

Hopkins on the Hill

Exploring the Universe

Saving Millions of Lives

Expanding Human
Knowledge

June 7, 2023

5:30 - 7:30 p.m.

Kennedy Caucus Room

Russell Senate Office Building

RSVP: hopkinsonthehill2023.eventbrite.com

Join the conversation: **#HopkinsontheHill**

“The support of federal funding makes it possible for researchers across the Johns Hopkins community to continue the work of addressing humanity’s most pressing problems and advancing human knowledge.”

Vice Provost for Research Denis Wirtz

Hopkins on the Hill

Hopkins on the Hill is a biennial showcase of the range, value, and impact of federally funded research and programming at Johns Hopkins University.

Come meet our researchers and practitioners to learn about their work in artificial intelligence, education, space exploration, health care, extreme materials, pandemic preparedness, and more.

5:30 p.m. Doors open

6:15 p.m. Remarks by **U.S. Senator Ben Cardin & JHU President Ronald J. Daniels**

Presenters Supported by:

Administration for Strategic Preparedness and Response (ASPR)

Army Research Office (ARO)

Centers for Disease Control and Prevention (CDC)

Defense Advanced Research Projects Agency (DARPA)

Defense Threat Reduction Agency (DTRA)

Department of Defense (DOD)

Department of Energy (DOE)

Department of Health and Human Services, Office of Minority Health

Department of Justice (DOJ)

National Aeronautics and Space Administration (NASA)

National Endowment for the Arts (NEA)

National Institutes of Health (NIH)

National Science Foundation (NSF)

United States Agency for International Development (USAID)

United States Army Medical Research Acquisition Activity (USAMRAA)



Johns Hopkins University is proud to be America's first research university.

Founded in 1876, Johns Hopkins revolutionized higher education in America as the first university to implement graduate training and research, based on a model adopted from universities in England and on the Continent.

Johns Hopkins was established on the principle that by pursuing big ideas and sharing what we learn, we make the world a better place. For more than 140 years, we haven't strayed from that vision.

Our researchers and students have worked side by side in pursuit of discoveries that improve lives. What kinds of discoveries? We made water purification possible, launched the field of genetic engineering, completed a flyby of Pluto with the New Horizons space probe, invented the first implantable and rechargeable pacemaker, and authenticated the Dead Sea Scrolls.

We invented saccharin, CPR, and the supersonic ramjet engine. Our efforts have resulted in child safety restraint laws, the discovery that Dramamine can prevent and cure all kinds of motion illness, the use of rubber surgical gloves, and the development of a revolutionary surgical procedure to correct heart defects in infants.

Johns Hopkins strives to have a positive impact on our communities, states, and the nation.

Our main campus is located in Baltimore, and we are a large part of communities in Maryland, Washington, D.C., and Florida. Across the U.S., we provide over 100,000 jobs (direct and indirect) and have an impact of \$16.8 billion on the economy. But it's not just about the numbers: Johns Hopkins provides outreach, education, training, support services, and so much more to families, patients, and neighbors.

Johns Hopkins has led the nation in research and development expenditures since 1979.

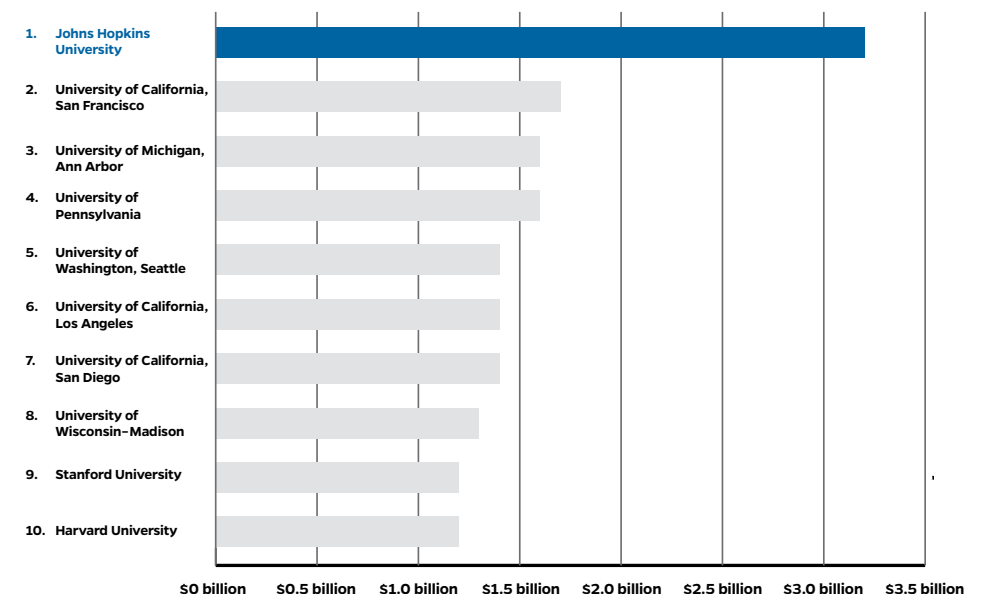
Research isn't just something we do—it's who we are. Every day, our faculty, clinicians, researchers, students, and staff collaborate to advance humanity.

