Welcome to the 10th IEEE Integrated STEM Education Conference

Virtual Conference

General Co-Chair:
Ashutosh Dutta Ph.D.
IEEE Communications Society Member-At-Large
IEEE PCJS EdSoc Chair
IEEE Future Networks Initiative Founding Co-Chair

General Co-Chair & Workshops Chair:
Nagi Naganathan, Ph.D.
IEEE PCJS SSCS Chair

August 1, 2020, Virtual Event
PRINCETON, NJ
2020 Program Committee

General Co-Chair:
Ashutosh Dutta, Ph.D., JHU/APL

General Co-Chair, IEEE Liaison and Workshops Chair:
Nagi Naganathan, Ph.D., Northrop Grumman

Technical Program Committee Chair:
Matthew Morrison, Ph.D., University of Notre Dame

Technical Program Committee Co-Chair:
Jaideep Roy, HSBC

Sponsorship and Exhibits Committee:
Ralph Tillinghast, Collaboration Innovation Lab, US Army CCDC-AC

Technical Program Committee Co-Chair:
Roger Ding, Treasurer, IEEE Princeton / Central New Jersey Section

K-12 and Outreach Committee and K-12 Poster Chair:
Wei-hsing Wang Ph.D., Princeton International School of Mathematics and Science
Srijoy Dutta, University of Maryland
TECHNICAL CO-SPONSORS

IEEE Princeton / Central Jersey Section (PCJS)

IEEE Region 1

IEEE Region 2

IEEE Education Society
ISEC PARTNERS / SPONSORS
ISEC 2020 Program Overview

Virtual Conference: https://IEEE_ISEC.info
Live Session: https://IEEETV.ieee.org/live_event/IEEE.ISEC
Ask Questions through IEEE.TV Chat

Live Sessions

9:00 to 9:15: Introduction
9:15 to 10:00: Keynote Speaker (Dr. David S. Touretzky)
10:00 to 10:45: Keynote Speaker (Dr. Naveen Verma)
10:45 to 11:30: Keynote Speaker (Mr. Burt Dicht)

On-demand

12:00 – 6 months K-12 Posters Presentation
12:00 – 6 months Paper Presentation
12:00 – 6 months Workshops
12:00 – 6 months Paper Presentation
12:00 – 6 months K-12 Posters Presentation

Ask questions within next week to be answered
10 Years of IEEE ISEC
# Past Keynote Speakers

