

# Fluid Management in Roll-to-Roll Nanoimprint Lithography



Akhilesh Jain, Roger T. Bonnecaze

Dept. of Chemical Engineering, The University of Texas at Austin

## GOALS

- Create a model to identify the key process parameters for UV R2R imprint lithography with inkjet dispensing
- Provide a tool for scale-up from experimental test bed to industrial scale.

## OUR MODEL

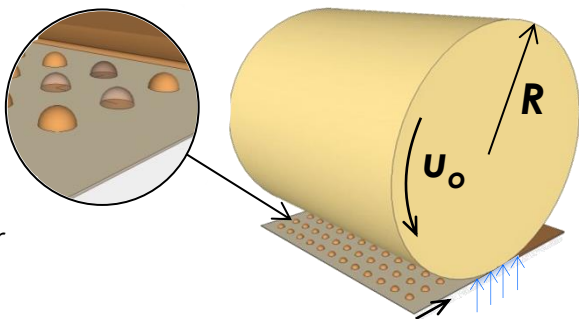
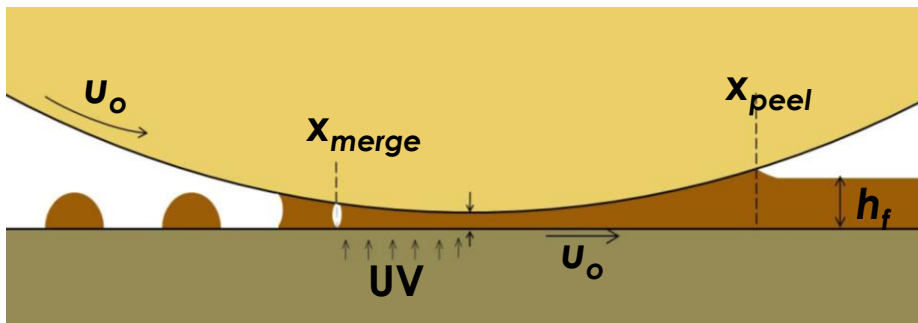


Fig 1. Our model for roller based R2R imprinting



## KEY RESULTS

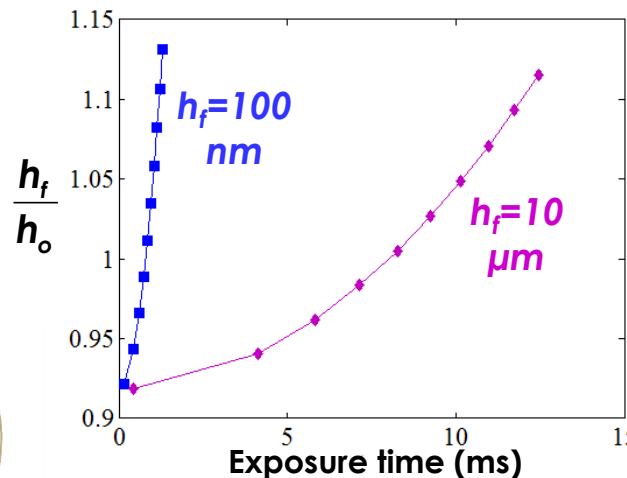


Fig. Exposure time,  $t$  vs.  $h_f/h_0$

$$t \sim O(\sqrt{Rh_0}/u_0)$$

High UV intensity required for  $h_f \sim O(100$  nm)

The results from our model compares well with the experimental results from Ahn et al. (2009).

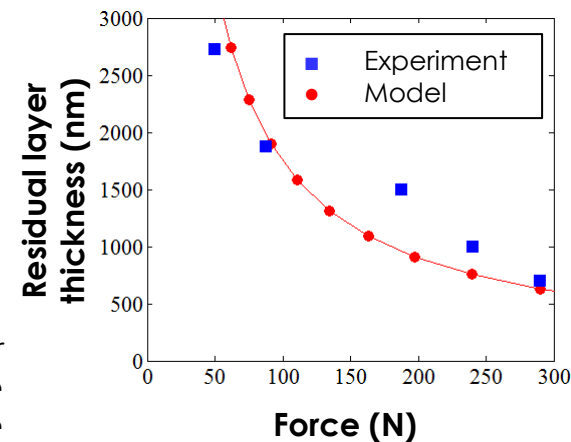


Fig 3. Residual layer thickness  $h_f$  vs. force on the substrate