2014 Frontiers in Education Conference

OCTOBER 22-25, 2014

Opening Innovations and Internationalization in Engineering Education

MADRID - SPAIN

Melia Castilla Hotel & Convention Center

PROCEEDINGS

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Thursday, October 23

8:00 AM – 6:00 PM	Registration Open
8:00 AM – 9:00 AM	Focus on New Attendees Breakfast
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
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8:00 AM – 6:00 PM	Registration Open
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10:30 AM – 11:00 AM	Exhibit Hall Break
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2:30 PM – 4:00 PM	Technical Sessions (F3)
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11:00 AM – 12:30 PM	Technical Sessions (S2)
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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 CO-CHAIRS

One of the most rewarding tasks a conference chair has is the pride of becoming, for a few days, an ambassador of his city and having the responsibility and opportunity to repay to his colleagues the many experiences, the knowledge acquired, and the friendships that are the results of his past conference attendance.

The 44th Annual Frontiers in Education (FIE) Conference, as any of the past editions, is special. However, this one stands out for the fact that it is held, for the first time in more than 25 years, outside the United States, thanks to the consideration and trust shown by the sponsoring entities: the IEEE Education Society, the IEEE Computer Society, and the ASEE Educational Research and Methods Division, through the FIE Steering Committee.
What can you expect from Madrid during your visit? Testimonies from attendees to other organized events endorse Madrid as a luminous city, just as Velazquez portrayed it, a result of its multicultural composition, its presentation of history through its museums and monuments, and its modern cutting-edge ambiance. You will feel welcomed by its people, who haven't necessarily been born in Madrid.

In addition, FIE 2014 in Madrid is inspired by this year´s theme "Opening Doors to Innovation and Internationalization in Engineering Education." Analogous to the city, we engineering educators search for new roles in the face of the world challenges and necessities which transcend boundaries, by using innovation and generously sharing both resources and educational practices.

This has been the guideline that has lead to the participation of more than 500 speakers and that continues a long tradition of disseminating the results of educational innovations and research in engineering and computing. We are thankful for these speakers and the hard and brilliant work performed by the co-chairs of the Program Committee, who have selected and organized the papers submitted: Monica Cardella, ASEE Program Co-Chair; Russ Meier, IEEE Education Society Program Co-Chair; and Arnold Pears, IEEE Computer Society Program Co-Chair. Also to be thanked is the FIE Steering Committee, which by representing the three Societies, has achieved, despite the present situation of global, political and educational crisis, the success of this journey.

Thanks also to the logistic support of Assistant to the General Chairs Kevin Curry, University of Kansas Continuing Education, and to Conference Catalysts, for their work on the computer applications and the web site.
We have to thank our sponsors - the academic host institutions: Universidad Politécnica de Madrid (Madrid Technical University) and Universidad Nacional de Educación a Distancia (Spanish University of Distance Education); our other sponsors: The Madrid Convention Bureau, Hewlett-Packard, Edibon, Mathworks; and our exhibitors.

Madrid will play the role of a hub, a meeting point for professionals from different parts of the world to share ideas and learn about developments in computer science, engineering, and technology education and to interact with colleagues in these fields. Enjoy the history of the city, and the passion with which the artistic and sporting events are experienced. We hope that Madrid will forever find a place in your heart.

Conference General Co-Chairs

Manuel Castro, UNED, Madrid, Spain

Edmundo Tovar, UPM, Madrid, Spain

WELCOME FROM THE PROGRAM CO-CHAIRS

Dear Colleagues,

It gives us great pleasure to welcome you to Madrid, Spain, and the 2014 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 close to 900 submissions, from which we have selected approximately 500 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, mini-workshops, keynotes, 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 2014 in Madrid!

Monica Cardella	Russ Meier	Arnold Pears
ASEE ERM	IEEE Education Society	IEEE Computer Society

MESSAGE FROM THE FIE STEERING COMMITTEE

¡Bienvenidos a Madrid!

You are attending the 44th annual Frontiers in Education conference and we are happy to see you here! The Steering Committee is especially excited about this conference, as it has been 14 years since the last time FIE was held in Europe. As FIE is one of the premier conferences in engineering education, we look forward to increasing the frequency that FIE is held outside the United States so that we can all better learn from engineering educators from around the world.

FIE is a space where we can be challenged, invigorated and encouraged to think in new ways to facilitate our engineering students' learning. I hope you come away from this conference changed in some way - be it how you see your students, how you see yourself or how you see your institution and its role in educating future engineers.

One of the wonderful aspects of FIE is the community we continue to create and maintain. Over these next few days, I hope you meet some new colleagues and perhaps make a new friend. For those of you that have been coming to FIE for a while, I encourage you to make the extra effort to reach out to those that are new to the conference and make them feel welcome. FIE is a special time and place that we can welcome others to.

Many volunteers, including the Steering Committee work to continually innovate and improve the conference. This year you will notice it is our first year without a physical program. We look forward to hearing your response to this new change that is easier on the planet and our pocketbooks.

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
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- James Sluss, University of Oklahoma, sluss@ou.edu
- Edmundo Tovar, Universidad Politécnica de Madrid, etovar@fi.upm.es

As the senior ASEE ERM representative, this conference begins my first of a two year rotation as FIE Steering Committee Chair. I want to thank our recent past chairs, Dr. Russ Meir (IEEE Ed. Soc. 2012-2014) and Arnold Pears (IEEE Comp. Soc. 2010-2012) for their vision and leadership. I look forward to working with all of you to continue to keep FIE on the frontier.

¡Amigos y colegas, espero que disfrutéis de la Conferencia!

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FIE STEERING COMMITTEE

ASEE Educational Research and Methods Division Representatives

- James Morgam

(June 2011 - June 2014)

- Archie Holmes, University of Virginia

(June 2012 - June 2015)

- Beth Eschenbach , Humboldt State University

(June 2010 - June 2016)

IEEE Computer Society

- Arnold Pears, Uppsala University

(June 2009 - June 2015)

- Stephen Frezza, Gannon University

(June 2011 - June 2014)

- Deborah Trytten

(June 2013 - June 2016)

IEEE Education Society

- Russ Meier, Milwaukee School of Engineering, Steering Committee Chair

(June 2007 - present)

- Edmundo Tovar, Universidad Politecnica de Madrid

(June 2008 - June 2014)

- James Sluss, University of Oklahoma

(June 2012 - June 2015)

FUTURE FIE CONFERENCES

FIE 2015 El Paso, Texas
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 **44th 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

Universidad Nacional de Educación a Distancia (The National University of Distance Education)

Universidad Nacional de Educación a Distancia (UNED) is a distance learning and research university founded in 1972 and is the only university run by the central government of Spain. UNED is headquartered in Madrid and has centers in all of the Spanish Autonomous Communities as well as in thirteen countries in Europe, the Americas, and Africa. The University awards undergraduate and postgraduate degrees, as well as non-degree qualifications such as diplomas and certificates, or continuing education units. UNED has more than 205,000 students, making it the largest student population in Spain and is one of the largest universities in Europe.

