Overview of Overarching Goals
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Overarching goals and physics

*Predict the lifetime of PRISM-type devices within an order of magnitude*

**Solid / fluid dynamics**
- Fluid damping

**Solid mechanics**
- Creep and stress relaxation, size effects, dynamical loading

**Dielectric Charging**
- Trapped charges cause uncontrollable changes in actuation voltage

**Contact physics**
- Interactions between surface, stiction
  - Sub-surface defects, surface chemistry
  - Current channeling (Joule heating, contact welding)

**Characterization and validation experiments**
- Initial microstructure
- Performance and failure
**Input Experiments:**
Geometry, microstructure and chemistry, surface roughness

**Validation Experiments:**
Microstructure evolution, device performance & reliability

- Electrically active defects in dielectric
- Contact mechanics and plastic deformation in metal
- Fluid-solid interactions
- Thermal & electrical conductivity

**PRISM Device simulation**

- Electronic processes
- Micromechanics
- Fluid/solid dynamics
- Thermal and mass transport

**Predictions**

**PRISM multi-physics integration**