

## Energy Conversion and Conservation Division (ECCD)

### *Fall 2019 Newsletter*

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#### Message from the Division Chair

Dear ECCD Members,

I hope you had a good start of the academic year, fall activities, and projects. As we all know, energy engineering education & research topics are an important part of activities in any organization and institutions of higher learning. Many universities now offer energy education programs and faculty members are doing basic/applied research projects in renewable energy, Smart Grid, and cyber physical systems. We are very happy that the Nuclear Engineering Division joined the ECCD recently. In my own institution, we have four engineering programs including nuclear engineering. We work closely with Idaho National Lab (INL) and its Center for Advanced Energy Studies (CAES), where researchers from state universities collaborate with INL scientists and engineers.

Dr. Siamak Farhad is the Division's Program Chair for the 2020 ASEE Annual Conference June 20-24 in Montréal, Québec, Canada. He is putting together an excellent program including technical sessions, panels, distinguished lecture, tour, and dinner. We

have panel sessions discussing renewable energy systems, bioenergy, sustainability, green entrepreneurship in STEM curricula, energy innovation, and environmental impact as well as recent topics in energy education and research. I will again moderate a session on the latest research and pedagogy in energy conversion and conservation. Panel members have included representatives from universities, government and industry. A tentative list of panel members in my session for the 2020 annual conference includes: Charles Alexander, Cleveland State University, Howard Rockman, Chicago patent attorney, Dagmar Niebur, Drexel University, Aaron St. Leger, West Point, Barry Ganapol, University of Arizona, Herbert Hess, University of Idaho, and Timothy J. O'Regan, Electrical Materials Company.

We are excited to be back in Canada and I hope we will see you in Montreal next June!

Sincerely,  
Hossein Mousavinezhad, Idaho State  
University  
2019-2020 ECC Division Chair

## 2019 – 2020 Division Officers

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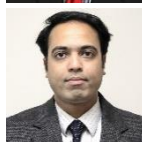
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## 2020 Conference Call for Papers

The Energy Conversion and Conservation Division (ECCD) invites papers for the 127th ASEE Annual Conference and Exposition to be held **June 21-24, 2020** in **Montreal, Quebec, Canada**. The division is multi-disciplinary and is honored to share innovative pedagogy related to all forms of energy generation, distribution, use, and conservation with the engineering education community. Authors should consider submitting technical papers for oral or poster presentations, as well as recommendations for Workshops, Special Panels, Outreach Events, and Service Projects. The topics of interest are

- Innovative Research and its dissemination into grades P-20
- Innovative teaching and learning strategies
- Research methods to assess teaching and learning strategies
- Curriculum content innovation
- Hands-on Projects for grades P-20
- Novel experiments and use of laboratory equipment and their impact on learning
- Integrating research and engineering education
- Impact of problem-based learning, collaborative learning, cooperative learning, discovery learning and inverted learning
- Outreach programs that involve the energy conversion and conservation industry
- Renewable Energy Sources
- Manufacturing – all processes including 3D printing
- Energy conversion technologies
- Energy storage technologies
- Engineering for sustainability and emissions reductions
- Worldwide energy supply/demand issues
- Electrical distribution and power systems
- Industrial and commercial scale energy conversion and conservation
- Discipline-specific engineering research relating to energy conversion and conservation (electrical, mechanical, nuclear, chemical, aerospace, civil, computer, textile, petroleum, biological, agricultural, natural resources, etc.)
- Role of engineers in the formulation and enforcement of public policy related to energy at all levels.
- Research Experiences for Undergraduates (REU) projects related to energy conversion or conservation.

## Division Announcements

- The ECCD Call for Papers for the 2020 ASEE Conference and Exposition has been released. For more information and to view the paper guidelines, please visit the Call for Papers webpage, [available here](#).
- Please join the ECCD LinkedIn group for all of the latest information! The URL for this group is: <https://www.linkedin.com/groups/12134751>

The 2020 ASEE Annual Conference and Exposition Author's Kit can be found on [this webpage](#). Authors should submit an abstract of 300 words or less on their paper topic. All ASEE papers are published to present. Panels must also submit an abstract and may submit a full paper. Papers accepted for publication in the Proceedings must be presented by at least one registered conference participant in a designated technical session or poster session. ECCD will not accept work-in-progress (WIP) papers or papers that overlap significantly in content that has been (or will be) published elsewhere. The abstract submission period opens September 3<sup>rd</sup>, 2019 and will close on October 14<sup>th</sup>, 2019.

## Highlights from the 2019 Conference

At the 2019 ASEE Annual Conference and Exposition in Tampa, FL, the Energy Conversion & Conversation Division had 25 papers presented, two posters presented, six technical sessions, three discussion panels, one distinguished lecture, one technical tour (at the Florida Aquarium), one social event (dinner at The Sail Restaurant), and one business event (Energy Conversion and Conservation Division Business Meeting).

## ECCD 2019 Papers Presented, Posters & Panels

### [Papers: U416 Technical Session](#)

Moderators: Dr. Lynn Albers and Dr. Patrick Tebbe P.E.

