Eliana Stilson

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Education

2025 - Present **University of Arizona** Tucson, AZ

PhD in Optical Sciences

2021 - 2025 **University of Arizona** Tucson, AZ

Bachelor of Science in Optical Sciences and Engineering: GPA3.929/4.0

Optical Engineer on BAE Systems Senior Design Team

- Designed and integrated a 2D optical payload with camera and LiDAR for autonomous drone situational and distance awareness.
- Simulated beam steering in MATLAB using mirror rotation matrices to shape a 1D scanning LiDAR into an 'X' pattern with a horizontal crossline. The simulated scan closely matched the real-world output, validated through mirror angles and positions supported by a 3D-printed payload housing.
- Performed first-order calculations using the Johnson criteria and object space resolution to evaluate and select a COTS camera capable of detecting 2-inch linear features.
- Calibrated and tested the optical payload actuation system using an IR camera to visualize LiDAR scan patterns. Evaluated required detection performance using 2-inch linear targets placed at a 20-meter range.

Professional Experience

05/2025 — 08/2025 **Optical Engineering Internship** Phillip Medisize — Caldwell, ID

- Designed and executed advanced optical experiments comparing standard and meta lens systems for fiber coupling and collimation using single-mode (SM) and multimode (MM) fibers.
- Engineered custom optical test fixtures, including precision-mounted pinholes and lens mounts, to ensure accurate laser alignment with optical axes and fiber inputs. Configured multi-mirror beam steering systems to accommodate diverse lens geometries and beam heights, optimizing experimental flexibility.
- Conducted quantitative analysis of transmission efficiency, beam alignment, and beam quality (M^2 values) across multiple lens configurations, supporting meta lens integration in fiber optic connectors.

08/2022 — 05/2025 **Undergraduate Research Assistant in BOOM Laboratory** University of Arizona — Tucson, AZ

- Conducted research on the adverse effects of Formaldehyde fixation on endogenous fluorophores autofluorescence intensities.
- Ability to operate Multispectral Imaging System and experienced using Image J software.

06/2024 — 08/2024 **Optical Engineering Internship** Briteseed — Chicago, IL

- *MKR Foot Plate Imaging Relay*: Designed a multispectral reflectance sensor for the footplate of a Kerrison Rongeur with biteplate diameters of 3mm or less. The design process utilized Zemax to explore various configurations, including off-axis parabolic mirrors, light guides, and micro-optics, with a focus on manufacturability. Deliverables included a detailed summary of each illumination design, performance

evaluation against design criteria, modeling files for each design, and recommendations for future improvements.

- *MKR Spectral Classification Validation*: Developed a GUI using Arduino and MATLAB scripts to control Briteseed's semi-custom multispectral reflectance sensor for preliminary data collection. Deliverables included harvesting ex-vivo spinal tissues for data collection and testing the designed GUI for data collection process validation.

06/2023 – 08/2023 **Institute für Technische Optik Research Assistant** Stuttgart, GER

- Designed a magnetically actuated objective doublet lens using software methods of Zemax and SolidWorks.
- Responsible for designing and simulating the lens system by optimizing the lens geometry, minimizing aberrations, and maximizing the system's efficiency.

Honors and Awards

- Kenneth E. and Michele L. Moore Graduate FoTO Endowed Scholarship in Optical Sciences – July 2025.
- Outstanding Senior Award – April 2025.
- Optica Women's Scholarship – February 2025.
- Norman W. Edmund Merit Scholarship in Optical Sciences - May 2024
- Eustace L. Derek Family and Friends Endowed Scholarship in Optical Sciences - May 2023 & May 2024.
- SPIE Student Conference Support Program Award (2024) - December 2023.
- Christian Bürkert Foundation - May 2023.

Publications

- 3D-printed endoscope with a magnetic actuator for axial image plane scanning - Optica, Jan 2025.
- Fixative induced effects in labeled and unlabeled fluorescence: implications for biomedical imaging studies - SPIE, Apr 2024.