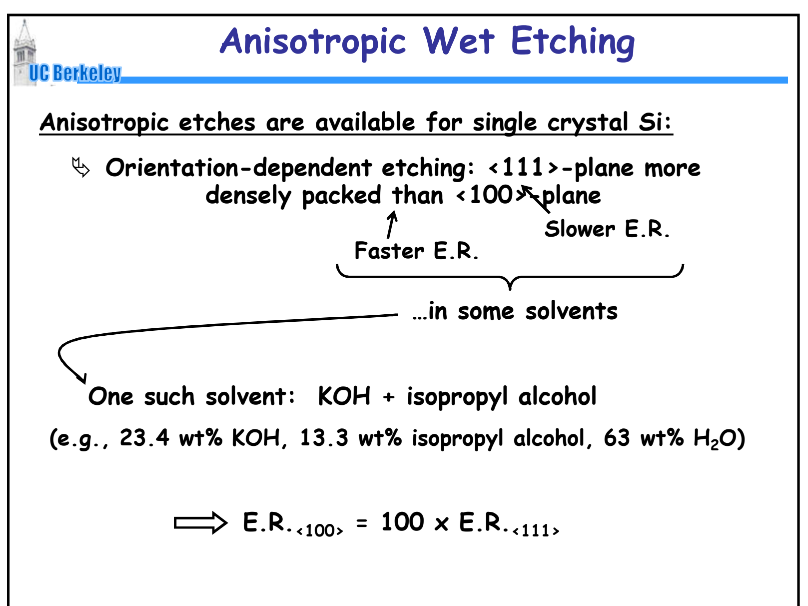

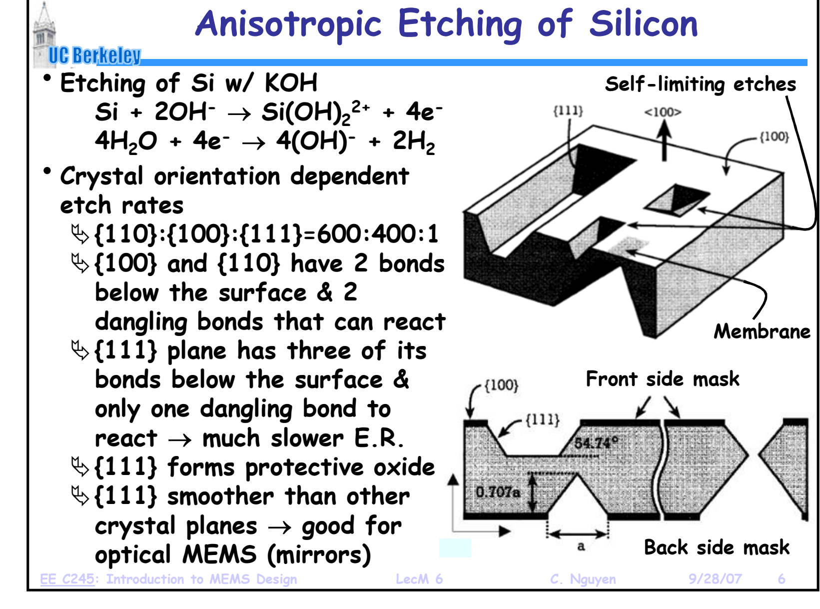

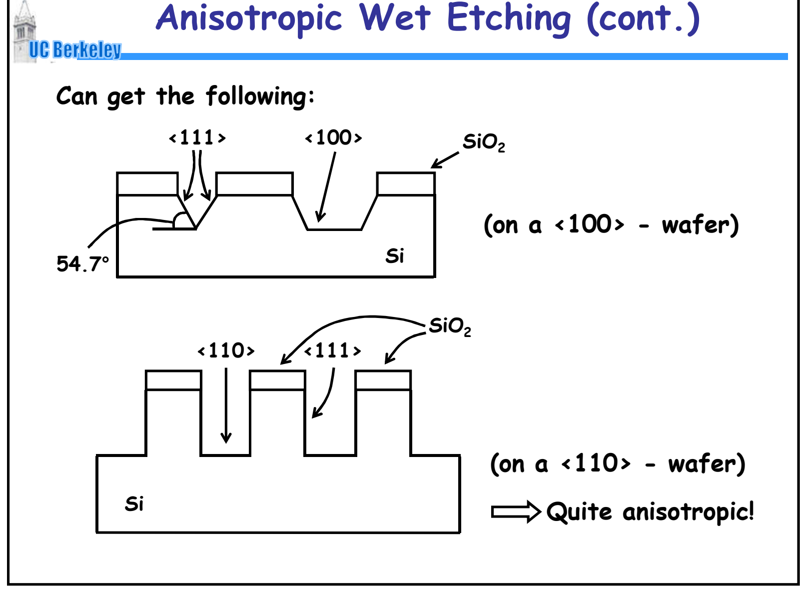

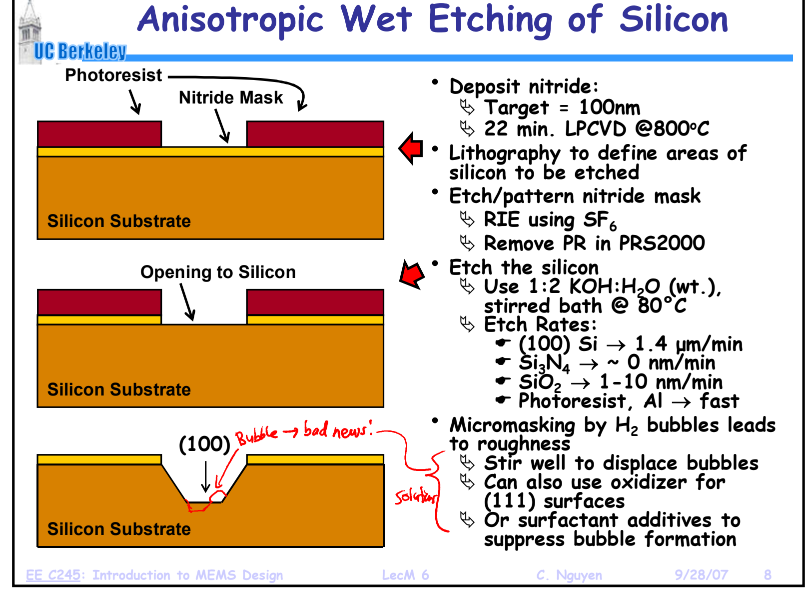

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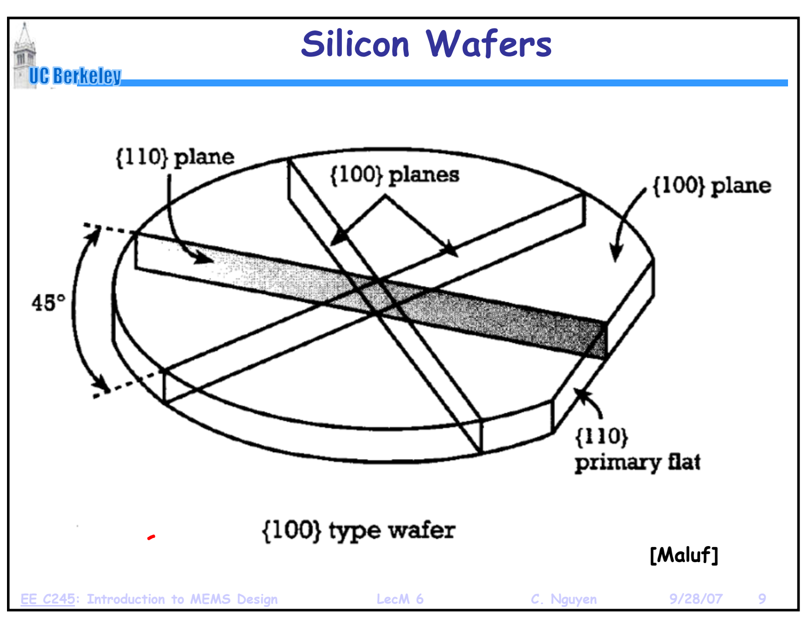

