IEEE Educational Activities' Pre-University Education Programs

Muhammad Mustafa &
Abdelrahman Al Saifi

IEEE Region 8 Pre-University Activities Committee

The Jordanian Student
Branches Meeting, Amman

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IEEE Educational Activities

- Educational Activities Board
  - Dedicated to ensuring the growth of skill and knowledge across the technical profession and to fostering individual commitment to continuing education.

- The IEEE Educational Activities Board, in support of IEEE's core purpose:
  - Recommends policies on educational matters
  - Plans IEEE educational programs
  - Coordinates pre-university and university programs
  - Develops continuing education products and activities
  - Represents IEEE in matters regarding engineering education

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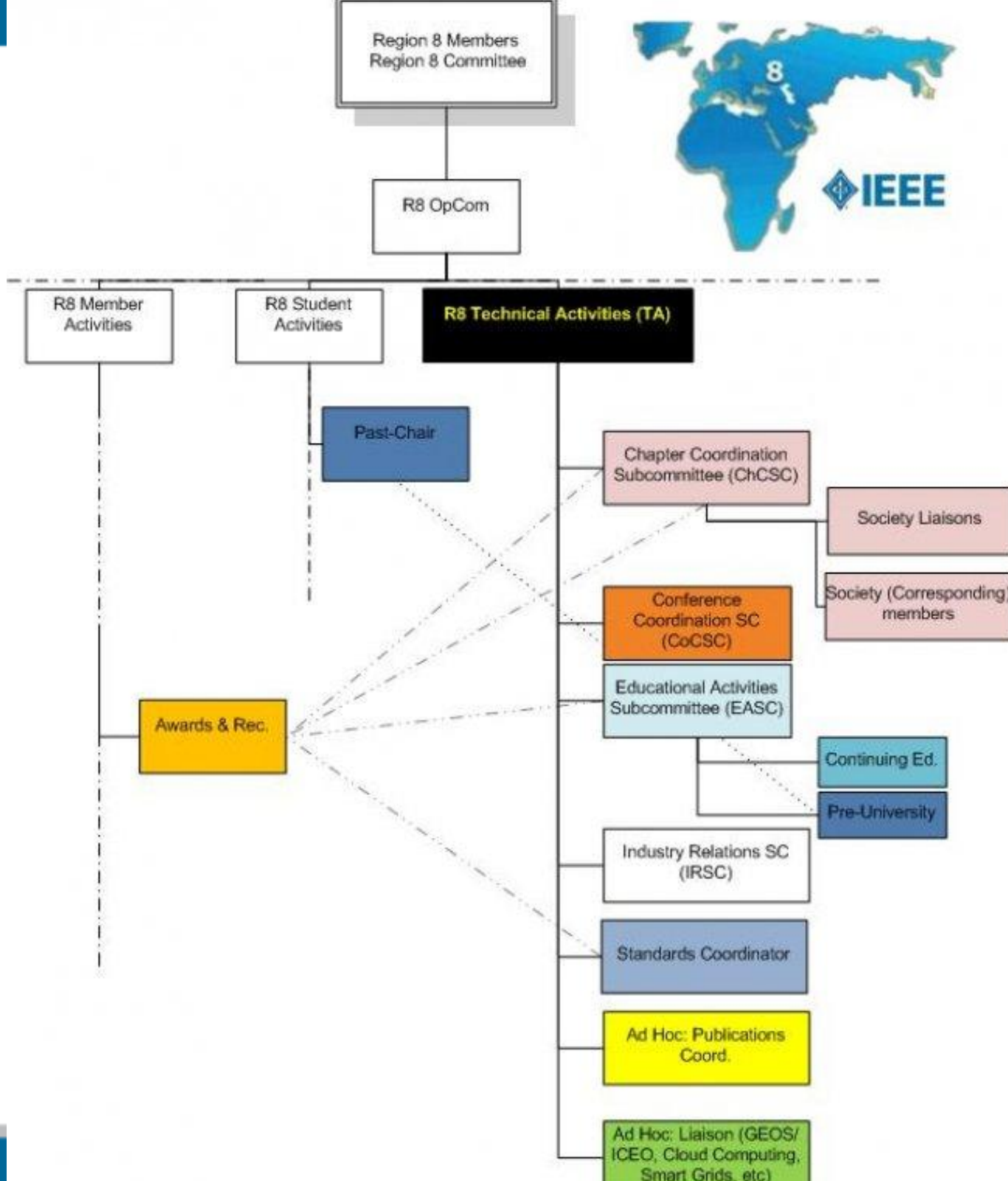
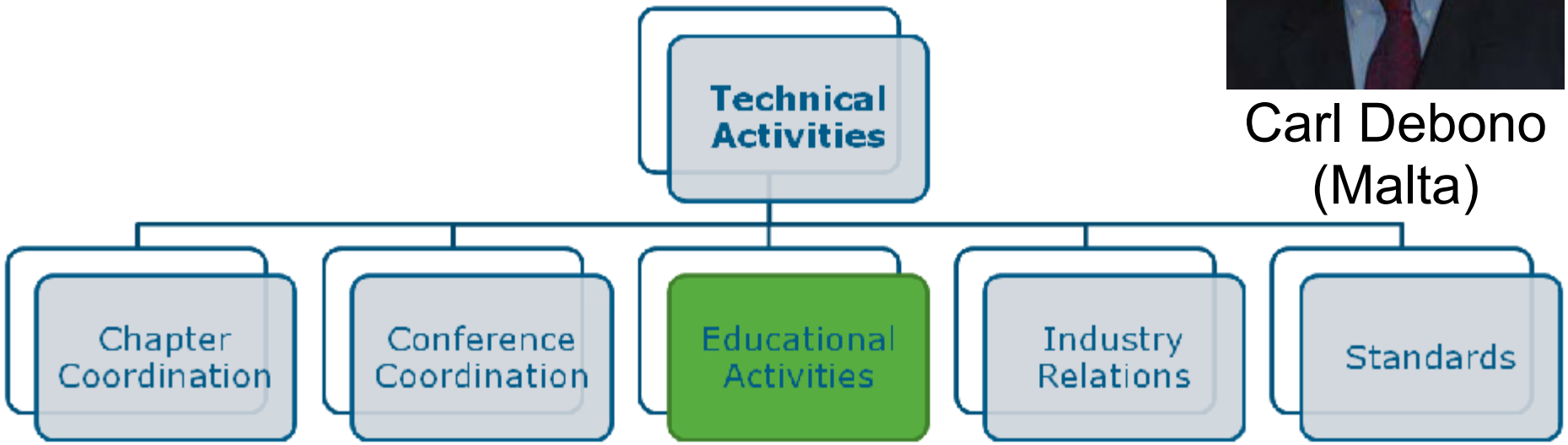
IEEE REGION 8 Technical Activities Organogram



