

# RYAN HANNIGAN

## Software Engineer



North Austin

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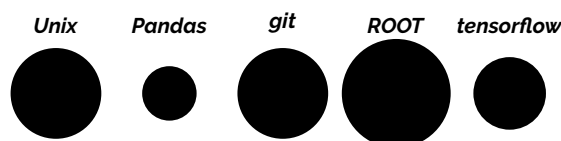
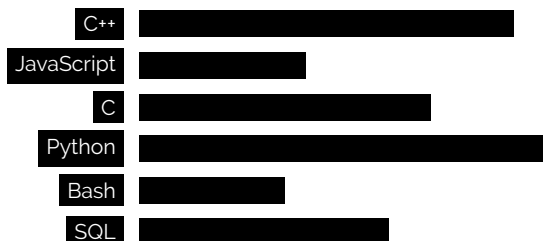
hannigan.xyz

github.com/rhanniga

@astrophysiic

### WHO AM I?

Particle physics PhD fellow at the University of Texas at Austin. Software engineer and data scientist for the ALICE experiment at CERN. Work involves a multitude of fields, from writing full-stack software for the LHC Run 3 hardware upgrade to investigating multi-dimensional strange hadron angular correlations in p-Pb collisions at ALICE. Specializing in Python and C++ with an emphasis on automation and data visualization.



### EXPERIENCE

2018 – present

#### Software Engineer

ALICE at CERN

Developed an entire C++ software suite for testing and characterizing various hardware components for ALICE detector upgrade. Utilized OOP under the factory method design pattern with large focus on automation. Initial prototyping was done using Python under the unittest framework. Also incorporated hardware testing into gitlab pipeline to account for discrepancies in simulation.

C++ / Python / Git / QT / Flask

2017 – present

#### Data Scientist

ALICE at CERN

Analyzed proton-lead data from the Large Hadron Collider (LHC) to investigate multi-dimensional angular correlations with strange hadrons, which is pertinent to understanding Quantum Chromodynamics (QCD). Initial analysis performed using C++ software running on supercomputing cluster, with final analysis/systematic automation/data visualization done in Python.

Python / C++ / Jupyter / ROOT

2018 – present

#### Firmware Engineer

ALICE at CERN

Developed and implemented multiple FPGA modules for the primary readout board for the Inner Tracking System (ITS) of the ALICE detector upgrade. Modules were responsible for monitoring detector health as well as timing events at the picosecond level. Most modules written in VHDL, with USB interface written in verilog. Python was used to validate firmware modules in software.

VHDL / Verilog / Python / Git

### EDUCATION

2017 - 2023

#### Doctorate Degree (4.0 GPA)

University of Texas at Austin

Currently in final year of PhD program. Working towards a PhD in Particle Physics. Recipient of Graduate Provost's Excellence Fellowship, valued at over \$240,000. Completed courses include General Relativity, Quantum Field Theory, Physics of Sensors and all core courses.

2012 – 2017

#### Bachelor's Degree (3.9 GPA)

University of Houston

Received BS in both Physics and Mathematics at the University of Houston. Graduated Magna Cum Laude, and was #1 in the Physics Department. Advanced physics courses included Astrophysics, Quantum Field Theory, Devices and Sensors. Advanced math courses included Advanced Linear Algebra, Advanced Partial Differential Equations, Numerical Analysis.

### LEADERSHIP

**Shift Leader** 2023, CERN  
**Teaching Assistant** 2018-2019, UT  
**Physics Lecturer** 2017, UH  
**Math Facilitator** 2016-2017, UH  
**Physics Facilitator** 2014-2017, UH

### HOBBIES

I love playing video games (mainly CS:GO), working out, playing piano, coding, and I'm a huge fan of math puzzles or riddles. I also enjoy learning new things about Vim, the greatest text editor.

### FUN FACTS

I currently play for the UT Varsity CS:GO team and am the only graduate physics student in the entire league. I also have synesthesia, meaning I hear colors.