

SYSTEMS ENGINEERING TRACK

SYSTEMS SCIENCE – PRINCIPLES FOR SUPPORTING THE EVOLUTION OF SYSTEMS

OCTOBER 18TH, 2017

-WORKSHOP DESCRIPTION-

In this workshop, ongoing work on discovering systems science principles is presented. In the workshop, attendees will receive an overview on how three systems principles were discovered, from a systems philosophy perspective. Following, two operationalized theoretical examples using the three principles are used to explain how communication and teams emerge in organizations seeking a continuous process improvement culture. Finally, attendees will be presented with a concrete example on how the principles can influence operations at a manufacturing company (Boeing Commercial Airplanes Portland). Workshop attendees will get to practice the roadmap presented and apply it to either explore more in depth the examples presented or explore other phenomena they are interested in.

-WORKSHOP REQUIREMENTS-

All ASEM IAC attendants are welcome.

This workshop combines 4 hours of instruction and team work.

-FULL DESCRIPTION-

This workshop explores the journey from foundational theory to a practical application in a manufacturing environment. The context is in the design of a human activity system that supports the realization of a complex engineered system. The workshop team will showcase how generalized theory can be operationalized and then implemented under an action-research framework (Plan-Do-Check-Act).

MODULE	TOPIC	TIME	ACTIVITY TYPE	LEAD PRESENTER
1	Principles of Systems Science	1 hr	Lecture	David Rousseau
			Reflection Activity	
2	Applications of Systems Science Principles	1 hr	Lecture	Javier Calvo-Amodio
			Reflection Activity	
3	BPPS Example	1 hr	y	Ron Barca
			Reflection Activity	
4	Team work in applied example	1 hr	Team work	Javier Calvo-Amodio and Ron Barca

-WORKSHOP LEARNING OUTCOME(S)-

After completing this workshop, participants will be able to:

1. Describe three systems science principles
2. Understand how systems principles can be used to develop explanatory frameworks
3. Apply systems science principles to real-world scenarios

-WORKSHOP INSTRUCTOR(S) BIO(S)-

Javier Calvo-Amodio is an assistant professor of Industrial and Manufacturing Engineering at Oregon State University, where he directs the Change and Reliable Systems Engineering and Management Research Group (CaRSEM). His research focuses on developing fundamental understanding of how to engineer and manage systemic change in organizations by combining engineering management, industrial engineering, and systems science. His research group works with Oregon's industry and state agencies and NSF to derive fundamental theory and test how organizations can engineer and maintain systemic change under an action-research format.

David Rousseau is President of the International Society for the Systems Sciences (ISSS), Director of the Centre for Systems Philosophy, and leader of the project on 'Systems Philosophy for Systems Engineering' in the Systems Science Working Group (SSWG) of the International Council on Systems Engineering (INCOSE). His research is focused on the development of a general systems theory (GST) and how it can be used to investigate philosophical questions and practical problems relevant to contemporary society.

Ron Barca is a Lean Practitioner with Boeing Commercial Aircraft at the Portland Oregon fabrication facility. With 38 years in the industry, Ron is focused on creating balance between employee and corporation needs. He teaches the fundamentals of the Boeing Portland Production System (BPPS) now becoming the Boeing Production System. His time is divided by the systems driven communication improvements necessary to compete in aerospace today and continuous improvement activities that take place on the factory floor.