

Cyber-Physical Systems Security Workshop

Toward a Future Reliable and Secure Electrical Grid

October 18-19, 2019 Kingston, Rhode Island

THE
UNIVERSITY
OF RHODE ISLAND

WELCOME PACKET

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Welcome

Welcome to the 2019 Cyber-Physical Systems Security Workshop, to be held at the historical, beautiful campus of University of Rhode Island in Kingston, RI on October 18, 2019 and October 19, 2019. The hope of this workshop is to provide a catalyst for open communications between academia, industry and government to combat the emerging challenges in the field of cyber-physical systems security and to construct workforce development strategies in order to better prepare the next generation. We look forward to meeting you, sharing ideas, and working together to tackle this crucial topic.

Sincerely,

Dr. Haibo He and Dr. Yan (Lindsay) Sun

Workshop Location

University of Rhode Island Kingston Campus

45 Upper College Road, Kingston, RI 02881

Map of the campus on the following page

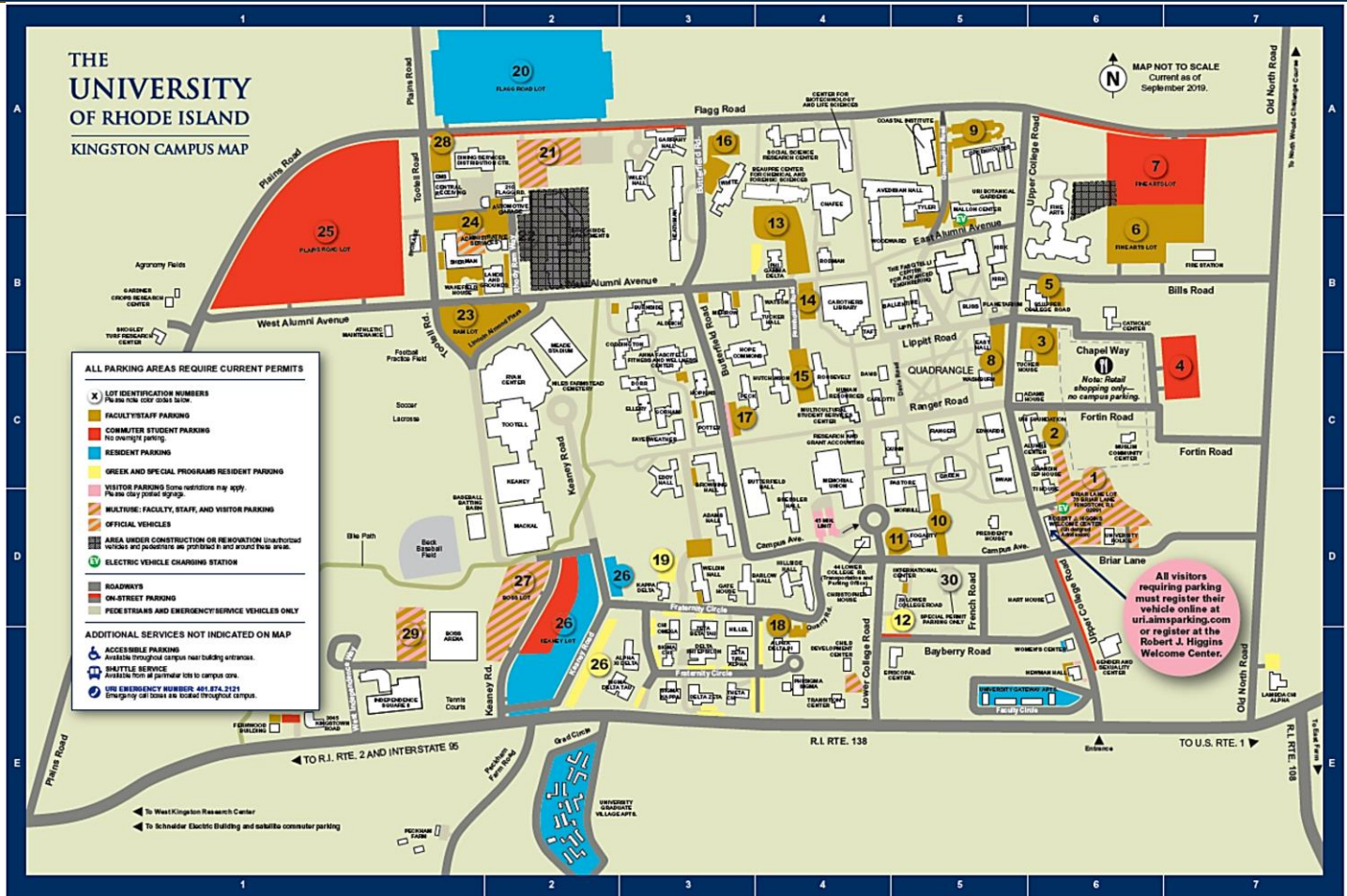


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For Questions or concerns, please contact:
haibohe@uri.edu or yansun@uri.edu

University of Rhode Island Kingston Campus Map



THE UNIVERSITY OF RHODE ISLAND KINGSTON CAMPUS MAP INDEX

Academic and Service Buildings

- ** 44 Lower College Rd., Transportation and Parking Office (TAP) (D4)
- 95 Upper College Rd. (B6)
- 177 Plains Rd. (D1)
- 210 Flagg Rd. (A2)
- 3045 Kingstown Rd. (E1)
- Adams House (C5)
- Administrative Services (B2)
- Agronomy Fields (B1)
