

Surprise Resulting from Convergence

Intelligence Community Studies Board

Division on Engineering & Physical Sciences

The National Academy of Sciences Building, Room 125

2101 Constitution Avenue NW, Washington DC, 20418

Day One - Tuesday, February 26, 2019

8:00 Working Breakfast for Presenters and Committee Members

Setting expectations, getting to know each other and gaining alignment

8:30 Welcome

*Caryn Leslie, NASEM Senior Program Officer of the Intelligence Community Studies Board
Mr. Dan Flynn, Office of the Director of National Intelligence (ODNI), Director of IC Net Assessments*

9:00-12:00 Session #1 - Convergence of IoT, AI, and Privacy Coupled With Constrained Resources (Facilitator: Dr. Kevin Kornegay, Planning Committee Member)

In 2016, Mirai demonstrated the destructive potential of a botnet composed exclusively of Internet of Things (IoT) devices. Security and privacy issues are a great challenge for IoT but they are also enabling factors to create a “trust ecosystem”. In fact, the intrinsic vulnerabilities of IoT devices, with limited resources and heterogeneous technologies, together with the lack of specifically designed IoT standards, represent a fertile ground for the expansion of specific cyber threats. The amount and diversity of devices that integrate connection capabilities continues to grow, particularly with the introduction of 5G wireless technology, and both the public and private sectors continue to explore various application areas and paradigms that involve these connected devices. Yet very little is done to address the virtually horizontal attack surface that the anticipated tens of billions of IoT devices present. The convergence of IoT and AI will also have a profound impact on security and privacy. We will address the security and privacy challenges in this workshop with a discussion by experts that will provide a snapshot into the threats that lie ahead.

9:00 – 9:10 Introductory Remarks

9:10 – 9:50 IoT Device Security Challenges

Dr. Jean Camp, Director, Center for Security and Privacy in Informatics, Indiana University

9:50 – 10:30 Convergence of AI and IoT

Dr. Patrick McDaniel, Director, Institute for Networking and Security Research, Pennsylvania State University

10:30 – 10:45 **Break**

10:45 – 11:25 **IoT and Privacy**

Mr. Marc Groman, Privacy Consultant and Principal at Groman Consulting Group, LLC

11:25 – 11:55 **Q&A**

11:55 – 1:00 **Working Lunch for Presenters and Committee Members**

1:00-4:00 - Open Session #2 - New Global IT Ecosystems - (Facilitator: Mr. Sam Visner, Planning Committee Member)

This session will discuss the development and implications for US national security and national interests of the ongoing development of a new global, cyber ecosystem. This ecosystem will be characterized by the convergence of information technology, the connected Internet of Things (IoT), and social media, as well as the convergence of "smart" infrastructures (e.g., energy, transportation, finance) that have been managed separately heretofore. Resources comprising and connected to this ecosystem will be mediated increasingly by information technology, served by cloud-based analytics. Global connectivity will be enabled by IPv6, allowing for practically infinite addressability of IT, IoT, and social network devices, and 5G Internet, allowing for far greater speeds and direct connectivity than is possible today. This new eco-system will allow for implementation of new policies, doctrines, and concepts of operations that may pose significant challenges to US national interests, particularly if these policies, doctrines, and concepts of operations reflect different ethical frameworks and a disregard for international behavioral norms. The new eco-system is also the environment in which many public infrastructures, including those serving the elections of the US and its allies, exist.

