linux ⋄ Engineering Mechanics ⋄ Signal Processing ⋄ Deep Learning ⋄ Aerodynamics ⋄ CFD ⋄ HPC

EDUCATION

PhD Student, Computer Science *August 2017 - Present*
University of Colorado, Boulder Expected Graduation: May 2021
Department of Computer Science, Correll Lab. GPA: 4.0/4.0

Master of Science, Aerospace Engineering *August 2015 - August 2017*
The Pennsylvania State University GPA: 3.6/4.0
Minors: Computational Science, Electrical Engineering
Thesis: "Performance and Parsimony in Training Deep Neural Networks"

Bachelor of Science, Aerospace Engineering *August 2013 - May 2015*
The Pennsylvania State University GPA: 3.9/4.0
Thesis: "Corrections to the BEMT Method for Highly Loaded Wind Turbine Blades"

PUBLICATIONS

Aguasvivas Manzano, S., Hughes, D., Simpson, C., Patel, R., Correll, N. Embedded Neural Networks for Robot Autonomy. International Symposium on Robotics Research (2019). Accepted for publication

Aguasvivas Manzano, S., Correll, N. In-situ Deep Learning for Prediction and Controls in Smart Composites. 22nd International Conference on Composites Materials (2019). Presentation

Aguasvivas Manzano, S., Hughes, D., Correll, N. Wireless Online Impact Source Localization on a Composite. 4th International Conference on System-Integrated Intelligence (2018)

Aguasvivas Manzano, S., Lavely, A., Vijayakumar, G., Brasseur, J., Schmitz, S. Nonsteady Wind Turbine Loading Response to Passage of Daytime Atmospheric Turbulence Eddies. Annual Meeting of the APS Division of Fluid Dynamics 68 (2015)

Aguasvivas Manzano, S., Jha, P., Plummer, J., and Schmitz, S. "Turbulent Transport in the Wakes of Wind Turbines." Annual Meeting of the APS Division of Fluid Dynamics 67 (2014)

Hava, H., Zhou, L., Lombardi, L., Cui, K., Joung, H., Aguasvivas Manzano, S., et.al. SIRONA: Sustainable Integration of Regenerative Outer-space Nature and Agriculture. Part I. Architecture and Technology Session. International Conference on Environmental Systems (2019)

Basu, K., Melton, R., Aguasvivas Manzano, S. Time-Optimal Reorientation using Neural Networks and Particle Swarm Formulation. AAS/AIAA Astrodynamics Specialist Conference Columbia River Gorge, Stevenson, WA (2017)

TEACHING EXPERIENCE

CU Boulder, Teaching Assistant, CSCI 1320: Introduction to Programming for Engineering Students
Penn State, Teaching Assistant, CMPSC 200 and 201: Intro to MATLAB and Intro to C++
Penn State, Teaching Assistant, AERSP 430: Spacecraft Propulsion
Penn State, Teaching Assistant, AERSP 497I/597I: Spacecraft-Environment Interactions
Penn State, Teaching Assistant, AERSP 313: Aerospace Analysis (Numerical Analysis in MATLAB)
Penn State, Teaching Assistant, AERSP 305W: Aerospace Technology Laboratory: Aerodynamics Lab

WORK EXPERIENCE

National Renewable Energy Lab (NREL)   May 2019- Present
Graduate Research Intern

Built an OpenAI gym that uses the SUMO as a simulation environment and tweaks its API to be able to perform continuous steering and acceleration control on a car for the purpose of reinforcement learning ⋄ Analyzed the performance of multiple on-policy reinforcement learning algorithms (TRPO, PPO2, A2C) in this new environment and compared their performances on a trained agent.

University of Colorado Boulder   Jan 2018- Present
Graduate Research Assistant

Design, manufacture and perform experiments on online prediction and controls in robotic composite materials with embedded sensors, actuators and computers using advanced signal processing and artificial intelligence. Currently working on multiple projects that range from software development to neural network predictive controls on a MIMO system. Research statement is to develop an abstraction that allows a robot to perform open-ended learning.

NIST — PREP Fellowship   April 2018- September 2018
Guest Researcher

Theoretical Quantum Computing: Continued the development of a Python package intended to perform quantum state tomography on a single qubit by reducing computation time using parallel programming and by improving the numerical computation with the help of statisticians and applied mathematicians.

PREP Student Payroll Database: Continued the development of a relational medium-sized database with financial information for the PREP fellowship awardees based on Access, SQL and VBA. Monitored the usage of the database through tutorials, how-to guides and improving the accessibility when necessary.

The Pennsylvania State University   August 2015-December 2017
Graduate Teaching Assistant

· Held office hours, review sessions, recitations and formulated exam/quiz/homework questions to courses of class sizes varying between 75 and 500 students.

The Pennsylvania State University   2014-2015
Undergraduate Research Assistant

Created CFD (Computational Fluid Dynamics) animations of wind turbines at varying atmospheric settings using FieldView (by Intelligent Light), MATLAB and OpenFOAM Formulated a correction factor to the BEMT Method in a Penn State produced wind turbine solver called PSU-XTurb

PROJECTS

Neural Networks for Microcontrollers (Open Source)

Open source compiler that translates neural network trained model file binaries into embedded C code to be used in a microcontroller

Neural Network Predictive Controller for Morphing Aircraft Wings

In collaboration with Robert Shepherds lab at Cornell. Currently developing multiple input multiple output (MIMO) controller that uses neural networks for system plant identification for a soft robotic morphing wing

Wireless Online Impact Source localization

Developing a distributed algorithm to localize the source of an impact by assuming the position of individual sensors are unknown Autonomous Driving Car

Terrain Sensitive Tire in Self-Driving Car

Worked on a team that developed a ROS based controller for autonomous driving in a hallway. Developed a method to determine the friction coefficient between the cars tire and multiple terrains using a convolutional neural network in Keras

ACTIVITIES, HONORS AND AWARDS

⋄ 2nd Place Winning Team. Unearthed Denver Hackathon (2017). Team Roosters (Link)

⋄ CU Boulder Deans Assistantship Award

⋄ NIST PREP Fellow

⋄ Member of Sigma Gamma Tau (Aerospace Honors Society)

⋄ Member of AIAA (American Institute of Aeronautics and Astronautics) Penn State Student Chapter

⋄ NASA BigIdea Challenge: Most Innovative Concept Award (Link)

⋄ Volunteered at STEMrev (http://stemrev.org/)