



GLOBAL CITIZEN.  
**ACTION ALERT**

Congress — The Clock is Ticking to Act for the Climate



by Alex Lim / iStockphoto





**ister**

Ibero-American Science & Technology  
Education Consortium



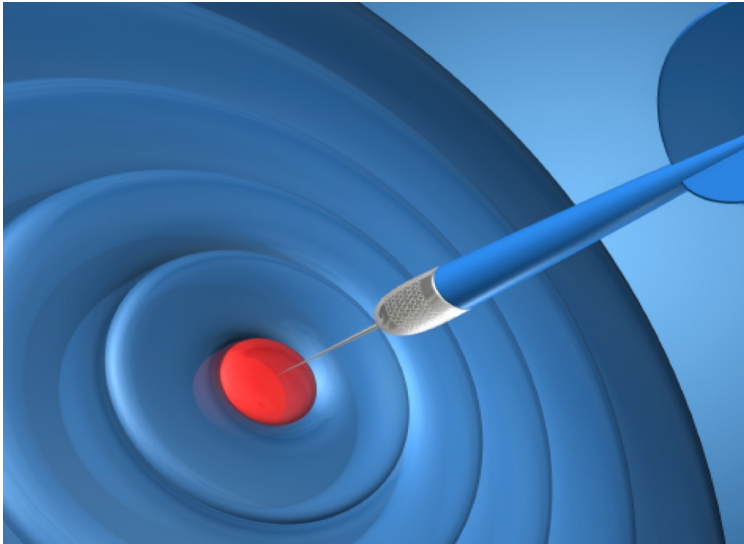
**Peace Engineering a Call to Action: Nov. 2018 to present**

**February 23, 2022**

**Ramiro Jordan – [rjordan@unm.edu](mailto:rjordan@unm.edu)**





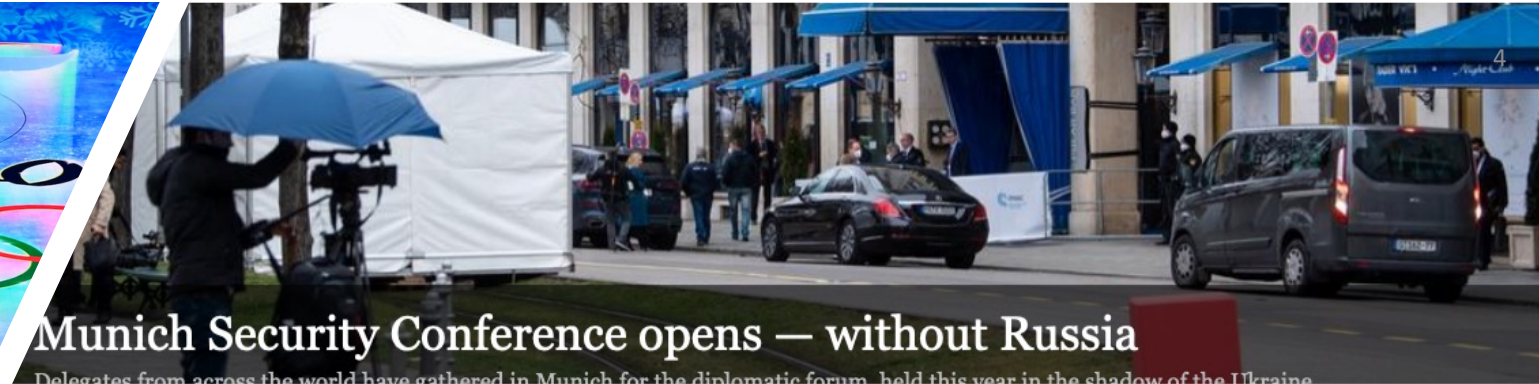


# Purpose and WHY

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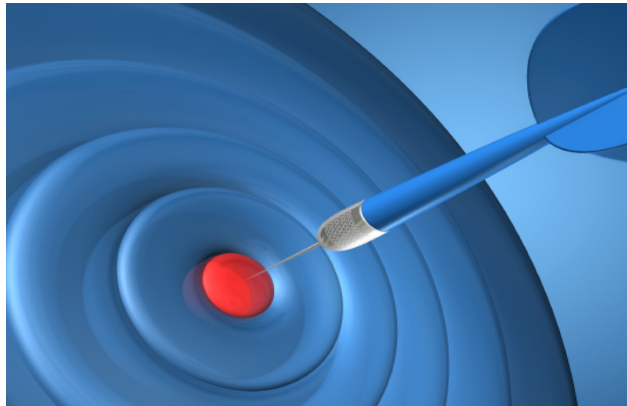
[https://www.flickr.com/photos/pablo\\_fotografia](https://www.flickr.com/photos/pablo_fotografia)





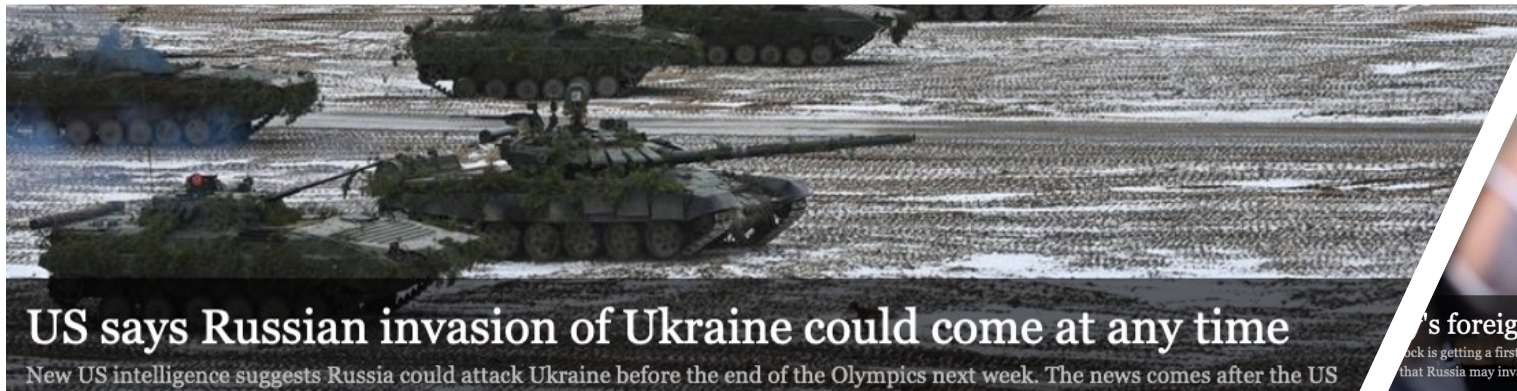
## Munich Security Conference opens — without Russia

Delegates from across the world have gathered in Munich for the diplomatic forum, held this year in the shadow of the Ukraine



# Purpose and Why

<https://www.dw.com/en/top-stories/s-9097>



## US says Russian invasion of Ukraine could come at any time

New US intelligence suggests Russia could attack Ukraine before the end of the Olympics next week. The news comes after the US



