

Jackson Lyle

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EDUCATION

University of Florida

Aug. 2025–Expected May 2029

Gainesville, FL

- B.S. Computer Science (Cybersecurity) | B.S. Astrophysics
- University Research Scholars Program (URSP); USP Fellow; Honors Program

Phillips Exeter Academy

Sep. 2021–Jun. 2025

Exeter, NH

- High School Diploma; Highest Academic Honors (2023–2025)

RESEARCH EXPERIENCE

Undergraduate Researcher — AGN Torus Reverberation Mapping

Fall 2025–Present

Department of Astronomy, University of Florida | Dr. Triana Almeyda

- Year-long study of convolutional methods for active galactic nucleus (AGN) light curve analysis: building a response-function library for AGN dust tori with the TORMAC radiative-transfer simulation on UF's HiPerGator supercomputer; showed that FFT convolution with precomputed response functions reproduces direct simulation output.
- Presented in-progress results at the UF Department of Astronomy PULSAR poster session (Apr. 2026).
- Research funded by the University Scholars Program (USP), 2026–27; writing a paper for publication as the USP culminating deliverable (expected Spring 2027).

Data Pipeline Developer / Remote Telescope Operator

Sep. 2025–Present

Rosemary Hill Observatory, University of Florida | RETRHO Program | Dr. Jamie Tayar & Dr. Triana Almeyda

- Write and maintain code for automated calibration, reduction, and delivery pipelines that turn raw CCD frames into science-ready datasets for requesting researchers.
- Operate a 14-inch research telescope and CCD system to collect observational data on requested astronomical targets (~6 hrs/week).
- Collaborate with the university research team on observational planning and instrument use.

PROFESSIONAL EXPERIENCE

Software & Systems Developer

Apr. 2026–Present

Lyle Contracting Solutions, Inc.

- Co-developed Kinetics, a construction management platform (web + offline-first mobile) now in daily field use, replacing commercial software costing ~\$18,000/yr; led system architecture, database design (PostgreSQL/Supabase), and testing, with implementation heavily leveraging agentic AI tooling.
- Designed and deployed the company's on-premises infrastructure: FortiGate perimeter firewall; least-privilege nftables rules limiting administrative and accounting systems to allowlisted WireGuard users and devices; Debian server with mirrored ZFS storage and encrypted offsite backups; self-hosted PowerSync mobile sync; and a monitoring/logging stack. Continue to run IT and maintenance remotely with weekly diagnostics.

SECURITY PROJECTS

Security Home Lab — Attack Simulation & Detection

Sep. 2026–Present

- Built an isolated KVM/QEMU lab simulating a small network: OPNsense firewall, Kali Linux attacker, and Windows 11 and Debian/Nextcloud targets.
- Executed a session-cookie hijacking attack end-to-end against a self-hosted Nextcloud instance; deploying Wazuh SIEM to build and validate detections for simulated attacks.

ACADEMIC PROJECTS

Constraining Quasar UV Variability for the L_X – L_{UV} Distance Ladder

Spring 2026

- Observing proposal written for AST3722C and selected for telescope time through class judging rounds; observed a $z = 1.512$ quasar over two nights with the Rosemary Hill Observatory 14" telescope.
- Built a custom reduction and photometry pipeline with full error propagation; interpolated rest-frame 2500 Å flux via power-law SED fitting, demonstrating precision sufficient for quasar variability detection with small-aperture telescopes.
- Results written as a full AASTeX paper (jacksonlyle.dev).

Variable Star Photometry & Remote Observing System

May 2024–Present

- Built a custom observatory platform: Celestron EdgeHD 8" aplanatic SCT, ASI2600MM Pro monochrome camera, CGEM II equatorial mount, ZWO filter wheel and off-axis guider.
- Enabled fully remote operation via onboard MeLE mini-PC, Pegasus Powerbox Micro power distribution, and dedicated Wi-Fi access point; RDP control from any network with 50 Ah LiFePO₄ battery for portable field use.
- Currently producing broadband and narrowband deep-sky imagery; developing toward differential photometry contributions to the AAVSO variable star database.