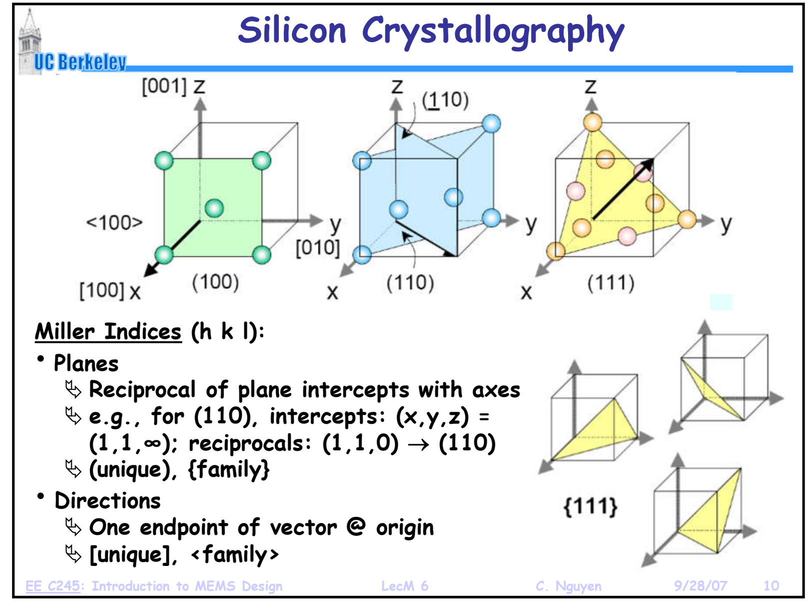

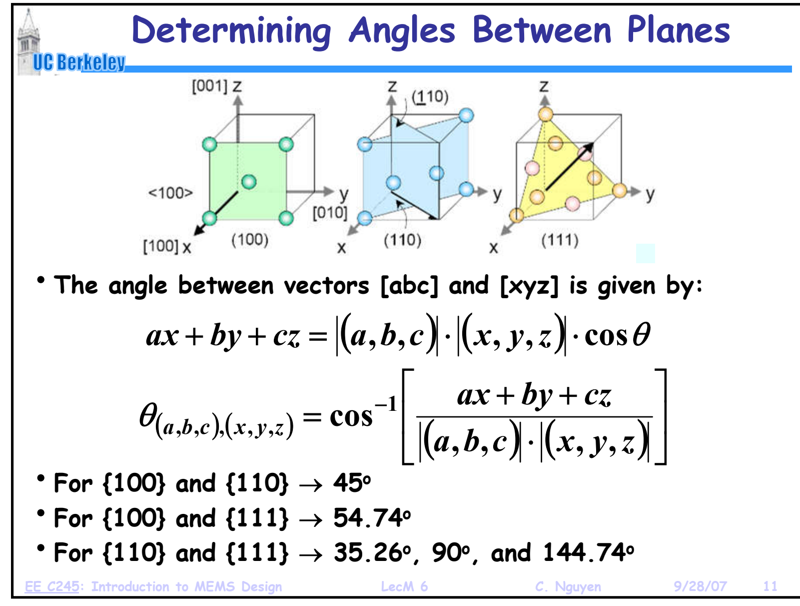

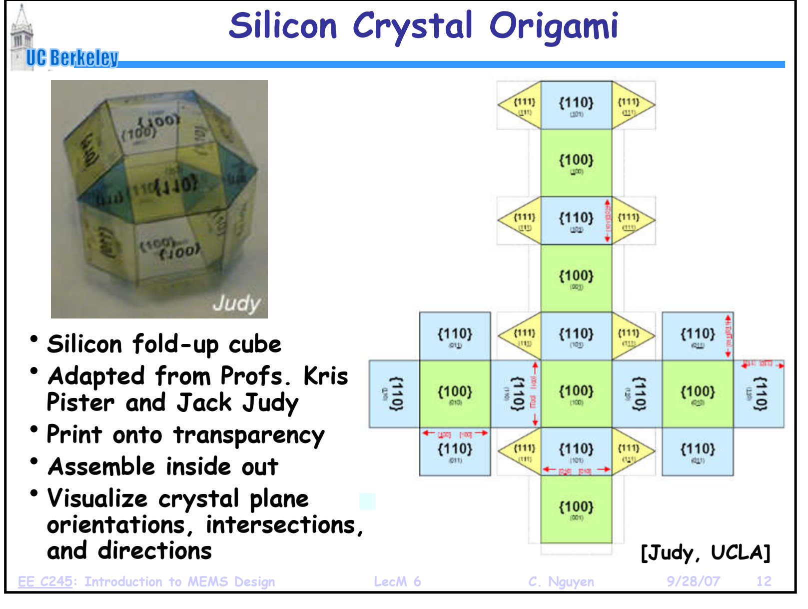

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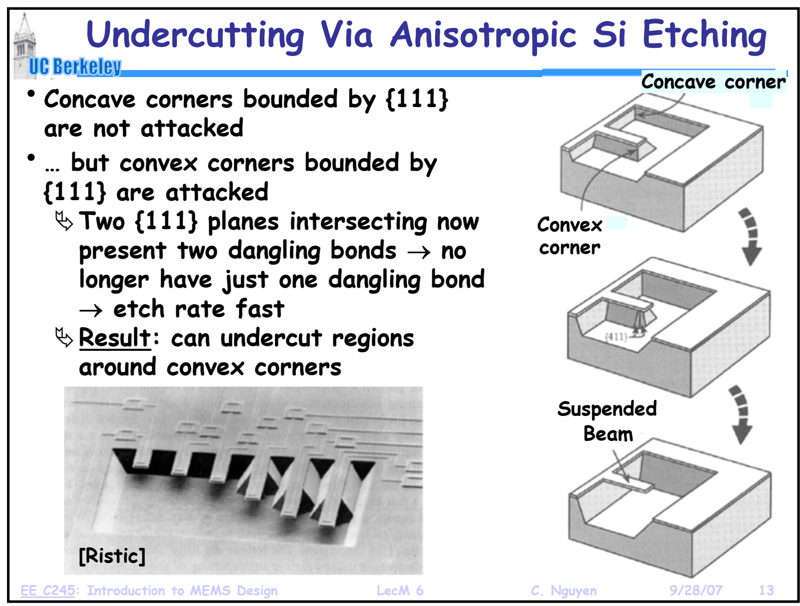

