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## Conference at a Glance

### Wednesday, October 21
- 11:00 AM - 8:00 PM: Registration Open
- 1:00 PM - 4:00 PM: Workshop Session 1
- 5:00 PM - 9:00 PM: Workshop Session 2

### Thursday, October 22
- 8:00 AM - 6:00 PM: Registration Open
- 8:00 AM - 9:00 AM: Focus on New Attendees Breakfast *(included in conference registration)*
- 9:00 AM - 10:30 AM: Plenary Session
- 10:30 AM - 6:00 PM: Exhibit Hall Open
- 10:30 AM - 11:00 AM: Exhibit Hall Break
- 11:00 AM - 12:30 PM: Technical Sessions (T1)
- 12:45 PM - 2:15 PM: HP Terman and Rigas Awards Lunch *(included in conference registration)*
- 2:30 PM - 4:00 PM: Technical Sessions (T2)
- 4:00 PM - 4:30 PM: Exhibit Hall Break
- 4:30 PM - 6:00 PM: Technical Session (T3)
- 7:00 PM - 10:00 PM: Reception *(included in conference registration)*

### Friday, October 23
- 8:00 AM - 6:00 PM: Registration Open
- 8:00 AM - 9:00 AM: Breakfast *(included in conference registration)*
- 9:00 AM - 10:30 AM: Technical Sessions (F1)
- 10:00 AM - 5:30 PM: Exhibit Hall Open
- 10:30 AM - 11:00 AM: Exhibit Hall Break
- 11:00 AM - 12:30 PM: Technical Sessions (F2)
- 12:45 PM - 2:15 PM: Lunch *(included in conference registration)*
- 2:30 PM - 4:00 PM: Technical Sessions (F3)
- 4:00 PM - 5:00 PM: Focus on Exhibits and New Faculty Fellows
- 5:00 PM - 6:30 PM: Technical Sessions (F4)
- 7:30 PM - 10:00 PM: Reception and Awards Banquet *(additional ticket required)*

### Saturday, October 24
- 8:00 AM - 5:00 PM: Registration Open
- 8:00 AM - 9:00 AM: Breakfast *(included in conference registration)*
- 9:00 AM - 10:30 AM: Technical Sessions (S1)
- 10:30 AM - 11:00 AM: Break
- 11:00 AM - 12:30 PM: Technical Sessions (S2)
- 12:45 PM - 2:15 PM: Lunch *(included in conference registration)*
- 2:30 PM - 4:00 PM: Technical Sessions (S3)
- 4:00 PM - 4:30 PM: Break
- 4:30 PM - 6:00 PM: Technical Sessions (S4)
Welcome from the General Chair

2015 is the year of the 45th Annual Frontiers in Education (FIE) Conference. It is good to see that we have been doing this conference for 45 years already and I am personally grateful to be a part of it. As always I am privileged to have the help of the sponsoring entities: the IEEE Education Society, the IEEE Computer Society, and the ASEE Educational Research and Methods Division, through the FIE Steering Committee. Beyond that, I am blessed to have the input from my home institution New Mexico State University and our neighbor, the University of Texas at El Paso.

During your visit here, you can enjoy the warm autumn weather of the Southwest United States as well as the newly renovated downtown area of El Paso Texas.

Our theme this year is “Launching a New Vision in Engineering Education”. This fits well with the latest addition to the southern New Mexico businesses, the brand new Spaceport America, as well as other space related facilities such as the National Radio Astronomy Observatory Very Large Array Telescope and the Apache Peak Observatory, home of the Sloan Digital Sky Survey. It would be my honor to schedule tours of any of these facilities and you can contact me directly to do so. However, you need to be ready for long travel times since the closest of these is two hours from the conference center.

Once again this year we have more than 500 speakers and many pre-conference workshops. These continue a long tradition of some of the best educational innovations and research in engineering and computing. We are thankful to these speakers and to the co-chairs of the Program Committee who have selected and organized the papers submitted: Senay Purzer, ASEE Program Co-Chair; Mani Mina, IEEE Education Society Program Co-Chair; Ari Korhonen, IEEE Computer Society Program Co-Chair; Holly Matusovich, Special Session & Workshop Chair; and James Huff, New Faculty Fellows Chair. I also thank the FIE Steering Committee who guided me through the preparation with much needed professional advice and encouragement.

Finally, I cannot be grateful enough for the logistic support of Assistant to the General Chairs, Kevin Curry, and to Conference Catalysts, for their work on the computer applications and the web site.

Special thanks to our sponsors - New Mexico State University and the University of Texas at El Paso; as well as our other sponsors: Hewlett Packard, VentureWell, and the Markkula Center for Applied Ethics.

I hope you enjoy your stay in the home of cowboys, Native Americans, and Mexican culture, and I look forward to meeting each and every one of you.

Conference General Chair
Michael DeAntonio, NMSU, Las Cruces, New Mexico
Welcome from the Program Co-Chairs

Dear Colleagues,

It gives us great pleasure to welcome you to El Paso, Texas, and the 2015 Frontiers in Education Conference.

As conference programme co-chairs we have had the stimulating challenge of managing the reviewing, selection, and scheduling of submissions for what promises to be a truly outstanding conference. This year we received over 700 submissions, from which we have selected approximately 400 for presentation in different formats. The result is a research and innovation packed programme that commences with a day of pre-conference workshops on Wednesday, followed by three full days of presentations, special sessions, panels, and last, but not least, many opportunities over breakfast, lunch and dinner events to meet new friends, renew old acquaintanceships and engage in inspiring debate and discussion.

We have spent a most exciting six months preparing the technical programme. We hope that you enjoy the fruits of our labour, and find the conference as stimulating and interesting to attend, as we have found the process of putting it all together.

Welcome to FIE 2015 in El Paso!

Senay Purzer
ASEE ERM

Mani Mina
IEEE Education Society

Ari Korhonen
IEEE Computer Society
Welcome! And ¡Bienvenidos a El Paso!

The organizers of the 45th annual Frontiers in Education conference are pleased to offer you this opportunity to network and engage in engineering education research that is on the frontier. The FIE Steering Committee welcomes you to El Paso, TX after our successful time in Madrid last year.

If you are like me, you come to FIE to see old friends and find new ideas. I hope you come away from this conference with a renewed sense of commitment to the improvement engineering education and that you have expanded your network of colleagues. For those of you that are “regulars”, I hope you will share your sense of community with those that are new to FIE.

The Steering Committee continues to iterate on ways to improve the conference. This year will be our second time going with a paperless conference. We believe using our resources this way is responsible and keeps us on the frontier. We are also investigating ways to improve the experience of both authors and reviewers in our peer review process within EDAS. Lastly, we are improving the documentation of our processes, so that new FIE volunteers will have a better understanding of their roles. Please continue to provide feedback so we can iterate more effectively.

Below is the list of all current members on the FIE Steering Committee. You can find us at the conference as we will be wearing Steering Committee ribbons on our conference badges. We represent you and your needs for this conference. Please let us know how to improve FIE.

ASEE Educational Research and Methods Division Representatives
• Beth Eschenbach (Chair), Humboldt State University, beth@humboldt.edu
• Archie Holmes, University of Virginia, ah7sj@virginia.edu
• James Morgan, Charles Stuart University, jmorgan@csu.edu.au

IEEE Computer Society Representatives
• Stephen Frezza, Gannon University, FREZZA001@gannon.edu
• Arnold Pears, Uppsala University, Arnold.Pears@it.uu.se
• Deborrah Trytten, University of Oklahoma, dtrytten@ou.edu

IEEE Education Society Representatives
• Russ Meier, Milwaukee School of Engineering, meier@msoe.edu
• James Sluss, University of Oklahoma, sluss@ou.edu
• Edmundo Tovar, Universidad Politécnica de Madrid, etovar@fi.upm.es

Next year's conference will be in Erie, Pennsylvania. We will try a new idea where we will have a co-located Saturday conference for K-12 STEM educators. Please invite your K-12 colleagues!

I hope you have a great conference!

Beth Eschenbach, PhD.
Chair of the Frontiers In Education Steering Committee
Department Chair & Professor
Environmental Resources Engineering
Humboldt State University
Arcata, CA USA
FIE 2015 Planning Committee

General Co-Chairs
Mike DeAntonio
New Mexico State University

Virgilio Gonzalez
University of Texas, El Paso

Assistant to the General Chairs
Kevin Curry
University of Kansas
kgcurry@ku.edu

ASEE/ERM Program Co-Chair
Senay Purzer
Purdue University

IEEE/Computer Society Program Co-Chair
Ari Korhonen
Aalto University

IEEE/Education Society Program Co-Chair
Mani Mina
Iowa State University

Special Sessions and Workshop Chair
Holly Matusovich
Virginia Tech

Exhibits Chair
Robert J. Hofinger
Purdue University

International Co-Chair, Australasia
Mark Lee
Charles Sturt University

International Co-Chair, Europe
Edmundo Tovar
Universidad Politecnica de Madrid

International Co-Chair, South America
Melany M. Ciampi
VP COPEC- Science and Education Research Council
melany@copec.org.br

Conference Historian
Ed Jones
Iowa State University
n2ecj@iastate.edu

Awards Chair
Ed Jones
Iowa State University
n2ecj@iastate.edu

FIE Steering Committee

ASEE Educational Research and Methods Division Representatives
- Beth Eschenbach (Chair)
  Humboldt State University
- James Morgan
  Charles Stuart University
- Archie Holmes
  University of Virginia

IEEE Computer Society
- Stephen Frezza
  Gannon University
- Arnold Pears
  Uppsala University
- Deborah Trytten
  University of Oklahoma

IEEE Education Society
- Russ Meier
  Milwaukee School of Engineering
- James Sluss
  University of Oklahoma
- Edmundo Tovar
  Universidad Politecnica de Madrid

Future FIE Conferences

FIE 2016 Erie, Pennsylvania
FIE 2017 Indianapolis, Indiana

Are you interested in hosting a future FIE conference? Leave your business card at the registration desk, and an FIE steering committee member will contact you.
Sponsors

Society Sponsors

The **45th Annual Frontiers in Education Conference** is sponsored by the IEEE Education Society, the IEEE Computer Society, and the ASEE Educational Research and Methods Division.

Academic Host Institutions

A comprehensive land-grant institution of higher learning, **New Mexico State University** is dedicated to teaching, research, and service at the undergraduate and graduate levels. NMSU is a NASA Space Grant College, a Hispanic-serving institution and is home to the very first Honors College in New Mexico. U.S. News and World Report ranks NMSU in the top tier among Best National Universities.

**The University of Texas at El Paso (UTEP)** was founded in 1914 as the State School of Mines and Metallurgy. Today, UTEP is comprised of seven colleges and offers 71 bachelor’s programs, 76 master’s programs, 20 doctoral programs and 25 certificate programs. With a student population that exceeds 23,000 and a research portfolio that boasts more than $83 million in spending, UTEP is on track to become the first national public research university to truly serve the 21st-century student demographic.

Diamond Sponsor

**Hewlett-Packard** sponsors the ASEE Frederick Emmons Terman Award and the IEEE Harriet B. Rigas Award as well as the luncheon where the awards will be presented.
Sponsors (Continued)

Silver Sponsor

VentureWell sponsors the plenary session the morning of Thursday, October 22, and a complimentary workshop which will focus on stimulating science and technology invention, innovation and entrepreneurship on university and college campuses.

Conference App Sponsor

Markkula Center for Applied Ethics, producer of "An Introduction to Software Engineering Ethics" by Shannon Vallor, Associate Professor of Philosophy, Santa Clara University with special contributor Arvind Narayanan, Assistant Professor of Computer Science, Princeton University. This ethics module includes a reading, homework assignments, case studies, and classroom exercises, all designed to spark a conversation about ethical issues that students will face in their lives as software engineers.
FIE 2015 Exhibitors

Exhibit Hall Hours
The exhibits will be open in the Mezzanine Level by the Bathroom from 9:30 AM to 5:00 PM Thursday and from 9:00 AM to 4:30 PM Friday.

