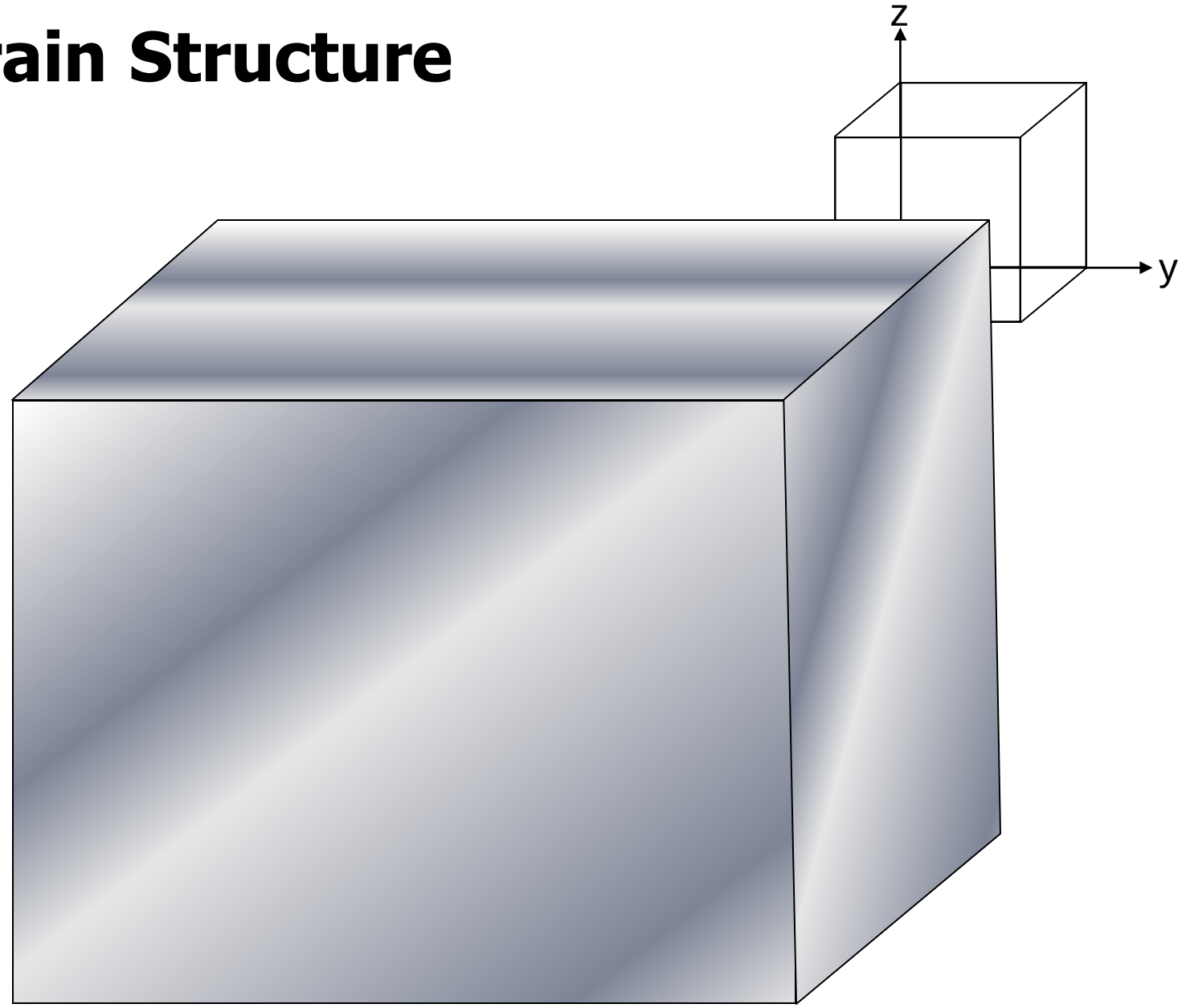
Tailored Oriented Microstructures in Thin Silver Films

Bethany Little and Brandon Hoffman
Department of Physics
Houghton College
1 Willard Avenue
Houghton, NY

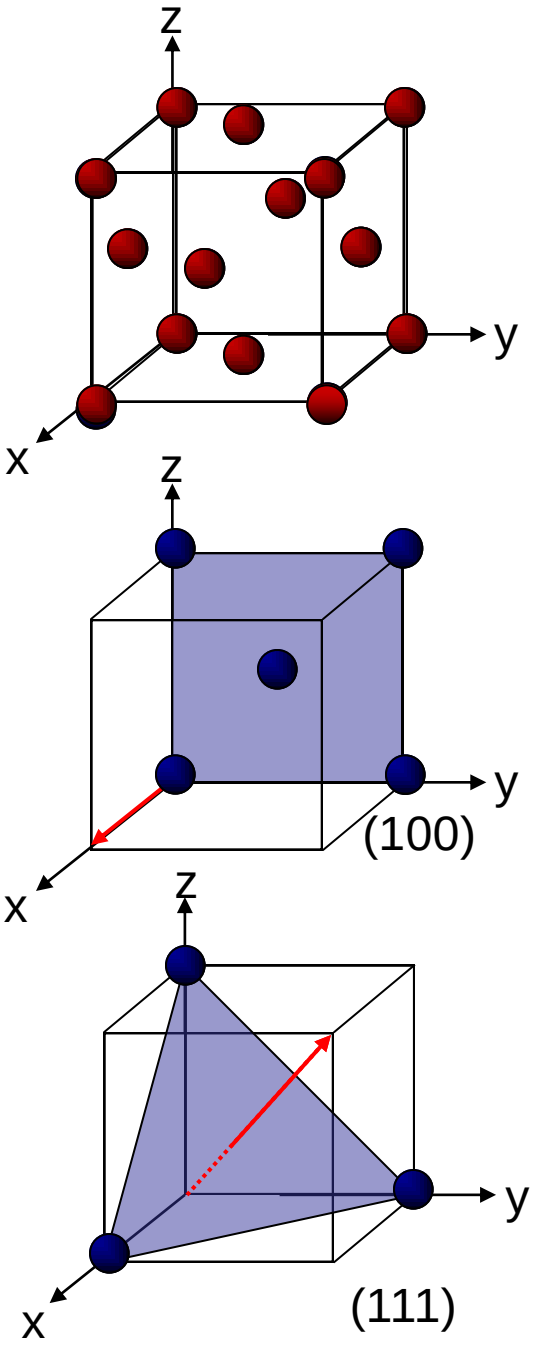
Working with Prof. Shefford Baker's
group at Cornell University,
Department of Material Science

