

2018 Science, Technology & Innovation Exchange (STIX) US Institute of Peace, Washington DC

Monday, December 10, 2018

8:30 – 10:00 am	Breakfast
8:30 – 10:00 am	Registration: Leland Auditorium
10:00 – 10:10 am	Introduction by Dr. Bindu Nair, Deputy Director for Basic Research
10:10 – 10:25 am	Opening Remarks Dr. Milan Nikolich, Director of Defense Research and Engineering for Research and Technology
10:25 – 11:40 am	Talk Block: The Life Sciences
11:40 – 1:00 pm	Lunch Break
1:00 – 2:15 pm	Talk Block: Materials
2:15 – 2:35 pm	Break: Leland Auditorium
2:35 – 3:50 pm	Talk Block: Modelling, Sensing, Seeing
3:50 – 4:00 pm	Closing Remarks

Tuesday, December 11, 2018

8:00 – 9:00 am	Breakfast
8:00 – 9:00 am	Registration: Leland Atrium
9:00 – 9:10 am	Welcome Remarks
9:10 – 10:25 am	Talk Block : Small, Smaller, Smallest
10:25 – 10:40 am	Break: Leland Atrium
10:40 – 11:55 am	Talk Block : Robotics and the Human-Machine Interface
12:00 – 1:00 pm	Lunch Break
1:00 – 2:00 pm	Talk Block : Cognitive and Social Sciences
2:00 – 2:15 pm	Break: Leland Atrium
2:15 – 3:00 pm	Keynote: “Micro Wells, Major Impact: Connecting Curiosity to Application” Dr. David Walt, Harvard University Founder of Illumina Inc. and Quanterix Corp
3:00 – 5:00 pm	Reception , US Institute of Peace, Leland Auditorium

Science, Technology, and Innovation Exchange 2018: Connections

This year's STI^x is all about the connections at the heart of science and technology. They tie together the student and the mentor, and link groups of scientists in collaboration. Connections lie between innovation and application, the known and the unknown, and the network of ideas in different disciplines that combine to produce new discoveries. The 2018 STI^x event celebrates the importance of these connections to DoD science.

DAY ONE: December 10, 2018

10:25 – 11:40 am | The Life Sciences

Life itself is what makes us who we are and links all organisms across the planet. Teeming and hugely varied, life pushes on horizons we're only just starting to guess at. In this session, researchers will discuss their work that explores our origins, tracks disease movement, delves into the diversity of biomaterials, and uses biology as a creative technology to solve challenges in new ways.

Decoding the Blueprints of Life with Synthetic Biology and Theoretical Physics

Jonathan Liu, UC Berkeley

Functional microbiome design for agile and expedient manufacturing

Matthew Perisin, Army Research Lab

The electric microbiome: How bacteria use electrical signals to communicate with each other and their surroundings

Sarah Glaven, Naval Research Lab

Predicting and preventing disease outbreaks

David Markman, Colorado State University

From spiders to snails: Understanding the biodiversity of repetitive biomaterials through studies in yeast

Stephen Fuchs, Tufts University

1:00 – 2:15 pm | Materials

It's a vast understatement to say that materials are important. Every aspect of our lives – communicating, traveling, working, and living safer lives – depends on new materials

with tailored properties. In this session, we will hear from researchers who are expanding our fundamental understanding of materials and building our functional repertoire to meet society's ever-evolving needs.

Discovery and Design of a Novel Cobalt Nickel-based Superalloy

Sean Murray, UC Santa Barbara

Materials-By-Design, Self-Assembly and Manufacturing of Light-Weight, High Strength and High Toughness Polymer Armors

Shenqian Ren, SUNY Buffalo

Designing New Antimicrobial Agents

Lisa Stabryla, University of Pittsburgh

Magnetism Manipulated

Steven Bennett, Naval Research Lab

Materials that can solve equations

Nader Engheta, University of Pennsylvania

2:35 – 3:50 pm | Modelling, Sensing, Seeing

New ways to model, sense, and predict have provided unprecedented access to processes too small, too far away, or too complex for our normal methods of detection. From peering into the brain to hearing sound in space, this session features researchers working on new ideas that enhance how we observe, understand, and interact with the world around us.