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<th>EXHIBITOR</th>
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<td>ARM</td>
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<td>EMA Design Automation</td>
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<td>Virginia Tech Department of Engineering Education</td>
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Exhibitor Showcase Presentations

Again this year, FIE offers Exhibitor Showcases, which provide our exhibitors a longer block of time for demonstrations or presentations. Additional information about the content of each showcase is in the conference app. Please join us for one of these informative sessions.

**Thursday, October 22**

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<thead>
<tr>
<th>Time</th>
<th>Exhibitor</th>
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<tbody>
<tr>
<td>11:00 AM - 12:30 PM</td>
<td>Cengage Learning</td>
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<td>2:30 PM - 6:00 PM</td>
<td>ARM</td>
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**Friday, October 23**

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<tr>
<th>Time</th>
<th>Exhibitor</th>
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<td>9:00 AM - 10:30 AM</td>
<td>SAS Institutes, Inc.</td>
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<td>11:00 AM - 12:30 PM</td>
<td>IonIdea Inc.</td>
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<td>2:30 PM - 4:00 PM</td>
<td>MathWorks</td>
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<td>5:00 PM - 6:30 PM</td>
<td>ZyBooks</td>
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Special National Science Foundation Presentation

On Thursday, October 22, from 4:30 PM to 6:00 PM in the ballroom, the NSF will hold a special session to discuss funding opportunities to cover ENG/EEC and EHR/DUE programs. Additional information about this presentation is in the conference app.
Meetings at FIE

Wednesday, October 21

5:00 PM - 6:30 PM  FIE Steering Committee  Boardroom

Saturday, October 24

8:00 AM - 10:00 AM  FIE Steering Committee  Boardroom
1:00 PM - 3:00 PM  FIE 2015 Planning Committee  Boardroom

Workshops

Workshop 1A
Wednesday, October 21 1:00 PM - 4:00 PM
**Integrating Service-Learning into Engineering and Computing Education**
Service learning is a rapidly growing pedagogy in higher education and within engineering, technology and computing. Service-learning provides a learning environment that is very well-matched with ABET. Students can learn strong technical skills while developing teamwork, communication and leaderships skills. The community and human context of service-learning provides rich learning experiences for contemporary social, global and ethical issues. Service-learning also provides the kind of curricular efficiency necessary to meet the attributes called for in the National Academy's Engineer of 2020. Evidence suggests that service-learning also has the potential to increase participation among underrepresented populations within engineering, technology and computing. This interactive workshop will provide an introduction to service-learning and allow participants to explore how it could be integrated into their own courses and curricula. Resources, partnerships and potential barriers will be discussed to provide strategies for successful implementation at the participants' own institutions.

Workshop 1B
Wednesday, October 21 1:00 PM - 4:00 PM
**Teaching and Assessment Strategies that Value Innovative Thinking**
An increasing number of studies point to the issue that engineering students tend to lose their creative edge during their undergraduate education. In our prior studies, we identified three barriers to innovation experienced by students: an overwhelming technical identity that values technical problem solving over creativity, a view of innovativeness as an attribute that is attainable to just few privileged or masterminds, and instructional constraints that demotivate students from taking risks by exploring novel solutions.

This workshop will focus on teaching and assessing in engineering courses so that students see the essential role of innovative thinking for engineers. Examples of student work will be used to illustrate assessment practices that value creativity and innovative problem solving. The participants will develop rubrics to be used in own courses or design projects.
Workshops (Continued)

**Workshop 1C**
**Wednesday, October 21 1:00 PM - 4:00 PM**

*Process to Draft the Program Educational Objectives for Undergraduate Engineering Degree Programs*

This workshop will engage the participants in the process to draft Program Educational Objectives (PEOs) appropriate for undergraduate engineering degree programs at ABET-accredited institutions of higher education. ABET stipulates in its Self-Study Questionnaire under Criterion 2, Category E that there should be a process in place to periodically review and revise PEOs.

PEOs must reflect the Mission Statement of the institution and serve as a yardstick of student achievement three to five years following graduation. The objectives represent the expectations of the department from its graduates and must be crafted such that measurable objective evidence can be obtained through alumni surveys. To be consistent and effective, the entire engineering department must contribute to the discussion, ratification, and eventual adoption of the PEOs. Active participation by the faculty in defining the PEOs yield clear and concise objectives and promotes ownership of the goals of the Department and ABET process. However, not all faculty members are necessarily familiar with the assessment language and the process to evaluate the PEOs. In order to ensure a meaningful contribution from all faculty members involved in defining the PEOs, this workshop presents a framework that facilitates the discussion and the steps taken to define the PEOs that are (1) adhering to the Mission of the University (2) achieving consistent and measurable expectations.

**Workshop 1D**
**Wednesday, October 21 1:00 PM - 4:00 PM**

*Agile Way of Educating*

The goal of this workshop is to help participants explore how Agile development, a management technique borne out of the software industry, can not only change the way that students engage in project-based and team-based course projects, but the Agile mindset can also transform the way that we educate our students. The Agile Way of Working (or Agile) is a collection of principles and practices that supports rapid and flexible response to change. It does this by promoting communication, collaboration, continuous improvement, and reflection within teams of problem solvers. The approach also fosters self-managed teams. Agile accomplishes this by embracing changing requirements, delivering products frequently, using human-centric methods, and engaging the customer in regular collaboration. Agile puts heavy emphasis on articulating goals, facilitating interactions, improving team dynamics, supporting collaboration, and encouraging experimentation and innovation.

There is an increase in interest in how Agile can be applied in higher education settings - both as a topic of study for project management (i.e., Agile Way of Working) and as a pedagogical mindset (i.e., Agile Way of Educating). In this workshop we will: Provide a tutorial overview of Agile; present examples of how Agile has been used for project management for course projects; present examples of how Agile practices has been applied as a pedagogical approach to derive benefit in the areas of encouraging students to take responsibility for their learning (self-managed learning), continuous improvement through reflection, alternative approaches for evaluation, and increased engagement by learners; and engage in activities that demonstrate Agile in practice in order to provide attendees with ideas for applying Agile. Participants will come away with ideas for applying Agile in their courses and resources for a deeper dive into Agile. Participants will also leave the session with resources that will allow them to perform a deeper dive into Agile.
Workshops (Continued)

Workshop 2A
Wednesday, October 21 5:00 PM - 9:00 PM
Encouraging Information Rich Engineering Design

Students frequently spend too little time understanding the problem in their design projects and jump to solutions without considering alternatives. This leads to inefficient use of time and suboptimal results in the final design. Instead of re-inventing the wheel, students need to explore and understand the work of others applied to similar situations, using strong information gathering, application, and evaluation skills. Ultimately, these reinforce core skills needed for students to be lifelong learners, i.e., determining where they have gaps in knowledge and determining how to fill those gaps efficiently and effectively. This workshop will provide a conceptual model and examples of activities that will help instructors keep students problem-focused, allowing them to generate and weigh alternatives, and ultimately settle on a solution that is most promising to meet their stakeholders' needs. Participants will take away techniques they can apply to their own engineering design courses.

Participants will learn how to determine the needs of stakeholders, better understand the context of the design problem, and make sure they meet professional standards and legal requirements for their designs. In addition to their own brainstorming, they investigate the prior art of others to enlarge the solution space they explore. Evaluating and synthesizing information gathered or generated themselves, they determine the most promising of their proposed solutions.

Workshop 2C
Wednesday, October 21 5:00 PM - 9:00 PM
Agile Teaching and Learning

Educators are converting traditional and project-base courses to agile in response, but this is a daunting task with few structured teaching resources methods available to reduce the burden on the educator. This workshop will present a comprehensive approach to teaching Agile methods that is itself agile, employing a highly iterative, continuous feedback-driven process. This workshop will convey instructional resources to participants, and provide the scaffolding to conduct an agile project course. Participants will receive materials including Eclipse-based open source labs, project scripts, and pedagogical scripts to adapt to their classrooms. Pedagogical and assessment strategies will be shared, and the presenter will facilitate a best practices interactive discussion to draw out lessons learned from workshop participants. The workshop agenda will include strategies and instructions for setting up Scrum, and supporting XP developer practices including Continuous Integration and Testing using Jenkins, Source Code Control using Git, unit testing, static analysis, and more. The workshop will also encourage interaction amongst participants to share best practices and lessons learned. Research directions related to the application of agile principles to teaching and learning will be discussed. Post-workshop support will be provided through a website hosted by the presenter.

A custom Eclipse install with requisite tools will be available for installation during the workshop via USB stick and the Web. The presenter will record and coalesce information gathered from collaborative sessions on the agenda and make the record available to participants on his university website. Instructions for server-based installations and trial accounts will be distributed to participants. Laptop Required. Tablets will be of only limited utility.
Workshops (Continued)

Workshop 2D  
Wednesday, October 21 5:00 PM - 9:00 PM  
*How to Select an Area of Scholarship and Address the Applicable Review Criteria to Publish a Paper in the IEEE Transactions on Education*

Engineering education publications are expected to make substantive contributions to the field, but there is a need to clarify expectations of substantive contributions across the global community of scholars in this field. For the purposes of the review criteria, contributions will be defined as clear statements of how work described in the manuscript is expected to influence future directions of the field. Many different types of contributions are possible. Review criteria need to be specific to broad areas of potential contributions. Review criteria for the IEEE Transactions on Education are organized based on the three categories of scholarship described by Boyer: discovery, application, and integration. Workshop participants should expect to learn more about the three areas of scholarship and be able to select the area most appropriate for their manuscript.
Building a Teaching Academy at Your University — What a Faculty Member or Administrator Can Do

Members of Frontiers in Education know much about university teaching that could—and should—be shared with educators across our home campuses. It is especially important to share outside of STEM fields where research about education is not as robust. But how to share such information on one’s own campus? Enter: the teaching academy.

A teaching academy is a member-driven organization designed to enhance teaching. A teaching academy can serve as a center for teaching or coordinate with an already established center. It need not have even one paid staff or even a budget in the beginning. Activities that are common for teaching academies include having members offer workshops, lead learning communities, induct new members, honor teaching award winners, host celebrations of teaching, as well as observe and give feedback on colleagues’ online or face-to-face classes.

In this plenary session, Dr. Gray will address how to begin a teaching academy at your university as well as how to build upon an existing one. She will discuss how even one faculty or administrator can create a groundswell of support, demonstrate the impact of the academy, and raise money as necessary.

Tara Gray, Ph.D., serves as associate professor of criminal justice and as founding director of the New Mexico State University Teaching Academy. The Academy was established in 2003. In the five years before the Academy was founded, while working as an associate professor of criminal justice, Dr. Gray directed two popular short courses, raised the money necessary to support them and bring in a half dozen speakers per year, and began building the faculty and administrative support for a Teaching Academy. Today, the Teaching Academy is a full-service center, working to improve student learning by providing professional development to New Mexico State educators.

Dr. Gray was educated at the United States Naval Academy, Southwestern College in Kansas and Oklahoma State, where she earned her Ph.D. in economics by asking, “Do prisons pay?” She taught economics at Denison University before joining the Department of Criminal Justice at NMSU. Dr. Gray has published three books, including Publish & Flourish: Become a Prolific Scholar. She has been honored at New Mexico State and nationally with eight awards for teaching or service.

