

# Daniel T. Bruce

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## Objective

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Motivated, hands-on electrical engineer with 3+ summers of experience working in engineering department of a local utility company. Strengths focus on hardware design, simulation and troubleshooting analog circuits, detailed reports and public presentations. Additional experience working with DC and AC power circuits, transmission lines, three-phase systems and acoustic systems. I hope to apply my skillset to solve new and interesting problems in today's evolving world.

## Education

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**Georgia Institute of Technology | Atlanta, GA** *August 2020 – May 2021*  
Master of Science in Electrical Engineering

**Georgia Institute of Technology | Atlanta, GA** *August 2018 – May 2020*  
Bachelor of Science in Electrical Engineering with Highest Honors, GPA 4.00

**Georgia Southern University | Statesboro, GA** *August 2016 – May 2018*  
Bachelor of Science in Electrical Engineering, Transfer with 84 Credit Hours, GPA 4.00

## Skills

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**Programming:** C++, MATLAB, Python, VHDL

**Platforms:** Windows, macOS, Linux

**Hardware:** FPGA, DE2 Board, analog and digital oscilloscope, logic analyzer, multimeter, frequency response analyzer

**Software:** Altera Quartus II, ArcGIS, NI Multisim, NI LabVIEW, Microsoft Office

**Communication:** Technical reports, design specifications, presentations (small and large audiences)

## Experience

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**Newnan Utilities | Newnan, GA** *May 2017 – August 2019*  
**Engineering Intern – Water and Wastewater Engineering Department**

*Local water, wastewater and power company providing utilities to the City of Newnan.*

- Full Time Internship with 40 hours worked weekly during summer and winter breaks.
- Assisted a professional engineer with GPS mapping utilities and transferring obtained location data into an ArcGIS system.
- Performed onsite inspections of new water and wastewater construction in Newnan for granting a Certificate of Occupancy and assisted with residential and commercial client interactions.
- Updated and revised the water system developer specification sheets, which lead to an hour of time saved with each new construction meeting.
- Worked closely with the electrical team while assisting them with correcting errors in the three-phase electrical system ArcGIS map of Newnan, GA.

## Projects

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**Two Person Go-Kart Electric Powertrain – Sponsored by General Motors** *Fall 2019 – Spring 2020*  
**Analog Circuitry Lead and Documentation Coordinator – ECE Senior Design Project**

*Converting gas powered go-kart into an electric vehicle with regenerative braking and roof mounted solar panel.*

- Verified that all documentation is created to proper specification and is submitted on time.
- Worked with team members to construct a full project proposal including technical specifications, design approach, scheduling, and budgeting/cost analysis.
- Preliminary worked lead to obtaining a sponsorship from General Motors to increase the group's budget from \$400 to \$1,000.
- Conducted researched into Lithium-ion battery modules to find a suitable lightweight power source for the electric vehicle.
- Created a theoretically working design with team members to overcome the challenges encountered due to the COVID-19 campus closure.

## **Electric Vehicle Charger Design Project**

Spring Semester 2020

### **Solo Design Project – Power Electronics**

*A solo design project to design a dc/dc power supply for Electric Vehicle charging that accounted for a range of input voltages and kept the efficiency of the power supply above 90%.*

- Designed a DC/DC Forward Converter within many design constraints such as a range of voltage inputs, minimal output voltage ripple
- Accounting for the main theoretical losses (MOSFET Conduction and Switching, Diode Conduction, and Transformer and Inductor Loss), the EV Charger obtained an efficiency of 92.77%.
- The final converter met all required specifications using the chosen real-world components.

## **Moving Coil Loudspeaker Modeling and Closed Box Design**

Fall Semester 2019

### **Project Leader – Audio Engineering**

*A team design project to determine the component values in the three-part analogous circuit for a moving coil loudspeaker based off measured voice-coil impedance data. This data was then used to design a closed box system that produced a Butterworth response.*

- Measured the voice-coil impedance using a function generator and used to techniques learned in class to determine the three-part model component values to recreate the same response.
- The derived model was simulated in NI Multisim to verify the components were correct and matched the measured data.
- A closed box system was designed with the known components to successfully reproduce a Butterworth response.

## **Wireless Power Transfer Through Passive Components**

Fall Semester 2019

### **Construction, Testing and Documentation – Electromagnetic Applications**

*A team design project to optimize a 10 MHz wireless power transfer system using designed intermediary, resonant coils.*

- Assisted in fabrication of new send and receive antennas as well as two revisions of passive transmission coils.
- Tested and recorded measurements of the passive coils at various distances with a RF Power Meter, finding that the newly built antennas and insert coils created a -37 dBm improvement over the baseline.
- The designed, built and tested coils received third place in the class for improvement over the baseline send and receive antennas.
- Documented the building, testing and results of the project into an IEEE two-column format paper.