1. Adding the Concept of Improving Product Value to a Design Project in a Course on Internal Combustion Engines; Dr. John R. Reisel (University of Wisconsin, Milwaukee)
2. Integrating Geothermal Energy Education to an Engineering Technology Curriculum; Dr. Reg Pecan (Sam Houston State University), Dr. Faruk Yildiz (Sam Houston State University), and Dr. Ulan Dakeev (Texas A&M University, Kingsville)
3. Pipeline Development of Skilled Students in Advanced Control Systems; Dr. Ahmed Cherif Megri (North Carolina A&T State University) and Dr. Sameer Hamoush P.E. (North Carolina A&T State University)
4. Undergraduate Students' Research on Energy Saving in Industrial Robots: Effect of Regular and Irregular Meetings on Deductive Research; Dr. Siamak Farhad (University of Akron), Mr. Daniel E. Kandray Sr. (University of Akron), and Dr. Maryam Younessi Sinaki (Cleveland State University)

### [Panel: U545 Energy Innovation and Environmental Impact](#)

Moderator: Dr. Bala Maheswaran

Speakers:

- Dr. Tooran Emami, U.S. Coast Guard Academy
- Dr. Veera Ganeswar Gude P.E., Mississippi State University
- Dr. Bala Maheswaran, Northeastern University
- Mr. Paul Dykshoorn Dykshoorn, Kent State University at Tuscarawas
- Dr. Ramanitharan Kandiah P.E., Central State University

### [Papers: M316 Technical Session](#)

Moderators: Dr. Herbert L. Hess P.E. and Dr. Reg Recayi Pecan

1. Improving Students' Understanding of Electromagnetic Principles with an Alternator Design-Build-Test Project; Dr. Matthew R. Aldeman (Illinois State University)
2. Conversion of a Prime Mover: One-third Scale Model-T from Gasoline to Electric Power; Dr. John M. Mativo (University of Georgia), Daniel Plant (University of Georgia), and Mr. Daniel Ethan Wallon (University of Georgia)
3. Teaching Power Transformer Testing to Undergraduates; Dr. Glenn T. Wrate P.E. (Northern Michigan University)
4. Extended Summer Research to Senior Design Project; Dr. Jinmyun Jo (Virginia State University), Xiaoyu Zhang (Old Dominion University), Dr. Ali A. Ansari (Virginia State University), Dr. Pamela Leigh-Mack (Virginia State University), and Dr. James Irvin Cooke Jr. (Virginia State University)
5. Project Based Learning Program for Nuclear Workforce Development Phase I: Outreach, Recruiting, and Selection; Dr. Hayrettin Bora Karayaka (Western Carolina University), Dr. Amber C. Thompson (Western Carolina University), and Dr. Chip W. Ferguson (Western Carolina University)

### [Papers: M416 Technical Session](#)

Moderators: Dr. Robert J. Kerestes and Dr. Teodora Rutar Shuman

1. Autonomous PV Systems for Developing Countries: Assessing Student Learning of Experiential Study Abroad Programs; Dr. Jeremy C. Ferrell (Appalachian State University) and Brent Jason Summerville P.E. (Appalachian State University)
2. Development of Low-cost Remote Online Laboratory for Photovoltaic Cell and Module Characterization; Dr. Sandip Das (Kennesaw State University)

3. Using Recycled Photovoltaic Modules and Batteries for Engineering Education, Student Projects, and as Viable Portable, Backup Storage Power Sources; Dr. Robert W. Fletcher (Lawrence Technological University) and Naim R. Shandi (Lawrence Technological University)
4. Managing a Multi-Institution Block Grant for Renewable Electricity Research; Dr. Patrick A. Tebbe (Minnesota State University, Mankato) and Mr. Bruce Allen Peterson (Minnesota State Energy Center of Excellence)

#### Papers: M516 Technical Session

Moderators: Dr. Glenn T. Wrate and Dr. Sandip Das

1. Simulation for Energy Savings in AC Systems Equipped with Shaded Condensing Units; Dr. Maher Shehadi (Purdue Polytechnic Institute)
2. A Highly Practical and Affordable Microgrid Design Project for Developing Rural Communities: Case Study in Ghana; Dr. Hossein Salehfar (University of North Dakota) and Michael Klein (University of North Dakota)
3. Using Campus Energy System Data to Save Energy and Provide Students with Real-world Learning Experiences; Dr. Jennifer Lynn Wade (Northern Arizona University), Dr. Karin E. Wadsack (Northern Arizona University School of Earth & Sustainability), Dr. Benjamin L. Ruddell (Northern Arizona University), and Dr. Brent A. Nelson (Northern Arizona University)
4. Virtual Instrumentation for Study of a Fluid Power System; Dr. Alamgir A. Choudhury (Western Michigan University), Dr. Jorge Rodriguez P.E. (Western Michigan University), and Awilma Paola Ventura Lugo (Western Michigan University)

