MEMS Education Survey

Education Providers

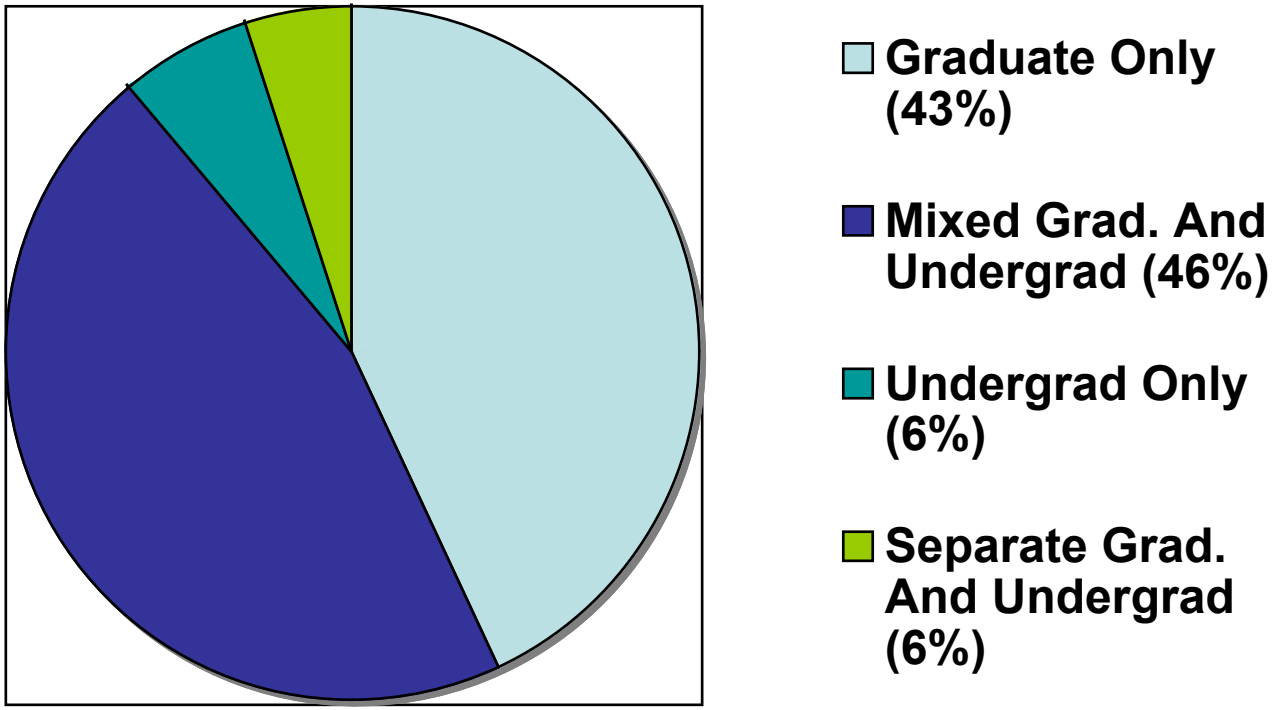
34 institutions of all sizes

Provider Statistics

- 64 Responses
- From 34 different institutions
- 3 countries

- 43% involved in community outreach
- 45% involved in continuing education
- 45% involved in industry outreach
- 55% involved in industry partnership
- 9% involved in foundry partnership

Education Type Provided at Responding Institutions



Types of classes offered

MEMS fab. lecture	MEMS fab. lab	MEMS Science	MEMS Technology	Nanofab lecture	Nanofab lab
67%	43%	46.8%	30%	30%	7%
Mems Design	Nanofab lab	Nanoscience	Micro-fluidics	Bio-MEMS	43 OTHER COURSES
62.5%	7.8%	28%	25%	34%	

Cooperation between colleagues

- In developing coursework
  - 25% Lots of cooperation
  - 65% some cooperation
  - 10% little to no cooperation
- In teaching coursework
  - 24% Lots
  - 63% some
  - 9% little
  - 4% none

Tools used for MEMS Design

- Intellisuite
- SUGAR
- ANSYS
- Co-Solve
- ADS
- FEMLAB

Foundries Utilized

- 21% of MEMS classes use foundries for fabrication work.

- MUMPS/CRONOS
- University of Michigan
- UC Berkeley Internal

Successful Pedogogical Activities

- Hands on Experience
- Model Based Teaching
- Physics of processes rather than recipes. Focus on a single process during the course.
- Design Projects with hands-on component
- Deploying real problems. Utilize “coaches” from industry
- Comparing to macro-scale sensors and show the benefits and drawbacks to scaling.

Fabrication classes

- Average # of Students: 32 (st.dev. 29)
  - Large variation in student numbers
- Average Masks per class: 5
  - Varies from 1-12
- Average Cost per Student: $1829
  - Varies significantly
- Sponsorship mixed between Industry, Institutional, and PI supported. (varied drastically between schools)

Where do the students go?

- Industry (More than half)
- Academia (~20%-30% faculty & postdocs)
- National Laboratories (10%)

Most Important Skills Learned as perceived by the Providers

- Concept of Miniaturization
- Hands on Fabrication Experience
- Strength in fundamental area “mems is secondary”
- Ability to think big and be interdisciplinary

How prepared are graduates (academic prospective)

- Most (all but one respondent) feel graduates are adequately or well prepared for MEMS jobs or academic positions.
- There is some concern (2 respondents) that MEMS curriculum is just repackaging of the other areas, and that students need to remain strong in a “technical discipline”