JOHNS HOPKINS
UNIVERSITY

HOPKINS
ON THE HILL

June 12, 2019
5:30 – 7:30 p.m.

Rayburn Cafeteria, Rayburn House Office Building

Drinks and hors d'oeuvres will be served.

Please RSVP: *hopkinsonthehill2019.eventbrite.com*

Join the conversation: #HopkinsontheHill

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 early career researchers and practitioners to learn about their work in artificial intelligence, education, space exploration, health care, extreme materials, and more.

Presenters Supported by:

Army Research Laboratory (ARL)
Army Research Office (ARO)
Department of Defense (DOD)
Department of Education (ED)
Department of Energy (DOE)
Intelligence Advanced Research Projects Activity (IARPA)
Department of Health and Human Services (HHS)
National Aeronautics and Space Administration (NASA)
National Endowment for the Arts (NEA)
National Endowment for the Humanities (NEH)
National Institutes of Health (NIH)
National Reconnaissance Office (NRO)
National Science Foundation (NSF)
Office of Naval Research (ONR)
Rapid Reaction Technology Office (RRTO)
United States Agency for International Development (USAID)

EXPLORING THE UNIVERSE

SAVING MILLIONS OF LIVES

EXPANDING HUMAN KNOWLEDGE

Doors open at 5:30 p.m.
6:15 p.m.: Special performance by the Peabody Preparatory
Tuned In Wind, Brass and Percussion Congregation
Invited remarks by Majority Leader Steny Hoyer & JHU President Ronald J. Daniels

"Our history shows that our commitment to bold experimentation did not pass with our founding. ***It's at the core of who we are."***

President Ronald J. Daniels

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

Founded in 1876, Johns Hopkins was the first university in the Western Hemisphere based on the European research institution model, and it revolutionized U.S. higher education.

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 creation of Dramamine and 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 in our communities, states, and the nation.

Our main campus is located in Baltimore, Maryland, and we are a large part of communities across Maryland, Washington, DC, and Florida. Across the U.S., we provide over 100,000 jobs and an impact of $12 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.

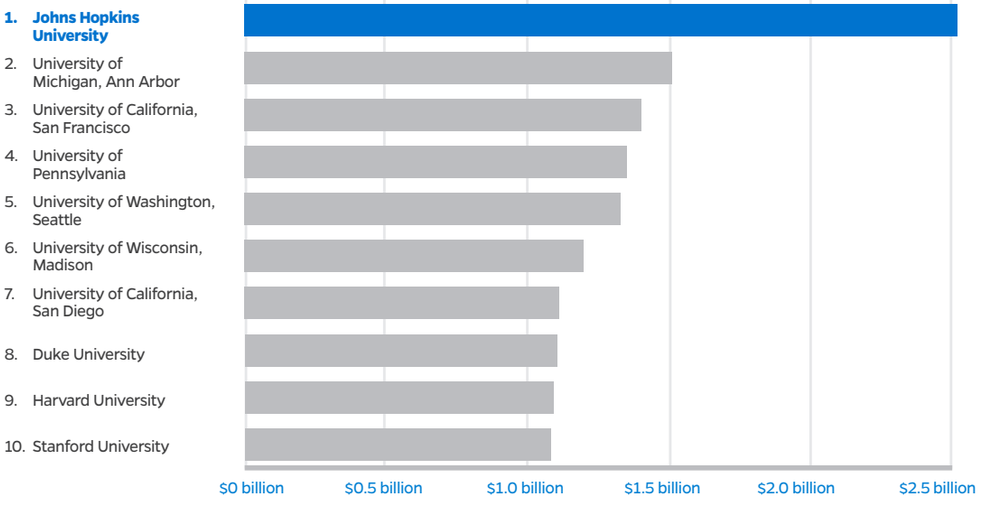
Research isn't just something we do—it's who we are. Every day, our faculty, clinicians, researchers, students, and staff collaborate to advance humanity.