Standing Committees

Carl Debono
(Malta)



Niovi Pavlidou
(Greece)

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EASC - Operational Areas

Pre-University

University

Post-University (Continuing Education)

Sohaib Qamar
(United Kingdom)

Rui Costa
(Portugal)

Niovi Pavlidou
(Greece)

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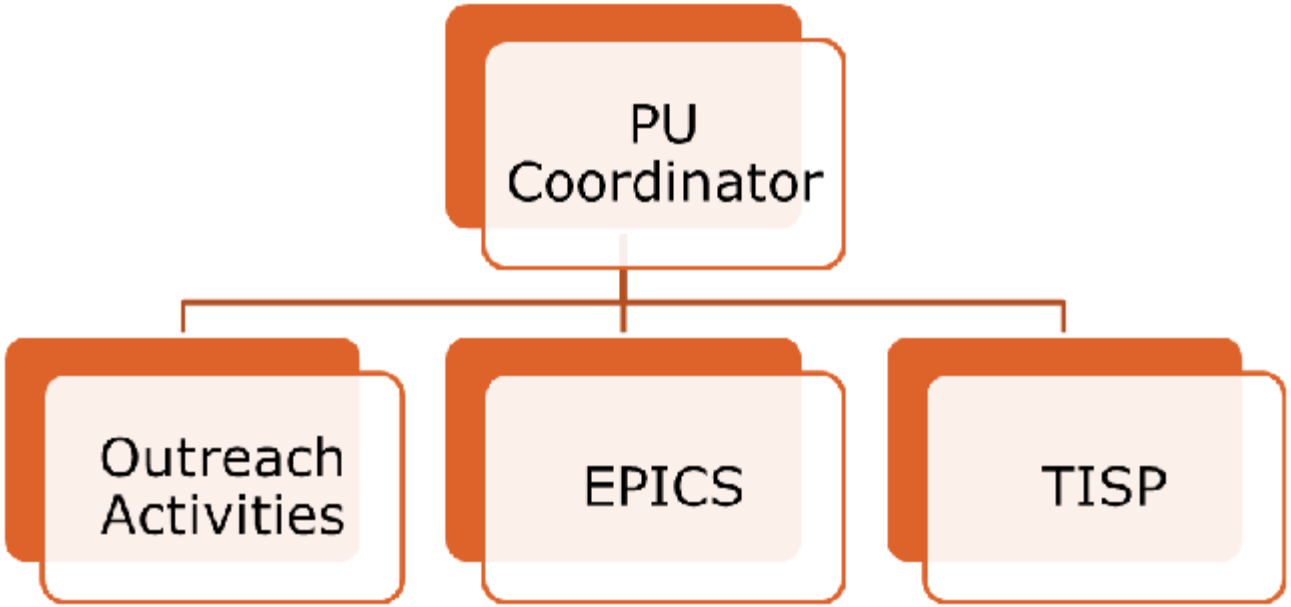
PUW Committee



Muhammad Mustufa
(Saudi Arabia)

Joyce Mwangama
(South Africa)

Riadh Besbes
(Tunisia)

