



Jiwoong Park
Professor

Areas of Research Expertise

Nanoscale materials and devices, chemical physics

Research Overview: The Park Group

The Park group combines chemical and physical approaches to build modern integrated circuits using atomically thin materials.

Contact

Phone

773.834.3179

Address

GCIS E219

929 East 57th Street

Chicago, IL 60637

Email

jwpark@uchicago.edu

Research

Jiwoong Park is an expert in the science and technology of nanomaterials. His multidisciplinary research includes researchers in chemistry, physics, material science, and electrical engineering.

One main research goal of the Park group is to build atomically-thin integrated circuitry. For this, the team develops advanced growth, characterization and device fabrication methods for 2D layered materials, which include electrically conducting graphene, insulating hBN and semiconducting transition metal dichalcogenides. For example, the Park group reported the atom-resolution imaging of individual grain boundaries in graphene using transmission electron microscope (TEM), and investigated their electrical properties. It also developed a method for producing atomically thin lateral heterojunctions within individual 2D films, and reported the metal-organic chemical vapor deposition (MOCVD) growth of wafer-scale three-atom-thick semiconductor films with high mobility. These results enable the fabrication of electrically isolated active and passive elements embedded in continuous, one- and few-atom-thick sheets, which could further be manipulated and stacked to form complex devices at the ultimate thickness limit.

Another research goal is to explore novel electrical, optical, and optoelectronic properties of low-dimensional nanostructures, which will allow the development of advanced devices, including highly efficient solar cells, ultrasensitive infrared bolometric detectors, and novel valleytronic and spintronic devices. In the past, the group reported multiple exciton generation, optical intertube coupling, and photothermal current microscopy in carbon nanotubes, supercollision cooling, and giant circular dichroism in graphene, and the valley Hall effect in MoS₂ transistors.

Bio

Park earned his BS from Seoul National University in 1996, and his PhD at the University of California-Berkeley in 2003. He was a junior fellow at Harvard's Rowland Institute before joining the faculty at Cornell University in 2006. Park joined IME in 2016 with joint appointment in the Department of Chemistry.

Park has received the National Science Foundation CAREER Award, the Presidential Early Career Award for Scientists and Engineers, and the Alfred P. Sloan Research Fellowship.