La Universidad Politécnica de Madrid (The Technical University of Madrid)

La Universidad Politécnica de Madrid (UPM) was founded in 1971 by the merging of the higher technical schools of engineering and architecture, most of which originated in the 18th and 19th centuries. According to the annual university ranking conducted by *El Mundo Newspaper*, UPM ranks as the number two university in Spain and as the top technical university. The majority of its engineering schools are consistently ranked as the leaders in their fields in Spain, and among the very best in Europe. UPM is attended by over 44,000 students pursuing undergraduate and postgraduate degrees, as well as those in permanent training.

KEYNOTES

Thursday, October 23, 9:00 AM
Tapices
Reinventing Education in the Internet Age

Speaker: Carlos Delgado Kloos, Universidad Carlos III de Madrid

We find ourselves at a crossroads. In Higher Education, we have to teach young people to work in jobs that don't exist to solve problems we don't know of, with technology that has not yet been developed. There are even problems today that are complex and wicked enough. And this in a context, where the professor cannot be any more the source of all knowledge. On the other side, we are witnessing a commoditization of educational content. Content abounds and becomes richer and more interactive. The Internet and ICT have reinvented the photography, music and news industries. How to reinvent the education industry?

Carlos Delgado Kloos received the Ph.D. degree in Computer Science from the Technische Universität München and in Telecommunications Engineering from the Universidad Politécnica de Madrid. He is Full Professor of Telematics Engineering at the Universidad Carlos III de Madrid, where he is the Director of the GAST research group, Director of the UNESCO Chair on "Scalable Digital Education for All", Director of an online Master program on e-learning, and Vice-Rector of Infrastructures and Environment. He is also the Coordinator of the eMadrid research network on Educational Technology in the Region of Madrid.

His main research interests are in the area of Technology-enhanced Learning. He has been involved in more than 30 projects with European (Esprit, IST, @LIS, eContentPlus), national (Spanish Ministry, Region of Madrid) and bilateral (Spanish-German, Spanish-French) funding. He has published over 200 articles in national and international conferences and journals. He has further written a book and co-edited over a dozen. He is the Spanish representative at IFIP TC3 on Education and Senior Member of IEEE.

Friday, October 24, 12:45 PM
Tapices
Who am I? Who are you? Where are we going?

Speaker: John Heywood, Life member and Fellow ASEE, Life Senior Member IEEE

Dr John Heywood is best known for his IEEE/Wiley publication Engineering Education: Research and Development in Curriculum and Instruction. He has been engaged in R and D in Engineering and Higher Education since 1960 and during that period studied change, been a change agent and an innovator. He is author of Learning, Adaptability and Change: The Challenge for Education and Industry. He has made other contributions to management including a study of engineers at work, and has a particular interest in policy making. He has made a special study of assessment both in high schools and higher education and three editions of his book on Assessment in Higher Education have been published. In engineering he had the privilege to direct the British Astronomical Association's and Radio Society of Great Britain's observations of Sputniks I and II. He is currently interested in the development of philosophy as applied to engineering education and the development of engineering and technological literacy. He has made many contributions to Frontiers in Education Conferences. John Heywood is a Professorial Fellow Emeritus of Trinity College Dublin in the School of Education of the University of Dublin.

CONFERENCE AMENITIES

Breakfast ● Tapices Room
Breakfast is included with hotel registration at the conference hotel. It is separate from your conference registration. However, our conference attendees who are staying at the Meliá Castilla will eat in a separate breakfast room from the other hotel guests so we have more freedom to network. Breakfasts will take place in the Tapices Room. On Thursday and Friday, breakfasts will include plenary presentations.
If you registered for the conference, but do not stay at the Meliá Castilla, you will be responsible for your own breakfast. Nonetheless, you will be able to come to the plenary sessions following the breakfasts on Thursday and Friday.

8:00 a.m. – 10:30 a.m. Thursday Includes Plenary Session
8:00 a.m. – 9:00 a.m. Friday
8:00 a.m. – 9:00 a.m. Saturday

Refreshment Breaks
Morning and afternoon breaks Thursday and Friday Exhibit Hall – Patio 2
Morning and afternoon breaks Saturday – Outside Patio Rooms by Conference Registration

Lunches ● Tapices Room

Frederick Emmons Terman and Harriett B. Rigas Awards Luncheon
Sponsored by the Hewlett-Packard Company
12:45a.m. –2:15 p.m. 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
12:45a.m. –2:15 p.m. Friday
Includes Plenary Session

Luncheon
12:45a.m. –2:15 p.m. Saturday

New Faculty Fellows ● Exhibit Hall ● Patio 2
4:00 p.m.–5:00 p.m. 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 Hall ● Patio 2
4:00 p.m.–5:00 p.m. Friday
Visit the FIE exhibits and check out the latest textbooks, computer software, lab equipment, and other innovations while enjoying refreshments.

Awards Banquet ● Tapices Room
7:30 p.m.–9:00 p.m. Friday
This year's awards banquet features fine food, drink, and camaraderie along with presentation of special awards from FIE, the IEEE Education Society, and the IEEE Computer Society. There is a separate charge for the banquet.