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

With programs on every continent, we are continuing our founding mission to bring knowledge to the world through a proud tradition of leadership. 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 2017 Institution Ranking by Total R&D Expenditures



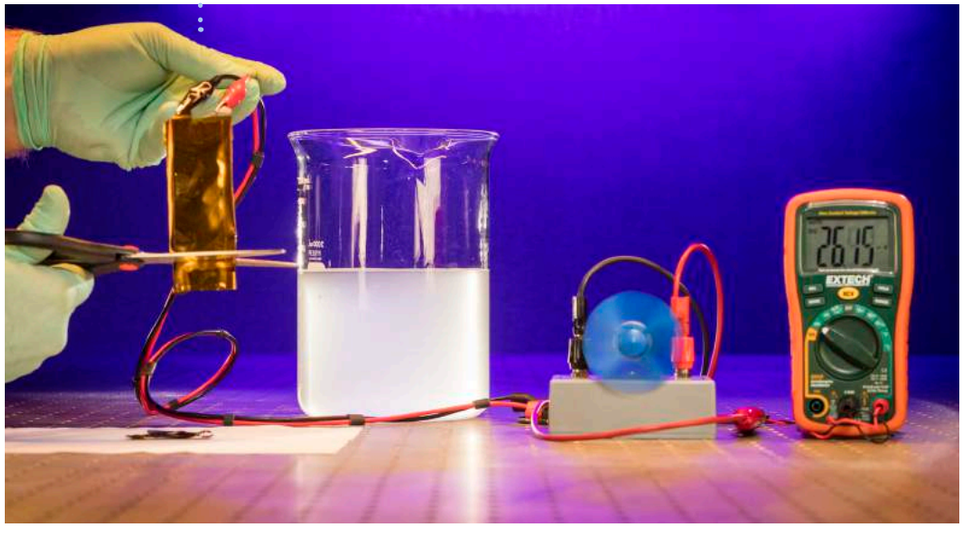
Presentations

USING WATER **TO DEVELOP SAFER LITHIUM-ION BATTERIES**

Adam Freeman, Applied Physics Laboratory
@JHUAPL

Rechargeable lithium-ion batteries, which power the portable electronic devices so fundamental to modern life, are prone to overheating due to the flammability of their organic components. The Johns Hopkins Applied Physics Laboratory is addressing the critical challenge of improving battery safety by developing novel lithium-ion batteries based on intrinsically non-flammable, water-based polymer electrolyte technologies.

Supported by the Army Research Laboratory (ARL), National Reconnaissance Office (NRO), Office of Naval Research (ONR), and Rapid Reaction Technology Office (RRTO)



ADVERSARIAL AI – BACKDOORS IN NEURAL NETWORKS

Neil Fendley, Applied Physics Laboratory @JHUAPL

As AI systems continue to improve, there has been great success in teaching computers to identify objects. As automated systems become more widespread and adopted to different settings, however, potential security risks must be fully understood. Johns Hopkins Applied Physics Laboratory studies the vulnerability of these AI networks and how to defend against attacks on them.

Supported by the Intelligence Advanced Research Projects Activity (IARPA)

PARKER SOLAR PROBE – HUMANITY'S FIRST MISSION TO OUR STAR

Parker Solar Probe Team, **Applied Physics Laboratory**
@JHUAPL

Developed for NASA by the Johns Hopkins Applied Physics Laboratory, Parker Solar Probe is the culmination of a 60-year quest to build a spacecraft capable of exploring the searing temperatures and radiation of the Sun's outer atmosphere, and to investigate the processes that drive the solar wind.

Supported by the National Aeronautics and Space Administration (NASA)

"Federal support allows the institution to uphold its critical mission of fostering independent and original research, and bringing the benefits of discovery to the world."

