IEEE Humanitarian Activities

IEEE Conference on Technologies for Humanitarian Challenges

Bangalore, India
27 August, 2009

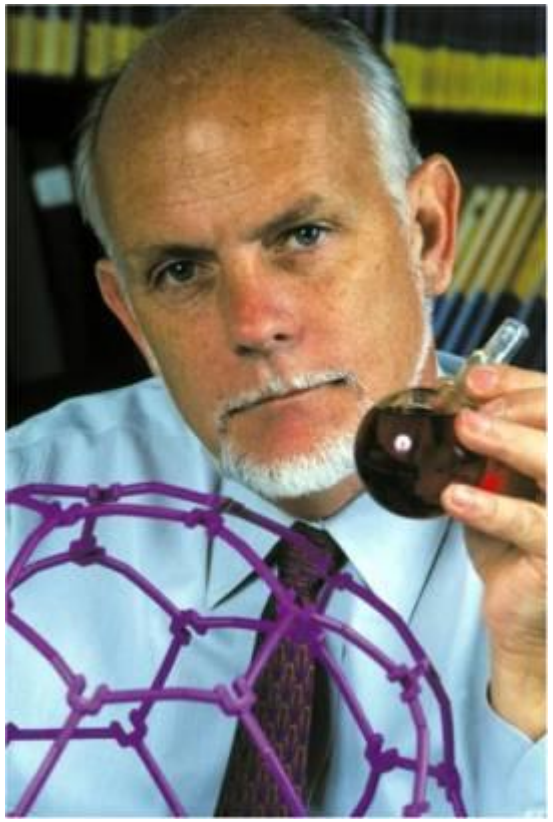
Lewis Terman
IEEE 2008 President

IEEE

Humanitarian Technology

Humanity's "Top Ten" Problems for the next 50 years (in no particular order)

- Energy
- Water
- Food
- Environment
- Disease
- Poverty
- Terrorism & War
- Education
- Democracy
- Population



Richard Smalley, Nobel Laureate

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IEEE – Advancing Technology for Humanity

- **Core Purpose**
  - To foster technological innovation and excellence **for the benefit of humanity**
- **Envisioned Future**
  - Be essential to the global technical community and to technical professionals everywhere…
  - and be universally recognized for the contributions of technology and of technical professionals **in improving global conditions**

IEEE - the World's Largest Technical Professional Society

- Over 382K members
  - Including 85,000 students
  - In over 160 countries
- ~ 1,400 Student Branches
- 324 Sections
- 38 Societies, 7 Technical Councils
- Nearly 1,800 Chapters

The IEEE Today….

- Sponsors and cosponsors more than 900 conferences worldwide
- Publishes over 30% of the world's literature in electrical and electronics engineering, computing and related technologies
- Offers over 900 active industry standards
  - Actively involved in creating 800 additional standards

The IEEE World-Wide Presence

R7 – 15,947

R1 to 6 – 212,838

R10
67,157

R1 – 37,973
R2 – 32,363
R3 – 30,782
R4 – 23,555
R5 – 29,020
R6 – 59,145

R9 – 15,410

R8 – 64,976

Reflecting the global nature of IEEE, R8 and R10 are now the two largest IEEE Regions

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IEEE Recent Focus on Humanitarian Activities

- **2008 - we initiated a strong effort to increase focus, identify opportunities, and coordinate IEEE Humanitarian Activities, and saw a number of new activities started.**

- **2009 – saw continued growth of IEEE activities; creation of Ad Hoc Committee to look at humanitarian efforts within IEEE, outside of IEEE....**

  ...And identify how IEEE can best contribute and interact across the Humanitarian space.

IEEE's Role in Humanitarian Endeavors

- Engineering, science, technology and the world condition are intimately connected
- IEEE tenets:
  - Advance global prosperity
  - Work for the benefit of humanity

