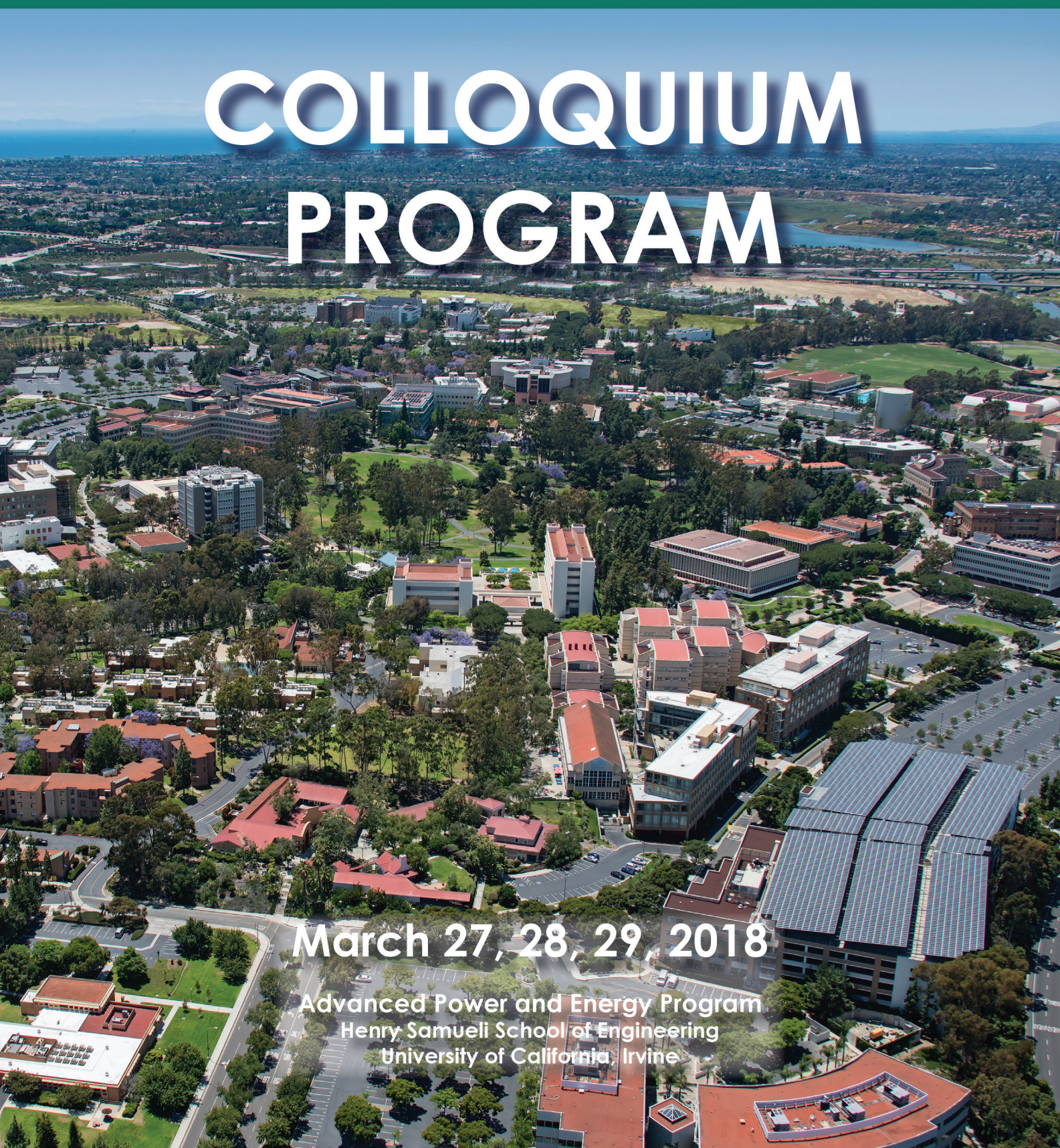
ICEPAG 2018 | MICROGRID Global Summit

COLLOQUIUM PROGRAM



March 27, 28, 29, 2018

Advanced Power and Energy Program
Henry Samueli School of Engineering
University of California, Irvine

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WELCOME
ICEPAG 2018: MICROGRID GLOBAL SUMMIT

The "Microgrid Global Summit" is one of two pillars in the ICEPAG (International Colloquium on Environmentally Preferred Advanced Generation) smart, clean-energy colloquium series. Presented by the Advanced Power and Energy Program (APEP) at UC Irvine, ICEPAG alternates each year between two clean energy topics: **Microgrids** and **Grid Evolution**.