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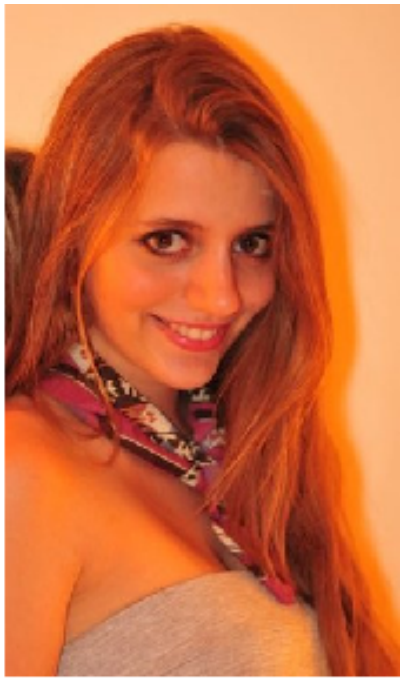
PUW Ad-Hoc Committee

- Europe

Anastasiia Stotckaia
(Russia)

Rui Costa
(Portugal)



Femia Ar
(Greece)

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PUW Ad-Hoc Committee

- Middle East

Sinan Sabih
(Qatar)

Abdelrahman AlSaifi
(Jordan)

Ahmed Gamal
(Egypt)

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PUW Ad-Hoc Committee

- Africa

Lwanga Herbert
(Uganda)

Adeyemi Abel Ajibesin
(Nigeria)

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Educational Activities Principal Activities

Pre-University Education
Engineering Projects in Community Service (EPICS)
Teacher In-Service Program (TISP)
TryEngineering.org

University Education
Accreditation (US and non-US)
Conferences and workshops focused on the reform engineering education
Accreditation.org
IEEE Acadimic

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Educational Activities Principal Activities

Standards Education
standardsmagazine.ieee-elearning.org
Standardseducation.org
TryStandards.org

- Grants for students and faculty mentors to help with graduate and capstone design projects with an industry standards component // 500$

Continuing Education
IEEE eLearning Library
Professional Certification
English for Technical Professionals (on-line)
Expanding Continuing education across IEEE

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Pre-University Activities

Objective: Increase the propensity of young people to select engineering as a career path

Main Activities:

- Engineering Projects In Community Service (EPICS)
- Teacher In-Service Program (TISP)
- TryEngineering.org
- TryComputing.org
- TryNano.org
- IEEE Spark
- Presidents' Scholarship
- E-Scientia

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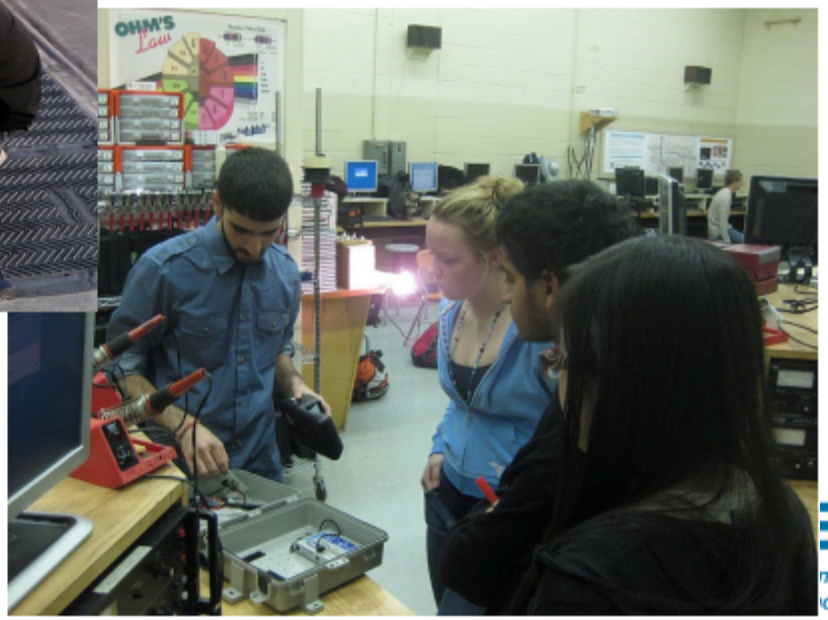
Engineering Projects in Community Service (EPICS)



Engineering Projects in Community Service (EPICS)

What is EPICS?

- Engineering Projects in Community Service (EPICS) Organizes university and high-school students to work on engineering-related projects for local area non-profit organizations.
- Conceived and championed by IEEE 2007 President Leah Jamieson.
- EPICS-in -IEEE - New Humanitarian Initiative Empowers student branches and IEEE GOLD groups to work with high school students on EPICS community service-related engineering projects