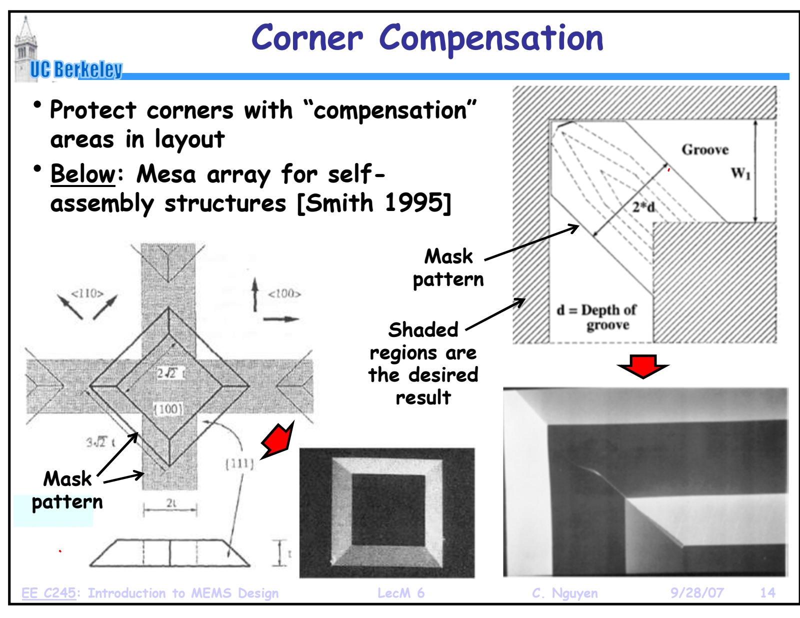

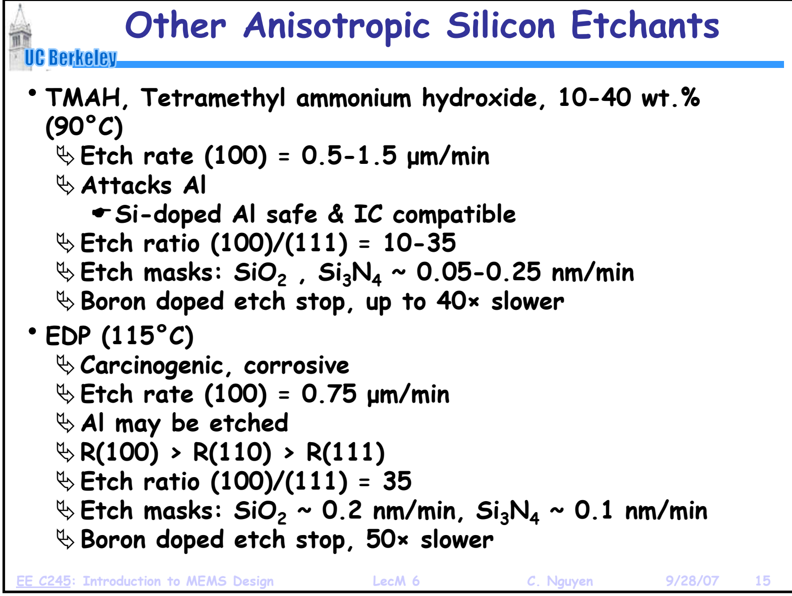

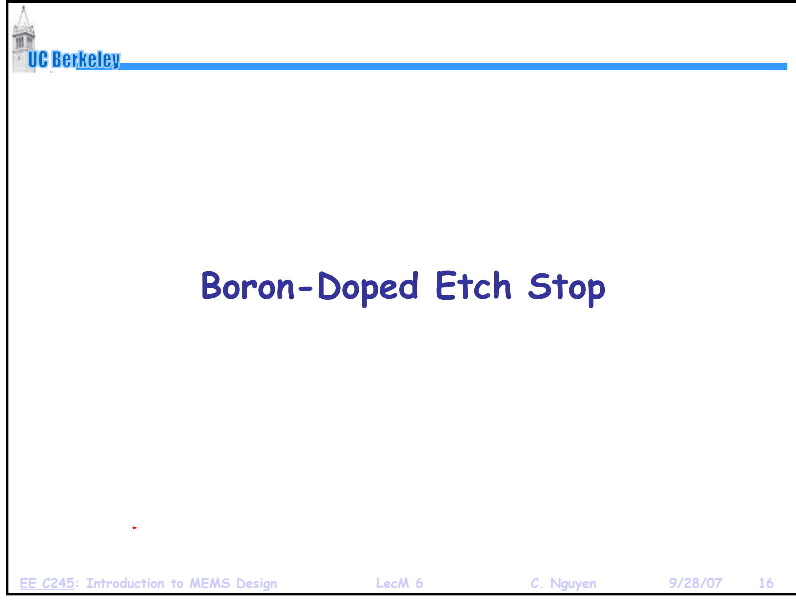

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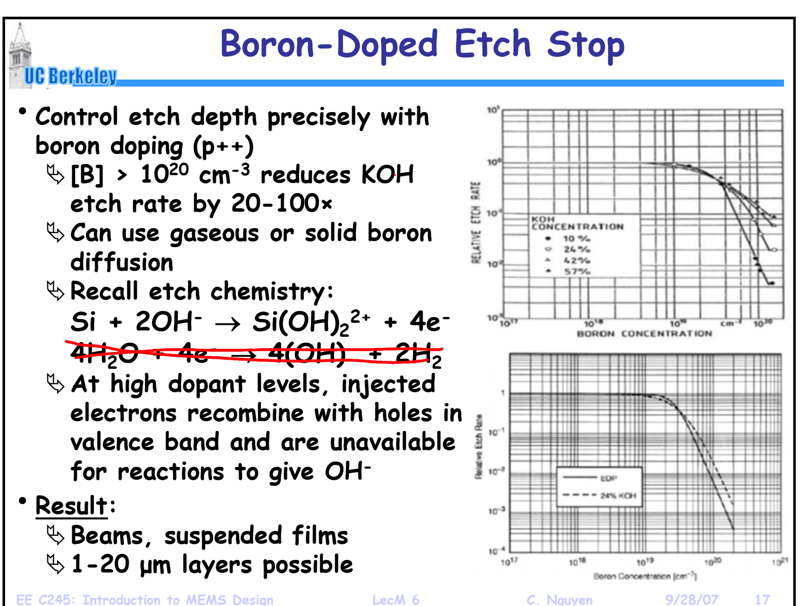