We are conducting research and providing patient care, training, service, and education at more than 1,300 sites in over 155 countries.

With programs on every continent, we are continuing our founding mission to bring knowledge to the world. We continue to seek out new and innovative ideas from across the globe, and as we look ahead, it's clear that Johns Hopkins University research programs and academics will continue to produce pioneering investigations and world-class results.

We are thrilled to share this progress and excitement with you by hosting Hopkins on the Hill.

FY 2021 Institution Ranking by Total Research & Development Expenditures



Source: NSF Higher Education Research and Development (HERD) Survey

Destination: Titan

Dragonfly Team, Applied Physics Laboratory @JHUAPL



Nick DeMatt



Elizabeth P.
Turtle



Adam Fagan



Rick Fitzgerald



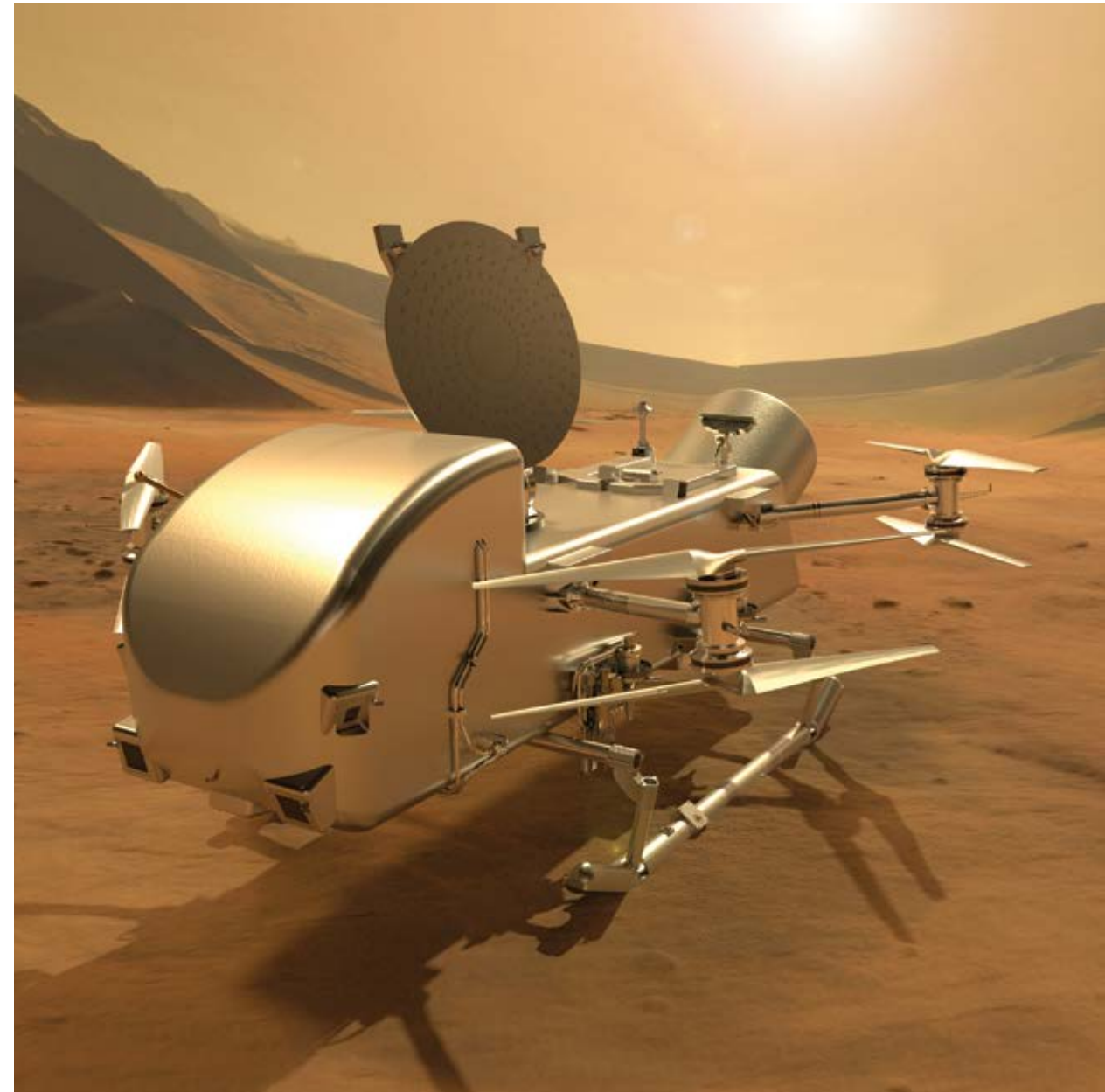
Ken Hibbard



Shannon
MacKenzie

Dragonfly is a revolutionary rotorcraft-lander NASA expedition that will explore Saturn's largest moon, Titan. Led by principal investigator Elizabeth Turtle of APL, this groundbreaking mission will study the complex carbon-based chemistry, geology, and atmosphere of this cold yet Earth-like ocean world and ultimately advance our understanding of life's chemical origins.

Supported by the National Aeronautics and Space Administration (NASA)



New Advances in Neural Interfaces Research

Brain-Computer Interface Team, Applied Physics Laboratory @JHUAPL



Robert Armiger



Brock Wester



Luke Osborn

Two Johns Hopkins University divisions—the Applied Physics Laboratory (APL) and the School of Medicine (SOM)—are working at the forefront of neural interface technologies to improve functional restoration, rehabilitation, and augmentation in people with spinal cord injury, upper limb loss, or blindness.

