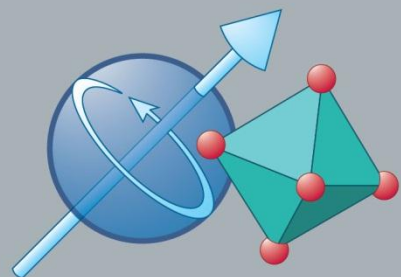


"A huge strength of the CEM is the people involved. People [faculty, staff, and students and post-docs] are friendly, collaborative, goal-oriented, and true to scientific ideals [honest and truth-seeking]."

"One of CEM's greatest strengths is in the large number of opportunities for collaborative research, both locally at OSU and nationally/internationally."

--Quotes from CEM students



cem

Center for Emergent Materials
an NSF MRSEC

Center for Emergent Materials

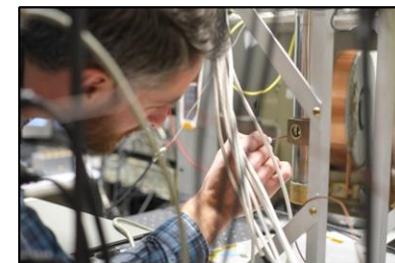
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The Center for Emergent Materials at The Ohio State University is a Materials Research Science and Engineering Center (MRSEC) funded by the National Science Foundation (NSF), one of 23 nationwide. The MRSEC program funds teams of researchers from different disciplines to work collaboratively on materials research in order to address fundamental problems in science and engineering. By working in teams, called Interdisciplinary Research Groups (IRG), the researchers at CEM tackle scientific problems that are too large and complex for a scientist working alone to solve.



Research

- **Spin-Orbit Coupling in Correlated Materials: Novel Phases and Phenomena**, is a group with a long record of successful collaboration, establishing fundamentals for understanding and prediction in this area. The grand aim is to design a new class of tailored quantum materials with tunable magnetic and electric properties that would impact technology and society.
- **Control of 2D and 1D Electronic Structure by Surface Functionalization of Group-IV Graphane Analogues**, is leading experts in creating and manipulating single-atom sheets. The flexibility of these new materials will find broader applications in science and technology including new opportunities in materials by design, platforms for chemical sensing and information processing.
- **Nonlinear Interactions between Spin Flux and Engineered Magnetic Textures**, is a group composed of leaders in the theory of spin dynamics and dynamic spin. This research could enable transformative technologies that move beyond current spintronics concepts and technologies.

More information about CEM researchers, projects, and publications, is available under at <http://cem.osu.edu>

Outreach & Professional Development

- **Local primary and secondary school partnerships** to enhance STEM learning in non-traditional ways through programs like Breakfast of Science Champions, Scientific Thinkers, and Math Science Partnership Program.
- **Undergraduates** from local community colleges and universities nationwide benefit from authentic research experiences.
- **Graduate students and postdocs** participate in technical and professional workshops for career development.
- **Physics Masters-to-PhD Bridge program**, which CEM was vital in establishing, strives to enhance the diversity of talented applicants and prepare them to succeed in a physics PhD program.

Industry & Collaborations

- **Robust national and international collaborations** like IFW-Dresden in Germany, Iowa State, University of Tennessee, Case Western, UCLA and UC Berkeley, to name a few.
- **Industrial and commercial collaborations** with companies such as HGST, a Western Digital company; IBM Research- Almaden; Lake Shore Cryotronics; Traycer Systems, Inc. and Entrotech Inc. improve both partners' ability to translate technologies from the lab to the commercial sector.
- **The next generation of researchers**, through CEM undergraduate, graduate, and postdoc educational programs, will translate innovative technologies into commercial successes.



“CEM research has significantly advanced discovery and understanding in the field of spin-related physics, materials science, and devices.”

-MRSEC Site Visit Report, 2012

