TIMESTEP Summer Internship Program

We are ELE Optics, a software startup in the optical field. Founded by two PhD graduates from the Wyant College of Optical Sciences in May 2019, we are a three-person Tucson-based software startup that values inclusiveness, full transparency, responsiveness, diverse perspectives, and leadership. These core values underpin our software development, company culture, and personal development. For more information, see our website: www.eleoptics.com.

We are building the next-generation of optical modelling software. This enables light-based technologies from autonomous driving, medical devices, consumer tech to astronomical instruments. Our software is cloud-based and hardware accelerated. We provide a platform that empowers the user to customize, collaborate, and create.

At ELE Optics, we are looking for an intern to contribute to and develop their skills in one of the following three areas:

• **Wave Theory:** Physical optics modelling via Gaussian beam decomposition and generalized wave propagation using Fresnel and angular spectrum techniques
• **Electricity and Magnetism Modeling:** Finite Difference Time Domain (FDTD) simulations to solve Maxwell’s equations for full E&M simulations of fine-structures in optical elements
• **Information Theory and Data Sampling:** Dynamic meshing algorithms to represent small-scale structures while simultaneously achieving large-scale data efficiencies in 4D fields

Throughout the course of this internship the student will gain skills:

• Programming algorithms and functions grounded in theory.
• Creating scalable software to deploy to the cloud.
• Technical research and comprehension from research papers.
• Presentation and communication of their work to members of the company.
• Skills to adapt and grow in a company, working in a dynamic environment.
• Develop their ability to own, manage, and document a project.

The student will be advised and work closely with the Chief Technology Officer, Isaac Trumper. Isaac obtained his PhD in Optical Engineering from the University of Arizona, and has mentored both undergraduate REU students as well as graduate students. He specialized in software for optics, applying this to metrology of large mirrors and the design of freeform systems, culminating in the optical design for a mm-wave instrument on the 12-m radio telescope on Kitt Peak for the Department of Astronomy. After graduating and starting ELE Optics, Isaac has continued to consult and is currently designing the optics for a balloon-borne spectrometer.

An ideal candidate for this position is someone who is self-motivated and wants to take ownership of a project. Skills in Python, Matlab or a lower-level programming language are necessary. Knowledge in a domain related to the project is a plus, but the ability and desire to learn the specifics are more valuable. Creative thinkers who can contribute novel perspectives are highly encouraged.