

EDUCATION*Doctor of Philosophy*, Computer Engineering

The University of Tulsa, Tulsa, OK

December 2018

Dissertation - User Acceptance In Safety-Critical Autonomous Transportation Systems

GPA 3.85

Master of Science, Electrical Engineering

The University of Tulsa, Tulsa, OK

May 2015

Thesis - Enhancing FSO Link Performance In Adverse Conditions Using A
Fiber-Bundled Based Receiver Design

GPA 3.90

Bachelor of Science, Electrical Engineering

The University of Tulsa, Tulsa, OK

May 2012

Minor: Mathematics

GPA 3.125

TEACHING EXPERIENCE

- FYE1001 - First Year Experience, Instructor
 - Presented lecture material for new introductory class for engineers and scientist college wide.
 - Organized and directed students in completion of assignments and in class discussion over handling college life and how to become engineers and scientist.
- EE1001 - Introduction to Electrical and Computer Engineering, Instructor
 - Developed and presented lecture material for new revision of introductory class to incorporate the new Computer Engineering degree plan
 - Organized and directed students in a laboratory environment, teaching lab safety as well as Electrical and Computer Engineering Topics
- EE1011 - Computer Tools in Electrical and Computer Engineering, Instructor
 - Researched new software tools and developed teaching criteria and assignments
 - Lectured classes and prepared assignments for student completion.
- EE2063 - Introduction to Computer Organization and Microprocessors, Instructor
 - Teaching components of microprocessor based computer systems
 - Flow of information and control
 - Instruction and data representation
 - Assembly language
- EE2161 - Digital Systems Principles Laboratory, Teaching Assistant
 - Lectured and instructed laboratory procedures
 - Teaching digital logic in a laboratory setting
- EE2163 - Digital Systems Principles, Instructor
 - Developed lectures for introduction to logic
 - Teaching digital logic in a classroom setting

- EE2263 - Embedded System in 'C', Instructor
 - Teaching 'C' programming techniques
 - Instructing troubleshooting and debugging
 - Guiding design projects from proposal through completion

RESEARCH EXPERIENCE

- Hardware Virtualization
 - Development of Hardware Virtualization software to ease in development of new systems
 - Implementation of software-defined Hardware Virtualization systems into current hardware systems
- Rapid Prototyping of RF Circuits
 - Development of processes for 3D printing of RF circuits for research and classroom activities
 - Development of Microstrip circuits using LPKF S103 PCB Milling Machine
 - Evaluation of filament in the with respect to RF spectrum
- The University of Tulsa Vehicle Autonomy and Intelligence Lab (VAIL)
 - Development of Autonomous Flight System for small fixed wing Unmanned Aerial Vehicle
 - Developed a simulator for Autonomous Flight Systems for software in the loop testing UAV system development
 - Built hardware-in-the-loop system for use with UAV simulators
- NASA Armstrong Flight Research Center
 - Designed a modular stereo-vision system for deployment of small fixed wing UAV
 - Developed Calibration procedures for stereo-vision systems in conjunction with JPL
- Dr. Peter LoPresti's Laser Lab
 - Developed a fiber-bundle receiver for a Free-Space Optical link
 - Analyzed correct function of linear fiber transmitter for Free-Space Optical link steering
 - Analysis and simulation of turbulence effects of a Free-Space Optical link

PROFESSIONAL EXPERIENCE

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| <i>The University of Tulsa</i> | August 2017 – Present |
| Chapman Applied Assistant Professor of Electrical and Computer Engineering, Tulsa, OK | |
| <ul style="list-style-type: none"> • Developing and instructing classes at both the undergraduate and graduate level • Advising students on program progression and job opportunities • Directing students (graduate and undergraduate) in research opportunities | |
| <i>National Aeronautics and Space Administration (NASA)</i> | Summer 2015 |
| Stereo Vision Research Intern, Edwards, CA | (Internship) |
| <ul style="list-style-type: none"> • Design and implementation of a stereo-vision system using MATLAB • Review and Documentation of JPL designed stereo-vision system • Development of calibration procedures for consistent stereo-vision data collection | |
| <i>Sercel-GRC Inc.</i> | Summer 2014 |
| Research and Development Design Intern, Tulsa, OK | (Internship) |

- Developed a downhole temperature and pressure gauge with minimal in hole electronics
- Worked directly with the Mechanical Engineering team to develop design constraints and requirements

Level (3) Communications

Summer 2010

Telecommunications Intern, Tulsa, OK

(Internship)

- Scheduled and organized fiber optic control card installations and de-installation
- Organized field engineers to complete orders in a timely manner

COMPUTER SKILLS

Experienced in Programming in C/C++, Java, OpenCV, Ubuntu 16.04, ROS, VHDL, AWR Microwave Office, Microsoft Office Professional Suite, Mathematica, MATLAB & Simulink, MathCAD, PSpice, Atmel AVR Studio 4&5, Eagle, LT Spice, Eclipse IDE,