- Alumni Center (C6)
- Anna Fascitelli Fitness and Wellness Center (C3)
- Athletic Maintenance Facility (B1)
- Automotive Garage (A2)
- Avedisian Hall, *pharmacy* (A4)
- Ballentine Hall, *business* (B5)
- Baseball Batting Barn (D1)
- Beaupre Center for Chemical and Forensic Sciences (A4)
- Bliss Hall, *engineering* (B5)
- Boss Arena (E1)
- Carloti Administration Building (C4)
- Carothers Library and Learning Commons (B4)
- Catholic Center (B6)
- Center for Biotechnology and Life Sciences, *environment and life sciences* (A4)
- Central Receiving Warehouse (A1)
- Chafee Social Science Center, *arts and sciences* (A4)
- Child Development Center (E4)
- Christopher House (D4)
- Coastal Institute (A5)
- Davis Hall (C4)

Dining Services Distribution

- Center (A1)
- East Farm (off Rte. 108)
- East Hall (B5)
- ** Edwards Hall (C5)
- Emergency Medical Services Station (EMS) (A1)
- Episcopal Center (E5)
- 3045 Kingstown Rd. (E1)
- Fine Arts Center (A6)
- Fire Station (B7)
- Fogarty Hall (D5)
- Gardner Crops Research Center (B1)
- Gender and Sexuality Center (E6)
- Grandin IEP House (C6)
- Green Hall, *enrollment services* (C5)
- Greenhouses (A5)
- Hart House (D6)
- Hillel (E3)
- ** Human Resource Building (C4)
- Independence Square II (E1)
- International Center (D5)
- Keaney Gymnasium (C2)
- Kirk Applied Engineering Lab (B5)
- Kirk Center for Advanced Technology (B5)
- Lands and Grounds (B2)
- Lippitt Hall (B5)
- Mackall Field House (D2)
- Mallon Outreach Center (A5)
- Meade Stadium (B2)
- Memorial Union (C4)
- Morrill Hall (D5)
- Multicultural Student Services Center (C4)

