Nolan Groves

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College graduate with lab work, programming, research, and teaching experience. Looking to specialize in autonomous systems. Extensive experience in a ultra-high vacuum research lab with both hardware and software. Participated in undergraduate research projects including a project applying machine learning to spectral data. Broad exposure to physics, applied electronics, multiple programming languages, and advanced math.

Education

2017 – 2021 **Bachelors degree in Physics with CS minor**, *Texas State University*, San Marcos, TX, 3.97 GPA.
Graduated *Summa Cum Laude*, Dean's list every semester

Notable Coursework

- *Advanced Lab* - Worked in self-guided groups to design and create practical projects, including an automated high-vacuum chamber and a small quadcopter capable of limited autonomous flight. Through thsese projects we learned how to integrate hardware and software components with Arduino and Labview, as well as the basics of PID systems and control loops.
- *Applied Electronics* - Learned the fundamentals of designing and understanding circuits, then applied those to design and create an independent project. My project was a simple coil-gun using a capacitor bank and solenoid to accelerate a projectile, and capable of charging to 1000 volts. Aside from an understanding of circuit design, I also gained experience in soldering, component choice, and working with high voltage.
- *Other Notable Courses* - Electromagnetic Theory I & II, Calculus III, Quantum Mechanics, Statistical Physics, Differential Equations, Assembly Language, Data Structures & Algorithms

2012 – 2016 **IB Diploma**, *Westwood High School*, Austin, TX, 4.0 GPA.

Research Experience

May 2019 – May 2021 **Lab Tech**, *Texas State University*, San Marcos, TX.
Worked under Dr. Mark Wistey in Molecular Beam Epitaxy (MBE) research. Resolved technical/mechanical issues and assisted with general ultra-high vacuum lab operation. Also worked alongside him doing guided research using machine learning to analyze spectra.

- Modified code to allow digital reading of unsupported sensors through Molly control software, as well as debugging and implementing various other hardware control interfaces.
- Helped design and build water chiller units with digital controls.
- Oversaw transfer of control systems to new hardware and operating systems.
- Preformed general maintenance work and operation on ultra-clean systems, ultra-high vacuum systems, high voltage systems, arsenic contaminated systems, and others.

Fall 2021 **Undergraduate Research - Machine Learning**, *Texas State University*, San Marcos, TX.
Worked as part of a project to identify irregularities in goat blood via spectrography. Implemented a neural network using TensorFlow to categorize the spectral data. The nature of the collected data resulted in machine learning being a poor fit for the processing method, and further research is ongoing

Spring 2020 **Undergraduate Research - FTIR**, *Texas State University*, San Marcos, TX.
Worked under an advisor to analyze the feasibility of utilizing Fourier Transform Infared Spectroscopy (FTIR) to produce a on-chip component capable of spectorgraphy. While the required materials-science foundataion could not be found to utlize FTIR, a promising technique with a supercapacitor could be an alternative.

Teaching Experience

Sep 2021 – Current **Instructor**, *Mathnasium*, Austin, TX.
Help students K-12 struggling with math in a tailored curriculum course, as well as one on one instruction

Aug 2021 – Current **Online Tutor**, *Tutor.com*.
Work with students in science, math, and programing with any probelems on an ad-hoc basis. Highly rated by my students

Aug 2019 – May 2021 **Learning Assistant/Lab Instructor**, *Texas State University*, San Marcos, TX.
Worked with various teachers to teach the intro Electricity and Magnetism course and the Advanced Lab course

- Taught the fundamentals of electronic and mechanical systems using independent projects including a high-vacuum system and an automated weather station
- Learned the pedagogical models backing the Learning Assistant program and modern learning in general
- Staffed the physics help center to assist with a variety of problems from various classes.

Other Skills

Computer Skills

- Python
- Java
- Linux
- C++
- JavaScript
- TensorFlow

Fabrication Skills

- Welding
- Water Jet
- Wood Shop
- Soldering
- CNC Mill
- Laser Cutter

References

- *Dr. Mark Wistey*, Associate Professor – Physics, Texas State University
  P.I. / Advisor
  (512) 245-2916
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- *Dr. Brandon Lunk*, Lecturer – Physics, Texas State University
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