

## **Strategic Foresight and Global Governance of Critical Technologies & Socio-technical Systems: Implications for Peace and Security 2025-2050**

**Monday March 24 – Tuesday March 25, 2025**

Hintz Alumni Center, Penn State University

### **Objectives**

1. Students are introduced to strategic and systems thinking to understand the global governance challenges of critical technologies and infrastructure systems. The workshop will focus on autonomous systems, which transcend many critical civil and defense infrastructures.

Some of the questions we address are the following: how do technologies that create autonomy become integrated into critical infrastructure systems, what are the social and technical risks generated, who are people and groups that bear the risks and rewards, and what are the strategies and policies needed to manage a spectrum of risks to individuals, organizations, and society? What are the ethical, legal, and social implications of autonomy and autonomous systems?

Students from Chalmers University of Technology and Penn State, who work on the joint engineering capstone design project with industry sponsorship, will be the student participants in the workshop along with other engineering and science students from Penn State as well as students from the School of International Affairs, the Smeal College of Business, and the ROTC at Penn State. Students from across Penn State and SIREUS (Students, Innovators, Researchers, Entrepreneurs, United States, Sweden) network partners will participate.

2. Workshop participants identify possible joint research projects to be proposed on trusted, human machine engineering systems and autonomy, together with enabling technologies such as 6G, which are a part of the convergence research agenda and accelerator. The systems engineering research projects and socio-technical systems analysis include the identification and management of risks and the related ethical, legal, and social implications. The proposed research is linked to education and workforce development.

3. Industrial representatives and national laboratories identify increased and expanded ways to collaborate as partners with Penn State and Chalmers for research and education that have civil and defense related applications. The collaboration will include broader workforce development, including critical trade skills needed for emerging and novel technologies, as well as exploring opportunities for technology transfer, supply chain risk and vulnerability analysis, and advanced manufacturing of hardware and software development, testing, and evaluation.

## **PROGRAM**

**Day 1 – Monday, March 24, 2025**

**8:30–9:00 am** – Continental breakfast

### **9:00 am Welcome and Objectives**

Welcome to Penn State, Dr. Eric Donnell, Senior Associate Dean, College of Engineering

Objectives of the workshop: Darryl Farber, Penn State; Mikael Enelund, Chalmers University of Technology

### **9:15–10:45 am Block 1** Global Trends, Risks, and Strategy

Darryl Farber, Moderator

Dr. Mathew Burrows, Counselor, Executive Office, Stimson Center; Counselor (ret.) U.S. National Intelligence Council

Dr. Maria Brogren, Counselor for science, innovation and higher education, Embassy of Sweden, Washington, D.C.

Ms. Malia Du Mont, Fellow, Strategic Foresight Hub, Stimson Center

Gen. James Cartwright, USMC (ret.) Board Director at the Atlantic Council; Eighth Vice Chairman of the Joint Chiefs of Staff

### **10:45 am BREAK**

### **11:00–12:30 pm Block 2: “Wicked” Problems and Trusted Solutions**

Dr. Mikael Enelund, Introductory remarks, Professor - Dynamics, Mechanics and Maritime Sciences, Chalmers University of Technology

Dr. Guru Madhavan, Norman R. Augustine Senior Scholar, Senior Director of Programs, and Director, Forum on Complex Unifiable Systems (FOCUS), National Academy of Engineering

Dr. Akhlesh Lakhtakia, 2022 Jefferson Science Fellow, US State Department; Evan Pugh Professor, Penn State

Ms. Natalya S. Lakhtakia, Board of Education Trustee, Saratoga Springs City School District, New York

### **12:30–1:30 pm LUNCH**

Professor Dan Cahoy, Department Head of Risk Management, Smeal College of Business, Penn State University – Introduction

Speaker on Leadership and the Management of Strategic Risks – General C. Robert Kehler, USAF (ret.), Commander, US Strategic Command

### **1:45–3:15 pm Block 3** Engineering Trustworthy Autonomous Systems: Challenges and Research Needs

Dr. Jason Moore, Professor, Mechanical Engineering, Penn State – Moderator

Dr. Amy Pritchett, Professor and Department Head, Aero Space Engineering, Penn State

Dr. Emmanuel Dean, Chalmers University of Technology

Dr. Timo Kero, Asta Zero, Sweden

Dr. Satadru Dey, Asst. Professor, Mechanical Engineering, Penn State

### **3:15–3:45 pm BREAK**

**3:45–5:00pm Block 4** Technology Transfer, Manufacturing, and Workforce Needs

Dr. Sergey Naumov, Smeal College of Business, Moderator

Dr. Bruce Vojak, Breakthrough Innovation Advisors; Conference Board

Mr. Dennis Gilbert, President, Innovative Manufacturers' Center, Manufacturing Extension Partnership Center – NIST

Dr. Tim Simpson, NASA

Dr. Ola Isaksson, Professor, Industrial-Materials Science, Chalmers University of Technology

Dr. Xianbiao Hu, Asst. Professor, Civil Engineering, Penn State

**5:00 pm BREAK** (Students meet with Dr. Jared Mondschein to discuss systems analysis and scenario planning for emerging technology)

**6:00–8:30 pm Block 5** Reception and panel: Science, technology, and engineering systems tell us what we can do, the liberal arts, values, and ethics inform us what we should do.

Dr. Mitchell Smith, Professor and Director, School of International Affairs, Penn State.  
Master of Ceremonies

Dr. Norman Augustine, retired CEO and Chair, Lockheed Martin

Panelist I Governance in the International System: Dr. Patricia Gruber, former Science and Technology Adviser to the Secretary, U.S. Department of State

Panelist II Mr. Julian Mueller-Kaler, Chief of Staff and Director Strategic Foresight Hub, Stimson Center

Panelist III Ethical, Legal, Societal Implications, Dr. Laura Cabrera, Dorothy Foehr Huck and J. Lloyd Huck Chair in Neuroethics, Penn State

**Day 2 – Tuesday, March 25**

**9:00 am** – Continental breakfast

Dr. Jared Mondschein, Penn State alum, Policy Advisor for Critical and Emerging Technology

**9:30–10:45 am Block 6** Student Working Groups – presentation preparation

**10:45 am BREAK**

**11:00–12:30 pm Block 7** Student Presentations

**12:30 – 3:00 pm** Lunch

Dr. Vijay Narayanan - Associate Dean of Innovation, College of Engineering

1. Industry brief, Doug Woodall, Vice President Warfighting, Rhombus

2. Strategic Foresight Knowledge and Skill Set in Practice

Mr. Munaf Syed Aamir, Manager; Ms. Marilee Orr, Brian Miller; Strategic Futures + Policy Analysis Department, Sandia National Laboratory