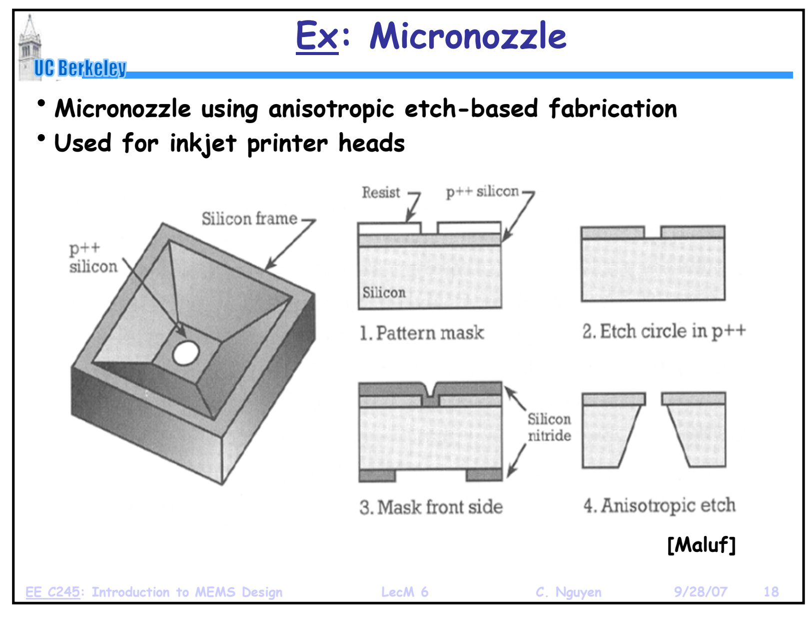

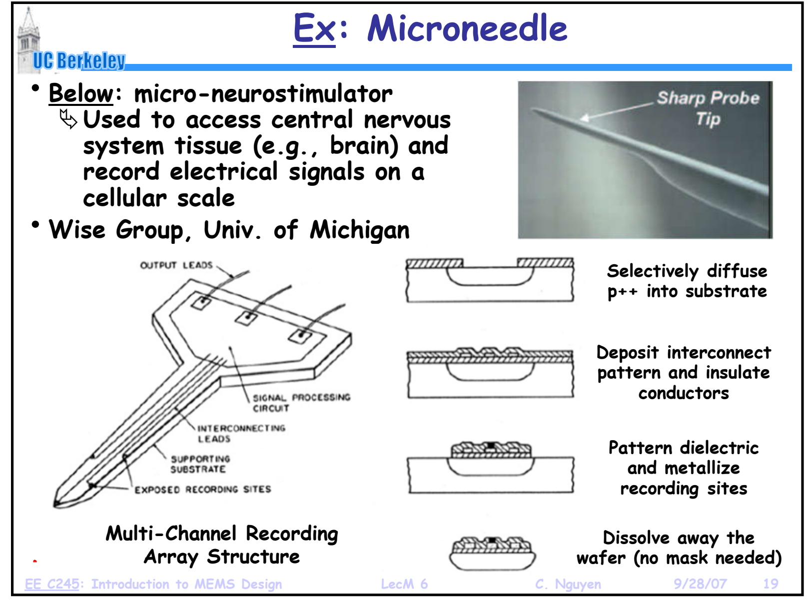

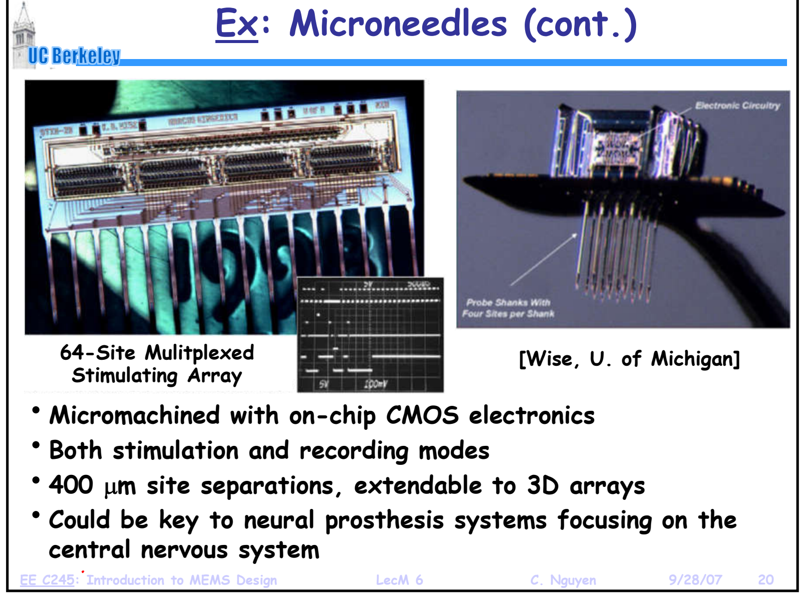

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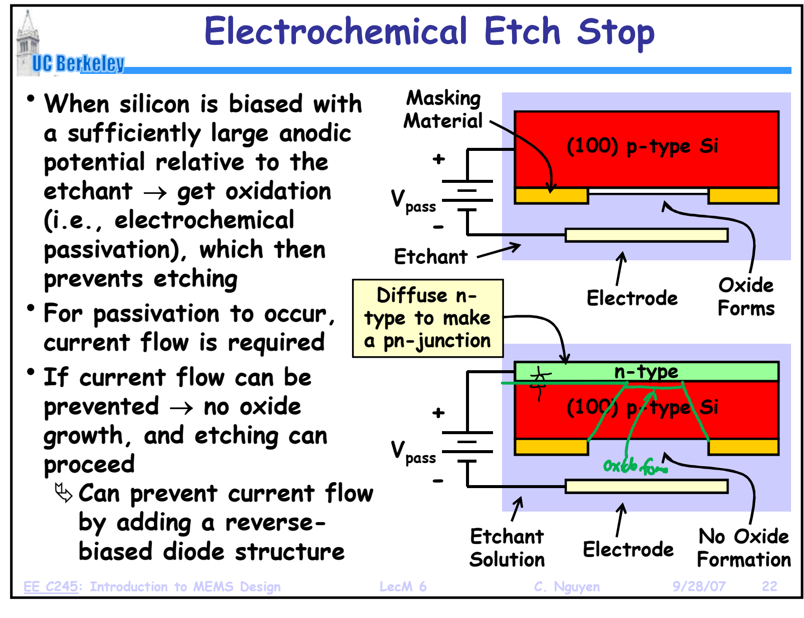
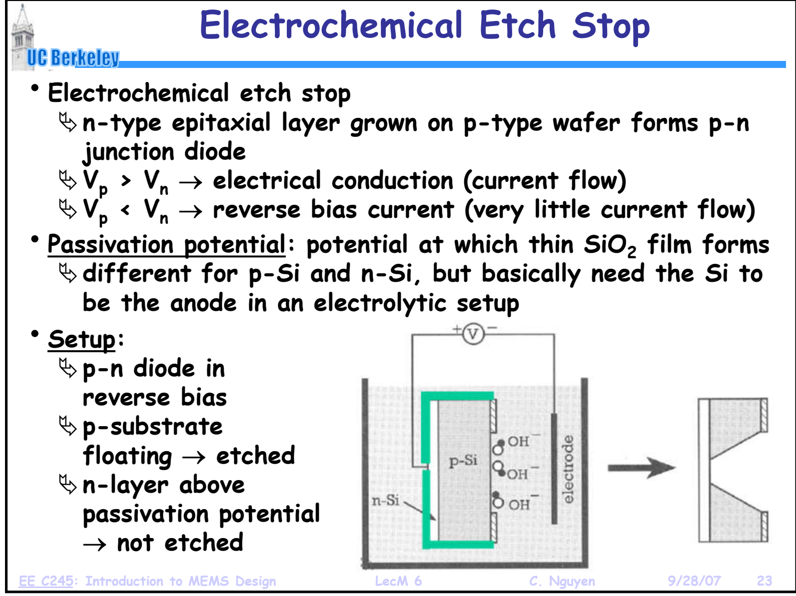
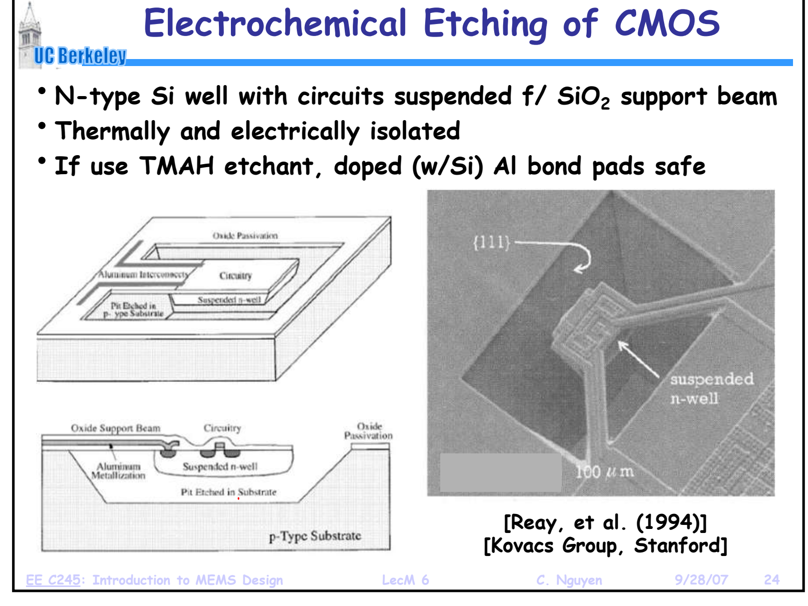
UC Berkeley

Electrochemical Etch Stop







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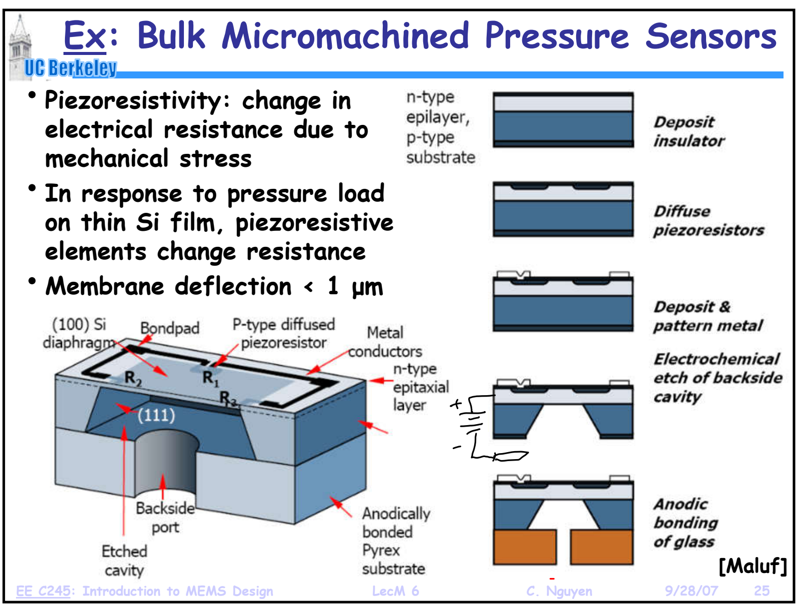