- Muslim Community Center (C6)
- ** Newman Hall (E6)
- Niles Farmstead Cemetery (C2)
- North Woods Challenge Course (off campus)
- Pastore Hall and Annex (D5)
- Pastore Farm (E1)
- Planetarium (B5)
- Police (University) (D6)
- Potter Building, *health services* (C3)
- Quinn Hall, *health sciences, graduate admission* (C5)
- Ranger Hall (C5)
- Research and Grant Accounting (C4)
- Robert J. Higgins Welcome Center, *undergraduate admission* (D6)
- Rodman Hall (B4)
- Roosevelt Hall, *University College for Academic Success* (C4)
- Ryan Center (C2)
- Skogley Turf Research Center (B1)
- Sherman Building (B1)
- Schneider Electric Building, *engineering* (off campus) (Fairgrounds Road, off Rte. 138 W.)
- Social Science Research Center (A4)
- Storage (B1)
- Swan Hall (C5)
- Taft Hall (B4)
- Texas Instruments House (77) (C6)
- The Fascitelli Center for Advanced Engineering (B5)
- Tootell Physical Education Center (C2)

- Transition Center (E4)
 - Tucker House (C5)
 - Tyler Hall (A5)
 - URI Foundation (C6)
 - Wakefield House (B1)
 - Washburn Hall (C5)
 - Watson House (B4)
 - West Kingston Research Center (Liberty Lane, off Rte. 138 W.)
 - White Hall, *nursing* (A3)
 - ** Women's Center (E6)
 - Woodward Hall (B4)
- ### Residential Buildings and Dining Halls
- * 29 Lower College Rd. (D5)
 - Adams Hall (D3)
 - Aldrich Hall (B3)
 - Barlow Hall (D3)
 - Bressler Hall (D4)
 - Brookside Apartments (B2)
 - Browning Hall (C3)
 - Burnside Hall (B3)
 - Butterfield Hall (C3)
 - Coddington Hall (B3)
 - Dorr Hall (C3)
 - Eddy Hall (C3)
 - Ellery Hall (C3)
 - Fayerweather Hall (C3)
 - Garray Hall (A3)
 - Gate House (D3)
 - Gorham Hall (C3)
 - Grandin IEP House (C6)
 - Heathman Hall (A3)
 - Hillside Hall (D4)
 - Hope Commons (B3)
 - Hopkins Hall (C3)
 - Hutchinson Hall (C4)
 - Merrrow Hall (B3)
 - Peck Hall (C3)
 - President's House (D5)

- Texas Instruments House (77) (C6)
- Tucker Hall (B3)
- University Gateway Apts. (E5)
- University Graduate Village Apts. (E2)
- Weldin Hall (D3)
- Wiley Hall (A3)
- ** Women's Center (E6)

Fraternities and Sororities

- * Alpha Delta Pi (E4)
- * Alpha Xi Delta (E3)
- * Chi Omega (E3)
- * Delta Phi Epsilon (E3)
- * Delta Zeta (E3)
- * Kappa Delta (D3)
- * Lambda Chi Alpha (E7)
- * Phi Gamma Delta (B4)
- * Phi Sigma Epsilon (E4)
- * Sigma Chi (E3)
- * Sigma Delta Tau (E3)
- * Sigma Kappa (E3)
- * Theta Chi (E3)
- * Zeta Beta Tau (E3)
- * Zeta Tau Alpha (E3)

Unless marked by an asterisk, buildings are fully accessible.

** Public space is accessible.

* Limited or no access.

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Directions and Parking

There are three parking lots we are recommending people who are attending the workshop to park: (1) the Robert J. Higgins Welcome Center Visitor Parking Lot, (2) the Tyler Hall Faculty Parking Lot, and (3) the Fine Arts Faculty Parking Lot.

Note, the University of Rhode Island scans license plates rather than supplying parking permits. Therefore, **you must register your car** at <https://uri.aimsparking.com/> before the workshop. For more information regarding parking at the University of Rhode Island please visit: <https://web.uri.edu/transportation/parking/visitors/>.

Robert J. Higgins Welcome Center Visitor Parking Lot

This lot is the closest lot for the first day of the workshop.

