

# Resilience Week 2016 Final Summary Report

Craig Rieger

September 2016



The INL is a U.S. Department of Energy National Laboratory  
operated by Battelle Energy Alliance

**INL/EXT-16-39919**

# **Resilience Week 2016 Final Summary Report**

**Craig Rieger**

**September 2016**

**Idaho National Laboratory  
Idaho Falls, Idaho 83415**

**<http://www.inl.gov>**

**Prepared for the  
U.S. Department of Energy  
Assistant Secretary for \_\_\_\_\_, OR Office of \_\_\_\_\_  
Under DOE Idaho Operations Office \_\_\_\_\_  
Contract DE-AC07-05ID14517**



## **Resilience Week 2016 Final Summary Report**

**August 16-18, 2016 in Chicago, IL**

**Dr. Craig Rieger, General Chair**

Resilience Week 2016 was held in Chicago, IL from August 16 through August 18, 2016 at the Lisle Hilton. Resilience Week currently includes 5 multidisciplinary symposia on Resilient Control, Cyber, Cognitive and Communications systems in addition to a more government-industry focused Resilient Critical Infrastructure symposium. The vision of Resilience Week is “Symposia dedicated to promising research in resilient systems that will protect critical cyber-physical infrastructures from unexpected and malicious threats--securing our way of life.” The symposium was sponsored by the Idaho National Laboratory (INL.) Technical co-sponsorship was also received from the Institute of Electrical and Electronics Engineers (IEEE) Industrial Electronics Society (IES). Organizing support came from several organizations, including universities such as Johns Hopkins Applied Physics Laboratory and the University of Illinois, Urbana-Champaign, and government agencies such as Naval Surface Warfare Center and Argonne National Laboratory. The output of the symposium includes summary presentations and paper proceedings for those identified concepts that advance the state of the art in the area of resilient systems and infrastructure.

Two hundred and ten people registered for the symposium this year. This is up from one hundred and eighty registrations in 2015, showing a consistent growth each year. The attendees were primarily from the United States. International participation included attendees from Argentina, Canada, Chile, China, Columbia, France, Greece, India, Iran, Lebanon, Libya, Pakistan, South Korea, Sri Lanka, Turkey and the United Kingdom. Attendees were from a diverse mix of industry, academia and government, with a growing contingent from both industry and government.

Forty-nine papers were submitted for consideration to Resilience Week. Of these, thirty-three were accepted for submission to IEEE Xplore, giving an overall acceptance rate of 67%. However, only 49% were accepted for paper presentation, with the remainder only allowed a poster presentation. Each paper received a minimum of three reviews. Numerous abstracts were also submitted, specifically in the resilient critical infrastructure symposium, but are internally reviewed for presentation and not for submission to IEEE Xplore.

Four well-known plenary speakers' (Figure 1) delighted attendees with presentations on cross-disciplinary resilience research in France, defense advanced research, power system resilience, and other resilience topics. The opening welcome was provided by Retired Admiral Bill Leigher (top left), Director of Government Cyber Solutions, Raytheon Company. The other exemplary plenary speakers included:

- Dominique Luzeaux (bottom left), Deputy Director of the Joint Directorate for Networks, Infrastructure and Information Systems, France's Ministry of Defense
- Massoud Amin (top right), Director of TLI, University of Minnesota and Honorary Chair
- Brian Pierce (bottom right), Deputy Director Defense Advanced Research Projects Agency (DARPA), Information Innovation Office.

Keynote Speakers presented relevant challenges within each of the symposia, and represented academia, government and industry. These included:

- Matt Bishop, University of California at Davis
- David Bruemmer, 5D Robotics
- Alexander Dolpp, Mercedes-Benz Research & Development
- Cynthia Hsu, National Rural Electric Cooperative Association
- Kris Kearns, Air Force Research Laboratory
- Bob Kolasky, U.S. Department of Homeland Security
- Annabelle Lee, Electric Power Research Institute
- Osama Mohammed, Florida International University
- Greg Shannon, Office of Science and Technology Policy
- Kevin Staggs, Honeywell Automation and Control
- Trung Tran, DARPA Microsystems Technology Office
- Nitin Vaidya, University of Illinois Urbana-Champaign



**Figure 1: Plenary Speakers**



As with last year, the symposium also included two series of invited, paper and keynote speakers. These two series were started last year to develop greater interdisciplinary interaction. The topics of these talks were Resilience Models and Measures and Mixed Human-Automation Resilience. The former track includes and will maintain collaboration through the IES Resilience and Security for Industrial Applications (ReSia) technical committee in focusing on terminology, metrics and a use case for future events with the intent to develop an eventual IEEE standard.

With the increased focus on resilience in the United States, federally funded centers have begun to be established. Both the Department of Homeland Security and National Institute of Standards and Technology were represented, with the former’s Critical Infrastructure Research Institute (CIRI) led by the University of Illinois Urbana-Champaign had a significant contribution to the symposium. Student competitions were also held and judged to recognize and highlight the next generation of resilience researchers.

An expansion of the third day of the symposium included a focused track on the human dimension, led by Department of Energy labs.



**Figure 2. Receptions with Poster Session**



**Figure 3. Reception at Top Golf**



**Figure 4. Argonne Tours**

Two receptions were held for event attendees. The first was held concurrently with the poster session (Figure 2), which was well attended 3-hour event. A second, less formal activity was held at TopGolf (Figure 3), which allowed attendees to network while hitting a few balls. The reception also provided for best paper and student presenters to further highlight their work. Tours were organized with Argonne National Laboratory (Figure 4) for the Friday after the event, which were also well attended.

With the world's dependence on control systems for automating critical infrastructure, the next generation of resilient systems and associated infrastructure will be critical to ensure that these operations perform in a safe and dependable manner. The Resilience Week symposia series provides a cross-disciplinary avenue for interacting with representatives from government, industry and the academic community to shape this vision. Relevance is provided in the application of resilience to real world industry challenges. Attendees see papers in each area of resilience, but more importantly, sessions that combine two or more aspects.