Humanitarian Engineering
Colorado School of Mines

Engineers co-creating with communities

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ASEE EDI Cool Ideas Session
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Humanitarian Engineering is ...

.... a curricular minor for engineering students to learn about co-creating just and sustainable solutions for communities
Humanitarian Engineering is …

…. Cutting Edge! – as the 1st such program in the US (2003), HE is a

• Space for deep and serious constructive critical reflection on “what is engineering for?”

• Vehicle for praxis, where students can see the relevance of engineering to social problems
Humanitarian Engineering is... Complicated!

The World of the Humanitarian Engineer

- Corporations
- NGOS
- Development banks
- NGOs (engineers and other actors)
- Geopolitics and ideology
- History, culture
- Community groups
- Labor unions
- Governments
- Academia
- Families
- Corporate Social Responsibility
- Engineers and scientists
Humanitarian Engineering is ... 

... Participatory! – 1/2 of the required 18 credit hours are project based learning

HE students brainstorming at the Posner Center, a Denver-based NGO incubator
Humanitarian Engineering is …
Engineering by Doing!

EbD I – Human Centered Design (HCD)
Methods for problem identification, definition, scoping using IDEO techniques.

EbD II – Projects for People
Combines HDC techniques with technical skills to address design challenges for communities.

EGGN491/2 – Senior Design
Design/build of infrastructure, assistive technologies and solutions for community partners based on work previously completed inEbD I/II
Humanitarian Engineering is ... Interdisciplinary!

Employing a Human-Centered Design methodology, HE as a place where team-based problem definition and solution skills are developed in a real-world setting.

Vertically-Integrated Teams by Skill Level

- Freshmen learn basic hands-on skills related to fabrication and assembly while working on real-world projects.
- Sophomores and juniors work on advanced processes and carry out basic design functions.
- Seniors act as advanced designers and design team leaders.

Horizontally-Integrated Teams by Discipline

- Faculty and client liaisons work together to link client needs and project efforts.
- Graduate students act guide teams in design optimization and systems engineering, act as project managers.
Humanitarian Engineering is … 

*a Partnership with Community!*

Numerous HE students work with some of the 60+ Tenants at the Posner Center for International Development – the largest US NGO Incubator – located in Denver.
Humanitarian Engineering is …
Making a difference!

- Water-powered pumps in Niger
- Mountain bikes for quadriplegics
- Solar-powered pumps and post-harvest storage solutions for African farmers
- Schools for girls in Nepal and Nicaragua
- Footbridges over formerly impassable rivers,
- Energy-efficient housing for Native American Sustainable Housing Initiative
Humanitarian Engineering is …

… a COOL IDEA!!

Questions?
Humanitarian Engineering is …

- Recruiting and retaining diverse students including people with disabilities, low income, and students of different sexual orientations

- Connecting our privileged "ivory tower" with less privileged communities and people

- Opening opportunities for engineering faculty to explore their passions for
  - social justice
  - community development
  - assistive technologies