## Ukraine's foreign minister visits front line in Ukraine

Ukraine's foreign minister is getting a firsthand account of the humanitarian and military situation in eastern Ukraine. She is making the trip as Russia may invade its neighbor. » [Go to article](#)

© Bernd von Jutrczenki/ANSA/Contrasto



# Peace Engineering - Purpose

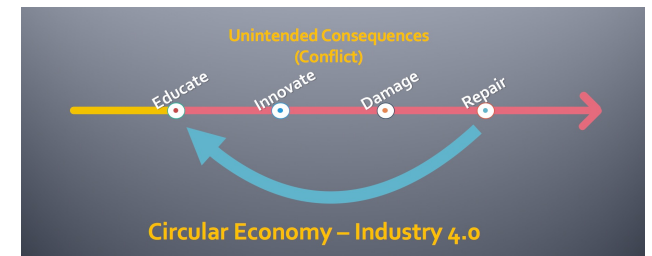
- Enabling / Empowering People, Communities and Institutions
- Cultural Respect and Preservation
- Symmetry of Information and Knowledge – Level Playing Field
- All Teach – All Learn





# Why are we doing this?

- Need a **new mindset** to address global challenges:
  - UN 17 SDGs, NAE Challenges – **one planet, one environment, one chance.**
  - New mindset across all disciplines and new ones: Humanitarian engineering, societal engineering, ...
  - Industry 4.0, 5.0
- Use the **language of Science and Technology** language to integrate and collaborate globally, create/enhance trust.
- Need to **educate new leaders/champions** as global citizens.
- **Asymmetry** in knowledge and information!!!!!!

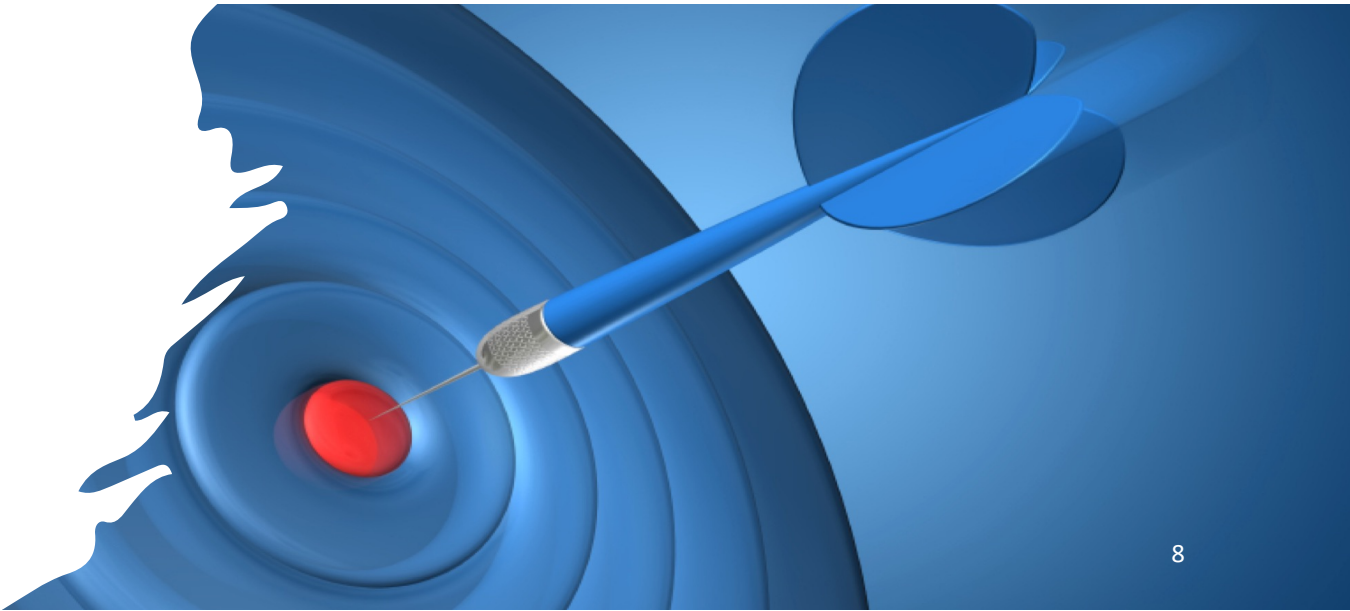


Nov. 2018 – Definition – 1<sup>st</sup> Global Peace Engineering Conference

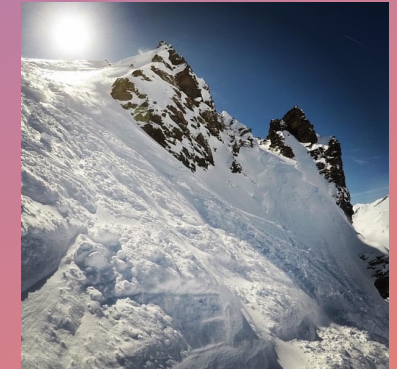
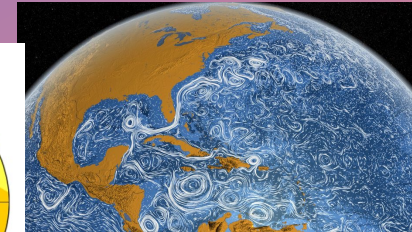
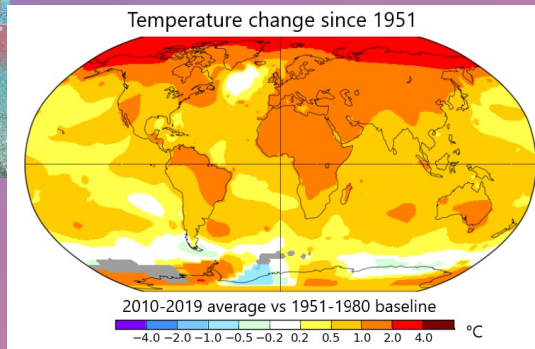
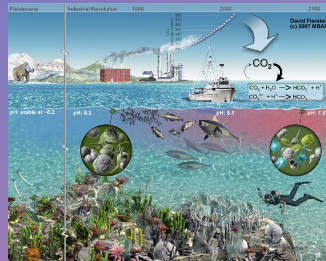
Peace Engineering is the intentional application of science, technology, culture and engineering principles to promote and support peace. It recognizes the important contribution that engineering, the social sciences and other disciplines can make toward a world where prosperity, sustainability, social equity, entrepreneurship, transparency, community voice and engagement, and a culture of equality and quality thrive.



# Global Challenges







# Climate Change – in a nutshell...



# Challenges

Nov 14, 2021

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## 'Blah, blah, blah' as climate 'catastrophe' nears



Despite governments reaching a global climate agreement at the Glasgow conference, many have been left disappointed with the outcome. Climate campaigners say it's not enough to contain dangerous temperature rises.



