Calling all artists, musicians, gamers, chefs, mechanics, and athletes

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Abstract: A worldwide shortage of optics and photonics technicians is stifling our industry's growth. This paper describes how Monroe Community College has become a national model for educating a diverse workforce, by breaking down barriers to entry into the field.

The global optics, photonics, and imaging industry is large and growing faster than the overall US economy, but the technical workforce for the industry is shrinking at an alarming rate. Optics and photonics technicians manufacture optics, perform testing and evaluation of optics components and systems, and work with scientists and engineers in research, design, development, manufacturing, and quality control. Optics and photonics technicians are integral to the industry. The absence of a single technician can delay shipments and impede the productivity of an optics company that is forced to hire engineers to fill technician openings. The shortage of technicians is stifling innovation and requiring engineers with advanced degrees to complete the work of technicians. Development of the current and next-generation optics manufacturing workforce is vital.

The growth of the industry coupled with reports that 20% of experienced technicians and engineers are approaching retirement, is creating even greater need for skilled optics and photonics technicians. In the Finger Lakes area of New York State, more than 550 new optics and photonics technicians are needed every year (Labor Market Information, 2019). In 1971, Monroe Community College (MCC), located in Rochester, New York, was the first school in the nation to create a two-year degree program for training technicians to work in the optics industry. Today, MCC remains the world's only college awarding associate degrees in precision optics. With fifteen to twenty students graduating per year, more than 96% of Upstate New York skilled optics technician job openings unfilled annually due to an insufficient number of optics and photonics graduates. And the demand for precision optics technicians is far greater when the entire United States optics industry is considered. We have a worldwide shortage of optics and photonics technicians.

To meet the growing demand for skilled optics technicians, MCC's Optical Systems Technology program created the ***D**efense **E**ngineering **E**ducation **P**rogram in **Op**tic**s** (DEEP OPS)* to increase the national optics workforce. Funded by the Department of the Navy Office of Naval Research (Award #N00014-19-1-2740), the DEEP OPS program strengthens and expands the national precision optics workforce to ensure technological superiority for the Department of Defense. This project: 1) Extensively enhances precision optics technician training with innovative approaches that meet the needs of the optics industry and students; 2) Increases the number and diversity of optics technicians nationwide; and 3) Establishes opportunities for student and faculty engagement with the optics industry.

Innovative approaches for technician training include: adapted course delivery models, enriched curriculum, apprenticeship opportunities, and improved access for high school students. Recruitment and outreach activities target historically underrepresented populations, specifically women, members of minority groups, veterans, and individuals with disabilities. By expanding awareness of optics through presentations to high school students, teachers, guidance counselors, and parents, more students recognize the opportunities to join an exciting, growing field and upon completion of the precision optics program help fill the technician-level workforce gap that currently exists. Student and faculty engagement with the optics industry include: tours of optics companies, workshops and networking opportunities with alumni and optics industry professionals, visits from optics companies to MCC and high schools, an industry-linked professional development program for MCC faculty and high school teachers, expansion of the dual enrollment program, and broadened faculty and high school representation at national conferences.

Our industry is responsible for remarkable optics and photonics innovations that have revolutionized our world and improved our lives every single day. We need more optics and photonics technicians for continued growth and innovation.

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