Supported by the Defense Advanced Research Projects Agency (DARPA)



Eliminating Forever Chemicals

Danielle Nachman & Leslie Hamilton, Applied Physics Laboratory @JHUAPL



Danielle Nachman



Leslie Hamilton

PFAS, or perfluoroalkyl and polyfluoroalkyl substances, pose a significant public health concern. These artificial chemicals—found in household items, firefighting foams, and other industrial applications—linger indefinitely in the environment without degrading. Scientists from the Johns Hopkins Applied Physics Laboratory are developing technologies to capture and destroy these “forever chemicals.”



Johnny Matheny



Establishing Evidence-Based Solutions to Gun Violence



Cassandra Crifasi

Cassandra Crifasi, Bloomberg School of Public Health @DrCrifasi

Spencer Cantrell, Bloomberg School of Public Health @SpenceCantrell

Rooted in rigorous research, the Center for Gun Violence Solutions advocates for the implementation of evidence-based, equitable policies and programs to prevent gun violence in our communities. Co-director Cass Crifasi's research focuses on policy and program evaluation, research translation, and attitudes and public opinion regarding gun violence solutions.

Supported by the Centers for Disease Control and Prevention (CDC), Department of Justice (DOJ), and National Institutes of Health (NIH)



Spencer Cantrell

Improving the Care and Lives of People Affected by Dementia



Michael Darden, Carey Business School @JHUCarey

The Hopkins' Economics of Alzheimer's Disease and Services (HEADS) Center seeks to improve the care and lives of those affected by Alzheimer's disease and related dementias. We identify and advance solutions that address accessibility, affordability, quality, and equity of care. Michael Darden's work focuses on the determinants of cognitive decline.