ICEPAG 2018: Microgrid Global Summit
The Summit has broad support within the U.S. Department of Energy (DOE), the California Energy Commission (CEC), and the South Coast Air Quality Management District (AQMD) and is a gathering of global energy professionals focused on the business and technology issues of:

- Existing Microgrids
- Emerging Microgrids
- Microgrid Control
- Powering Microgrids
- Microgrid Commercialization

The Summit brings together experts from Industry, Government, and Academia to examine issues and share critical, cutting edge information on the escalating deployments of Microgrids that are securing energy reliability, quality, and accessibility.

APEP continues to expand its cutting-edge research which is solidly focused at the forefront of advanced energy devices and systems. The connection of our research to practical application, a commitment that we entitle "Bridging," is at the core of who we are and what we do. Through our strategic alliances and close collaboration with industry, national and international agencies, and laboratories, this commitment enables us to reach new research heights.

APEP continues to partner with the University Administration in the evolution of the UCI Microgrid as a major field laboratory. The UCI Microgrid includes the most noteable energy efficiency initiatives in the country, the broadest array of advanced energy and transportation technologies, and the latest in diagnostics and computer simulation resources. Key partners are **Southern California Edison (SCE)**, **SoCalGas**, **Toyota**, the **California Public Utilities Commission**, the **California Energy Commission**, the **U.S. Department of Energy**, the **Air Quality Management District**, **Schweitzer Engineering Laboratories (SEL)**, and **Solar Turbines**.

In one of our newest efforts, with funding from the U.S. Department of Energy, APEP in collaboration with Southern California Edison and project partners **ETAP**, **MelRok** and UC Irvine Facilities Management, developed and received IEEE approval of the functional specifications for an industry-first Generic Microgrid Controller (GMC). The specifications developed by APEP and its partners were applied to the UCI Microgrid architecture, and the controller was developed and tested on the **OPAL-RT** platform where a detailed model of the UCI Microgrid was simulated.

Our first-in-the-U.S. Power-to-Gas (P2G) demonstration project continues to operate at the UC Irvine central plant as we study the impacts of renewable hydrogen generation sourced from an on-site electrolyzer driven by otherwise curtailed campus solar generated electricity. Smart integration of P2G with direct injection of renewable hydrogen gas into the natural gas infrastructure can provide a massive energy storage buffer that can manage and better utilize high levels of intermittent renewable power. The renewable hydrogen can also be directly dispensed into Fuel Cell Electric Vehicles as a carbon-free fuel.