## **Altera Cyclone II Integer Calculator**

Spring Semester 2018

### **Project Leader – Digital Design Lab**

*A team design project to create a two-bit integer calculator out of an Altera Cyclone II using VHDL design language.*

- Authored code for integer input, addition, subtraction, multiplication and the seven-segment display.
- Successfully led an underperforming 3-person group analyzing the skills of the other members, recommending a project idea, assigning tasks for each member to perform and making sure everyone adhered to their job to create a working integer calculator.

## **Relevant Coursework**

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- **Audio Engineering:** Concepts of acoustics and electroacoustic modeling for the analysis and design of microphones, loudspeakers, and crossover networks.
- **Digital Design Lab:** Design, creation and testing of digital systems created using both discrete chips and FPGAs with VHDL design language; included a final team design project.
- **Electric Energy Conversion:** Introduction to three-phase power systems, electromechanical energy conversion and operating principles of electric machines.
- **Electrical Energy Systems:** Covered power generation, transmission, and conversion using Boost/Buck converters, AC/DC converters, and DC/AC converters. Also introduced concepts of green energy production such as wind and solar.
- **Electromagnetic Applications:** Covered concepts of electromagnetics applied to the design of microwave/RF circuits, modules, and systems encompassing transmission and radiation for applications up to optical frequencies.
- **Engineering Electromagnetics:** Introduced Transmission Lines, Static Electric and Magnetic Fields, and Plane Wave Propagation.
- **Microelectronic Circuits:** The fundamentals of non-linear circuit elements including diodes, and transistors (BJT and MOSFET), how they are used in circuits and real-world applications.

- **Power Electronics:** Covered the design and analysis of various power conversion circuits while accounting for parasitic losses. Lastly, the principles taught in this course were applied to real-life design problems.
- **Senior Analog Circuits Lab:** Theory and experiments related to the design, analysis, construction, and measurement of advanced analog electronic circuits using discrete devices (diodes, bipolar junction transistors, MOSFETs), concluding with creating an Op-Amp out of only discrete components.

## **Campus Involvement**

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### **The Hive | Georgia Institute of Technology | Atlanta, GA**

*Fall 2018*

#### **End User Handbook Creator – Documentation Team**

- Created an end user handbook for The Hive to use in the Interdisciplinary Design Commons to teach and inform users of the rules and regulations of the IDC, where safety equipment is needed and other general information.
- The document was approved and distributed to patrons of the IDC starting January 17, 2019.

### **Georgia Southern IEEE Robotics Team | Statesboro, GA**

*August 2017 – May 2018*

#### **Member – Hardware Sensor Team**

- Active member of the Georgia Southern University's IEEE robotics team to create a robot to compete against other schools at IEEE SoutheastCon 2018.
- Assigned to the sensor team tasked with creating the hardware and coding library for using multiple light and ultrasonic sensors on an Arduino Uno.
- Worked with another member to address the issue of reading the distance measured from multiple ultrasonic sensors connected through a multiplexor.

### **Georgia Southern University's CEIT LLC | Statesboro, GA**

*August 2016 – May 2017*

#### **Member – College of Engineering and Information Technology Living Learning Community (CEIT LLC)**

- Active member of a living learning community focused on enriching first year students through company site visits, faculty led chats and company showcases in the engineering and IT field.

## **Professional Organizations**

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### **IEEE**

*August 2016 – Present*

#### **Member – Professional Chapter**

- Active member of a society focused on connecting students with a network of professionals and experts in the Electrical Engineering field.

## **Awards**

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- **Georgia Tech School of Electrical and Computer Engineering's ECE Senior Scholar Award:** April 29, 2019 & April 8, 2020  
*This award is given to the electrical or computer engineering seniors with the highest academic average attending the Georgia Tech School of Electrical and Computer Engineering.*
- **Georgia Institute of Technology's Faculty Honors:** Fall 2018, Spring 2019, Fall 2019, Spring 2020  
*Faculty honors-includes all degree-seeking undergraduates who during the preceding term made an academic average of 4.00, completed a schedule of at least 12 hours of coursework on a letter-grade basis with no W grades, and are not on academic warning or probation or subject to any disciplinary action.*
- **Georgia Southern University's College of Engineering and Information Technology Living Learning Community Distinguished Member Award:** Spring 2017  
*A merit-based award given to one member each year who was to be the most active and academically successful within the community of freshmen engineering and information technology majors who live together and attend events to improve their grades, internship and teamwork skills.*
- **Georgia Southern University's President's List:** Fall 2016, Spring 2017, Fall 2017, Spring 2018  
*During any semester, an undergraduate or post baccalaureate student enrolled in 12 or more GPA hours and making a semester GPA of 4.0 will be placed on the President's List.*
- **Georgia Southern University's President's Scholarship (\$2,000):** April 2016
- **Zell Miller Scholarship Recipient (Full Tuition):** Fall 2016 - Spring 2020