## COP26: Creative protests in Glasgow

The Climate Change Conference in the Scottish city of Glasgow was accompanied by a series of colorful protests by thousands of tireless activists. 📷

### Negotiators Reach a Climate Deal, but Remain Far From Limiting Warming

- After two weeks of negotiations, nearly 200 countries struck a major agreement aimed at intensifying global efforts to fight climate change.
- Some activists called the deal disappointing, but it established a clear consensus that all countries need to do much more.

Here are six takeaways from the United Nations climate summit in Glasgow.





# Challenges

Borders?



Omicron subtype BA.2 spreading quickly  
A new coronavirus subtype is spreading in Denmark and more than 40 other countries. Its effects are still unclear.

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Aporophobia



Racism



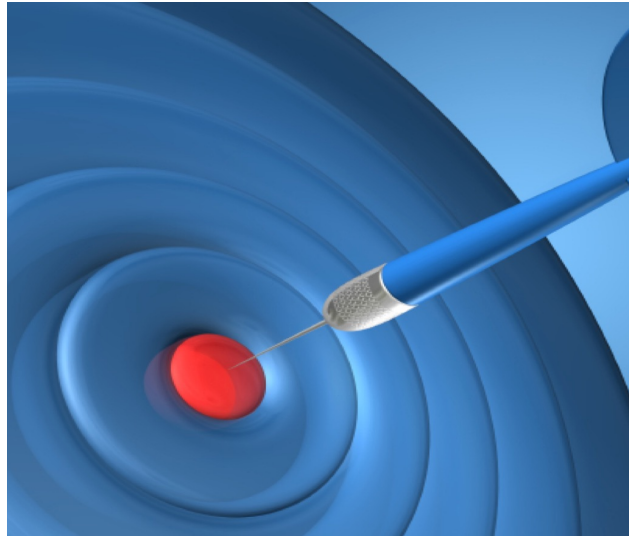
Social Responsibility

Accountability

Globish

570 × 345





# NAE New Strategic Plan

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NAE Strategic Plan  
October 1, 2021

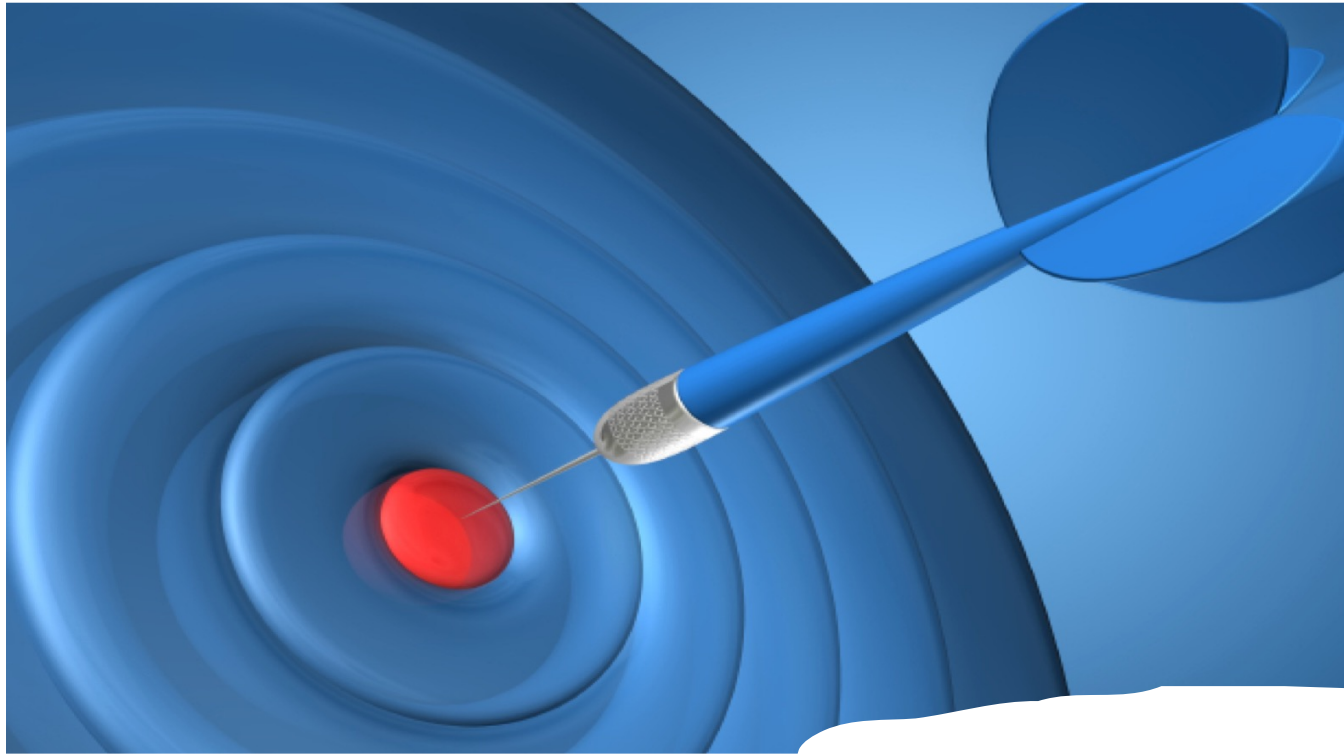
**VISION:** to be the trusted source of engineering advice for creating a healthier, more secure, and more sustainable world.

**MISSION:** to advance the welfare and prosperity of the nation by providing independent advice on matters involving engineering and technology, and by promoting a vibrant engineering profession and public appreciation of engineering.

The themes of people, systems, and culture guide the new [2021-2026 strategic plan](#), which outlines the following programmatic priorities for NAE:

- Increase engineering talent in the U.S. through a strong commitment to diversity, equity, and inclusion.
- Instill a culture of ethical and environmental responsibility in engineering.
- Identify and inform the frontiers of engineering theory, practice, and policy.
- Improve capabilities and competencies for complex systems engineering.





PENG – What are we doing?



# What are we doing and looking form partners

- UNM co-hosted the first Global Peace Engineering Conference – over 500 diverse attendees, 41 countries
- UNM wants to be a leader in Peace Engineering (PENG) as an emerging field
  - [PENG Minor – open to ALL disciplines \(no silos\)](#)
  - [PENG graduate programs](#)
  - [PENG on-line MS degree and certificate program](#)
    - [In collaboration with the Peace Engineering Consortium](#)
- Ingeniería para la Paz – ITM – Medellin, Colombia – June 2021 – Fulbright Program
- **Peace Engineering (PENG) for a Sustainable Planet by 2030:  
Call to Action 2020-2030 - October 2021  
Summary of Peace Engineering Biome Kickoff Workshop**