FIE Registration Conference Desk ● Lobby Level by Patios 1, 2 & 3
Registration will be open during these times:

Wednesday	12:00 p.m. – 8:00 p.m.
Thursday	8:00 a.m. – 6:00 p.m.
Friday	8:00 a.m. – 6:00 p.m.
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Richard Layton (Rose-Hulman Institute of Technology, USA)

1B: Evaluability Assessment for Engineering Educators
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Room: Patio 1

Training Student in Responsibility for Their Own Learning: True Student Centered Learning *6*
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2:00 - 5:00 PM
Room: Comendador

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9:00 AM - 10:30 AM
Room: Doblon

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Chair: Oladipo Onipede
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Room: Patio 1

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Room: El Jardin

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Carme Martin (Universitat Politecnica de Catalunya - BarcelonaTech, Spain)
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Roberto Hernandez (Spanish University for Distance Education - UNED, Spain)
Rafael Pastor Vargas (Spanish University for Distance Education - UNED, Spain)
Manuel Castro (Spanish University for Distance Education - UNED, Spain)

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Chair: Jordi Fortuny-Santos
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Room: Alcalá

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Montserrat Alsina (Universitat Politècnica de Catalunya-BarcelonaTech, Spain)
Jordi Fortuny-Santos (Universitat Politècnica de Catalunya-BarcelonaTech, Spain)
Conxita Lao-Luque (Universitat Politècnica de Catalunya-BarcelonaTech, Spain)
Francesc Xavier de las Heras- Cisa (Universitat Politècnica de Catalunya-BarcelonaTech, Spain)

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Akash Pooransingh (The University of the West Indies, Trinidad and Tobago)

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Julian Bass (Robert Gordon University, United Kingdom)
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Marta Lárusdóttir (Reykjavik University, Iceland)

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Sally Smith (Edinburgh Napier University, United Kingdom)
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Ian Smith (Edinburgh Napier University, United Kingdom)

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Jorge Martin-Gutierrez (La Laguna University, Spain)
Antonio Manuel González Marrero (La Laguna University, Spain)

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Adalberto Gabriel Diaz Torres (EAFIT University, Colombia)
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Sebastian Rivas (University of Malaga, Spain)

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Larry Richards (University of Virginia, USA)

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Chair: Pramod Abichandani
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Juan Quemada Vives (Universidad Politécnica de Madrid, Spain)

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Eli Fromm (Drexel University, USA)

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Marc Sosnick-Pérez (San Francisco State University, USA)
Shihong Huang (Florida Atlantic University, USA)
Rainer Todtenhoefer (University of Applied Science, Fulda, Germany)
Kazunori Okada (San Francisco State University, USA)
Swati Arora (San Francisco State University, USA)
Ramasubramanian Sreenivasen (San Francisco State University, USA)
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Trina Fletcher (Purdue University, USA)
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Mary Virnoche (Humboldt State University, USA)
Susan M. Lord (University of San Diego, USA)
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Sandra B Nite (Texas A&M University, USA)
Jim Morgan (Texas A&M University, USA)
Mary M Capraro (Texas A&M University, USA)
Robert M Capraro (Texas A&M University, USA)
Cheryl A Peterson (Texas A&M University, USA)

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Kristina Tank (University of Minnesota, USA)
Corey A Mathis (Purdue University, USA)
Selcen Guzey (University of Minnesota, USA)

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Vanessa Natalie Dominguez (University of California, Santa Barbara, USA)
Danielle B. Harlow (University of California, Santa Barbara, USA)

Might Young Makers Be the Engineers of the Future? *1408*
Shawn Jordan (Arizona State University at the Polytechnic Campus, USA)
Micah Lande (Arizona State University at the Polytechnic Campus, USA)

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Chair: Lisa Zidek
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John Pollard (British University in Egypt, Egypt)
Sara Al Menabawy (British University in Egypt, Egypt)

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Catherine Mobley (Clemson University, USA)

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Daniel Ringis (University of the West Indies at St. Augustine, Trinidad and Tobago)
Cathy-Ann Radix (The University of the West Indies at St. Augustine, Trinidad and Tobago)

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11:00 AM - 12:30 PM
Room: Alcalá

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Jim Morgan (Texas A&M University, USA)

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Gaurav Kumar Singh (Tata Consultancy Services Limited, India)
Varun Kumar (Tata Consultancy Services Limited, India)
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Niranjan Pedanekar (Tata Consultancy Services Limited, India)

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Paige Cote (Olin College of Engineering, USA)
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Yevgeniya V Zastavker (Olin College of Engineering, USA)

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Room: La Galería

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Elaine H. T. de Oliveira (Federal University of Amazonas, Brazil)
Alessandra Silva (Samsung Eletrônica da Amazônia (SEDA), Brazil)

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José Alberto Naves Cocota, Jr. (Universidade Federal de Ouro Preto, Brazil)
Tiago Pinheiro dos Santos (Universidade Federal de Ouro Preto, Brazil)
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Thiago D'Angelo (Universidade Federal de Ouro Preto, Brazil)
Luciana Castanheira (Universidade Federal de Ouro Preto, Brazil)

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Åsa Cajander (Uppsala University, Sweden)
Mats Daniels (Uppsala University, Sweden)
Anne-Kathrin Peters (Uppsala University, Sweden)
Roger McDermott (Robert Gordon University, United Kingdom)

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Chair: Jia-Ling Lin
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Room: Patio 3

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Karl O. Jones (Liverpool John Moores University, United Kingdom)
Kevin Johnston (Liverpool John Moores University, United Kingdom)
Colin Robinson (Liverpool John Moores University, United Kingdom)
Rebecca Bartlett (Liverpool John Moores University, United Kingdom)
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Fatima Nunes (University of São Paulo, Brazil)
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CUR3: Civil, Chemical, and Mechanical Engineering Curricula Design
Chair: Alicia Triviño
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Room: Doblon

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Francisco-Angel Moreno (Universidad de Malaga, Spain)
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Juan José Sánchez-Martínez (Universidad de Malaga, Spain)

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Chair: Anurima Chatterjee
2:30 PM - 4:00 PM
Room: Escudo

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Room: El Escorial

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Brook Sattler (University of Washington, USA)
Anette Kolmos (Aalborg University, Denmark)

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Chair: Adam R Carberry
2:30 PM - 4:00 PM
Room: Aranjuez

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Katherine Chen (California Polytechnic State University at San Luis Obispo, USA)
Roberta Herter (California Polytechnic State University at San Luis Obispo, USA)

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Sarah Beecham (University of Limerick, Ireland)

FAC3: Faculty Development: Initiatives and Research
Chair: Uma Garimella
2:30 PM - 4:00 PM
Room: La Granja

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Room: El Jardin

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Kishore Prahallad (International Institute of Information Technology, India)
Euan Lindsay (Charles Sturt University, Australia)
Burton Dicht (IEEE, USA)

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G. Lee (New Mexico State University, USA)
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Chair: Margaret D. Sullivan
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Peter Sauer (University of Illinois at Urbana-Champaign, USA)

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Otavio Acosta (Federal University of Rio Grande do Sul, Brazil)
Patricia Behar (Federal University of Rio Grande do Sul, Brazil)
Eliseo Reategui (Federal University of Rio Grande do Sul, Brazil)