<table>
<thead>
<tr>
<th>Title</th>
<th>Keynote Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISEC 2018 Keynote: What Hurdles Should We Overcome To Provide 100% of Our Electricity From Renewable Sources?</td>
<td>Elie Bou-Zeid, PhD, Associate Professor of Civil and Environmental Engineering, Princeton University</td>
</tr>
<tr>
<td>ISEC 2017 Keynote: The Curiosity Effect</td>
<td>Kimberly Ennico Smith, Ph.D., Research Astrophysicist, NASA Ames Research Center</td>
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<tr>
<td>ISEC 2016 Keynote: Learning How to Learn</td>
<td>Barbara Oakley, Ph.D., P.E., Professor of Engineering, Oakard University</td>
</tr>
<tr>
<td>ISEC 2015 Keynote: Everyone Can Engineer: Why All Kids Should Study Engineering - Even Before They Can Spell It</td>
<td>Christine M. Cunningham, Ph.D., Director of Engineering is Elementary &amp; VP, Å Museum of Science, Boston</td>
</tr>
<tr>
<td>ISEC 2015 Keynote: Focus on Informal STEM Education for K-12</td>
<td>Saurabh Sinha, Ph.D., Executive Dean of the Faculty of Engineering and the Built Environment, University of Johannesburg</td>
</tr>
<tr>
<td>ISEC 2014 Keynote: Inspiring Innovation</td>
<td>Karen Panetta, Ph.D., Associate Dean of Graduate Education, Tufts University and IEEE WIE International Director</td>
</tr>
<tr>
<td>ISEC 2014 Keynote: Why STEM education is vital for the Future of America</td>
<td>Alicia Abella, PhD, AVP Cloud Services Research Organization, AT&amp;T</td>
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<tr>
<td>ISEC 2014 Keynote: The complex problem of engaging more girls in STEM fields</td>
<td>Ms. Nita Patel, IEEE Women in Engineering International Chair</td>
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<tr>
<td>ISEC 2013 Keynote: Engineering Education Research: The Growth of a Discipline</td>
<td>Leah H. Jamieson, PhD (Dean of Engineering) &amp; John A. Edwardsion, PhD (Ransburg Professor of Electrical and Computer Engineering), Purdue University</td>
</tr>
<tr>
<td>ISEC 2013 Keynote: Recruiting and Retaining Minority Graduate Students in Engineering</td>
<td>Athina P. Petropulu, PhD, Professor and Chair, Department of Electrical and Computer Engineering, Rutgers The State University of New Jersey</td>
</tr>
<tr>
<td>ISEC 2013 Keynote: Overview of the Engineering Projects in Community Service (EPICS) in IEEE Programs</td>
<td>Kapil R. Dandekar, PhD, Associate Dean for Research and Associate Professor of Electrical and Computer Engineering, Drexel University</td>
</tr>
<tr>
<td>ISEC 2012 Keynote: The Engineering Crisis: Five Things We Should and Can All Be Doing to Inspire STEM</td>
<td>Suzanne Deffree, UBM Electronics</td>
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<tr>
<td>ISEC 2012 Keynote: The Importance of Mentoring in STEM</td>
<td>Naomi Eigner Price, UBM Electronics</td>
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<tr>
<td>ISEC 2012 Keynote</td>
<td>Prof. H. Vincent Poor, Michael Henry Strater University Professor of Electrical Engineering and Dean of School of Engineering and Applied Science, Princeton University</td>
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<tr>
<td>ISEC 2011 Keynote</td>
<td>Congressman Rush Holt</td>
</tr>
<tr>
<td>Name</td>
<td>Title/Affiliation</td>
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<tr>
<td>Susan Donohue, Ph.D.</td>
<td>The College of New Jersey</td>
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<tr>
<td>Ashutosh Dutta, Ph.D.</td>
<td>JHU/APL, IEEE PCJS EdSoc Vice Chair</td>
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<tr>
<td>Jennifer L. Casper</td>
<td>Mitre</td>
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<tr>
<td>Allen Katz, D.Sc.</td>
<td>The College of New Jersey, TCF General and Program Chair, President, The Trenton Computer Festival, Inc.</td>
</tr>
<tr>
<td>Nagi Naganathan, Ph.D.</td>
<td>Northrop Grumman, IEEE PCJS SSCS Chair</td>
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<tr>
<td>Charles Rubenstein, Ph.D.</td>
<td>Pratt Institute, IEEE Region 1 Director</td>
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<tr>
<td>William W. Ward, Ph.D.</td>
<td>Center for Research and Education in Bioluminescence and Biotechnology, Rutgers University</td>
</tr>
<tr>
<td>Aparna Rajagopal, Ph.D.</td>
<td>STEM Program Supervisor (6-12), South Brunswick School District</td>
</tr>
<tr>
<td>Vignesh Subbian</td>
<td>University of Arizona</td>
</tr>
<tr>
<td>Forough Ghahramani</td>
<td>IEEE PCJS Women In Engineering Chair</td>
</tr>
<tr>
<td>Katalin Frolio</td>
<td>IEEE PCJS Young Professionals Chair</td>
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<tr>
<td>Jeffrey Beck</td>
<td>Quality and Compliance Solutions</td>
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<tr>
<td>Roger Ding</td>
<td>US Navy</td>
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<tr>
<td>Srijoy Dutta</td>
<td>University of Maryland College Park</td>
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<tr>
<td>Matthew Morrison, Ph.D.</td>
<td>University of Notre Dame</td>
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<tr>
<td>Clifford Sayre</td>
<td>Hewlett-Packard Enterprise</td>
</tr>
<tr>
<td>Ralph Tillinghast</td>
<td>US Army</td>
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<tr>
<td>Wei-hsing Wang, Ph.D.</td>
<td>Princeton International School of Mathematics and Science</td>
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<tr>
<td>Jaideep Roy</td>
<td>HSBC</td>
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</table>
### IEEE PCJS Chairs (10 Years of ISEC)