# What are we doing and looking for partners

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- PENG Minor
  - A) 15 credit hours
    - ENG 220 – Engineering, Business, Sustainability, Ethics and Society
    - ENG 320 – Design Thinking, Project Management, Metrics, Data Models, Analytics, Data Science
    - 9 credits from UNM Core or other - 300 or 400 levels
      - Invited lectures from Peace Engineering Consortium members
  - B) 15 credit hours
    - ENG 220 – Engineering, Business, Sustainability, Ethics and Society
    - ENG 320 – Design Thinking, Project Management, Metrics, Data Models, Analytics, Data Science
    - ENG 419 and 420 – Senior Design
    - 3 credits from UNM Core or other - 300 or 400 levels
      - Invited lectures from Peace Engineering Consortium members



# What are we doing and looking for partners

- ENG 220 - Engineering, Business, Sustainability, Ethics and Society
  - COIL format with CETYS University from Mexico
  - **Some Themes:** COVID – Probability and Statistics; Captology (“Netflix: the social dilemma”), Whistle blowers – Future of Employability, Health Insurance and Other Benefits; Systems Thinking; The Risk of Not Innovating; Global Warming; Government Inaction on Climate Change Linked to Psychological Distress in Young People; Aporophobia; JEDI, other
  - Example Project
    - **17 SDGs and smartphones**
      - Map the 17 SDGs to your smartphone
      - How can your smartphone be used to measure/record data, help, etc. the 17 SDGs







# What are we doing and looking for partners

- UNM is leveraging and collaborating with Project ECHO to bring critical infrastructure to promote Health and Well-being globally
- We believe in multidisciplinary/holistic education
  - Integrate socio-techno-policy-finance
- We see a window of opportunity for new relevant R&D and entrepreneurial activities and leadership





# Peace Engineering (PENG) for a Sustainable Planet by 2030: Call to Action 2020-2030 – October 2021

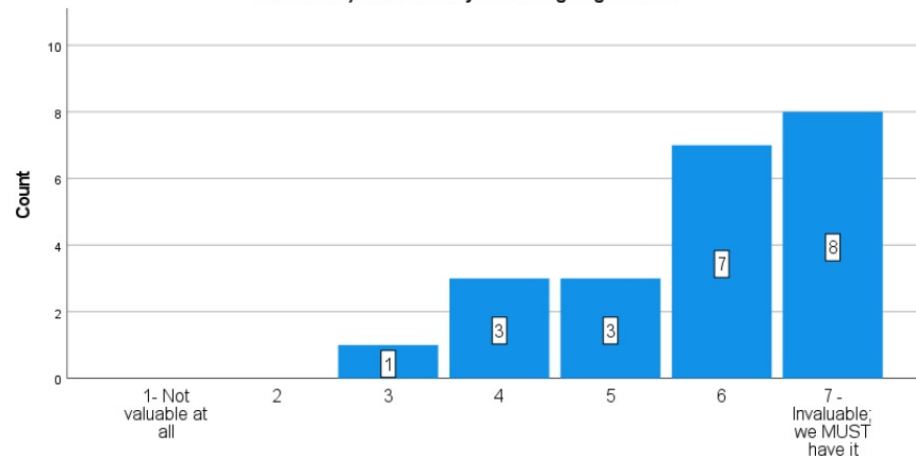
## Summary of Peace Engineering Biome Kickoff Workshop

### The OUTCOMES

#### **Participants felt that Peace Engineering is critical in the present and future.**

In a survey of workshop attendees, the majority of respondents felt that the themes and goals of Peace Engineering were *already* a part of *more than half of their current work*. When asked how valuable they thought Peace Engineering would be to their future work, *all* saw value in it, and the plurality reported that it would be “invaluable.”

On the following scale, please tell us how valuable you feel the PENG initiative (the COI and building a curriculum) could be for your work going forward.







# Peace Engineering (PENG) for a Sustainable Planet by 2030: Call to Action 2020-2030 – October 2021 Summary of Peace Engineering Biome Kickoff Workshop

## OUTCOMES

- Peace Engineering will be advanced by transforming engineering education
- Peace Engineering must be transdisciplinary
- Partnerships and collaboration are essential
- It is important that the Peace Engineering approach embrace community, culture, and individuals
- Peace Engineering should inform diplomacy and policy-making
- Foster Peace Engineering R&D, Peace-Tech and entrepreneurship





Peace Engineering (PENG) for a Sustainable Planet by 2030:  
Call to Action 2020-2030 – October 2021  
Summary of Peace Engineering Biome Kickoff Workshop

## The NEXT STEPS – How we are transforming ideas into action

- Peace Engineering academic programs
  - Minor, graduate and certificates
- Communities of Interest/Action





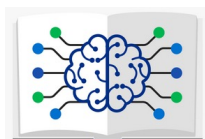


# Peace Engineering (PENG) for a Sustainable Planet by 2030: Call to Action 2020-2030 – October 2021 Summary of Peace Engineering Biome Kickoff Workshop

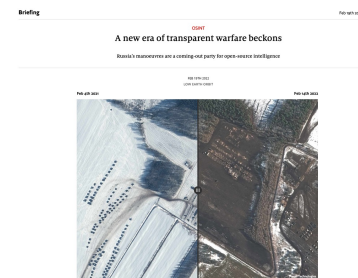
## The NEXT STEPS – How we are transforming ideas into action

### • Working groups

- 1) Climate Security;
- 2) Life Sustainable Infrastructures;
- 3) Materials & Sustainability;
- 4) Complex Systems Modeling and
- 5) Global Security and Cooperative Monitoring



OSINT



<https://www.economist.com/briefing/2022/02/19/a-new-era-of-transparent-warfare-beckons>

<https://www.recordedfuture.com/open-source-intelligence-definition/>





## Peace Engineering (PENG) for a Sustainable Planet by 2030: Call to Action 2020-2030 – October 2021 Summary of Peace Engineering Biome Kickoff Workshop

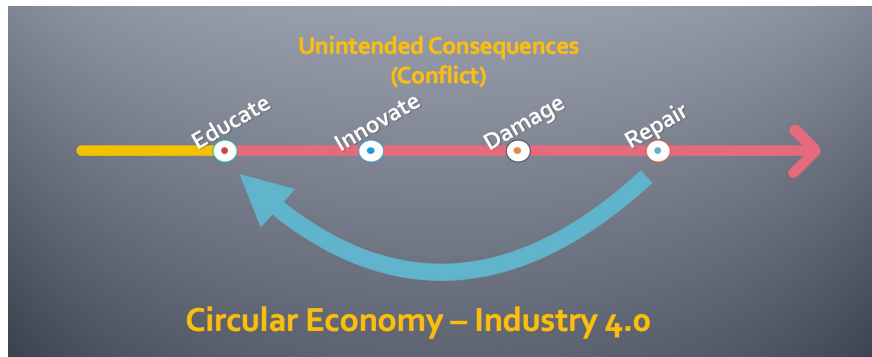
### The NEXT STEPS – How we are transforming ideas into action

- **Working groups**
  - **Curriculum:** Peace Engineering educational programs including the development of curricula for undergraduate minor programs, expanding existing MS and PhD programs, and developing certificate programs that will provide PENG-relevant micro-credentials.
  - **Outreach:** Development of outreach activities including community partnerships and participatory projects, and audience-specific marketing ventures to facilitate recruitment of PENG practitioners and expand awareness of its mission and capabilities.
  - **Partnerships and Sponsors:** Identification of key partnerships and sponsors through strategic development. This involves reviewing short, medium, and long-term opportunities with both local and global scope.