PUBLICATIONS

- **Nathan F. Hutchins**, Alison J. Kerr, Loyd R. Hook, "User Acceptance in Autonomous Vehicles: The Evolution of the End User," 2019 IEEE International Symposium on Systems Engineering, Edinburgh, Scotland, UK, 2019.
- **Nathan Hutchins**, "User Acceptance in Safety-Critical Autonomous Transportation Systems," Ph.D. dissertation, Dept. of Elct. and Comp. Eng., The University of Tulsa, Tulsa, OK, 2018.
- **Nathan Hutchins** and Loyd Hook, "Technology Acceptance Model for Safety Critical Autonomous Transportation Systems" 2017 36th IEEE/AIAA Digital Avionics Systems Conference, St. Petersburg, Florida, 2017.
- **Nathan Hutchins**, Kaveh Ashenayi, "EE 1001 – Introduction to ECE: A Re-Introduction" 2017 ASEE Midwest Section Conference, Stillwater, Oklahoma, 2017.
- **Nathan Hutchins**, Zack Kirkendoll, Loyd Hook, "Social Impacts of Ethical Artificial Intelligence and Autonomous System Design" 2017 IEEE International Symposium on Systems Engineering, Vienna, Austria, 2017.
- **Nathan Hutchins**, Loyd Hook, William Friedel, Zack Kirkendoll, "Use of Unity in Scientific Simulation and Modeling for Research and Education" 2017 SIIE International Symposium on Computers in Education, Lisbon, Portugal, 2017.
- **Nathan Hutchins**, "Enhancing FSO Performance in Adverse Conditions Using A Fiber-Bundled Based Receiver Design," M.S. dissertation, Dept. of Elct. and Comp. Eng., The University of Tulsa, Tulsa, OK, 2018.
- P. LoPresti, **N. Hutchins**, S. Kohrmann, M. F. Babelli and H. H. Refai, "Wavelength dependence of a fiber-bundle based FSO link," 2014 IEEE Globecom Workshops (GC Wkshps), Austin, TX, 2014, pp. 493-498. doi: 10.1109/GLOCOMW.2014.7063480
- Justin G. Fuller, Loyd Hook, **Nathan Hutchins**, K. Niki Maleki, Mark A. Skoog "Toward Run-Time Assurance in General Aviation and Unmanned Aircraft Vehicle Autopilots," 2016 35th AIAA/IEEE Digital Avionics Systems Conference, Sacramento, CA, 2016.
- K. Niki Maleki, Kaveh Ashenayi, Loyd R Hook, Justin G Fuller, **Nathan Hutchins** "A Reliable System Design for Nondeterministic Adaptive Controllers in Small UAV Autopilots," 2016 35th AIAA/IEEE Digital Avionics Systems Conference, Sacramento, CA, 2016.
- Justin G. Fuller, Loyd Hook, **Nathan Hutchins** "Accounting for Helpful and Harmful Human Reaction in Run-Time Assurance Framework," 2017 36th AIAA/IEEE Digital Avionics Systems Conference, St. Petersburg, Florida, 2017.

Presentations

- 2019 IEEE International Symposium on Systems Engineering, Edinburgh, Scotland, UK
- 2019 University of Tulsa TEDxUTulsa - Interdisciplinary Research: Autonomous Cars, Tulsa, Oklahoma
- 2017 IEEE International Symposium on Systems Engineering, Vienna, Austria
- 2017 ASEE Midwest Conference, Stillwater, Oklahoma

- 2017 IEEE/AIAA Digital Avionics System Conference, St. Petersburg, Florida
- 2014 IEEE Globecom Workshops, Austin, Texas

Service

- IEEE Educational Activities Board Continuing Education Committee, Committee Member; 2020
- IEEE Global Ethics Initiative General Principles Committee, Committee Member; 2017 - 2020
- Tulsa Aquarium Volunteer Dive Team; 2020

MEMBERSHIPS

Institute of Electrical and Electronics Engineers (IEEE) Member

- IEEE Robotics and Automation
- IEEE Signals and Systems
- IEEE Young Professionals
- IEEE Aerospace and Electronic Systems Society
- IEEE Education Society
- IEEE Standards Association

HONORS, GRANTS, and AWARDS

- MDA Hardware Virtualization Research Grant
- Chapman Professorship Research Grant 2019
- TU Student Research Grant
 - 12th Scale Autonomous Rover
 - LIDAR for Autonomous Rover
 - VR Autonomous Vehicle Simulator
- TU Chapman Travel Grant
 - DASC Conference Travel Award
- TU GSA Travel Grant
 - ISSE Conference Travel Award
- TU Research Colloquium 2017 3rd Place
 - "Acceptance, Human Factors, and Ethics in Autonomous Vehicles"

PROPOSALS IN PROGRESS

- Human Factors in Safety-Critical Systems - NSF/DoT
- Advance Applied Undergraduate Education in Microprocessors - NSF
- Early Career for Non-Tenure Track Faculty - NSF

MENTORING

- Masters of Science in Electrical Engineering
- Tulsa Undergraduate Research Challenge (TURC)
- NSF Research Experience Undergraduate (REU)
- University of Tulsa Independent Undergraduate Research

CLASS DEVELOPMENT

- Microprocessors in Digital Design
- Practical Electrical Engineering Topics and Design
- PCB Analysis and Design
- System Setup and Design
- VLSI Design

RESEARCH INTERESTS

Autonomous Vehicles, Autonomous Systems and Artificial Intelligence Ethics, Humans Factors in Autonomous Systems, Engineering Ethics, Engineering Education, Rapid Prototyping of RF Circuits, Microcontroller Architecture

ADDITIONAL TRAINING and QUALIFICATIONS

- State of Oklahoma Certified Engineer Intern
- SSI Certified Master SCUBA Diver
- Oklahoma Certified Surface Mine Supervisor
- American Heart Association Certified First Aid