

# **EPICS in IEEE and in the College of Engineering**



**IEEE**

**EDI: Community and Service Learning**

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# Organizations and Programs

**PURDUE**  
UNIVERSITY

IEPICS® / **PURDUE**  
IEPICS / HIGH

 **University of  
New Hampshire**

**IEEE** 

 **Drexel**  
UNIVERSITY

**NJIT**  
New Jersey Institute of Technology

**UMBC**

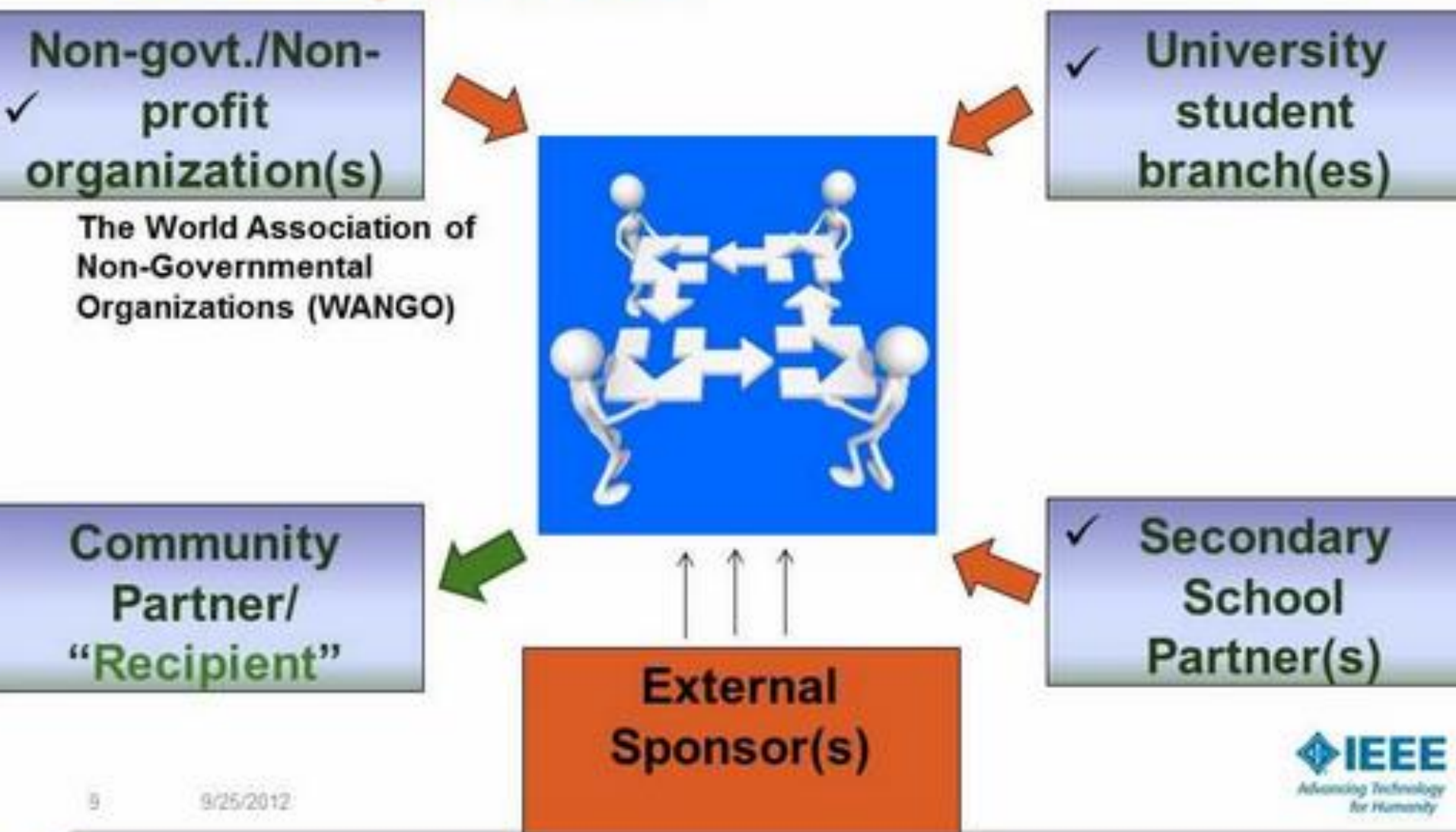
# IEEE and EPICS

- In 2008 the IEEE sought to understand its own volunteer-led community service activities
  - Groups of volunteers were already working with NGOs and UN agencies in about 20 locations around the world
- Several models were in competition
  - Focus on engaging IEEE's 2600 student branches
  - About 100,000 students out of 400,000 members
- An IEEE version of *EPICS* was selected as the principal model
- EPICS = Engineering Projects in Community Service