Supported by the National Institutes of Health (NIH)



Where Discovery Meets Democracy

555 PENNSYLVANIA AVENUE



Featuring soaring views of the Capitol and a light-filled atrium, the 10-story steel-and-glass building sits on one of the world's iconic avenues. The site is steeped in America's history and is situated at the epicenter of the nation's corridor of power, linking all three branches of the federal government.

- 400,000 square feet of classroom, office, and convening space
- 38 classrooms
- 375-seat theater
- Street-level restaurant and café
- Art gallery
- Library

Learn more at jhu.edu/555Penn

Pairing the power of the Johns Hopkins University's data-driven research with its commitment to democracy, our new building on Pennsylvania Avenue will be a vibrant convening space serving students, world-renowned researchers, and policymakers from city halls to the halls of Congress and beyond.

The building will be a destination for trusted academic experts, newsmakers, global leaders, and the next generation of innovators.

Anchored by the School of Advanced International Studies (SAIS) and the D.C.-based academic programs of the Carey Business School and the Krieger School of

Arts and Sciences, the building will ultimately host activities from every division of the university. It will be a preeminent forum for Washington's public discourse, artistic expression, and vigorous policy debate—a place that connects learning with leading, scholarship with statecraft.

**A NEW SPACE
FOR HOPKINS
IMPACT**



Telehealth App to Diagnose Strep Throat, UTI with a Selfie

Therese Canares, School of Medicine and Johns Hopkins Technology Ventures @Doctor_TLC

Mathias Unberath, Whiting School of Engineering @MathiasUnberath



Therese Canares



Mathias Unberath

CurieDx is a software platform that screens for disease, like strep throat, from a smartphone image analyzed with artificial intelligence. Patients can screen themselves at home to determine whether they should see a doctor. When patients connect to clinicians via telehealth, CurieDx's assessment can be used by the clinicians to decide whether antibiotics or confirmatory medical testing is needed.

Supported by the National Science Foundation (NSF)

Needle-Free Vaccinations with Tropis: Money and Time Savings Coupled with Better Acceptability



Chris Morgan, Jhpiego @Jhpiego

PharmaJet's WHO-approved Tropis jet injector has saved resources by getting more vaccine doses from a single vial, and the delivery method of narrow jet administration under the skin is preferred by children over standard needles. Investigators from Jhpiego and JHU's School of Public Health are working with Nigerian health authorities to test whether these benefits result in better uptake of routine services.

Supported by the United States Agency for International Development (USAID)



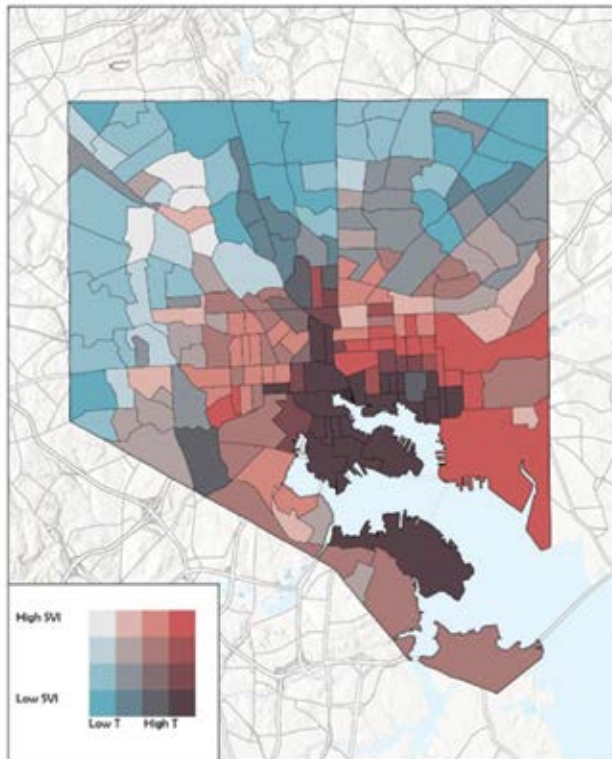
Building the World's Most Meaningful Urban Climate Science with the Baltimore Community



Michael Bader, Krieger School of Arts & Sciences
@mike_bader

Climate change affects some more than others. In partnership with communities in Baltimore, the Baltimore Social-Environmental Collaborative is co-creating the most meaningful urban climate science in the world. Using the findings from this collaboration, Baltimore can become a world leader in identifying pathways to equitable futures for climate adaptation and mitigation.

