

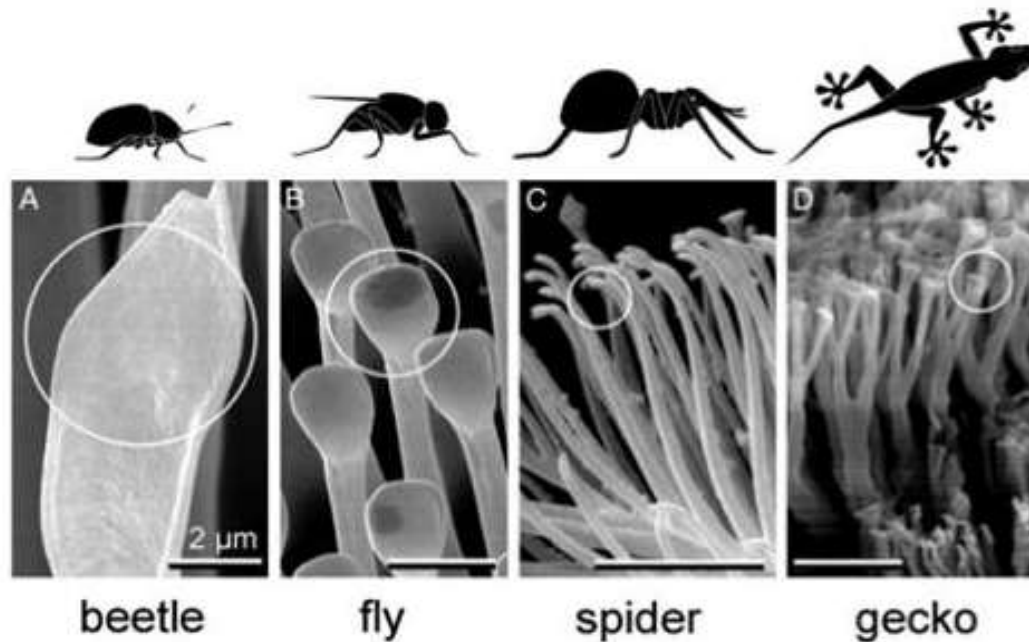
# Fabrication of a Peel Tester for Gecko Inspired Adhesive Tape

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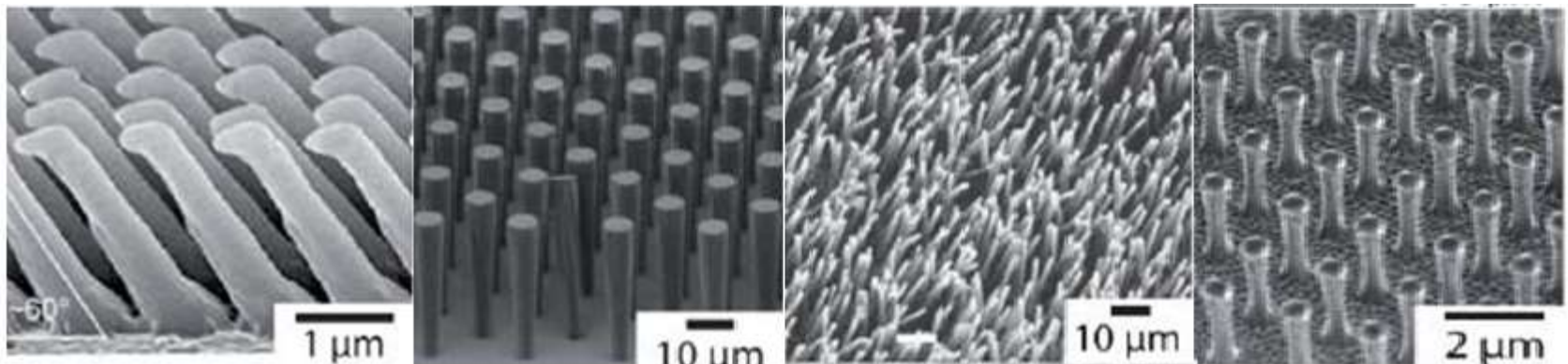
# Gecko Tape Background

