Thermal analog to AFM force-displacement measurements for interfacial contact resistance

Faculty: J. E. Blendell and S. V. Garimella  Student: B. D. Iverson

Objective
Develop a method for measurement of interface resistance through thin-film polymer/Si interfaces using a heated AFM tip.

Impact
Use of heated AFM tips for interfacial characterization:
- Enables nanoscale spatial resolution
- Reduces contrast from variance in tip contact
- Provides sub-surface resistance measurement

Approach
Measure voltage imbalance in and out of contact with a substrate.

Identify impact of film thickness on thermal diffusion.

Calibrate voltage change as a function of temperature difference.

Estimate contribution of contact resistance at zero film thickness.