1:00 – 1:10 **Introductory Remarks**

Mr. Samuel S. Visner, Director, National Cybersecurity Federally Funded Research and Development Center, the MITRE Corporation

1:10 – 1:45 **The Intersection of Artificial Intelligence, 5G, and Cybersecurity**

Dr. Donna Dodson, Director, National Cybersecurity Center of Excellence, and Special Assistant the Director for Cybersecurity, the National Institutes of Standards and Technology (NIST Fellow)

1:45-2:20 **National Security Implications of Artificial Intelligence**

Dr. Mikel Rodriguez, Innovation Area Leader, Decision Science, the MITRE Corporation

2:20 – 2:30 **Break**

2:30-3:05 **The Evolution of 5G Networks and the Implications for US National Security**

Mr. John Nagangast, Executive Director, AT&T

3:05 - 3:40 **The Cybersecurity Threat to American Democracy – Election System Vulnerabilities**

Mr. Marc Schneider, Principal, Cyber Research, the MITRE

3:40– 3:50 **Q&A**

4:00 **Adjourn for the Day**

Day Two - Wednesday, February 27, 2019

8:00 **Working Breakfast for Presenters and Committee Members**

8:30 – 8:45 **Welcoming Remarks**

9:00 – 12:00 - Open Session #3 – Chemistry/large data/synthetic biology - (Facilitator: **Dr. Peter Palese, Planning Committee Member**)

Design and fabrication of biological components and systems that DO NOT exist in the natural world – entire organisms created from scratch, directed evolution, industrial enzymes, information storage
Chemistry: New chemical compounds, new poisons, new plastics (breaking down for re-use on command)

Big data: Medical records, health care, predictive analysis (did not work for influenza), user behavior etc. etc.

8:45 – 9:00 **Introductory Remarks**

9:00 – 9:45 **Synthetic Biology: Biology by Design**

Dr. James Collins, Termeer Professor of Medical Engineering and Science, Massachusetts Institute of Technology

9:45 – 9:55 Q&A for This Presentation

9:55 – 10:40 **Expanding Biology's Toolkit to Solve Important Technological Challenges**

Dr. Angela Belcher, James Mason Crafts Professor of Biological Engineering and Materials Science and Engineering, Koch Institute for Integrative Cancer Research, Massachusetts Institute of Technology

10:40 – 10:50 Q&A for This Presentation

10:50 – 11:05 **Break**

11:05 – 11:50 **Finding Surprises in Big and Small Data First**

*Andrew Kasarskis, Ph.D., Professor, Department of Genetics and Genomic Sciences
Icahn School of Medicine at Mount Sinai, Chief Data Officer, Mount Sinai Health System*

11:50 – 12:00 Q&A for This Presentation

12:00 – 1:00 **Working Lunch for Presenters and Committee Members**

1:00 – 4:00 Open Session #4 – Mitigation Through Key Technologies (Facilitator: **Ms. Joanne Isham, Planning Committee Member**)

What are the technologies that one might believe will provide some assistance in mitigating the issues discussed in other topics (cannot include recommendations)? What are some opportunities to intervene? How do you detect anomalous behavior—especially in their own home territory? What are some potential offensive and defensive actions? Smart communities & smart cities are an example—collection awareness.

1:00 – 1:10	Introductory Remarks
1:10 – 1:50	The Smart City Ecosystem and Why It Matters <i>Mr. Pete Tseronis, Founder and CEO of Dots and Bridges, LLC</i>
1:50 – 2:30	AI Driving Cascading Strategic Surprise <i>Mr. Gilman Louie, partner at Alsop Louie Partners, founder and former CEO of In-Q-Tel</i>
2:30 – 2:45	Break
2:45 – 3:25	Everybody Lies...Especially Our Adversaries <i>Jeffrey D. Grant, Former Sector Vice President and General Manager Space Systems Northrop Grumman Aerospace Systems</i>
3:25 – 3:50	Q&A
4:00	Adjourn

For Additional Information Contact:

Ms. Caryn Leslie, Senior Program Officer
Phone: (202) 334-2508
Email: CLeslie@nas.edu

Ms. Marguerite Schneider, Admin. Coordinator
Tele: (202) 334-2435
Email: MSchneider@nas.edu

Ms. Dionna Ali, Research Associate
Phone: (202) 334-2589
Email: DAli@nas.edu

Mr. Nathaniel DeBevoise, Senior Program Assistant
Phone: (202) 334-2578
Email: NDebevoise@nas.edu