Emerging markets—consumers who are quickly moving out of poverty in nations such as China, Africa, India, and Brazil—are expected to account for 70 percent of the world’s economic growth over the next few years. Today’s emerging economies comprise 50 percent of the market for Fortune 500s.

Frugal innovation is strongly tied to social justice, but it’s not just about students doing good. It is a holistic approach that is at the intersection of altruism with the bottom line. As these technologies find their way to the mature markets of the West, they will fundamentally reshape the global economy.

The Frugal Innovation Lab: Technology to Benefit Society

With the vibrancy of emerging-market growth, the School of Engineering’s Frugal Innovation Lab (FIL) meets this new paradigm head-on by offering undergraduate and graduate courses, hosting student and faculty research projects, and partnering with field-based social enterprises in emerging markets. Impactful work is being done in simple yet powerful ways. Projects range from designs and prototypes to implemented and utilized products and services. Students learn within the lab as well as interact with field-based social entrepreneurs and global partners to solve real-world problems.

The Frugal Innovation Lab pioneers products, technologies, and solutions to address human needs in three main areas:

- **Global Health**
  - health care provision, information, and management, and alert systems for disaster relief, especially with mobile devices

- **Clean Water**
  - analysis, filtration, purification, verification, distribution, management, and training

- **Renewable Energy**
  - alternative forms of energy generation, distribution and storage, especially to communities without access to an electrical grid

“For the United States to remain competitive, we must provide products and services to the growing masses, and we have to innovate to the needs of the billions of potential consumers at the bottom or middle of the income pyramid.”

— Radha Basu, director, Frugal Innovation Lab

**Frugal innovation** is a process of problem solving—and a game-changing strategy—that addresses the need for products and services in emerging, underdeveloped countries. Features of frugal innovation include ruggedization, simplification, sparing use of low-cost raw materials, an emphasis on earth-friendly practices, and a philosophy that favors “doing more with less” in creating compassionate, user-centric design.
How you can become involved:

Students
- Take an undergraduate or graduate course through the Frugal Innovation Lab that offers hands-on industry experience and knowledge
- Attend workshops and seminars hosted by FIL, with emphasis on topics such as mobile app development
- Join your professor on a cutting-edge research project
- Work with social entrepreneurs
- Tailor your senior design project to work with enterprises that use technology to benefit society

Faculty
- Apply for a course release to teach a technical elective or an area-specific class in the Frugal Innovation Lab
- Co-teach a class
- Join us as a guest lecturer
- Invite students to work on a research project

Supporters
- Sponsor a senior design project
- Host a workshop
- Mentor our teams
- Fund a student competition
- Ask us about the numerous opportunities for individuals and organizations to support our program

FIL Partners
Partnerships with academic institutions, industry leaders, and NGO networks provide expertise to our projects and help to expand Santa Clara University’s contribution to the innovation ecosystem. FIL continually seeks ways to leverage its expertise to maximize social impact through the following partnering opportunities:
- Incubating entrepreneurial projects with industry mentors
- Hosting corporate workshops for the developing world
- Consulting with corporate partners, nonprofits, and foundations

For more information:

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Santa Clara University’s Frugal Innovation Lab develops accessible, affordable, appropriate, and sustainable technologies, products, and solutions for emerging markets.
Santa Clara University’s Instruction

The Frugal Innovation Lab exemplifies Santa Clara University’s academic mission by incorporating collaboration and coursework across engineering, business, public health, and environmental science disciplines. Beginning with the undergraduate core curriculum, frugal innovation is embedded within technical electives, senior design research projects, public health science classes, and graduate engineering courses including Engineering for the Developing World and Mobile Applications for Emerging Markets. Courses incorporate business planning and entrepreneurial skills to emphasize the need for a design framework/infrastructure that considers the entire product cycle, from manufacturing to distribution as well as scaling.

Sustainable Livelihoods: Empowering Rural Communities

Within the Frugal Innovation Lab’s worldwide network of social entrepreneurs is Anudip, a social enterprise that provides market-aligned skills training in new economy jobs and livelihoods to empower rural youth and women in India. Under the guidance of SCU faculty from computer engineering and communication departments, undergraduate student teams in FIL courses collaborated with Anudip’s field staff to design and test mobile applications, expand mobile technology platforms, and document the program’s social impact in an engaging, accurate, and meaningful way. Through these activities, Anudip alumni are able to accelerate their education and, thus, their employability.
Innovation

The Frugal Innovation Lab is a collaborative space for students and faculty to work with industry partners and NGOs to research and implement new technologies for consumers in emerging markets. The lab environment, along with expert faculty guidance, facilitates the critical transition from theoretical learning to practical skill application.

FIL distinguishes itself from other international innovation programs by closely integrating the classroom curriculum and hands-on work with our network of alumni from SCU’s Global Social Benefit Incubator (GSBI) program. Through these ready-made partnerships, unique to Santa Clara, students come to understand the necessity of frugal innovation as they address the specific design constraints and engineering challenges faced by social entrepreneurs.

Health Management: Lab-on-a-Chip

More than one billion people in the world are without access to drinkable water, and more than two million deaths each year are attributed to water-borne diseases. To address these burgeoning numbers, a FIL team created a microfluidic sensor—a virtual lab-on-a-chip—which is both rugged and easy to use in the field, and integrates several complex laboratory functions onto a single chip. The portable, fast, and accurate diagnostic device, fabricated by this interdisciplinary group of students, will be used in remote areas to detect the presence of pathogens in a tiny water sample without the need for expensive and bulky lab equipment.
Immersion

It takes more than excelling at coursework and a desire to do good to bring affordable and convenient health care and technologies to people in remote areas. Through FIL, Santa Clara students have incredible opportunities to work with social entrepreneurs all over the world. While conducting fieldwork, students gain invaluable insights into the resource constraints and cultural considerations relevant to a project by testing and implementing their designs in the field. Through these mutually enriching programs, students witness, firsthand, challenges faced by marginalized communities and are thus better prepared to address their needs.

A Lab Within a Lab: Mobile Health Applications

The Mobile Health Lab is housed in FIL and spearheads SCU’s participation in the explosive field of mobile health. This “lab within a lab” provides an environment for students to evaluate technology solutions used in the field, and enables the development of a comprehensive set of mobile health applications for underserved communities that have limited access to medical facilities.

For example, FIL students joined forces with social enterprise salaUno to improve means for detecting cataracts in patients living in remote areas of Mexico, eliminating the need to travel long distances to an urban clinic for diagnosis by an eye doctor. The FIL team developed a plan to pair an existing $2 smartphone add-on that scans the eye and maps cataract locations with their own mobile app and cloud-based storage system. Data from the scan is merged with patient information for review by surgeons in salaUno’s vision centers—saving significant time and money for patients and for the eye care innovator.