Dr. Gray has presented faculty development workshops to 8,000 participants in more than a hundred colleges and universities, thirty-five states, and Thailand, Guatemala, Mexico, Canada, Saudi Arabia and the United Arab Emirates. Workshop participants report that she is “spirited, entertaining, and informative—she’s anything but gray™”
New Faculty Fellow Program

Each year, FIE invites new engineering and computer science faculty to submit applications for possible selection as New Faculty Fellows. A review panel of engineering and computer science faculty from assistant, associate, and full professorship levels completes a rigorous peer review of each applicant’s conference paper, nomination letters and professional résumé. The fellowship provides a $1,000 grant for conference travel expenses.

The purpose of the program is to promote the involvement of new faculty in the Frontiers in Education Conference so they will be exposed to the "latest and greatest" in engineering educational practices and will have the opportunity to exchange information with leaders in education innovations. This year, FIE 2015 will provide registration and travel grants for the awardee to attend the conference.

Focus on New Faculty Fellows
Each fellow will present a conference paper during FIE 2015. Join them in their session and share your thoughts and ideas about the future of engineering education. Also, during the Focus on Exhibits session Friday at 4 p.m., the Fellows will display posters describing their interests and activities and previewing the full papers that they will present as part of the FIE 2015 technical sessions. Below are this year’s recipients and the papers they authored or co-authored.

2015 New Faculty Fellows:

Joyce Main
Purdue University
   Session T2D: Using life course theory to frame women and girls' trajectories toward (or away) from computing: Pre high-school through college years
   Session F2F: Student evaluations of team members: Is there gender bias?
   Session S2C: The Institutional Environment for Student Veterans in Engineering
   Session S3B: Examining How International Experiences Promote Global Competency among Engineering Graduate Students
   Session S4E: Modeling Student Perceived Costs and Benefits to Cooperative Education Programs (Co-ops) and Pathways to Participation

Noah Salzman
Boise State University
   Session S3C: Effects of Pre-College Engineering Participation on First-Year Engineering Outcomes

Nathan Canney
Seattle University
   Session F3F: How engineering students define 'Social Responsibility'
Conference Amenities

Breakfast ● Ballroom
Breakfast is included in your conference registration. On Thursday breakfast will include a plenary presentation.

- 8:00 AM – 10:30 AM Thursday  Includes Plenary Session
- 8:00 AM – 9:00 AM Friday
- 8:00 AM – 9:00 AM Saturday

Refreshment Breaks ● Mezzanine Level
Morning and afternoon breaks will take place daily on the Mezzanine Level, outside the Ballroom.

Lunches ● Ballroom
Lunches are included in your conference registration. On Thursday lunch will include the Hewlett-Packard Awards

Frederick Emmons Terman and Harriett B. Rigas Awards Luncheon
Sponsored by the Hewlett-Packard Company
12:45 PM – 2:15 PM Thursday
The Frederick Emmons Terman Award is presented annually to an outstanding young electrical engineering educator by the Electrical and Computer Engineering Division of the American Society for Engineering Education. The Harriett B. Rigas Award is presented annually to an outstanding woman engineering educator in recognition of her contributions to the profession.

Luncheon
12:45 PM – 2:15 PM Friday
Includes Plenary Session

Luncheon
12:45 PM – 2:15 PM Saturday

New Faculty Fellows ● Exhibit Area ● Mezzanine Level
4:00 PM – 5:00 PM Friday
A special session focusing on the New Faculty Fellows will be held on Friday. This session will provide an opportunity to meet this year’s New Faculty Fellows, a group of new CSET educators who were selected based on an application and a full paper being presented at this year’s conference. There will also be an opportunity to view their poster presentations at this time.

Focus on Exhibits ● Exhibit Area ● Mezzanine Level
4:00 PM – 5:00 PM Friday
Visit the FIE exhibits and check out the latest textbooks, computer software, lab equipment, and other innovations while enjoying refreshments.

Awards Banquet ● Ballroom
7:30 PM – 10:00 PM Friday
Thanks to our sponsor, the IEEE Education Society, the Frontiers in Education Conference annual gala networking dinner and awards program is only $30 per person. An opening reception will be followed by a full-service plated meal. This business formal event is sponsored by the IEEE Education Society - a group of more than 3,000 engineers and academics dedicated to advancing the scholarship and practice of engineering education. You do not have to be an IEEE Education Society member to attend. Tickets can be added to your registration on site.

FIE Registration Conference Desk ● Mezzanine Level by the Elevators
Registration will be open during these times:

- Wednesday  11:00 AM – 8:00 PM
- Thursday  8:00 AM – 6:00 PM
- Friday  8:00 AM – 6:00 PM
- Saturday  8:00 AM – 5:00 PM
Award Selection Committee Chairs

Frontiers in Education Conference
Benjamin J. Dasher Best Paper Award ..................................................Diane Rover
Helen Plants Award ........................................................................Mats Daniels
Ronald J. Schmitz Award .................................................................Cynthia Finelli

ASEE Electrical and Computer Engineering Division
Hewlett-Packard Frederick Emmons Terman Award .........................Changzhi Li

IEEE Education Society
Awards Policy Committee: Edwin C. Jones, Jr., Chair; Michael Auer; Joanne Bechta Dugan; Lyle Feisel; and Susan Lord.

IEEE William E. Sayle Award for Achievement in Education ..........Susan Conry
IEEE Transactions on Education Best Paper Award ..............................Jeffrey Froyd and
Chapter Achievement Award ..........................................................Trond Clausen
Distinguished Chapter Leadership Award ........................................Trond Clausen
Distinguished Member Award ..........................................................Victor Nelson
Edwin C. Jones, Jr. Meritorious Service Award .................................Susan Lord
Hewlett-Packard/Harriett B. Rigas Award ........................................Joanne Bechta Dugan
Mac Van Valkenburg Early Career Teaching Award ......................Seyed Hosseinn Housavinezhad
Student Leadership Award ..............................................................Kai Pan Mark
ASEE ECE Division Hewlett-Packard Frederick Emmons Terman Award

For being the principal author of Fundamentals of WiMAX, 449 pages, Prentice-Hall, 2007, a leading textbook in wireless communications, and for research, teaching, and professional service in the discipline of wireless communications.

Jeffrey G. Andrews (S’98, M’02, SM’06, F’13) received the B.S. in Engineering with High Distinction from Harvey Mudd College, and the M.S. and Ph.D. in Electrical Engineering from Stanford University. He is the Cullen Trust Endowed Professor (#1) of ECE at the University of Texas at Austin and the Editor-in-Chief of the IEEE Transactions on Wireless Communications. He developed Code Division Multiple Access systems at Qualcomm from 1995-97, and has consulted for entities including Apple, Samsung, Verizon, AT&T, the WiMAX Forum, Intel, Microsoft, Clearwire, Sprint, and NASA. He is a member of the Technical Advisory Board of Fastback Networks, and co-author of the books Fundamentals of WiMAX (Prentice-Hall, 2007) and Fundamentals of LTE (Prentice-Hall, 2010).

Dr. Andrews is an ISI Highly Cited Researcher, received the National Science Foundation CAREER award in 2007 and has been co-author of eleven best paper award recipients including the 2010 IEEE Communications Society Best Tutorial Paper Award, the 2011 IEEE Heinrich Hertz Prize, the 2014 IEEE Stephen O. Rice Prize, and the 2014 IEEE Leonard G. Abraham Prize. He is an IEEE Fellow and an elected member of the Board of Governors of the IEEE Information Theory Society.
About the Terman Award

The Frederick Emmons Terman Award is presented annually to an outstanding young electrical or computer engineering educator by the Electrical and Computer Engineering Division of the American Society for Engineering Education. The Terman Award, established in 1969 by the Hewlett-Packard Company, consists of $5,000, an engraved gold-plated medal, a bronze replica of the medal mounted on a walnut plaque, and a parchment certificate.

The recipient must be an electrical engineering educator who is no more than 45 years old on June 1 of the year in which the award is presented and must be the principal author of an electrical engineering textbook published before June 1 of the year of his/her 40th birthday. The book must have been judged by his/her peers to be an outstanding original contribution to the field of electrical engineering. The recipient must also have displayed outstanding achievements in teaching, research, guidance of students, and other related activities.

About Frederick Emmons Terman

Frederick Emmons Terman received his A.B. degree in chemistry in 1920, the degree of engineer in electrical engineering in 1922 from Stanford University, and his Sc.D. degree in electrical engineering in 1924 from Massachusetts Institute of Technology. From 1925-1965, he served as instructor, then professor of electrical engineering, executive head of the Electrical Engineering Department, dean of the School of Engineering, provost, vice president, and finally, as acting president of Stanford University.

Among the many honors bestowed upon him were: the IEEE Medal of Honor; the first IEEE Education Medal; the ASEE’s Lamme Medal; the 1970 Herbert Hoover Medal for Distinguished Service to Stanford University; an honorary doctor’s degree by Harvard; a decoration by the British government; the Presidential Medal for merit as a result of his war work; and the 1976 National Medal of Science from President Ford at a White House ceremony.

Dr. Terman was a professor at Stanford University when William Hewlett and Dave Packard were engineering students there. It was under Dr. Terman’s guidance in graduate work on radio engineering that Mr. Hewlett built the first tunable and automatically stabilized Weinbridge oscillator. Partially through Dr. Terman’s urging, Hewlett and Packard set up their partnership in an old garage with $538 and the oscillator as their principal assets.

Dr. Terman died in December 1982. It is in appreciation of his accomplishments and guidance that Hewlett-Packard is proud to sponsor the Frederick Emmons Terman Award.

'05 Ali H. Sayed
'06 Vijay K. Madisetti
'07 Russel Jacob (Jake) Baker
'08 Keith M. Chugg
'09 David Tse
'10 Bhaskar Krishnamachari
'11 Tony Givargis
'12 Ali Niknejad
'13 Mung Chiang
'14 Changzhi Li
IEEE Education Society Hewlett-Packard Harriett B. Rigas Award

For exceptional contributions to electrical and computer engineering education and the global engineering community through student and faculty development, transformational and inclusive institutional and professional leadership, and engineering accreditation service.

Sarah Rajala, who has been a pioneer for women in electrical engineering, graduated with a bachelor's degree in the field.

She is currently serving as dean of the Iowa State University College of Engineering and holds the James & Katherine Melsa Professorship in Engineering. Prior to this, Rajala served as the named dean of Mississippi State University's Bagley College of Engineering and head of the Department of Electrical and Computer Engineering. She earned both master's and doctoral degrees from Rice University, taught at North Carolina State University and Purdue University, and served as an adjunct research faculty member at the Wake Forest University Bowman Gray School of Medicine.

Rajala joined the faculty at NC State in 1979, where she was the first female professor in the Department of Electrical and Computer Engineering. Throughout her career at NC State, she served as a center director, Associate Dean for Academic Affairs, and Associate Dean for Research and Graduate Programs.

She is a Fellow of the American Association for the Advancement of Science and the Institute of Electrical and Electronic Engineers; she served as president and is a Fellow of the American Society for Engineering Education. She served as the chair of the Global Engineering Deans Council and is currently Chair of the Engineering Accreditation Council of ABET. A native of Skandia, Michigan, she was only the third woman to graduate from Michigan Tech with an electrical engineering degree.

At Michigan Tech, Rajala is a member of the Presidential Council of Alumnae and the Electrical Engineering Academy and was the first alumna to receive Tech's Outstanding Young Alumni Award (1986). She was recognized again in 2008 with the Distinguished Alumni Award.

Past Recipients
'95 Denice D. Denton
'96 Karan L. Watson
'97 Patricia D. Daniels
'98 Delores M. Ette
'99 Sherra E. Kerns
'00 Leah Jamieson
'01 Valerie Taylor
'02 Nan Marie Jokers
'03 Joanne Bechta Dugan
'04 Jennifer L. Welch
'06 Eve A. Riskin
'07 Bonnie Heck Ferri
'08 Cheryl B. Schrader
'09 Cynthia Furse
'10 Mari Ostendorf
'11 Karen Panetta
'12 Tanja Karp
'13 Nancy Amato
'14 Noel Schulz
About the Rigas Award

The Harriett B. Rigas Award is presented annually to recognize outstanding faculty women who have made significant contributions to electrical and computer engineering education. The award consists of an honorarium, plaque, certificate, and Frontiers in Education Conference registration.

