# Nathaniel Belles

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## EDUCATION

*Master of Science in Robotics (Electrical and Computer Engineering)*                    August 2021 – May 2023
**Georgia Tech Institute for Robotics and Intelligent Machines**, Atlanta, GA

*Honors Bachelor of Science in Computer and Electrical Engineering with Minor in Mathematics*       August 2016 – May 2021
**University of North Carolina at Charlotte**, Charlotte, NC
- Overall GPA: 4.0/4.0
- Involvement and Awards: President of Charlotte Area Robotics (Fall 2018 – Spring 2021), Robotics and Automation Society (Spring 2018 – Spring 2021), Institute of Electrical and Electronics Engineers (Fall 2017 – Spring 2021), Tau Beta Pi Honors Society (Spring 2020 – Spring 2021), Chancellor's List (Fall 2016 – Spring 2021), Who's Who Among Students at UNCC

## ENGINEERING EXPERIENCE

*Graduate Research Assistant - Cognitive Optimization and Relational (CORE) Robotics Lab*        August 2021 – May 2023
**Georgia Tech Institute for Robotics and Intelligent Machines**, Atlanta, GA
- Design, build, and program drivetrain control system for autonomous wheelchair-based tennis-playing robot with system paper accepted at IEEE Robotics and Automation Letters 2022 (RA-L): https://arxiv.org/pdf/2210.02517.pdf
- Use off-the-shelf RC plane parts to create autonomous airplane controller that learns real-time changes to flight dynamics

*Associate Engineer - Integration and Test Systems Engineering Intern*                   May 2021 – August 2021
**SpaceX**, Hawthorne, California
- Design, build, and program Hardware-In-The-Loop (HITL) truth sensing system for all motion control sensors on satellites
- Create and procure wiring harnesses to connect and integrate subcomponents of satellites
- Test individual components and wiring harnesses to ensure safe-to-mate and power-on readiness

*Ride Control Engineering Professional Intern*                               June 2019 – December 2019
**Walt Disney World Design and Engineering**, Orlando, Florida
- Program safety PLCs and create associated Human Machine Interfaces (HMIs) with track map and diagnostic information
- Wire new electrical cabinets, terminate cables, keeping clean cable management, and update existing cabinets
- Implement safety systems including operator panels and ride actuators

*Undergraduate Researcher for PowerAmerica*                                October 2018 – June 2019
**University of North Carolina at Charlotte**, Charlotte, North Carolina
- Use semiconductor devices to create a power electronics board used for teaching semiconductor characterization
- Design PCB layout of teaching board to increase switching efficiency while decreasing noise and power loss
- Manufacture boards, solder components, simulate high power tests using high wattage power supplies and electronic loads

## PERSONAL PROJECT EXPERIENCE

*Custom Video Switcher Panel (CUSP)*
**A modular, configurable, cheaper video switcher panel for Blackmagic Design video switchers and videohubs**
- Inputs: 128x hot-swappable Cherry MX key switches, 2x 12-bit fader sliders, 1x rotary encoder, Outputs: 128 RGBW LEDs
- Created robust self-contained video switcher panel for configuring and operating network video equipment
- Ongoing documentation and support on Gitlab repository: https://gitlab.com/Nathaniel.Belles/cusp

*motorController*
**A microcontroller-based encoder controller and motor controller**
- Inputs: encoder (hardware interrupts), motor voltage and current; Outputs: motor speed (PWM) and direction
- Created full functional system over summer used in robotics motion base projects by Charlotte Area Robotics Club
- Ongoing documentation and support on GitLab repository: https://gitlab.com/Nathaniel.Belles/motorController

## LEADERSHIP EXPERIENCE

*Leadership Academy Cohort 16, Member*                                   October 2017 – April 2019
**William States Lee College of Engineering**, UNC Charlotte
- Two-year program based on periodic weekend-long modules and a group capstone project to serve the community
- Capstone project was a hosted day-long event for high schoolers to learn about opportunities past high school

## SKILLS / SOFTWARE

Software: macOS, Linux, Windows, Microsoft Office, MATLAB, Fusion 360, LabView, Code Composer Studio
Languages: C, C++, Python, HTML, Shell Scripting, Ladder Logic
Prototyping: Laser Cutting/Engraving, 3D CAD/Printing, Breadboarding, PCB Design, CNC Machining, Soldering
Robotics: ROS, Simulation, Path Planning, System Design, Automation, Circuit Design, Microcontrollers, Power Distribution