Initial motivation and progress with doctoral studies in computer science - A case study from a Finnish university 1747
Sami Kollanus (Univ. of Jyväskylä, Finland)

Learning Fundamental Mechanics Relationships Using Inquiry-Based Learning Activities *1755*
Brian Self (California Polytechnic State University, USA)
James Widmann (California Polytechnic State University, USA)

A Systematic Mapping Study on Practical Approaches to Teaching Software Engineering *1759*
Maíra Marques Samary (Universidad de Chile, Chile)
Alcides Quispe (Universidad de Chile, Chile)
Sergio Ochoa (Universidad de Chile, Chile)

TLE6: Technologies and Practices for Teaching and Learning Engineering
Chair: Adrian Rusu
2:30 PM - 4:00 PM
Room: La Galería

Developing Novel Practices of Somatic Learning to Enhance Empathic Perspective-Taking for Ethical Reasoning and Engineering Design *1767*
Holly Jaycox (Purdue University, USA)
Justin Hess (Purdue University, USA)
Carla Zoltowski (Purdue University, USA)
Andrew O. Brightman (Purdue University, USA)

A Service-Oriented Reference Architecture for Mobile Learning Environments *1772*
Nemesio Duarte Filho (University of São Paulo, Brazil)
Ellen Barbosa (University of São Paulo, Brazil)

Is a Mac "PC" in Engineering? *1780*
Cory Brozina (Virginia Tech, USA)
Courtney Smith (Virginia Tech, USA)
Suzanne Nicewonder (Virginia Tech, USA)
Ben Lutz (Virginia Tech, USA)

Deployment and Analysis of Lecture Recording in Engineering Education *1786*
Carlos Turro (Universitat Politècnica de València, Spain)
Ignacio Despujol (Universitat Politècnica de València, Spain)
Aristóteles Cañero (Universitat Politècnica de València, Spain)
Jaime Busquets (Universitat Politècnica de València, Spain)

Interdisciplinary Faculty-Faculty Collaborations for the Development of Learning Technologies *1791*
Adrian Rusu (Rowan University, USA)
Matthew Bealor (Rowan University, USA)
Hector Lopez (Rowan University, USA)

ASM2: Uses of Assessment to Promote Learning
5:00 PM - 6:30 PM
Room: Patio 3

The Effects of Test-Enhanced Learning on Student Learning in an Electric Circuits Course *1799*
Archie Holmes (University of Virginia, USA)

Including Peer and Self-Assessment in a Continuous Assessment Scheme in Electrical and Electronics Engineering Courses *1806*
Juan Carlos Gonzalez de Sande (Universidad Politecnica de Madrid, Spain)
Adarsh Murthy (National Institute of Technology Karnataka-Surathkal, Mangalore, India)

Promoting student commitment and responsibility through self- and peer-assessment *1811*
Carlos Serra-Toro (Universitat Jaume I, Spain)
V. Javier Traver (Universitat Jaume I, Spain)
Juan C Amengual (Universitat Jaume I, Spain)

Redesign the Engineering Teaching and Assessment Methods to Provide More Information to Improve Students' Learning *1815*
Omar M. Ashour (Pennsylvania State University, The Behrend College, USA)
Shraddha Sangelkar (Pennsylvania State University, The Behrend College, USA)
Russell L. Warley (Pennsylvania State University, The Behrend College, USA)
Oladipo Onipede (Pennsylvania State University, The Behrend College, USA)

Prediction of students' academic performance: Adapt a methodology of predictive modeling for a small sample size *1821*
John Mativo (University Of Georgia, USA)
Shaobo Huang (University of Southern California, USA)

CUR4: Using Learning Theories to Guide Curriculum Design
5:00 PM - 6:30 PM
Room: Doblon

100% PBL Curriculum Startup Phase Complete *1824*
Ron Ulseth (Itasca Community College, USA)
Bart Johnson (Itasca Community College, USA)

Upgrading the Engineering Curriculum Through Thematic Learning Modules *1832*
Fazeel Khan (Miami University, USA)
Kumar Singh (Miami University, USA)

Using a cyclic model of knowledge transfer for the development of transdisciplinary learning environments *1836*
Klavdiya Bochenina (ITMO University, Russia)
Irina Boukhanovskaya (ITMO University, Russia)
Anna Bilyatdinova (ITMO University, Russia)
Alexey Dukhanov (ITMO University, Russia)
Anna Lutsenko (ITMO University, Russia)

A Practice-then-Apply Scaffolding Approach to Engineering Design Education *1845*
Adam R Carberry (Arizona State University, USA)
Nathan Johnson (Arizona State University, USA)
Mark Henderson (Arizona State University, USA)

Designing a Blended Learning Curriculum in the Development of Video Games *1848*
Angela Restrepo (Universidad de los Andes, Colombia)
Pablo Figueroa (Universidad de los Andes, Colombia)

DIS3: Distance Education in Multiple Disciplines
Chair: Bridget Benson
5:00 PM - 6:30 PM
Room: Escudo

Experience with Teaching Digital Design Online *1851*
Bridget Benson (California Polytechnic State University, USA)
Bryan Mealy (California Polytechnic State University, USA)

Efficacy of an Online Writing Program on URM Students in Engineering *1858*
Patricia R Backer (San Jose State University, USA)

Online Resource Platform for Mathematics Education *1865*
Edmund Nevin (Dublin Institute of Technology, Ireland)
Marisa Llorens (Dublin Institute of Technology, Ireland)
Eileen Mageean (Dublin Institute of Technology, Ireland)

The Use of Self-Monitoring Tools for Linear Algebra Course in Student Centered e-Learning Environment *1873*
Kasiyah Junus (Universitas Indonesia, Indonesia)
Harry Santoso (Universitas Indonesia, Indonesia)
Lia Sadita (Universitas Indonesia, Indonesia)

Comparison of the Impact of Two Research Experiences for Undergraduate Programs on Preparing Students for Global Workforces *1877*
Gisele Ragusa (University of Southern California, USA)
Cheryl Matherly (University of Tulsa, USA)
Sarah R. Phillips (Rice University, USA)

EER7: Reflection and Metacognition
Chair: Chris Venters
5:00 PM - 6:30 PM
Room: Aranjuez

"I Just Google It": A Qualitative Study of Information Strategies in Problem Solving Used by Upper and Lower Level Engineering Students *1884*
Anna Douglas (Purdue University, USA)
Connor Rohan (Purdue University, USA)
Michael Fosmire (Purdue University, USA)
Casey Smith (Purdue University, USA)
Amy S Van Epps (Purdue University, USA)
Senay Purzer (Purdue University, USA)