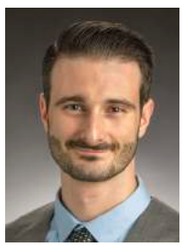
Vice Provost for Research
Denis Wirtz


Patrick Hill

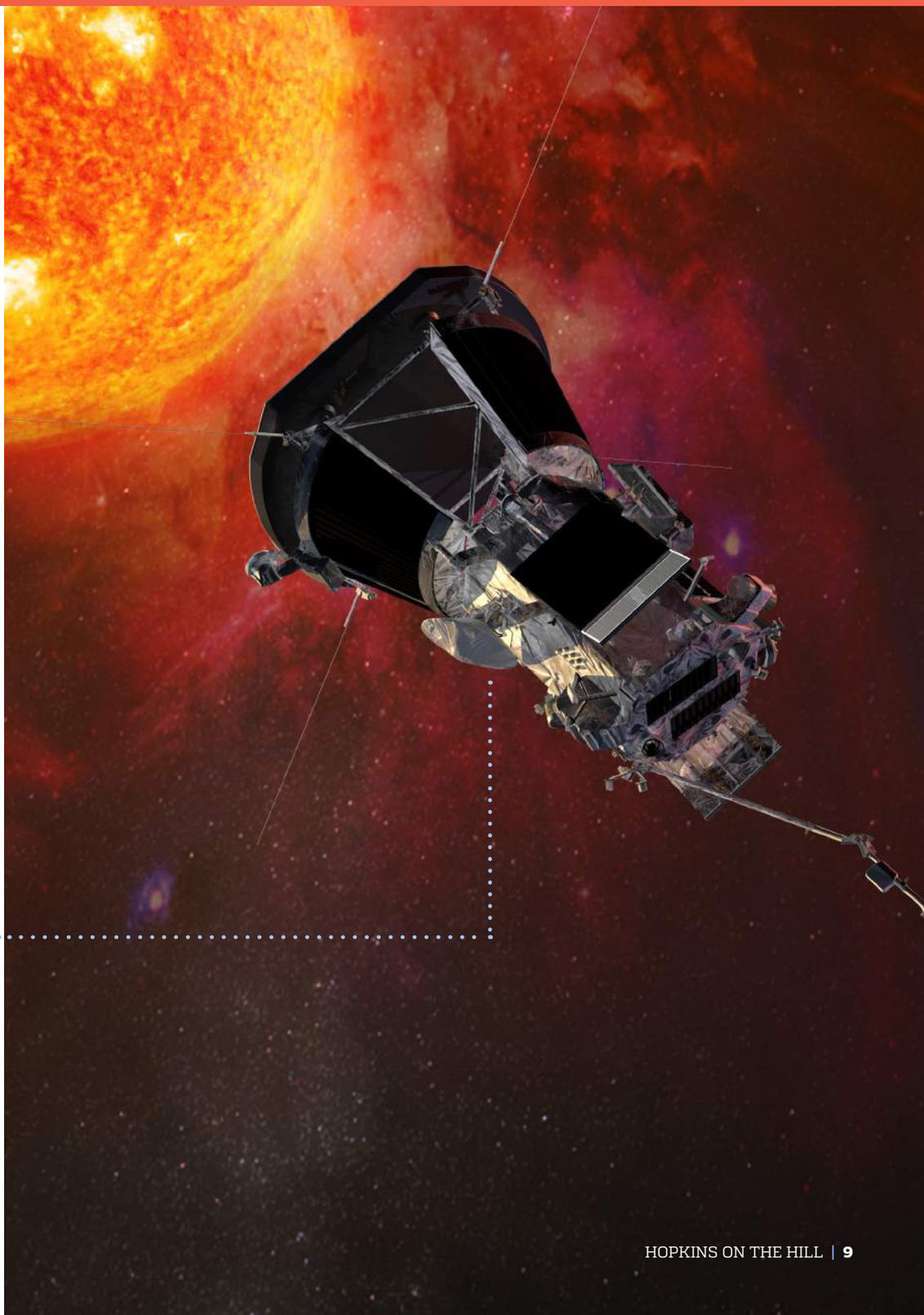

Jim Kinnison


Nour Raouafi


Elizabeth Congdon


Devin Hahne


Sanae Kubota



PRECISION MEDICINE ANALYTICS PLATFORM – USING AI TO REVOLUTIONIZE HEALTHCARE

Geoff Osier & Hannah Cowley,
Applied Physics Laboratory @JHUAPL

To leverage the promise of precision medicine, clinicians need access to important data scattered across medical records, research studies, images, and genomics test results. The volume and variety of this information far exceeds the ability of researchers to capitalize on the insights they hold. In response to this challenge, the Johns Hopkins Applied Physics Laboratory and Johns Hopkins Medicine have developed an information technology system that enables biomedical research and discovery with clinical decision-making in a continually learning precision medicine system.

