Jacob Hartzer

Curriculum Vitae

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JacobHartzer
JHartzer

Professional Experience

2021 – Present
Guidance, Navigation, and Control Senior Engineer — **Dallas, Texas**
Lockheed Martin Missiles and Fire Control
- Optimizing estimation algorithms using novel filtering techniques.
- Supporting hardware-in-the-loop, flight test, and hardware test events.
- Optimized performance of missile fire control algorithms.
- Integrated tactical software with 6-DOF monte-carlo simulations.
- Automated data processing and analysis at unit and integration level.

2021
Real-Time Software Engineer — **Huntsville, Alabama**
Boeing Defense and Space
- Developed real-time C++ applications for flight software and control in an agile environment.
- Design and implementation of multi-target software architecture.
- Implemented control algorithms and developed unit and integration tests.
- Modernized legacy Ada programming to C++.
- Created automation tooling in MatLab and Python to aid development.

2019 – 2020
Guidance, Navigation, and Control Engineer — **Huntsville, Alabama**
Boeing Defense and Space
- Developed flight software simulation and optimal jet control algorithms.
- Implemented real time motion compensation algorithms for visual guided systems.
- Designed and implemented Monte-Carlo 6-DOF IMU error simulation with gyro-compassing.
- Developed efficient gravity anomaly algorithm with numerical propagation.
- Developed variable atmospheric model for use in simulation.

2018
Automation Engineering Intern — **Dallas, Texas**
PepsiCo: Frito-Lay North America
Worked in the development of new automation projects and processes.
- Developed novel bag seal sensing technology with ¿99.9% accuracy to decrease process downtime
- Developed optimization algorithm for mobile robot to increase throughput by 4.9%

2017
R&D Design Engineering Intern — **Houston, Texas**
Bray International Inc.
Sought to develop new valve sensing technologies and a continuous-use lab test station.
- Designed and tested failure intelligence for valve products using LabVIEW
- Developed automation system to save over 12 hours of labor per cycle test

2016
Physics Undergrad Teaching Fellow — **College Station, Texas**
Texas A&M Department of Physics and Astronomy
Peer led and taught multiple sections of Freshman-level Newtonian physics.
- Helped decrease student drop rate by 40% through the UTF program

2016
Reliability Engineering Intern — **Austin, Texas**
NXP Semiconductors
Developed reliability testing automation scripts as well as managed scripts and webpages for the new product introduction department.
- Developed scripts to automate the validation of reliability tests
- Decreased machine down time by 75%

Education

2021 – Present
Ph.D. Mechanical Engineering — **College Station Texas**
Texas A&M University — *3.857 GPR*
Research topic: Extended Kalman Filtering for Online Sensor Calibration and Localization

2019 – 2020 **M.S. Mechanical Engineering** **College Station Texas**
Texas A&M University *3.750 GPR*
Thesis: Decentralized Collaborative Localization using Ultra-Wideband Ranging for Autonomous Vehicles

2015 – 2019 **B.S. Mechanical Engineering** **College Station Texas**
Texas A&M University *3.928 GPR*
Thesis: Development of a Highly Efficient Consumer Vehicle for the Shell Eco-Marathon Competition

Research Experience

2018 – Present **Graduate Researcher** **College Station, Texas**
Texas A&M Unmanned Systems Lab
- Researching online calibration and localization of multiple sensors for autonomous systems
- Researching the use of software for real-time sensor performance evaluation
- Researching novel sensors for use in collaborative localization
- Integrated differential GPS and filtering into the platform
- Developed multiple packages for sensor communication
- Developed autonomous omni-robot to improve highway safety

2017 **Undergraduate Research Team Lead** **College Station, Texas**
Texas A&M AggiE-Challenge: Flexiform
Completed research in and developed novel technology for a device capable of creating complexly-curved concrete structures
- Developed silicone with flexible embedded structure that was capable of supporting concrete in a continuous and configurable way.
- Design went on to win AggiE-Challenge

2015 – 2017 **Research Assistant** **College Station, Texas**
Texas A&M Department of Aerospace Engineering
Research in and implementation of real-time computer vision techniques for autonomous control
- Worked on combining ORB-SLAM data with accelerometer data through a Kalman filter
- Developed scripts for data processing and visualization

2015 – 2017 **Undergraduate Researcher** **College Station, Texas**
Texas A&M Department of Mathematics
Development of Python programs in multiple factorization theory and algebraic geometry
- Wrote Sage code for the analysis of Maximal Mediated Sets for polynomial optimization
- Wrote Sage code to analyze Arithmetical Congruence Monoids

Publications

[1] J. Hartzer and C. O'Neill, "On the periodicity of irreducible elements in arithmetical congruence monoids," *Integers*, vol. 17, 2017.