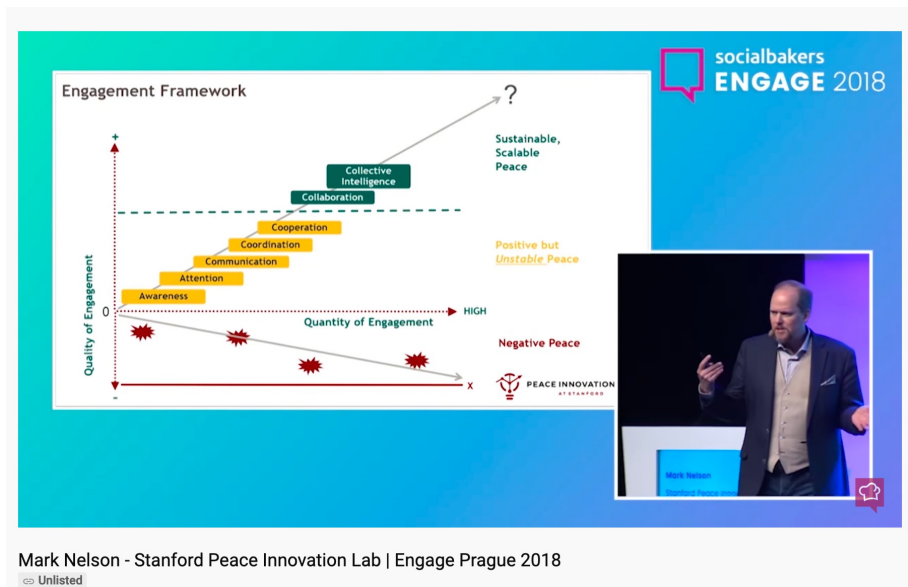
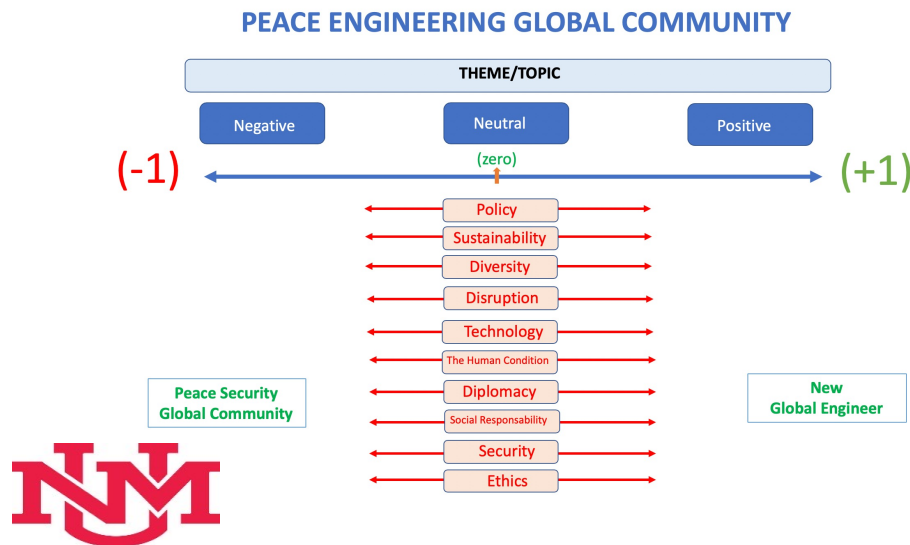


# Peace Engineering New Mindset



## Can we measure Peace?

Metrics, data models, analytics, prediction, emergence engineering, respectful design, systems and complex systems – empathy, anger, trust, conflict, rejection, ...

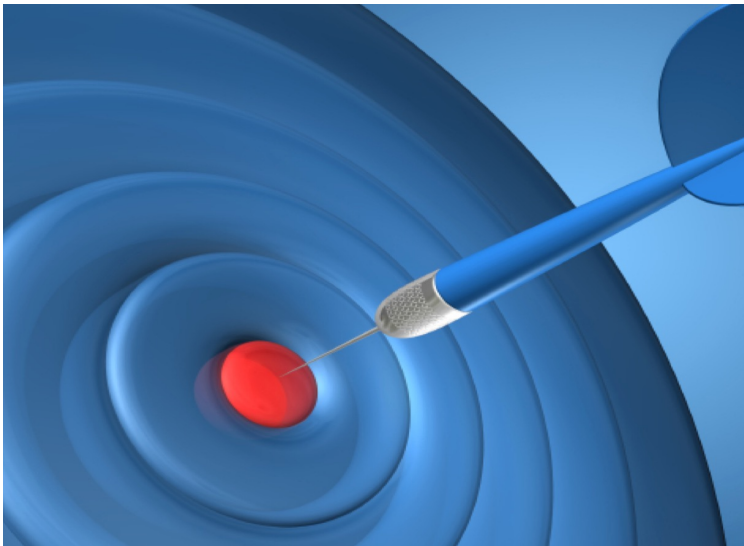


# Peace Engineering New Mindset

*ABET Program Outcomes: Engineering programs must demonstrate that their students attain the following outcomes*

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors* ←
3. *an ability to communicate effectively with a range of audiences* ←
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts* ←
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.* ←





Peace Engineering – ECHO

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# PENG - ECHO



Peace Engineering



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**At ECHO, our mission is to democratize medical knowledge and get best practice care to underserved people all over the world.**

**Our goal is to touch the lives of 1 billion people by 2025.**

Supported by New Mexico Department of Health, Agency for Health Research and Quality, New Mexico Legislature, the Robert Wood Johnson Foundation, the GE Foundation, Helmsley Charitable Trust, Merck Foundation, BMS foundation, NM Medicaid



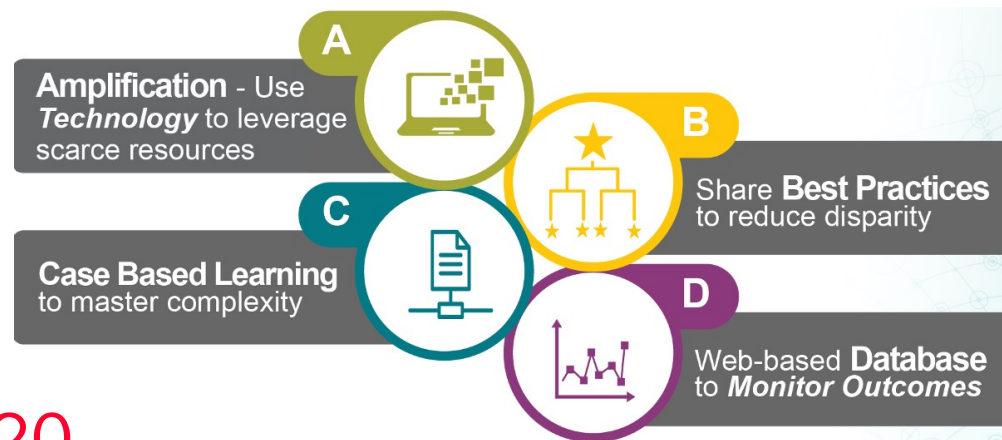
*Sanjeev Arora, MD, MACP*

Distinguished and Regent's Professor of Medicine (Gastroenterology/Hepatology)  
Director of Project ECHO®

