

# Sean Tran

📍 Irving, TX   ✉ seantran55@gmail.com   🌐 stran55.github.io/site   📄 github.com/stran55

## Education

---

**The University of Texas at Dallas**   **B.S. in Physics**, GPA: 3.4/4.0 – *Expected Dec 2026*

**B.S. in Computer Science** – 2023

## Work Experience

---

**NSF REU Research Intern — Computational Astrophysics**

*May 2025 – Present*

*University of Texas at Dallas – Richardson, TX*

- Developed and optimized computational models using Python to simulate complex physical systems, improving runtime efficiency for large-scale multi-parameter simulations
- Automated data analysis of 10,000+ simulation outputs, building visualization dashboards and applying statistical methods to identify relationships between input parameters and system performance
- Implemented numerical ray-tracing algorithms for modeling optical system behavior and analyzing light propagation under varying conditions, with exposure to extending models toward wave-based effects
- Received award for presenting data-driven findings at UTD SPUR 2025
- Tools Used: *Python (NumPy, SciPy, Astropy, Matplotlib, Plotly), MATLAB, Linux, Bash, Jupyter, Git, Glafic*

**Restaurant Manager — Family-Owned Business**

*June 2012 – Present*

*Golden Deli – Addison, TX*

- Managed high-volume operations including transactions, inventory control, and equipment maintenance while troubleshooting issues to maintain efficiency and ensuring exceptional customer service

## Projects and Builds

---

**Optical Schlieren Imaging System — Density Gradients in Gas Propulsion**

- Designed and built an optical Schlieren imaging system to capture refractive index variations in gas flow, enabling visualization of otherwise undetectable flow structures
- Aligned and optimized optical components (mirrors, a collimated light source, and knife-edge cut-off) to optimize system sensitivity, spatial resolution, and image contrast

**Eddy Current Braking System — Electromagnetic Drag Force**

- Designed and built an eddy current braking system to quantify electromagnetic drag in a rotating conductor, reducing stopping time by up to 87% compared to friction-only deceleration
- Isolated electromagnetic and mechanical contributions to drag, showing 92% braking force arose from induced eddy current and estimating magnetic field strength ( $\sim 0.07$  T) from system dynamics

**Semiconductor Characterization — Hall Effect Measurements**

- Determined carrier density, mobility, and conductivity of doped semiconductors by combining Hall effect measurements with transport analysis, validating results against expected material behavior
- Calculated semiconductor band gap ( $\sim 0.75$  eV) from temperature-dependent conductivity using  $\ln(\sigma)$  vs  $1/T$  analysis, achieving agreement within 12% of accepted values

**Laser Diode Spectroscopy — Hyperfine Transitions of Rubidium**

- Diagnosed and corrected a systematic measurement error in a laser setup caused by unintended optical paths in the Michelson interferometer, reducing error from an order-of-magnitude deviation to  $< 5\%$
- Developed a fringe-based frequency calibration to extract GHz-scale spectral features and determine hyperfine peak separations consistent with known atomic transitions

## Skills

---

**Software:** Kali Linux (WSL), Ubuntu, MATLAB, Jupyter, Git, FreeCAD, Arduino IDE, AWS, Firebase, MySQL

**Mechanical:** Hand and Power Tools, Basic Electrical Wiring and Circuit Assembly, Soldering, Basic Fabrication, Welding, Prototyping, Optical Alignment, Equipment Repair and Maintenance

**Work Eligibility:** Eligible to work full time in the U.S. with no restrictions; Available full-time starting June 2026