Supported by the Johns Hopkins University

STRENGTHENING THE VOICE OF AFRICAN SCHOLARS IN GLOBAL HEALTH ETHICS

Joseph Ali, **Berman Institute of Bioethics**
@joealiesq

Debates about ethical controversies in global health research are often dominated by voices from the global "North." Through federally-funded global bioethics initiatives, Joseph Ali has advanced training programs for scholars in sub-Saharan Africa. These programs empower researchers and institutions to meaningfully engage in local and international research and deliberations about the ethics of such research.

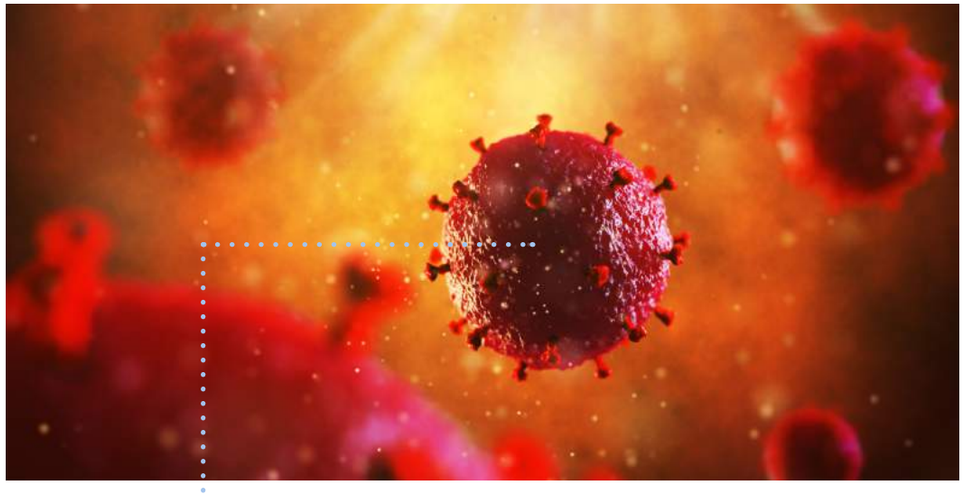
Supported by the Fogarty International Center, National Institutes of Health (NIH)

PROMOTING REPRODUCTIVE HEALTH EQUITY WITH NATIVE AMERICAN COMMUNITIES

Lauren Tingey, Bloomberg School of Public Health
@JHUCAIH

Native American communities have the highest rate of teen pregnancy in the U.S. This disparity is fueled by the absence of school-based reproductive health education in rural reservations. Lauren Tingey of the Center for American Indian Health is proving the impact of a culturally relevant, camp-based program, to give Native teens the power to decide their future.

Supported by the Department of Health and Human Services (HHS)



MOTIVATING HIV TESTING WITH INCENTIVES AND BEHAVIORAL NUDGES

Mario Macis, Carey Business School
@mmacis

Many people are unaware that they have HIV due to lack of information, economic costs, and psychological barriers such as procrastination. Under-diagnosis of HIV is a pressing public health issue, especially among vulnerable and marginalized populations. Working with epidemiologists and public health experts, Mario Macis is testing ways to motivate HIV testing and results-seeking behaviors by translating ideas from behavioral economics.

Supported by the Department of Health and Human Services (HHS) and National Institutes of Health (NIH)

INCREASING HIV AND HEPATITIS C VIRUS INFECTION STATUS AWARENESS AMONG INDIVIDUALS WITH AN OPIOID USE DISORDER

Jemima Frimpong, Carey Business School
@frimpongja

The U.S. opioid epidemic creates a synergistic context for HIV and hepatitis C virus infections, both of which can be transmitted through opioid-related risk behaviors. Many people using opioids, however, may not know they are at risk for, or infected with, HIV and HCV. Jemima Frimpong investigates new strategies for testing and receipt of results among individuals with an opioid use disorder, so that individuals with HIV and/or HCV infection can receive the treatment they need to improve their health outcomes.