Using the Engineering Design Process as a Metacognitive Learning Strategy to Improve Student Performance *1890*
Peter Shull (Penn State University, USA)

Reflecting on Engineering Concepts: Effects on Critical Thinking *1895*
Polly Piergiovanni (Lafayette College, USA)

Using Cooperative Learning to Enhance Critical Reflection *1899*
Meriel Huggard (Trinity College Dublin, Ireland)
Frank Boland (Trinity College Dublin, Ireland)
Ciaran Mc Goldrick (Trinity College Dublin, Ireland)

Writing and Conceptual Knowledge in Statics: Does Learning Approach Matter? *1907*
Chris Venters (East Carolina University, USA)
Lisa McNair (Virginia Polytechnic Institute and State University, USA)
Marie Paretti (Virginia Polytechnic Institute and State University, USA)

FAC2: Supporting and Empowering Faculty
Chair: Luis Amaral
5:00 PM - 6:30 PM
Room: La Granja

Potential Minimum Viable Value Propositions for Engineering Education Scholarship *1915*
Jeffrey E Froyd (Texas A&M University, USA)
R Cheville (Bucknell University, USA)
Thomas Siller (Colorado State University, USA)

New Faculty Development: Creating a Community of Practice *1920*
Mary Lynn Brannon (The Pennsylvania State University, USA)
Sarah Zappe (The Pennsylvania State University, USA)

A Program Designed to Empower Engineering Educators *1925*
Melany M Ciampi (Safety, Health and Environment Research Organization, Brazil)
Claudio R Brito (Science and Education Research Council, Brazil)
Luis Amaral (University of Minho, Portugal)
Rosa Maria Vasconcelos (University of Minho, Portugal)
Victor F. A. Barros (Science and Education Research Council, Portugal)

An Examination of the Climate for Quality Teaching in Engineering *1930*
Jacqueline McNeil (Purdue University, USA)
Catherine E. Brawner (Research Triangle Educational Consultants, USA)
Matthew W Ohland (Purdue University, USA)

A Higher Education Social Network to Share and Promote Teaching Innovation Experiences *1934*
Lina García-Cabrera (University of Jaén, Spain)
José Ramón Balsas Almagro (University of Jaén, Spain)
Ildefonso Ruano Ruano (University of Jaén, Spain)

PHI: Special Session: Agents for STEM Change - Articulating the Goals of Our Community
5:00 PM - 6:30 PM
Room: El Jardin

Special Session: Agents for STEM Change - Articulating the Goals of Our Community *1942*
Rebecca Bates (Minnesota State University, Mankato, USA)
R Cheville (Bucknell University, USA)
Jennifer Karlin (SD School of Mines and Technology, USA)
Lisa Benson (Clemson University, USA)
Cynthia Finelli (University of Michigan, USA)
Susan M. Lord (University of San Diego, USA)

PRE: Pre-College (K-12) Engineering Education: Getting Them Early ... and Keeping Them!
5:00 PM - 6:30 PM
Room: El Escorial

Pre-College (K-12) Engineering Education: Getting Them Early ... and Keeping Them! *1944*
Larry Richards (University of Virginia, USA)
Susan Donohue (University of Virginia, USA)

PRE3: Measuring the Outcomes of Precollege Education
Chair: David Reeping
5:00 PM - 6:30 PM
Room: Comendador

"STEM Academies" and Their Effect on Student Perceptions of Engineering *1948*
David Reeping (Ohio Northern University, USA)
Kenneth Reid (Virginia Tech, USA)

Middle School Students' Understanding and application of the Engineering Design Process *1954*
Linda S. Hirsch (New Jersey Institute of Technology, USA)
Suzanne Berliner Heyman (New Jersey Institute of Technology, USA)
John Carpinelli (New Jersey Institute of Technology, USA)
Howard Kimmel (New Jersey Institute of Technology, USA)

STEM Integration in the Middle Grades: A Case Study of Teacher Implementation *1960*
Tamara J. Moore (Purdue University, USA)
Corey A Mathis (Purdue University, USA)
Selcen Guzey (University of Minnesota, USA)
Aran Glancy (University of Minnesota, USA)
Emilie Siverling (Purdue University, USA)

Initial Findings of High School Pre-engineering and Non-engineering Students' Design Cognition *1968*
Matthew Lammi (NC State University, USA)
John Wells (Virginia Polytechnic Institute & State University, USA)
Cameron Denson (NC State University, USA)
Marie Paretti (Virginia Polytechnic Institute & State University, USA)
Christopher Williams (Virginia Polytechnic Institute & State University, USA)
John Gero (George Mason University, USA)

Development of Non-Cognitive Skills in Minority Engineering Outreach Programs..... *1972*
Tasha Zephirin (Purdue University, USA)
DeLean Tolbert (Purdue University, USA)
Darryl Dickerson (Purdue University, USA)
Freddy Solis (Purdue University, USA)

SBM3: Student Beliefs, Motivation, and Persistence Through the College Years
Chair: Rodany A. Merida
5:00 PM - 6:30 PM
Room: Patio 1

Attitude towards Capstone Project: Looking from Gender and Stage Perspectives..... *1976*
Rex Bringula (University of the East, Philippines)
Rodany A Merida (University of the East, Philippines)
John Benedic Enriquez (University of the East, Philippines)
Gil Francis Abinal (University of the East, Philippines)
Jose Mari Ramos (University of the East, Philippines)

The Use of Physiological Tools to Identify Changes in Affective Responses for Graduate Students Recently Admitted into a Scientific Discipline *1983*
Idalis Villanueva (Utah State University, USA)
Adam Raikes (Utah State University, USA)
Nathan Ruben (Utah State University, USA)
Sydney Schaefer (Utah State University, USA)
Jake Gunther (Utah State University, USA)

That's Not My Style: Understanding the Correlation of Learning Style Preferences, Self-Efficacy, and Student Performance in an Introductory Chemical Engineering Course *1988*
Elif Eda Miskioglu (The Ohio State University, USA)
David Wood (The Ohio State University, USA)

The Development of a Virtual Socializer-Based Intervention Targeting Low-Achieving Second-Year Engineering Students *1991*
Kevin Sevilla (The University of Queensland, Australia)
Marie Paretti (Virginia Tech, USA)

Development of an Instrument to Measure the Self-efficacy of Teaching Engineering Design (SETED)..... *1996*
Erik Ward (NC State University, USA)
Matthew Lammi (NC State University, USA)

