

## ERDC Partners with Multiple Universities on Graphene Research

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Researchers at the U.S. Army Engineer Research and Development Center (ERDC) have started working with multiple applications for graphene, from graphene-infused asphalt and concrete to water filtration systems.

This research has led to the development of a new initiative that brings together top research institutions and experts from the [University of Mississippi](#) (UM), [Jackson State University](#) (JSU), [Rice University](#) and the [ERDC](#) to explore graphene's unique abilities in uses ranging from advanced materials-by-design to self-sensing infrastructure. Emerging materials such as graphene are driving fundamental changes in material performance with potential future military and civilian applications.

"This new initiative will continue a long legacy of ERDC partnering with academia and industry to advance emerging technologies in support of our warfighters and the nation," said ERDC Senior Scientific Technical Manager Dr. Robert Moser.

This strategic ERDC partnership provides an incredible opportunity to leverage expertise and state-of-the-art materials research from Rice University's NanoCarbon Center and the UM Center for Graphene Research and Innovation (CGRI). The CGRI is also working with JSU experts on computational chemistry and synthesis of graphene.

The CGRI executes graphene research and acts as a bridge with the other research universities, particularly within the state of Mississippi, private industry and other government research and development organizations in the region.

"The objective of the project is to strengthen the partnership between the CGRI at UM and ERDC to conduct research in utilizing graphene-based materials and to establish a testing

facility at UM that will enrich research capacity in Mississippi, attract industry to the region and enhance collaboration between Mississippi universities, ERDC and broader Army users,” said Ahmed Al-Ostaz, director of CGRI at UM. “We are very excited to the opportunity of collaborating with ERDC researchers on this project and believe that the wide range of engineering applications in both force protection and force projection areas will greatly impact technology and spur innovators to develop new products and processes in areas of national interest.”

James Tour and colleagues at Rice University recently discovered a process called flash Joule heating that produces graphene from any carbon source with low energy requirements and without the need for solvents or purification. As part of the initiative, ERDC researchers will advance novel flash graphene technology for many potential application areas.

“The flash process produces an unusual kind of graphene, known as turbostratic graphene, that is far easier to bring to applications than graphene traditionally produced in small amounts in a furnace,” Tour said. “Turbostratic graphene consists of misaligned flakes that are more soluble than the more common, or AB-stacked, graphene, which tends to clump in solution. Turbostratic graphene is much easier to make, and we are learning to produce it in bulk. We’re confident that our ERDC partners will help us push this process to the limit.”

Altogether, this initiative will create a regional hub of innovation in partnership with ERDC for novel research and applications in graphene and other low dimensional materials that could be used to address gaps in advanced materials, composites and manufacturing processes that will contribute to outstanding military performance, sustainment and readiness across many applications.

“Graphene production and research presents a unique opportunity to advance our national defense and infrastructure with next-generation materials,” said U.S. Senator Roger Wicker. “I am encouraged by the Army Corps’ efforts to bring these opportunities to our state’s skilled students and researchers at University of Mississippi and Jackson State University. Such industry and higher education partnerships could serve as a model for Mississippi and the rest of the country for the years ahead.”

“We should be very optimistic about the vast potential that this collaborative research initiative can have on our state and nation. Advancing graphene technologies and applications could be a boon for our national security, energy future, and other areas,” said U.S. Senator Cindy Hyde-Smith, who helped secure federal funding to support this initiative. “I commend ERDC, Ole Miss, Jackson State, and Rice for reaching this point, and look forward to learning more about its progress.”

Read the [original article](#) on Engineer Research and Development Center (ERDC).