

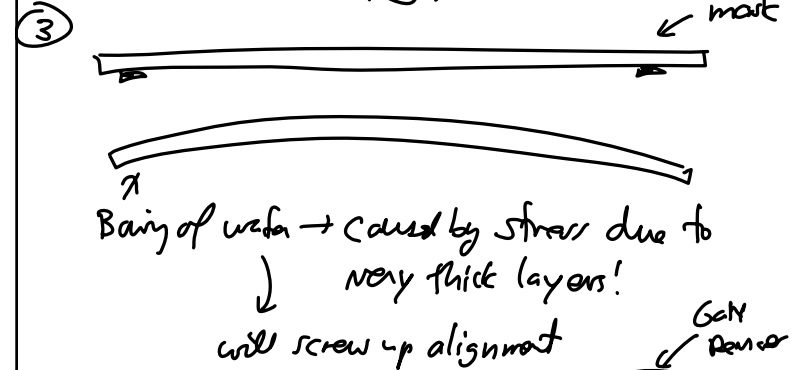
Lecture 11: Bulk Micromachining

- Announcements:
- Module 6 on Bulk Micromachining online
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- Today:
- Reading: Senturia Chpt. 3, Jaeger Chpt. 11,
 Handout: "Surface Micromachining for
 Microelectromechanical Systems"
- ↳ Lecture Topics:
 - ↳ Polysilicon surface micromachining
 - ↳ Stiction
 - ↳ Residual stress
 - ↳ Topography issues
 - ↳ Nickel metal surface micromachining
 - ↳ 3D "pop-up" MEMS
 - ↳ Foundry MEMS: the "MUMPS" process
 - ↳ The Sandia SUMMIT process
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- Reading: Senturia Chpt. 3, Jaeger Chpt. 11,
 Handout: "Bulk Micromachining of Silicon"
- Lecture Topics:
 - ↳ Bulk Micromachining
 - ↳ Anisotropic Etching of Silicon
 - ↳ Boron-Doped Etch Stop
 - ↳ Electrochemical Etch Stop
 - ↳ Isotropic Etching of Silicon
 - ↳ Deep Reactive Ion Etching (DRIE)
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- Last Time:
- Going through Surface Micromachining Module 5
- Go thru Bulk Micromachining Module 6

Why 4.0 μm min. feature sizes in MUMPS?

① Expensive to get good resolution.
 ↳ not reasonable for low volume products

② Aspect ratios \rightarrow topography



Microfluidic Assembly