- Observation of animals ability to climb walls
- Behavior linked to fiber structures on animals feet
- Van der Waals forces create adhesion



# Gecko Tape Invention

- Mechanism for Gecko attachment inspired micro-patterned adhesive surfaces
- These tapes came to be known as “Gecko Tape”
- Many different fibril designs are possible and created



# The Institute of New Materials (INM)

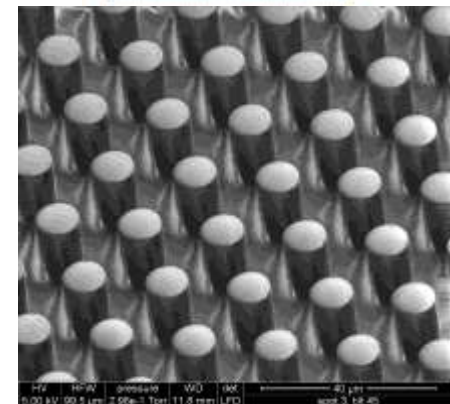
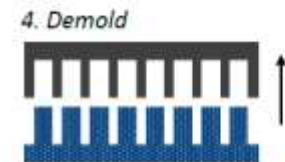
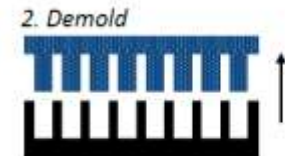
- Advanced materials company based out of Saarbrücken Germany
- Large focus in micro-patterned surfaces
- Formal collaboration established for the project



(Functional surfaces...)

# Fabrication

- Fabrication is difficult
- Many ways to synthesize
- Soft molding used in our lab
- Receive molds from INM

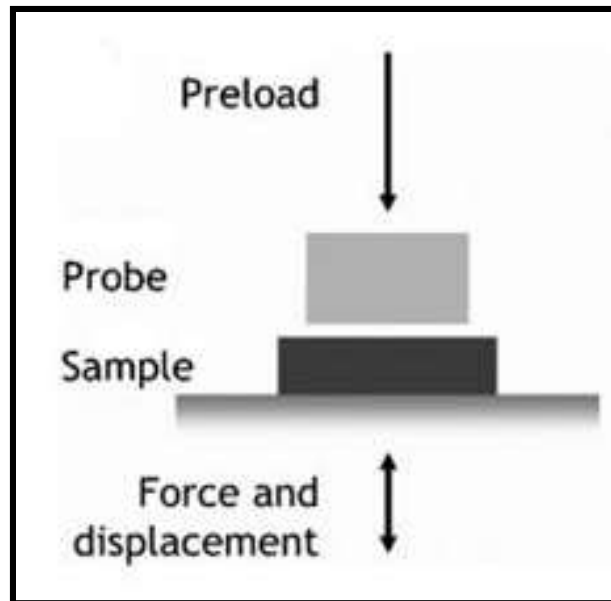


# Current Testing

- Testing of micro-patterned adhesive surfaces is not standardized
- Focused on better fabrication techniques or mimicking biological observations
- Adhesion studies *extremely* difficult to compare
- Normal adhesion tests have been performed widely

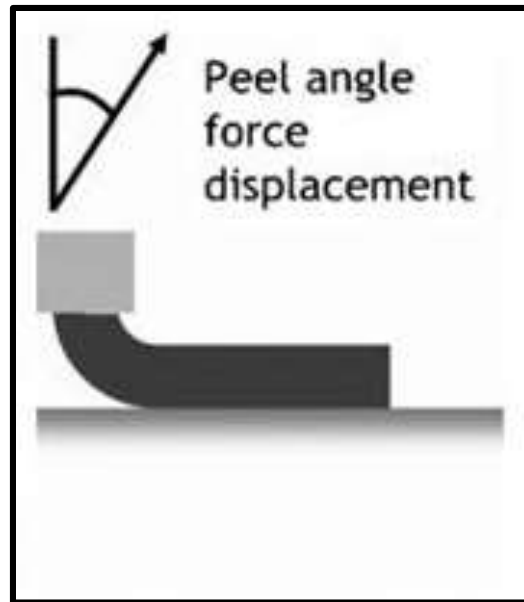
# Normal Adhesion Testing

- Research has been focused on Normal Adhesion testing
- Force results are straight forward
- Insight to detachment behavior is limited



