



Greater Rochester, NY - the world leader in optics, photonics, imaging, and lasers.

GROW GREATER

### **Innovation that's out of this world**

How the Greater Rochester, NY region is driving growth in optics, photonics, imaging and lasers

What's found in the Mars Rover, the James Webb Space Telescope, augmented reality smart glasses and autonomous vehicles?

Innovations created in the Greater Rochester, NY region. Here, optics, photonics, imaging and laser technologies are part of the local DNA.

"High tech companies know Rochester, NY as the optics mecca in the United States," said Matthew Sydor, Vice President of Sydor Optics, a third-generation manufacturer of precision optical components.

The nine-county region is home to more than 120 optics, photonics, imaging and laser companies generating over \$3 billion in annual sales, making it one of the most robust and highly-integrated supply chains in the country.

"Pick any of the top tech companies," Sydor added. "If they want to create an optical system, the first place they come is Rochester. They might be able to complete 75% of that system buying from local companies. It's a one-stop shop for them, because the technology, the workforce and the companies are all here."



### **Skilled and ready workforce**

Employing about 17,000 people in the sector, the Greater Rochester, NY region is saturated with secondary and higher education and training programs feeding the talent pipeline.

Nineteen high schools offer optics programs and the region's largest community college is the first in the nation with an associate degree in optical systems technology.

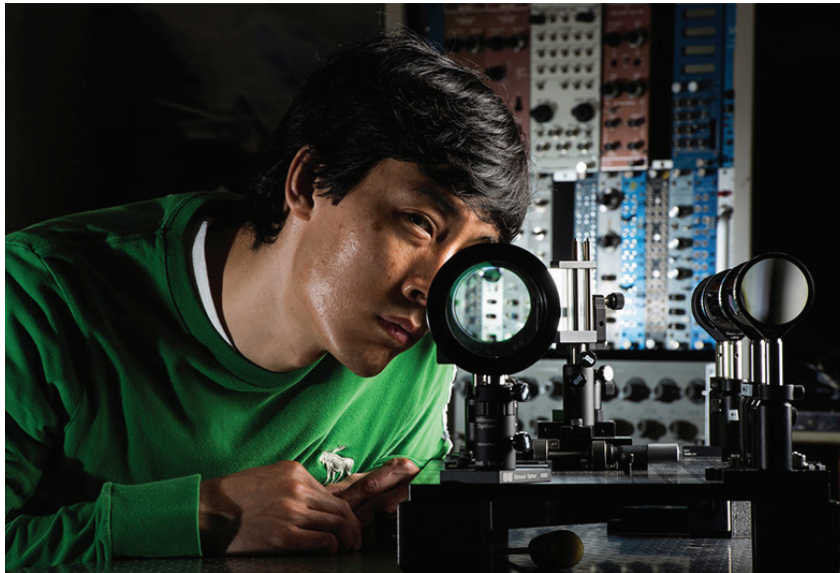
Alexis Vogt, Ph.D., professor and chair of the program at Monroe Community College, said they are meeting the need for optics technicians worldwide.

“Employers around the globe regularly contact me seeking to hire our graduates,” Vogt said, mentioning big names like Apple, Google and Microsoft. “Many of our students receive job offers before they even graduate from our program.”

Vogt herself is a graduate of the University of Rochester Institute of Optics, the first optics education program in the U.S. and awarding half of all optics degrees in the country.

Just a few miles away is Rochester Institute of Technology with its abundant research centers and labs, including one focused on the region’s burgeoning semiconductor industry that relies on the optics, photonics and imaging supply chain.

Many of the most innovative companies in the region can trace their roots to graduates and faculty of the region’s educational institutions.



