GSAW 2024 Tutorial A: Full Day

Industrial DevOps Applied

Overview:

Course Outline:

- Module 1: Introduction to Agile and DevSecOps in Safety-Critical Environments
  - Overview of Agile principles and DevSecOps culture
  - Specific challenges in safety-critical cyber-physical systems
  - Case studies of Agile/DevSecOps implementation in large-scale, safety-critical projects
- Module 2: Adapting Agile Practices for Safety-Critical Development
  - Agile methodologies (Scrum, Kanban, SAFe) and their scalability
  - Tailoring Agile to comply with safety standards
  - Risk management and iterative development in safety-critical software
- Network Break
- Module 3: Integrating Security and Compliance in the Development Life Cycle
  - Understanding DevSecOps and its significance in cyber-physical systems
  - Security requirements, threat modeling, and risk assessment
  - Incorporating compliance checks and balances within Agile sprints
- Module 4: Engineering for Dependability and Resilience
  - Design principles for dependable cyber-physical systems
  - Ensuring resilience and fault tolerance
  - Automated testing strategies for safety-critical functions
- Lunch Break
- Module 5: Continuous Integration and Continuous Deployment (CI/CD) in Regulated Environments
  - Setting up CI/CD pipelines under strict regulations
  - Automated compliance verification
  - Balancing speed and safety in continuous deployment
- Module 6: Systems Thinking and Managing Complexity
  - Applying systems thinking in the design and development of cyber-physical systems
  - Managing system interdependencies and complex architectures
  - Simulation, modeling, and formal methods
- Network Break
- Module 7: Collaboration and Communication
  - Building cross-functional teams for cyber-physical system development
  - Effective communication practices within large, distributed teams
  - Tooling for collaboration in a DevSecOps environment
- Module 8: Workshop and Practical Exercise
  - Interactive workshop on applying Agile/DevSecOps practices to Space Case Study
  - Group activity: planning an Agile sprint for a Satellite.
- Q&A, Course Wrap-up, and Feedback Collection

Instructors:

Robin Yeman, Carnegie Mellon SEI and Suzette Johnson, Northrop Grumman Corporation

Biographies:

Robin Yeman – Expertise spanning over twenty-eight years in software engineering with focus on Digital Engineering, DevSecOps, and Agile building large complex solutions across multiple domains from submarines to satellites. She advocates for continuous learning with multiple certifications including SAFe Fellow, SPCT, CEC, PMP, PMI-ACP, and CSEP. She is a Systems Engineering PhD candidate at Colorado State researching best practices to deliver large-scale safety-critical cyber-physical solutions using Agile and DevSecOps. Key areas of focus include Systems Thinking, Digital Engineering, DevSecOps and Agile. She has also led several efforts in Agile transformation and continues to lend her expertise in Agile techniques and processes on management, schedule, cost, and technical performance.

Dr. Suzette Johnson works for Northrop Grumman Corporation near Baltimore, Maryland. As an NG Fellow for Lean Agile, she works for Space Systems fostering operational and program excellence to achieve mission outcomes. Her experience with Lean Agile began twenty years ago spanning across IT systems and software and systems engineering for cyber-physical systems. She has led the adoption of Lean Agile across the enterprise and has supported over 100 internal projects and government programs on the Lean-Agile journey. She holds several certifications including Scaled Agile Program Consultant Trainer (SPCT), Certified Enterprise Coach, PMP, and PMI-ACP. She is an active member within NDIA and is currently serving as NDIA Systems Engineering Division, vice chair. She received a Doctorate of Management Technology at the University of Maryland with a dissertation focused on investigating the Impact of leadership styles on software project outcomes in traditional and agile environments. In collaboration with Robin Yeman, they have published multiple papers on Industrial DevOps through IT Revolution where they outline how to expand DevSecOps outside of software into management, hardware and firmware. Most recently they published a book, Industrial DevOps: build better systems faster.

Description of Intended Audience and Recommended Prerequisite:

Target Audience: Program Managers, Systems Engineers, Software Engineers, Hardware Engineers, Security Specialist working in the Space Industry.
Pre-requisite: Open Mind; Basic Understanding of Agile and DevSecOps.

What can Attendees Expect to Learn:

- Understand the challenges and opportunities of applying Agile and DevSecOps practices to safety-critical cyber-physical systems at the System Level
- Learn how to adapt Agile for large-scale system development while maintaining rigorous safety standards.
- Gain knowledge on integrating security and compliance into the development lifecycle without compromising speed and innovation.
- Develop strategies for continuous integration, delivery, and deployment in a highly regulated and safety-critical environment.
- Apply systems thinking to manage complexity and interdependencies in cyber-physical systems development.