

# Minor in Multidisciplinary Design: Global Health Design Specialization



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## Overview

Many of today's undergraduate engineering students demonstrate a passion for global health and are taking it upon themselves to create opportunities for impact in this topic, as demonstrated by the growing number of student groups that have formed within the College of Engineering at the University of Michigan (i.e. M-Heal, BLUElab, and Health in Action). Course-based educational trends seeking to meet this interest are currently providing undergraduate engineering students with exposure to global health through lectures, case studies, and design projects. In an effort to expand educational options for students with interests in global health, the University of Michigan College of Engineering will be launching a Minor in Multidisciplinary Design Specialization in Global Health Design (GHD) that incorporates core design principles such as co-creation and opportunity for technology introduction and redesign. The core of the GHD specialization is an intense two-semester design course featuring project scoping, co-creation with the community it intends to serve, technology introduction, and redesign. This educational approach leverages existing University relationships in Ghana (project scoping field site can be domestic or international), prior experiences by the GHD organizers in leading international clinical field site experiences, and a multi-semester design course centered on bioinnovation.

## Global Health Design Specialization

The Minor in Multidisciplinary Design (MMD) was created at the University of Michigan to enable students to exercise their acquired disciplinary expertise in the context of a significant multi-semester design project and was launched during the 2009 academic year. Engineering students pursuing the MMD who are interested in addressing global health challenges have the opportunity to specialize in Global Health Design (GHD). The specialization emphasizes co-creation as part of a comprehensive design process, experiential learning, intercultural training, in-depth exposure to a specific global health theme, and social entrepreneurship. The core of the Specialization is an intense two-semester design course featuring clinical project scoping, co-creation with the end user, technology introduction, redesign, and social entrepreneurship.

## Specialization Objectives

- Emphasize the importance of co-creating with the community versus simplistic needs assessment
- Understand the implications of introducing technologies to the community
- Teach for sustainability
  - Avoid the "hit and run"
  - Leverage existing university relationships
  - Build local capacity
- Understand cultural influences on health care

## Specialization Requirements

- "Cornerstone" course related to cohort theme (i.e. Health and Illness in Africa)
- Two-semester global health design course
  - Project scoping
  - Technology introduction
  - Redesign
- International Engineering or Social Entrepreneurial Seminar Series
- Formal leadership/mentorship experience



## Additional Information

- Applications are due December 1, 2009.
- For more details, please refer to: <http://sitemaker.umich.edu/specialization/overview>

## Acknowledgements

Prof. Steve Skerlos, Prof. Frank Anderson, Prof. Tim Johnson, Prof. Elijah Kannatey-Asibu, Prof. Kwabena Danso, Dr. Anthony Ofori, M.D., GIEU Director A.T. Miller, GIEU Asst. Director Reggie Noto, Katharine Robb, Kira Fleming, Kofi Gyan, Daniel Ursu, 2008 & 2009 GIEU Ghana students, Prof. Thomas Zurbuchen, Eva Cha, Jessica Boria.

## Pilot Clinical Project Scoping Experience

The Global Intercultural Experience for Undergraduates (GIEU) Program at the University of Michigan provides opportunities for short-term faculty-led intercultural study emphasizing the development of intercultural skills, global perspective, cultural sensitivity, critical self-reflection, and navigation within an intercultural setting. Prof. Sienko participated in this program for the past two years to: 1) create a clinical immersion experience for undergraduates that could concurrently serve as a dry run for a GHD Clinical Project Scoping Experience, 2) work with a group of academically diverse students, and 3) develop sustainable research collaborations with Ghanaian clinicians. The GIEU field sites are briefly described below as a potential model for the immersion experiences to be developed as part of the GHD Specialization.

GIEU 2008 – Combating Maternal Mortality  
Location: Kumasi, Ghana



GIEU 2009 – Improving Maternal Health  
Location: Kumasi, Ghana



During May 2008 and July 2009, multidisciplinary undergraduate students conducted clinical observations in urban and rural hospitals in Ghana for the purpose of understanding current maternal health issues. The students:

- Taught HIV/AIDS educational outreach modules
- Developed website templates for Kwame Nkrumah University of Science and Technology
- Conducted a medical inventory of OBGYN Departments
- Evaluated design projects from Winter 2009 semester and generated innovative technological interventions for improving maternal health



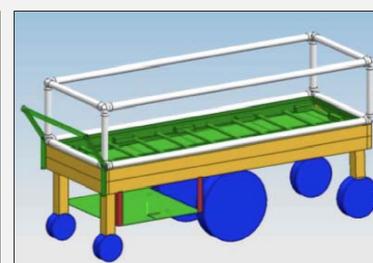
## Design Course: Global Health Design Themed Section

During W09 and F09, the Mechanical Engineering Department offered a global health design themed section within the traditional ME450 Senior Design Course. Some of the design project work was based on the 2008 and 2009 GIEU student observations. Projects included:

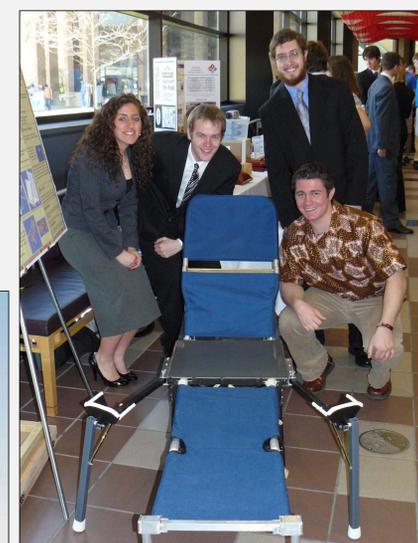
- Portable Obstetrics & Gynecology Examination Equipment
- Reconfigurable Obstetric Delivery Bed
- Automated Blood Transfusion Device
- Folding Tricycle Attachment for Wheelchairs
- Mortuary Truck
- Traditional Male Circumcision Tool
- Mechanical CPAP Device for Sleep Apnea
- Surgical Thoracotomy Simulator
- Threshold-based Blood Pressure Device



Circumcision Tool



Mortuary Truck



Portable Examination Equipment Team including GHD Pilot Student Joey Perosky