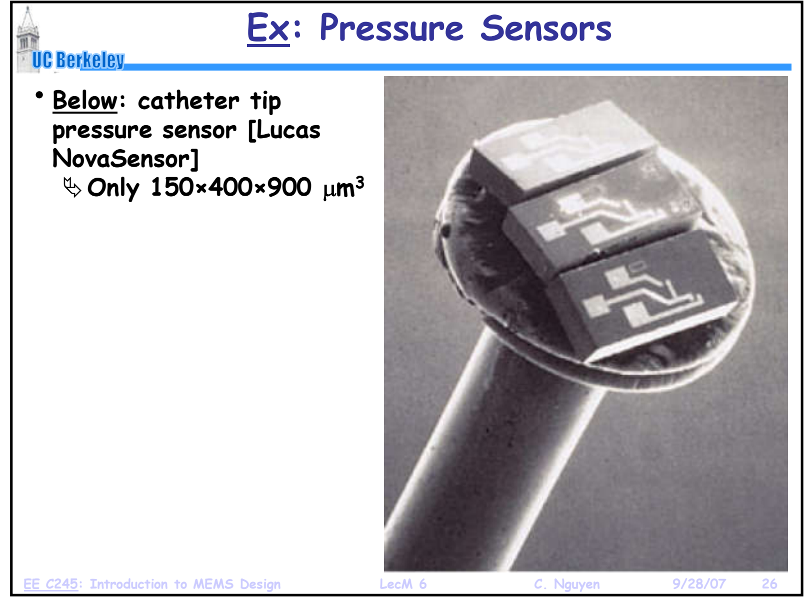

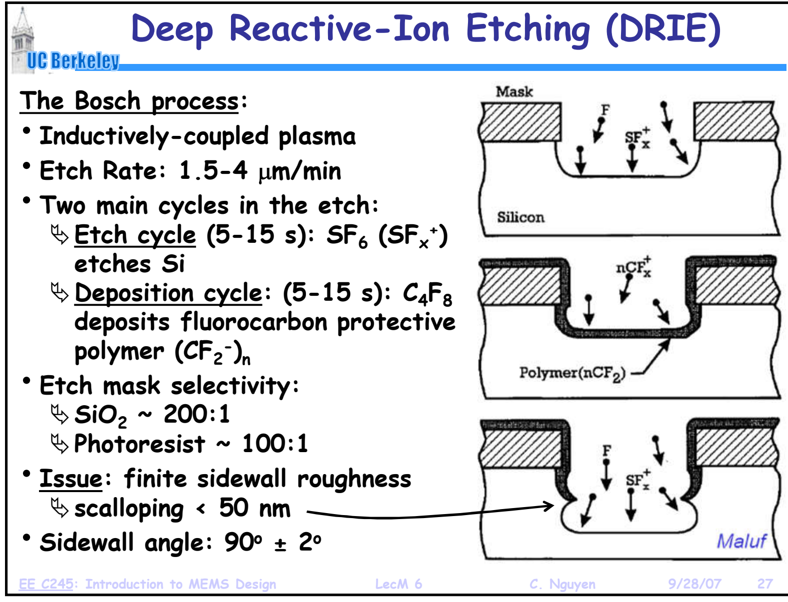

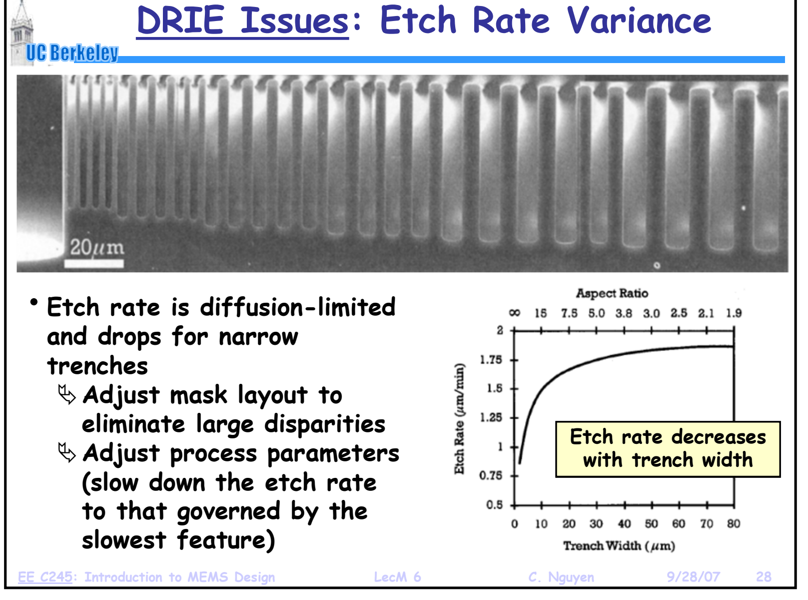

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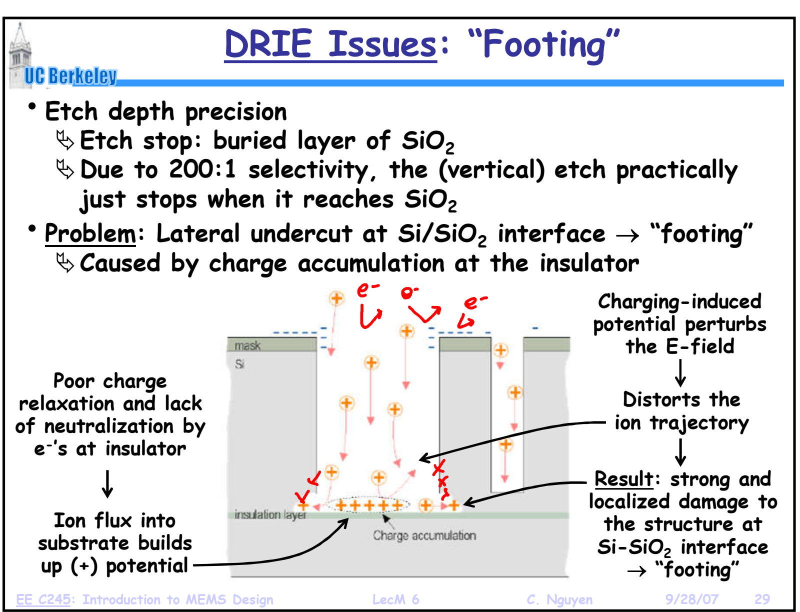

