

## **Uncertainty Quantification in Transfer Printing**

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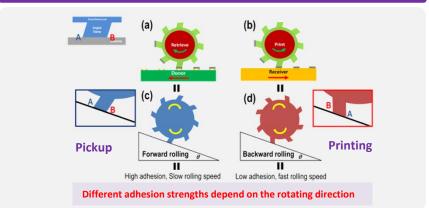
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### **OBJECTIVE**

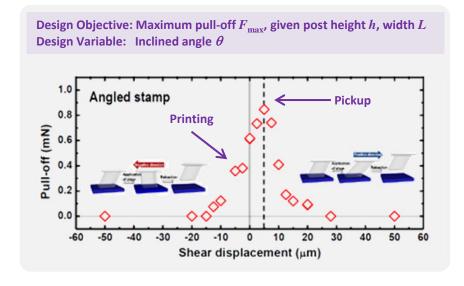
Establish analytically the scaling law for shear-enhanced transfer printing Optimize the design parameters in the process of transfer printing for stretchable and flexible electronics Enable a cost-effective fabrication and pave the way for potential commercialization

#### **Shear-Enhanced Transfer Printing Adhesion Retrieval:** Initiate Rapid retraction $\Gamma_{1}$ contact $\Gamma_{2}$ donor Align to **Printing:** target Slow Contact: retraction apply shear $\Gamma_1'$ $\Gamma_3$ Conventional: $\Gamma_3 > \Gamma_1' = \Gamma_1 > \Gamma_2$ Shear-enhanced: $\Gamma_3 > \Gamma_1' << \Gamma_1 > \Gamma_2$

# **Continuous Roll-to-Roll Application**



### **Design Problem in Roll-to-Roll Application**



### **Uncertainty Quantification & Optimization**