The recipient must be a tenured or tenure track woman faculty member in an ABET-accredited engineering program in the United States, with teaching and/or research specialization in electrical or computer engineering.

About Harriett B. Rigas

Dr. Harriett B. Rigas (1934-1989), an IEEE Fellow, was an electrical engineer with an international reputation for her hybrid computer and computer simulation research. At Washington State University between 1966 and 1984, she was eventually both full professor and chair of Electrical and Computing Engineering School. Later she chaired larger departments at the Navy's Postgraduate School in Monterey and, at the time of her death, Michigan State University.

Her achievements in engineering research, administration, and service were widely recognized. In 1975-76, Harriett was a Program Director at the National Science Foundation and, over the years, a member of numerous panels and advisory committees at both the NSF and the National Academy of Sciences.

Professor Rigas' success was achieved within a profession and within university administrative structures where there were very few women. Her character and courage were both evident in her strong advocacy of advancement for women. She was involved both locally and nationally in the Society of Women Engineers.
Lecia Barker is an Associate Professor in the School of Information at the University of Texas at Austin and a Senior Research Scientist for the National Center for Women & Information Technology. Lecia conducts research in attracting, retaining, and advancing groups underrepresented in professional computing and science careers; these studies focus on social climate, identity/belonging, faculty adoption of teaching and curricular practices, and sustainable organizational change. She advises several research and implementation projects intended to advance knowledge about computer science education. She is a co-PI of the NCWIT Extension Services program, which provides customized consulting to support systemic reform of computing and engineering departments. Lecia is currently studying faculty adoption of teaching methods in computer science. Lecia holds a Ph.D. in Communication from the University of Colorado at Boulder, a Master of Business Administration from San Diego State University, and a Bachelor of Arts from the University of Iowa.

Jane Gruning is a doctoral student in the School of Information at the University of Texas at Austin. In addition to her research on retaining underrepresented groups in undergraduate computer science programs, Jane conducts research in the area of human-computer interaction investigating the importance of objects in everyday human life and how this differs between physical and digital objects. Her research has focused on various aspects of this subject, from digital objects in causal gaming, to objects on obsolete media in a workplace, to how people share objects in home settings (study conducted during an internship at Microsoft Research Cambridge). She holds an MSIS from the University of Texas at Austin, an MA in Philosophy from Tulane University, and a BA in English Literature from Loyola University in New Orleans.

Past Recipients
'73 Walter D. Story
'74 Richard Hooper
'75 John J. Alan III and J.J. Lagowski
'76 John Hipwell and David Blaune
'77 John W. Renner
'78 Albert J. Morris
'79 Donald R. Woods, Cameron M. Crowe, Terrence W. Hoffman, and Joseph D. Wright
'80 Marilla D. Svinicki
'81 Martha Montgomery
'82 A.L. Riemenschneider and Lyle D. Feisel

'83 Davood Tashayyod, Banu Onaral, and James M. Trosino
'84 Bill V. Koen
'85 Bill V. Koen
'86 Richard S. Culver
'87 David A. Conner, David G. Green, Thomas C. Jannett, James R. Jones, M.G. Rekoff, Jr., Dennis G. Smith, and Gregg L. Vaughn
'88 Richard M. Felder
'89 Richard C. Compton and Robert York
'90 Cindy A. Greenwood
'91 Robert Whelchel
'92 William LeBold and Dan D. Budny

'93 Daniel M Hull and Arthur H. Guenther
'94 Burks Oakley II and Roy E. Roper
'95 Curtis A. Carver, Jr. and Richard A. Howard
'96 Val D. Hawks
'97 Edwin Kashy, Michael Thoennnessen, Yihjia Tsai, Nancy E. Davis, and Sheryl L. Wolfe
'98 A.B. Carlson, W.C. Jennings, and P.M. Schoch
'99 Wayne Burleson, Aura Ganz, and Ian Harris
'00 David W. Petr
'02 Zeynep Dilli, Neil Goldman, Lee Harper, Steven I. Marcus, and Janet A. Schmidt
Past Recipients  
(Continued)  
‘03 Glenn W. Ellis, Gail E. Scordilis, and Carla M. Cook  
‘04 Matthew W. Ohland, Guili Zhang, Brian Thorndyke, and Timothy J. Anderson  
‘05 Gregory A. Moses and Michael Litzkow  
‘07 Donna Riley and Gina-Louise Sciarra  
‘08 Eric Hamilton and Andrew Hurford  
‘09 Steve Krause, Robert Culbertson, Michael Oehrtman, Marilyn Carlson, Bill Leonard, C.V. Hollot, and William Gerace  
‘10 Glenda Stump, Jenefer Husman, Wen-Ting Chung and Aaron Done  
‘11 Jeffrey L. Newcomer  
‘12 Kristi J. Shryock, Arun R. Srinivasa and Jeffrey E. Froyd  
‘13 Robin Adams, Alice Pawley and Brent Jesiek  
‘14 Hansi Keijonen, Jaakko Kurhila, Arto Vihavainen  

About the Dasher Award  
The Benjamin Dasher Best Paper Award is given to the best paper presented at the annual Frontiers in Education Conference, as demonstrated by technical originality, technical importance and accuracy, quality of oral presentation, and quality of the written paper appearing in the Conference Proceedings. Papers are nominated for the award by reviewers.  
A committee with representation from each of the organizing societies (ERM, IEEE Ed. Soc., IEEE Comp. Soc.) is formed to review nominated papers. During the FIE meeting, the committee attends presentations of the nominated papers. The committee then makes a final recommendation to the FIE Planning Committee for the Ben Dasher Award winner based on the overall quality of both the paper and the presentation.  

About Benjamin J. Dasher  
Benjamin J. Dasher was born December 27, 1912 in Macon, Ga. He earned his bachelor’s and master’s degrees in electrical engineering in 1935 and 1945, respectively, and graduated with a doctorate in electrical engineering in 1952 from the Massachusetts Institute of Technology. At MIT, Dr. Dasher worked on the electronics of instrumentation of electromechanical transducers and analog-to-digital converters. He was the author of “Dasher’s method” for synthesis of resistance-capacitance two-port networks, which is found in standard textbook treatments.  
While at Georgia Tech, Dr. Dasher served as a graduate assistant in 1936, then as an instructor in 1940, and became an assistant professor in 1945. While earning his PhD at MIT, he was an instructor from 1948-51. Before finishing with his PhD, he became an associate professor at Georgia Tech in 1951, was promoted to professor in 1952, and became director of the School of Electrical Engineering in 1954, where he served in that capacity until 1969. In 1968, Dr. Dasher was appointed associate dean in the College of Engineering. At Georgia Tech, Dr. Dasher served as director of network synthesis projects and transistor oscillator projects. His fields of interest included advanced network theory, electronic theory, electronic circuits, electrical engineering education, machine translation, speech analysis, and pattern recognition. He was credited for bringing undergraduate engineering education to the forefront at Georgia Tech and for increasing interactions between undergraduates and industry.  
Dr. Dasher was a member of Phi Kappa Phi, ASEE, Sigma Xi, and the American Association of University Professors; he was a Fellow of both the IEEE and the Institute of Radio Engineers. He served as a regional director for IEEE and as the chair for the Atlanta section of IEEE; he was on numerous committees for IRE, AIEE, and IEEE. He served as President of the IEEE Education Group in 1970-71.  
Ben Dasher organized the first Frontiers in Education Conference; it was held in Atlanta in 1971, and attracted 100 participants. There were 34 papers in six technical sessions.  
Dr. Dasher died of congestive heart failure on December 13, 1971 in Houston, Texas.
The EER Leaders NetWorkshop was formed in 2013 through funding from the National Science Foundation (EEC-1314725 and 1314868; Rebecca Bates and Lisa Benson, co-PI’s). Our goal is to provide a mechanism for mentoring and supporting mid-career faculty across distributed locations who are not far enough along in their careers to have administrative or leadership experience, but are frequently stepping into these roles. We seek to develop advocates and future leaders for our emerging discipline of EER by focusing on building community, developing skills to communicate across organizational boundaries and identifying strategies for moving the emerging field forward and supporting rising EER leaders. As a group of about 25 mid-career EER faculty, we have had held face-to-face workshops at and around engineering education conferences. We have also had monthly virtual meetings to learn about ways to influence those outside of our discipline, and ways to navigate important conversations across administrative boundaries within universities. We have learned about sources of influence (such as structural, social and personal), barriers to achieving influence, and change models that are appropriate for engineering education.

Rebecca Bates is a Professor and Chair of the Department of Integrated Engineering at Minnesota State University, Mankato. She directs the Iron Range and Twin Cities Engineering programs, project-based learning programs that provide pathways to four-year engineering degrees for community college graduates. Her research background has focused on speech recognition and understanding as well as engineering and computer science education. Her degrees are in biomedical engineering (B.S, Boston University), electrical engineering (M.S., Boston University, Ph.D., University of Washington) and theological studies (M.T.S, Harvard University).

Lisa Benson is an Associate Professor of Engineering and Science Education at Clemson University, with a joint appointment in Bioengineering. Her research focuses on the interactions between student motivation and their learning experiences. Her projects involve the study of student perceptions, beliefs and attitudes towards becoming engineers and scientists, and their problem solving processes. Other projects in the Benson group include effects of student-centered active learning, self-regulated learning, and incorporating engineering into secondary science and mathematics classrooms. Her education includes a B.S. in Bioengineering from the University of Vermont, and M.S. and Ph.D. in Bioengineering from Clemson University.

Alan Cheville studied optoelectronics and ultrafast optics at Rice University, followed by fourteen years as a faculty member at Oklahoma State University working on terahertz frequencies and engineering education. While at Oklahoma State he developed courses in photonics and engineering design. After serving for two and a half years as a program director in engineering education at the National Science Foundation, he took a chair position in electrical engineering at Bucknell University. He is currently interested in engineering design education, engineering education policy, and the philosophy of engineering education.
Cynthia Finelli is Director of the Center for Research on Learning and Teaching in Engineering and associate professor of electrical engineering at University of Michigan. At U-M, she actively engages in engineering education research, assists other engineering faculty in accomplishing their educational research endeavors, and promotes institutional change through faculty professional development. She currently studies student resistance to active learning, faculty adoption of evidence-based teaching practices, and ethical decision-making in undergraduate engineering students. Dr. Finelli leads an international initiative to create a taxonomy for the field of engineering education research, and she is a Fellow of the American Society for Engineering Education.

Jennifer Karlin is a professor of industrial engineering at the South Dakota School of Mines and Technology. She received her undergraduate degree from Washington University in St. Louis and her Ph.D. in industrial and operations engineering from the University of Michigan, specializing in engineering management. Jennifer studies colleges and universities as organizations and change management to improve learner development and university-based economic development. She has been active in FIE, serving as conference general co-chair for the 2011 conference and an ERM representative on the FIE steering committee. She also served as an ERM Board Member.

Susan M. Lord is Professor and Chair of Electrical Engineering, University of San Diego. She received a B.S. from Cornell University and the M.S. and Ph.D. from Stanford University. Her research focuses on the study and promotion of diversity in engineering including student pathways, diverse populations including Latinos and military veterans, and cross-cultural studies with non U.S. students. Dr. Lord is a Fellow of the IEEE and ASEE and is active in the engineering education community including serving as General Co-Chair of the 2006 Frontiers in Education (FIE) Conference, on the FIE Steering Committee, and as President of the IEEE Education Society for 2009-2010.