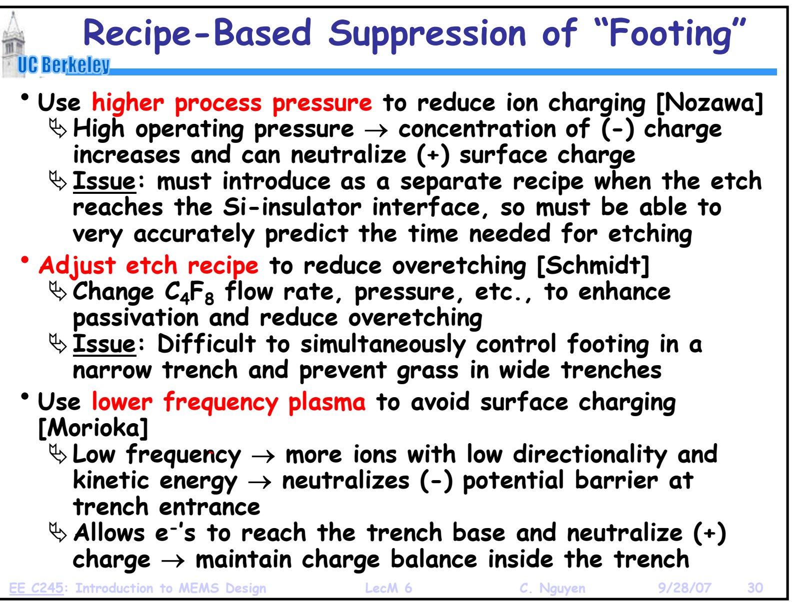

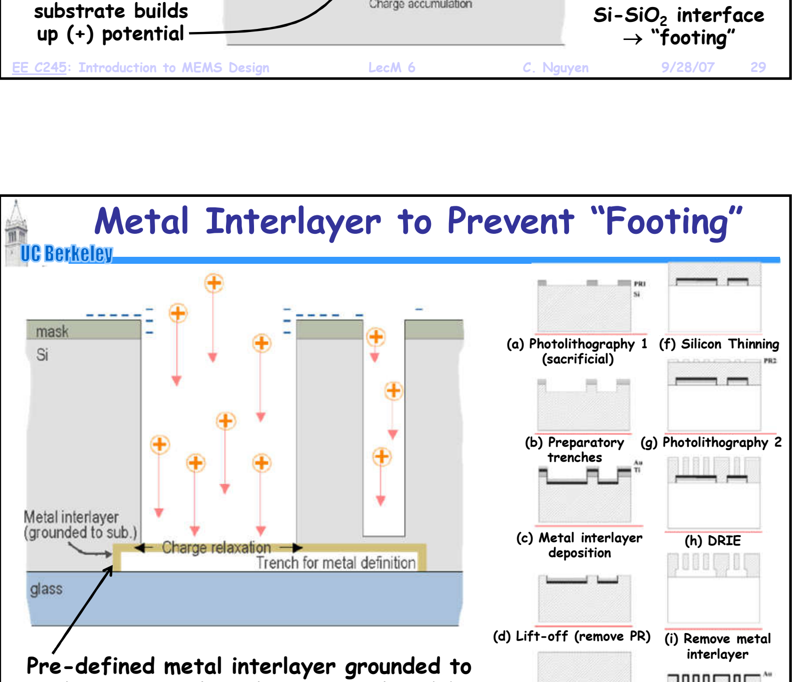

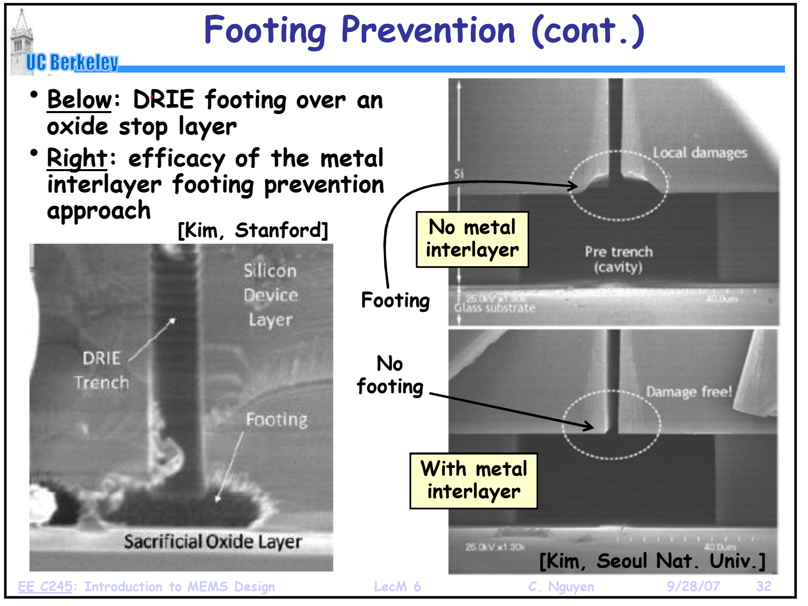

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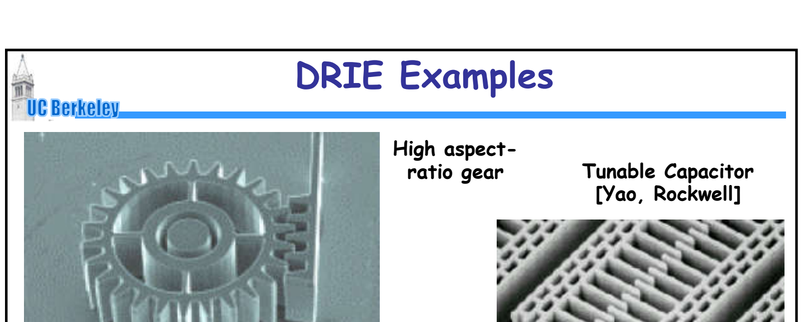
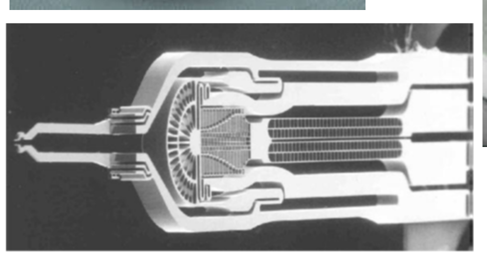
DRIE Examples



High aspect-ratio gear

Tunable Capacitor [Yao, Rockwell]



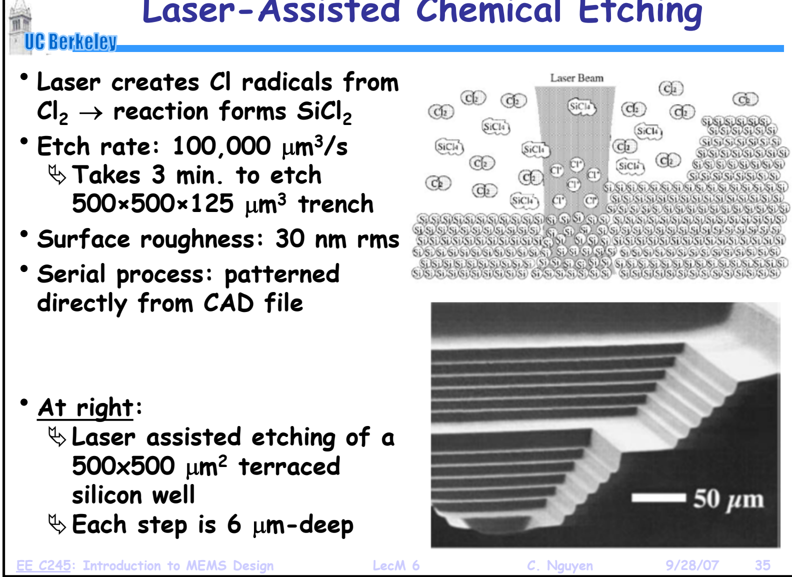
Microgripper [Keller, MEMS Precision Instruments]

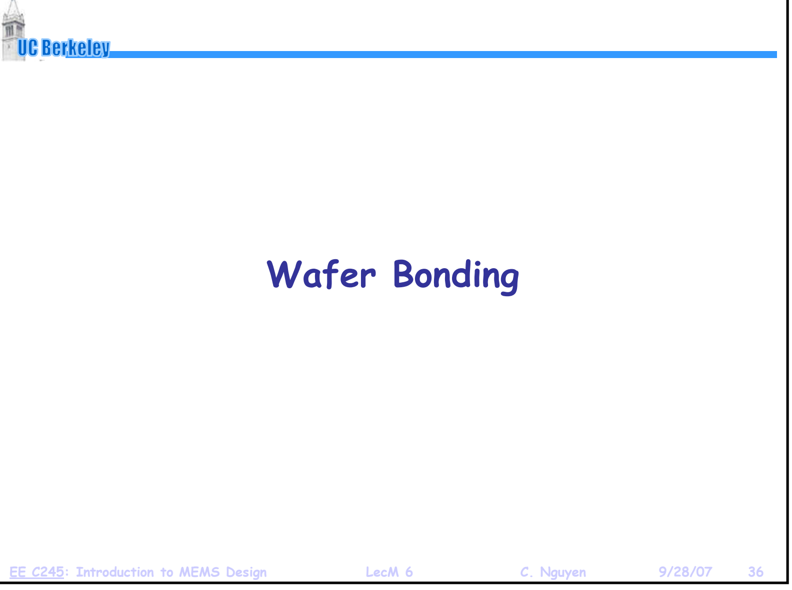
Vapor Phase Etching of Silicon

- Vapor phase Xenon Difluoride (XeF_2)
  $2XeF_{2(g)} + Si_{(s)} \rightarrow 2Xe_{(g)} + SiF_{4(g)}$
- Set-up:
  - Xe sublimes at room T
  - Closed chamber, 1-4 Torr
  - Pulsed to control exothermic heat of reaction
- Etch rate: 1-3 μm/min, isotropic
- Etch masks: photoresist, SiO_2, Si_3N_4, Al, other metals
- Issues:
  - Etched surfaces have granular structure, 10 μm roughness
  - Hazard: XeF_2 reacts with H_2O in air to form Xe and HF

Xactix XeF_2 Etcher

Inductor w/ no substrate [Pister]





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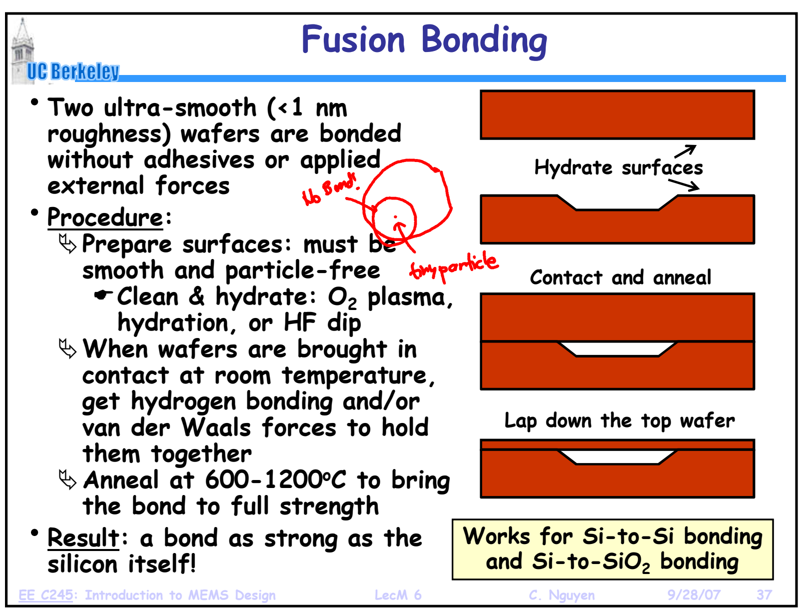

