

**EECS C245/ME C218 Final Project
Fall 2003**

References Useful for Fabrication

For the final project, you may choose one of these processes listed below for fabricating your MEMS or microfluidic device. Or, if you are familiar with MEMS fabrication techniques, you may develop your own process or a mixture of the above processes (with permission from the instructors).

1. MUMPS (Surface micromachining)

www.ece.ncsu.edu/erl/tutorials/mumps

2. Sandia SUMMiT process (Surface micromachining)

J. Bustillo *et al.* article, pp. 48-50 in reader. Also, Sandia SUMMiT website,

<http://www.sandia.gov/mstc/technologies/micromachines/tech-info/technologies/summit5.html>

3. Polysilicon germanium (Integrated MEMS)

A. Franke *et al.* article, pp. 160-2 in reader.

4. SOI MEMS (Integrated MEMS)

Analog Devices process, T. Brosnihan *et al.*, pp. 170-3 in reader.

5. CMOS Foundry process (Integrated MEMS)

J. Bustillo *et al.* article, p. 58 in reader.

H. Xie, and G. K. Fedder, Vertical Comb-Finger Capacitive Actuation and Sensing for CMOS-MEMS, in *Sensors and Actuators A: Physical*, Page 212-221, Volume: 95 Issue: 2-3, 1 January, 2002. (http://www.ece.cmu.edu/~mems/pubs/retrieve.cgi?doc=xie_02b)

6. Microchannels etched in silicon or glass (Microfluidic chip)

S. A. Sundberg *et al.*, Supplement to *Drug Discovery Today*, Vol. 5 No.12, 2000. Selected pages are in [links](#) section of website.

7. Polymer molding technique with PDMS (Microfluidic chip)

S. Quake *et al.* article, pp. 393-4 in reader.

Silicone material properties in Becker *et al.* article, p. 269 in reader.

M. A. Unger and S. R. Quake *et al.*, "Monolithic Microfabricated Valves and Pumps by Multilayer Soft Lithography," *Science*, Vol 288, 7 April 2000, pp. 113-116.