Past Recipients
'80 Helen Plants
'81 Jim Russell and John C. Lindenlaub
'82 Karl A. Smith and Harold Goldstein
'83 E. Dendy Sloan and Charles F. Yokomoto
About the Plants Award

The Helen Plants Award is given for the best special (non-traditional) session at the FIE conference, as demonstrated by originality, session content and presentation including the use of written materials and visual aids, and participation of session attendees.

About Helen Margaret Lester Plants

Helen Margaret Lester was born in Desloge, Missouri, in March 1925, the only child of Rollo Bertell and Margaret Stephens Lester.

She entered the University of Missouri as a journalism major, but soon switched to Civil Engineering. She received her BSCE in 1945. She joined West Virginia University in 1947 as a graduate student and Instructor in Mechanics, and received her MS in Civil Engineering in 1953. She was a Professor of Theoretical and Applied Mechanics and of Curriculum and Instruction in the Division of Education at WVU. She became Professor Emeritus, Mechanical and Aerospace Engineering in 1983. From 1985 to 1990 she served as Chair of Civil Engineering Technology at Indiana University-Purdue University - Fort Wayne.

Her husband Ken Plants had been a "bureaucrat" with the US Bureau of Mines in Morgantown - a chemical engineer with great expertise in cost estimation. Some of their "courting" evenings were spent manually checking the design calculations on the Star City, WV Bridge, designed by the Dean and State Bridge Engineer. While in Morgantown, Helen was active in Trinity Episcopal Church where she served as a Vestryman and Bishop's Man. For many years she was a Girl Scout leader. Helen died in Tulsa, Oklahoma in September 1999.

From the beginning of her academic career, she was a gifted teacher and a role model for the few women students at West Virginia University at that time. Later, she became an advocate of programmed and individualized instruction. She and Wally Venable wrote series of papers on these topics and several texts: *Introduction to Statics, a Programmed Text*, (1975), *A Programmed Introduction to Dynamics* (1967), and *Mechanics of Materials, A Programmed Textbook* (1974). She established the first doctoral program in Engineering Education at West Virginia University.

In 1975, the University of Missouri at Columbia recognized her with the Missouri Honor Award for Distinguished Service in Engineering. She became an ASEE Fellow in 1983 as a member of the first class of Fellows. She also received Distinguished Service Award, Western Electric Fund Award, and was an ASEE Vice-President (1974 – 1976).

Past Recipients (Continued)

'84 David W. Johnson and Karl A. Smith
'85 Billy V. Koen
'86 Martha A. Nord and Patricia H. Whiting
'87 John C. Lindenlaub
'89 Karl A. Smith
'91 Troy E. Kostek
'92 Barbara M. Olds and Ronald L. Miller
'93 John C. Lindenlaub and Alisha A. Waller
'94 Billy V. Koen
'95 Burks Oakley II and Mark Yoder
'96 Alisha A. Waller, Edward R. Doering, and Mark A. Yoder
'97 Karl A. Smith, James D. Jones and Elizabeth Eschenbach
'98 Alice Agogino
'99 Melinda Piket-May and Julie L. Chang
'03 William C. Oakes
'04 Susan M. Lord, Elizabeth A. Eschenbach, Alisha A. Waller, Eileen M. Cashman, and Monica J. Bruning
'05 Ruth A. Streveler
'06 Ruth A. Streveler, Karl A. Smith, and Ronald L. Miller
'08 Maura Borrego, Lynita Newsward, and Lisa McNair
'09 Lisa C. Benson, Sherrill B. Biggers, William F. Moss, Matthew Ohland, Marisa K. Orr, and Scott D. Schiff
'10 Russell Korte and Karl A. Smith
'11 Mark Somerville, Dave Goldberg, Sherra E. Kerns, and Russell Korte
'12 Şenay Purzer and Jonathan C. Hilpert
'13 Lynn Andrea Stein, and Caitrin Lynch
'14 Stephanie Cutler, James J. Pembridge, Matthew Verleger, Lauren D. Thomas
Frontiers in Education Conference  
Ronald J. Schmitz Award

For contributions to the Frontiers in Education Conference through developing and maintaining a comprehensive program of informative educational exhibits.

Robert J. Hofinger holds the title of Professor Emeritus from the Electrical and Computer Department in the College of Technology at Purdue University. He received his BSEE and MSEE degrees from the Brooklyn Polytechnic Institute (now the NYU Polytechnic School of Engineering).

Before starting his academic career at Purdue University, he worked as an electrical engineer for over 30 years. His experience included work in the military/aerospace industry with LITCOM electronics, a division of LITTON Industries and RCA AstroSpace Division where he designed digital circuitry for the decoding and control of hydrogen gas thruster engines on commercial telecommunication satellites; in the gasoline industry with GILBARCO, at the time an EXXON subsidiary, in the design of ultrasound underground metering systems and specialized switching power supplies for gasoline dispensers; in the electric metering industry with LANDIS & GYR, in the design of analog current dividing circuits for accurately measuring the in-phase and quadrature-phase currents for electronic watt-hour metering systems; and the automotive industry with DELCO Electronics (now DELPHI Electronics) in designing Electronic Control Modules (ECMs) for OPEL Motors, a General Motors European subsidiary.

After retirement from full time teaching, he is teaching part time as an Adjunct Professor for the IvyTech Community College of Indiana in the School of Applied Science and Engineering Technology.

He has been active in the American Society for Engineering Education (ASEE) for many years, serving as the program chair for the Instrumentation Division. He was elected to and has held all executive positions in the IL/IN section of the ASEE. He has also held the office of treasurer of the Greensboro, N.C. chapter of the IEEE.
About the Schmitz Award

The Ronald Schmitz Award is given to recognize outstanding and continued service to engineering education through contributions to the Frontiers in Education Conference.

About Ronald J. Schmitz

Ronald J. Schmitz was born near Ionia, Iowa on April 25, 1934. He attended a one-room country school through the eighth grade and then, as was not uncommon at the time, decided to forgo high school and work on his father’s farm. At age 18, he joined the United States Navy. He served as an Electricians Mate, spending much of his enlistment at sea and made a round-the-world cruise aboard the USS Saipan.

In the Navy, Ron found an interest in and an aptitude for technology and recognized the need for further education. He completed a GED program in the Navy and, when he was discharged, enrolled in electrical engineering at Iowa State University. He received all his degrees there, finishing his doctorate in 1967.

In the fall of 1967, he accepted appointment as Assistant Professor in the Department of Electrical Engineering at the South Dakota School of Mines and Technology in Rapid City. He was involved in various research activities and directed both masters and doctoral students, but his strongest interest was always in teaching. Ron was a consummate teacher, patient with students who were having difficulty but intolerant of sloth. He received the School of Mines Teaching Award in 1975 and the Western Electric Fund Award for Excellence in Teaching in 1981.

Dr. Schmitz was very active in the IEEE, especially the Education Society, and served as Secretary Treasurer of the Society. He was also active in ERM and attended, and contributed to, many Frontiers in Education Conferences. He served as general chair of FIE 1981 in Rapid City.

Ron was an avid hunter and fisherman, a devoted husband and father and a faithful friend. He served his church as Lector and Lay Minister and was active as a Boy Scout leader.

IEEE Education Society William E. Sayle II Award for Achievement in Education

For continuously introducing project-based learning into the engineering curriculum and promoting professional development of the faculty

Marco Winzker (M’10-SM’11) is Professor for digital design and fundamentals of electric circuits at the Bonn-Rhein-Sieg University in St. Augustin, Germany. He joined the faculty in 2004 and was associate dean of the Engineering department from 2007 to 2011. Since 2011 he has been the project manager for Pro-MINT-us, the university project of the German Teaching Quality Pact initiative ("Qualitätspakt Lehre"). Marco studied Electrical Engineering at the University of Hannover, Germany and received his Ph.D. for work on low-power CMOS design. As Design Engineer and Group Leader he developed image processing systems with ASICs and FPGAs. He worked for Philips Semiconductors (now NXP) in Hamburg, Germany and Eindhoven, The Netherlands, for Liesegang electronics in Hannover, and for Silicon Optix (now IDT) in Hannover and Toronto, Canada.

At the Bonn-Rhein-Sieg University he was the Program Director of the first bachelor curriculum in electrical engineering which introduced a new 4-1-4-1-4-1 semester structure. Three weeks of each semester are reserved for project-based learning and self-learning exercises and these project weeks alternate with four weeks of regular lectures, classroom exercises, and hands-on labs. He successfully applied for funding from the Teaching Quality Pact initiative to extend project-based learning to 1st-year students and to strengthen STEM-subjects in the initial study phase. Marco promotes professional development within the faculty by organizing workshops, "education evenings" where professors dine at a restaurant and discuss an education topic and "teaching days" with talks from university staff and external speakers. In the university canteen he enthusiastically reports from education conferences like Educon and invites colleagues to join him at future events.

Marco was selected as participant for the excellence in education program "Lehre-hoch-n". He received an IEEE Educon Best Paper Award and the award for innovation in teaching at the Bonn-Rhein-Sieg University. He wrote an interdisciplinary textbook about electronics for non-engineers ("Elektronik für Entscheider") for a degree course of technical journalism. He was guest editor of the Austrian journal for higher education development ("Zeitschrift für Hochschulentwicklung") and was invited to speak as well as to chair workshops at several national and international education conferences. He regularly participates in summer schools of his university and has accompanied students to Finland, Spain and The Netherlands. He was also guest lecturer at the National Technical University of Argentina in Buenos Aires.
About the Sayle Award and William E. Sayle II

The William E. Sayle II Award is presented to recognize a member of the IEEE Education Society who has made significant contributions over a period of years in a field of interest of the IEEE Education Society. The award consists of a plaque, a certificate, and paid registration to the Frontiers in Education Conference.

Dr. William (Bill) E. Sayle received his BSEE and MSEE degrees from the University of Texas at Austin and his Ph.D. from the University of Washington. He joined the faculty in electrical engineering at Georgia Institute of Technology in 1970, just as Georgia Tech was beginning the transition from an undergraduate institution to a research university. He was the ECE associate chair for undergraduate affairs from 1988-2003, and, following retirement in 2003, served as director of undergraduate programs at Georgia Tech-Lorraine in France until 2007. Bill was a tireless advocate for students, putting in countless late night and weekend hours in addressing student issues, assigning teaching assistants, and meeting with prospective students and parents.

Throughout his career, Bill touched the lives of many people in the worldwide academic community. He was a leader and a pioneer in many areas. In the 1970s, he was a founding member of the IEEE Power Electronics Society, where he served in many leadership roles over the years. He was a champion of diversity and in recruiting underrepresented minorities and women to engineering and science, long before it became a national issue. He visited many high schools on behalf of the Southeastern Consortium for Minorities in Engineering, a role where he made many friends for Georgia Tech among high school administrators and students in the southern part of Georgia.

In his 30-year career at Georgia Tech, Bill received the ECE outstanding teacher award twice, as well as the Georgia Tech outstanding teacher award and outstanding service award. Bill lent his voice and efforts to Georgia Tech faculty governance throughout his career, serving as an elected member of Institute-level committees, the Academic Senate, and the Executive Board.

Bill was a long-time member and active volunteer in the IEEE Education Society and the Electrical and Computer Engineering Division of ASEE. He was a Fellow of both IEEE and ASEE. He was the recipient of the Education Society's 2001 Meritorious Service Award and 2004 Achievement Award and of the ECE Division's 2001 Meritorious Service Award and 2006 ECE Distinguished Educator Award. Bill was the General Chair of the 1995 Frontiers in Education (FIE) Conference, which is still remembered for its all-vegetarian menu, and received the 1996 Ronald J. Schmitz Award for outstanding service to FIE.