IEEE Has a Wealth of Humanitarian Efforts Worldwide

Humanitarian Technology Initiatives

Disaster Relief Support

Humanitarian Workshops and Conferences

Global Earth Observation Efforts

Awards and Competitions

Accessibility and Aid to Disabled

Sustainability Projects

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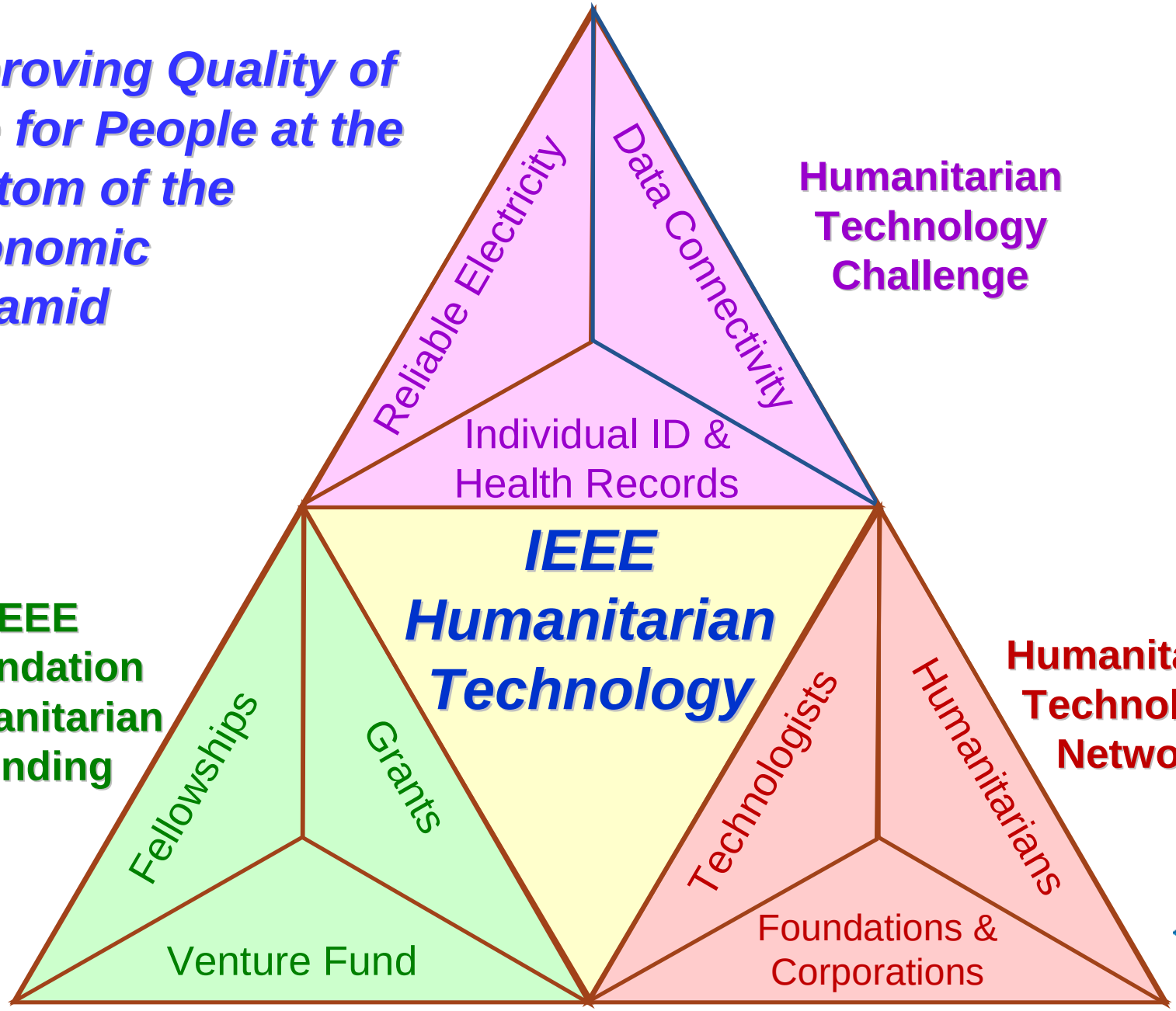
- A Look At What IEEE and IEEE Members Are Doing To Help Address Humanitarian Issues Across The Globe. . .
- From earth monitoring to local community issues. . .
- From working with international organizations to activity by individual members. . .

