

*User Survey Summary*

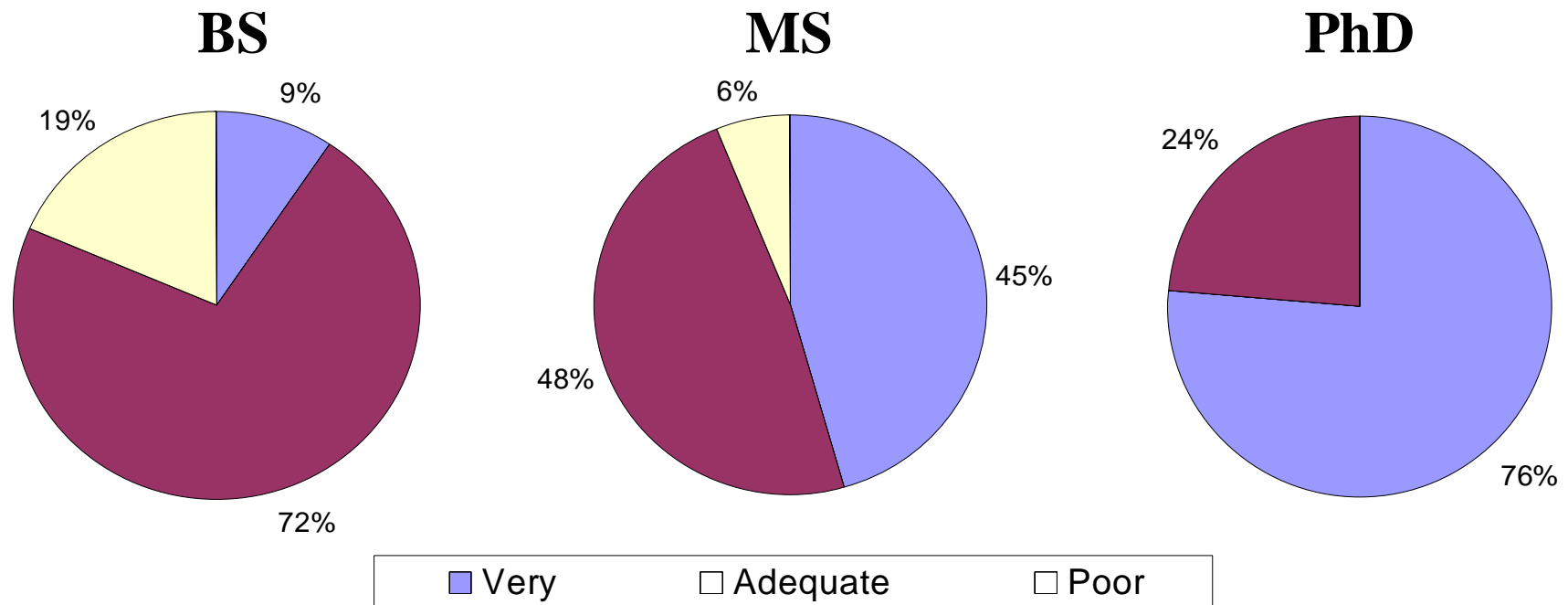
*MEMS Education Workshop*

- Total of 42 Participants:
  - 36 Industry and 6 National Labs
- Approximately how many graduate students with a MEMS educational background has your firm hired in the past 10 years?

	0-5	6-10	10+
BS	80%	12%	7 %
MS	74%	15%	10%
PhD	68%	22%	10%

- Analog Devices, Sandia National Lab, and Rockwell Scientific Company have hired > 20 at all levels

- How well prepared to succeed at your firm are the MEMS graduates you have hired?



- What are the most valuable skills/assets that graduates from MEMS programs bring to your organization?
  - **Dominant Themes:**
    - Hands on experience with cleanroom micro-fabrication and/or testing and characterization
    - Diverse knowledge base, multidisciplinary understanding
    - Combination of analytical and practical skills
  - **Other Highlights:**
    - Independent thinkers with intuition for the micro-scale
    - Simulation and Finite Element Analysis
    - Knowledge of MEMS processes, tools, trends, etc

# Quotes for valuable skills/assets

- “Multidisciplinary scientific background”
- “knowledge of microfabrication/MEMS device and process fabrication techniques”
- “Hands-on, dirty fingernail process development, fabrication, and design skills”
- “Patience, attention to detail, great observational skills”
- “Exposure to broad range of research topics”
- “intuition for the microscale domain”
- “powerful mix of analytical skills and hands-on / intuitive knowledge of likely causes of “disagreement” between analysis and empirical results”

- What are the most common skills/assets missing from the MEMS graduates that your organization has hired in the last 10 years?
  - **Dominant Theme:** *Reality Check*
    - Commercial vs academic success
    - Naïve regarding manufacturing, packaging and reliability concerns
    - Lack of basic business understanding
  - **Other Highlights:**
    - Generally poor writing and communication skills
    - Little management and/or team experience
    - Too much emphasis on component level rather than system level concerns
    - Over-engineering, trouble stopping at ‘good enough’

# Quotes for missing skills/assets

- “Manufacturing reality check”
- “Lack real team experiences, experience giving a lot of good presentations to customers that are concise and acknowledge the target audience”
- “Most graduates have not addressed any reliability issues”
- “Ability to solve a problem quickly and efficiently without making it a thesis project”
- “Lack of microsystems and product focus”
- “Manufacturing Basics, Product Development, knowledge of the state of the art (not just published papers)”
- Ability to Integrate Business Factors into Technical Approach

- Would you be willing to work with MEMS educators to ensure that MEMS graduates have an opportunity to learn these commonly missing skills?
  - Yes: 74%
  - No: 26%