<table>
<thead>
<tr>
<th>Name</th>
<th>Year started</th>
<th>Year End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deepak Kataria, Ph.D.</td>
<td>2020</td>
<td>2021</td>
</tr>
<tr>
<td>Francis O'Connell</td>
<td>2018</td>
<td>2019</td>
</tr>
<tr>
<td>David Soll</td>
<td>2016</td>
<td>2017</td>
</tr>
<tr>
<td>Habib Ahson</td>
<td>2014</td>
<td>2015</td>
</tr>
<tr>
<td>Rebecca Mercuri, Ph.D.</td>
<td>2012</td>
<td>2013</td>
</tr>
<tr>
<td>Wieslaw Bury, Ph.D.</td>
<td>2010</td>
<td>2011</td>
</tr>
</tbody>
</table>
2020 Conference Statistics

- 3 - Key Note Speakers
- 40 - Full Papers
- 11 – Works-in-Progress Papers
- 31 – K-12 Poster Presentations
- 12 – Workshops

Authors by Country (Home Institution)

- 198 – United States of America
- 12 - Guatemala
- 10 – Philippines
- 5 - China
- 5 – Iraq
- 4 – Hong Kong
- 4 – Mexico
- 4 – Sri Lanka
- 3 – China
- 2 – Bosnia and Herzegovina
- 2 – India
Relevant Links and Information

Program Book for 2020 IEEE ISEC Available Online
- On the top of the https://ieee-isec.info page on the right hand side
  - Direct Link

IEEE Integrated STEM Education Conference Page
- https://ewh.ieee.org/conf/stem/
- Check this page for updated information about the conference next week, including the announcement of the Best Paper and Best Poster Awards
### 10 Years Of IEEE ISEC - Papers

#### Paper per Year at IEEE ISEC

<table>
<thead>
<tr>
<th>Year</th>
<th>Papers</th>
<th>Year</th>
<th>Papers</th>
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<tbody>
<tr>
<td>2011</td>
<td>15</td>
<td>2016</td>
<td>59</td>
</tr>
<tr>
<td>2012</td>
<td>27</td>
<td>2017</td>
<td>44</td>
</tr>
<tr>
<td>2013</td>
<td>46</td>
<td>2018</td>
<td>60</td>
</tr>
<tr>
<td>2014</td>
<td>56</td>
<td>2019</td>
<td>94</td>
</tr>
<tr>
<td>2015</td>
<td>60</td>
<td>2020</td>
<td>96</td>
</tr>
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</table>

**TOTAL 557 Papers**
## 10 Years Of IEEE ISEC - Authors

For Authors here are the stats for most frequent authors:

<table>
<thead>
<tr>
<th>Authors:</th>
<th># Papers</th>
</tr>
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<tbody>
<tr>
<td><strong>Top 10:</strong></td>
<td></td>
</tr>
<tr>
<td>Abdullah Konak</td>
<td>12</td>
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<tr>
<td>Ralph C. Tillinghast</td>
<td>10</td>
</tr>
<tr>
<td>Sadan Kulturel-Konak</td>
<td>9</td>
</tr>
<tr>
<td>Edward A. Petersen</td>
<td>7</td>
</tr>
<tr>
<td>Amy Eguchi</td>
<td>7</td>
</tr>
<tr>
<td>Mo Mansouri</td>
<td>6</td>
</tr>
<tr>
<td>A. Ravishankar Rao</td>
<td>6</td>
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<tr>
<td>Eric P. Flynn</td>
<td>5</td>
</tr>
<tr>
<td>William Gray-Roncal</td>
<td>5</td>
</tr>
<tr>
<td>Eric J. Page</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Authors:</th>
<th># Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Notable Contributors:</strong></td>
<td></td>
</tr>
<tr>
<td>Srijoy Dutta</td>
<td>4</td>
</tr>
<tr>
<td>James Whitehair</td>
<td>4</td>
</tr>
<tr>
<td>Kara Vance</td>
<td>4</td>
</tr>
<tr>
<td>Vignesh Subbian</td>
<td>4</td>
</tr>
<tr>
<td>Melvin Goodwin</td>
<td>4</td>
</tr>
<tr>
<td>Natalia Mosina</td>
<td>4</td>
</tr>
<tr>
<td>Lisbeth Uribe</td>
<td>4</td>
</tr>
<tr>
<td>Briana Jewczyn</td>
<td>4</td>
</tr>
</tbody>
</table>
Top 5 Cited Papers:


Top 5 Cited Papers (continue):


Notable Citation Counts:

K – 12 Students Posters

IEEE Integrated STEM Education Conference

It is all about the students...

