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Boyu Zhang

EDUCATIONAL BACKGROUND

University of California, Berkeley Degree: Ph.D. in Mechanical Engineering (GPA: 3.97/4.0)	Berkeley, CA, United States 01/2022 - 12/2026 (Expected)
University of Michigan-Shanghai Jiao Tong University Joint Institute Degree: B.S. in Mechanical Engineering (GPA: 3.64/4.0)	Shanghai, China 09/2017 - 08/2021

TECHNICAL SKILLS

- **Optical Systems & Testing:** Optical system design and assembly, optical alignment, diffractive and Fourier optics, wavefront shaping and control, non-linear optics, laser-matter interaction, optical testing and characterization
- **Optical Hardware:** CW & pulsed lasers, SLMs, DOEs, AO systems, CCD/CMOS cameras, photodiodes, power meters, wavefront sensors, beam-delivery optics, optoelectronic & optomechanical components
- **Modeling & Data Analysis:** FDTD methods, atmospheric and nonlinear optical propagation modeling, adaptive-grid numerical simulation, automated image & signal processing
- **Programming & Engineering Software:** MATLAB, Python, SolidWorks, AutoCAD, LabVIEW, Zemax

PROFESSIONAL EXPERIENCE

Lawrence Berkeley National Laboratory <i>Graduate Student Research Assistant, Energy Technologies & Systems</i>	Berkeley, CA, United States 01/2022 - Present
▪ Designed, built, aligned, modeled, and validated advanced optical and laser systems across diverse applications and operating conditions to improve performance, stability, and efficiency.	
NIO Inc. <i>Intern, Product Design and Development</i>	Beijing, China 10/2021 - 12/2021
▪ Supported autonomous driving development in LiDAR-based optical perception and system architecture. ▪ Collaborated with system engineers to analyze cross-module dependencies and risk factors.	

SELECTED RESEARCH PROJECTS

Plasma Mirror Shaping and Characterization of Reflected Signals	01/2025 - Present
▪ Designed and conducted laser-plasma experiments, including optical setup alignment, diagnostic system assembly, and quantitative optical characterization. ▪ Optimized plasma-array geometry through CO₂ probe reflectivity measurements and shadowgraph imaging, achieving around 70% improvement in reflectivity and 30% improvement in energy efficiency.	
Algorithmic Elimination of Undesired Diffractions in SLM Holographic Projection	10/2023 - 01/2025
▪ Developed a holographic beam-shaping algorithm based on modified Gerchberg-Saxton method and grid-space-varying angular spectrum propagation for improved holographic projection. ▪ Experimentally validated the algorithm using CW and high-power femtosecond laser systems to eliminate undesired diffraction without additional optical components.	
Long-distance Propagation of Vortex Laser Beams in Atmospheric Turbulence	01/2022 - 10/2023
▪ Designed and aligned a 100-meter free-space optical test platform for camera-based beam profiling and experimental validation of MATLAB wave-propagation simulations. ▪ Performed quantitative beam-quality analysis and model validation, reducing prediction error by up to 79.8% and demonstrating >5× improved turbulence tolerance of vortex beams over Gaussian beams.	

SELECTED PUBLICATIONS

- Zhang, Boyu, et al. "Towards robust laser beam propagation in atmospheric turbulence." *Photonics Research* 14.7 (2026): 3245-3267. **(Research Highlight)**
- Zhang, Boyu, et al. "Toward noninvasive tumor removal through optical clearing and real-time guided femtosecond laser ablation." *Cell Reports Physical Science* 7.4 (2026). **(Cover Article)**