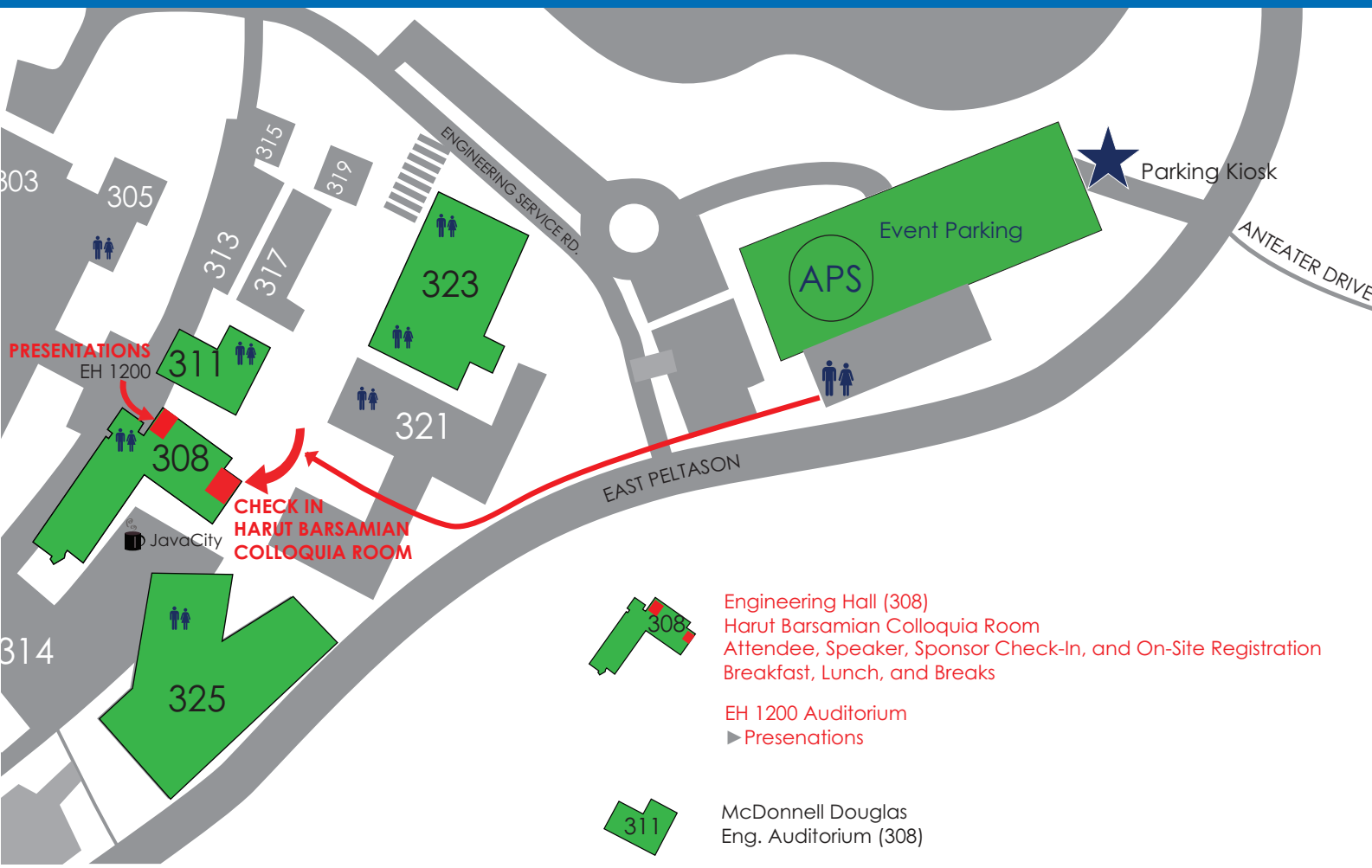
During the day one and day two receptions, a tour is scheduled to showcase the significant elements of the APEP facilities, UCI Microgrid, and the P2G project. We hope that the tours will fit your schedule.

In summary, we are indebted to our long-standing relationships that contribute in so many ways to the Summit, our real world research and demonstration projects, and our students.

We thank you for attending, and for your support and contributions to the Summit.

Scott Samuelsen
Program Chair

UC Irvine | Henry Samueli Engineering Complex



308 — Engineering Hall (308)
Harut Barsamian Colloquia Room
Attendee, Speaker, Sponsor Check-In, and On-Site Registration
Breakfast, Lunch, and Breaks

EH 1200 Auditorium
▶Presenations

311 — McDonnell Douglas
Eng. Auditorium (308)

325 — Calit2 (325)

323 — Advanced Power and Energy Program (APEP)
Engineering Laboratory Facility (ELF Bldg 323)
▶Network Receptions

APS — Anteater Parking Structure (APS)
(Engineering Parking Structure)

Restrooms JavaCity

UBER / LYFT / TAXI

If you are using Uber, Lyft or taxi service, let your driver know you would like to end your trip at East Peltason and Engineering Service Road or the Anteater Parking Structure.

Program Day 1: Tuesday, March 27, 2018

8:30 – 9:00 am **WELCOME AND OPENING**
Scott Samuelsen, UCI Advanced Power and Energy Program (APEP)

EXISTING AND EMERGING MICROGRIDS

Moderator: Scott Samuelsen

9:00 – 10:00 am **COMMUNITY MICROGRIDS**

Swarthmore College Microgrid
Sierra Spencer, Swarthmore College

UCI Microgrid
Brendan Shaffer, UCI APEP

Advanced Energy Community Microgrid
Jack Brouwer, UCI APEP

10:00 – 10:30 am **NETWORKING BREAK**

10:30 – 11:30 am **AGRICULTURAL MICROGRIDS**

Butler Farms Microgrid
Lee Ragsdale, North Carolina Electric Membership Cooperation