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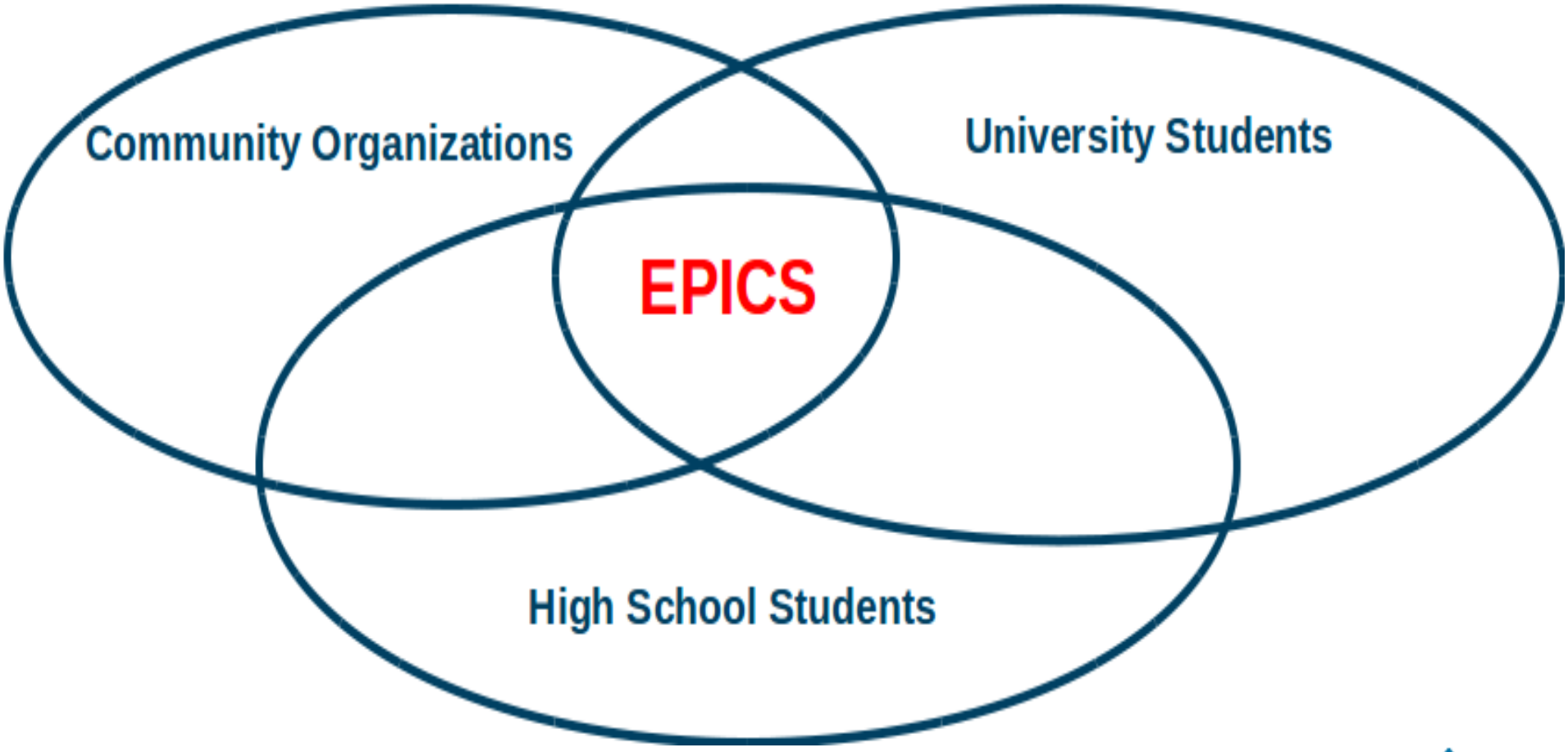
Engineering Projects in Community Service (EPICS)



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Objectives of EPICS-in-IEEE

- Increase high school student interest in pursuing an engineering-related career path
- Leverage the EPICS program demonstrated ability to reach female and under-represented students
- Increase the reputation of IEEE in the public
- Accentuate IEEE's transnational nature by conducting the effort over IEEE Sections all over the world

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Main Categories of EPICS-in-IEEE

- **Education:** K-12 schools, museums, adult learning programs, after school programs
- **Access and abilities:** adaptive services, clinics for children with disabilities, programs for adults with disabilities, assistive technology
- **Human services:** homelessness prevention, affordable housing, family and children agencies, neighborhood revitalization, local government
- **Environment:** environmental organizations, neighborhood associations, parks & recreation