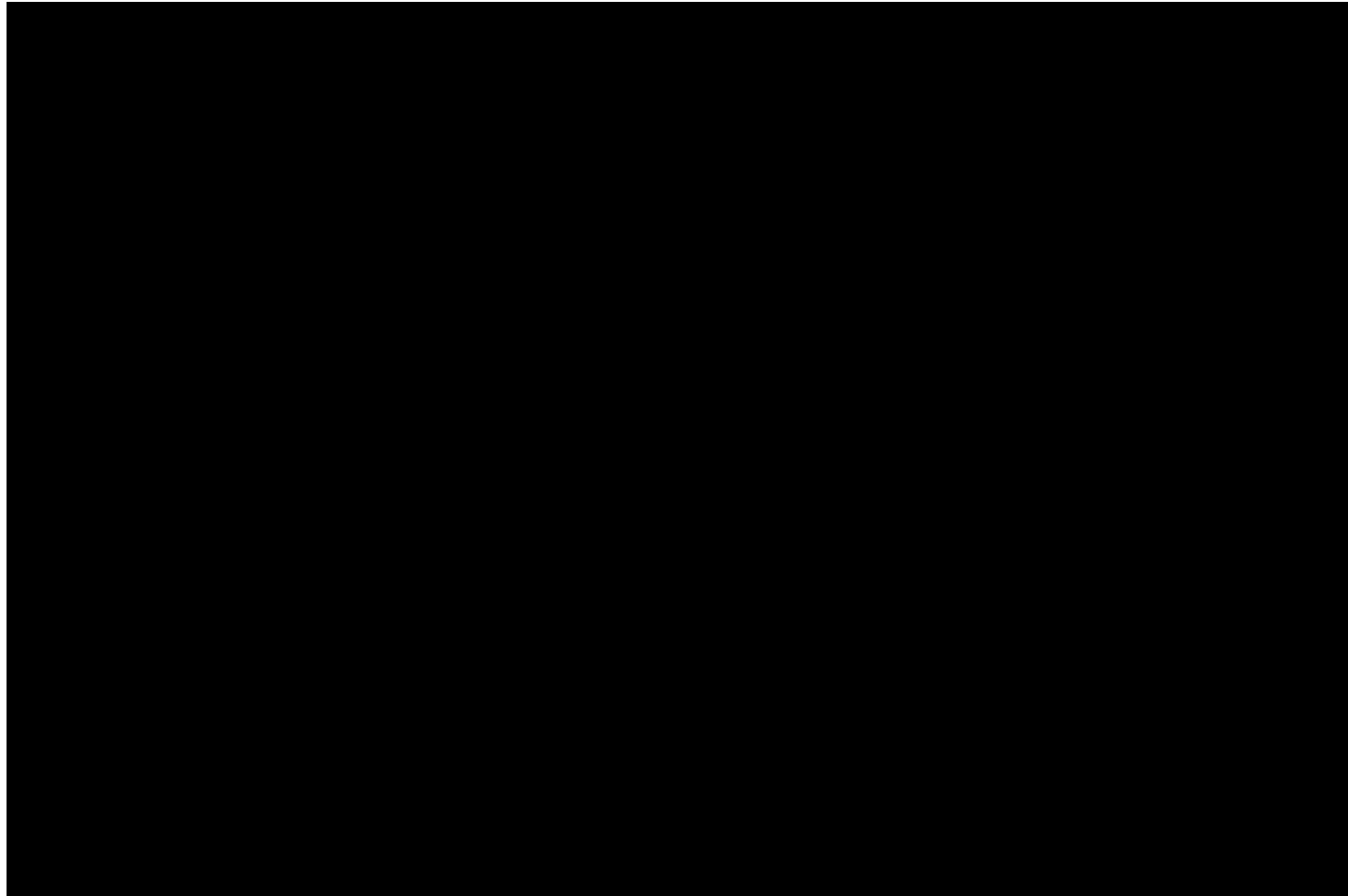
# Peel Testing

- Allows for detachment properties to be examined directly
- Testing reveals insight into the practical use of these adhesives
- Testing will lead to a more fundamental knowledge of Gecko Tape adhesion