**Started Sept 2020**

**simple, scalable, highly effective,  
low-cost**

## All Teach – All Learn





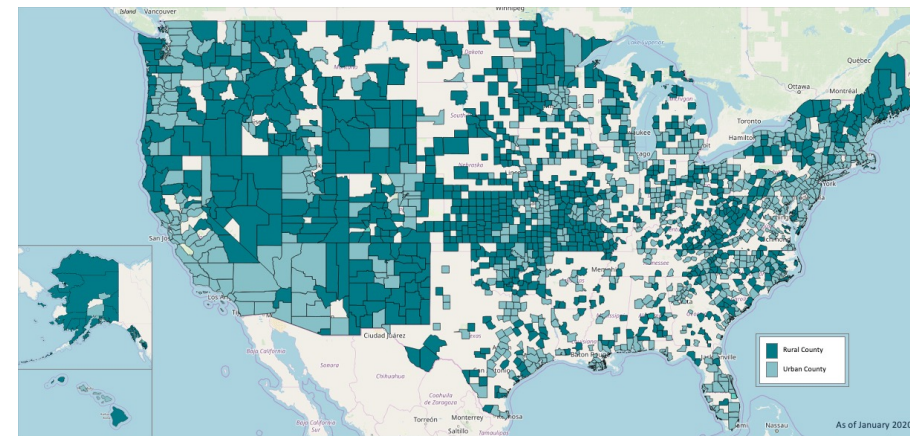
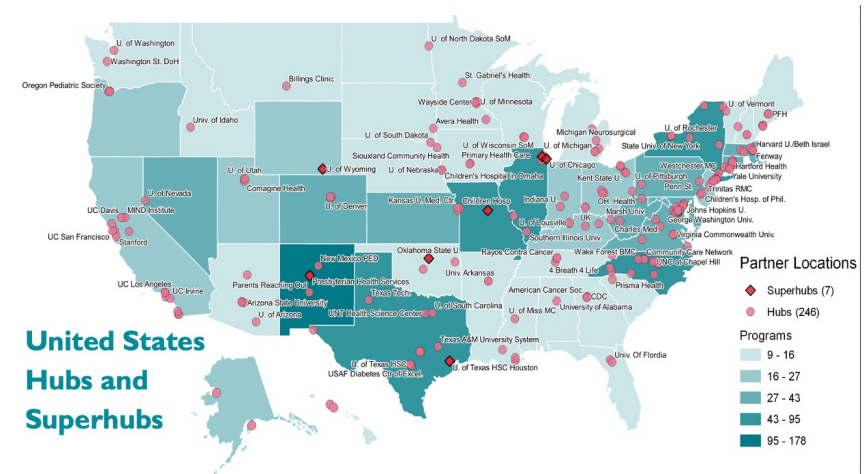
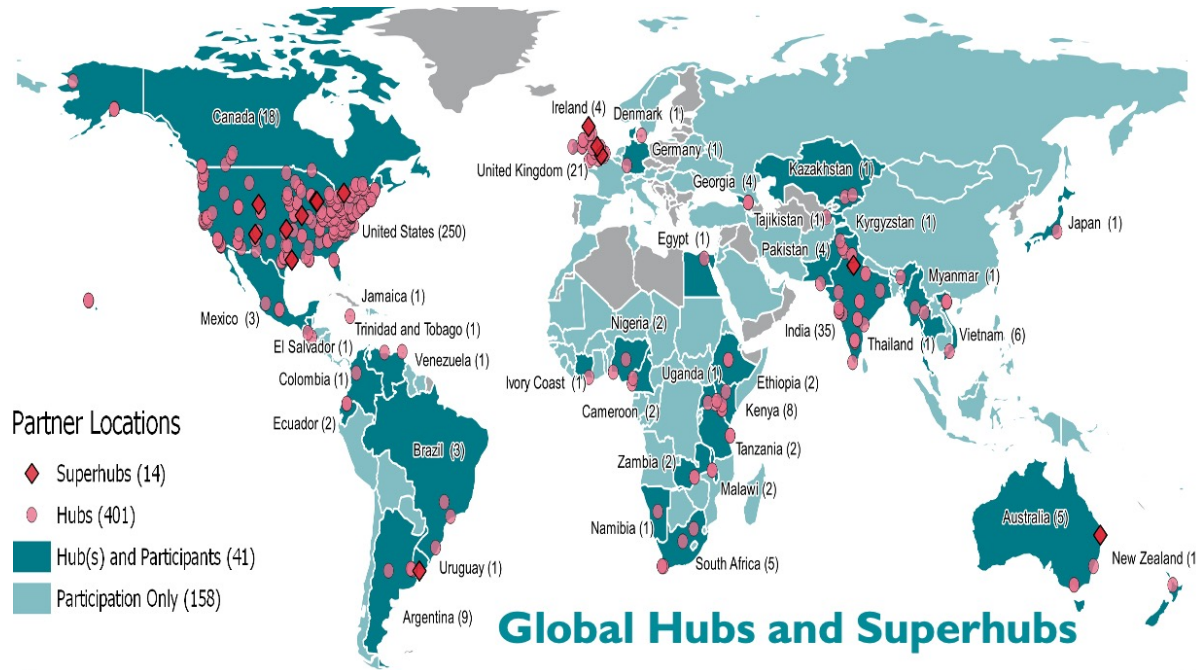
# PENG - ECHO



Peace Engineering



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Since a standing start in mid-March, the ECHO Global Network has already provided over 1 million hours of lifesaving COVID 19 training to over 600,000 healthcare workers in 158 countries.



