

NECSI 2020 International Conference on Complex Systems

26-31 July 2020, Nashua, NH

One-Day Workshop: Complexity Science and Defense Applications

Understanding how complexity arises in military situations and how complexity science can improve military outcomes

Organizers: **Dr. Bonnie Johnson**
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The rise of technology, computers, information systems, automation, and global networks has led to an age of complexity that has introduced multi-faceted problems unlike any before encountered. These highly complex problems are unpredictable; and in the defense realm they can rapidly lead to dire consequences. Complex situations arise from non-linear problem spaces consisting of distributed and heterogeneous entities and events that are highly interrelated and dynamic—changing states rapidly and unexpectedly. Complexity is increasing in warfare situations with advances in, and the proliferation of, weapons, sensors, manned and unmanned platforms, and the computers and communication networks that connect these systems.

Expected Outcomes:

- To identify situations that have the potential to become complex; to discuss how these situations can be identified, understood, and characterized when they arise; and to shed light on reducing unknowns and predicting consequences and their possible effects on systems, missions, and actors.
- To begin to develop methods, tactics, and engineered systems that apply complexity science as solutions to improve operations, especially in high complex situations. Solutions may involve complex systems engineering, complex adaptive systems, and system of systems emergence.
- To foster communication and collaboration among practitioners in this field.

Tentative Agenda: Thursday, July 29th, 2020

1200 – 1230 [Lunch/Virtual Networking](#)
1230 – 1240 Opening: Bonnie Johnson
1240 – 1310 Keynote 1 – Dr. Wayne Porter, Naval Postgraduate School
1310 – 1315 [Break](#)
1315 – 1355 Keynote 2 – Dr. Gary Langford, Portland State University
1355 – 1400 [Break](#)
1400 – 1440 Keynote 3 – Dr. Antulio Echevarria, Army War College
1440 – 1450 [Break](#)
1450 – 1605 Panel 1 – The Highly Complex Defense Environment: Challenges and Potential Consequences
1605 – 1610 [Break](#)
1610 – 1725 Panel 2 – Solutions Leveraging Complexity Science: Methods, Tactics, and Engineered Systems
1725 – 1735 Closing: Bonnie Johnson

This workshop will be held at the unclassified/Distribution A level. The workshop will occur during the week of 26-31 July 2020 and the specific date will be announced soon. Please register to attend ICCS - <https://necsi.edu/iccs-2020#>. Your registration will allow you attend the conference as well as this one-day workshop.

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Panel 1 – The Highly Complex Defense Environment: Challenges and Potential Consequences

Dr. Sean Lawson, University of Utah and Modern War Institute at West Point

Mr. Byron Mushrush, US Central Command

Dr. Tonya Henderson, US SPACECOM

Panel 2 – Solutions Leveraging Complexity Science: Methods, Tactics, and Engineered Systems

Dr. Ying Zhao, Information Sciences, Naval Postgraduate School

Mr. Jack Crowley, Forge AI

Dr. Philip Brown, NORAD & USNORTHCOM