Improving Quality of Life for People at the Bottom of the Economic Pyramid



Humanitarian Technology Challenge

IEEE Foundation Humanitarian Funding

Humanitarian Technology Network

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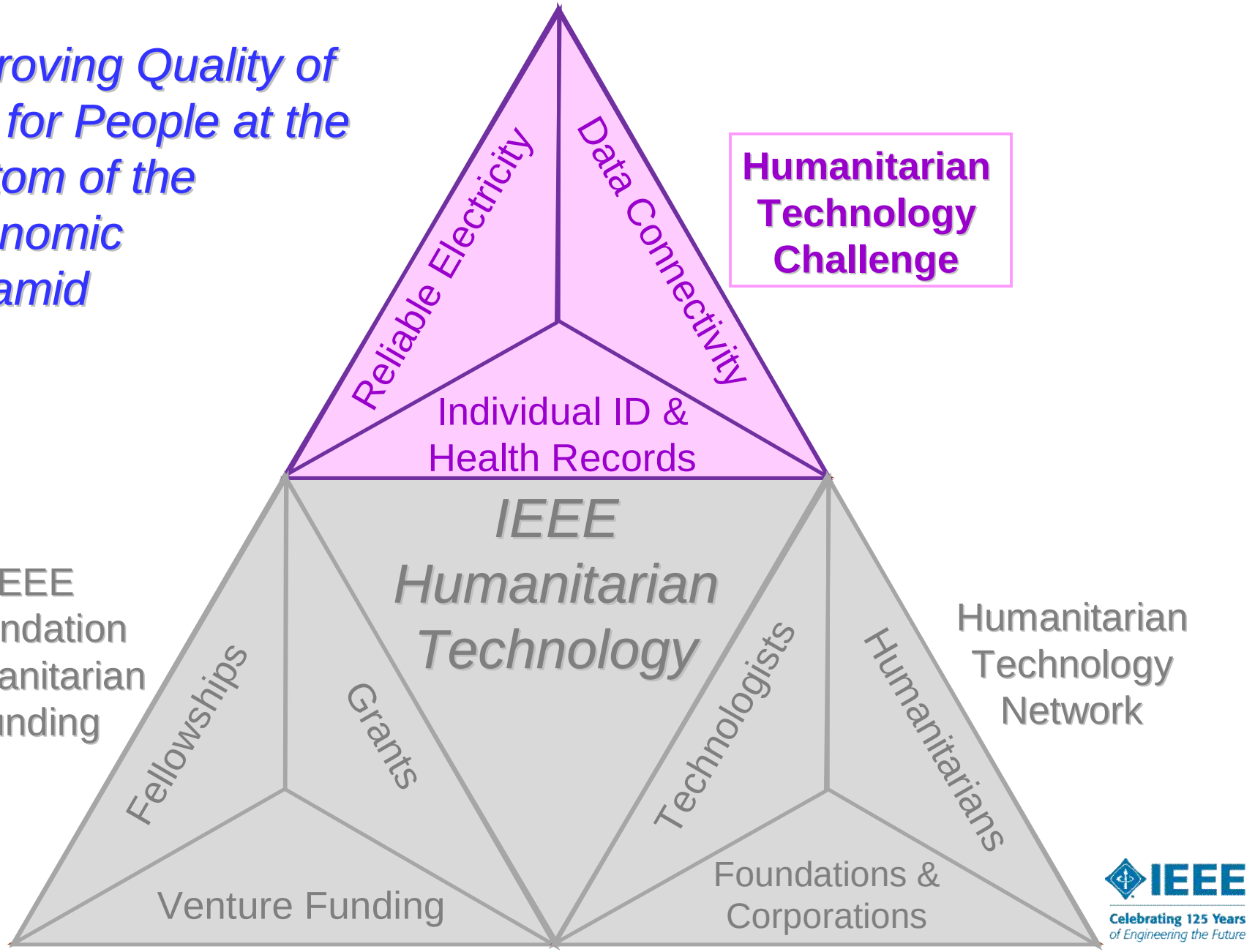
Improving Quality of Life for People at the Bottom of the Economic Pyramid



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Do You Wonder Why . . .

- With all our electrical power technology, people in the world still don't have night-time lighting for work, education, or medical care?

- With all the world's medical and health care technology, people still die needlessly and suffer from curable diseases?

One African Country Example:

- 11% of the world maternal mortality
- > 1100 maternal deaths per 100,000 live births
- Women's lifetime risk of dying in childbirth: 1 in 13

Why can't the world better apply technology to basic human needs?