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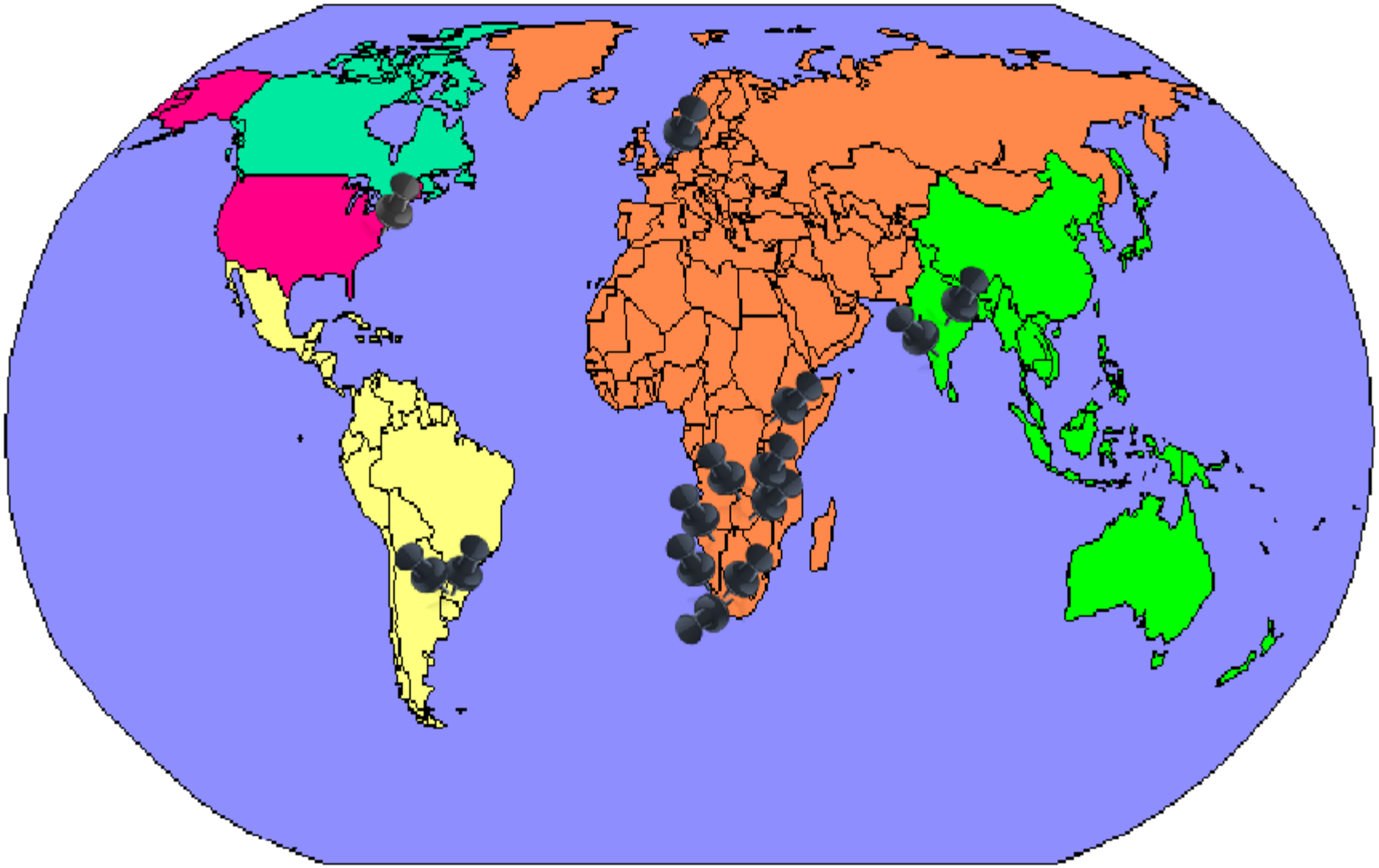
EPICS Around the World

Since 2009, 30 projects received funding



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How to apply for EPICS

- In order to receive funding support from the EPICS in IEEE initiative, you just need to submit a filled EPICS Application to ***epics-high@ieee.org***

- **The Application must include the following:**
  1. Contact information for the project lead and alternate
  2. Non-profit community organization partner
  3. High school partner
  4. Project duration
  5. Detailed budget
  6. Project title and emphasis
  7. Project description, objectives, and methodology

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How to apply for EPICS

- If the non-profit organization or high school has not been identified, a pre-application can be submitted, if feedback is requested on the proof of concept.
- Applications may be submitted at any time throughout the year.
- The EPICS in IEEE team will review the submission and will notify the project lead within 30 days of receipt.
- If the application is accepted and funding is provided - through your IEEE Section.
- the project lead agrees to provide a midterm and final report on technical plans/progress, student demographics, and student outcomes to the EPICS team.
- You can EPICS application form on www.ieee.org/education_careers/education/preuniversity/EPICSApplication.html

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Examples of EPICS Projects

University of Cape Town (South Africa Section, South Africa) - Western Cape Breeze

- The University of Cape Town Student Branch developed a wind power turbine out of scrap material which was able to deliver 50 W of power.

- Wind turbine has the potential to be used as lighting for the school or for a mobile clinic.

- Over 7 sessions, secondary school students met to learn about renewable energy and to construct the wind turbine. Students learned importance of design and environmental impact.

7 university and 10 (4 female) high schools students involved

University of Cape Town SB- Oaklands School Computer Lab Renewable Energy Audit and Alternative Energy Installation

- UCT Student Branch was given 20 PCs from the UCT Engineering and Built Environment faculty.

6 vols, 8 university and 11 (4 female) high schools students involved

- PCs are 3-4 years old but received technological upgrades and installed in Oaklands High School.

- Students learned how to assess energ consumption and conduct energy audits, and learn about environmental impacts.

Kyambogo University (Uganda) - Poverty Reduction And Environmental Conservation Through Solar Powered Solutions

- Students translate their theoretical knowledge in engineering into skills to develop clean technologies which will reduce the use of fossil oil, lamps stoves, and wood-fuel (used by 90% of Ugandans) to sustain a clean environment.

- Students from Kyambogo University worked with students at Agha Khan High School to create a solar powered phone charger with solar charging controllers designed and built for low-income communities.

IES College of Engineering SB (Kerala Section, India) - Synchronous Traffic Control System

- Students at IES designed and implemented a wireless transceiver to be placed in an ambulance (from the local hospital) and at a traffic light at a busy traffic junction.

- With the transceiver, emergency vehicles can safely cross busy junctions in order to quickly & safely g to a destination.

