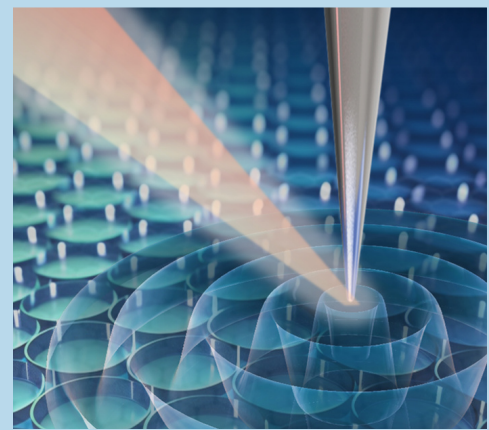


 COLUMBIA | QUANTUM INITIATIVE  
FIVE-YEAR IMPACT REPORT



# COLUMBIA | QUANTUM INITIATIVE

## FIVE YEARS, IN NUMBERS

### A Note From Quantum Task Force Co-Leads, Dmitri Basov & Alexander Gaeta:

*Five years ago, research groups from across Columbia came together as the Columbia Quantum Initiative to combine our strengths in quantum fundamentals, quantum materials, and quantum optics. Our goal is to lay foundations for the second quantum revolution while training the next generation of quantum scientists. Here, we celebrate our first five years of achievements in quantum research and education. Since 2018, we have...*

- Welcomed **seven new hires** to our **29 core** quantum faculty members:



Ana  
Asenjo-Garcia



Milan  
Delor



Henry  
Yuen



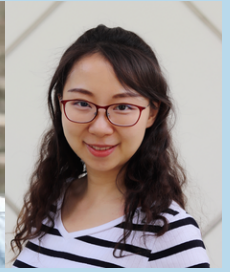
Raquel  
Queiroz



James  
McIver



Aravind  
Devarakonda



Xueyue (Sherry)  
Zhang

- Mentored over **80 postdoctoral fellows** and **160 graduate students**, with alumni now holding academic, government, and industry positions around the world.
- Exposed **hundreds of students** from Columbia, Barnard, and those elected to undergraduate research experience programs to the latest quantum research.
- Published more than **500 senior-author research and review papers**, and over **500** more as contributing authors.
- Were awarded nearly **\$150 million in grants**, including for the establishment of two flagship quantum centers: the Department of Energy (DOE) EFRC on Programmable Quantum Materials and the National Science Foundation (NSF) MRSEC on Precision-Assembled Quantum Materials.
- Celebrated our faculty who received more than **two dozen awards and honors**, including multiple NSF Career Awards; NSF PECASE Awards; DOE Early Career Awards; Vannevar Bush Awards; Moore Awards; Brown Science Awards; Sloan Fellowships; and inductions into the National Academy of Sciences.

# COLUMBIA | QUANTUM INITIATIVE

## FIVE-YEAR HIGHLIGHTS



### Columbia Launches Master's in Quantum Science and Technology

The degree program will combine education in quantum fundamentals with hands-on experience in quantum research labs.

### Quantum Leaps and Bounds

Columbia University joins the Flatiron Institute and Germany's Max Planck Society for the Advancement of Science to establish the Max Planck - New York City Center for Nonequilibrium Quantum Phenomena.



### Switching Nanolight On and Off

A team of researchers led by Columbia University has developed a unique platform to program a layered crystal, producing imaging capabilities beyond common limits on demand.

### Columbia Chemists Discover a New Form of Carbon: Graphene's "Superatomic" Cousin

Graphullerene, an atom-thin material made of linked fullerene subunits, gives scientists a new form of modular carbon to play with.

### Scientists See Spins in a 2D Magnet

Research shows that spinning quasiparticles, or magnons, light up when paired with a light-emitting quasiparticle, or exciton, with potential quantum information applications.



### Columbia Engineers First to Observe Avalanches in Nanoparticles

Researchers develop the first nanomaterial that demonstrates "photon avalanching." The finding could lead to new applications in sensing, imaging, and light detection.

### A Superatomic Semiconductor Sets a Speed Record

Columbia chemists discover ballistic flow in a quantum material. The finding could help overcome shortcomings in semiconductors.

### Ribbons of Graphene Push the Material's Potential

A new technique developed at Columbia may help physicists better probe the fundamental properties of 2D materials.