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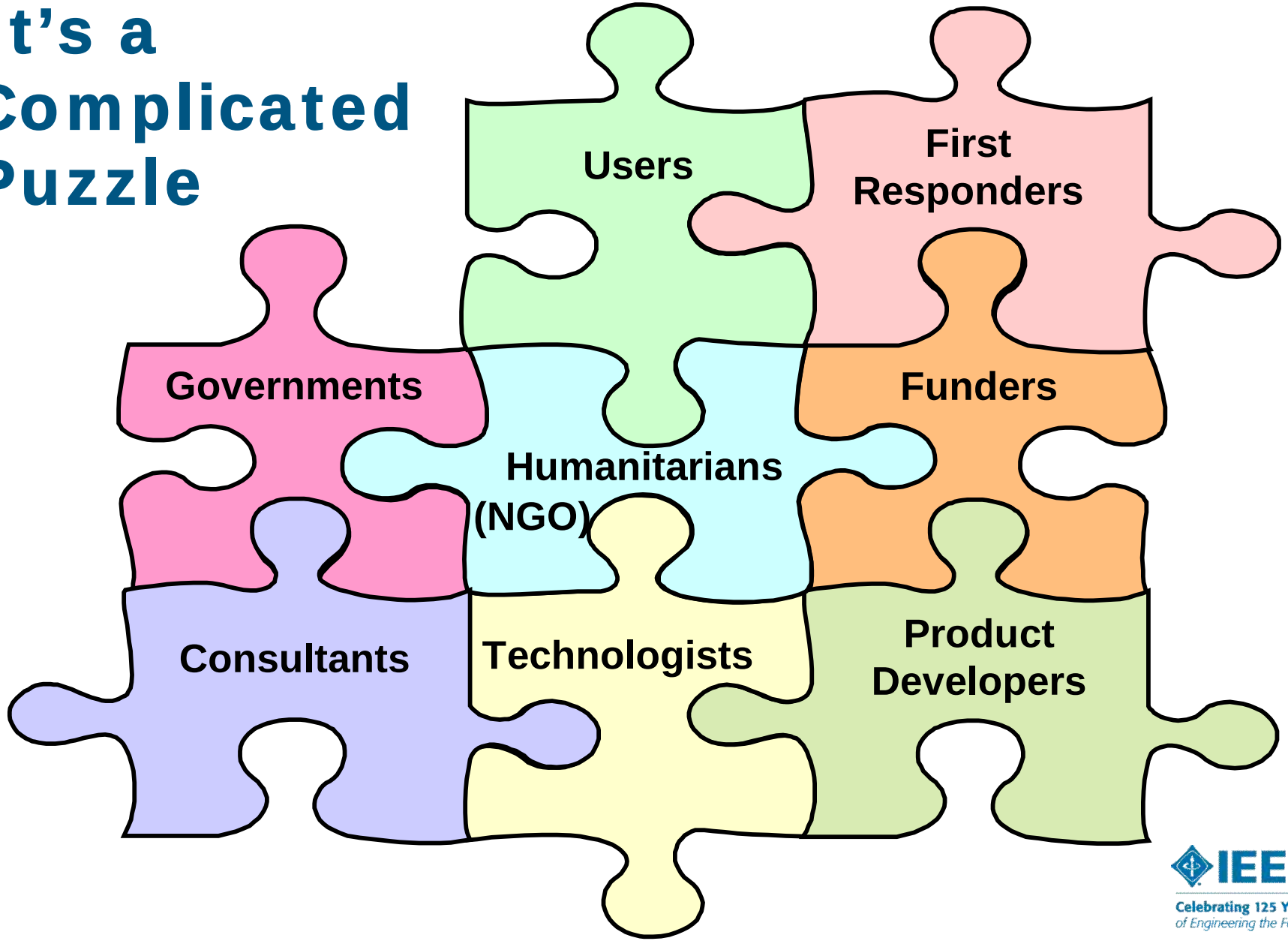
It's a Complicated Puzzle



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Humanitarian Technology Challenge

- Partnering with United Nations Foundation, Vodafone Foundation and IEEE
- Developing systematic approach to applying technology to solve world problems
- Identified three challenges
- Formulating solutions that are implementable and sustainable through a combination of workshops and online collaboration
- Define repeatable methodologies to addressing challenge-oriented, large scale efforts

The Humanitarian Technology Challenge

IEEE UNITED NATIONS FOUNDATION

Search Search

The Humanitarian Technology Challenge is a partnership between the IEEE (Institute of Electrical and Electronics Engineers) and the United Nations Foundation targeted at developing technological solutions to some of the greatest challenges facing populations in developing countries.

Reliable electricity

help solve this challenge

Data connectivity of rural district health offices

help solve this challenge

Patient ID tied to health records

help solve this challenge

As far as we know, this is the first time that a technology association and a major humanitarian organization have formed an up-front collaborative relationship. Other involved organizations include:

-Non-Governmental Organizations (NGOs)

-"Implementation" NGOs (e.g., WHO, Red Cross)

-Solution Developers (Corporations and others) -Solution Funders (Foundations and others)

-IEEE Societies, Councils and Sections

HTC Conference, 1-2 June 2009

- 153 attendees
  - 60 of the 153 from outside the US
  - Approximately equal humanitarian and technology representatives
  - Mix of organizations: Academia, Foundations, Government, Consulting Firms, NGO's (Non-Governmental Organizations), R&D Organizations / Laboratories, students, IEEE members, Trade Press, bloggers
- Presentations by humanitarians experienced in implementing technology in developing countries
- Finalized documentation of the three challenges
- Initial working groups formed for solutions
- Work continues through online collaboration tool, and periodic conference calls and workshops

