

# BER Biofuels SFA: Patent issued for

## “High-throughput reproducible cantilever functionalization”

### Objective:

- A new technique to map component biopolymer distribution on biomass surfaces at a submicron scale

### Approach:

- Develop high-throughput functionalization of commercial silicon cantilevers with bifunctional silanes to impart affinity to specific biomass polymers (TES N-isopropyl gluconamide for cellulose) for use in modified Atomic Force Microscopy (AFM)

### Results:

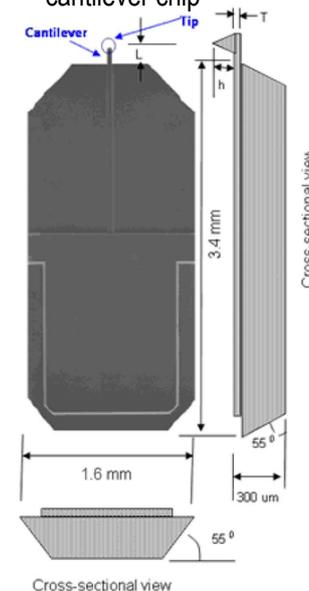
- Custom silicon chip holder that holds 12 cantilevers and fits a standard polypropylene 96-well plate for fast dip coating and washing of fragile cantilever silicon tips was designed, fabricated and tested
- Patent issued

### Significance:

- Fast and reproducible multiple-step functionalization of cantilevers enables imaging of molecular chemical forces across sample surfaces

### Steps to functionalize cantilevers

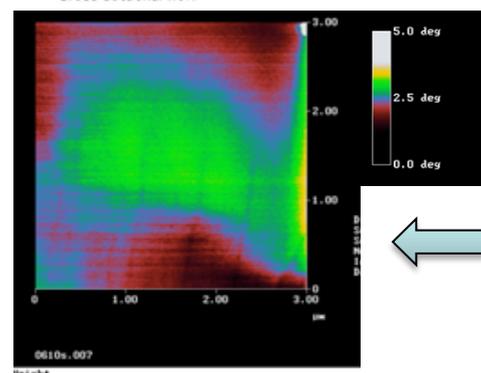
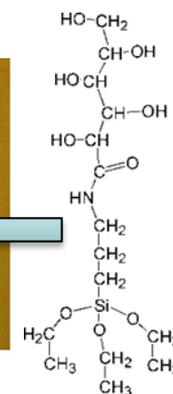
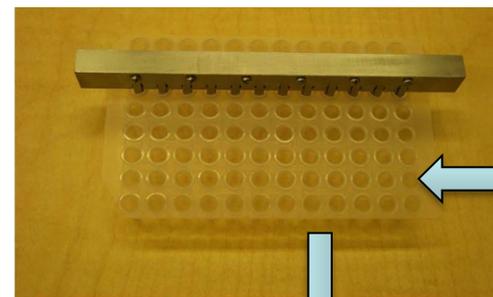
A. Use commercial silicon cantilever chip



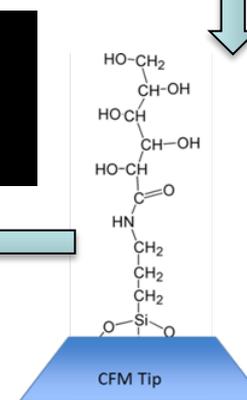
B. Insert 12 chips in clip holder



C. Put reagents in multi-well plate, add reagents and wash



E. Measure cellulose adhesion forces across biomass sample



D. Place functionalized cantilever in AFM image sample in force-volume mode to measure adhesion