Much of Bill's professional career was devoted to engineering accreditation, serving at various times as member and chair of the IEEE Committee on Engineering Accreditation Activities and the IEEE Accreditation Policy Council. He participated in more than 20 visits as a program evaluator, in addition to serving as a team chair and member of the Engineering Accreditation Commission of ABET for more than five years. Bill received the IEEE Educational Activities Board Meritorious Achievement Award in Accreditation Activities in 2004.

Dr. Sayle passed away on February 2, 2008.
IEEE Transactions on Education Best Paper Award


Raghu Raman (M’08, SM’12) received his MBA from Haas School of Business, Berkeley in 2003. He is the Principal Investigator for the National Mission on Education through ICT EdRP Project, Measuring Learning under the HP Catalyst Global Innovation with Carnegie Mellon University and for the Medical Simulation initiative under the Ministry of IT. Currently Raghu is guiding research projects in the areas of learning analytics, serious games and virtual interactive learning environments.

Raghu has over 14 years of product design and architecture experience from NEC Research Labs and IBM and is recipient of the President of India Gold Medal. He is Immediate Past Chair of the IEEE Education Society, India, and recipient of IEEE Outstanding Chapter award for 2013.

Prema Nedungadi (M’12) is the Joint Director of Amrita CREATE (Center of Research in Advanced Technologies for Education) and faculty in School of Engineering. She has coauthored numerous scientific publications. Her research interests are in personalized e-learning solutions using computational intelligence methods, multimodal and virtual reality systems for STEM learning and language learning. She is Principal Investigator for the Online Science Labs and Adaptive Continuous and Comprehensive Evaluation research grants from Govt. of India and Co-Principal Investigator for the Virtual Labs project under National Mission in Education through ICT.

Krishnashree Achuthan holds a Ph.D. in chemical engineering and heads the Center for Virtual and Accessible Laboratories Universalizing Education (VALUE @ Amrita) at Amrita University. VALUE @ Amrita has built over 30 virtual laboratories that are simulation-based, interactive and/or remotely triggerable with over 300 experiments in the areas of Physics, Chemistry, Biotechnology, Computer Science and Mechanical Engineering. She is Principal Institute Coordinator for National Mission on Education through ICT at Amrita University. Her research interests include Science and Engineering under-graduate education amongst others. She has over forty research papers and publications in peer-reviewed conferences and journals. She is also the author of 29 U.S. Patents.

Shyam Diwakar (M ’01) received his Ph.D. in computational sciences from the University of Milan, Italy in 2008. Currently, he is an assistant professor at the School of Biotechnology where he is the head of the Computational Neuroscience laboratory. Prior to that he worked as a postdoctoral researcher in the department of General Physiology, University of Pavia, Italy. His research uses principles from electrical engineering and informatics to study the cerebellum and its functioning. Dr. Diwakar is also a member of Indian Academy of Neurosciences, Organization of Computational Neuroscience Societies (OCNS) and the IACSIT.

Ranjan Bose (SM ’11) received his B.Tech. degree in electrical engineering from the Indian Institute of Technology (IIT), Kanpur and the M.S. and Ph.D. degrees in electrical engineering from the University of Pennsylvania, Philadelphia, Currently he holds the Microsoft Chair Professorship and heads the Wireless Research Lab in IIT Delhi. His research interests lie in the areas of ultra-wideband (UWB) communications, broadband wireless access and coding theory. He has held guest scientist positions at the Technical University of Darmstadt, Germany, University of Colorado at Boulder, USA and UNIK, Norway. He has published over one hundred research papers in refereed journals and conferences, and holds ten patents.

Past Recipients
'09 J.A. Buck, H. Owen, J.P. Uyemura, C.M. Verber, and D.J. Blumthenthal
'00 David J. Russomanno and Ronald D. Bonnell
'01 Christopher W. Trueman
'02 Mohan Krishnan and Mark J. Paulik
'03 Tyson S. Hall, James O. Hamblen, and Kimberly E. Newman
'04 M. Brian Blake
'04 Russell L. Pimmel
'05 Antonio J. Lopez-Martín
'06 Euan Lindsay and Malcolm C. Good
'07 Jason A. Day and James D. Foley
'08 France Bélanger, Tracy L. Lewis, George M. Kasper, Wanda J. Smith and K. Vernard Harrington
'09 Kenneth Ricks, Jeff Jackson, and William A. Stapleton
'10 Keith Holbert and George G. Karady
'11 Julie A. Rursch, Andy Luse, and Doug Jacobson
'12 Susan Lord, Richard Layton, and Matthew Ohland
'13 Benjamin Hazen, Yun Wu and Chetan Sankar
'14 James McLurkin, Joshua B. Rykowski, Meagan John, Quillan Kaseman, and Andrew J Lynch
Distinguished Chapter Leadership Award

For her exceptional contribution to the IEEE Education Society and for distinguished leadership in engineering education over a sustained period.

Dr. Rosanna Yuen-Yan Chan is a Senior Member of the IEEE and an Adjunct Assistant Professor at the Department of Information Engineering, The Chinese University of Hong Kong. She has a multidisciplinary background in engineering, education, and learning science. Rosanna is the Founding Chair of the IEEE Education Society Hong Kong Chapter, the Educational Activities Chair of the IEEE Hong Kong Section, and a committee member of the IEEE Educational Activities Board (EAB) Student Educational Resources Committee (SERC) as well as the Chapter Committee of the IEEE Education Society. Rosanna is elected the New Faculty Fellow of the Center for the Advancement of Scholarship on Engineering Education (CASEE), National Academy of Engineering (NAE), USA.
IEEE Education Society Edwin C. Jones, Jr. Meritorious Service Award

For service to the Education Society through maintenance, improvement, and implementation of the by-laws and related activities, for overall service to the society, and for service to all of IEEE, ABET, and ASEE.

Victor P. Nelson is a Professor and Assistant Chair of Electrical and Computer Engineering at Auburn University, where he has been on the faculty since 1978. His primary research interests include embedded systems and computer-aided design and testing of digital systems and application-specific integrated circuits (ASICs). He is co-author of the textbook Digital Logic Circuit Analysis and Design and IEEE tutorial book Fault-Tolerant Computing. He is past chair of the ECE Curriculum Committee and coordinator of the ECE Graduate Program, and served one year as Associate Dean for Assessment in the College of Engineering. He was a co-winner of the 2005 “Wireless Educator of the Year” award from the Global Wireless Education Consortium for his role as one of the developers of the Bachelor of Wireless Engineering program at Auburn University, which is the first of its kind in the U.S., and currently serves as the director of that program. He received the Birdsong Merit Teaching Award in 2000 and the Walker Merit Teaching Award in 2002 from the College of Engineering, and was named outstanding member of the Graduate Faculty in 2004.

He is a member of the IEEE Education Society, in which he has served as a member of the Board of Governors, chair of the Constitution and Bylaws committee, and previously as an associate editor of the IEEE Transactions on Education. He was a member of the IEEE Computer Society/ACM Task Force that developed the Computer Engineering 2004 (CE20014) report on model computer engineering curricula, and is a member of the task force updating that report for CE2016. He is active in accreditation activities, having served as an ABET program evaluator and a current member of the ABET Engineering Accreditation Commission, and previously as a member and mentor coordinator of the IEEE Committee on Engineering Accreditation Activities (CEAA). He is also a member of ASEE, and previously served as chair of the ASEE ECE Division.
About the Edwin C. Jones Award

The Edwin C. Jones Meritorious Service Award is presented to recognize a member of the IEEE Education Society who has made pioneering contributions to the administrative efforts of the IEEE Education Society over a period of years. The award consists of a plaque, a certificate, and registration to the Frontiers in Education Conference.

About Edwin C. Jones

Professor Jones served as a Society officer from 1970 through 1976; this service included two years as president. He served as Editor-in-Chief of the IEEE Transactions on Education from 1982-84. Since he first became involved in the Society in the late 1960s, he has held virtually every office in the Education Society. Professor Jones also serves the IEEE as a member of the IEEE Committee on Engineering Accreditation Activities. Dr. Jones is University Professor and Associate Chair, emeritus, Department of Electrical and Computer Engineering, Iowa State University. Prior to joining Iowa State in 1966, he was an Assistant Professor at the University of Illinois from 1962-66. He received his PhD in 1962 from the University of Illinois; the DIC in 1956 from Imperial College of Science and Technology, London; and the BSEE in 1955 from West Virginia University. Dr. Jones’ honors and awards include: Fellow, Institute of Electrical and Electronics Engineers; Fellow, American Society for Engineering Education; Fellow, American Association for Advancement of Science; Fellow, Accreditation Board for Engineering and Technology; IEEE Centennial Medal, 1984; ASEE Centennial Medal, 1993; and the Grinner Distinguished Service Award from ABET in 2001. Some of his students founded a scholarship for Electrical and Computer Engineering students at Iowa State University in his honor.
IEEE Education Society Mac Van Valkenburg Early Career Teaching Award

For leadership in engineering education innovation and outstanding classroom teaching, providing students hands-on experience during classes and research, and helping them understand fundamentals using practical examples.

Dr. Chengying “Cheryl” Xu is currently an Associate Professor at the Florida State University, Tallahassee, Florida. She received her Ph.D. in 2006 in mechanical engineering from Purdue University, West Lafayette, Indiana, and her M.S. in 2001 in mechanical manufacturing and automation from Beijing University of Aeronautics and Astronautics, Beijing, China.

Her research interests include manufacturing of advanced materials, manufacturing process optimization and control, high temperature sensor design. Dr. Xu has co-authored a textbook with her doctoral advisor: Intelligent Systems: Modeling, Optimization and Control (CRC Press, 2008, 433 pages), and four book chapters. She has authored and coauthored more than 30 journal papers and around 30 refereed conference proceedings.

Dr. Xu is the Journal Guest Editor for ASME Transactions, Journal of Micro- and Nano-Manufacturing (ASME JMNM), an Associate Editor of the International Journal of Nanomanufacturing (IJNM) from 2008 to 2010, and has been on the Board of Editors for Journal of Aviation and Aerospace Perspectives (JAAP) since 2010, and International Journal of Computational Materials Science and Surface Engineering since 2007. She served on the Conference Organizing Committee for ASME Dynamic Systems and Control Conference (DSCC), International Symposium on Flexible Automation (ISFA), SPIE Conference, Smart Structures/NDE, Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems. She won the Office of Naval Research Young Investigator Award and Society of Manufacturing Engineers’ (SME) Richard L. Kegg Outstanding Young Manufacturing Engineer (OYME) Award in 2011.

She is actively in conducting research in manufacturing field and has attracted an impressively high level of research funding (total > $4M, where her share > $2.8M). She has secured significant support from National Science Foundation (NSF), Department of Energy (DoE), Office of Naval Research (ONR), Florida State, international/national companies, and her university to conduct research. She has graduated five Ph.D. and nine M.S. students.
IEEE Education Society Distinguished Member Award

For leadership in promoting innovation in STEM education, including service as project director for the Foundation Coalition, service as an ABET program evaluator, and service to the IEEE Education Society as Editor-In-Chief of the IEEE Transactions on Education and past-chair of the Frontiers in Education Conference.

Dr. Jeffrey E. Froyd is a TEES Research Professor in the Office of Engineering Academic and Student Affairs at Texas A&M University, College Station. He received the B.S. degree in mathematics from Rose-Hulman Institute of Technology and the M.S. and Ph.D. degrees in electrical engineering from the University of Minnesota, Minneapolis. He was an Assistant Professor, Associate Professor, and Professor of Electrical and Computer Engineering at Rose-Hulman Institute of Technology. At Rose-Hulman, he co-created the Integrated, First-Year Curriculum in Science, Engineering and Mathematics, which was recognized in 1997 with a Hesburgh Award Certificate of Excellence. He served as Project Director for a National Science Foundation (NSF) Engineering Education Coalition in which six institutions systematically renewed, assessed, and institutionalized innovative, integrated undergraduate engineering curricula.

