

# GLOBAL HEALTH TECHNOLOGIES

## Contact Information

**Global Health Technologies**  
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Collaborating with multiple academic departments, the [Rice 360 Institute](https://rice360.rice.edu/) (https://rice360.rice.edu/) for Global Health Technologies offers students a minor in Global Health Technologies (GLHT), a unique, multidisciplinary program to educate and train students to reach beyond traditional disciplinary and geographic boundaries to understand, address, and solve global health disparities. With complementary contributions from the humanities, social science, policy, bioscience, and engineering programs at Rice, the GLHT minor prepares students to integrate diverse perspectives as they develop solutions to the complex problems of global health, using the formal approach of the engineering design process.

The minor is open to Rice undergraduate students from all disciplines and requires completion of seven courses, including five core courses, and two electives. Students begin the minor by taking GLHT 201, which provides an overview of scientific, economic, and policy issues associated with advanced global health technologies, followed by an introductory design course, GLHT 360. The subsequent core course is selected by the student from a collection of approved courses. The final two courses, GLHT 451 and GLHT 452, are taken in a two-semester sequence in which multidisciplinary teams of undergraduate students work together to design and implement solutions to existing global health challenges in low-resource settings. Elective courses include a range of subjects. Courses such as Immunology, Health Economics, Medical Chemistry, or Health Policy, provide students experience in engineering and social sciences as applied to international health challenges.

Throughout the program, GLHT students benefit from receiving guidance and mentorship from Rice faculty and graduate students, as well as

from partner organizations and clinicians in the Texas Medical Center and in low-resource settings, to design robust, low-cost, effective health technologies.

## Minor

- [Minor in Global Health Technologies](https://ga.rice.edu/programs-study/departments-programs/engineering/global-health-technologies/global-health-technologies-minor/) (https://ga.rice.edu/programs-study/departments-programs/engineering/global-health-technologies/global-health-technologies-minor/)

Global Health Technologies does not currently offer an academic program at the graduate level.

## Director and Advisor

Rebecca Richards-Kortum

## Undergraduate Advisors

Elias K. Bongmba  
 Z. Maria Oden

## Minor Advisor

Michelle Nodskov

## Adjunct Lecturer

Meaghan Bond

## Steering Committee

Pedro J.J. Alvarez  
 Rachel Tolbert Kimbro  
 Douglas A. Schuler  
 Tomasz Tkaczyk

*For Rice University degree-granting programs:*

To view the list of official course offerings, please see [Rice's Course Catalog](https://courses.rice.edu/admweb!/SWKSCAT.cat?p_action=cata) (https://courses.rice.edu/admweb!/SWKSCAT.cat?p\_action=cata).

To view the most recent semester's course schedule, please see [Rice's Course Schedule](https://courses.rice.edu/admweb!/SWKSCAT.cat) (https://courses.rice.edu/admweb!/SWKSCAT.cat).

## Global Health Technologies (GLHT)

**GLHT 201 - INTRODUCTION TO GLOBAL HEALTH**

**Short Title:** INTRO TO GLOBAL HEALTH

**Department:** Global Health Technologies

**Grade Mode:** Standard Letter

**Course Type:** Lecture

**Distribution Group:** Distribution Group III

**Credit Hours:** 3

**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

**Course Level:** Undergraduate Lower-Level

**Description:** This course provides an overview of contemporary challenges and advances to improve human health. The course opens with an introduction to the epidemiology and physiology of the major human health problems throughout the world. With this introduction, we examine medical technologies to prevent infection, detect cancer and treat heart disease. The course is designed for non-engineering / non-science majors.

**GLHT 238 - SPECIAL TOPICS**

**Short Title:** SPECIAL TOPICS

**Department:** Global Health Technologies

**Grade Mode:** Standard Letter

**Course Type:** Internship/Practicum, Laboratory, Lecture, Seminar, Independent Study

**Credit Hours:** 1-4

**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

**Course Level:** Undergraduate Lower-Level

**Description:** Topics and credit hours vary each semester. Contact department for current semester's topic(s). Repeatable for Credit.

**GLHT 314 - SUSTAINABLE WATER PURIFICATION FOR THE DEVELOPING WORLD**

**Short Title:** SUST WTR PURIF FOR DEV WORLD

**Department:** Global Health Technologies

**Grade Mode:** Standard Letter

**Course Type:** Lecture/Laboratory

**Credit Hours:** 3

**Restrictions:** Enrollment limited to students with a class of Senior. Enrollment is limited to students with a minor in Global Health Technologies. Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

**Course Level:** Undergraduate Upper-Level

**Description:** This course is an overview of sustainable strategies for safe water supply in off-the-grid, low-income regions. Topics covered include water quality and treatment, sustainability and WASH (water, sanitation and hygiene). A major element of the course is a project to solve a water-related issue in a real-world context. Cross-list: BIOE 365, CEVE 314. Repeatable for Credit.

