

# EMILY LUBAR

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## EDUCATION

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### **Ph.D., The University of Texas at Austin**

*Spring 2021 - present*

Focus on Infrared Instrumentation and Brown Dwarf Science

### **M.S., The University of Texas at Austin**

*December 2021*

Fabrication and Characterization of Silicon Dispersive Optics

### **B.A./B.S., The Evergreen State College**

*received June 2017*

Dual Bachelor of Arts & Science Degrees

Emphasis in Physics and Applied Math

## RELEVANT PROFESSIONAL HISTORY

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### **Research Technologist**

Oct 2017 - August 2019

*Penn State University, Department of Astronomy and Astrophysics*

### **REU Student Researcher**

Summer 2016

*Arecibo Observatory, Puerto Rico*

### **Physics and Calculus Tutor**

Aug 2015 - June 2017

*The Evergreen State College QuaSR tutoring center*

## CURRENT WORK

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### **Instrumentation**

- Fabrication of Silicon immersion gratings via lithography/wet chemical etch technique.
- General characterization of fabricated gratings for future instruments (MagNIFIES/GMTNIRS)
- Redesign & alignment of UV grating fabrication exposure system
- Precisely measuring final fabricated grating blaze via theoretical analysis and experiment

### **Science**

- Observing with the Immersion Grating Infrared Spectrometer (IGRINS) on Gemini South.
- Analyzing IGRINS data to refine our understanding of the early evolution of brown dwarfs and young stellar objects

### **Equity and Inclusion**

- Leading the UT Austin astronomy department Equity & Inclusion (E&I) discussion group
- Co-organizing the department book club hosted by the E&I group (e.g. *Equity in Science* by Dr. Julie Posselt and *Disordered Cosmos* by Dr. Chanda Prescod-Weinstein)

## OUTREACH AND COMMUNITY ENGAGEMENT

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- Grad mentor for visiting summer REU student *Summer 2021*
- American Astronomical Society Congressional Visit Day participant *October 2020*
- UT Austin Girl Day volunteer *April 2019*
- GUMMY graduate mentor (UT Austin astronomy department program) *Sept 2019 - Present*
- Organizer/co-leader of Penn State Women in Astronomy group *Feb 2018 - July 2019*
- Leader for Toward a More Inclusive Astronomy (TaMIA) meeting *Sept 2019*
- Volunteer Observer at Penn States annual AstroFest *July 2018*
- Volunteer Observer at Penn States annual AstroNight *October 2018*
- Presenter at local Girl Scout Camp: Harry Potter night *March 2018*
- We Are For Science: Ask A Scientist volunteer *April 2018*
- Founder and first president of the Evergreen Astronomical Society (EAS) *Sept 2016 - June 2017*
- Evergreen Science Carnival Presenter *March 2017*
- Evergreen physics faculty hiring committee member *Oct 2016 - February 2017*
- Lead organizer of EAS first annual public Star Party at The Evergreen State College *April 2016*

## AWARDS

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- NASA Group Achievement Award *October 2020*  
For the development and delivery of the state-of-the-art NEID radial velocity spectrograph and port adapter to the WIYN 3.5-meter telescope on Kitt Peak
- Evergreen Astronomical Society 2017 Budget *December 2016*  
Funded the purchase of two telescopes, a mobile planetarium visit during Science Carnival, visiting guest speakers, and books.
- Diversity Mini-Grant *November 2015*  
Awarded to sponsor trip to Undergraduate Women in Physics (CUWiP) conference

## HARDWARE EXPERIENCE

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- Optical fiber work: Polishing, splicing, testing the throughput and Focal Ratio Degradation (FRD) of fibers for precision science applications
- Soldering wiring harnesses for sensors to maintain NEID's Environmental Control System
- Basics of electrical troubleshooting
- Machine shop training
- General clean room procedures and optics handling

## SOFTWARE EXPERIENCE

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- Python: intermediate/advanced
- Zemax: beginner/intermediate
- LaTeX: intermediate

- GitHub: intermediate
- Arduino: beginner

## OBSERVING EXPERIENCE

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- Gemini South Observatory: after installing and commissioning IGRINS on the telescope, collected data on brown dwarfs to probe the physical properties of the sub-stellar boundary (2020)
- Greenbank Observatory: worked on a team of PSU graduate students to use Breakthrough Listen time to conduct radio observations of transiting planets (2018)
- Arecibo Observatory: conducted radio observations for my mentor during REU program (2016)