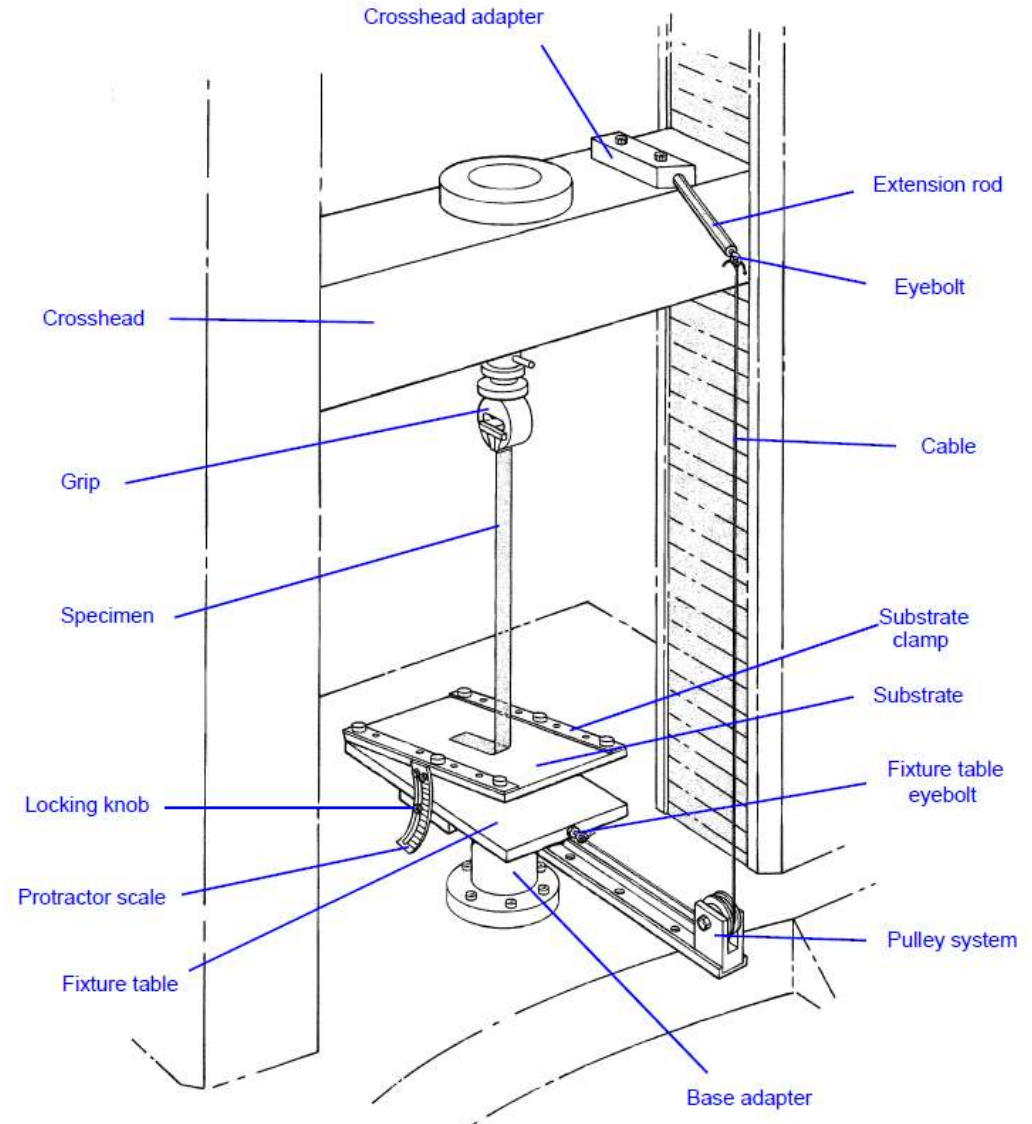


# Peel Testing Difficulty

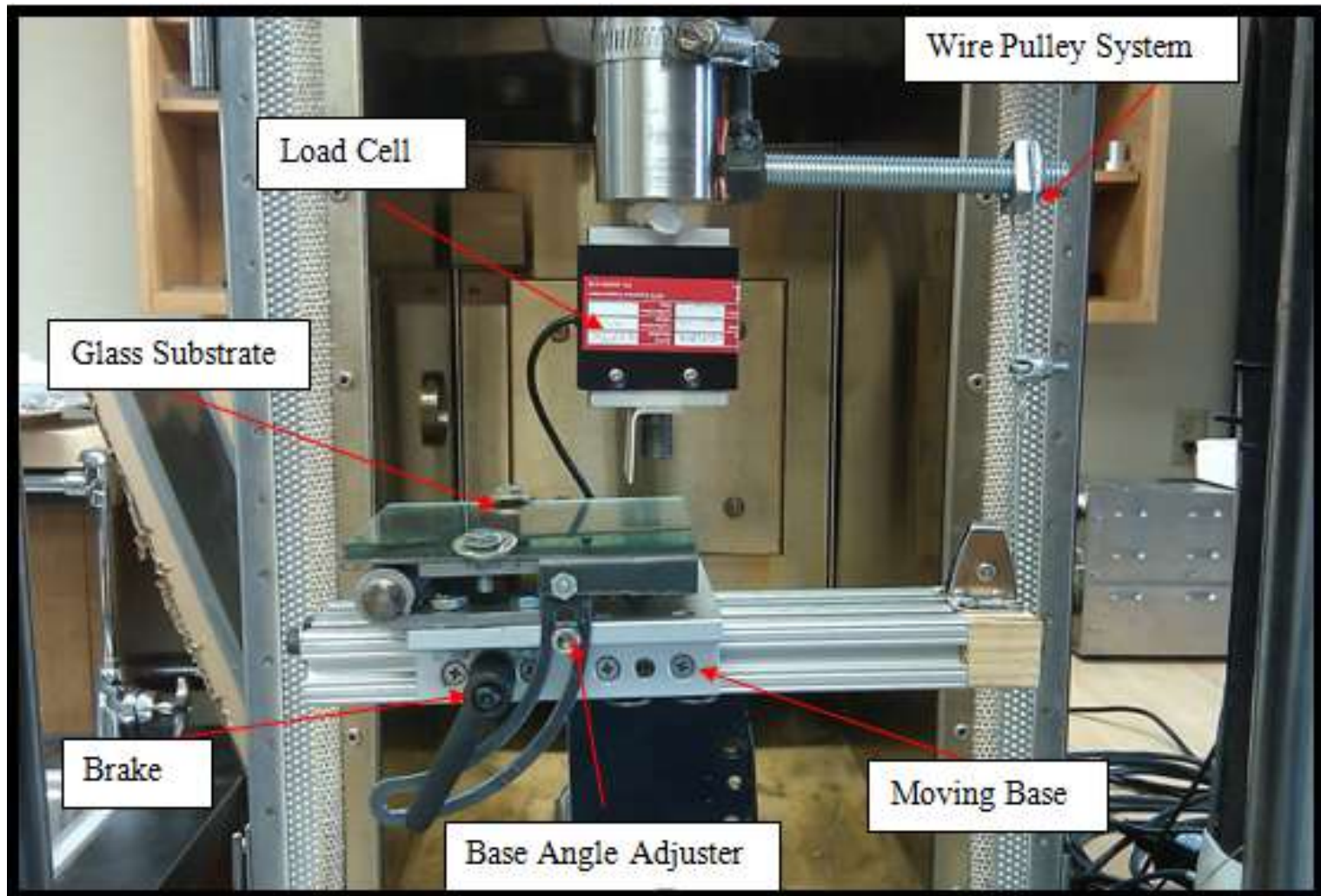