**GLHT 360 - APPROPRIATE DESIGN FOR GLOBAL HEALTH**

**Short Title:** APPRO DESIGN FOR GLOBAL HEALTH

**Department:** Global Health Technologies

**Grade Mode:** Standard Letter

**Course Type:** Seminar

**Credit Hours:** 3

**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

**Course Level:** Undergraduate Upper-Level

**Prerequisite(s):** GLHT 201

**Description:** Seminar-style introductory design course covering epidemiology, pathophysiology, health systems, health economics, medical ethics, humanitarian emergencies, scientific and engineering design methods, and appropriate health technology case studies. To register, you must be enrolled in the GLHT minor. The minor and course prerequisite is waived for students majoring in Bioengineering. Instructor Permission Required. Cross-list: BIOE 360.

**GLHT 364 - INNOVATION FOR SOCIAL IMPACT**

**Short Title:** INNOVATION FOR SOCIAL IMPACT

**Department:** Global Health Technologies

**Grade Mode:** Standard Letter

**Course Type:** Seminar

**Distribution Group:** Distribution Group II

**Credit Hours:** 3

**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

**Course Level:** Undergraduate Upper-Level

**Description:** This course provides students with an introduction to contemporary concepts, debates, and contexts essential for analyzing and participating in the realm of social impact. Our focus is on addressing issues within social spheres and exploring innovative approaches for organizations to tackle them. The course is structured into four main components: understanding the social context, exploring different organizational forms and collaborations, examining the various roles of business, and delving into methods for measuring social impact. Additionally, we introduce field methodologies to facilitate practical application. Building upon this framework, students will engage in a field project collaborating with an organization to address a social issue prevalent in Houston, specifically focusing on food insecurity. Through this project, students will assess the effectiveness of the organization's social innovation efforts.

**GLHT 392 - NEEDS FINDING AND DEVELOPMENT IN BIOENGINEERING**

**Short Title:** NEEDS FINDING & DEV IN BIOE

**Department:** Global Health Technologies

**Grade Mode:** Standard Letter

**Course Type:** Lecture/Laboratory

**Credit Hours:** 3

**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

**Course Level:** Undergraduate Upper-Level

**Description:** Students in this course will learn and develop the engineering skill of needs finding in the field of bioengineering focused on designing for disabilities. Students will work in groups with patients with disabilities to identify daily needs and develop design criteria to meet those needs including preliminary prototype development. Instructor Permission Required. Cross-list: BIOE 392.

**GLHT 400 - GLOBAL HEALTH TECHNOLOGIES INDEPENDENT RESEARCH PROJECTS**

**Short Title:** GLHT INDEPENDENT RESEARCH

**Department:** Global Health Technologies

**Grade Mode:** Standard Letter

**Course Type:** Research

**Credit Hours:** 1-3

**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

**Course Level:** Undergraduate Upper-Level

**Description:** This course enables undergraduates pursuing the Global Health Technologies Minor to perform independent research on a specific design challenge in global health technology and innovation. Students are advised by the faculty and often mentored by a graduate student/post-doc. Instructor Permission Required. Repeatable for Credit.

**GLHT 401 - GLHT RESEARCH PAPER WRITING AND SUBMISSION****Short Title:** GLHT RESEARCH REPORTING**Department:** Global Health Technologies**Grade Mode:** Standard Letter**Course Type:** Research**Credit Hour:** 1**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Description:** Students in this course will work in the preparation of a paper reporting a previously completed design project. Instructor Permission Required. Repeatable for Credit.**GLHT 411 - INTEGRATED APPROACHES TO SUSTAINABLE DEVELOPMENT****Short Title:** SUSTAINABLE DEVELOPMENT**Department:** Global Health Technologies**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Description:** This is a multidisciplinary course in which students explore the origins, connections and consequence of social and political tensions arising from the expansion of commercial energy resources in unique and rapidly changing Arctic and sub-Arctic environments. The challenge for the class will be to understand that in matters of sustainable development systemic complexities often give rise to a disconnect between analysis and decision-making. Topics will include the impacts of commercial energy development and drilling in rapidly changing Arctic environments, as well as strategies that can promote sustainable development and improved conditions for indigenous populations in the context of environmental challenges associated with the Arctic meltdown and drilling activities for oil and gas. Methodologies for structuring the analysis to be applied to enhance systemic resilience of the Alaska environment will be presented. Students will learn explore the barriers to sustainable development and discuss cost-effective, culturally appropriate solutions to energy related issues by integrating technical, organizational, and personal perspectives. Each class will have formal lectures(s) by Rice faculty or guest lecturer. Registered students are eligible to apply for a summer internship in Alaska. Recommended Prerequisite(s): POST 401 Mutually Exclusive: Cannot register for GLHT 411 if student has credit for POST 411. Repeatable for Credit.**GLHT 448 - TECHNOLOGY COMMERCIALIZATION IN DEVELOPING COUNTRIES FOR ENGINEERING****Short Title:** TECH COMM IN DEV CTY FOR ENGS**Department:** Global Health Technologies**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Description:** This is a unique opportunity for engineering students to 1) collaborate with graduate business students to design and disseminate global health technologies; 2) learn about the sustainable distribution of health products in developing countries; 3) have a once-in-a-lifetime trip to Africa that tourism can never duplicate; and 4) help the poor. Working alongside advanced MBA students, engineering students will apply their skills to developing business plans for student-designed global health technologies that may influence dissemination and business plans. Interested students should email [beyondtraditionalborders@rice.edu](mailto:beyondtraditionalborders@rice.edu) for an application. Instructor Permission Required.**GLHT 449 - TROUBLESHOOTING WORKSHOP FOR CLINICALLY-RELEVANT BIOMEDICAL EQUIPMENT****Short Title:** MED BIOENGINEERING WORKSHOP**Department:** Global Health Technologies**Grade Mode:** Standard Letter**Course Type:** Laboratory**Credit Hour:** 1**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Prerequisite(s):** ELEC 243**Description:** Bioengineering course in the troubleshooting, repair, and maintenance of standard biomedical equipment used in hospitals in the developed and developing worlds. Cross-list: BIOE 449. Repeatable for Credit.**GLHT 451 - GLOBAL HEALTH DESIGN CHALLENGES I****Short Title:** GLOBAL HEALTH DESIGN I**Department:** Global Health Technologies**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Prerequisite(s):** GLHT 201 and (BIOE 360 or GLHT 360) and (PSYC 370 or SOCI 381 or GLHT 392 or ANTH 381 or SOCI 345 or GLHT 464 or GLHT 314)**Description:** Students in this course will work on design projects to address global health disparities. Students will work in teams and partner with bioengineering students to develop solutions to particular problems in delivering healthcare in the developing world. Students must take GLHT 452 in the spring semester to complete their projects. Instructor Permission Required.

