

## Lyman Briggs College: An Innovative Living Learning Community for STEM Education

Ryan Sweeder, Aaron McCright  
Lyman Briggs College  
Michigan State University

ASQ STEM Agenda Conference  
July 2012



## Outline

- The National Picture for STEM
- LBC Graduation results
- Lyman Briggs College Description
  - Lyman Briggs Curriculum
  - Lyman Briggs Experience
  - Scholarship of Teaching and Learning



## The National Picture for STEM

- STEM education is in need of reform to make it more relevant to students, more engaging, more reflective of science. (PCAST, Rising above the Gathering Storm, etc.)
- 40-60% of those entering college planning a STEM major leave the field. (Seymour & Hewitt, 1997)
- Bad teaching most frequently cited as reason for leaving stem (Seymour & Hewitt, 1997)
- Females and minorities are more likely to leave STEM than males (Bhattacharjee, 2009)


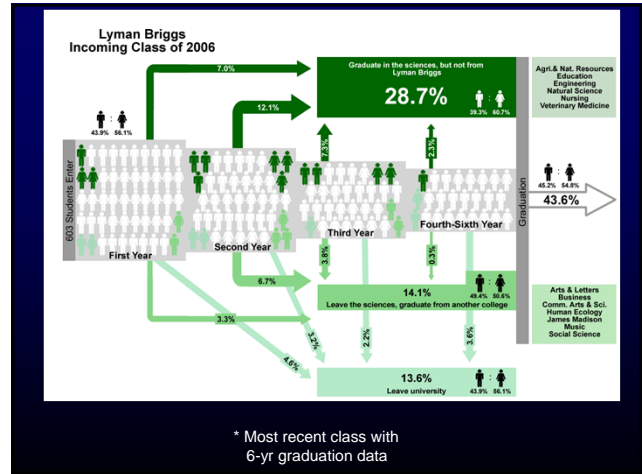


## Where We Are Headed

- Expected 17% growth of STEM occupations between 2008 and 2018 (US Department of Commerce, 2011)
- Training students for jobs and fields that may not currently exist
- Computers are continuing to rapidly change the possibilities within the STEM fields


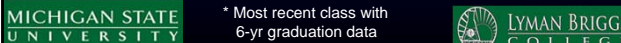


# Lyman Briggs College Results

## Class of 2006\*


- 86.4% of starting students graduate
- 72.3% graduate from a “STEM college”
- Equal % of male and female students leave MSU
- Higher % of female students remain in the sciences
- Where graduates go:
  - 40% continue to graduate school
  - 40% continue to professional school
  - 20% enter the workforce

\* Most recent class with 6-yr graduation data

## Outline

- The National Picture
- LBC Graduation results
- **Lyman Briggs College Description**
  - Lyman Briggs Curriculum
  - Lyman Briggs Experience
  - Scholarship of Teaching and Learning



## What is Lyman Briggs?

- A Living-Learning Community founded in 1967 to bridge CP Snow's Two Cultures
- Students interested in studying math and science
- A small college within MSU
- Offering 38 majors
- Over 30 faculty spanning astrophysics to zoology



MICHIGAN STATE UNIVERSITY

LYMAN BRIGGS COLLEGE

## Who are our students?

- 625 students in the entering class
  - No additional requirements for LBC (beyond MSU acceptance)
  - Slightly higher average HSGPA and ACT
- 56% female, 20% minority (2006)
- All intend to study within STEM disciplines
  - Over 60% enter with plans to be a health professional (doctor, nurse, dentist, etc.)
- Approximately 1900 total students



MICHIGAN STATE UNIVERSITY

LYMAN BRIGGS COLLEGE

## Where do Lyman Briggs students live?

- **Holmes Hall**
  - 1250 students (largest residence hall at MSU)
  - 100% LBC students
  - Classrooms
  - Faculty Offices
  - Laboratories
  - Academic Help-Rooms
  - Cafeteria
  - Convenience Store
  - Learning Lounges



MICHIGAN STATE UNIVERSITY

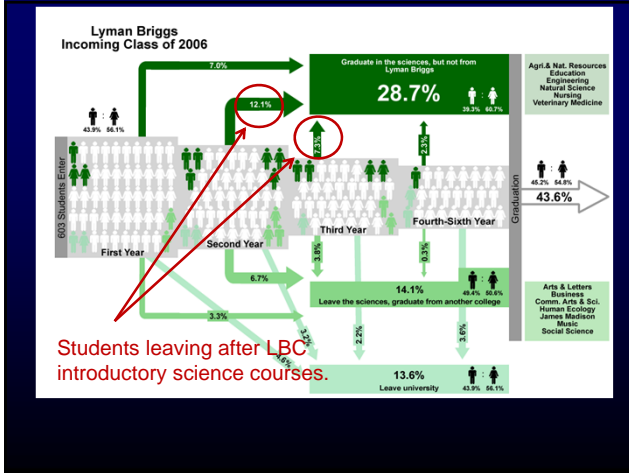
LYMAN BRIGGS COLLEGE

## The Lyman Briggs Curriculum

Student year	Usual Courses taken through LBC	Courses taken outside LBC
1st	Intro to HPS Biology I General Chemistry I&II Mathematics (Calculus or other appropriate)	1-3 General education courses
2nd	Biology II Physics I&II	Organic chemistry 2-6 general education
3rd	1-2 HPS upper level courses	4-7 major or general education courses
4th	0-1 HPS upper level courses, senior seminar (Capstone Course)	5-8 major or general education courses