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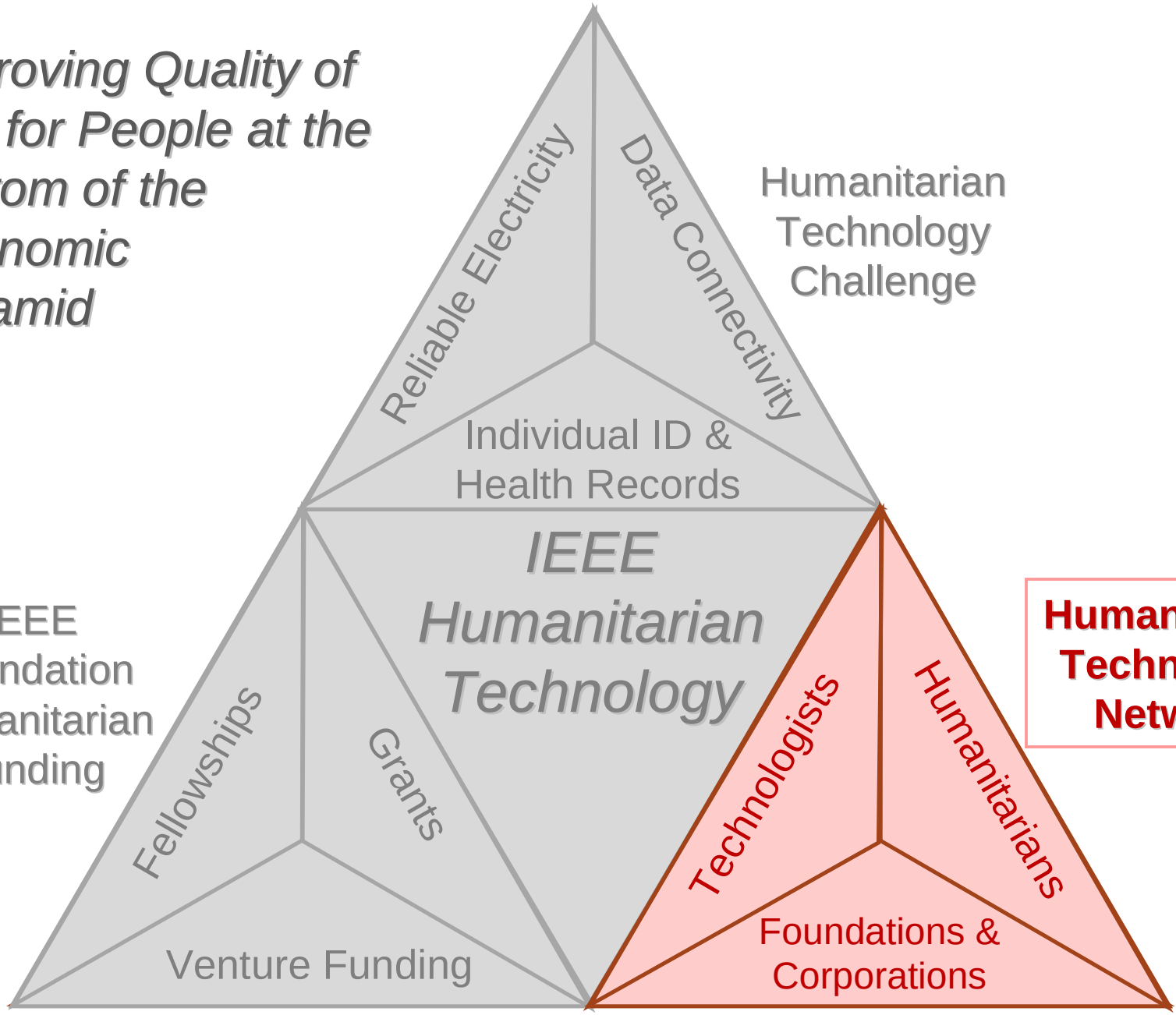
Improving Quality of Life for People at the Bottom of the Economic Pyramid



Humanitarian Technology Challenge

IEEE Foundation Humanitarian Funding

Humanitarian Technology Network

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IEEE Humanitarian Technology Network

GOAL:

Build a website which becomes a repository for technology - related humanitarian activities around the world, making such projects widely visible, and enabling all those involved in such humanitarian projects to learn from each others' experiences

Why?

1. ***Foster interaction and information exchange***
2. ***Building synergy across the community***
3. ***Avoid "re-inventing the wheel"***
4. ***Gain visibility for success stories***
5. ***Get resources and expertise to replicate a single success many times within a country or around the world***
6. ***Demonstrate best practices, and expose difficulties and challenges***
7. ***Enable funding sources and programs needing funding to get together***
8. ***Demonstrate the importance of technology to solving societal problems***

… Thus building a world-wide humanitarian technical community.

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IEEE Humanitarian Technology Project Repository

1. www.ieeehtn.org, initially launched March 10, 2009
2. Utilizes MediaWiki technology for posting articles and commenting online
3. Accommodates multi-media descriptions – including text, photographs, diagrams, audio, video, as well as PowerPoint slide presentations.
4. Viewable by all, including NGOs, Foundations, and others who may wish to partner or fund IEEE member efforts

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IEEE Technology for the benefit of humanity.

Humanitarian Technology Network

Search

Login Register Help

About the HTN | Topics & Projects | Add a Project/Register | HTN Member Directory

ADD A PROJECT NOW!

VIEW A PROJECT NOW!