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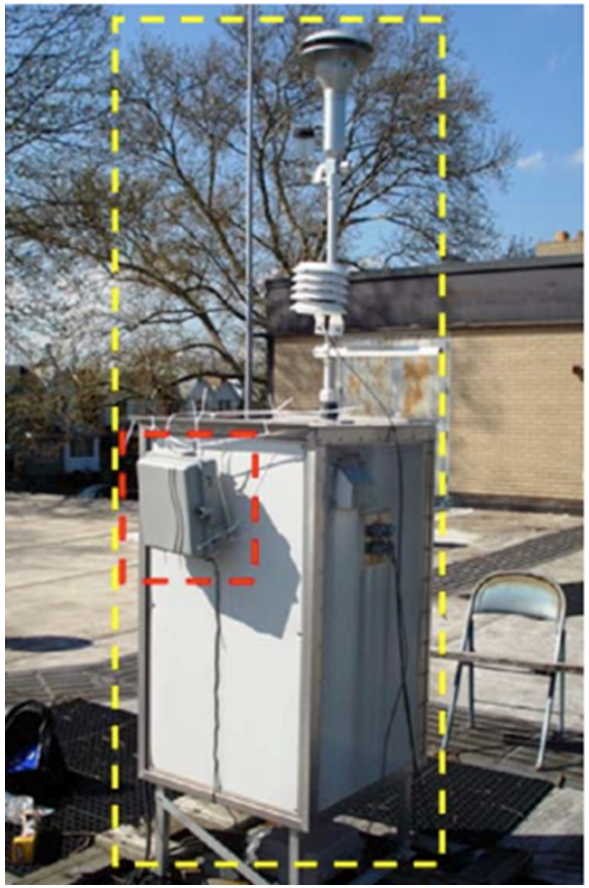
Drexel University SB (Philadelphia Section, USA) –Clean Air Council

- Philadelphia Section in partnership with the Philadelphia Clean Air Council and Science Leadership Academy developed an air quality sensor network for monitoring residential areas i South Philadelphia.

- These sensors determine air quality in various Philadelphia neighborhoods to provide “first screening” for EPA standards.

- Student groups: designed and manufactured wireless interface & sensor, deployed materials through city, designed algorithm to map sensor network, evaluated effects and sensitivity of weather conditions on sensors



Teacher In Service Program (TISP)

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Teacher In Service Program (TISP)

- A program that trains IEEE volunteers to work with pre-university teachers
  – Based on approved lesson plans
    - Prepared/reviewed by IEEE volunteers
    - Tested in classrooms
    - Aligned with Education Standards

- Designed to highlight engineering design principles
  – Emphasis on volunteer-teacher interaction as opposed to volunteer-student interaction

History: 2001 Inception – Florida West Coast Section in conjunction with the University of South Florida College of Engineering

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TISP Objectives

- Empower IEEE “champions” to develop collaborations with local pre-university education community to promote applied learning.
- Enhance the level of technological literacy of pre-university educators.
- Increase the general level of technological literacy of pre-university students.
- Increase the level of understanding of the needs of educators among the engineering community.
- Identify ways that engineers can assist schools and school systems.

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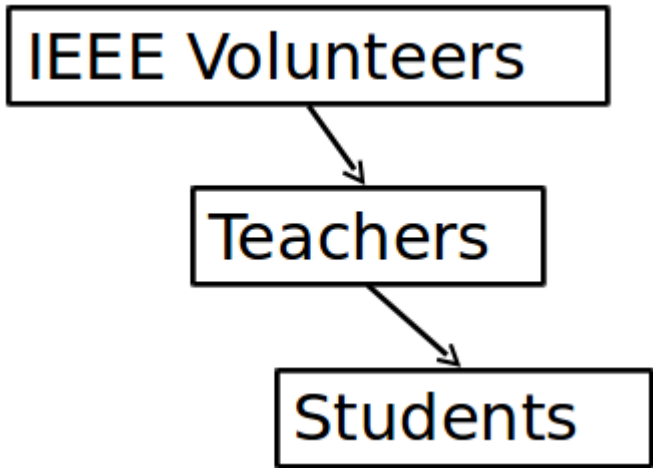
Teacher In Service Program (TISP)



- Train Volunteers
  - IEEE Section Members
  - IEEE Student Members
  - Teachers and Instructors
- …using approved lesson plans on engineering and engineering design
- IEEE members will develop and conduct TISP training sessions with Teachers
- Teachers will incorporate these lesson plans in their classroom instruction to impact students

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How does a TISP event works?

- Volunteers of an IEEE Section organize a TISP training event.
- EAB provides logistical support and instructors
- Volunteers gather for a day and a half of training.
  - With teachers and school administrators
- Volunteers spread the program in their school districts

What is After The Training ?

- IEEE volunteers work with the school system to conduct training sessions for teachers
- Teachers use the training sessions and the lesson plans to educate their students
- IEEE participates in paying for the program
  - In the first year, EAB pays the materials and supplies expenses for TISP sessions for teachers
  - In subsequent years, funding is the responsibility of the IEEE Section

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How to get involved

Host and/or attend a train the trainer workshop to:

- Learn tips and strategies on how to organize teacher workshops in your area.
- How to connect with local schools.
- Develop hands-on activities that teach engineering and engineering design concepts.