Supported by the National Institutes of Health (NIH)

BREAKING TRAINING TRADITION: TRANSLATING EVIDENCE INTO EFFECTIVE ON-SITE, TEAM-BASED LEARNING

Julia Bluestone and Laura Fitzgerald, Jhpiego
@Jhpiego

Traditional training for healthcare workers in low and middle income countries is often conducted through extended, offsite, group-based workshops which fail to improve provider performance. Jhpiego tested alternative models of interactive, simulation-based, modularized training at the workplace, followed by ongoing practice, to achieve dramatic improvements in maternal and newborn outcomes. They are now scaling up this evidence-based learning approach globally.

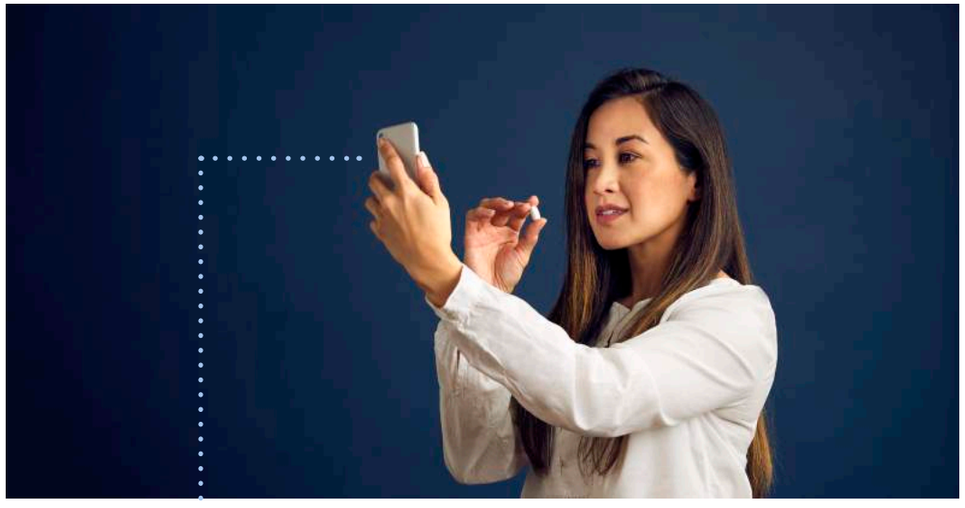
Supported by the United States Agency for International Development (USAID)

USING TRANSFORMATIVE SOLUTIONS **TO SAVE MOTHERS AND NEWBORNS**

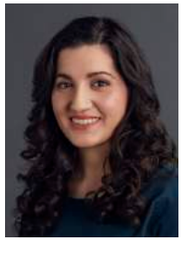
Somesh Kumar, Jhpiego @Jhpiego

Alliance for Saving Mothers and Newborns (ASMAN) uses technology solutions as a driver for improved quality of care in labor rooms of public health facilities. ASMAN prevents delays in providing care in efforts to reduce maternal and newborn deaths. By combining technology for data recording with an intelligently developed 'Labor Room Decision Supporting' tool, ASMAN helps to build competency among healthcare providers using of evidence-based best practices that reduce maternal and newborn deaths.

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



USING SMARTPHONES **TO EMPOWER PATIENTS TO TAKE EVERY DOSE OF MEDICATION**



Morad Elmi & Michelle Mendes, Johns Hopkins Technology Ventures - *emocha* @emochaHealth

Half of patients do not take medications as prescribed, which leads to poorer health and greater health care costs - to the magnitude of $300 billion every year. With *emocha*, patients use a smartphone app to video record themselves taking their medication and engage with their providers. *emocha* empowers every patient to take every dose of medication.