Stone Edge Microgrid
Craig Wooster, Wooster Energy Engineering Specialties

Bubolz Nature Center Microgrid
Terry Bickham, Faith Technologies

11:30 – 12:10 pm **MILITARY MICROGRIDS**

Joint Base Microgrid
Mohammad Nikkhah Mojdehi, O'Brien & Gere

Point Hueneme Microgrid
Dan Cohee, PDE Total Energy Solutions

12:10 – 1:20 pm **LUNCH**

Program Day 1: Continued

EXISTING AND EMERGING MICROGRIDS

Moderator: Jack Brouwer

1:20 – 2:00 pm **RURAL MICROGRIDS**

Puertecitos Microgrid
Pedro Rosales, Universidad Autónoma de Baja California

Ocracoke Island Microgrid
Lee Ragsdale, North Carolina Electric Membership Cooperation

2:00 – 3:00 pm **MICROGRID DESIGN AND UTILIZATION**

Education: Bubolz Nature Center Microgrid
Caramy Reisenauer, Faith Technologies

Islanding: Stone Edge Microgrid
Jorge Elizondo, Stone Edge Farm/Heila

Islanding: UCI Microgrid
Scott Lee, UCI APEP

3:00 – 3:30 pm **NETWORKING BREAK**

3:30 – 4:50 pm Nanogrid Energy Management
Michel Kamel, MelRok

Fuel Cell Supported Microgrids
Pere Margalef, FuelCell Energy

Insights from Real-Time Simulation
Jean-Philippe Berard, OPAL-RT

A Microgrid Design Tool
Moshen Jafari, Rutgers University

4:50 pm **INTERNATIONAL COLLABORATION**

MOU Ratification
Director and Professor Tomasz Galka
Poland Institute of Power Engineering

Director and Professor Scott Samuelsen
UCI Advanced Power and Energy Program

5:00 pm **DAY 1 SESSIONS END**
EVENING RECEPTION: OPTION TO TOUR UCI MICROGRID AND APEP LABORATORIES

Program Day 2: Wednesday, March 28, 2018

8:30 – 9:20 am **KEYNOTE ADDRESS**
Role of Microgrids in the Regulatory Space
Wayne Nastri, Executive Officer, South Coast Air Quality Management District

POWERING MICROGRIDS

Moderator: Scott Samuelsen

9:20 – 10:00 am **CLEAN, FIRM (24/7, LOAD-FOLLOWING) POWER**

Solid Oxide Fuel Cell Technology
Preeti Pande, Bloom Energy

Molten Carbonate Fuel Cell Technology
Tony Leo, FuelCell Energy

10:00 – 10:30 am **NETWORKING BREAK**

10:30 – 10:50 am **NATURAL GAS AND CHP**

CHP/Natural Gas in Microgrids
Adam Forni, Navigant

10:50 – 11:50 am **SUPPORTING DER (ELECTRIC, THERMAL, AND HYDROGEN BATTERIES)**

Reversible SOFC/SOEC Systems to Complement Solar and Wind
Jakub Kupecki, Institute of Power Engineering, Warsaw

Battery Electric Storage
Phil Fischer, NEC Energy

Thermal Energy Storage
Matt Gudorf, UCI

11:50 – 1:00 pm **LUNCH**

1:00 – 1:40 pm **SUPPORTING DER (ELECTRIC, THERMAL, AND HYDROGEN BATTERIES)**

Power-to-Gas for Microgrids
Paolo Colbertaldo, Polytechnical University of Milan

Power-to-Gas Energy Storage by Reversible SOFC
Tianyu Cao, Tsinghua University, Beijing

Program Day 2: Continued

MICROGRID CONTROL

Moderator: Jack Brouwer

1:40 – 2:00 pm **MICROGRID CONTROLLER STANDARD**

IEEE 2030.7 Microgrid Controller
Russ Neal, APEP

2:00 – 3:00 pm **APPLICATIONS AND CHALLENGES**

Integrating Electrical Controls for Microgrids
Jim Cushman, Emerson Automation Solutions

National Renewable Laboratory Microgrid Controller Shootout
Scott Manson, Schweitzer Engineering Laboratories, Inc.

