

## Slow Sand Filters for Drinking Water Treatment in Rural Communities: Colombia, East Africa, And Elsewhere

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ENVIRONMENTAL & ECOLOGICAL  
ENGINEERING

WHERE PASSION  
FOR THE  
ENVIRONMENT  
MEETS  
PURDUE  
ENGINEERING

- 16 Faculty
- Joint appointments in:  
CE, IE, ME, ABE, MSE, AGRY, and FNR



## What We Do

- **Water and Watershed Stewardship**  
Ensuring that engineered systems & ecological systems interact sustainably.
- **Pollution Control, Monitoring, Abatement and Remediation**  
Wastewater, soil and air treatment/control, industrial waste control and recycling.
- **Industrial Ecology**  
Optimize industrial resource use; analyze and control of complete life-cycles of materials; industrial system redesign; energy efficiency optimization.
- **Sustainability**  
Provide for current needs without sacrificing future ability to meet needs. Consider whole system, including complex interactions of environmental, technological and societal systems.

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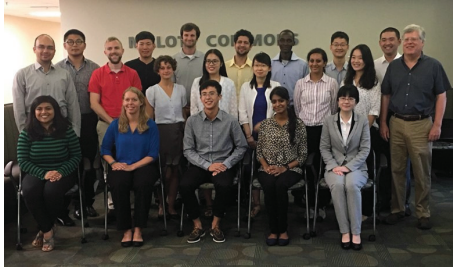
## EEE Undergraduate Student Profile

- ~110 undergraduates
- ~55% women



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## EEE Graduate Student Program



- ◆ First Students Admitted in 2016
- ◆ 13 women, 14 men (including 4 ESE)
- ◆ 5 Students in the Combined Degree (4+1) Program
- ◆ US, China, Argentina, India, Kenya

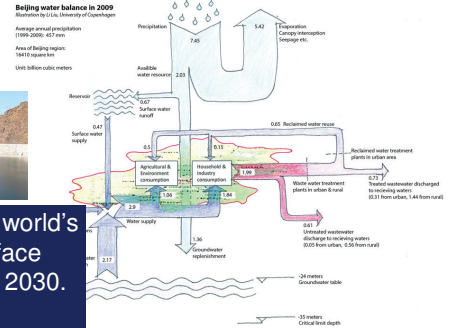
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## Lake Mead, Hoover Dam



One-half of the world's population will face water stress by 2030.

There is a critical need for an increase in water infrastructure investment



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**ENVIRONMENTAL monitor**  
Application and technology news for environmental professionals

**DON'T MISS** | Researcher replicates tidal salt marsh ecosystem with two buckets

Home > News > China pumps 2.8 million tons of algae from tainted lake

### China pumps 2.8 million tons of algae from tainted lake

By Jeff Gillies on February 8, 2012

Like 0 Tweet 2

A project to clean up one of China's largest lakes has pumped 2.8 million tons of blue-green algae from the water, according to a report from the Xinhua news service.

Taihu Lake suffered a massive blue-green algae outbreak in 2007 that forced a nearby city to stop drawing water from the lake, disrupting service to 2 million people.

The lake is in the middle of the Yangtze River Delta and its watershed is highly developed and industrialized. The algae pumping is part of a larger cleanup effort that officials say will take decades to complete.

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Lake Erie, Summer 2014, showing the extent of the blue-green algae (cyanobacteria) bloom. Cyanobacteria produce microcystins, a class of monocyclic hepta-peptide toxins.

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- ◆ According to USAID, more than 1 billion people (or 14% of the world's population) lack access to safe drinking water and nearly 2 million people die each year due to diarrhea alone, of which 1.5 million are children.
- ◆ USAID also reports that approximately 90% of diarrhea is attributed to unsafe drinking water.
- ◆ The National Academy of Engineering has listed: "Provide access to clean water" as one of the 14 Grand Challenges for Engineering in the 21<sup>st</sup> century.
- ◆ A large fraction of the people without an improved water source live in rural areas and have limited financial resources.
- ◆ *In general, **people** in rural areas are this demographic population for which our research and outreach efforts are directed.*

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### Places:

- ◆ Colombia, South America
  - ◆ Rural Elementary Schools
  - ◆ Barbosa, Antioquia
  - ◆ Amaga, Antioquia
  - ◆ University of Cartagena
- ◆ Tanzania, Africa
  - ◆ Nelson Mandela African Institute for Sci. & Technology
- ◆ Kenya, Africa
  - ◆ UN Habitat (Kibera "informal area")
  - ◆ Eldoret – 5 Schools in Western Kenya
- ◆ China, Asia
  - ◆ Qinghai Normal University
  - ◆ Eastern India (through a church group)



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### Mechanism:

- GEP 200 to 500 level courses
- 92 students from 2011-2016
  - (10-15 students per class – each spring semester and some fall semesters)
- 11 students have traveled to Colombia for 1 week work periods



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### Initial Project Site: Rural Communities near Barbosa, Antioquia, Colombia (1 hr Northeast of Medellin)