Dynamics not statistics: Measuring and predicting reaction growth in flows

Thomas Nevins, University of Rochester

Nanotechnology for Seeing the Brain in a New Light

James Delehanty, Naval Research Lab

Rethinking Networks in a Quantum World

Kevin Cox, Army Research Lab

Listening for Surface Explosions in Space

Joseph Helmboldt, Naval Research Lab

DAY TWO: December 11, 2018

9:10 – 10:25 am | Small, Smaller, Smallest

Strange and interesting phenomena emerge as we explore scales from the microscopic to the subatomic. In talks that include microfibers, nanoscale electronics, and quantum computing, researchers will discuss their work where understanding the challenges and opportunities presented at the smallest of scales can lead to new ideas for the biggest challenges we face today.

What is the primary driver of microfiber pollution?

Melik Demirel, Penn State University

Printing of Nano and Microscale Electronics and Sensors on Flexible and Rigid Substrates

Ahmed Busnaina, Northeastern University

Quantum Computers: At The Cusp of Reality

Pranav Gokhale, University of Chicago

Connections on the road to quantum networks

Kurt Jacobs, Army Research Lab

Quantum Computing and Particle Physics in a Molecule

John Doyle, Harvard University

10:40 – 11:55 am | Robotics and the Human-Machine Interface

Artificial systems aim to enhance human activity by pairing our creativity and dynamism with machine precision, strength, and speed. In this session, researchers will discuss their work to develop better artificial systems, drawing from how we think and act to create a future where humans and machines can work together in novel ways.

Supporting Trust, Transparency, and Joint Performance in Human-Robot Teams

Kevin Lieberman, University of Michigan

Soft Wearable Robots for Everyday Use

Conor Walsh, Harvard University

Getting Virtually Personal: Responsible and Empathetic “Her” for Everyone

Michelle Zhou, Juji, Inc

An embodied cognitive model of social norms

Greg Trafton, Naval Research Lab

The Memristor: nanoscale connections enabling brain-like computing hardware

Hans Cho, Naval Research Lab

1:00 – 2:00 pm | Cognitive and Social Sciences

While conflict is social in origin, most attempts to address it are technological. The cognitive and social sciences aim to provide insight into how we think, learn, and behave in culturally diverse environments. The talks in this session highlight research that works to better know ourselves across scales from the individual to societies, with the ultimate goal of stability and security.

Autonomy on the Arrogance Curve

Amy Magnus, Air Force Institute of Technology

Strength in Numbers: How social connections shape our brains and decisions

Jean Vettel, Army Research Lab

The Secret Life of Social Norms

Michele Gelfand, University of Maryland

Great Power Connections in Central Asia

Eric McGlinchey, George Mason University

2:15 – 3:00 pm | Keynote

Micro Wells, Major Impact: Connecting Curiosity to Application

Dr. David Walt, Harvard University



David R. Walt is the Hansjorg Wyss Professor of Bioinspired Engineering at Harvard Medical School and Professor of Pathology at Harvard Medical School and Brigham and Women's Hospital, is a Core Faculty Member of the Wyss Institute at Harvard University and is a Howard Hughes Medical Institute Professor. Previously, he was University Professor at Tufts University. Dr. Walt is the Scientific Founder of Quanterix Corp and has co-founded several other life sciences startups including Illumina Inc., Ultivue, Inc. and Arbor Biotechnologies. He has received numerous national and international awards and honors for his fundamental and applied work in the field of optical microwell arrays and single molecules. He is a member of the National Academy of Engineering, the National Academy of Medicine, a Fellow of the American Academy of Arts and Sciences, a Fellow of the American Institute for Medical and Biological Engineering, and a Fellow of the National Academy of Inventors. He has published over 300 papers and holds nearly 100 patents. He received a B.S. in chemistry from the University of Michigan and a Ph.D. in chemical biology from SUNY at Stony Brook, and did postdoctoral studies at MIT.