

# Droplet Actuation and Motion under various Actuation Forces

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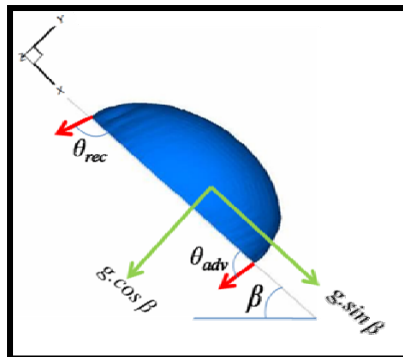
Student: S. Ravi Annapragada

## OBJECTIVE

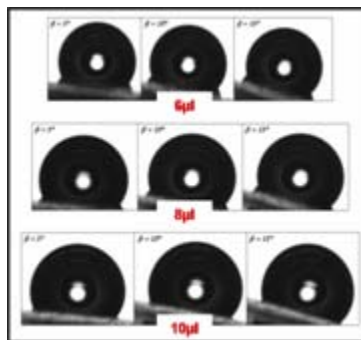
Develop experimentally validated numerical models to describe droplet motion under various actuation forces.

## APPROACH

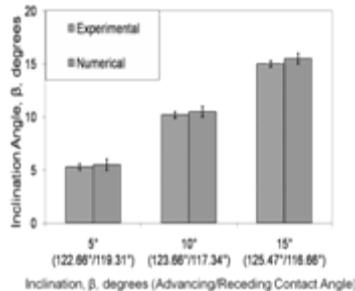
- Perform well defined inclined droplet experiments and measure contact angles
- Develop contact angle correlations for stationary and moving droplets
- Develop VOF based numerical methodologies for predicting droplet actuation and motion
- Compare numerical predictions with data
- Develop new numerical models for the same



Free Body Diagram



Sessile droplet images

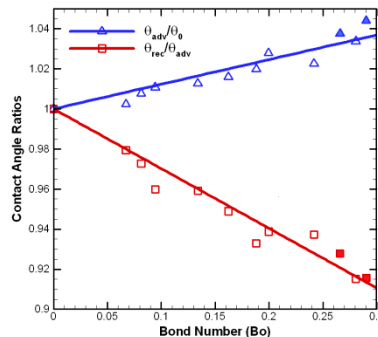


Benchmarking of Numerical Model

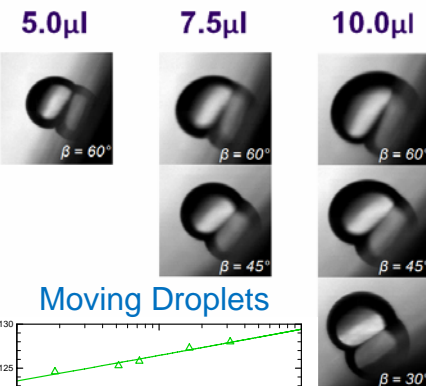
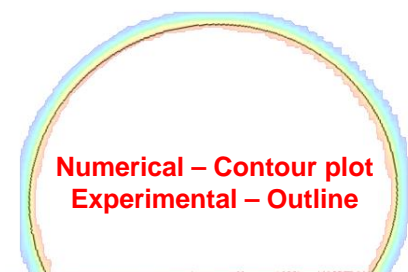
## IMPACT

The outcomes of this study will:

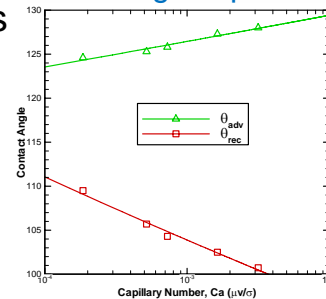
- Develop benchmark data for evaluation of numerical models for droplet actuation
- Predictive numerical models for droplet motion under gravitational and electrical actuation



Contact Angle Correlation



Moving Droplets



## SELECTED PUBLICATIONS

- S. Ravi Annapragada, J.Y. Murthy, S.V. Garimella, "Experimental Characterization of Droplet Motion on Inclined Hydrophobic Surfaces", 9<sup>th</sup> ASME-ISHMT Heat and Mass Transfer Conference, IIT Bombay, India, Jan 4-6, 2010 .
- S. Ravi Annapragada, J.Y. Murthy, S.V. Garimella, "Forces Acting on Sessile Droplets on Inclined Surfaces", Summer Heat Transfer Conference, San Francisco, CA, USA, 2009.