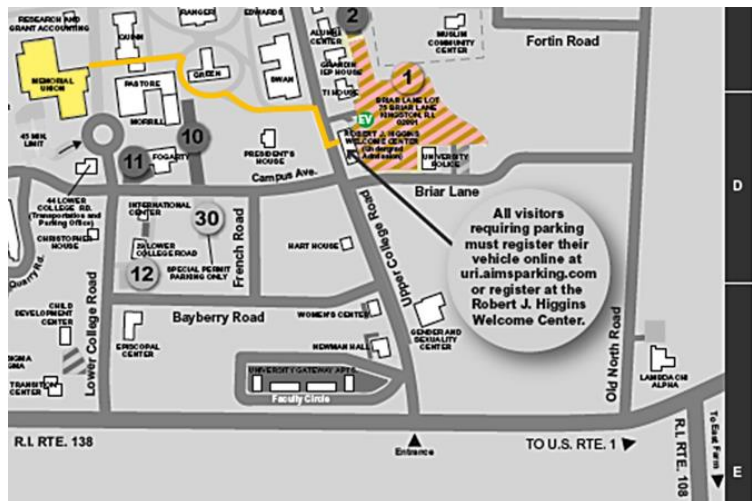
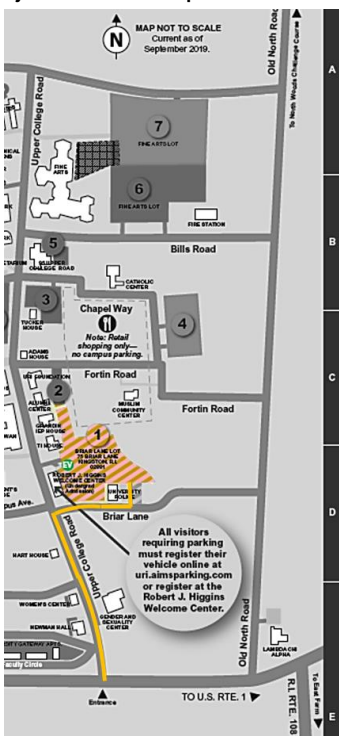
Driving Directions

Set your GPS to: 75 Briar Lane, Kingston, RI (Closest address to the Robert J. Higgins Welcome Center Parking Lot)

- Turn onto Upper College Road, the main entrance to URI.
- Turn right onto Briar Lane at the first intersection.
- Turn left into the parking lot just after the police station.

Walking Directions to the Memorial Union

- From the front of the Robert J. Higgins Welcome Center, cross Upper College Road.
- Turn right and head north on Upper College Road.
- Turn left on the walking path before Swan Hall.
- Follow the walking path around the back of Green Hall and then turn left on the walking path that goes past Pastore Hall.
- Cross Lower College Road and enter through the main entrance of the Memorial Union under the clock tower.
- The first day of the workshop will be hosted in the Memorial Union Ballroom (Room 227). Continue down the hallway and at the end of the hallway turn left. The ballroom is located on the right



You must register your car online at: uri.aimsparking.com prior to parking to prevent having it towed.

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Tyler Hall Faculty Parking Lot

This lot is the closest lot for the second day of the workshop.