He has authored over 70 journal articles and conference papers and offered over 30 workshops on faculty development, curricular change processes, curriculum redesign, and assessment. He has served as a program co-chair for three Frontiers in Education Conferences and the general chair for the 2009 conference. He also serves on the IEEE Curricula and Pedagogy Committee, which is part of the University Resources Committee, which is part of the Educational Activities Board. Prof. Froyd is a Fellow of the IEEE, a Fellow of the American Society for Engineering Education (ASEE), an ABET Program Evaluator, the Editor-in-Chief for the IEEE Transactions on Education, a Senior Associate Editor for the Journal of Engineering Education, and an Associate Editor for the International Journal of STEM Education.

Past Recipients
'05 Marion O. Hagler and Burks Oakley II
'06 Ted Batchman and David A. Conner
'08 David L. Soldan
'10 Manuel Castro
'11 Susan M. Lord
'12 Matthew Ohland
'13 Victor Nelson

Jeffrey Froyd
Texas A&M University
IEEE Education Society
Student Leadership Award

For Student Branch leadership advocating and facilitating the activities of the UNED Student Branch and collaborations in Spain and Portugal to sustain IEEE Students Branches.

German Carro Fernandez is Doctor, Cum Laude, in Industrial Engineering (UNED, 2014), Master in Research on Electronics, Electricity and Industrial Control (UNED, 2012), Bachelor degree on Computer Systems Engineering Tech. (UNED, 2010), Master on Business Administration and Taxes (UDC and Spanish Public Tax School, Spanish Treasury, 1997) and Bachelor degree on Economics Science and Financial Markets (UDC, 1996). He is on the Board of Directors of Pre-University Activities Sub-Committee of EASC Region 8, was Treasurer of IEEE Spain Section, Chair of Spain Section AG GOLD/YP, Chair of IEEEsbs of UNED, Chair of Student Chapter of IEEE Education Society on IEEEsb of UNED, and Member of several IEEE Societies.

He has worked as a freelance economist and engineering consultant for industries and enterprises since 1994. Since 2012 he is working as Professor and Researcher on several projects with main focus on Remote Laboratories, Telematics Control, Robotics and IoT, at UNED, and since 2015 he is Director of the UNED Associate Center on A Coruña (Spain). Since 2006 he has been working as volunteer at IEEE to spread technology on several education areas and promoting the engineering and science on Schools, Universities and Academia receiving several appreciation certificates like “Certificate of Appreciation from IEEE”, 2010/2011, and "Certificate of appreciation from IEEE Spain Section”, 2012/2013.

Past Recipients
‘09 Seiji Isotani
‘10 Emmanuel Gonzalez and Kai-Pan Mark
‘11 Dario Schor
‘12 Elio San Cristobal Ruiz and Sergio Martin
‘13 Subhamoy Mandal
‘14 Liang-Bi Chen
IEEE Fellow Award

Susan M. Lord, University of San Diego

For professional leadership and contributions to engineering education

Susan M. Lord is Professor and Chair of Electrical Engineering, University of San Diego (USD). She received a B.S. from Cornell University and the M.S. and Ph.D. from Stanford University. Her research focuses on the study and promotion of diversity in engineering including student pathways, diverse populations including Latinos and military veterans, and cross-cultural studies with non-U.S. students. Her research has been sponsored by the National Science Foundation (NSF). Dr. Lord and Dr. Michelle Madsen Camacho are among the first to study Latinos in engineering. In reviewing their 2013 book, *The Borderlands of Education: Latinas in Engineering*, Dr. Riley, Smith College, called it “groundbreaking work…that will challenge your assumptions about women and minorities in engineering”. Dr. Walden, University of Oklahoma said “This book should be high on the must-read list for engineering educators at all levels, from first-year faculty to deans.” Dr. Lord is a Fellow of the IEEE and ASEE and is active in the engineering education community including serving as General Co-Chair of the 2006 Frontiers in Education (FIE) Conference, on the FIE Steering Committee, and as President of the IEEE Education Society for 2009-2010. She is an Associate Editor of the IEEE Transactions on Education. She and coauthors received the 2011 Wickenden Award for the best paper in the Journal of Engineering Education and the 2011 Best Paper Award for the IEEE Transactions on Education. Dr. Lord spent a sabbatical in 2012 at Southeast University in Nanjing, China teaching and doing research. Dr. Lord is currently on the USD team implementing “Developing Changemaking Engineers”, an NSF-sponsored Revolutionizing Engineering Education (RED) project.
IEEE Fellow Award

Mark H. Weichold, Texas A&M University, Qatar

For contributions to international development of engineering education

Dr. Mark H. Weichold is an electrical engineer and has worked for General Dynamics Ft. Worth Division, Motorola in Austin, TX and the U.S. Army Electronic Technology and Devices Laboratory in Ft. Monmouth, NJ. He joined the Electrical Engineering faculty at Texas A&M University in 1982 and now holds the title of Professor. His research interests include electron device fabrication process development, device design and characterization. He has authored more than 80 journal articles, conference papers and scientific reports and holds three US patents. At the University’s main campus, he served as the Dean of Undergraduate Programs and Associate Provost for Academic Services. In 2009, he was recognized as a Regents Professor his outstanding work and exemplary contribution to Texas A&M University. In 2013, he was awarded the Abdullah bin Hamad Al Attiyah International Energy Award for ‘Lifetime Achievement for the Advancement of Education’.

He is a Fellow of the IEEE, a member of the American Physical Society, and a registered professional engineer in the State of Texas.

In January 2007, Weichold became Dean and CEO of Texas A&M University at Qatar. Since its inception, Texas A&M at Qatar has grown to more than 500 currently enrolled students, including 50 graduate students and over 80 faculty members. Of the more than 500 graduates, nearly half are Qatari nationals and 40% are female. Texas A&M at Qatar is also home to a dynamic research program with more than $160 million in cumulative funding that supports responsive research projects closely aligned with the goals of Qatar National Vision 2030.
IEEE Fellow Award

Sundaram Ramesh, California State University, Northridge

For contributions to entrepreneurship in engineering education

Dr. Sundaram Ramesh has been serving as the Dean of the College of Engineering and Computer Science at California State University, Northridge since 2006. Prior to joining CSUN he was Professor of Electrical and Electronic Engineering at California State University, Sacramento, where he was the Department Chair from 1994 to 2006. His efforts and leadership have created jobs and enhanced the growth of high technology industries through the Center for Entrepreneurship and Innovation and Energy Research Center at CSU Northridge. Examples include a Satellite Clean Tech Incubator, a Master’s Degree in Assistive Technology Engineering – whose graduates help design and create products to serve persons with disabilities; and as the PI of the nationally acclaimed five year AIMS² (www.ecs.csun.edu/aims2) program to graduate underrepresented minorities in engineering and computer science with a $5.5 Million grant from the US Department of Education.

In 2014 Ramesh was invited by the White House Office of Science and Technology Policy (OSTP) to host one of the four national White House STEM workshops at CSU Northridge to broaden participation of minorities in the STEM disciplines, remove barriers, and improve student graduation rates especially in engineering and computer science. Ramesh serves on several Boards including IEEE EAB, the IEEE-HKN Board of Governors, and ABET Board of Directors. He has served ABET as a program evaluator representing IEEE. He is the IEEE-HKN President-Elect for 2015-16, and chairs the 2015 IEEE EAB Pre-University Coordinating Committee leading signature programs such as TISP (Teacher in Service program) and EPICS (Engineering Projects in Community Service) in IEEE. Dr. Ramesh’s professional interests are in Fiber Optic Communications and he received the BE (Honors) degree from the University of Madras, India, in 1981, and the MSEE and PhD degrees from Southern Illinois University, Carbondale, in 1983 and 1986 respectively. For additional information please visit http://www.csun.edu/engineering-computer-science/ramesh.
Reviewers

This year, FIE 2015 had over 700 papers and presentations submitted for consideration. The FIE 2015 Program Committee wishes to thank the following individuals for acting as abstract and paper reviewers. The program committee asked these individuals to help control the quality of the presentations at this year's conference by reviewing the submissions for FIE 2015. Their outstanding effort has helped maintain the high standard that has become the reputation of each FIE conference.

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<td>Haqiq Abdelkrim</td>
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Mariano Savelski  
Rowan University

Walter Schilling  
Milwaukee School of Engineering

Corey Schimpf  
Purdue University

Lizabeth Schlemer  
Cal Poly, San Luis Obispo

Susan Schneider  
Marquette University

Dario Schor  
Magellan Aerospace

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Michael Scott  
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Kumar Singh  
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James Sluss  
The University of Oklahoma

Richard Smith  
Rensselaer Polytechnic Institute

Sally Smith  
Edinburgh Napier University

Thérèse Smith  
University of Connecticut

Carl Smith  
University of Minnesota

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CESAR / UFPE

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University of São Paulo

Andreas Spanias  
ASU / SenSIP Center / School of ECEE

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Itana Stubiener  
Universidade Federal do ABC UFABC

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Aaron Striegel  
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Jaspal Subhlok  
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Toshiharu Sugawara  
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Kazuhide Sugimoto  
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Heru Suhartanto  
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Jarkko Suhonen  
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Alfred Weaver  
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Wook-Sung Yoo  
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Cheah Yoong  
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Sarah Zappe  
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Yevgeniya Zastavker  
F. W. Olin College of Engineering

Jinghua Zhang  
Winston-Salem State University

Xue Zhang  
Arizona State University

Ling Zhao  
Shanghai University

Carla Zoltowski  
Purdue University

Sergio Zorzo  
Federal University of Sao Carlos

Danilo Zutin  
Carinthia University of Applied Sciences
Session Chairs

The conference committee would like to thank the people that have agreed to act as session chairs at the 2015 Frontiers in Education Conference. Session chairs play an important role in ensuring the conference runs smoothly and that the technical presentations are a valuable experience for both speakers and attendees. Session chairs also have served a critical role in helping with the Ben Dasher Award process.

The primary responsibilities of session chairs are to:

- Read the session's papers in advance and recommend papers for the Ben Dasher Best Paper committee.
- Contact the authors in the session and become familiar with the authors who are presenting.
- Introduce the session and make any FIE announcements that are needed.
- Briefly introduce each speaker and paper.
- Manage audience questions, and ensure that presentations begin and end within their time slots.

