In support of the U.S. Army Multi-Domain Operations 2028 and three material modernization priorities, the MEDE program provides new concepts to improve protection capabilities. To achieve this, MEDE is integrated into the CCDC Army Research Laboratory core competencies and essential research programs.

Johns Hopkins University and the CCDC Army Research Laboratory jointly lead a collaborative research alliance which consists of 18 university and research centers across nine states, the United Kingdom, Germany, and Switzerland.

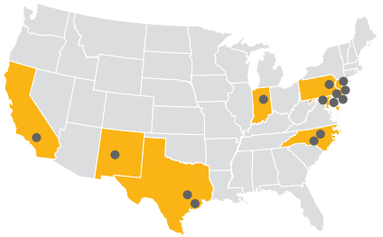
MEDE has developed a materials-by-design strategy which integrates advanced experiments, computational modeling, and synthesis and processing into a single program. Three classes of materials are being investigated: metals, ceramics, and composites. The goal of MEDE is to develop new protection materials, and new computational design codes and tools for armor applications.

"THE REAL HOLY GRAIL OF TECHNOLOGIES THAT I'M TRYING TO FIND IS MATERIAL... IS THE ARMOR ITSELF."

- General Mark A. Milley
39th Chief of Staff for the US Army
at the National Press Club in 2017

THE MEDE TEAM

U.S. ARMY · DEVCOM ARMY RESEARCH LABORATORY



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Fraunhofer EMI

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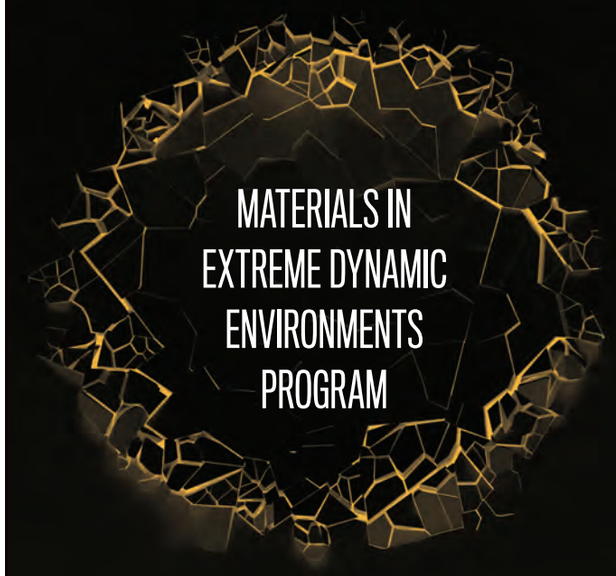
Malone Hall, Suite 140 3400 North Charles St. Baltimore, MD 21218

CMEDE | CENTER FOR MATERIALS IN EXTREME DYNAMIC ENVIRONMENTS



Johns Hopkins University

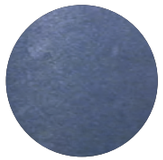
WE LOOK FAR INTO THE FUTURE TO PROTECT THOSE WHO PROTECT US.

The Materials in Extreme Dynamic Environments (MEDE) program is the U.S. Army's largest basic research program focused on improving protection materials for the Soldier and military platforms.

MEDE KEY CONTRIBUTIONS

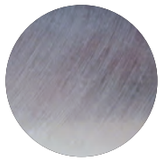
- Identified the critical material properties for lightweight armor design.
- Synthesized the first generation of new MEDE materials for future Army applications.
- Transitioned new physics-based material models to CCDC ARL to improve armor design computational codes.
- Increased the DoD S&T workforce with graduates transitioning into government laboratories and the industrial base.
- Published over 400 articles in scientific journals and proceedings.

MEDE MATERIALS



Boron Carbide

S2 Glass/Epoxy



Magnesium Alloy

"THE MEDE PROGRAM HAS DEVELOPED ADVANCED MATERIALS... THESE MATERIALS ALL REDUCE THE SIZE AND WEIGHT OF VEHICLE ARMOR WHILE ENHANCING PROTECTION... IN MY OPINION, WE NEED TO KEEP THE RESEARCH AND DEVELOPMENT MOVING AHEAD IN THIS AREA."