Supported by the Department of Energy (DOE)



Post-Pandemic Considerations for Safe and Healthy Schools



Annette Anderson, School of Education
@ImpactGreater

The Center for Safe and Healthy Schools is assessing the impact of the COVID-19 pandemic on K-12 education, including instructional outcomes, increased attention to mental health issues, teacher and school leader recruitment and retention, and the implications for the future of safe and healthy schools.

Supported by the Department of Health and Human Services, Office of Minority Health



A Vision for Success: How Providing Glasses Is Helping Baltimore’s Schoolchildren



Megan Collins, School of Medicine
@DrMcollins2020

Students who cannot see struggle to succeed. The challenge in disadvantaged communities is obtaining needed care. Megan Collins works with Vision for Baltimore, a citywide partnership, bringing eye care directly to schools. The program has provided eye exams to more than 12,000 students and demonstrated how eyeglasses can transform a student’s learning as well as their vision.

In partnership with Johns Hopkins University and Medicine, Baltimore City Health Department, Baltimore City Public Schools, Vision To Learn, and Warby Parker

Preparing for the Next Infectious Disease Outbreak

Brian Garibaldi & Jade Flinn, School of Medicine @HopkinsMedicine



Brian Garibaldi



Jade Flinn

The COVID-19 pandemic, and its aftermath, continues to highlight the need for pandemic preparedness. The Johns Hopkins Biocontainment Unit (JH BCU) is one of 13 federally funded Regional Emerging Special Pathogen Treatment Centers (RESPTCs) dedicated to improving national preparedness for high consequence infectious diseases, such as COVID-19, Ebola, smallpox, and SARS.

Supported by the Administration for Strategic Preparedness and Response (ASPR), Maryland Department of Health, and National Institutes of Health (NIH)



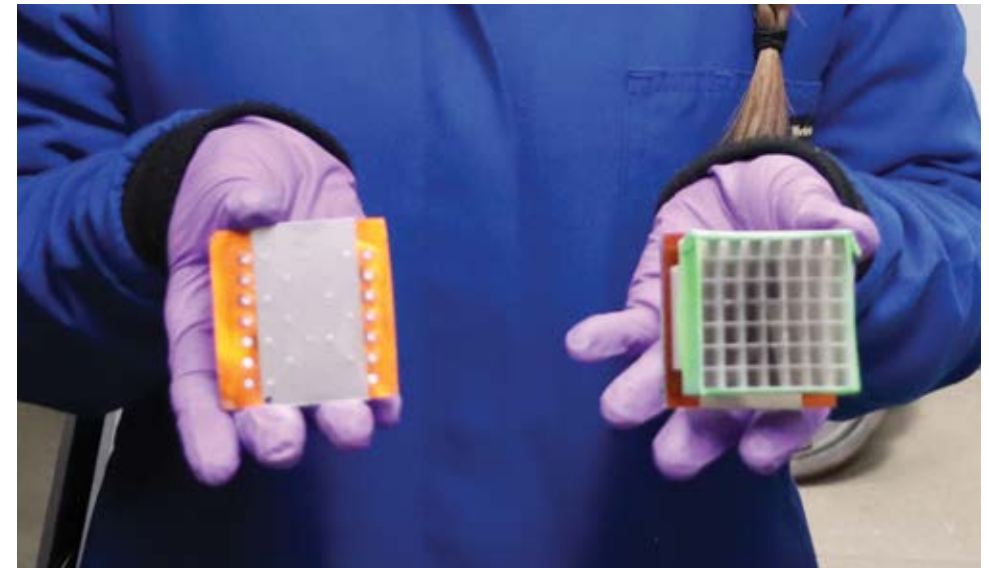
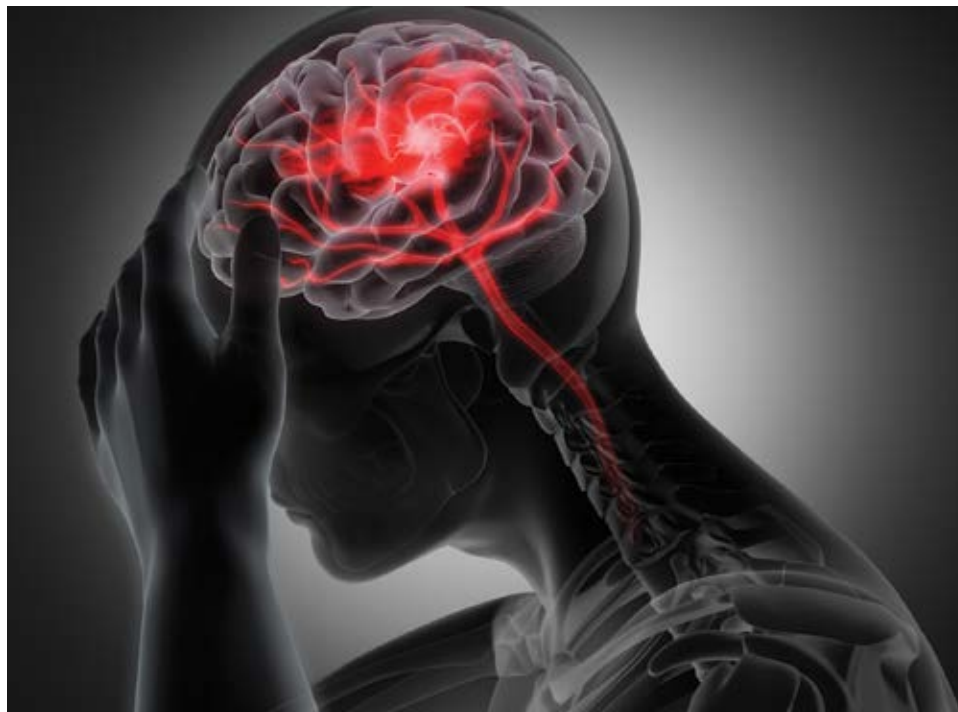
Biomarkers to Improve Brain Injury Care