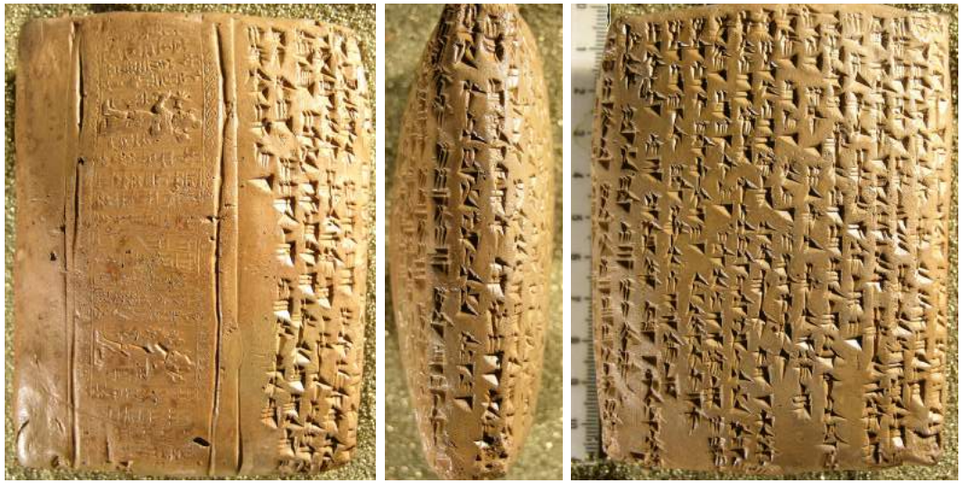
Supported by the National Institutes of Health (NIH)

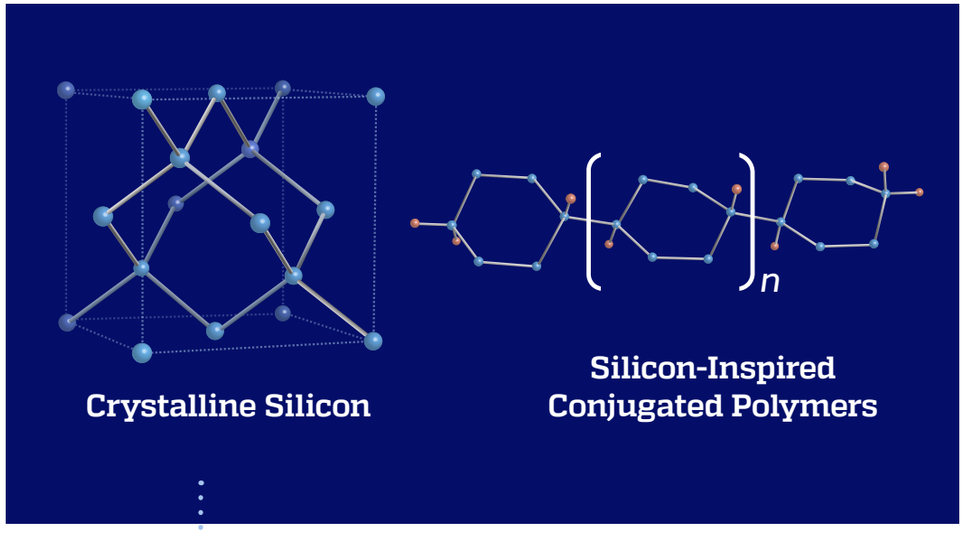
OPEN ACCESS **TO THREATENED ANCIENT SYRIAN RECORDS**

Jacob Lauinger, Krieger School of Arts & Sciences
@JHUArtsSciences

1,887 clay tablets from the ancient Syrian kingdom of Ugarit (ca. 1350–1185 BC) provide unparalleled perspectives on globalism in our earliest human history. But these tablets are imperiled by the ongoing crisis in Syria. Jacob Lauinger is preserving the information on the tablets and sharing them with the world via open-access English language translations.

Supported by the National Endowment for the Humanities (NEH)





ULTRASMALL **SILICON FRAGMENTS**

Rebekka Klausen, Krieger School of Arts & Sciences
@bekkaklausen

New materials discovered today will support the revolutionary technologies of the future. Rebekka Klausen uncovers transformative new capabilities in silicon, the singular material in computer chips, solar cells, and batteries. Her discoveries are made possible by the chemistry of atom-by-atom materials construction.