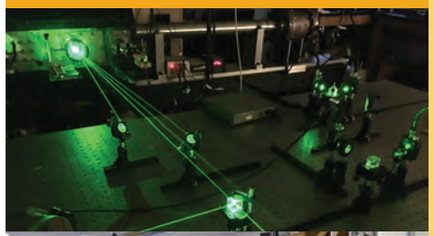
- Congressman Dutch C.A. Ruppersberger (D-MD)
House Appropriations Committee, Subcommittee on Defense hearing on U.S. Army budget request for FY2020

"TACTICAL OVERMATCH IS THE PRODUCT OF ADAPTABLE, AGGRESSIVE LEADERS AND SOLDIERS ORGANIZED IN COHESIVE, WELL-TRAINED FORMATIONS; AND AIRCRAFT, FIGHTING VEHICLES, SMALL UNITS, AND INDIVIDUALS WITH SUPERIOR MOBILITY, PROTECTION, AND LETHALITY."

MATERIALS-BY-DESIGN STRATEGY

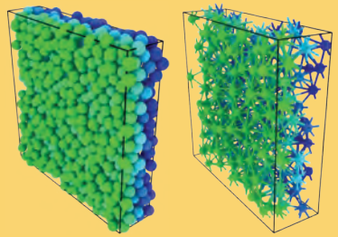
ADVANCED EXPERIMENTS

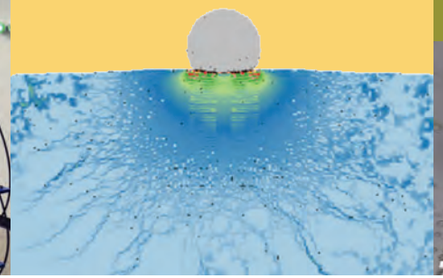
Simulating ballistic events through high strain rate experiments



COMPUTATIONAL MODELING

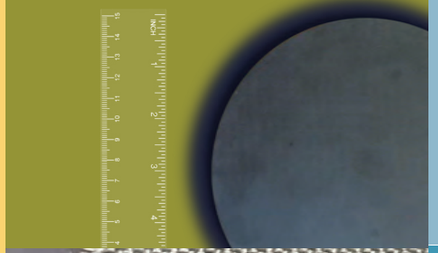
Modeling from the atomistic to the continuum scales

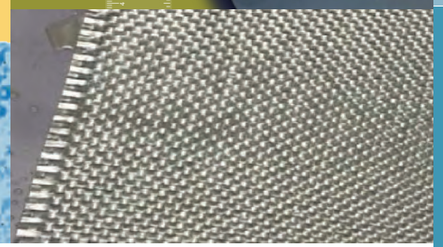




SYNTHESIS & PROCESSING

Creating new materials to validate experimental and modeling data





MATERIALS-BY-DESIGN RESULTS

- New lightweight materials
- Computational codes for armor material design
- Knowledge products
- Scientific discovery
- Use-inspired research

WANT TO LEARN MORE? VISIT US ONLINE AT HEMI.JHU.EDU/CMEDE

U.S. ARMY MULTI-DOMAIN OPERATIONS 2028

ARMY MATERIAL MODERNIZATION PRIORITIES

Developing material solutions to support new protection concepts

- Soldier Lethality
- Next Generation Combat Vehicle
- Future Vertical Lift

CCDC ARL CORE COMPETENCIES & ESSENTIAL RESEARCH PROGRAMS

- Terminal ballistics and materials research
- Physics of soldier protection to defeat evolving threats
- Convergence of lethality, protection and autonomy to dominate ground combat

MEDE PROVIDES FOUNDATIONAL RESEARCH

ADVANCED EXPERIMENTS | COMPUTATIONAL MODELING | SYNTHESIS & PROCESSING