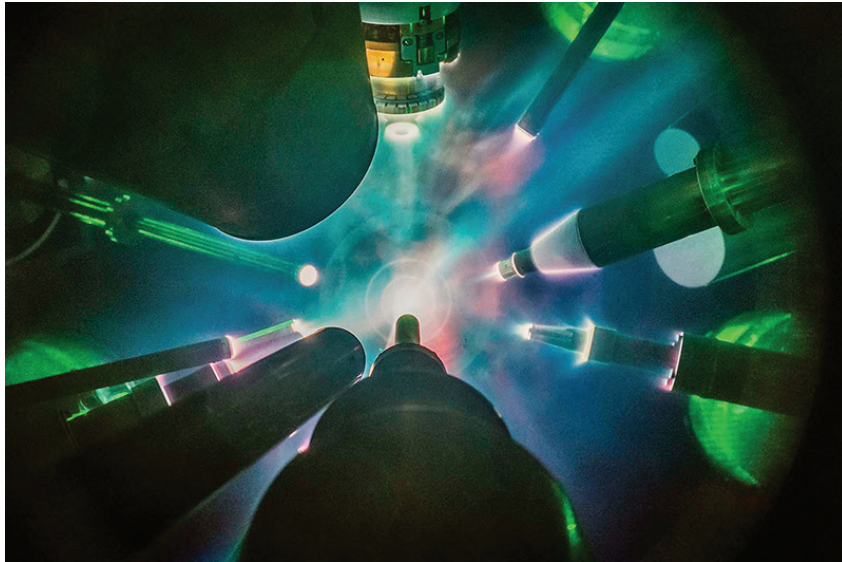
Thomas Brown, Ph.D., professor and director of the Institute of Optics at the University of Rochester, said the school is graduating a record number of students, with a good portion putting their knowledge to work for local companies.

Brown said, “Any company that moves into our area has a huge advantage just by virtue of proximity. They have access to a freshly-minted workforce skilled in the latest biomedical, semiconductor and internet technologies. They have access to a network of nearby companies that can really accelerate and improve how they do business. We have more qualified researchers and consultants within a 15-mile radius than practically anywhere in the country.”

### **Laser-focused from R&D to commercialization**

“Rochester is already the optics, photonics and imaging capital of the world. We also want to make it the lasers capital of the world,” added Brown.

Enter the University of Rochester Laboratory for Laser Energetics, home to the two most powerful lasers in the world.



These lasers fire what are called target shots that guide researchers to new scientific insights and discoveries that are ultimately applied to new products and technologies.

Christopher Deeney, Ph.D., is director of the laser lab, which is an asset for both startup and established companies.

“We have unique technical expertise, whether it be to consult on joint projects or help a company solve a problem. We do engineering, R&D, advanced manufacturing and of course, we run big lasers,” explained Deeney. “We have both a scientific and a production mindset.”

“For a small business trying to grow, they don’t have to hire a full-time expert in optical coating, for example. They can come to us and we can give them a tutorial on the cooling cycles for large optics. We can help them build their tech base and reputation,” he added.

Collaboration in the region is very strong, Deeney said. He described the lab’s work with the University of Rochester Medical Center using lasers to watch how an infection might develop on an artificial lung.

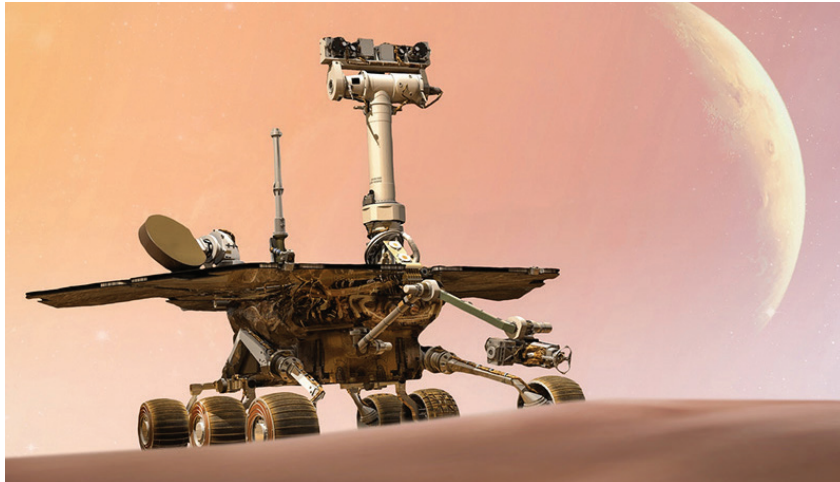
“We put the science into practice every day. We go from the fundamental science, to R&D, into something that’s engineered, implemented and then used every day,” he said.