# Peel Tester Design

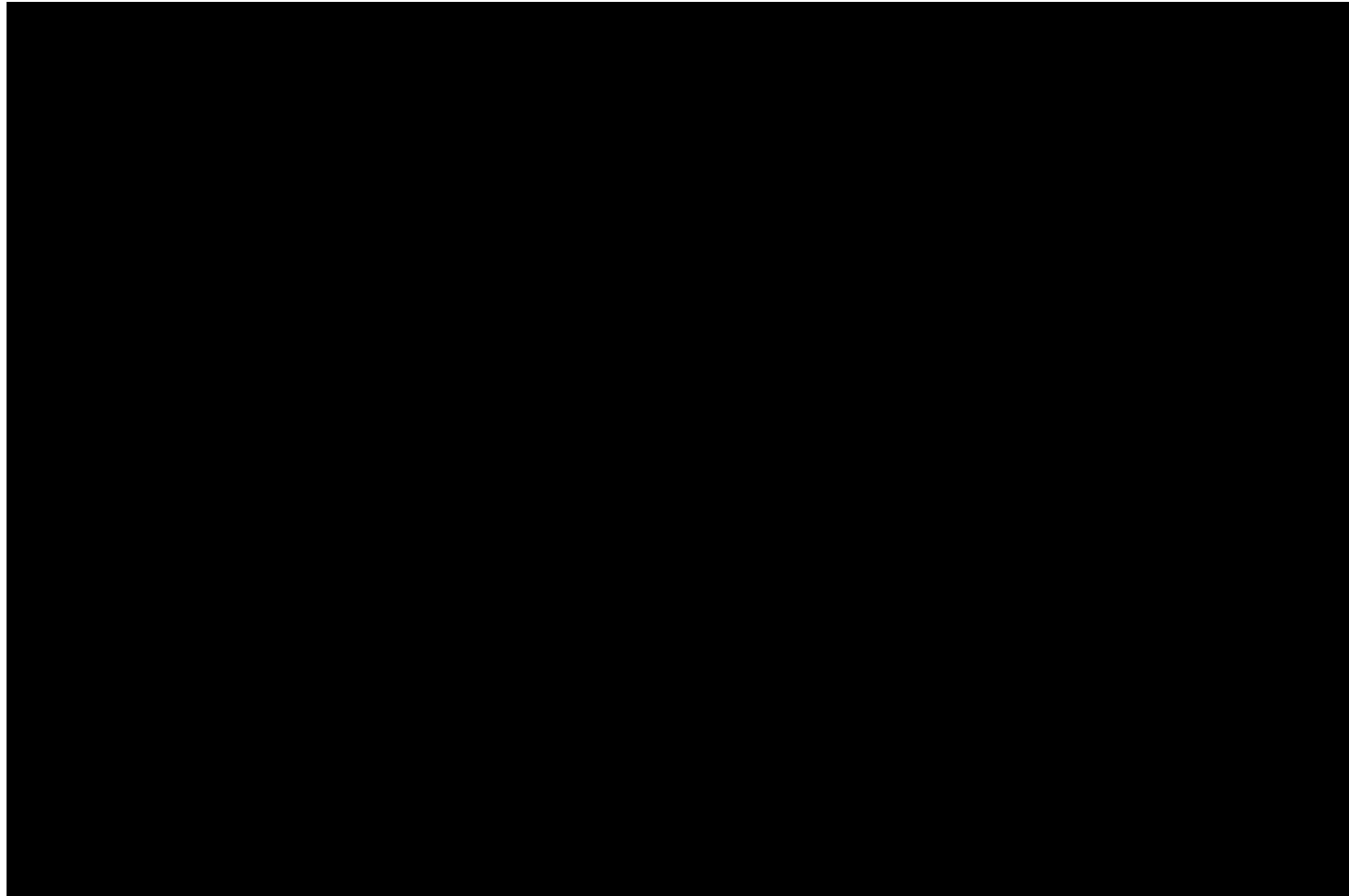
- Design based off of machines used to test “common” adhesive tapes
- Moving base to allow for constant angle tests
- Designed to fit load frames found in most materials labs