## Resources

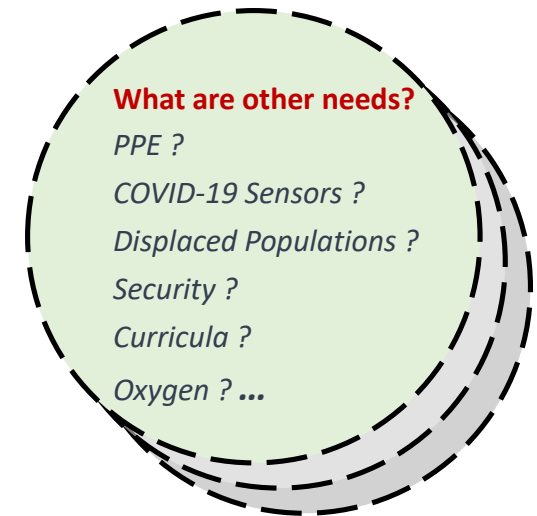
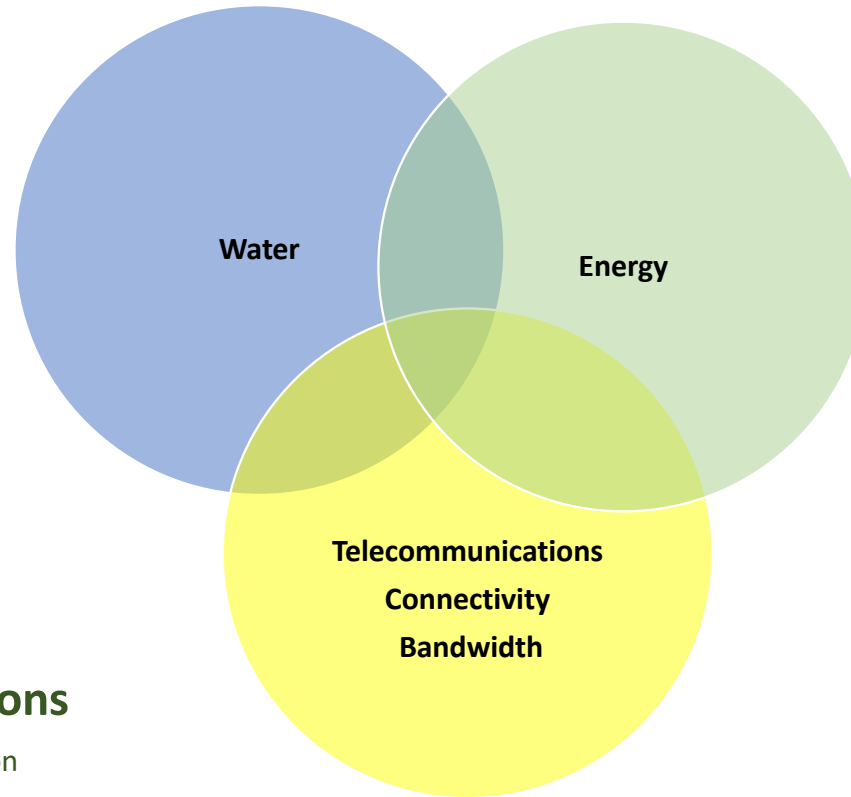
### Talent

- Peace Engineering - ECHO Development Team
- Global Network of Engineering SMEs in focus areas
- Global Network of Engineering students and faculty advisors who want to work on real projects
- IFEEES/GEDC Global Network
- Customer/Client Resources

### Vetted Best Practice Solutions

- Water – pumping, filtration, disinfection
- Energy – Power suitcase
- Telecommunications (IT), others . . .

# Initial Areas of Focus



***Community of Practice – All teach, all learn***  
***Empowering Communities***



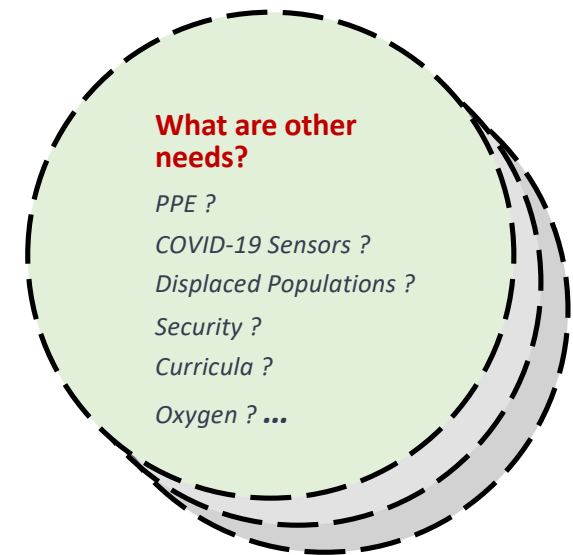
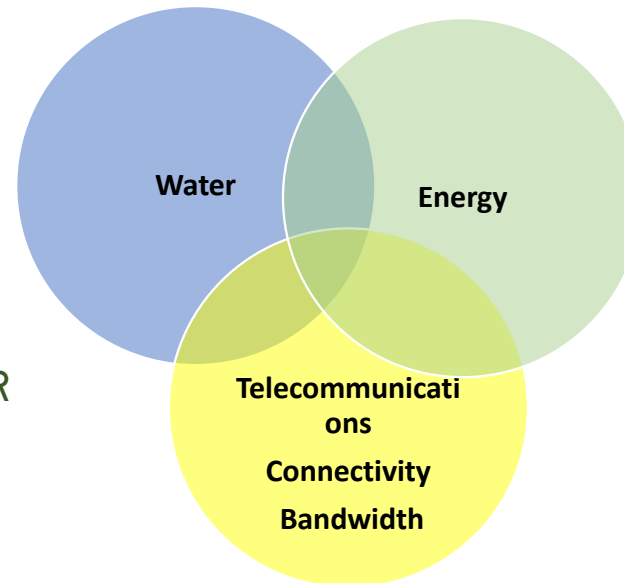




# Initial Areas of Focus



- PENG Consortium
- EPICS – Community Based Projects
- Global events WEEF-GEDC 2018/19/20/21/22
- EWB partnership
- PENG-ECHO
- PENG MINOR @ UNM
- PENG BIOME – UNM, SNL, LANL OTHER
- NSF funding for PENG
- DATA STANDARD
- FINANCE, ESG, other
  - Periodic Table
  - Resilience
  - Transparency



***Community of Practice – All teach, all learn***  
***Empowering Communities: lifelong learning***





# WET - Kit

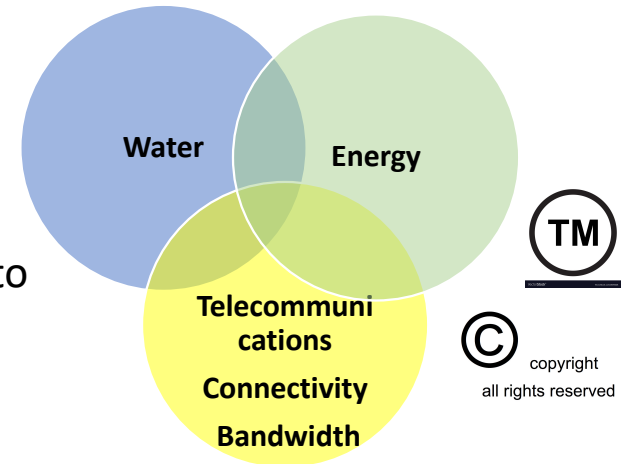


Sudan, Kenya, Uganda, Peru, Colombia,...

**An invitation to all students who want to make a lasting difference in response to Global Climate and Humanitarian Crises**

The Peace Engineering - ECHO program works with Community Engineering Response Teams (CERT). These teams will follow ECHO model's **“all-teach, all-learn” philosophy**, in which both specialists and providers contribute equally to the knowledge sharing process.