Students' research posters are the results of integrated STEM education!
Sponsors Through the Years

IEEE Education Society

MathWorks
STEAM Works Studio
IEEE
knowledge integration
UNIVERSITY OF WATERLOO
IEEE.tv
UNIVERSITY OF CINCINNATI

UB Tech Education

PRISMS
WARP Worldwide, Inc.
IEEE Education Society
IEEE Future Networks
IEEE Education Society

The Trenton Computer Festival, Inc.

PRINCETON UNIVERSITY
IEEE Future Directions
Carisma4u
Workshops Through the Years

- Building collaborative relationships between school day and afterschool programs, Mike MacEwan (NJSACC, USA)
- IEEE Educational Activities Board (EAB) Pre-University Activities, Nagi Naganathan (Avago Tech, USA)
- Workshop on Scalable Low-Cost Solutions for implementing IoT, Yeisson R Chicas, Rodrigo A Canek and Oscar Rodas (Universidad Galileo, Guatemala)
- Computational Thinking: An Offline Approach!, Arta Szathmary (Bucks County Community College & STEMgirlz @ bccc, USA)
- IEEE Sponsored Coding Clubs in NJ Public Schools, Jyoti Sharma (NOKIA & IEEE WIE Chair North NJ, USA)
- EDS - ETC and Snap Circuits Workshop and Arduino Demonstration, Luis Quevedo (Global EDS-ETC Program Leader, Colombia)
- Using Robots in K-12 STEAM Education, Howard Michel (UBTech Education, USA); Jack Wang (UBTech Education, P.R. China)
- Introduction to Social Network Analysis using R, Khadija N Shah (Johns Hopkins University Applied Physics Laboratory & Gerstell Academy, USA)
- Exploring Integration of Technology in Classrooms for Flipped Instruction and Active, Learning Using Free Web Tools and Services (to 3 pm)
- Integrating Gaming & Tinkering/Making in STEM Curricula, Andrew G. Klein (Western Washington University, USA) and Richard K. Martin Air Force
- Learn How to Incorporate Collaborative Project-Based Learning in Middle School Math & Science Using Inclined Planes, (Salvadori Center, USA)
- After-School Outreach Program Promoting STEM Education for Young Girls,
- Engaging Very Young Engineers w/ littleBits, Scratch, Raspberry Pi, and GoPiGo, Robert Felekey (King Philip Middle School & Florence E. Smith STEM Elementary School, USA) and Madelyn Filomeno (St. Timothy Middle School, USA)
- MathWorks Demonstration (Many Years)
- Code.org
- STEAMWORKS, Sudendu Das
- Upenn
- MIT
- CMU CS Academy
- SeeSignals
- Drexel
- Purdue
- Analog Devices
- Future Directions
- Knowledge Integration
Exhibitors Through the Years

MathWorks
Woodrow Wilson Foundation
IEEE
RepRap 3D Printers
SNAP Circuits
Vassar English Language
Learner Outreach Program (VELLOP)
5eBoard by 5eTek
Leading Engineering Technologies, LLC
ANDRO Computational Solutions, LLC

STEAM Works Studio
Nexus Valley Solutions
American College of Education
Johns Hopkins Center for Talented Youth
ZC Analytics
STEAM Works Studio
Start Engineering
UBTech Education
ISEC 2020 PROGRAM OVERVIEW
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- 12:00 – 6 months Paper Presentation
- 12:00 – 6 months Workshops
- 12:00 – 6 months Paper Presentation
- 12:00 – 6 months K-12 Posters Presentation
KEYNOTE SPEAKER
INTRODUCTION

KEYNOTE SPEAKER – DR. DAVID S. TOURETZKY
KEYNOTE SPEAKER – DR. NAVEEN VERMA
KEYNOTE SPEAKER – MR. BURT DICHT
Keynote Speaker – Dr. David S. Touretzky

