

**DEPARTMENT OF
BIOMEDICAL ENGINEERING
(Founded July 1, 2004)**

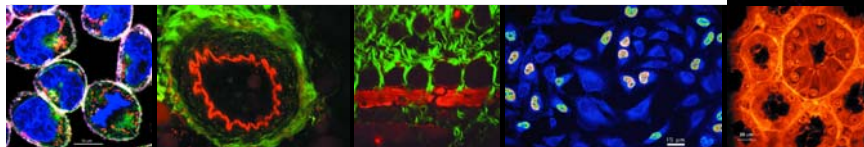
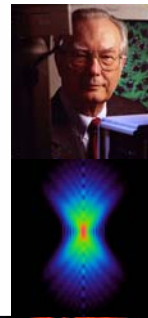
**Michael L. Shuler
James and Marsha McCormick
Chair of Biomedical Engineering**

**What is Bioengineering? Biomedical
Engineering?**

NIH:

“Bioengineering integrates physical, chemical, or mathematical sciences and engineering principles for the study of biology, medicine, behavior, or health.”

Biomedical Engineering (BME) is the subset of bioengineering that focuses on human health.



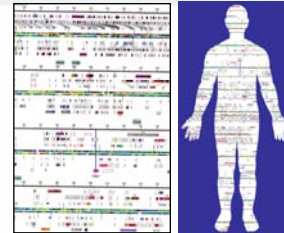
Vision

Quantitative understanding of the human body across scales:

from atom to Eve, from gene to Gene

Grand challenges

- Can we replace and regenerate organs and tissues to treat arthritis, heart disease, and spinal cord injuries?
- How do we design and deliver drugs to treat Alzheimer's, cancer, circulatory problems and liver failure?
- Can we develop advanced diagnostic tools to detect vascular disease, infectious agents, and osteoporosis?



BME Educational Vision

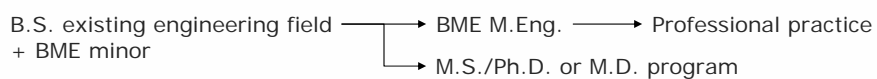
Undergraduate

- BME minor
 - Engineering undergraduates
- No undergraduate major
- BME program of study
 - Biology undergraduates



Graduate

- M.Eng.
 - First BME professional degree
- M.S./Ph.D.



Mission of Cornell Biomedical Engineering

Develop innovative curricula that help define biomedical engineering education; build on BME vision

Catalyze interdisciplinary education and research between engineering, biology and medicine

Attract and retain world class faculty and graduate students who would not otherwise come to Cornell

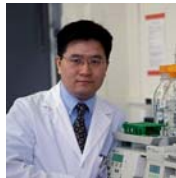
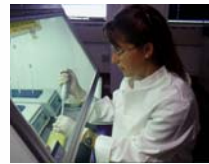
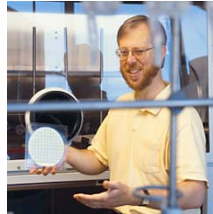
Collaboration with Weill Medical College

- 9 of 35 BME Graduate Field Faculty from WCMC
- About 30 students have participated in internship/research at WCMC
- Shared courses electronically
- "Immersion" term at WCMC for BME PhD students; 2 trials will be required
- Attempting to develop BME M.Eng. Projects with WCMC

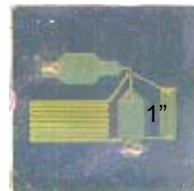
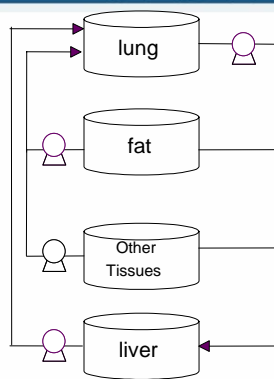
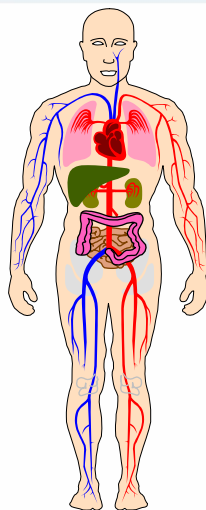


Areas of Research Concentration for BME

- Biomaterials
- Biomedical Instrumentation and Diagnostics
- Biomedical Mechanics
- Computational and Systems Biology
- Drug Delivery, Design, Production and Metabolism



"Microscale Cell Culture Analog"



We can model our body as combinations of tissue culture reactors

μ CCA: length scale of the cells in microns

Structure of Biomedical Engineering

Department of BME

3 FTE's but 5 faculty (Shuler, Putnam, Bonassar, Olbricht, Bartel)

0.75 FTE instructional lab manager (Archer)

1 Adjunct Assoc. Prof. (Zipfel)

Graduate Field of BME (35 faculty)

26 Ithaca-based faculty

representing 5 colleges

20 faculty from COE

9 WCMC-based faculty

Biomedical Engineering Growth

Continued growth in traditional departments

Department of BME to grow to 15 faculty (FTE's)

Impact on Students

Enrolled Graduate Students

MS/PhD	9	(2002)
(Approved 1997)	18	(2003)
	24	(2004)
	:	
	75	(2012)
M.Eng. (BME)	8	(2004)
	:	
	45	(2012)

Impact on Students (#2)

Undergraduate BME Minor

BS Grads with BME minor

	32	2003
	38	2004
est.	46	2005
	:	
	60	2012

Potential Areas of Strategic Strength

- BioMEMS; nanobiotechnology
(NBTC)
- Optical imaging molecular/cellular level
(DRBIO)
- Computational and Systems Biology
(CIS, Theory Center, WCMC, Sys Engr)
- Biomaterials
(CCMR)
- Disease models
(Vet)

Faculty Hiring

- 3 offers pending
 - 2 Assoc. Prof (BioMEMS; Nanobio)
 - 1 Asst. Prof (Optical imaging/cancer)
 - 1 Senior lecturer (Industrial Exp./M.Eng.)

Goal: 15 FTE's by 2012

Joint appointments with WCMC

Long Term

New Life Sciences Technology Building
(January 2008?)

Kimball Instructional Lab Facility (Now)
Currently small presence in Duffield

Short Term

Negotiating with Vet Med and CALs for space
through 2008

Expect this space will result in long-term
collaborations in research and teaching

BME will grow

Short-term challenges

Long-term unique opportunities

Strong positive student response

Are we on the road to being a national
leader?