#### Papers: T116 Technical Session

Moderators: Madhumi Mitra Ph.D and Dr. Siamak Farhad

1. Student Energy Audits of Buildings Can Be Done!; Dr. Victoria A. Scala (United States Military Academy) and Dr. James Ledlie Klosky P.E. (United States Military Academy)
2. Photovoltaic System Performance Under Partial Shading: An Undergraduate Research Experience; Xichen Jiang (Western Washington University), Ms. Jill Davishahl (Western Washington University), Mr. Dana Hickenbottom (Western Washington University), Daniel Saunders (Western Washington University), and Mr. Troy Thornton (Western Washington University)
3. Visualizing Power-Quality Phenomena in a Hands-On Electric Power Systems Laboratory; Mr. Thomas Vernon Cook (University of Pittsburgh), Dr. Robert

- J. Kerestes (University of Pittsburgh), and Prof. Brandon M. Grainger (University of Pittsburgh)
4. A First-Year Power Plant Design Project; Dr. Benjamin Emery Mertz (Rose-Hulman Institute of Technology)

#### Posters: T316 Poster Session

1. Project-based Teaching Approach of a Combined Undergraduate and Graduate Course in Power Electronics; Dr. Radian G. Belu (Southern University and A&M College)
2. Development and Implementation of a Non-Intrusive Load Monitoring Algorithm; Dr. Robert J. Kerestes (University of Pittsburgh), Mr. Dekwuan Stokes (University of Pittsburgh), Ryan M. Brody (University of Pittsburgh), Adam Emes (University of Pittsburgh), and Mr. Alexander Williams (University of Pittsburgh)

#### Panel: W116 The Latest Research and Pedagogy in Energy Conversion and Conservation

Moderators: Dr. S. Hossein Mousavinezhad P.E. and Dr. Chengying Xu

Speakers:

- Charles K. Alexander; Cleveland State University
- Dr. Herbert L. Hess P.E.; University of Idaho, Moscow
- Dr. Dagmar Niebur; Drexel University (Eng. & Eng. Tech.)
- Dr. Howard Rockman; University of Illinois at Chicago
- Dr. Aaron St. Leger; U.S. Military Academy

#### Distinguished Lecture: W216 Can Combating Climate Change Result in Renaissance of Electric Power Engineering?

Speaker:

- Prof. Ned Mohan; University of Minnesota, Twin Cities

#### Panel: W316 Bioenergy, Sustainability, and Green Entrepreneurship in STEM Curricula

Moderators: Dr. Madhumi Mitra and Dr. Abhijit Nagchaudhuri

Speakers:

- Dr. Serpil Guran; Director, Rutgers EcoComplex "Clean Energy Innovation Center"
- Dr. Lynn A. Albers; Hofstra University
- Dr. Ted Song; John Brown University



### Papers: W416 Technical Session

Moderators: Dr. Abhijit Nagchaudhuri and Dr. S. Hossein Mousavinezhad P.E.

1. A Smart Grid Implementation for an Engineering Technology Curriculum; Dr. Reg Pecen (Sam Houston State University) and Dr. Faruk Yildiz (Sam Houston State University)
2. Delivery of a Revamped Course on Electric Power Distribution Engineering and Smart Grids; Dr. Robert J. Kerestes (University of Pittsburgh), Dr. Paul A. Dolloff PE (University of Kentucky), and Dr. Renee M. Clark (University of Pittsburgh)
3. Impact of Electric Vehicles on Residential Power Grid: An Educational Review; Mitch J. Campion (University of North Dakota), Dr. Hossein Salehfar (University of North Dakota), and Prof. Prakash Ranganathan (University of North Dakota)
4. Student-Led Study of Energy Flow and Storage in an Emergency Microgrid; Dr. Herbert L. Hess (University of Idaho, Moscow)

### Best Papers Awards

Congratulations to all of the Best Paper Award Winners!

**1st Place & Best Paper:** Benjamin Emery Mertz (Rose-Hulman Institute of Technology); "A First-Year Power Plant Design Project."

**2nd Best Paper:** Thomas Vernon Cook, Robert J. Kerestes, and Brandon M. Grainger (all authors from University of Pittsburgh); "Visualizing Power-Quality Phenomena in a Hands-On Electric Power Systems Laboratory."

**3rd Best Paper:** Xichen Jiang, Jill Davishahl, Dana Hickenbottom, Daniel Saunders, and Troy Thornton (all authors from Western Washington University); "Photovoltaic System Performance under Partial Shading: An Undergraduate Research Experience."

### Photos of Social Events, Panels and Business Meeting



Left to Right: Dr. Herbert Hess, Dr. Hossein Mousavinezhad, Dr. Lynn Albers



Left to Right: Dr. Lynn Albers, Dr. Reg Pecen, Dr. Herbert Hess, Dr. Patrick Tebbe, Dr. Siamak Farhad



Left to Right: Dr. Aaron St. Leger, Dr. Dagmar Niebur, Dr. Charles Alexander, Dr. Hossein Mousavinezhad, Dr. Herbert Hess

Website: <http://eccd.asee.org>



ECCD Business Meeting, Tampa, Florida



ECCD Business Meeting, Tampa, Florida



Dr. Lynn Albers at the Division Social Gathering:  
Florida Aquarium Dolphin Tour