Grain Structure



Grain Structure

- Face Centered Cubic (FCC)
- Each Grain has a different orientation
  - Plane parallel to surface defines orientation
- Orientation affects strength
  - 100 grains compliant
  - 111 grains stiff



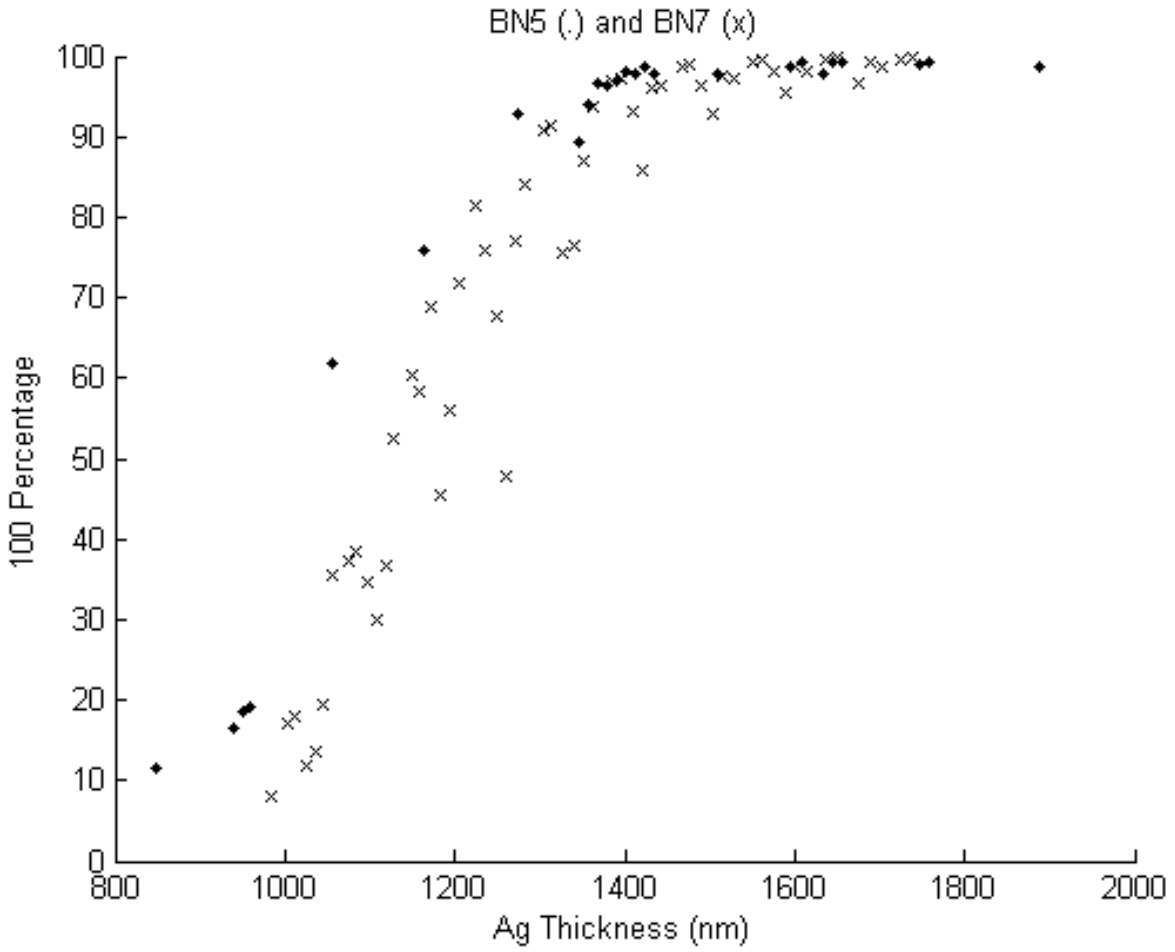
Some Goals of the Research Group

- Tailor two films with different grain orientation
- Better understand the growth process the mechanics of stress and strain within the films

Process:

- Make films (10nm- 2μm) thick
- Heat up (anneal)
- Analyze

Relationship Between Orientation and Film Thickness



Plot of 100 grain percentage vs silver thickness on three films. Data taken using a Scintag X-ray Diffractometer.

Acknowledgements

Prof. Shefford Baker
Prof. Brandon Hoffman
Aaron Vodnick
Michael Lawrence

Daniel Ballard
Derek Worden
Kurt Aikens
Max Aubain

National Science Foundation
Cornell Center for Materials Research
CCMR REU Program
Houghton College Summer Research Institute