Most of the big lasers in the world use techniques that were developed at the Laboratory for Laser Energetics. Donna Strickland won the 2018 Nobel Prize in Physics for research she conducted at the lab as a graduate student in the 1980s. The technique she developed enabled the creation of ultra-short, high-intensity laser pulses that led to many advances, including the invention of LASIK eye surgery.



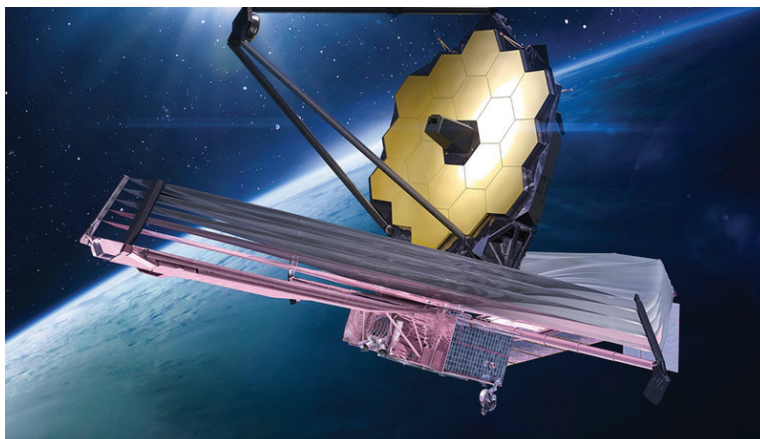
## Eyes on the future

Is life on other planets possible? Greater Rochester, NY's Optimax Systems is helping answer that question as a key supplier of lenses to NASA.



“Optimax has been involved in every rover NASA has sent to the surface of Mars,” said Joseph Spilman, President of Optimax. “There are many photonics technologies on these rovers – cameras for imaging things that have never been seen before by humans, to instruments that collect rocks from the surface of Mars and fire ultraviolet lasers at them to better understand what they’re made of and if there are any signs of past life.”

Elsewhere in space, L3Harris Technologies played a key role in building and testing the James Webb Space Telescope, the world’s largest, most powerful telescope unveiling never-before-seen cosmic views, including the universe’s first stars and galaxies.



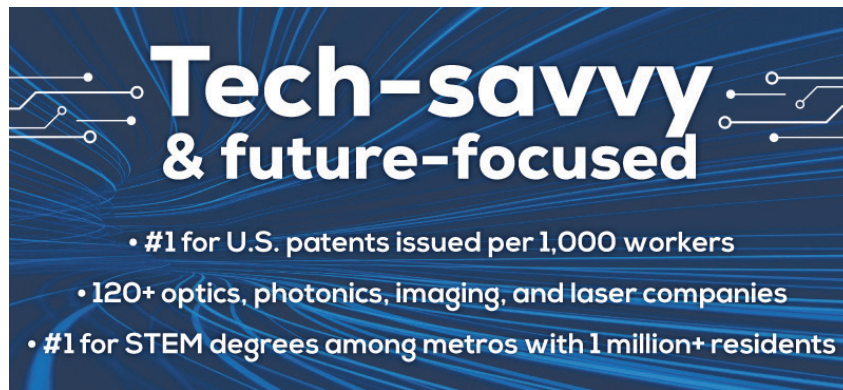
Missile-tracking satellites designed, developed and tested by L3Harris are giving the U.S. a more complete picture of advanced security threats such as hypersonic missiles.

## See the difference

Matt Hurlbutt, President and CEO of Greater Rochester Enterprise, the region's economic development arm for new business investment, said local companies are advancing how we live our lives now and into the future.

"From lasers and sensors for face ID to unlock your smartphone, to backup cameras in your car, to smart glasses used to perform knee surgery – we like to say the innovation created here is felt everywhere," he said.

Rochester-based Bausch + Lomb and CooperVision make the contact lenses that help millions of Americans see better. Syntec Optics is enabling optics to address central vision loss and blindness.



And one local company is even helping cars see better. OWL Autonomous Imaging, or OWL AI, patented 3D thermal imaging technology to enable the safe operation of autonomous vehicles at night and in bad weather.

The optics, photonics, imaging and laser innovations created in the Greater Rochester, NY region are making an impact – on the ground and out of this world.