FEATURED PROJECT

Early Diagnosis and TREATMENT of TUBERCULOSIS

Automate detection of TB by processing digital images of the microscopic photos of samples. READ MORE

CATEGORY: Social Implications of Technology

1 2 3 >> LEARN MORE

Popular Topics

» Communications
» Computational Intelligence
» Industry Applications

» DETAILED PROJECT LIST

New User

» Register
» FAQ's
» View Projects

Returning Registrants

» Most Popular Projects
» Add a New Project
» Recently Added Projects

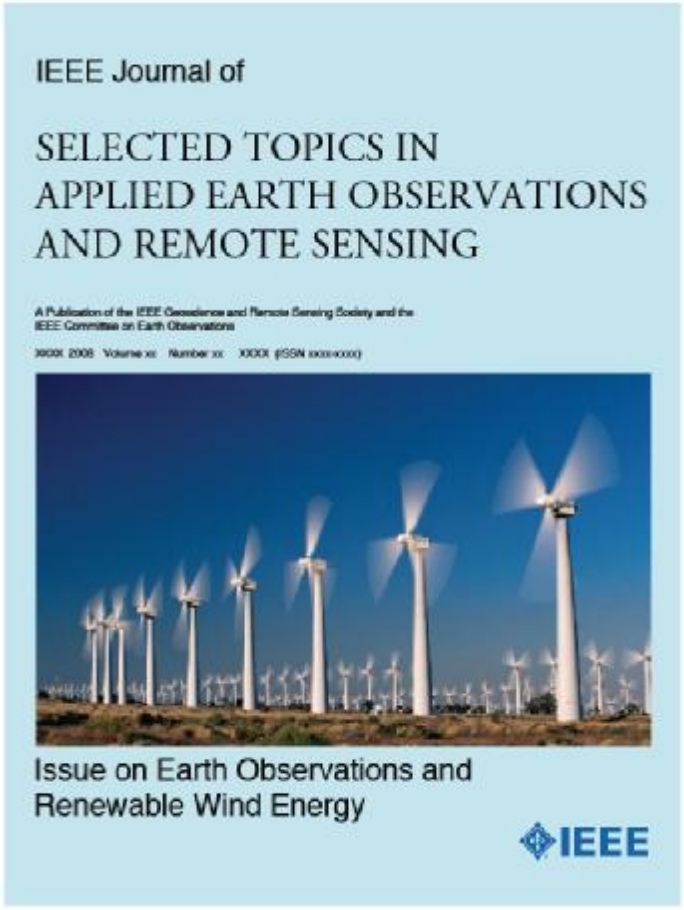
The IEEE, GEO and GEOSS

- Group on Earth Observation (GEO)
  - 72 members including the European Union, plus 46 participating international organizations

- Global Earth Observation System of Systems (GEOSS)
  - A comprehensive, coordinated, and sustained system to monitor the changing state of the planet – through ground, marine, spatial observation
  - 10 year program, started in 2005

The IEEE, GEOSS, and ICEO

- **ICEO - The IEEE Committee on Earth Observation**
  - **The IEEE is actively leading and/or participating in earth observation technologies through:**
    - **Architecture Definition**
    - **Standards development;**
    - **Workshops & conferences**
    - **Technical task teams**
    - **Internet & public outreach**
    - **Tutorials and training**



earthzine
FOSTERING EARTH OBSERVATION & GLOBAL AWARENESS

On-line publication for the international Earth-observing community that fosters Earth observation and global awareness
http://www.ieee-earth.org/Publications/Earthzine

"J-STARS" – first published in 2008

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IEEE “Water for the World” Program

IEEE International Panel assessing major challenges for water availability and defining a pilot project

- **Semi arid areas are at the mercy of rainfall for agriculture production.**
- **Modest annual rainfall with highly erratic distribution over the growing season results in subsistence type of rain-fed farming.**
- **Agricultural productivity from rainwater in these areas is extremely low.**

Solution Must Be:

- Sustainable
- Scalable
- Reusable
- Fundable

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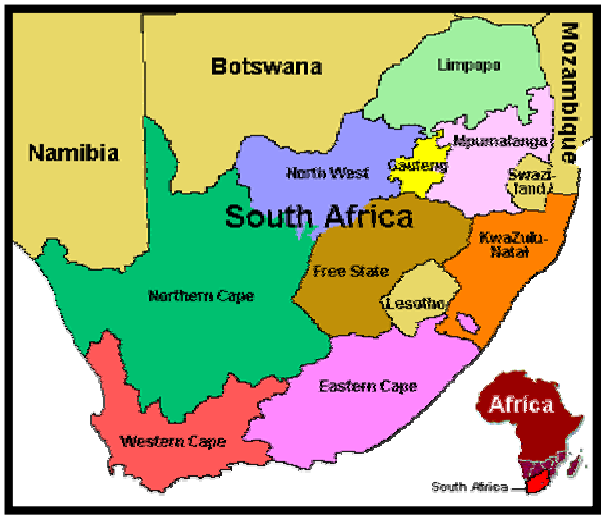
Rainwater Harvesting for NW India

- Project site: village Melva, Jodhpur district of India.
- Project: to create a means to capture and store rainwater for subsequent crop irrigration
- Villagers from Melva will participate, and MGCS, Jodhpur and local industry will build a training facility to support long-term sustainability.
- Experiences will be shared with nearby villages, thereby enabling them to replicate the project.
- Goal: provide a scalable, sustainable capability which can be exported to other locations across India and the globe.

