JAMIE SANTOS

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Education

- **Chalmers University of Technology** *Aug 2021 - Aug 2023*
  MSc Complex Adaptive Systems (Robotics and Machine Learning) Gothenburg, Sweden
  - Relevant courses: Autonomous Robots, Intelligent Agents, Advanced Machine Learning, Artificial Neural Networks, Stochastic Optimization, Statistical Inference, Dynamical Systems
  - Thesis: (NASA) *Detecting Changes on the ISS Autonomously with 3D Point Clouds: An Unsupervised Learning Approach Using GMM Clustering*

- **National University of Singapore** *Aug 2022 - Dec 2022*
  Semester Exchange, School of Computing Singapore, Rep. of Singapore
  - Relevant Courses: Data Structures and Algorithms (C++), Feedback Control Systems

- **University of Washington** *Sep 2015 - Aug 2018*
  BS Electrical Engineering (Embedded Systems) Seattle, WA, USA
  - Relevant Courses: Embedded Systems, Digital Logic, Computer Architecture, Linear Algebra
  - Capstone: (Booz Allen) Developed a platform to study the effects of virtual travel on Alzheimer's using VR scenes and frequency filters for neural oscillations to generate data visualizations for research analysis

Research Experience

- **Robotics and Automation Design Lab, Texas A&M University [🌐]** *May 2024 - Present*
  Robotics Research Engineer III College Station, TX, USA
  - Developing the software infrastructure to control and monitor a variable DOF customizable robotic arm designed for use aboard satellites, rovers, and space stations
  - Designing experiments to evaluate actuators and robotic arm software for use in space aboard the ISS
  - Writing proposals to initiate new robotic manipulator projects in the lab
  - Tuning and debugging custom series elastic actuators to optimize position, torque, and impedance control
  - Contributing to design decisions for lunar and LEO-rated motor controller boards

- **Intelligent Robotics Group, NASA Ames Research Center [🌐]** *Jan 2023 - Jun 2023*
  Research Intern (Master's Thesis) Mountain View, CA, USA
  - Developed an unsupervised anomaly detection pipeline (Python, ROS) based on Gaussian mixture models for NASA's Integrated System for Autonomous and Adaptive Caretaking (ISAAC) code base on the Astrobee platform, a free-flying robot that assists astronauts on the ISS
  - Gathered and analyzed data for alternative change detection research, *AstrobeeCD*, which compares 2D images of scenes re-projected through 3D maps

- **Husky Satellite Lab, University of Washington [🌐]** *Oct 2017 - Aug 2018*
  Electrical Power System Engineer Seattle, WA, USA
  - Developed Ruby scripts for automated battery board data collection and analysis, as well as ground station control, to prepare the CubeSat for deployment into Low Earth Orbit (launched Nov. 2019)
  - Debugged and tested engineering models of battery and power distribution PCBs

- **National Renewable Energy Lab, US Dept. of Energy [🌐]** *Jun 2017 - Aug 2017*
  Robotics Intern Golden, CO, USA
  - Led a project integrating an external controller into a water heater for research on smart home energy optimization, overseeing project coordination, research, and design
  - Developed control logic (Python) based on a series of lab tests conducted on the appliance
  - Designed high and low voltage circuits to enable dual controls for the water heater

- **Kueh Lab, UW Dept. of Bioengineering[🌐]** *Dec 2016 - Jun 2017*
  Undergraduate Researcher Seattle, WA, USA
  - Conducted experiments studying molecular signaling within cellular circuits as part of lab's overarching goal to study immune cell fate determination

Additional Engineering Experience

- **REVERE Lab, Chalmers University [🌐]** *Sep 2021 - Jun 2022*
  Student Engineer Gothenburg, Sweden
  - Collaborated on redesigning the electrical and structural configuration of a miniature autonomous car for educational purposes, including sensor selection, servo integration, pinout rerouting, and enhanced functionality
- **PHYTEC Embedded Solutions [🌐]** *Oct 2018 - July 2021*
  Embedded Software Engineer Seattle, WA, USA
  - Developed a robotic arm demo integrating computer vision (MXNet, SqueezeNet) with AWS cloud services running on PHYTEC's hardware for use by internal and Amazon marketing teams
  - Developed and modified Linux-based board support packages in C, porting and integrating bootloader/Linux drivers while adding customer-requested features to enhance sales
  - Mentored new engineers on software development and implementation
  - Diagnosed and resolved ambiguous issues during board bring-up and verified new hardware (PCBs) and interfaces (Ethernet, CAN, I2C, SPI, WiFi, USB A/C, UART, RS232, MIPI serial/HDMI cameras, etc.)
  - Created fixes for existing bugs, optimized software performance, and added features to meet client needs
  - Collaborated effectively with hardware and test engineering teams, including international partners
- **Husky Robotics (Rover Challenge), University of Washington [🌐]** *Sep 2016 - Aug 2017*
  Electrical Power System Engineer Seattle, WA, USA
  - Soldered and designed PCBs via EAGLE CAD for the electrical subsytem of a rover to compete in the University Rover Challenge, Mars Desert Research Station, Hanksville, Utah
- **Snohomish County Public Utility District [🌐]** *Jun 2016 - Sep 2016*
  Summer Student Engineer Everett, WA, USA
  - Analyzed commercial and industrial energy efficiency program data to inform critical improvements to existing programs
  - Accompanied engineers on site visits to commercial, industrial and public facilities to inspect and verify building system energy efficiency projects