Driving Directions

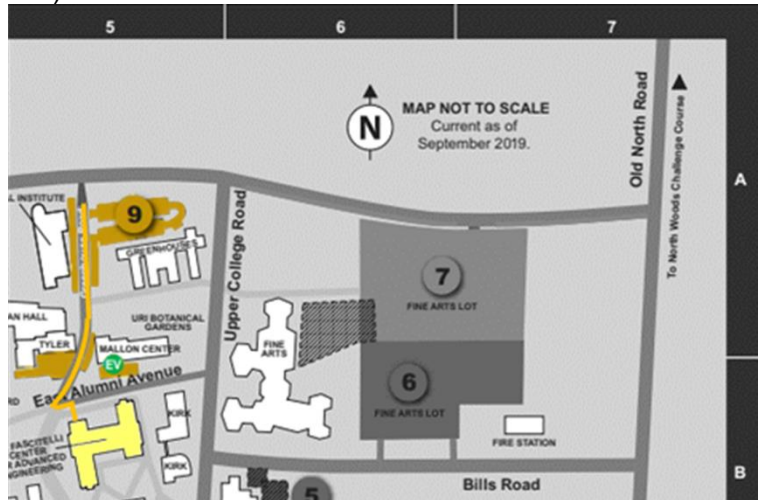
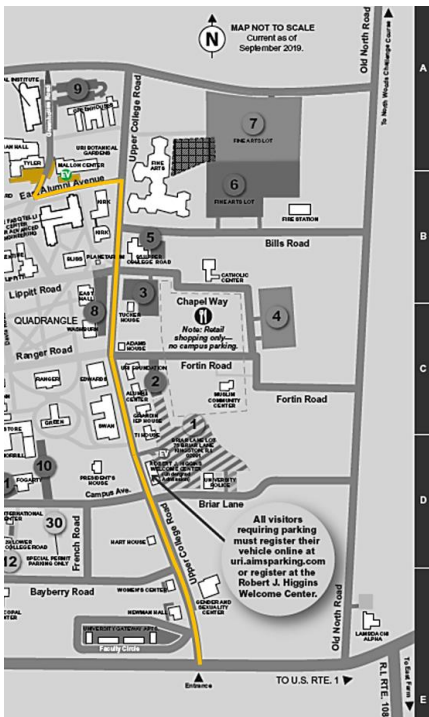
Set your GPS to: Tyler Hall

9 Greenhouse Road, Kingston, RI (Closest address to the Fine Arts Center)

- Turn onto Upper College Road, the main entrance to URI.
- Turn left onto East Alumni Avenue at the last intersection.
- Take the first right into the parking lot.
- From the Parking lot, you will see the back of the Fine Arts Center. Enter the building and continue straight through the next set of doors to get to the front of the building.

Walking Directions to the Fascitelli Center for Advanced Engineering

- From the parking lot head south and cross East Alumni Avenue
- Enter through the northwest entrance of the Fascitelli Center for Advanced Engineering
- Continue down the hallway to the rooms in the south west section of the building.
- The second day of the workshop will be hosted in the Fascitelli Center for Advanced Engineering Active Learning Rooms (Rooms 010 & 025).



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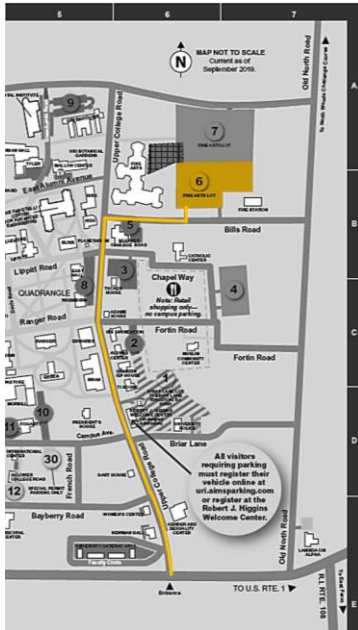
Fine Arts Faculty Parking Lot

This lot should be used as an overflow lot should parking fill up in the two lots described above for the recommended day since the other lots are closer to the buildings the workshop will take place.

Driving Directions

Set your GPS to: 35 Bills Road, Kingston, RI (Closest address to the Fine Arts Center)

- From Route 138, turn onto Upper College Road, the main entrance to URI.
- Turn right onto Bills Road just before the Fine Arts Building.
- Turn left into the parking lot just before the fire station.