**GLHT 452 - GLOBAL HEALTH DESIGN CHALLENGES II****Short Title:** GLOBAL HEALTH DESIGN II**Department:** Global Health Technologies**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Prerequisite(s):** GLHT 451**Description:** Students in this course will work on design projects to address global health disparities. Students will work in teams and partner with bioengineering students to develop solutions to particular problems in delivering healthcare in the developing world. Students must have taken GLHT 451 in the fall semester to initiate their projects.**GLHT 464 - SOCIAL ENTREPRENEURSHIP****Short Title:** SOCIAL ENTREPRENEURSHIP**Department:** Global Health Technologies**Grade Mode:** Standard Letter**Course Type:** Seminar**Distribution Group:** Distribution Group II**Credit Hours:** 3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Description:** This course introduces students to contemporary concepts, debates, and contexts necessary for analyzing and engaging in the sphere of social entrepreneurship. The course has four distinct parts: social context; organizational forms and collaborations; private sector roles; and measurement and impacts. Various aspects of social entrepreneurship, such as base of the pyramid/microenterprises, private-public partnerships, private-governmental partnerships, voluntary social codes, corporate social responsibility, and ethical consumerism will be covered. From this foundation, students will undertake a social entrepreneurship project about a contemporary social problem in Houston: food insecurity and food deserts. Cross-list: BUSI 464, SOSOC 464.**GLHT 510 - SEMINAR IN TROPICAL MEDICINE****Short Title:** SEMINAR IN TROPICAL MEDICINE**Department:** Global Health Technologies**Grade Mode:** Satisfactory/Unsatisfactory**Course Type:** Seminar**Credit Hour:** 1**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate**Description:** 8 week lecture series on topics in global health. The theme for this offering is one health; integrating efforts to obtain optimal health for humans, animals, and the environment. Offered in conjunction with the new National School of Tropical Medicine, the course will feature lectures by various experts on the public health issues most pressing in poor populations in the world today. Course open to all undergraduates and graduate students. Cross-list: BIOE 510. Repeatable for Credit.**GLHT 677 - SPECIAL TOPICS****Short Title:** SPECIAL TOPICS**Department:** Global Health Technologies**Grade Mode:** Standard Letter**Course Type:** Internship/Practicum, Laboratory, Lecture, Seminar, Independent Study**Credit Hours:** 1-4**Restrictions:** Enrollment is limited to Graduate or Visiting Graduate level students.**Course Level:** Graduate**Description:** Topics and credit hours vary each semester. Contact department for current semester's topic(s). Repeatable for Credit.

## Description and Code Legend

**Note:** Internally, the university uses the following descriptions, codes, and abbreviations for this academic program. The following is a quick reference:

### Course Catalog/Schedule

- Course offerings/subject code: GLHT

### Department (or Program) Description and Code

- Global Health Technologies: GLHT

### Undergraduate Minor Description and Code

- Minor in Global Health Technologies: GLHT

### CIP Code and Description <sup>1</sup>

- GLHT Minor. CIP Code/Title: 14.0501 - Bioengineering and Biomedical Engineering

<sup>1</sup> Classification of Instructional Programs (CIP) 2020 Codes and Descriptions from the National Center for Education Statistics: <https://nces.ed.gov/ipeds/cipcode/>.