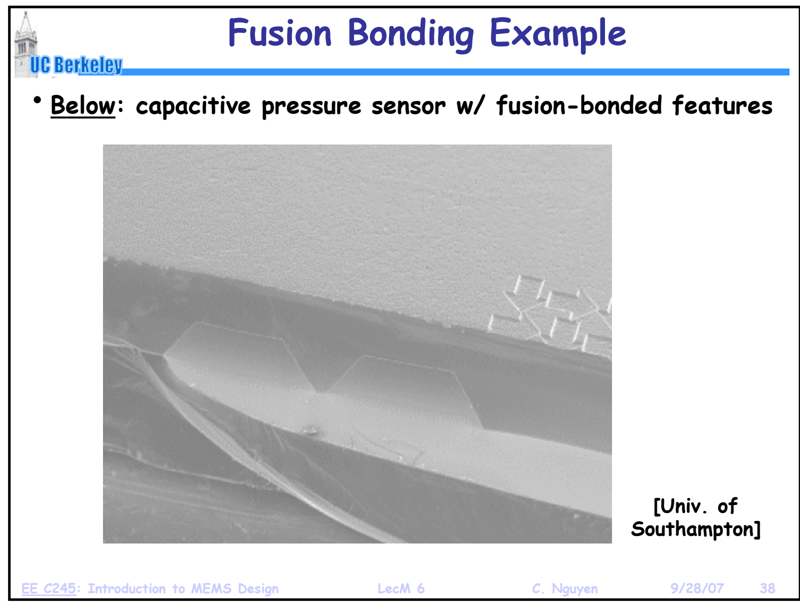

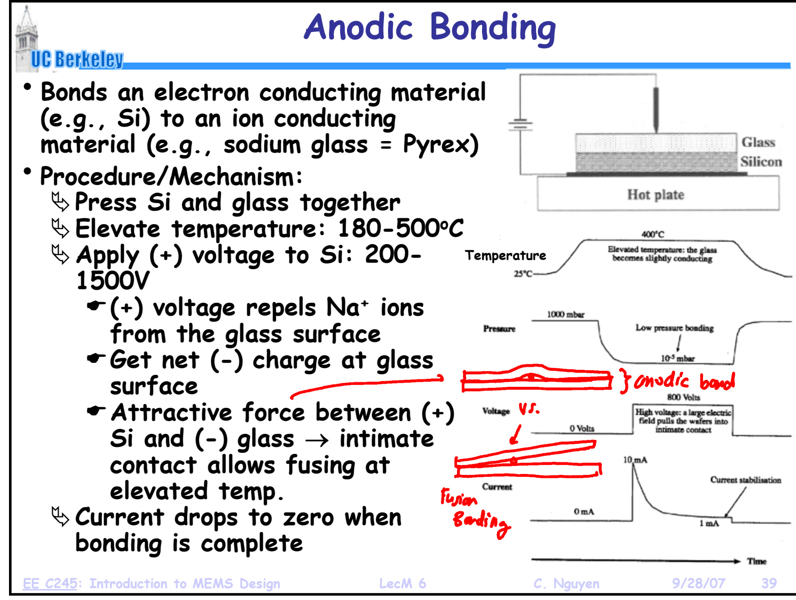

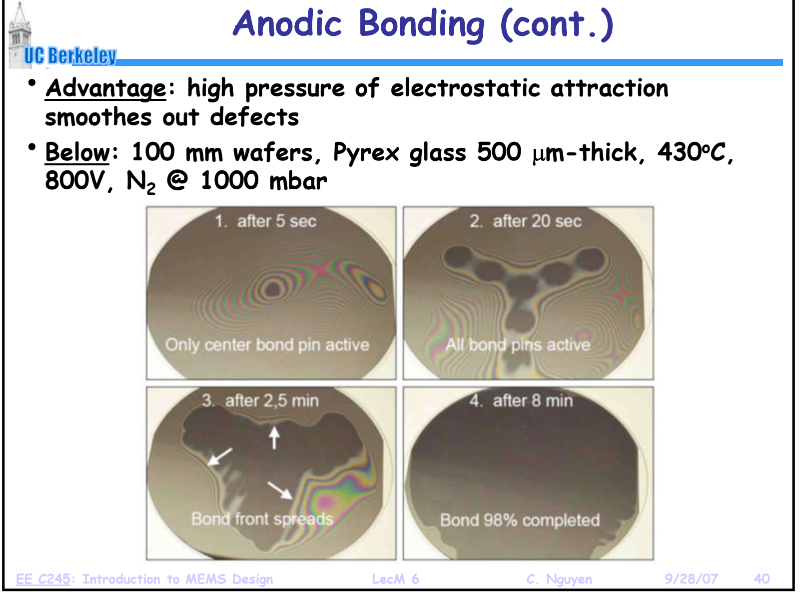

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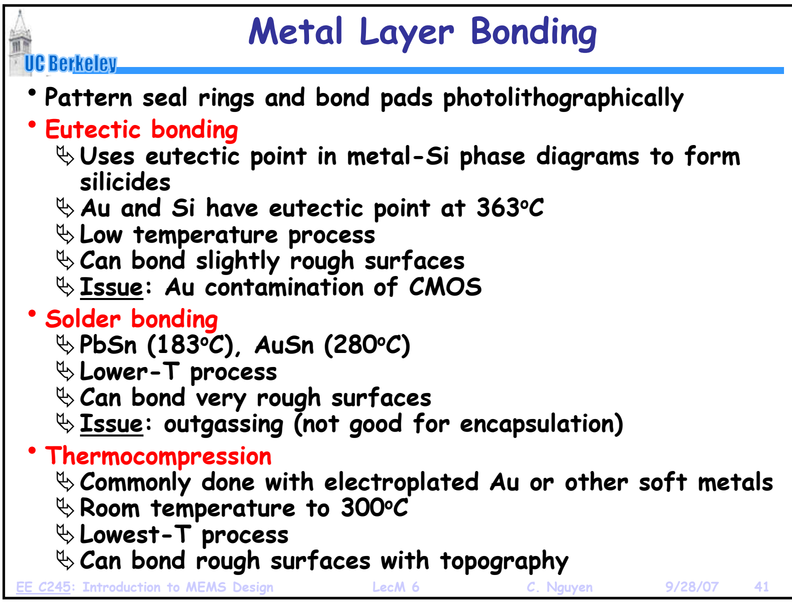

