Biological and Environmental Engineering

CORNELL ENGINEERING CALS

Degree Programs and Research Areas

BS Degrees: ABET accredited Biological Engineering and Environmental Engineering (Environmental Engineering ABET affiliation in process now, Fall 2008)
Professional Masters Degrees: Masters of Engineering (BEE) and Master of Professional Studies (Agriculture)
M.S. and Ph.D. Degrees
International Programs: MPS(AG) in Ethiopia and University Consortium for Chinese Agriculture

BEE faculty members lead programs in cellular and molecular bioengineering, nucleic acid engineering (e.g. dendrimers), bioanalytical devices (e.g. dipstick immunoassays), animal physiology, preferential flow, variable area hydrology, and bioprocessing related to the production of biofuels and bioproducts.

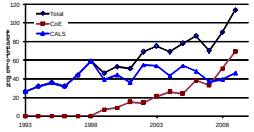
Trends

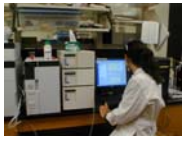
BEE is experiencing significant growth and change. The BEE Department has moved from application of engineering in living systems to integration of biology and environmental science into engineering.

Past	Future
Applied Teaching and Research	Basic and Applied Reaching and Research
Agricultural Industry	Bio-based Industry
Production Objective	Multiple Objectives
Empirical Approaches	Deterministic Approaches
One Professional Society	Multiple Professional Societies

Achievements

The number of BEE undergraduates has grown significantly to where we graduate 90 to 100 students annually.



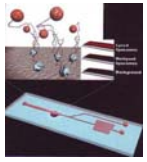


Newly renovated North Wing Life Sciences Labs

Algal Bioreactors: Biofuel and Biochemical Production (Ahner)

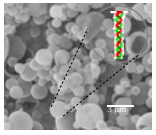
Nanometer-sized buckyballs and DNA hydrogel (Luo)

Microfluidic biosensor with liposome lysis fluorescence signal enhancement (Baeumner)



Metabolic Engineering (March)

Pollutant Marking (Walter)



Currently under renovation: Biofuels Research Lab (Walker)

Priority Goals

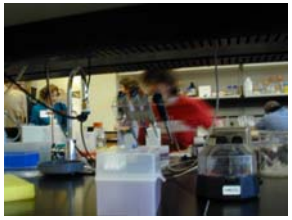
Education:
- Balance numbers in Biological and Environmental Engineering program
- Develop undergraduate laboratory courses in biological engineering and environmental engineering
- Develop focus areas for our Master of Engineering Program (Bioenergy Engineering, Soil and Water Engineering, Molecular Bioengineering, Physiological Engineering)
- Increase our selection of graduate courses in Biological Engineering area
- Enhance our international degree programs

Entrance to Bahir Dar University in Ethiopia

University Consortium for Chinese Agriculture

Research:
- Grow the sustainable bioenergy program
- Grow the biomaterials program

Infrastructure:
- Develop undergraduate laboratory facilities for cellular and molecular biological engineering



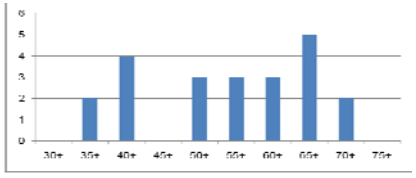
- Develop maintenance plan/schedule for renovated building spaces

Diversity:
- Increase the diversity of our faculty, staff, graduate students and undergraduate students

Challenges

Our challenges over the next few years will be budgetary with impact on hiring and retaining faculty, faculty retirements and continuing to develop a diverse workgroup.

	#	M(%)/F(%)
Total Faculty:	21	18 (86%) / 3(14%)
Staff and other:	47	28(60%) / 19(40%)
Grad Students:	74	41(55%) / 33(45%)
UG Students:	408	228(56%) / 180(44%)



Distribution of Faculty by Age

Renovations and maintenance of facilities will also be an issue.

In difficult economic times we will be challenged in the selection of our goals and opportunities in research, education and outreach. We will need to be thoughtful in the selection process and cooperative in our approaches. The BEE faculty will need to continue their collaborative spirit both within the department and within the university. We are fortunate to have some new facilities and an aggressive faculty willing to take on the task of finding funding to support our goals and opportunities.

Opportunities

Water: Improving sustainable access to sufficient and good quality water for human consumption and agricultural use.

BioEnergy: The development of sustainable bioenergy systems that are compatible with the environment and improve the economy of communities.

Food: Ensure a safe and sustainable supply of food for human and agricultural consumption.

we bring life to engineering