[2] T. De Wolff, J. Hartzer, O. Röhrig, and O. Yürük, "Initial steps in the classification of maximal mediated sets," *Journal of Scientific Computation: Effective Methods in Algebraic Geometry*, vol. 17, 2019.

[3] J. Hartzer and S. Saripalli, "Autocone: An omnidirectional robot for lane-level cone placement," in *Proceedings of the IEEE Intelligent Vehicles Symposium*, (Las Vegas, NV), p. 440, 2020.

[4] J. Hartzer and S. Saripalli, "Vehicular teamwork: Collaborative localization of autonomous vehicles," in *Proceedings of the IEEE Intelligent Transportation Systems Society Conference*, (Indianapolis, IN), 2021.

[5] J. Hartzer and S. Saripalli, "Online multi camera-imu calibration," in *Proceedings of the IEEE International Symposium on Safety, Security, and Rescue Robotics*, (Seville, Spain), 2022.

[6] J. Hartzer and S. Saripalli, "Online multi-imu calibration using visual-inertial odometry," in *Proceedings of the IEEE International International Conference on Multisensor Fusion and Integration*, (Bonn, Germany), 2023.

Research Presentations

December 2017 **Texas A&M University** **College Station, Texas**
AggiE-Challenge Video Competition
The Development of a Reusable Mold of Complexly Curved Concrete Structures (Video Presentation)

March 2017 **Texas A&M University** **College Station, Texas**
Student Research Week
On the Determination of Maximal Mediated Sets (Symposium Talk)

March 2016 **Texas A&M University** **College Station, Texas**
Student Research Week
On the Periodicity of Arithmetical Congruence Monoids (Poster Presentation)

Leadership Experience

2015 – 2019 **Texas A&M National Scholar Ambassadors** **College Station, Texas**
Texas A&M University
This organization (TANSA) is devoted to the recruitment and continuing community of national scholars for Texas A&M.
- President: 2018 - 2019
  - Lead all general committee and officer meetings
  - Organize high-level organization goals and outcomes
- Vice-President 2017 - 2018
  - Planned and lead fall and spring retreat for the organization
  - Handled all disciplinary actions regarding members
- Social Executive 2016- 2017
  - Planned and lead monthly organization socials

2016 – 2018 **MSC Business Associates** **College Station, Texas**
Texas A&M University
This organization is dedicated to serving the business needs of Texas A&M's student center, the MSC.
- Finance Executive 2017- 2018
  - Directed budget approval process for the MSC and oversaw $1.3MM
- Finance Subcommittee Member: 2016- 2017
  - Was assigned to individual committees to work with other students and employees to plan budget

2015 – 2019 **Texas A&M West Coast Swing Dance Club** **College Station, Texas**
Texas A&M University
This club, Aggie Westies, is a social organization centered around the West Coast Swing style of dance.
- Treasurer
  - Handled the collection of dues for lesson series
  - Planned annual budget for the organization as well as large dance events

Software

Experienced C++: *Real-Time, Modern C++, Architecture Design*
MatLab and Simulink: *Dynamic modelling, monte-carlo simulation, and real-time control*
Python: *Tool & Package Development, ROS*
LabVIEW: *CLDA, Real-Time, Wireless Sensor Network, and NI MyRIO*
SolidWorks: *CSWP, FEA, CFD, Weldments and Sheet Metal*
Intermediate Fortran, Ada

Honors and Achievements

2019 Shell Eco-marathon Safety Award
2018 Texas A&M Outstanding Senior Engineer
2018 BCS Marathon Finisher: 4:58:24
2017 College of Engineering Deans Excellence Award: Honorable Mention
2015 Brown Foundation Scholar
2015 National Merit Scholar, State Farm Scholarship
2013 Eagle Scout and Silver Palm

Interests

Outdoors Backpacking, Rock Climbing, and Mountain Biking
Music Guitar and Piano

References

Available upon request