Jessica Gill, School of Medicine and School of Nursing @JHUNursing

In her research among military personnel, athletes, emergency room patients, and others who have experienced traumatic brain injuries (TBIs), Jessica Gill identifies fluid biomarkers to identify people at higher risk for poor recovery and long-term effects of TBI, including post-traumatic stress disorder, depression, and post-concussive syndrome. Her research informs the development of methods to identify or diagnose a TBI, as well as the use of biomarkers to monitor recovery pathways.

Supported by the Army Medical Research Acquisition Activity (USAMRAA) and National Institutes of Health (NIH)



MEDE+: AI and Machine Learning for Development of New DOD Materials

Bess Bieluczyk & Rayna Mehta, Hopkins Extreme Materials Institute, Whiting School of Engineering @JHU_HEMI



Bess Bieluczyk



Rayna Mehta

Materials in Extreme Dynamic Environments plus (MEDE+) is focused on artificial intelligence and data-driven materials design, which utilizes advanced fabrication, testing, characterization, and robotic automation in a state-of-the-art facility. MEDE+ research will accelerate the development of new materials for the Department of Defense with applications toward protection, ballistics, and hypersonics.

Supported by the Army Research Office (ARO), Department of Defense (DOD), and National Endowment for the Arts (NEA)

Supporting Science to Mitigate the Effects of WMDs

Tim Weihs, Andrew Proulx & Kyle Fisher, Whiting School of Engineering @JHU_HEMI



Tim Weihs



Andrew Proulx



Kyle Fisher

The Materials Science in Extreme Environments University Research Alliance (MSEE URA) conducts basic research to understand, predict, and control the behavior of materials in the extreme conditions caused by weapons of mass destruction. Hopkins leads the basic research alliance that includes 17 institutions and 37 researchers across the United States.

Supported by the Defense Threat Reduction Agency (DTRA) and Department of Defense (DOD)



“This research and this enterprise would not happen but for the extraordinary collaboration and partnership between Johns Hopkins University and the federal government. We celebrate the strength and the vibrancy of this truly distinctive partnership that sets a standard and expectation around the world.”

Johns Hopkins President Ronald J. Daniels

For more information about federally funded research at Johns Hopkins, please contact us:

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