Supported by the Department of Energy (DOE)

PEABODY PREPARATORY

TUNED IN WIND, BRASS AND PERCUSSION CONGREGATION

Tuned In - Daniel Trahey, Peabody Institute
@DanielTrahey

Founded by Daniel Trahey, *Tuned In* is a community development program of the Peabody Preparatory that offers full scholarships to talented lower income Baltimore City school students to continue their musical studies. Directed by Eli Wirth, the *Tuned In Wind, Brass and Percussion Congregation* is a small wind ensemble that specializes in jazz and brass band music. This socially conscious ensemble has travelled locally and around the country, conducting workshops and performing for younger musicians.

Supported by the National Endowment for the Arts (NEA)

POLITICAL CONSEQUENCES
OF FOREIGN-CURRENCY POLICY

David Steinberg, School of Advanced International Studies @SAISHopkins

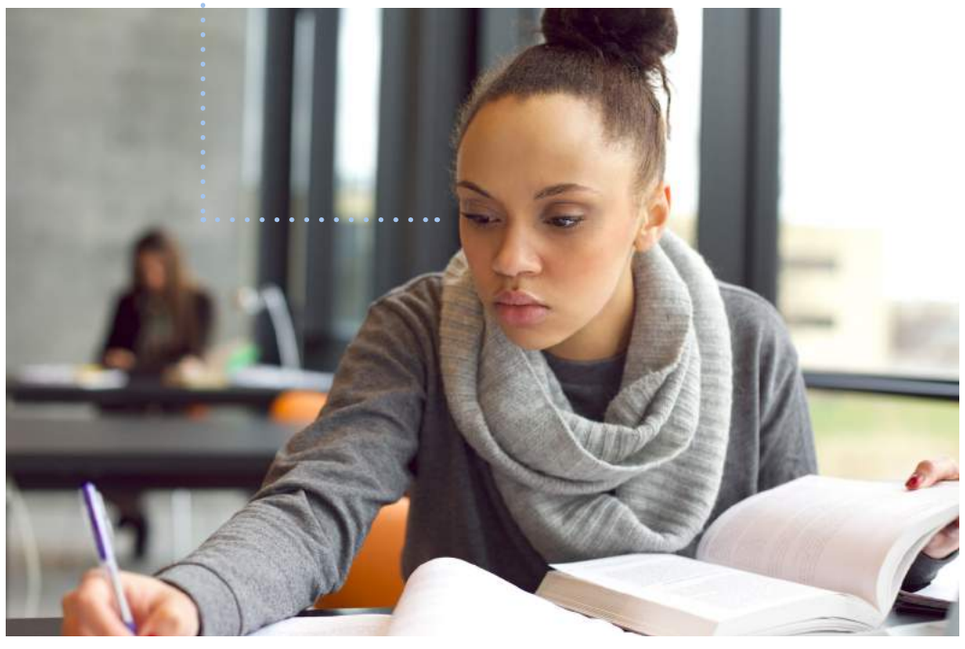
Do citizens pay close attention to currency policy in emerging-market economies? According to David Steinberg's research, citizens not only pay attention, but their support of the government wanes when a country's currency performs poorly. Understanding the relationship between a currency policy and government support can provide insight into drivers of political unrest.

GIVING HIGH SCHOOLERS A STRONG START **BY IMPROVING READING SKILLS**

Marcy Davis, School of Education @md4444

In neighborhoods of concentrated poverty, many teenagers enter high school with underdeveloped reading skills, which severely diminishes their likelihood of graduation. In high schools with a >50% drop-out rate, Marcy Davis is improving reading skills of the most challenged readers through a *Literacy Lab* intervention that is being scaled to schools across the nation.

Supported by the Department of Education (ED)



A VISION FOR SUCCESS: **HOW PROVIDING GLASSES IS HELPING BALTIMORE'S YOUTH**

Megan Collins, School of Medicine
@HopkinsMedicine

Students who cannot see struggle to succeed. For most students, the solution is simple – eyeglasses. The challenge, especially in under-resourced communities, is connecting children with necessary care. Dr. Megan Collins works with *Vision for Baltimore*, a citywide partnership addressing this health equity gap by bringing care directly to students in schools.