ShutterBug — Transmissive Grating Spectrograph

Apr. 2025–Present

- Designed and fabricated a transmissive-grating spectrograph (V.1) in Onshape; 3D-printed and assembled the optical system with a custom flash-bulb circuit.
- Calibrated pixel-wavelength mapping using an argon-emission lamp; identified oxygen telluric absorption lines; determined flash-bulb emission temperature to within 0.5% of an accepted reference value.
- Redesigning instrument (V.2) with a precision-machined slit and improved diffraction grating to achieve mid-range spectral resolution for stellar emission line analysis.

Distance to M44 Using *Gaia* EDR3

Apr.–Jun. 2025

- Extracted stellar photometry from *Gaia* EDR3 using TOPCAT; constructed color-magnitude diagrams of M44 and M45.
- Applied distance modulus fitting and polynomial regression to calculate M44's distance (173.7 pc), achieving –6.2% error from accepted values; validated against SIMBAD.
- Formatted results as a short research paper in AASTeX; deposited on Zenodo (doi:10.5281/zenodo.17038818).

ACADEMIC PRESENTATIONS

- *Building a TORMAC Response Function Library for AGN IR Reverberation Mapping.* J. Lyle, T. Almeyda, Z. Knutson. PULSAR Poster Session, Department of Astronomy, University of Florida, Apr. 2026.

- *The Quest for Quasars as a Standard Candle*. Poster synthesizing recent literature on quasar standard candle viability; covered the Lusso–Risaliti UV–X-ray luminosity relation, high-redshift Hubble diagrams, redshift evolution debates, and data-selection methods for unbiased quasar samples. PHY570 Advanced Astronomy Methods, Phillips Exeter Academy, 2024.
- *The Mechanics of Classical Novae and Cataclysmic Variables*. Poster covering cataclysmic variable accretion physics, electron degeneracy pressure, thermonuclear runaway via the CNO cycle, and spectral classification through light curve morphology and FeII vs. He/N type emission line analysis. PHY480 Special Topics in Astronomy, Phillips Exeter Academy, 2024.

ENGINEERING PROJECTS

Model Rocketry

Jan. 2020–May 2025

- Built and launched model rockets independently; competed on Phillips Exeter Academy’s rocketry team for two years, contributing to design, testing, and launch preparation.
- Applied CAD modeling and OpenRocket flight simulations to optimize performance.

Underwater Robotics — MATE ROV Competition

Sep. 2022–Jun. 2023

- Served as mechanical branch lead, overseeing design and fabrication of key ROV subsystems including the manipulator claw.
- Team advanced from regional to international competition, placing 6th worldwide.

HONORS & AWARDS

- University Research Scholars Program (URSP), University of Florida; invitation-only 2025
- University Scholars Program (USP), University of Florida; funded research award 2026–27
- Honors Program, University of Florida 2025
- John & Irene MacKenty Astronomy Prize, Phillips Exeter Academy 2025
- Highest Academic Honors, Phillips Exeter Academy 2023–2025

SKILLS

- **Observational:** CCD/CMOS photometry, spectroscopy, differential photometry, telescope operation and alignment, computerized equatorial mounts, astrophotography
- **Software & Data:** Python (NumPy, Pandas, Astropy), R, Mathematica, TOPCAT, AstroImageJ, Maxim DL, TheSkyX, Registax, PIPP, L^AT_EX
- **Fabrication:** 3D CAD (Onshape, Fusion 360), 3D printing, laser cutting/engraving, optical systems design, general fabrication
- **Development:** System architecture, database design (PostgreSQL/Supabase), agentic AI-assisted development, software testing & validation
- **Systems:** Linux (Arch, Debian), HPC (HiPerGator), KVM/QEMU, ZFS, Docker, network & firewall administration, self-hosted infrastructure
- **Security:** FortiGate, OPNsense, WireGuard, nftables, Kali Linux, Wazuh SIEM; CompTIA Security+ (in progress)
- **Communication:** Scientific and technical writing, poster design, image processing (Photoshop, Lightroom)
- **Languages:** French (intermediate)