## PUBLICATIONS

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- **E. Lubar**, et al., (2020) *Precise Blaze Angle Measurements of Lithographically Fabricated Silicon Immersion Gratings*. Proceedings of SPIE, Volume 11451, Advances in Optical and Mechanical Technologies for Telescopes and Instrumentation IV; 114515I. <https://doi.org/10.1117/12.2561128>
- C. Schwab, ...**E. Lubar**... G. Stefansson et al., (2020) *The NEID Spectrometer: Fibre Injection System Design*. Proceedings of SPIE, Volume 11447, Ground-based and Airborne Instrumentation for Astronomy VIII; 114474L. <https://doi.org/10.1117/12.2563248>
- S. Kanodia, ...**E. Lubar**... D. Stevens, et al., (2020) *Ghosts of NEID's past*. Proceedings of SPIE, Volume 11447, Ground-based and Airborne Instrumentation for Astronomy VIII; 114474O. <https://doi.org/10.1117/12.2561679>
- E. Honaker, G. Mace, E. Han, M. Hussaini, **E. Lubar** *TESS Photometry of the Precataclysmic Variable Wolf 1130AB*. Research Notes of the AAS, Volume 4, Number 11
- J. Ninan, ...**E. Lubar**... A. Roy, et al. (2020) *Evidence for He I 10830 Absorption during the Transit of a Warm Neptune around the M-dwarf GJ 3470 with the Habitable-zone Planet Finder*. The Astrophysical Journal, Volume 894, Number 2
- G. Steffanson, ...**E. Lubar**... J. Wright, et al. (2020) *A Sub-Neptune-sized Planet Transiting the M2.5 Dwarf G 9-40: Validation with the Habitable-zone Planet Finder*. The Astronomical Journal, Volume 159, Number 3
- A. Metcalf, ... **E. Lubar**,... G. Ycas, et al. (2019) *Stellar Spectroscopy in the Near-infrared with a Laser Frequency Comb*. Optica, Volume 6, Issue 2
- P. Robertson, ...**E. Lubar**,... J. Wright, et al. (2019) *Ultra-Stable Environment Control for the NEID Spectrometer: Design and Performance Demonstration*. Journal for Astronomical Telescopes, Instruments, and Systems, Volume 5(1), id 015003. <https://doi.org/10.1117/1.JATIS.5.1.015003>
- J. Wright, S. Kanodia, & **E. Lubar** (2018) *How Much SETI Has Been Done? Finding Needles in the n-Dimensional Cosmic Haystack*. The Astronomical Journal, Volume 156, Number 6. DOI: 10.3847/1538-3881/aad099
- S. Kanodia, ...**E. Lubar**... P. Robertson, et al. (2018) *Overview of the Spectrometer Optical Fiber Feed for the Habitable-zone Planet Finder*. Proceedings of SPIE, Volume 10702, Ground-based and Airborne Instrumentation for Astronomy VII; 107026Q. <https://doi.org/10.1117/12.2313491>

## POSTERS

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- **E. Lubar**, D. Jaffe, C. Brooks, S. Hickman, G. Mace, M. Gully-Santiago (2020) *Precise Blaze Angle Measurements of Lithographically Fabricated Silicon Immersion Gratings*. SPIE 2020 virtual conference.
- **E. Lubar**, P. Robertson, S. Mahadevan, et al. (2019) *Design and Performance of NEID Ultra-Stable Environmental Control System*. Extreme Solar Systems IV conference. Reykjavik, Iceland.
- **E. Lubar**, P. Robertson, S. Mahadevan, et al. (2019) *Design and Performance of NEID Ultra-Stable Environmental Control System*. American Astronomical Society (AAS) 233 conference. Seattle, WA.
- **E. Lubar**, P. Robertson, S. Mahadevan, et al. (2018) *Achieving High Precision Doppler Spectroscopy: NEID Internal Environmental Stability*. Emerging Researchers in Exoplanet Science (ERES) IV conference. State College, PA.
- **E. Lubar** & G. Verschuur, (2017) *Characterizing Galactic Neutral Hydrogen (HI) Filaments*. American Astronomical Society (AAS) 229. Grapevine, TX.

## PRESENTATIONS

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**A Tale of Two Projects: Evolution of Objects Above and Below the Substellar Boundary & Precise Blaze Angle Measurements of Lithographically Fabricated Silicon Immersion Gratings** May 2021

*Masters Qualifying exam talk at the University of Texas at Austin*

**Precise Blaze Measurements of Lithographically Fabricated Silicon Immersion Gratings** October 2020

*NYRIA virtual conference talk*

**NEID: The Great and Ultra-Stable Spectrograph** June 2019

*Astronomy on Tap State College 26 at Happy Valley Brewing Company*

**Achieving High Precision RVs with the HPF and NEID Spectrographs** October 2019

*Department talk at the University of Texas at Austin*

**NEID: Environmental Control System and Optical Fiber Train** October 2018

*Department talk at Penn State University*

**Science at Evergreen and my Path to Arecibo** May 2017

*Invited talk for Science, Wisdom, & The Future: Humanities Quest for a Flourishing Earth—*

*A Noetic Sciences Lecture Series*

*The Evergreen State College*

**Science at Evergreen** December 2016

*Talk given 3+ times to Prospective and current Evergreen students*

*The Evergreen State College*

**Characterizing Galactic HI Filaments** August 2016

*Arecibo Observatory, Puerto Rico*

**Synthesis and Characterization of Graphene Nanosheets for Lithium-Ion Battery Applications** April 2016

*Linus Pauling Undergraduate Research Symposium*