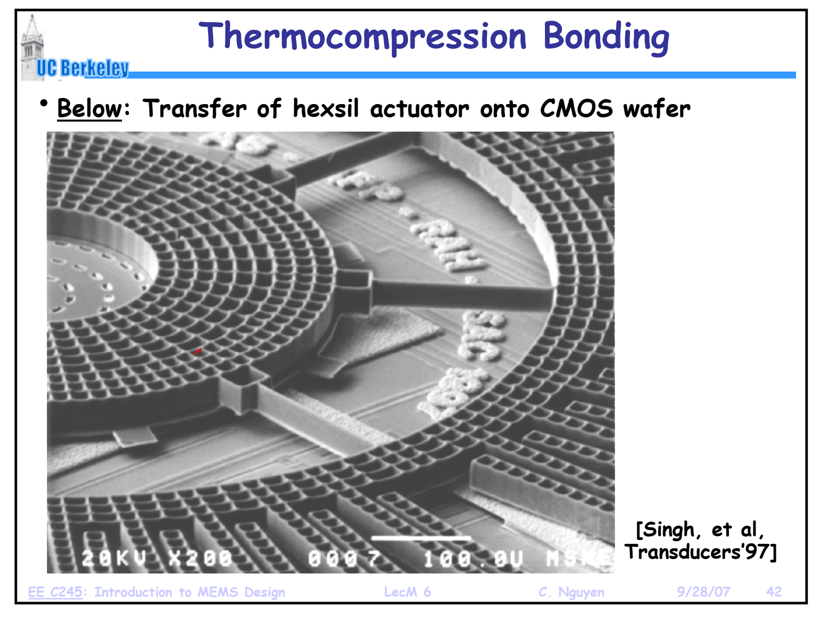

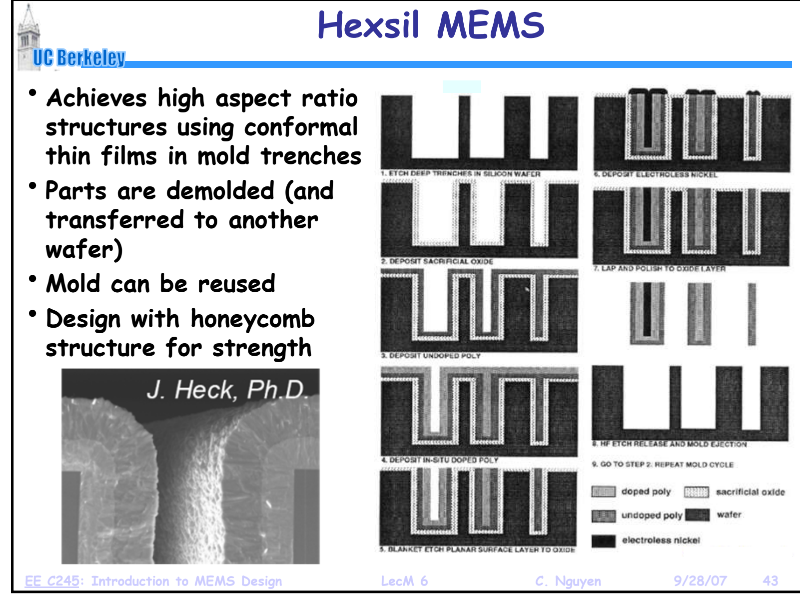

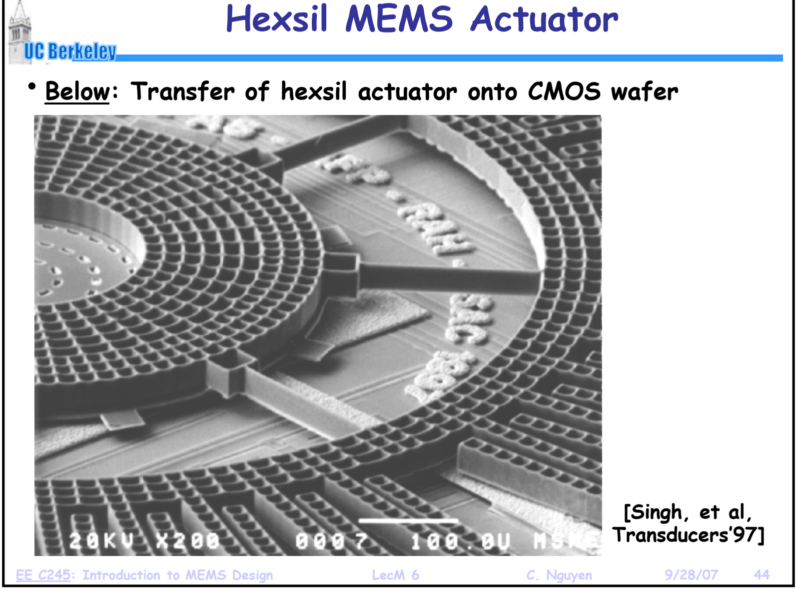

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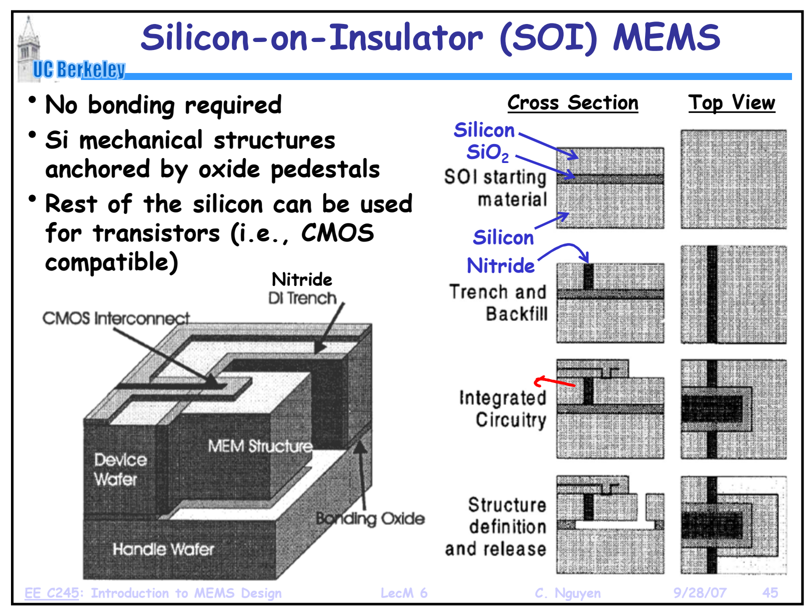

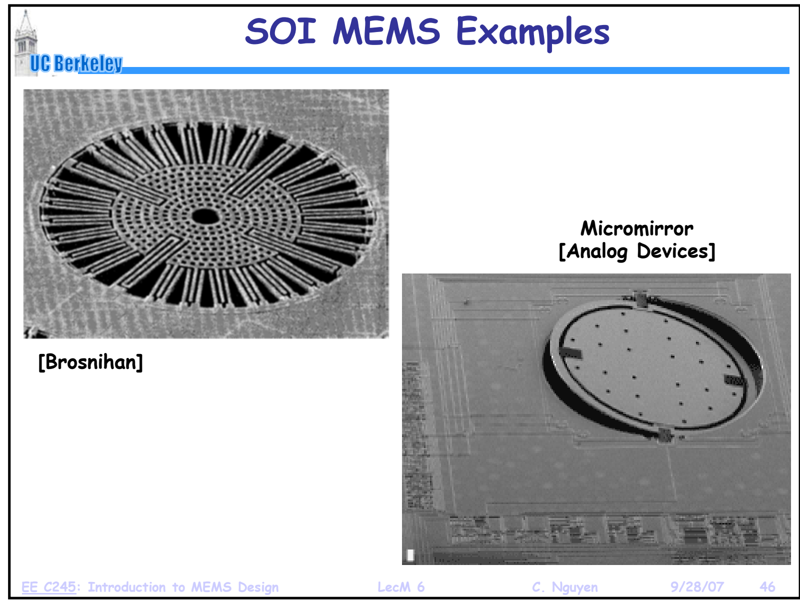

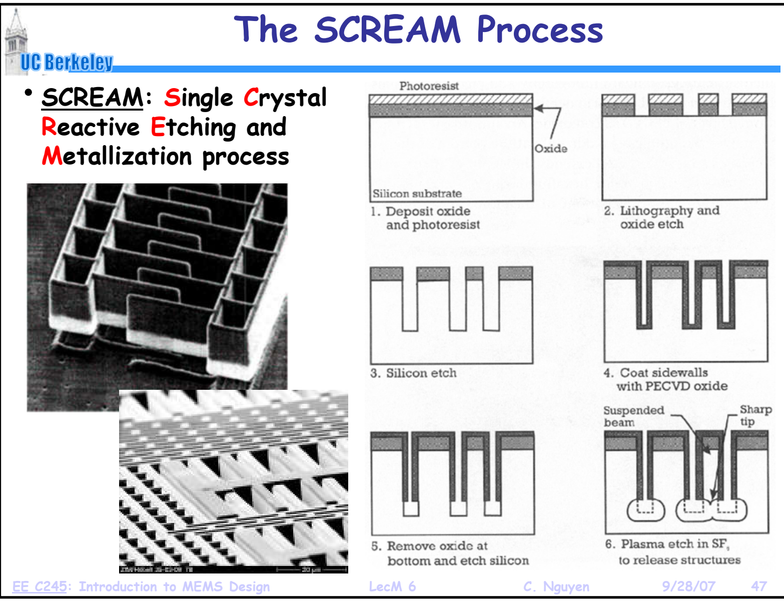

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