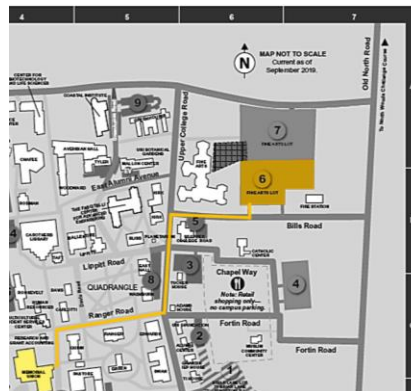


Walking Directions

Memorial Union

The first day of the workshop will be hosted in the Memorial Union Ballroom (Room 227).

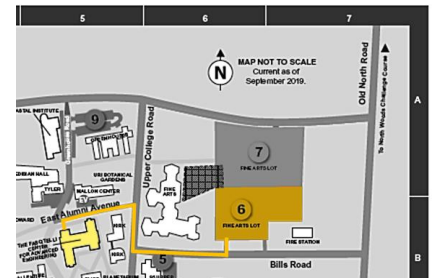
- Proceed to Upper College Road
- Cross Upper College Road
- Turn left and continue south down Upper College Road
- Turn right onto Ranger Road (the street between Edwards and Washburn Halls)
- The road will curve to the left and become Lower College Road.
- Cross Lower College Road and enter through the main entrance of the Memorial Union under the clock tower.
- At the end of the hallway turn left
- The ballroom is located on the right



The Fascitelli Center for Advanced Engineering

The second day of the event will be hosted in the Active Learning Classrooms in the Fascitelli Center for Advanced Engineering.

- Proceed to Upper College Road
- Cross Upper College Road
- Turn right and continue north on Upper College Road
- Turn left onto East Alumni Avenue
- Enter through the northwest entrance of the Fascitelli Center for Advanced Engineering
- Continue down the hallway to the rooms in the south west section of the building.



Travel Information

Airports

The closest airport to the University of Rhode Island is T.F. Green Airport being approximately a 30 minute drive from the University. However, Logan International Airport in Boston is approximately 2 hours away and may be able to provide more flexible or affordable flights.

Transportation

Though it is easy to get a ride sharing service (i.e. Lyft or Uber) from T.F. Green Airport, it is difficult to reliably find these services in South County. Therefore, it is highly advisable to get a rental car if possible.

If you choose to use a Taxi service, please be sure to book it in advance. Orange Cab is operated out of Newport but services South County. 1-401-841-0030

Accommodations

The following is a listing of nearby accommodations to the University of Rhode Island's Kingston campus, listed in order of proximity.

Each hotel has a limited number of rooms available at negotiated rates. When making your reservation, please mention the reference code.

Holiday Inn in South Kingstown

3009 Tower Hill Road

Saunderstown, RI 02874

Tel: 1-401-789-1051

Fax: 1-401-789-0080

Reference Code: UED

Rate: \$99 for October 17th and \$109 for October 18th and 19th

<https://www.holidayinn.com/redirect?path=hd&brandCode=HI&localeC>

[ode=en®ionCode=1&hotelCode=SKNRI&PMI](https://www.holidayinn.com/redirect?path=hd&brandCode=HI&localeC&ode=en®ionCode=1&hotelCode=SKNRI&PMI)

[D=99801505&GPC=UED&viewfullsite=true](https://www.holidayinn.com/redirect?path=hd&brandCode=HI&localeC&ode=en®ionCode=1&hotelCode=SKNRI&PMI)
Distance from campus: 3.9 mi

Hampton Inn in South Kingstown

20 Hotel Drive

South Kingstown, RI, 02879

Tel: 1-401-788-3500

Fax: 1-401-789-0080

Reference Code: ENG

Rate: \$139

<https://www.guestreservations.com/hampton-inn-south-kingstown-newport-area/booking>

Distance from campus: 6.8 mi

Dining and Attractions

Learn about local entertainment, restaurants, and events at: <https://www.southcountyri.com/>. Below is a list of a few recommended restaurants nearby.