# EPICS

- **Founded in Purdue in 1995**
- **Teams of undergraduates designing, building, and deploying real systems in the community**
- **Address engineering-based challenges for the benefit of local service and education organizations**
  - **The typical customer is an NGO**
- **In 2008 most almost all teams were in US universities**

# EPICS-in-IEEE – Engineering Social Innovation through University and Pre-University Education



# EPICS Project Categories

- Access & Abilities
- Education & Outreach
- Environment
- Human Services



# A Brief Summary of Principles

- **Engineering is central to addressing key communal needs**
- **Engineers have an obligation to address these challenges in their communities**
- **Projects performed in the community instill in students the ethos of engineering as a service to the public**
- **Projects provide student participants with direct experience with teamwork, communication, customer-awareness, project management, leadership, ethics, societal context, professionalism**

# What IEEE had contributed

- A structure for groups of engineering students and educators to receive
  - Guidance and training
  - Support network
  - Local support (IEEE local sections)
  - Seed Funding
  - Tracking and assessment
- 57 official projects around the world
  - About double that number initiated and funded locally
  - 33 official projects completed
  - Many involve high-school groups (EPICS-High)



# EPICS-in-IEEE Around the World

# of Projects	
Argentina	3
Belgium	1
China	2
India	18
Kenya	2
Malaysia	3
Mexico	1
Namibia	1
Nigeria	1
Pakistan	1
Portugal	1
South Africa	7
Tunisia	1
Uganda	3
United States	7
Uruguay	2
Zambia	2
Zimbabwe	1
Total	57



# of Projects	
<b>Argentina</b>	<b>3</b>
<b>Belgium</b>	<b>1</b>
<b>China</b>	<b>2</b>
<b>India</b>	<b>18</b>
<b>Kenya</b>	<b>2</b>
<b>Malaysia</b>	<b>3</b>
<b>Mexico</b>	<b>1</b>
<b>Namibia</b>	<b>1</b>
<b>Nigeria</b>	<b>1</b>

<b>Pakistan</b>	<b>1</b>
<b>Portugal</b>	<b>1</b>
<b>South Africa</b>	<b>7</b>
<b>Tunisia</b>	<b>1</b>
<b>Uganda</b>	<b>3</b>
<b>United States</b>	<b>7</b>
<b>Uruguay</b>	<b>2</b>
<b>Zambia</b>	<b>2</b>
<b>Zimbabwe</b>	<b>1</b>
<b>Total</b>	<b>57</b>

# Examples

- **A Wireless Sensor Network to restore oysters in the Great Bay of New Hampshire**
  - The Nature Conservancy, University of New Hampshire
- **Air quality monitoring of Marcellus Shale drilling sites**
- **Identifying sources of air pollution in South Philadelphia**
  - Clean Air Council, Drexel University
- **Wind-Powered Electrical Supply For Humanitarian Field Operations**
  - Global Outcomes, University of Maryland, Baltimore County

# Emphasis is on *Local Solutions*

- **“Those in need in one's city take precedence over those in need in another city”**
  - At Drexel we discovered enough challenges in Philadelphia's neighborhoods
  - At NJIT we find enough needed work in Newark, Irvington and Jersey City
- **Local focus is informed by knowledge of the community and the social context**
- **Maintenance: local projects continue to be the responsibility of the local university**

# **“Save the Profession”**

## **(not “Save the World”)**

- **The primary objective of EPICS-in-IEEE is to educate the participants**
  - **Instill a culture of public service to future engineering professionals**
  - **Make engineering “more of a profession”**
- **Achieving this goal requires high standards of performance and interaction with the customers – the community**
  - **No longer just prototypes that get discarded by the end of the senior year**

# EPICS-in-IEEE Resources for a CoE

- **An EPICS coordinator ( $\frac{1}{4}$  to  $\frac{1}{2}$  FTE)**
  - Helps identify and facilitate communications with...
    - NGOs that wish to work with the University
    - High schools that wish to participate
    - Industrial participants and donors
- **Seed money**
  - Usually a few thousand dollars per project
  - The EPICS-in-IEEE projects were able to receive some support from IEEE and participating NGOs
- **Project advisers**
  - 3-8 hours/week during project lifetime
  - Mostly faculty members
  - Local volunteers from industry
    - Engineering associations can help
- **Training**
  - Purdue and IEEE can help