Publications

C=Conference, J=Journal, T=Thesis

[C.1] J. Santos, H. Dinkel, J. Di, P. Borges, M. Moreira, O. Alexandrov, B.Coltin and T. Smith (2024). **"Unsupervised Change Detection for Space Habitats Using 3D Point Clouds"**. In *AIAA SciTech 2024 Forum*. January 2024, Orlando, FL. DOI: 10.2514/6.2024-1960 [Video, Code]

[J.1] H. Dinkel, J. Di, J. Santos, K. Albee, P. Borges, M. Moreira, R. Soussan, O. Alexandrov, B. Coltin, and T. Smith (2024). **"AstrobeeCD: Change Detection in Microgravity with Free-Flying Robots"**. *Acta Astronautica*, Vol. 223, pp. 98-107. DOI: 10.1016/j.actaastro.2024.06.037 [Video, Code]

[T.1] J. Santos (2023). ***Detecting Changes on the ISS Autonomously with 3D Point Clouds: An Unsupervised Learning Approach Using GMM Clustering***. Master's thesis, Chalmers University, Gothenburg, Sweden

Skills

- **Programming/Hardware Description Languages:** C++, Python, MATLAB, Bash, C, LaTeX, Verilog
- **Frameworks and tools:** Git, Vim, ROS/2, Docker, PyTorch, TensorFlow, Jupyter Notebook, Google Colab
- **Hardware:** Microcontrollers, Soldering, PCB Debugging/Board Development

Honors and Awards

- **US Friends of Chalmers Scholarship** *Aug 2021*
  Barbro Osher Pro Suecia Foundation [🌐]
  - Full tuition scholarship for the top US student based on GPA and university ranking
- **Lawrence & Lucille Frey Endowed Scholarship** *Jun 2017*
  University of Washington [🌐]
  - Annually awarded to two students in the Dept. of Electrical and Computer Engineering for academic excellence
- **Valedictorian** *Jun 2015*
  Lake Stevens High School
  - Rank 1/580
  - **Jim Talley Memorial Scholarship**: For the most accomplished student of the class as determined by teaching staff
  - **Rotary Club of Lake Stevens Scholarship**: Awarded to the top 10 students of the graduating class by GPA

Leadership and Outreach

- **Student Ambassador** *Aug 2021 - Oct 2022*
  International Student Communications, Chalmers
  - Assisted prospective and incoming international students with inquiries regarding program fit and courses
  - Authored monthly blog posts about my program and the experience of being an international student at Chalmers
  - Collaborated with a team of ambassadors to enhance outreach to international students by creating and sharing weekly social media content (Instagram Reels, Facebook, etc.)
- **Engineering Discovery Days** *Apr 2017, Apr 2018*
  College of Engineering, UW [🌐]
  - Facilitated setup and answered questions from elementary and middle school students about engineering
- **First-year Interest Group Leader - EE Direct Admits** *Mar 2017 - Dec 2017*
  Dept. of Electrical Engineering, UW
  - Mentored a weekly class of 34 electrical engineering freshmen on topics such as internships and research
  - Assigned and graded projects to familiarize students with the university and department
  - Conducted individual check-ins with all students to address concerns and assist with first-quarter challenges
  - Developed comprehensive lesson plans during the spring and summer prior
- **High School Outreach** *Dec 2017*
  Society of Women Engineers, UW [🌐]
  - Panelist for Q&A to inform high school girls about different engineering pathways

Relevant Articles

- Vedrana Sivac, *Nordstjernan*, "Study in Sweden, see the world", Aug 2022
- Serah Peterson, *PHYTEC*, "phyKARL – AWS Machine Learning and PHYTEC", Feb 2019
- *ORISE*, "Jamie Santos: Modifying appliances to unlock new energy resources", Sep 2017

Additional Information

Interests: Running (half/full marathons), backpacking, CrossFit, travel, reading (science, science fiction and history)

References

1. **Dr. Brian Coltin**
   Computer Scientist, Intelligent Robotics Group
   NASA Ames Research Center (KBR)
   Email: brian.coltin@nasa.gov
   Phone: +1 (512) 619-4720
   Relationship: Thesis Advisor
2. **Stephanie Swanson**
   Director of Academic Services, Dept. of Electrical and Computer Engineering
   Unviersity of Washington, Seattle
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   Phone: +1 (206) 221-5782
   Relationship: Undergraduate ECE Advisor
3. **Prof. Mattias Wahde**
   Professor of Applied Artificial Intelligence, Dept. of Mechanics and Maritime Sciences
   Chalmers University of Technology
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   Relationship: Graduate Professor and Thesis Examiner
4. **Russell Robinson, Jr.**
   Embedded Software Engineering Manager, Apple Vision Products Group
   Apple Inc.
   Email: russ.rjr@gmail.com
   Phone: +1 (253) 335-3442
   Relationship: Mentor/Manager at PHYTEC