SER1: Explorations in Service Learning
5:00 PM - 6:30 PM
Room: Alcalá

The Impacts of Service Learning on Students and Community Members: Lessons from Design Projects for Older Adults ***1999***
Caitrin Lynch (Olin College of Engineering, USA)
Lynn Andrea Stein (Olin College of Engineering, USA)
Sharon Grimshaw (Olin College of Engineering, USA)
Elizabeth Doyle (Olin College of Engineering, USA)
Lois Camberg (Olin College of Engineering, USA)
Ela Ben-Ur (Olin College of Engineering, USA)

Engineering for Development: An International Service Learning Collaboration ***2008***
Miguel A. Pando (University of North Carolina at Charlotte, USA)
Brett Tempest (University of North Carolina at Charlotte, USA)
Marcial Blondet (Catholic University of Peru (PUCP), Peru)
Sandra Dika (University of North Carolina at Charlotte, USA)

Engineers Without Borders: An Empirical Investigation of Member's Defining Characteristics ***2013***
Daniel Knight (University of Colorado Boulder, USA)
Kaitlin Litchfield (University of Colorado at Boulder, USA)
Amy Javernick-Will (University of Colorado Boulder, USA)

Cultural Considerations in Service Learning with American Indian Reservation Community Stakeholders ***2018***
Jennifer Benning (South Dakota School of Mines and Technology, USA)
Andrea Surovek (South Dakota School of Mines and Technology, USA)
Daniel Dolan (South Dakota School of Mines and Technology, USA)
Lyle Wilson (Oglala Lakota College, USA)
Andrew Thompson (Oglala Lakota College, USA)
Rob Pyatt (University of Colorado Boulder, USA)

Preliminary Results of a Freshmen Capstone Project to Design Educational Modules for Teachers in the Dominican Republic ***2022***
David Reeping (Ohio Northern University, USA)
John K. Estell (Ohio Northern University, USA)
Kenneth Reid (Virginia Tech, USA)

TLE7: Improving Academic Experiences
5:00 PM - 6:30 PM
Room: La Galería

Making Examinations 'More Enjoyable' ***2029***
Karl O. Jones (Liverpool John Moores University, United Kingdom)
John Skiffington (Liverpool John Moores University, United Kingdom)
Rebecca Bartlett (Liverpool John Moores University, United Kingdom)

Improving the Student Academic Experience through Lean Engineering Principles ***2034***
Denise R. Simmons (Virginia Tech, USA)
Glenda Young (Virginia Tech, USA)

How to make a distributed programming course a big fun ***2038***
Evgeny Osipov (Lulea University of Technology, Sweden)
Arash Mousavi (Lulea University of Technology, Sweden)

Enhanced learning by promoting engineering competencies 2044
Sofia Cassel (Uppsala University, Sweden)
Aletta Nylén (Uppsala University, Sweden)
Björn Victor (Uppsala University, Sweden)

A Recommendation System to Support the Students Performance in Programming Contests 2050
Lilian Paula (Federal Institute of Education, Science and Technology of the South of Minas Gerais, Brazil)
Aracele Fassbinder (Federal Institute of Education, Science and Technology of the South of Minas Gerais, Brazil)
Ellen Barbosa (University of São Paulo, Brazil)

Saturday, October 25

ASM3: Evaluation of Assessment Approaches and Instruments
9:00 AM - 10:30 AM
Room: Patio 3

Assessing the Assessment - Insights into CS1 Exams 2058
Ela Zur (The Open University of Israel, Israel)
Tamar Vilner (The Open University of Israel, Israel)

A Multi-Perspective Framework for Evaluating Software Engineering Education by Assessing Students' Competencies 2065
Yvonne Sedelmaier (Coburg University of Applied Sciences and Arts, Germany)
Dieter Landes (Coburg University of Applied Sciences and Arts, Germany)

Development and Validation of a Nano Size and Scale Instrument (NSSI) 2073
Yi Kong (Purdue University, USA)
Heidi Diefes-Dux (Purdue University, USA)
Kelsey J Rodgers (Purdue University, USA)
Anna Douglas (Purdue University, USA)
Krishna Madhavan (Purdue University, USA)

A case study of using multiple choice questions, supported by ICT, in an introductory Physics course for engineers 2077
Diana Urbano (Universidade do Porto, Portugal)
Cristina Gaspar Oliveira (Universidade de Aveiro, Portugal)
Paulo Coelho Oliveira (Instituto Superior de Engenharia do Porto, Portugal)

Items' difficulty level determination based on a Statics test with parameters variation 2081
Andrés Restrepo (EAFIT University, Colombia)
Jorge L. Restrepo (EAFIT University, Colombia)
Jaime Barbosa (EAFIT University, Colombia)

CSC1: Computer Science Teaching
9:00 AM - 10:30 AM
Room: Doblon

Open Hardware Platforms in a First Course of the Computer Engineering Undergraduate Program 2085
Ricardo Santos (Federal University of Mato Grosso do Sul, Brazil)

Using Cybersecurity as an Engineering Education Approach on Computer Engineering to Learn about Smart Grid Technologies and the Next Generation of Electric Power Systems 2092
Daniel Navarro (University of Puerto Rico-Mayaguez, Puerto Rico)
Jean Mendez (University of Puerto Rico-Mayaguez, Puerto Rico)
Kidany Berrios (University of Puerto Rico-Mayaguez, Puerto Rico)
Eduardo Ortiz-Rivera (University of Puerto Rico-Mayaguez, Puerto Rico)
Emmanuel Arzuaga (University of Puerto Rico-Mayaguez, USA)

Augmented Learning Roads for Internet Routing 2100
John McCaffery (University of St Andrews, United Kingdom)
Alan H. D. Miller (University of St Andrews, United Kingdom)
Iain Oliver (University of St Andrews, United Kingdom)
Colin Allison (University of St Andrews, United Kingdom)

SCAM, a Flexible, Scheme-like Language for Teaching Programming Language Concepts 2109
John Lusth (The University of Alabama, USA)

Active learning method in "System Analysis and Control" area 2113
Dmitry Nikolaevich Bazylev (ITMO University, Russia)
Alexey Margun (ITMO University, Russia)
Konstantin Zimenko (ITMO University, Russia)
Alexandr Shchukin (ITMO University, Russia)
Artem Kremlev (ITMO University, Russia)

