

# CCMR – Optics and photonics Industries



## Who we are

The Cornell Center for Materials Research (CCMR) is one of 29 centers funded by the National Science Foundation as part of the Materials Research Science and Engineering Centers (MRSEC) program. The mission of the CCMR is to advance, explore and exploit the science and engineering of advanced materials. Pursuit of this mission is carried out through fundamental experimentation, theoretical studies, K-12 educational outreach, and partnerships with industry. The mission of CCMR's Industrial Partnerships Program is to promote active cooperation between CCMR and industry to foster technology transfer, strengthen the links between university based research and its application, and promote economic development.

## What we do

- Promote lasting beneficial interactions between Cornell researchers and industry.
- Partner with industry to develop products and services.
- Provide assistance tailored to entrepreneurs, early-stage “start-up” companies, and New York State small businesses.
- Encourage use of shared university resources and instrumentation.

## How we do it

- Foster low-cost bench-to-bench collaborations with industry and Cornell researchers
- Administer a matching grant program called JumpStart, designed to help small NYS businesses solve concrete problems related to materials through collaborations with university experts.
- Sponsor workshops and meetings for entrepreneurs and startups such as the Pre-Seed Funding Workshops (PSW).
- Host workshops such as Facilities101, an in-depth introduction to shared instrumentation.

## Selected opportunities for the optics and photonics industries:

<b>Markets:</b>	<b>Materials:</b>	<b>Methods:</b>	<b>Machines:</b>
Microelectronics	Dyes	Material synthesis	Microscopes
Flat panel display	Coatings	Material characterization	Spectrometers
Metrology	Fiber optics	Prototype development	X-Ray diffractometers
Spectrometry	Nano-Materials	Product improvement	Thermal analyzers
Wireless communications	Custom optics	Product innovation	Mechanical analyzers

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### Selected JumpStart success stories:

*A NY State manufacturer of polishing pads for the semiconductor industry approached Cornell for assistance with a product improvement project. Working with researchers in Chemical and Biomolecular Engineering, the company was able to gain a solid understanding of the physics and materials science behind their product. With this information the company was able to develop new production procedures and implement new quality control measures resulting in a higher quality product at lower price.*

*A local precision optics manufacturer working on custom lenses for demanding military applications needed to optimize its polishing methods for these exotic optical materials. Cornell scientists were asked to construct a library of zeta potential and iso-electric point (IEP) values for various polishing abrasives and optical materials. Using instruments housed in the Nano Fabrication Facility at Cornell, researchers from the Mechanical and Aerospace Engineering Department were able to sample and analyze a list of selected materials and provide the required data to the company.*

*A New York manufacturer of ultrathin membranes used in a wide range of applications including molecular and nanoparticle separations wanted to explore new markets for their novel products. They were matched with Professor David Muller, a world leading microscopist in the Applied and Engineering Physics Department, to demonstrate new applications for their membranes as high performance sample supports for Transmission Electron Microscopy (TEM). During a one semester trial the utility of these new Ultrathin membranes used as sample support structures became very apparent. Prototype development progressed quickly to full production and this new product is currently being marketed by a new company division.*

*A specialty chemical company located in upstate New York was looking to expand their product line of near infrared absorbing laser dyes and ink formulations. The company lacked the capability to measure the effectiveness of their dyes beyond the 800nm wavelength. The company was given the opportunity to work closely with a biophysical imaging group at Cornell in the Department of Biomedical Engineering. During a semester long project 27 of the company's dyes were surveyed providing the company with valuable data allowing them to formulate new dyes and find new practical applications for existing dyes, opening up whole new areas of revenue.*