Alisha Whitehead

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EDUCATION

M.S./Ph.D., Optical Sciences - **The University of Arizona (UA)**   Aug 2021 – Present
- 2024-2025 Karlton Crabtree Memorial Scholarship in Optical Engineering
- 2024-2025 Chuck Hardesty Scholarship in Optical Design
- 2021-2022 Arthur G. (Jerry) and Beatrice DeBell Memorial Graduate Student Scholarship in Optical Sciences

B.S., Physics - **The University of Texas at Dallas (UT Dallas)**   Aug 2014 – May 2018
- 2019 Cibola Fellowship
- 2017 Texas Space Grant Consortium (NASA) Columbia Crew Memorial Scholar
- 2014-2016 UT Dallas Math Cohort
- 2015 Continuing Excellence Scholarship
- 2014-2018 Academic Excellence Scholarship

RESEARCH EXPERIENCE

Biomedical Optics and Optical Measurement Laboratory - UA, Tucson, AZ   Jan 2025 – Present
- Designed a LightTools illumination lens system in collaboration with team members for the lab's endoscope polarimeter project
- Advancing research and development of the lab's endoscope polarimeter project

Optical Engineering Intern – Georgia Tech Research Institute, Atlanta, GA   Jun 2025 – Aug 2025
- Derived governing equations to define the optical design space using Scheimpflug principles and target performance parameters
- Collaborated with team members to design, build, and demonstrate a range-finding system using an event-based camera and Scheimpflug geometry, capable of 3D point cloud reconstruction

3D Visualization and Imaging Systems Lab - UA, Tucson, AZ   Aug 2021 – Present
- Designed, built, and tested occlusion-capable optical see-through augmented reality head-mounted display benchtop prototypes
- Designed, performed stock lens matching, and built varifocal optical systems within the head-mounted display using ZEMAX and Code V optical design software
- Utilized Solidworks to design and 3D print optical housing and optomechanical mounts

Optical Production Engineer (New Product Introduction) - ASML, Wilton, CT   Aug 2019 – Jun 2021
- Maintained and troubleshooted complex metrology test stand equipment in ISO4 cleanroom environment – includes high voltage system, high vacuum system and vacuum chamber (1E-10 atm), and interferometer
- Production lead and responsible person for building a metrology test stand with laser interferometer and vacuum test chamber for EUV electrostatic wafer clamps
- Analyzed and made process decisions on electrostatic wafer clamp interferometric flatness data
- Worked closely with the design team to integrate novel processes into production – carbon contamination cleaning methods and laser ablation of high-frequency features affecting flatness
- Developed procedures and training for technicians for clamp handling and interferometric data acquisition process

Radiation Effects on Semiconductors Student Researcher - Los Alamos National Labs, Los Alamos, NM   May 2019 – Aug 2019
- Developed testing system on the robustness of the Mars 2020 rover's (launched in July 2020) SHERLOC cosmic ray removal algorithm for spectral data analysis
- Performed neutron generator tests irradiating SHERLOC proxy processor, SDRAMs and corresponding electrical equipment
- Characterized errors in cosmic ray removal algorithm by comparing with spectral data and FPGA golden files

Mechatronics Engineer - A+ Electronics, Cairo Governate, Egypt   May 2018 – Aug 2018
- Increased yield and eliminated 2.4K+ worker hours per year through establishing IoT remote monitoring system and streamlining 3D printing process

Research Assistant - UT Dallas Materials Science Lab   Jan 2018 – May 2018
- Completed 8 design cycles for making single and multi-layered halide perovskite LEDs
- Gathered luminescence data and analyzed IV curves using Ocean Fibre Optics and advanced metrology techniques

Team Member - UT Dallas Physical Measurements Lab   Sep 2017 – Dec 2017
- Designed and built experiment to measure work functions of a variety of metals using photoelectric effect
- Utilized monochromator to vary light wavelengths, and achieved 91% average accuracy to accepted work function values

Research Assistant - UT Dallas Cosmology and Astrophysics Lab   Jan 2017 – May 2017
- Wrote Python scripts for processing and visualization of weak gravitational lensing in high mass galaxy clusters data sets

Aerospace Engineering Data Analytics Intern - Collier Research Corporation, Newport News, VA   May 2017 – Aug 2017
- Led Advanced Composites Consortium R&D Workshop for aerospace companies (NASA, Boeing, Orbital ATK, etc.) along with Collier Research team
- Designed automated software testing process that led to 4x decrease in HyperSizer software analysis times

3D Composite Materials Researcher - Georgia Tech Manufacturing Institute, Atlanta, GA   May 2016 – Aug 2016
- Integrated MATLAB, Inventor, and ANSYS APDL to run simulations on how varying carbon nanotube properties in 3D composites would strengthen overall fracture toughness

RESEARCH PUBLICATIONS

- **Whitehead, Alisha,** and Hong Hua. "Design and demonstration of a varifocal occlusion-capable optical see-through head-mounted display." *Optical Architectures for Displays and Sensing in Augmented, Virtual, and Mixed Reality (AR, VR, MR) VI*. Vol. 13414. SPIE, 2025.
- Fong, M., R. Bowyer, **A. Whitehead**, B. Lee, L. King, D. Applegate, and I. McCarthy. "Prospects for determining the mass distributions of galaxy clusters on large scales using weak gravitational lensing." *Monthly Notices of the Royal Astronomical Society* 478.4 (2018): 5366-5378.

PROJECT EXPERIENCE

Founder, Project Manager - SpaceX Hyperloop Pod Competition   Nov 2015 – Oct 2016
- Founded team and directed design integration of pod subsystems -- levitation, braking, flight control, and chassis – for the final design package presented to SpaceX judges
- Coordinated publicity events and raised $3000+ for team's R&D from corporate sponsors and university
- Recruited and managed a team of 50 interdisciplinary university students
- Advanced to the top 10% out of 700 teams worldwide at SpaceX Design Weekend

TUTORING EXPERIENCE

Mathematics and Physics Tutor - UT Dallas Student Success Center Math Lab   Jan 2016 – May 2018
- Personally tutored up to 150 student walk-ins per week in fast paced Math Lab environment
- Able to quickly and effectively solve college-level Calculus, Linear Algebra, and Physics problems and provide understandable explanations tailored to the student

SKILLS

Software/Technical Skills: CODE V, ZEMAX, LightTools, Solidworks, Microsoft Office, MATLAB, LaTeX
Languages: English (Native), Mandarin Chinese (Intermediate)