DIS4: Computer Tools for Distance Education 1
9:00 AM - 10:30 AM
Room: Escudo

The usefulness of Usability and User Experience evaluation methods on an e-Learning platform development from a developer's perspective: A case study 2118
Aldo Gordillo (Universidad Politécnica de Madrid, Spain)
Enrique Barra (Universidad Politécnica de Madrid, Spain)
Sandra Aguirre Herrera (Universidad Politécnica de Madrid, Spain)
Juan Quemada Vives (Universidad Politécnica de Madrid, Spain)

MobiMonitor: a Mobile App for Monitoring Distance Courses in the Amazon Region 2126
Ketlen K. Teles Lucena (Federal University of Amazonas, Brazil)
Jath da Silva e Silva (Federal University of Amazonas, Brazil)
Vitor Bremgartner (Federal University of Amazonas, Brazil)
Elaine H. T. de Oliveira (Federal University of Amazonas, Brazil)
Bruno Gadelha (Federal University of Amazonas, Brazil)

An Agent-based Tutoring System for Learning Propositional Logic Using Multiple Linked Representations 2134
Evandro Costa (Federal University of Alagoas, Brazil)
Emanuele Tuane Silva (Federal University of Alagoas, Brazil)
Anderson Santos (Federal University of Alagoas, Brazil)
Alexandre Carlos Santos Azevedo (Federal University of Alagoas, Brazil)
Priscylla Silva (Federal University of Alagoas, Brazil)
Marlos Silva (Federal Institute of Education, Science and Technology, Brazil)
Hemilis Rocha, HJ (Federal University of Alagoas, Brazil)
Caroline Lima (Federal University of Alagoas, Brazil)

Computer Networks Virtualization with GNS3:
Evaluation a solution to optimize resources and achieve a distance learning *2141*
Pablo Gil (University of Alicante, Spain)
Gabriel Jesus Garcia (University of Alicante, Spain)
Angel Delgado (University of Alicante, Spain)
Rosa Medina (University of Alicante, Spain)
Antonio Calderon (University of Alicante, Spain)
Patricia Marti (University of Alicante, Spain)

Keyword Extraction for Mining Meaningful Learning-Contents on the Web Using Wikipedia *2145*
Tetsuya Toyota (National Institute of Informatics, Japan)
Yuan Sun (National Institute of Informatics, Japan)

EER8: Problem Solving, Mathematics and Design
Chair: Robert M Capraro
9:00 AM - 10:30 AM
Room: Aranjuez

"Problem Solving" in Engineering Research on Students'
Engineering Design Practices and Mathematical Modeling Practices *2149*
Monica Cardella (Purdue University, USA)
DeLean Tolbert (Purdue University, USA)

Cognitive Strategies and Misconceptions in Introductory Statics Problems *2152*
Wade Goodridge (Utah State University, USA)
Idalis Villanueva (Utah State University, USA)
Benjamin Call (Utah State University, USA)
Maria Valladares (Utah State University, USA)
Nicholas J. A. Wan (Utah State University, USA)
Christopher Green (Utah State University, USA)

Identifying the variation of experiences when dealing with problems in complex systems *2156*
John Mendoza-Garcia (Purdue University / Pontificia Universidad Javeriana, USA)
Monica Cardella (Purdue University, USA)
William Oakes (Purdue University, USA)

Pathways to Engineering: Mathematics as a Mediator of Engineering Success *2160*
Sandra B Nite (Texas A&M University, USA)
Jim Morgan (Texas A&M University, USA)
Mary M Capraro (Texas A&M University, USA)
Robert M Capraro (Texas A&M University, USA)
Cheryl A Peterson (Texas A&M University, USA)

An Examination of Mathematics Preparation For and Progress
Through Three Introductory Computer Science Courses *2165*
Christine F Reilly (University of Texas - Pan American, USA)
Emmett Tomai (University of Texas - Pan American, USA)

FAC1: Faculty Roles
9:00 AM - 10:30 AM
Room: La Granja

Epistemological Frames of Graduate Teaching Assistants and Instructors in Studio-Based Engineering Classes ***2174***
Christina Smith (Oregon State University, USA)
Debra Gilbuena (Oregon State University, USA)
Devlin Montfort (Oregon State University, USA)
Milo Koretsky (Oregon State University, USA)

Practical implications in engineering education: Who is supposed to do what? ***2181***
Jennifer Turns (University of Washington, USA)
Drew Paine (University of Washington, USA)
Brook Sattler (University of Washington, USA)

On the Role of a "Caring" Professor in Developing a Proper Learning Environment ***2190***
Waddah Akili (Geotechnical Engineering, USA)

A Self-Assessment of the Use of Evidence-Based Instructional Practices in Engineering ***2197***
Sarah Zappe (Pennsylvania State University, USA)
Daniel Merson (Pennsylvania State University, USA)
Kirsten Hochstedt (Pennsylvania State University, USA)
Lindsey Schrott (Pennsylvania State University, USA)
Thomas Litzinger (Pennsylvania State University, USA)

Making Teachers from Students: How Learning Environments May Foster an Interest in Teaching ***2201***
Adam Coppola (Olin College of Engineering, USA)
Yevgeniya V Zastavker (Olin College of Engineering, USA)
Jeremy M Goodman (Olin College of Engineering, USA)
Rebecca Christianson (Olin College of Engineering, USA)
Anne LoVerso (Olin College of Engineering, USA)
Cecelia Auerswald (Olin College of Engineering, USA)
Doyung Lee (Olin College of Engineering, USA)

INT1: International Dimensions of Engineering Education
9:00 AM - 10:30 AM
Room: La Galería

Parallel Virtual Urban Workshop: A "reasonable-cost" methodology for academic internationalization in problem-solving oriented postgraduate subjects ***2209***
Ester Higueras (Technical University of Madrid, Spain)
Jose Fernández-Güell (Technical University of Madrid, Spain)
Francisco Lamíquiz (Technical University of Madrid, Spain)
Marcela Riva Monti (Technical University of Madrid, Spain)

Engineering International Programs at the Public University of Navarre: a satisfactory on-going experience in a context of industrial globalization ***2214***
Pablo Sanchis (Public University of Navarre, Spain)
Antonio J López-Martín (Public University of Navarre, Spain)
Jesús López-Taberna (Public University of Navarre, Spain)
Gurutze Pérez-Artieda (Public University of Navarre, Spain)
Eugenio Gubía (Public University of Navarre, Spain)
Edurne Barrenechea (Public University of Navarre, Spain)
David Astrain (Public University of Navarre, Spain)
Daniel Morato (Public University of Navarre, Spain)
Ignacio R. Matias (Public University of Navarre, Spain)