Sample Lesson Plans

- Design and Build a Better Candy Bag – good icebreaker activity – uses sheets of plastic to create a bag that can hold the maximum weight of hard candy.
- Build Your Own Robot Arm – most popular lesson plan, highest number of downloads – uses common materials to build a mechanical robotic arm
- Working with Wind Energy – similar to Robot Arm, uses common materials to create a wind turbine to lift an object.
- Sail Away – use water bottles and common materials to create a sail boat to test sail design

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Sample Lesson Plans

- Ship the Chip – design a shipping package for a potato chip.
- Sort It Out – create a sorting device that can sort coins or washers.
- Critical Load – build a structure from cards to support maximum weight.
- Rotational Equilibrium – Build a mobile to experiment with rotational equilibrium – exposes students to estimations and validation – emphasis on mathematics.

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Training Workshops (2005-Present)

25 Workshops - 2203 Participants

Region 1-6 - USA

Boston, Massachusetts
Baltimore, Maryland
Pittsburgh, Pennsylvania
Atlanta, Georgia (2)
Indianapolis, Indiana
Dallas, Texas
Manhattan Beach, California
San Francisco, California

Region 7 - Canada

Montreal, Quebec
Mississauga, Ontario

Region 8 – Europe, Middle East, Africa

Cape Town, South Africa
Lusaka, Zambia
Porto, Portugal
Stirling, Scotland
Al Khobar, Saudi Arabia

Region 9 – Latin America

Rio de Janeiro, Brazil
Piura, Peru
Cordoba, Argentina
Guayaquil, Ecuador
Port of Spain, Trinidad
Montevideo, Uruguay

Region 10 – Asia & Pacific

Kuala Lumpur, Malaysia
Shenzhen, China
Hyderabad, India

Upcoming potential event: TISP Middle EAST (TISP ME)

- TISP ME is organized by the IEEE Educational Activities and UAE Section.
- It will be held in Dubai, in the month of September, 2013.
- The participated sections: UAE, Qatar, Egypt, Palestine, Pakistan, Tunisia, Jordan (?).
- 10 volunteers will be invited from each participated section.

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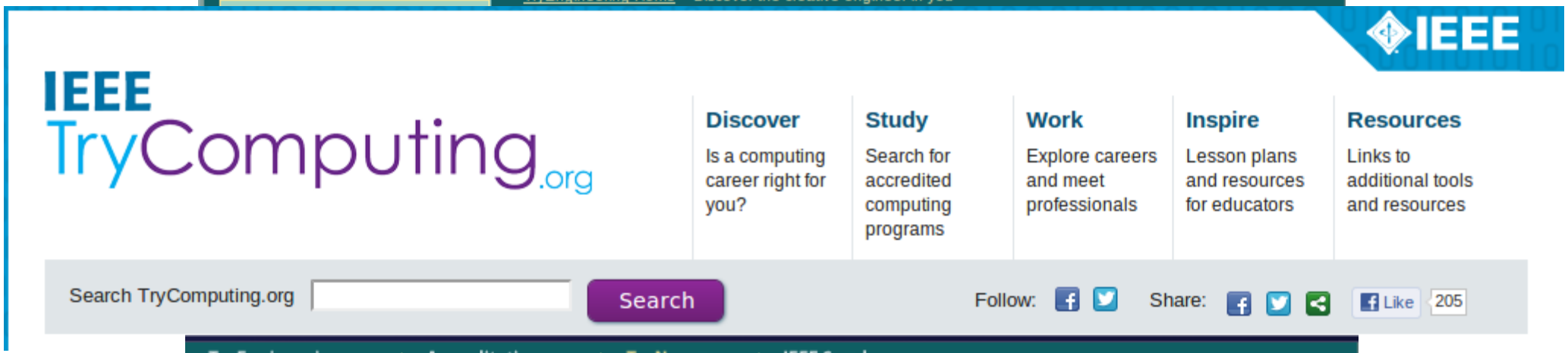
Try Engineering, Try Computing, Try Nano



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Try Engineering, Try Computing, Try Nano

- **A portal for school counselors, teachers, parents and students; funded by EAB and supported by IBM**

University search - By location, program, environment 34 countries; 2,703 universities	Explore Engineering – Discipline Descriptions, Day in the Life of an Engineer, Preparation Tips
Virtual Games – Bionic Arm Design Challenge, Solar Car Racing Game	97 lesson plans for teaching engineering design
Student opportunities – summer camps, fellowships, etc.	TryEngineering Today - News page with Facebook and Twitter integration
Frequently Asked Questions – Collection of responses from Engineers and Undergraduate Students	

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Tryengineering.org is available in Arab

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ENGINEERING INSIDE: GAMING

July 2012

Playing the Game-But First, Making It

July, 2012

Video games today are a far cry from where they began, but from Pong to the latest motion capture and 3-D graphics technology, engineers have been the backbone of this exciting and entertaining industry.

Read More

TIPS AND ADVICE

Try Engineering by Playing Games!

There are loads of games out there to play, but just a few that can give you a chance to see what engineers do.