The program committee would like to thank the following individuals and those session chairs not listed for their efforts to help make FIE 2015 both informative and successful:

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Start time</th>
<th>Room</th>
<th>Chair</th>
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<td>Kohlberg</td>
<td>Sohum Sohoni (Arizona State University, USA)</td>
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<td>T1B</td>
<td>Special Session: Movin' Along: Investigating Motion and Mechanisms Using Engineering Design Activities</td>
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<td>Eric Durant (Milwaukee School of Engineering, USA)</td>
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<td>T1C</td>
<td>First and Second Year Topics I</td>
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<td>Jon Sticklen (Michigan Technological University, USA)</td>
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<tr>
<td>T1D</td>
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<td>David Reeping (Ohio Northern University, USA)</td>
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<tr>
<td>T1E</td>
<td>Social and Cognitive Aspects of Learning</td>
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<td>Monique Ross (Engineering Education, USA)</td>
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<td>T1F</td>
<td>Innovation and Entrepreneurship I</td>
<td>11:00 AM</td>
<td>Longhorn</td>
<td>Meagan Vaughan (University of Texas at El Paso, USA)</td>
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<td>T1G</td>
<td>Learning in Teams</td>
<td>11:00 AM</td>
<td>Hereford</td>
<td>Katherine Goodman (University of Colorado Boulder, USA)</td>
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<td>T1H</td>
<td>Learning Analytics I</td>
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<td>Rio Grande</td>
<td>Molly Hathaway Goldstein (Purdue University, USA)</td>
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<td>T1I</td>
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<td>Santa Fe</td>
<td>Rose Gamble (University of Tulsa, USA)</td>
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<td>T2A</td>
<td>Special Session: Design Metaphors - Rethinking the Vocabulary of Design Education</td>
<td>2:30 PM</td>
<td>Kohlberg</td>
<td>Colin Smith (Edinburgh Napier University, United Kingdom)</td>
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<td>T2B</td>
<td>Special Session: Helping Tomorrow's Engineers Ask Productive Questions</td>
<td>2:30 PM</td>
<td>Pancho Villa</td>
<td>Susan Kowalski (Colorado School of Mines, USA)</td>
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<td>T2C</td>
<td>Innovative Curriculum &amp; Course Design I</td>
<td>2:30 PM</td>
<td>Angus</td>
<td>Axel Böttcher (Munich University of Applied Sciences, Germany)</td>
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<td>Blended Learning Approaches</td>
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<td>Michael Mogessie Ashenafi (University of Trento, Italy)</td>
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<td>T2I</td>
<td>Teaching Cryptography &amp; Computer Security</td>
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<td>T3A</td>
<td>Special Session: Introduction to Systematic Reviews in Engineering Education Research</td>
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<td>Kohlerberg</td>
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<td>T3B</td>
<td>Special Session: Exploring the Black Box of Dissemination: The Role of Professional and Organizational Development</td>
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<td>Special Session: Taking Stock: Using a Landscape Inventory to Drive Curriculum and Program Change</td>
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<td>Innovative Mobile Tools and Applications</td>
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<td>Special Session: CE2016 Updated Computer Engineering Curriculum Guidelines</td>
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<td>Special Session: What the Heck is That?? Adaptation of Evidence-Based Instructional Practices</td>
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<td>F4D</td>
<td>K-12 Teacher Education and Computational Thinking</td>
<td>5:00 PM</td>
<td>Brahma</td>
<td>Charles Wallace (Michigan Technological University, United States)</td>
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<td>F4E</td>
<td>K-12 Education III</td>
<td>5:00 PM</td>
<td>Charolais</td>
<td>Mary M Capraro (Texas A&amp;M University, USA)</td>
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<td>F4F</td>
<td>Design Education III</td>
<td>5:00 PM</td>
<td>Longhorn</td>
<td>Deeksha Seth (Drexel University, USA)</td>
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<td>F4G</td>
<td>Philosophy Of Engineering</td>
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<td>Hereford</td>
<td>Geoffrey Herman (University of Illinois at Urbana-Champaign, USA)</td>
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<td>Professional Skills</td>
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<td>Rio Grande</td>
<td>Abe Zeid (Northeastern University, USA)</td>
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<td>Embedded Systems Education II</td>
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<td>Firas Hassan (Ohio Northern University, USA)</td>
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<td>S1A</td>
<td>Panel: International iCampus Forum (IC15) on &quot;Smart Education in Smart Cities&quot;</td>
<td>9:00 AM</td>
<td>Kohlberg</td>
<td>Jason Ng (British Telecom, United Kingdom)</td>
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<td>S1B</td>
<td>New Approaches-Student-Center</td>
<td>9:00 AM</td>
<td>Pancho Villa</td>
<td>Rangith Baby Kuriakose (University of Technology, South Africa)</td>
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<td>Session</td>
<td>Topic</td>
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<td>S1C</td>
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<td>Angus</td>
<td>Brian Skromme (Arizona State University, USA)</td>
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<td>Brahma</td>
<td>Vladik Kreinovich (University of Texas at El Paso, USA)</td>
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<td>First and Second Year Topics II</td>
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<td>Frank Vahid (University of California, Riverside, USA)</td>
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<td>S1F</td>
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<td>9:00 AM</td>
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<td>Dazhi Yang (Boise State, USA)</td>
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<td>Innovative Curriculum &amp; Course Design I</td>
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<td>Venky Shankararaman (Singapore Management University, Singapore)</td>
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<td>Innovative Curriculum &amp; Course Design II</td>
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<td>Wei-Fan Chen (Penn State University, USA)</td>
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<td>S1I</td>
<td>Faculty Development III</td>
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<td>Megan Tomko (Georgia Institute of Technology, USA)</td>
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<td>S2A</td>
<td>Technological Tools I</td>
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<td>Kohlberg</td>
<td>Jean Hertzberg (University of Colorado Boulder, USA)</td>
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<td>S2B</td>
<td>Computer Based Learning</td>
<td>11:00 AM</td>
<td>Pancho Villa</td>
<td>Rogério Garcia (São Paulo State University, Brazil)</td>
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<td>S2C</td>
<td>Innovative Curriculum &amp; Course Design III</td>
<td>11:00 AM</td>
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<td>Rebecca Reck (University of Illinois at Urbana-Champaign, USA)</td>
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<td>S2D</td>
<td>Curriculum Design III</td>
<td>11:00 AM</td>
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<td>Kari Systä (Tampere University of Technology, Finland)</td>
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<td>S2E</td>
<td>Innovative Curriculum &amp; Course Design IV</td>
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<td>Larry Richards (University of Virginia, USA)</td>
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<td>Senay Purzer (Purdue University, USA)</td>
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<td>S2I</td>
<td>Innovative Curriculum &amp; Course Design V</td>
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<td>Dan Tappan (Eastern Washington University, USA)</td>
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<td>S3A</td>
<td>Innovative Curriculum &amp; Course Design VI</td>
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<td>Kohlberg</td>
<td>Paul B Crilly (United States Coast Guard Academy, USA)</td>
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<td>S3B</td>
<td>Global Programs</td>
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<td>Pancho Villa</td>
<td>Joyce B. Main (Purdue University, USA)</td>
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<td>Outreach &amp; University, Community Collaborations</td>
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<td>Natascha Trellinger (Purdue University, USA)</td>
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<td>S3D</td>
<td>First and Second Year Topics III</td>
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<td>James Morris (Portland State University, USA)</td>
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<td>Linda P. DuHadway (Utah State University, USA)</td>
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<td>Samuel A Malachowsky (Rochester Institute of Technology, USA)</td>
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<td>Project-Based Learning</td>
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<td>Stephen Frezza (Gannon University, USA)</td>
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<td>S4B</td>
<td>Innovative Tools and Approaches</td>
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<td>Pancho Villa</td>
<td>Efrain O'Neill-Carrillo (University of Puerto Rico-Mayaguez, Puerto Rico)</td>
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<td>S4C</td>
<td>Non-Traditional Students</td>
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<td>Maura Borrego (University of Texas at Austin, USA)</td>
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<td>Jaspal Subhlok (University of Houston, USA)</td>
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<td>Co-Op and Early Career Training</td>
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<td>Charolais</td>
<td>Samantha Brunhaver (Arizona State University, USA)</td>
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<td>Session</td>
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<td>Communication and Storytelling</td>
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<td>Imelda Smit (North West University, South Africa)</td>
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<td>S4I</td>
<td>Innovative Curriculum &amp; Course Design VIII</td>
<td>4:30 PM</td>
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<td>Chiu Choi (University of North Florida, USA)</td>
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### Session Grid – Wednesday, October 21st

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<tr>
<th>Time</th>
<th>Brahma Room</th>
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<th>Santa Fe Room</th>
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<tbody>
<tr>
<td>1:00 PM - 4:00 PM</td>
<td>1A: Pre-Conference Workshop: Integrating Service-Learning into Engineering and Computing Education</td>
<td>1B: Pre-Conference Workshop: Teaching and Assessment Strategies that Value Innovative Thinking</td>
<td>1C: Pre-Conference Workshop: Process to Draft the Program Educational Objectives for Undergraduate Engineering Degree Programs</td>
<td>1D: Pre-Conference Workshop: Agile Way of Educating</td>
<td>1E: Pre-Conference Workshop: Ideas at Play: Bring games to your classroom to increase student engagement and deep learning</td>
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<td>5:00 PM - 8:00 PM</td>
<td>2A: Pre-Conference Workshop: Encouraging Information Rich Engineering Design</td>
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<td>2C: Pre-Conference Workshop: Agile Teaching and Learning</td>
<td>2D: Pre-Conference Workshop: How to Select an Area of Scholarship and Address the Applicable Review Criteria to Publish a Paper in the IEEE Transactions on Education</td>
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<td>11:00 AM - 12:30 PM</td>
<td>T1A: SS: Connecting and Expanding the Emerging Engineering Education Research &amp; Innovation (EER&amp;I) Communities</td>
<td>T1B: SS: Movin' Along: Investigating Motion and Mechanisms Using Engineering Design Activities</td>
<td>T1C: First and Second Year Topics I</td>
<td>T1D: K-12 Education I</td>
<td>T1E: Social and Cognitive Aspects of Learning</td>
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<tr>
<td>2:30 PM - 4:00 PM</td>
<td>T2A: SS: Design Metaphors - Rethinking the vocabulary of design education</td>
<td>T2B: SS: Helping Tomorrow's Engineers Ask Productive Questions</td>
<td>T2C: Innovative Curriculum &amp; Course Design I</td>
<td>T2D: K-12 Education II</td>
<td>T2E: Blended Learning Approaches</td>
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<td>4:30 PM - 6:00 PM</td>
<td>T3A: SS: Introduction to Systematic Reviews in Engineering Education Research</td>
<td>T3B: SS: Exploring the Black Box of Dissemination- The Role of Professional and Organizational Development</td>
<td>T3C: Engineering Identity</td>
<td>T3D: Curriculum change</td>
<td>T3E: Assessment in Computer Science</td>
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<td>9:00 AM - 10:30 AM</td>
<td>F1A: SS: Taking Stock: Using a Landscape Inventory to Drive Curriculum and Program Change</td>
<td>F1B: SS: Taking Stock: Using a Landscape Inventory to Drive Curriculum and Program Change</td>
<td>F1C: Innovative Mobile Tools and Applications</td>
<td>F1D: Game-Based Learning III</td>
<td>F1E: Flipped Classroom</td>
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<td>11:00 AM - 12:30 PM</td>
<td>F2A: SS: CE2016 Updated Computer Engineering Curriculum Guidelines</td>
<td>F2B: Special Session: What the Heck is That?! Adaptation of Evidence-Based Instructional Practices</td>
<td>F2C: Mobile Teaching and Learning</td>
<td>F2D: Game-Based Learning IV</td>
<td>F2E: Student Engagement II</td>
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## Session Grid – Saturday, October 24th

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<td>S1A: Panel: International iCampus Forum (IC15) on &quot;Smart Education in Smart Cities&quot;</td>
<td>S1B: New Approaches-Student-Center</td>
<td>S1C: Student Center Education</td>
<td>S1D: Assessment I</td>
<td>S1E: First and Second Year Topics II</td>
<td>S1F: Online Assessment</td>
<td>S1G: Innovative Curriculum &amp; Course Design I</td>
<td>S1H: Innovative Curriculum &amp; Course Design II</td>
<td>S1I: Faculty Development III</td>
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<td>2:30 PM - 4:00 PM</td>
<td>S3A: Innovative Curriculum &amp; Course Design VI</td>
<td>S3B: Global Programs</td>
<td>S3C: Outreach &amp; University, Community Collaborations</td>
<td>S3D: First and Second Year Topics III</td>
<td>S3E: Student Centered Education IV</td>
<td>S3F: K-12 Education IV</td>
<td>S3G: Innovative Curriculum &amp; Course Design VII</td>
<td>S3H: Innovative Curriculum &amp; Course Design VIII</td>
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