FUNDED BY THE IEEE NEW INITIATIVES COMMITTEE

South Africa "Advisor to Nations" Pilot Program

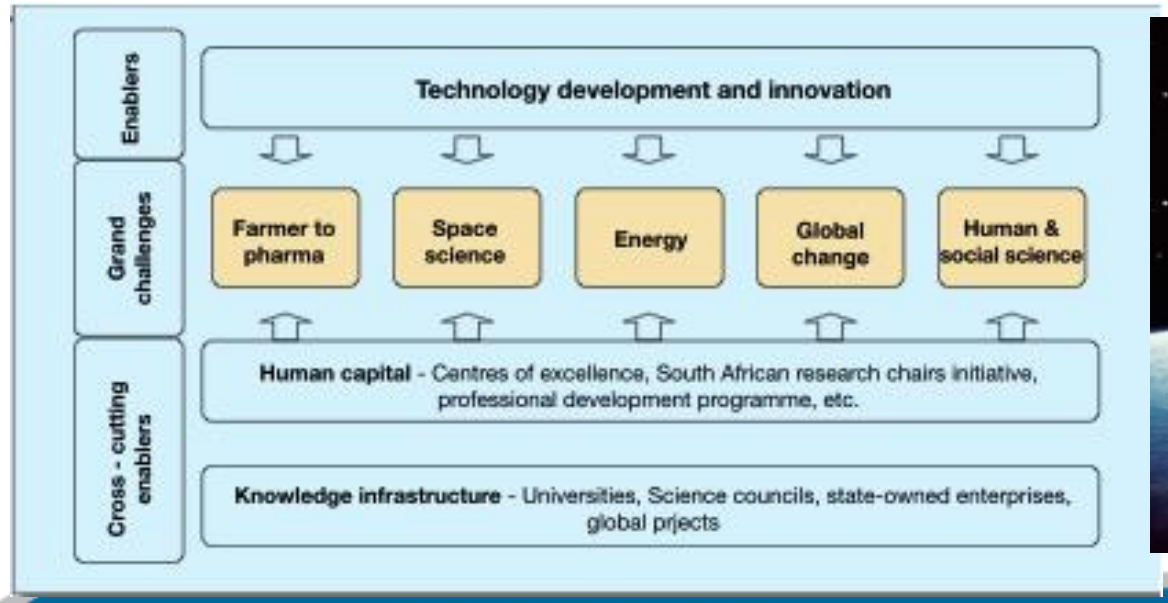
- Advise South Africa Department of Science and Technology (DST)
  - SA 10-year program on capacity building and content
  - Includes addressing certification needs of graduate programs.
- DST, IEEE to engage universities, research institutions to understand gaps in capacity for Earth Observation in South Africa
- ICEO, GRSS, EAB
- MOU signed in February
  - Validate "Advisor" process as model for future programs



IEEE-South Africa Science and Technology - Poverty Alleviation

Collaboration addresses Societal “Grand Challenges”

- Space Science and Technology
- Energy Security
- Bio-economy – Farmer to Pharma value chain
- Global Change Science
- Human & Social Dynamics (poverty alleviation)



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IEEE Standards and Green Activities

- High Voltage Lethal Discharge
  - Every Day. . a U.S. worker is killed, and 13 U.S. workers suffer lost time injuries due to electrical shock or burns
  - IEEE and NFPA formed collaboration. Laboratories worldwide began tests Dec. 2008

- *Green* technology areas
  - Smart Grid and related
  - Environmental Product Assessment
  - Energy Efficiency
- IEEE Solar System Project
  - At IEEE Headquarters in Piscataway, NJ

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Some IEEE Member Activities …

2009 IEEE Presidents' 'Change the World' Competition

- Students Created Solutions to Real World Problems
- Individual IEEE Student Members or teams led by Student Members
- Over 200 entries received from around the world
- Top 3 finalists invited to the 2009 IEEE Honors Ceremony
- Top Prize: US$10,000

- 4 of the top 8 awards, plus the "People's Choice" award** are from India:

1. *Electronic aids for physically or mentally handicapped children*
2. *AGROBOT: robots in agriculture*
3. *Information on human and health services (ISHHS)***
4. *NIDAAN – An e-Healthcare solution for the under-privileged*

These papers will be presented in the poster session later today

2010 Competition will be announced shortly

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Indian Ocean Tsunami - IEEE Kerala Section

- Members established Web site that became central point for information on tsunami relief.
- IEEE members created a communications network using mobile phones and data lines to coordinate the distribution of relief materials; still in use 2 years later
- Investigating use of satellite images to determine the natural drainage patterns of tsunami-caused flooding along the coast.