David S. Touretzky is a Research Professor in the Computer Science Department and Neuroscience Institute at Carnegie Mellon University in Pittsburgh, PA. He received his BA from Rutgers University in 1978 and his Ph.D. from Carnegie Mellon in 1984. Dr. Touretzky is the chair of the AI4K12 Initiative (AI4K12.org), a joint project of the Association for the Advancement of Artificial Intelligence (AAAI) and the Computer Science Teachers Association (CSTA) that is developing national guidelines for teaching AI in K-12. He is also the creator of Calypso for Cozmo and Cloud Calypso, an intelligent robot programming framework that puts real artificial intelligence tools into the hands of children.
The Princeton/Central Jersey Section
Extends Its Appreciation To
Prof. David S. Touretzky

Keynote Speaker At The 10th IEEE Integrated
STEM Education Conference (ISEC’20)
August 1, 2020

For Presenting The Keynote Address
"What Every Child (And Teacher) Should
Know About Artificial Intelligence"
Naveen Verma is a Professor of Electrical Engineering at Princeton University. He received his B.A.Sc from the University of British Columbia in 2003, and his M.S. (2005) and Ph.D. (2009) from the Massachusetts Institute of Technology, 2009. His research focuses on analog and digital integrated circuits, with an emphasis on developing system platforms for emerging applications, especially where considerable computation and instrumentation is required but energy is severely constrained. Important examples include implantable and wearable biomedical systems and remote sensing and processing network nodes. His talk is titled “Bringing Artificial Intelligence into the Real World.”
The Princeton/Central Jersey Section Extends Its Appreciation To Prof. Naveen Verma

Keynote Speaker At The 10th IEEE Integrated STEM Education Conference (ISEC'20)
August 1, 2020

For Presenting The Keynote Address "Bringing Artificial Intelligence Into The Real World"
Burt Dicht joined IEEE in 2011 and serves as the Director of Student and Academic Education Programs. He oversees IEEE’s engineering education accreditation efforts and is responsible for the development and implementation of programs for pre-university and university educators and students. Prior to joining IEEE, he was the Managing Director of ASME’s Knowledge and Community Sector. Burt began his career in the aerospace industry in 1982 and held the position as a lead engineer for Northrop Grumman and Rockwell Space Transportation Systems Division. Specializing in systems and configuration integration, he worked on programs such as the YF-23A Advanced Tactical Fighter, the F-18E/F Super Hornet, and the Space Shuttle. Burt is a member of AIAA, IEEE and is an ASME Fellow. He received his B.S. in Mechanical Engineering from Temple University and an M.A. in History from California State University, Northridge. Mr. Dicht has authored numerous articles on aerospace history and is a frequent guest speaker on space topics. Mr. Dicht volunteers as an Exhibit Explainer for the Intrepid Museum in NYC, serves as a Capt. and Aerospace Education Officer for Civil Air Patrol and is Vice President for Membership for the National Space Society. His talk is titled “Leveraging the Power of IEEE’s Global Communities . . . To Impact as Many Students as Possible: The IEEE Volunteer Pre-University STEM Portal”
The Princeton/Central Jersey Section
Extends Its Appreciation To
Mr. Burt Dicht

Keynote Speaker At The 10th IEEE Integrated
STEM Education Conference (ISEC' 20)
August 1, 2020

For Presenting The Keynote Address
"Leveraging The Power Of IEEE's Global Communities To Impact As Many Students As Possible: The IEEE Volunteer Pre-University STEM Portal"
VIRTUAL CONFERENCE INSTRUCTIONS

Register Free to View the Talks and Presentations

2. If you have not sign up before, Select “Free Signup”
   a. Enter Your Name and Email Address Information
   b. Choice a Password – At Least 8 Characters, With A Mix Of Upper And Lower Case
      Characters And Digits
   c. Select or Click “Sign up” Box On The Bottom
3. Log-in at “Sign in” With Your Email And Establish Password
4. On demand Papers, workshop, Poster presentations 12 Noon – (available for 6 months)
5. Keynotes will be available at IEEE TV site and virtual conference site
6. Leave questions for the authors within a week
7. Best Papers and Best posters will be announced within a week
SAVE THE DATE!

11TH IEEE INTEGRATED STEM EDUCATION CONFERENCE

PRINCETON UNIVERSITY
SATURDAY, MARCH 20, 2021