South Kingstown

- Trattoria Romana
- Matunuck Oyster Bar
- Pasquale's Pizzeria Napoletana

Narragansett

- Coast Guard House
- Spain of Narragansett
- Trio

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Workshop Purposes and Goals

The electrical grid is arguably the most essential infrastructure in modern society since most critical sectors are inherently contingent on reliable supply of electricity. As the electrical grid becomes increasingly "smarter"—more integrated with control systems, communication technologies, and computer processing—it has also become more vulnerable to both cyber and physical threats. In addition to research and technology development to improve the security, resilience, and reliability of the grid, a strong and talented workforce can lessen vulnerabilities to such a critical infrastructure.

This two-day URI Cyber-Physical Systems Security Workshop on October 18 and 19, 2019 will foster communications and discussions among different communities from academia, industry, and government to discuss and outline the important opportunities and challenges in this critical field, ranging from fundamental research, technology innovation, and workforce and outreach development.

This Workshop includes the following two themes, with focused keynote presentations, panels, and break-out group discussions:

The theme of the first day (October 18, 2019) is “Smart Grid Security: Science and technology advancements and challenges”. It will provide a platform for industry and government to present the smart grid vulnerabilities they are facing and discuss the current approaches being taken to mitigate threats. Meanwhile, academia will be able to give industry and government insights into the new innovative and transformative research being done in order to influence technology transformation, adoption, and policy making.

The theme of the second day (October 19, 2019) is “Cyber-physical Systems Security: Education and workforce development”. It is well known that a strong and talented labor force can lessen vulnerabilities to critical infrastructure; however, there is a significant shortage of qualified professionals in the field of cyber-physical systems security. Therefore, the emphasis of the second day will be to facilitate in depth and engaging discussions between academia, industry, and government to develop strategies for tackling the workforce shortage. The hope is that participants will gain an understanding of what education and workforce training is available related to cyber-physical systems security and as a group identify what challenges still exist and what potential solutions could be implemented.

We really hope that our workshop has sparked your interest. For more information about the workshop or to register please visit our website at www.uri.edu/dura/2019workshop/

Workshop Agenda

Friday, October 18th, 2019

Memorial Union Ballroom, University of Rhode Island

Theme of Day 1:

Smart Grid Security: Science and Technology Advancements and Challenges

7:15 am to 8:00 am	Continental Breakfast
	Opening Ceremony <i>Master of Ceremonies: Haibo He, University of Rhode Island</i>
8:00 am to 8:30 am	<i>David M. Dooley, President, University of Rhode Island</i> <i>Peter J. Snyder, Vice President of Research and Economic Development, University of Rhode Island</i> <i>Raymond M. Wright, Dean, College of Engineering, University of Rhode Island</i>
8:30 am to 9:20 am	Keynote Address: Demystifying Smart Grid Cyber Security <i>Session Chair: Katharine Flynn, University of Rhode Island</i> <i>Mukund Ravipaty, Director, Enterprise Security Architecture, National Grid</i>
9:20 am to 10:10 am	Keynote Address: Resilient, Cyber-Physical Secure Electrical Systems for the Navy and Marine Corps <i>Session Chair: Haibo He, University of Rhode Island</i> <i>Michele Anderson, Office of Naval Research, Program Manager</i>
10:10 am to 10:30 am	Coffee Break
10:30 am to 12:00 pm	Panel 1: Smart Grid Security: Opportunities and Challenges <i>Moderator: Chee-Wooi Ten, Michigan Technological University</i> <i>George Baker, Harvard University and Co-Founder of VCharge</i> <i>Jianhui Wang, Southern Methodist University, Editor-in-Chief of IEEE Transactions on Smart Grid</i> <i>Masood Parvania, University of Utah, ONR DURA</i> <i>Michael Brawner, CONFORM C5I Systems Capability and Technology Team Lead, General Dynamics Electric Boat</i> <i>B. Joey Souza, Scientist, Naval Information Warfare Center PAC</i>
12:00 pm to 1:00 pm	Lunch
1:00 pm to 1:50 pm	Keynote Address: Resilience by Design: Perspectives on Grid Security from Alaska and the Arctic <i>Session Chair: Aranya Chakraborty, North Carolina State University</i> <i>Gwen Holdmann, Director of Alaska Center for the Energy and Power</i>
1:50 pm to 2:40 pm	Keynote Address: Cyber-Physical System Security of the Power Grid <i>Session Chair: Lei Wu, Stevens Institute of Technology</i> <i>Chen-Ching Liu, Director of Power and Energy Center, Virginia Tech</i>
2:40 pm to 3:00 pm	Coffee Break
3:00 pm to 5:00 pm	Poster and Networking Session
5:00 pm to 7:00 pm	Banquet <i>Fascitelli Center for Advanced Engineering, University of Rhode Island</i>