Project Sangamam – Madras Section

"Sangamam": bringing together technical knowledge and human resources of rural areas for practical application

- **Provide women and youth with computer training**
- **Introduce children to science and technology as a career; "make engineering a passion"**
- **Introduce ecological technologies**
- **Foster women entrepreneurship**

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IEEE Madras Section

- Knowledge management system for HIV patients
- Intelligent cane for blind
- Home based rehabilitation model for elderly people and special needs children

From *The Hindu*, India's Largest Circulation Newspaper

Sampathkumar Veeraraghavan

IEEE GOLD Member

Software to evaluate developmental disorders in children unveiled

Based on a computational questionnaire matrix, which can be used as a pre-clinical tool

M. Dinesh Varma

CHENNAI: Now, a software matrix of 48 questions can, perhaps, give you vital leads on a pervasive development disorder like autism more quickly than a year or two of clinician visits.

The Automated Software Screener for developmental disorders, developed by a Chennai-based engineer-doctor team, is based on a computational questionnaire matrix that can be used as a pre-clinical tool to evaluate whether a child's development milestones are age-appropriate.

Forum floated

"We initially set out with a questionnaire of around 200 enquiries. The subsequent pruning based on inputs from experts has helped make the matrix more reliable and sensitive," said Sampathkumar Veeraraghavan, computer science expert, who developed the software along with young general physician Karthik Srinivasan.

The computer scientist and medical practitioner had come together to contribute to a social cause by floating Brahmam, a forum aiming to develop technological aids for physically challenged people, that eventually led to the creation of the software.

The software framework of the screener comprises an automated screener system, a report generator system and gaming techniques (which are being fine tuned). Based on the responses given by the primary care taker, the screener evaluates the child in the areas of fine and gross motor, social and language.

- **Software allows even uninitiated to do a preliminary disability screening**
- **A parent using it can be reassured child is attaining development milestones**

At the end of the screener sessions — a typical session takes no more than 25 minutes — the screener will send a comprehensive report stating whether the child demonstrates any symptoms for developmental disorders or not.

The software developers propose to dedicate the software tool free of cost to schools across Tamil Nadu some time next month.

The software's value lies in the accessibility it provides for rural areas and the simplicity that can guide even the uninitiated to do a preliminary disability screening.

"Importantly, even a lay parent using the software can now be reassured that the child is attaining the development milestones," said Jaya Krishnaswamy, director of the Madhuram Narayanan Centre (MNC) for Exceptional Children, which played a key role in field testing the tool.

Schools are an ideal starting point for implementing the software-based screening model, said Mr. Sampathkumar.

If trained, teachers will be able to shortlist children suspected of a development delay and refer them for evaluation by an expert clinician.

"We are thinking of making the software available across the country once the piloting in Tamil Nadu is successful," said Mr. Sampathkumar.

The screener has already proved to be a reliable index of disability from trials involving disability experts and expert clinicians, and won awards and accolades at several international forums.

It has also won for Mr. Sampathkumar the Institute of Electrical and Electronics Engineers (IEEE)'s Regional Activities Board (RAB) GOLD Achievement award and the IEEE Asia pacific GOLD award for 2007.

According to the software developers, a multi-lingual version of the screener is under development.

In conjunction with the launch of the software next month, it is also proposed to open a web portal where parents can access the screener to make a preliminary assessment for childhood development delays.

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Panama Section

- Public School: improvements to internal electrical system
- Seminar: improvements to internal electrical system; grounding of the main panel
- Public Library: 28 community members trained in computer maintenance, use of MS Windows and Office
- Basic Electricity Training -- 42 members of the near communities were trained in concepts of basic electricity

Sustainability

- ‘Sustainable Energy’ and ‘Sustainable World’
  à humanitarian-focused topics in the *IEEE Engaging the World* newsletter
- Generated responses from over 400 members who volunteered to serve as spokespeople in related areas
- Sustainability Workshop in 2008
- Sustainability Committee formed

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Some Other IEEE Activities

- **Region 1 GOLD Workshop October, 2008**
  - Create awareness among engineering students and young professionals on using skills, knowledge for humanitarian work
- **IEEE Ad Hoc Committees**
  - **Sustainability**
  - **India**
  - **Humanitarian**
  - **Green initiatives**
- **EPICS (Engineering Programs In Community Service)**
  - **Efforts in Capetown, South Africa, and Philadelphia, PA, USA**
- **… and this "Conference on Technologies for Humanitarian Challenges"**

Looking to the Future – IEEE Goals

- Bring a more systematic and comprehensive approach to applying technology to help solve world problems
- Create synergy – bring disparate efforts together within IEEE and around the world
- Continue to work at different levels: from the UN and GEOSS down to individuals

Looking to the Future – IEEE Goals

- Develop global solutions addressing areas of critical need, which are
  - Sustainable
  - Manageable
  - Adaptable - over environmental, cultural, structural, political and socio-economic conditions where they will be deployed
- Encouraging members at the local level to identify problems and create solutions
- Establish the Humanitarian Technology Network to serve all of the technical humanitarian community

Collaboration: Key for the Future

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Thank You!

IEEE Media Event
March 15, 2009
New York City