

People

- **Svetlana Tatic-Lucic (Lehigh)**
- **Masa Rao (UCSB)**
- **Chris Zorman (Case Western Res)**
- **Robert Gao (U. Mass. Amherst)**
- **Sunil Bhave (Cornell)**
- **Bill Sharpe (JHU)**
- **Steve Arnold (NRL/GW)**
- **Ellis Meng (USC)**

MEMS Education Workshop

January 30, 2005 (Miami)

Working Lunch Report: Priorities

1. **Fundamentals of Scaling / Energy Domains / Microscience**
2. **Transduction Mechanisms**
3. **Fabrication: Conventional IC/MEMS / Hands-On / Foundries**
4. **Materials: properties and integration processes**
5. **MEMS Design**
6. **Exotic fabrication processes**
7. **MEMS CAD**
8. **Testing: Materials Characterization and MEMS Devices**
9. **Statistical Analysis / Design of Experiments**
10. **Design for Reliability / Design for Manufacturability**
11. **Survey: Applications of MEMS in the Field of <FILL IN BLANK>**
12. **System Perspective: MEMS may not be appropriate**
13. **Chip-Scale System-Level Integration and Design**
14. **Economics of MEMS: Cost of Miniaturization**
15. **Integrated Product Development**
16. **Packaging**

MEMS Education Workshop

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Report: *Integrating Hands-On Laboratories into Courses*

- **Best Practices**
 - **Simple Short Labs: Modules**
 - Get students to measure ADI device: scale
 - Deposit initials on a wafer
 - MCNC test structures
 - Build macro accelerometers (smaller better?)
 - PDMS Stamping, Fluidics, Devices
 - Dielectrophoresis demonstration
 - Opportunity to share
 - **Hands on Lab Class**
 - **Probe-Station-In-A-Suitcase: \$6-10 K**
 - **Caltech Freshman Low-Tech Fab Class**
 - **Strength of materials lab: paper structures**

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Report: *Integrating Hands-On Laboratories into Courses*

- **Challenges**
 - **Resources: Money, space, staff, time**
 - **Experimental Setups**
 - **Qualified TAs**
 - **Credit hours for students and teacher**
 - **Integration of Lectures with Labs: timing**
 - **Modules needed**
 - **actuator scaling**

MEMS Education Workshop

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Report: *Integrating Foundry Runs into Courses*

- **Challenges**
 - Two slow to get in one semester
- **Best Practices**
 - Fab in one class and follow-up with symposium
 - Multi-class course: design then testing
 - Multi-week design project spec'ed by student, paper
 - **Sequence:**
 - Develop idea
 - Propose it in SBIR format / presentation
 - Work on design
 - Write abstract and paper submissions
 - Give final presentation

MEMS Education Workshop

January 30, 2005 (Miami)

Report: *Integrating MEMS into Engineering School Curricula*

- **Challenges**
 - Bigger challenge for larger schools
 - Departmental Revenue
- **Best Practices**
 - MEMS Minor

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