Opening up an interuniversity collaboration among Catalan university academic staff The case of CIRAX pilot experience 2218
Teresa Sancho-Vinuesa (Universitat Oberta de Catalunya, Spain)
M. Rosa Estela (Universitat Politècnica de Catalunya, Spain)
Joana Villalonga Pons (Universitat Oberta de Catalunya (UOC), Sweden)
Clàudia Sànchez-Bonvehí (Consorci de Serveis Universitaris de Catalunya, Spain)

Thinking out of the box: C-projectors and morphological overview 2226
Wim Zeiler (University of Technology Eindhoven, The Netherlands)

MINI WS: Special Session on Design & Failure: How Philosophy and Belief Impact Design Education
9:00 AM - 10:30 AM
Room: El Jardin

Special Session on Design & Failure: How Philosophy and Belief Impact Design Education 2234
Stephen Frezza (Gannon University, USA)
Mani Mina (Iowa State University, USA)

PRE4: Delivery Techniques for Precollege Education
Chair: Ann Kaiser
9:00 AM - 10:30 AM
Room: Comendador

CorePal: A standards-based content hub for STEM fields 2238
Smitesh Bakrania (Rowan University, USA)
Krishan Bhatia (Rowan University, USA)
Kauser Jahan (Rowan University, USA)

A Mobile Program for Enhancing Engineering Education 2243
Kauser Jahan (Rowan University, USA)
Nancy K DeJarnette (Rowan University, USA)

Pathways To Effective K-12 STEM Programs 2248
Howard Kimmel (New Jersey Institute of Technology, USA)
Levelle Burr-Alexander (New Jersey Institute of Technology, USA)
Linda S. Hirsch (New Jersey Institute of Technology, USA)
Ronald Rockland (New Jersey Institute of Technology, USA)
John Carpinelli (New Jersey Institute of Technology, USA)
Marie Aloia (Bayonne High School, USA)

Using K-12 STEM education and outreach to inspire student-driven leadership initiatives in Singapore 2254
Dara R Fisher (Harvard University, USA)
Aikaterini Bagiati (Massachusetts Institute of Technology, USA)
John Brisson (Massachusetts Institute of Technology, USA)

Constructivist Learning Environments to Bridge the Gap from High School to Engineering University Degrees 2262
Inmaculada Calet (University of Granada, Spain)
Belen Prados-Suarez (University of Granada, Spain)
Zoraida Callejas (University of Granada, Spain)

SBM4: Student Beliefs, Motivation, and Persistence in Precollege and the First Year of University Study
Chair: Eugenia Fernandez
9:00 AM - 10:30 AM
Room: Patio 1

An Award Winning Program for Increasing Participation in STEM 2270
Peggy Doerschuk (Lamar University, USA)
Cristian Bahrim (Lamar University, USA)
Jennifer Daniel (Lamar University, USA)
Joseph Kruger (Lamar University, USA)
Judith Mann (Lamar University, USA)
Christopher Martin (Lamar University, USA)

Changes in Student Goal Orientation Across the Semester in Undergraduate Computer Science Courses..... 2278
Melissa Patterson Hazley (University of Nebraska - Lincoln, USA)
Duane F Shell (University of Nebraska-Lincoln, USA)
Leen-Kiat Soh (University of Nebraska-Lincoln, USA)
Lee Miller (University of Nebraska-Lincoln, USA)
Vlad Chiriacescu (University of Nebraska-Lincoln, USA)
Elizabeth Ingraham (University of Nebraska - Lincoln, USA)

Early Course and Grade Predictors of Persistence in Undergraduate Engineering Majors..... 2285
James Middleton (Arizona State University, USA)
Stephen Krause (Arizona State University, USA)
Sean Maass (Arizona State University, USA)
Kendra Beeley (Arizona State University, USA)
James Collofello (Arizona State University, USA)
Robert Culbertson (Arizona State University, USA)

Student Performance in First Year, Mathematics, and Physics Courses:
Implications for Success in the Study of Electrical and Computer Engineering..... 2292
Jane Simpson (Indiana University-Purdue University Indianapolis, USA)
Eugenia Fernandez (Indiana University-Purdue University Indianapolis, USA)

SER2: Service Learning Challenges
9:00 AM - 10:30 AM
Room: Alcalá

Gender and Volunteer Computing..... 2296
Feng Raoking (University of Virginia, USA)
Joanne Cohoon (University of Virginia, USA)
Kathryn Cooke (University of Virginia, USA)
Michela Taufer (University of Delaware, USA)
Trilce Estrada (University of New Mexico, USA)

Impact of Team-Based Learning on Promoting Creative Thinking in Undergraduate Engineering Students..... 2301
Homero Murzi (National University of Tachira (UNET), USA)
Omar Perez (University of the Andes (ULA), Venezuela)

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Chair: Nancy K. DeJarnette
11:00 AM - 12:30 PM
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Milo Koretsky (Oregon State University, USA)
Audrey Champagne (University at Albany, SUNY, USA)

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Chair: Juan M Montero
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2:30 PM - 4:00 PM
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Room: El Jardin

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Joseph Le Doux (Georgia Institute of Technology, USA)

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Archie Holmes (University of Virginia, USA)
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Shailesh Jain (Indian Institute of Technology Bombay, India)
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Brett Tempest (University of North Carolina at Charlotte, USA)
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Luciana Berreta (Universidade Federal de Goiás, Brazil)

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Daria Kotys-Schwartz (University of Colorado Boulder, USA)
Mark Rentschler (University of Colorado Boulder, USA)
Joanna Weidler-Lewis (University of Colorado Boulder, USA)
Kevin O'Connor (University of Colorado Boulder, USA)

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Juan M Montero (Universidad Politecnica de Madrid, Spain)

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Carlos Vaz de Carvalho (Polytechnic Institute of Porto, Portugal)
Luis Paulo Reis (University of Minho, Portugal)

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Adam R Carberry (Arizona State University, USA)
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James J. Sluss, Jr. (University of Oklahoma, USA)
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Karl Smith (University of Minnesota & Purdue University, USA)
Ann McKenna (Arizona State University, USA)
Chris Swan (Tufts University, USA)
Russell Korte (Colorado State University, USA)
Shawn Jordan (Arizona State University, USA)
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Robert MacNeal (Working Company, USA)

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Konstantinos Chorianopoulos (Ionian University, Greece)
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Jose Rodrigues, Jr (University of Sao Paulo & ICMC-USP, Brazil)
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