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

PROVIDING UNIQUE SUPPORT
FOR HEALTH THROUGH HIV PREVENTION AND TREATMENT

Renata Arrington Sanders, School of Medicine
@HopkinsMedicine

Youth ages 15 to 24 have a high burden of HIV. An HIV diagnosis can severely damage a youth's future as it can lead to high rates of depression, high medical-related costs, and lower vocational and educational achievement. Proven strategies exist to help youth take HIV treatment and prevention medications, but youth do not routinely access these strategies. Renata Sanders, an adolescent HIV physician, is leveraging a coach-based approach that is aligned with the federal goal to *End the HIV Epidemic* among youth in Baltimore, MD, Washington, D.C. and Philadelphia, PA.

Supported by the National Institutes of Health (NIH)

FINANCIAL STRAIN
HARMS HEALTH AND COSTS TAXPAYERS MONEY

Laura Samuel, School of Nursing @Laura_J_Samuel

Lower income adults die at younger ages than higher income individuals, partly due to financial strain and the stress from meeting daily needs. Laura Samuel is investigating the links between income, financial strain and health. She is also evaluating the health impact of programs that reduce financial strain for low-income families.

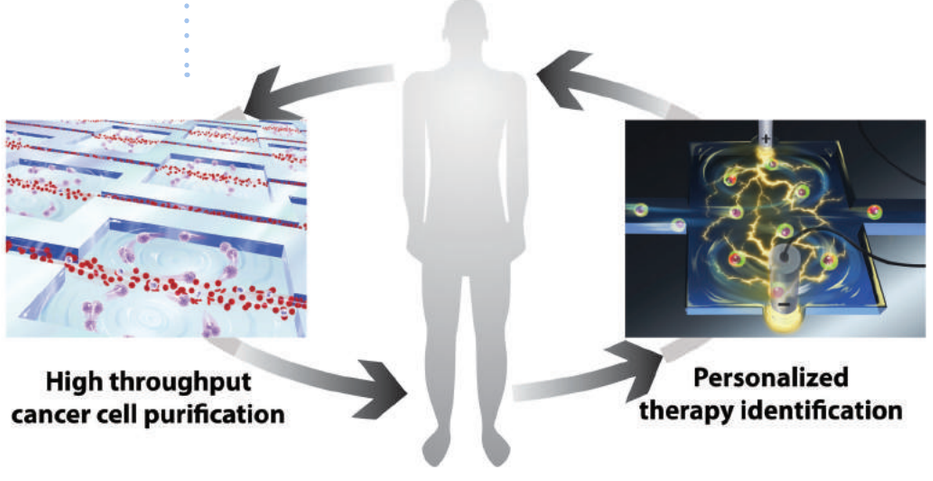
Supported by the National Institutes of Health (NIH)

BUILDING NEW TOOLS
TO FIGHT CANCER

Claire Hur, Whiting School of Engineering
@fromHurLab

To cure cancer, the most effective treatment must be delivered to the patient at the right time. Claire Hur and team are engineering new instruments to routinely collect and test diseased cells in blood, providing the critical information needed to help physicians treat patients with cancer.

Supported by the National Science Foundation (NSF)



MEDE: **PROTECTING SOLDIERS WHO PROTECT US**

Victor Nakano, Hopkins Extreme Materials Institute, Whiting School of Engineering @JHU_HEMI

Materials in Extreme Dynamic Environments (MEDE) develops materials and software codes to better protect U.S. soldiers and armored military vehicles. MEDE uses a materials-by-design strategy that integrates advanced experiments, computational modeling, and synthesis/processing activities. Johns Hopkins leads the MEDE consortium, the largest basic research program with this unique focus, composed of 14 university and research partners in the United States.

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

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

Johns Hopkins University & Medicine
Office of Federal Affairs
Cybele Bjorklund
Vice President for Federal Strategy

Kristen Reek
Assistant Director for Federal Affairs
KReek1@jhu.edu

Office of Research
Dr. Denis Wirtz
Vice Provost for Research

Dr. Keri Althoff
Provost's Fellow for Research Communication
kalthoff@jhu.edu

Julie Messersmith
Executive Director for Research
JMesser5@jhu.edu

Visit us at:
research.jhu.edu

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