Read more

POPULAR TOPICS

at-home activity biometrics careers comics engineering forensics get involved green technology IEEE Spotlight interview renewable energy video games

IEEE SPOTLIGHT

How IEEE Supports Gaming Pros

Did you know that IEEE has 38 different technical societies that focus on specialized fields of interest? Many gaming professionals are members of the IEEE Computer Society and the IEEE Consumer Electronics Society.

Read more

PAST ISSUES

Select an issue...

FIND A UNIVERSITY

Search for accredited engineering degree programs throughout the world.

Launch

IEEE Spark

- IEEE Spark is an online publication intended to inspire students ages 14-18 to learn more about engineering, technology, and computing, and raise excitement about careers in these disciplines.

- IEEE Spark features articles on technological innovation, university preparation tips, professional career profiles, at-home activities, cartoons, and more!

- Website: http://spark.ieee.org/

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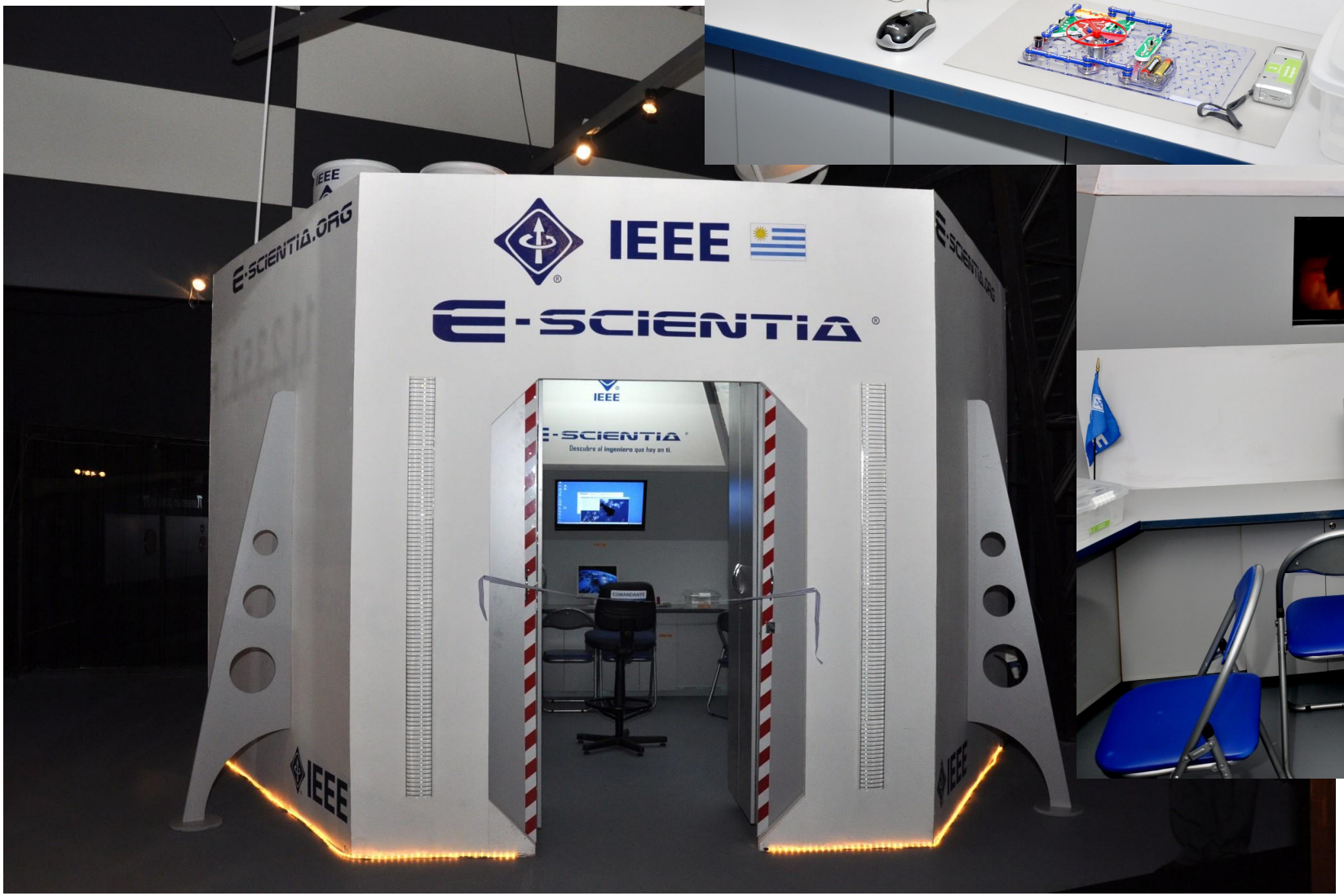
IEEE E-Scientia



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IEEE E-Scientia

- The E-Scientia exhibit consists of five stations, each occupying two students at a time.
- These stations are used by space travelers to create solutions to problems in the areas of energy, monitoring and detection, sensing of the environment, communication, and biomedical measurements.
- Students are provided with descriptions of the developing challenges, receive real-time training on how to address them, and use circuit components and devices to build hardware solutions.

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¿Questions?

Thanks for your attention…

Email: r8puw@ieee.org

Facebook Page: IEEE R8 Pre University

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