Workshop Agenda

Saturday, October 19th, 2019

Fascitelli Center for Advanced Engineering, University of Rhode Island

Theme of Day 2:

Cyber-Physical Systems Security: Education and Workforce Development

7:30 am to 8:30 am	Continental Breakfast
8:30 am to 9:20 am	Keynote Address: National Institute for Undersea Vehicle Technology: Focus Areas and Workforce Development <i>Session Chair: Yan (Lindsay) Sun, University of Rhode Island</i> <i>Erik Brine, Executive Director, National Institute for Undersea Vehicle Technologies</i> <i>Arun Shukla, Co-Director, National Institute for Undersea Vehicle Technologies</i>
9:20 am to 10:10 am	Keynote Address: Workforce and Economic Development Initiatives within the Defense Cluster <i>Session Chair: Dave Kring, Senior VP of Science and Technology, Navatek LLC.</i> <i>Molly Donohue Magee, Executive Director, Southeastern New England Defense Industry Alliance (SENEDIA)/Maritime Cybersecurity Center/Undersea Technology Innovation Consortium</i>
10:10 am to 10:30 am	Coffee Break
10:30 am to 12:00 pm	Panel 2: Building a Workforce for Cyber-Physical Systems Security <i>Moderator: Erik Brine, Executive Director, National Institute for Undersea Vehicle Technologies</i> <i>Jessica Mayernik, RI Department of Labor & Training - Real Jobs RI</i> <i>CDR Joseph Benin, U.S. Coast Guard Academy</i> <i>Julian L. Alssid, Vice President of Workforce Partnerships, Community College of Rhode Island</i> <i>Nathan Johnson, Arizona State University, ONR DURA</i> <i>Stephanie Murphy, Navatek LLC. and University of Rhode Island, ONR DURA</i>
12:00 pm to 1:00 pm	Lunch
1:00 pm to 1:30 pm	Keynote Address: Education and Workforce Development in Cyber-Physical Security for Autonomous Systems: Perspective from a Naval Research Company <i>Session Chair: Tao Wei, ONR YIP, University of Rhode Island</i> <i>Dave Kring, Senior VP of Science and Technology, Navatek LLC.</i>
1:30 pm to 2:20 pm	Keynote Address: Including Physical Systems into Cyber Security Education <i>Session Chair: Stephanie Murphy, Navatek LLC. and University of Rhode Island, ONR DURA</i> <i>Anthony R. Shaw Jr., Scientist, Naval Information Warfare Center PAC</i>
2:20 pm to 2:40 pm	Coffee Break
2:40 pm to 4:00 pm	Breakout Session Group 1: Research innovation <i>Moderator: Chen-Ching Liu, Director of Power and Energy Center, Virginia Tech</i> Group 2: Technology advancement & adoption <i>Moderator: Dave Kring, Senior VP of Science and Technology, Navatek LLC.</i> Group 3: Workforce and education <i>Moderator: Nathan Johnson, Arizona State University, ONR DURA</i>
4:00 pm to 4:30 pm	Breakout Session Reports
4:30 pm to 4:45 pm	Closing Remarks

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