

# Jakob Triemstra

Austin, TX | 910-599-2047 | jakobt@utexas.edu

## EDUCATION

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### UNIVERSITY OF TEXAS AT AUSTIN

Austin, TX

*M.S./Ph.D. Electrical Engineering*

August 2024 –

- **Relevant Coursework:** Power Electronics, Power Quality

### NC STATE UNIVERSITY

Raleigh, NC

*B.S. Electrical Engineering, Concentration in Renewable Electric Energy Systems*

August 2020 – May 2024

*Minor in Music Composition*

- **GPA:** 4.0/4.0 | **Engineering Class Rank:** 1 of 3113 | **EE Class Rank:** 1 of 275

## RESEARCH EXPERIENCE

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### UNIVERSITY OF TEXAS AT AUSTIN

Austin, TX

*Graduate Research Assistant*

August 2024 –

- Working under Dr. Brian Johnson in the Power Electronics & Systems Group

### NC STATE UNIVERSITY

Raleigh, NC

*Undergraduate Research Assistant*

January 2023 – May 2023

- Assisted Dr. Ning Lu and Chase Kelly in the Future Renewable Electric Energy Delivery and Management (FREEDM) Center
- Analyzed the performance of a PV output model using the single diode model using industry data and machine learning techniques in Python

### NC STATE UNIVERSITY

Raleigh, NC

*Undergraduate Research Assistant*

January 2022 – May 2022

- Assisted Dr. Brendan O'Connor and Ronald Booth in the Organic and Carbon Electronics Laboratories (ORaCEL)
- Performed an analysis of the power conversion efficiency of kirigami-style organic photovoltaics structure as a function of strain using MATLAB

## WORK EXPERIENCE

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### BLACK & VEATCH

Cary, NC

*Electrical Engineering Intern*

May 2023 – August 2023

- Facilitated the placement of inverters, load break disconnects, and PV strings on a 160 MW solar project by creating a unified tracking spreadsheet and reviewing general arrangement drawings
- Assessed 600,000 feet of DC cable on a 160 MW solar project to present an alternatives analysis of cable management options for the site
- Performed load flow, short circuit, and harmonics studies of solar projects using ETAP

### FLEXGEN

Durham, NC

*Systems Engineering Intern*

May 2022 – August 2022

- Created a lab testing plan for a 3.7 MWh battery energy storage system by compiling information from vendor documentation and single line diagrams
- Synthesized DNP3 communication data from various projects to build a standard data points list that allows future projects to obtain a list of necessary points depending on the project features and customer input

- Identified and implemented solutions for wiring issues with the 3.7 MWh system by physically testing the container according to my lab testing plan

## **LIVE OAK BANK**

*Bioenergy Lending Intern*

**Wilmington, NC**

*May 2021 – August 2021*

- Developed a predictive Excel model based on a \$500MM project portfolio to quantify the viability of future bioenergy projects with documentation to explain the statistical concepts to sales personnel
- Drafted a teaching tool to explain the statistical concepts in my financial model to sales personnel
- Created financial reports for the US Department of Agriculture by reading tax audits and calculating project key performance indicators

## **SKILLS**

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- Microsoft Excel
- Python
- MATLAB/Simulink
- PSSE
- ETAP

## **CAMPUS INVOLVEMENT**

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### **TEACHING ASSISTANT**

*ECE 211 Electric Circuits*

**Raleigh, NC**

*January 2022 – Present*

- Led problem sessions of up to 40 students and assisted them with problems relating to linear circuit analysis
- Assisted students with and graded breadboard circuits demonstrating concepts from lectures

### **ENGINEERS WITHOUT BORDERS**

*Sierra Leone Renewable Energy Project Lead*

**Raleigh, NC**

*August 2020 – Present*

- Planned and led a trip of 10 students to Sierra Leone in March 2023 to assess a primary school for solar panels and battery storage
- Created a year-long project plan and timeline for a team of 20 students to complete the design of the solar/storage system including load profiling, system sizing, and construction planning
- Led a creative committee to create a travel book documenting our previous project in Sierra Leone

### **NC STATE MARCHING BAND AND PEP BAND**

*Trombone*

**Raleigh, NC**

*August 2020 – Present*

- Performed at home and away football and basketball games every week

### **DEPARTMENT OF ENERGY SOLAR DISTRICT CUP**

*Financial Modeling Lead*

**Raleigh, NC**

*August 2021 – May 2022*

- Designed and pitched a PV panel and battery system to power the Ohio State University Medical Campus with a team of six other students
- Awarded third place in the Ohio State use case division at a 28-team national competition hosted by NREL
- Created a financial model that accounted for loan financing, tax incentives, and cost recovery from asset depreciation to demonstrate that our system would be profitable for both the Ohio State University and any outside investors in the project

## **PROJECTS**

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### **SENIOR DESIGN**

*Modular Solar Construction Power*

**Raleigh, NC**

*August 2023 – Present*

- Designing a mobile modular solar and energy storage system for a construction company to power their biometric time and attendance machine

- Performed a technical demo that powered the device provided by our sponsor company using a 100W solar panel, a battery, a charge controller and a 1000W inverter

## **POWER SYSTEM CONTROL AND OPERATION**

**Raleigh, NC**

*Contingency and Economic Dispatch Analysis*

*August 2023 – December 2023*

- Used Siemens's Power System Simulator for Engineers (PSSSE) to run power flow analyses, contingency analyses, and economic dispatch analyses on an IEEE 9-bus system
- Created a gradient descent search algorithm to identify the most economical remedial actions to relieve bus voltage and branch violations
- Wrote two IEEE format reports outlining our results and recommendations for the operation of the system

## **AWARDS**

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- Electrical and Computer Engineering Department Research Experience for Undergraduates (REU) Award
- Electrical and Computer Engineering Department Faculty Senior Scholar