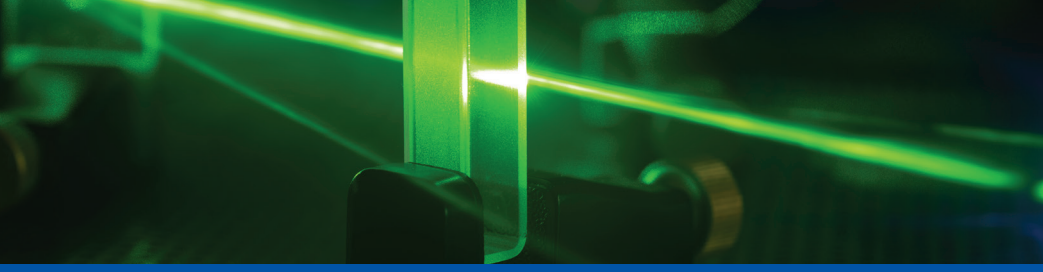


ADVANCED SCIENCE RESEARCH CENTER
THE GRADUATE CENTER
CITY UNIVERSITY OF NEW YORK

PHOTONICS INITIATIVE

asrc.gc.cuny.edu/photonics

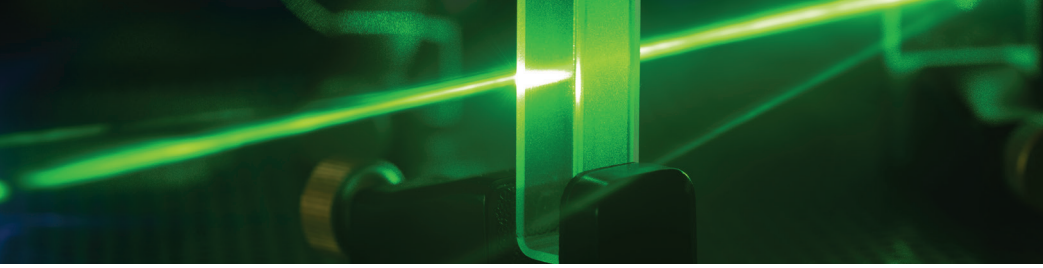
Mission

To serve as a world-recognized center for photonics/electromagnetics/wave physics research, making an impact on the fundamental understanding of light-matter interactions and their applications in the next generation of computing, sensing, and communications technology.

Initiative Overview

The technology of generating and using light and other radiant energy forms, photonics is best known for fiber-optic communications, but its potential in a wide range of fields of applied science is vast: from diagnosing cancer without a biopsy to detecting bioterrorism.

Photonics was chosen as an ASRC flagship initiative because it has become a strength for CUNY and because it offers unusual potential for collaboration across disciplines. Photonics research encompasses biology; medicine; physics; technology fields such as computer display and lighting; and the futuristic fields of quantum information processing and quantum encryption in which data reside on single photons, which are to light what electrons are to electricity.



Laboratories

Alù Laboratory

Professor Andrea Alù and his team's research interests span a broad range of technical areas, including nano-optics and photonics, microwave, THz, infrared, optical and acoustic metamaterials and metasurfaces, plasmonics, nonlinearities and nonreciprocity, cloaking and scattering control, applied electromagnetics and acoustics, and optical nanocircuits and nanoantennas. Alù and his team have achieved acclaim for introducing breakthrough discoveries in metamaterial technology. Applications of the laboratory's research include the creation of new nanodevices, cloaking and camouflaging, magnet-free nonreciprocal devices, nonlinearities at the nanoscale, energy harvesting, and biomedical sensing.

Grosso Laboratory

Professor Gabriele Grosso and his research team study the optical properties of 2D materials (matter consisting of a single layer of atoms) in order to enable the development of quantum information-processing systems and optoelectronic devices. Their research aims are to design quantum materials directly at the atomic level and to control light-matter interactions at the nanoscale. Understanding these interactions is crucial to designing high-performance and scalable photonic platforms that play a key role in emerging quantum technologies.

Guo Laboratory

Professor Qiushi Guo's group seeks to uncover new physical principles underlying the interaction between light and emerging active photonic materials, and to harness the resulting unprecedented optoelectronic properties in a scalable way to tackle the grand challenges in classical and quantum information processing, optical computing, and mid-infrared sensing. The team's research applications include integrated ultrafast light sources and novel architectures for unconventional photonic computing; next-generation thermal vision technologies; and quantum interactions between light and emerging materials.

Sfeir Laboratory

Professor Matthew Sfeir's lab focuses on enabling next-generation photonic technologies for light-harvesting, light-detection, and light-emitting devices, primarily for energy and sensing applications. Sfeir's group excels in using ultrafast laser techniques as a high-throughput platform for identifying macromolecular and nanoscale materials with unique electronic and spin dynamics. They also are developing tools for measuring the dynamics of light-matter interactions across the electromagnetic spectrum, from the UV to the microwave.