These teams will help communities develop effective means of water sanitation and storage, assistance with providing a renewable/alternative energy source, and basic telecommunication (IT) services.



**WET-Kit**





# WET - Kit

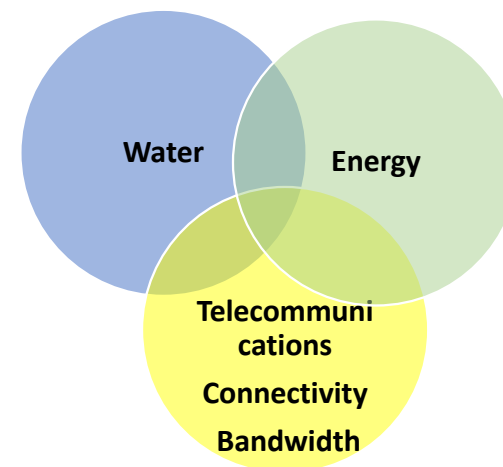


Sudan, Kenya, Uganda,  
Peru, Colombia,...

## What Resources do CERTs Need?

A **WET Kit** is based as a menu of off the shelf components to that can be tailored to meet the communities needs in **Water**, **Energy** and **Telecommunications (IT)** components. These components need to be configured as a backpack that can be carried by Community Engineering Response Teams (CERTs). ***Systems Integration Training.***

- **Water:** purification, disinfecting, chlorine generation, filtering
- **Energy:** solar, wind, hydro, batteries
- **Telecommunications:**
  - Cellphones, laptops, tablets, sensors, other
  - cellular networks (2G,3G,4G,5G), WiFi, satellite, Bluetooth



## WET-Kit

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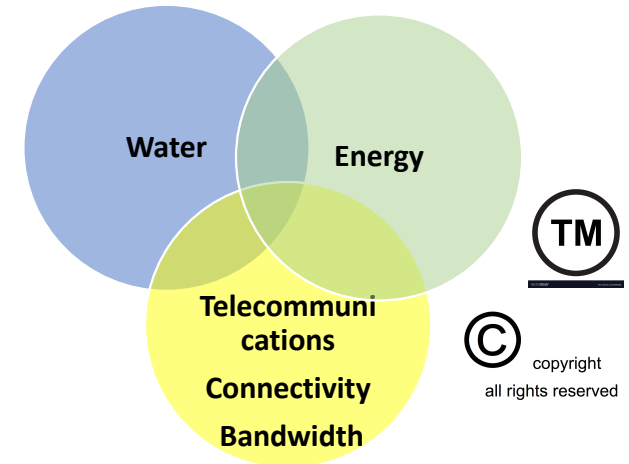


# Sudan Peace Engineering – ECHO Hub

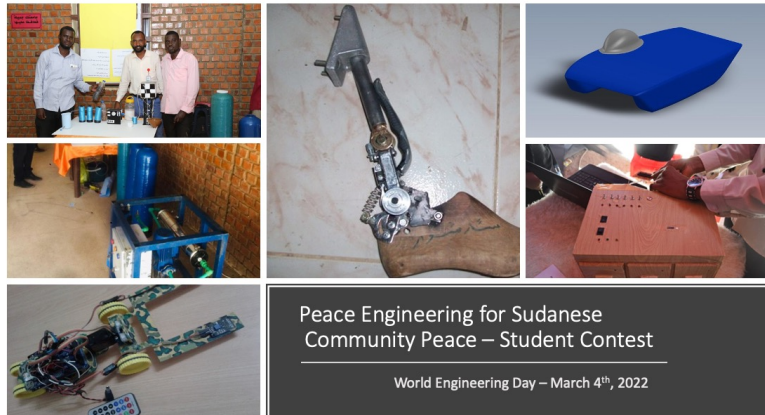
Leader : Dr. Tagwa Musa from SUST

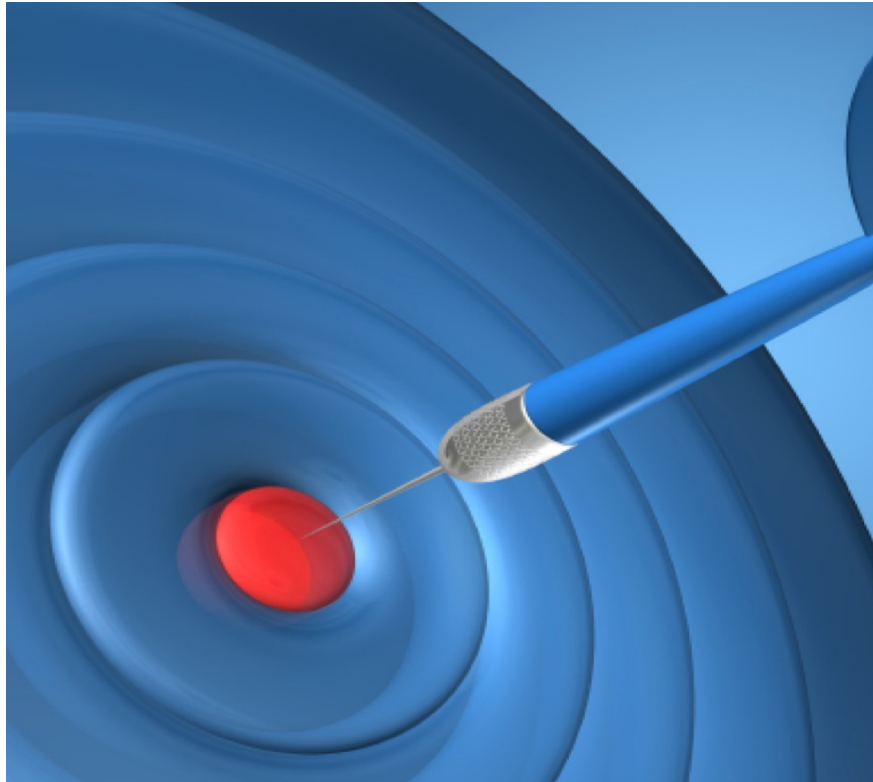
Tentative Date : May 2022

Empower: CERTs and CMRTs



**WET-Kit**





What is Peace Engineering to you?

# Peace Engineering

One planet, one environment, one chance! - ISTECH 1992



For each of us, and our communities, we must ask:

- What do we value most and want to keep? (resilience)
  - What do we need to let go of so as not to make matters worse? (relinquishment)
  - What could we bring back that will help us in these difficult times? (restoration)
- &
- With what and whom shall we make peace? As we awaken to our interdependence (reconciliation)

*Deep adaptation framework*  
*Jem Bendell*

Dr. Heidi Rogers – Human Health and Climate Change; PENG-ECHO Collaborative; April 1, 2021





**Thank You**  
**Gracias**  
**Obrigado**  
**Merci**



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PEACE INNOVATION LAB  
STANFORD



AQUA  
RESEARCH