Model-Driven Microgrid Control and Operation using Predictive Simulation
Tanuj Khandelwal, ETAP

3:00 – 3:30 pm **NETWORKING BREAK**

3:30 – 4:10 pm Bubolz Nature Center Microgrid Controller
John Ahrens, Schneider Electric

Practical Implementation of Microgrid Control, Protection and Communication Systems
Scott Manson, Schweitzer Engineering Laboratories, Inc.

4:10 – 4:50 pm **UTILITY DMS MICROGRID CONTROL**

System Operator Perspective
Lorenzo Kristov, Electric System Policy, Structure, and Market Design

Utility Perspective
Percy Haralson, Southern California Edison

4:50 pm **DAY 2 SESSIONS END**

5:00 pm **EVENING RECEPTION: OPTION TO TOUR UCI MICROGRID AND APEP LABORATORIES**

Program Day 3: Thursday, March 29, 2018

MICROGRID COMMERCIALIZATION

Moderator: Jeff Reed

8:30 – 10:00 am **MICROGRID ECONOMICS, SECURITY, AND RESILENCY**

California Lessons
Lori Schell, Empowered Energy

Microgrid Markets
Ghazal Razeghi, UCI APEP

Microgrid Security and Resiliency
Paul Myer, Veracity Industrial Networks

Microgrid Dispatch Economics
Robert Flores, UCI APEP

10:00 – 10:30 am **NETWORKING BREAK**

10:30 – 12:00 pm **STATE INITIATIVES**
RECENT $124M MICROGRID COMMERCIALIZATION AWARDEES

Overview of CEC Recent $45M Microgrid Solicitation Results
Mike Gravely, California Energy Commission

Overview of the Port of Long Beach JCCC Microgrid
Christine Houston, California Energy Commission Awardee

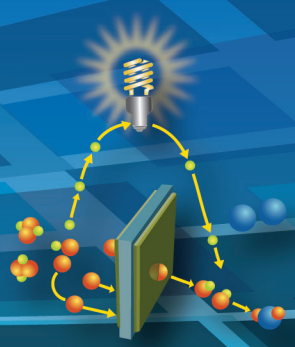
Overview of the Miramar MCAS Microgrid
Byron Washom, California Energy Commission Awardee

Overview of the U.S. Army Parks and Reserve Forces Training Area (PRFTA) Microgrid
Doug Black, California Energy Commission Awardee

12:00 pm **SUMMIT CLOSURE**

NATIONAL FUEL CELL SYMPOSIUM 2018

The Future is Here, Indeed! | Sacramento, CA



JOIN US AT THE

NATIONAL FUEL CELL SYMPOSIUM

Wednesday, June 27, 2018

8:30 am – 5:00 pm

Location: California Museum, 1020 O Street, Sacramento, CA 95814

This one day symposium will convene industry, government, and academia to discuss the current state of Stationary Fuel Cell development and deployment in the U. S. Presentation topics include:

Who should attend?

Those involved in or associated with the generation, transmission, and utilization of electricity, and/or the electrification of the transportation sector.

- State of the Art in Fuel Cell Technology
- The Rapidly Developing Fuel Cell Market
- Business Cases for Fuel Cell Installations
- California, U.S., and International Perspectives

Special Pre-Symposium Workshop: "Fuel Cells 101"

Tuesday, June 26, 2018

1:00 pm – 5:00 pm

Location: California Museum, 1020 O Street, Sacramento, CA 95814

This short course is presented by The Fuel Cell Technology Institute (FCTI), the educational outreach program of the National Fuel Cell Research Center. The workshop will address the basics of fuel cell technology, the spectrum of fuel cell types, stationary and mobile fuel cell markets, and the role of fuel cell technology in complementing and managing a high-penetration of intermittent renewable wind and solar power into the grid.

NATIONAL FUEL CELL RESEARCH CENTER
UNIVERSITY OF CALIFORNIA • IRVINE

General and Registration Questions

William Gary, Associate Manager of Outreach
National Fuel Cell Research Center, UCI
Tel: 949.824.1999 ext. 11131 | Email: wmg@nfcrc.uci.edu

CaSFCC

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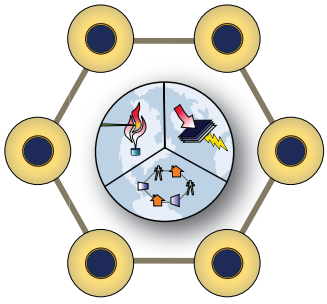

ADVANCED POWER
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