MICHIGAN STATE UNIVERSITY

LYMAN BRIGGS COLLEGE



## Lyman Briggs Classes

- Smaller class sizes (Kokkelenberg, 2008)
- Inquiry driven labs (Bransford, 2000)
- Reformed teaching practices, e.g. active, student-centered learning (Sawada, 2002)
- Provide relevance to real-world applications (Gutwill-Wise, 2001)

MICHIGAN STATE UNIVERSITY

LYMAN BRIGGS COLLEGE

## Student response

LBC characteristic	% respondents indicating "great deal" or "moderate amount" of quality added to their LBC experience	% of Male (N=137)	% of Female (N=309)
Smaller class sizes*	96.8	83.8	98.2
Inquiry-based labs	73.3	72.3	73.8
Intro STEM classes leading to success	82.8	77.9	85.0
Interaction with faculty outside class	88.6	85.5	90.0

\* Statistically different between male and female (p=.001) for Pearson's Correlation  
26% response rate (N=446 of 1715 total students) on 2012 survey

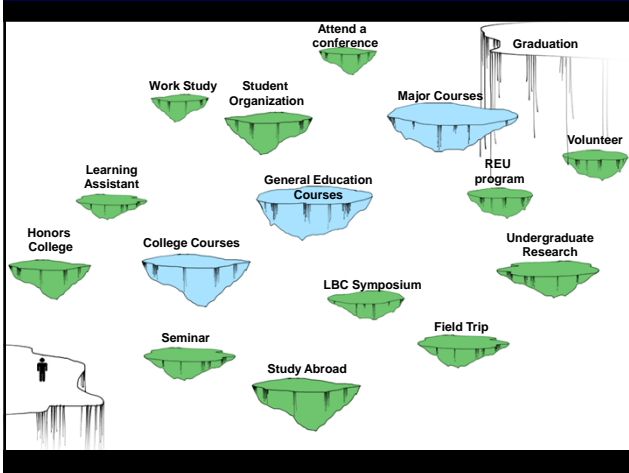
MICHIGAN STATE UNIVERSITY

LYMAN BRIGGS COLLEGE

## The Lyman Briggs Experience

MICHIGAN STATE UNIVERSITY

LYMAN BRIGGS COLLEGE



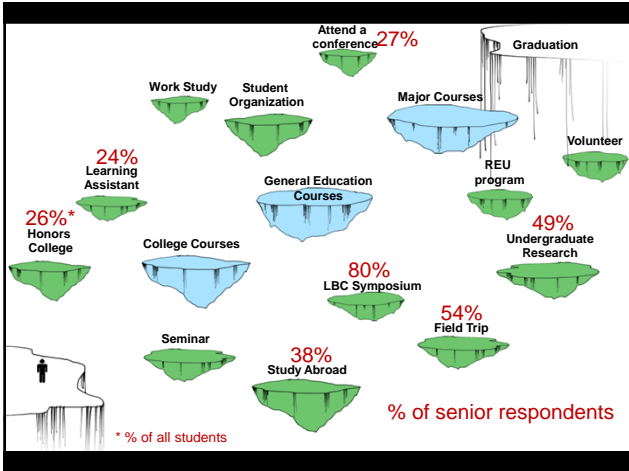
## Creating a Culture

- Expectation of research
  - LBC Research Symposium
  - Course based research
  - Faculty led research
- Expectation for teaching quality and excellence in learning
  - Learning Assistants
  - Study Abroad













## Student Response

Activity	% of students who participated (N=115)	% of Male (N=36)	% of Female (N=79)
Research with prof. outside a course	48.7	55.6	45.6
Study Abroad	38.3	36.1	39.2
Work as Learning Assistant	24.3	25	24.1



\* 25% response rate (N=115 of 459 senior students) on 2012 survey



## Academic Advising

- Curriculum development
- Assist with internship, research & part-time employment
- Career development
- Connect students with resources on campus
- Provide additional support when needed
- Study abroad



MICHIGAN STATE UNIVERSITY

LYMAN BRIGGS COLLEGE

## Scholarship of Teaching and Learning

- Take a scholarly approach to teaching
  - How People Learn (Bransford, 2000)
- Take a scholarly approach to evaluating teaching
  - Reflective teaching portfolios
  - Reformed Teaching Observation Protocol, RTOP (Sawada, 2002)
  - Student Assessment of Learning Gains, SALG (Seymour, 2000)

MICHIGAN STATE UNIVERSITY

LYMAN BRIGGS COLLEGE

## Community of SoTL Researchers

Biology	Physics	Mathematics
Luckie	Kortemeyer	Zelege
Smith	Oshea	Gerhardt
Fata-Hartley		
Cheruvell		
Murphy		
Urquhart		
Chemistry	HPS	
Sweeder	McCright	
	Pennock	
	Bellon	
	Westfall	

† SoTL research is valued equally to other research for RPT within LBC

MICHIGAN STATE UNIVERSITY

LYMAN BRIGGS COLLEGE

## Key Aspects

- Dedicated faculty / staff
- Administrative support
  - Recognition of the value provided on investment
- Creation of a culture expecting success
- High expectations of students
  - Provide support for less prepared students



MICHIGAN STATE UNIVERSITY

LYMAN BRIGGS COLLEGE

## Acknowledgements

- LBC Administration
- LBC Faculty / Staff
- Sean Valles
- Jubin Cheruvellil
- Kathleen Jeffery



NSF-DUE S-STEM  
#1022754