# Peel Tester

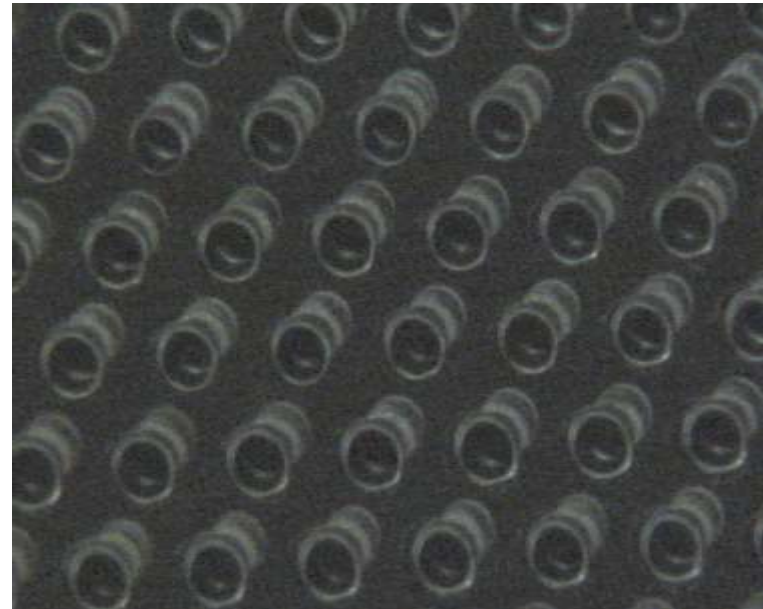
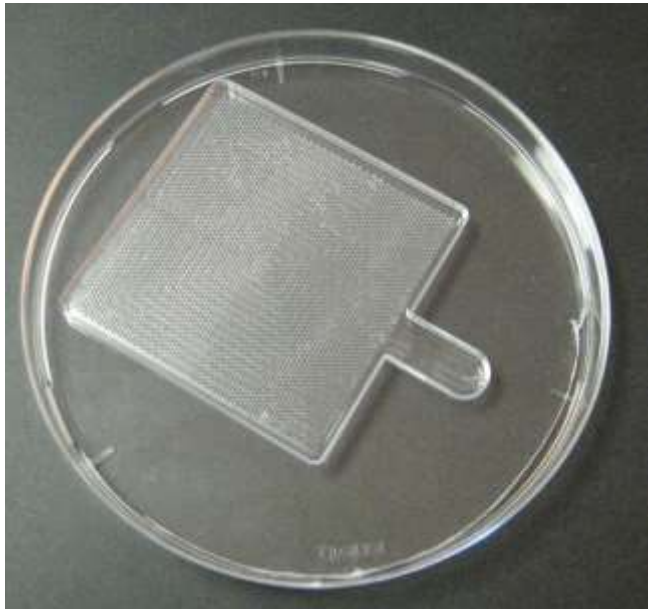


# Functioning Peel Tester



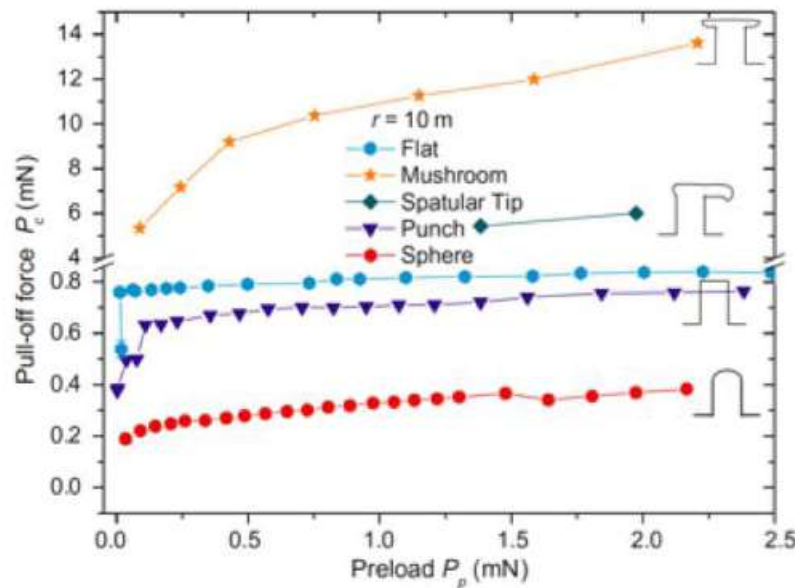
# Future Research

- Continue research this summer with NSF-EPSCoR funding
- Samples will be created in lab as well as sent from the INM

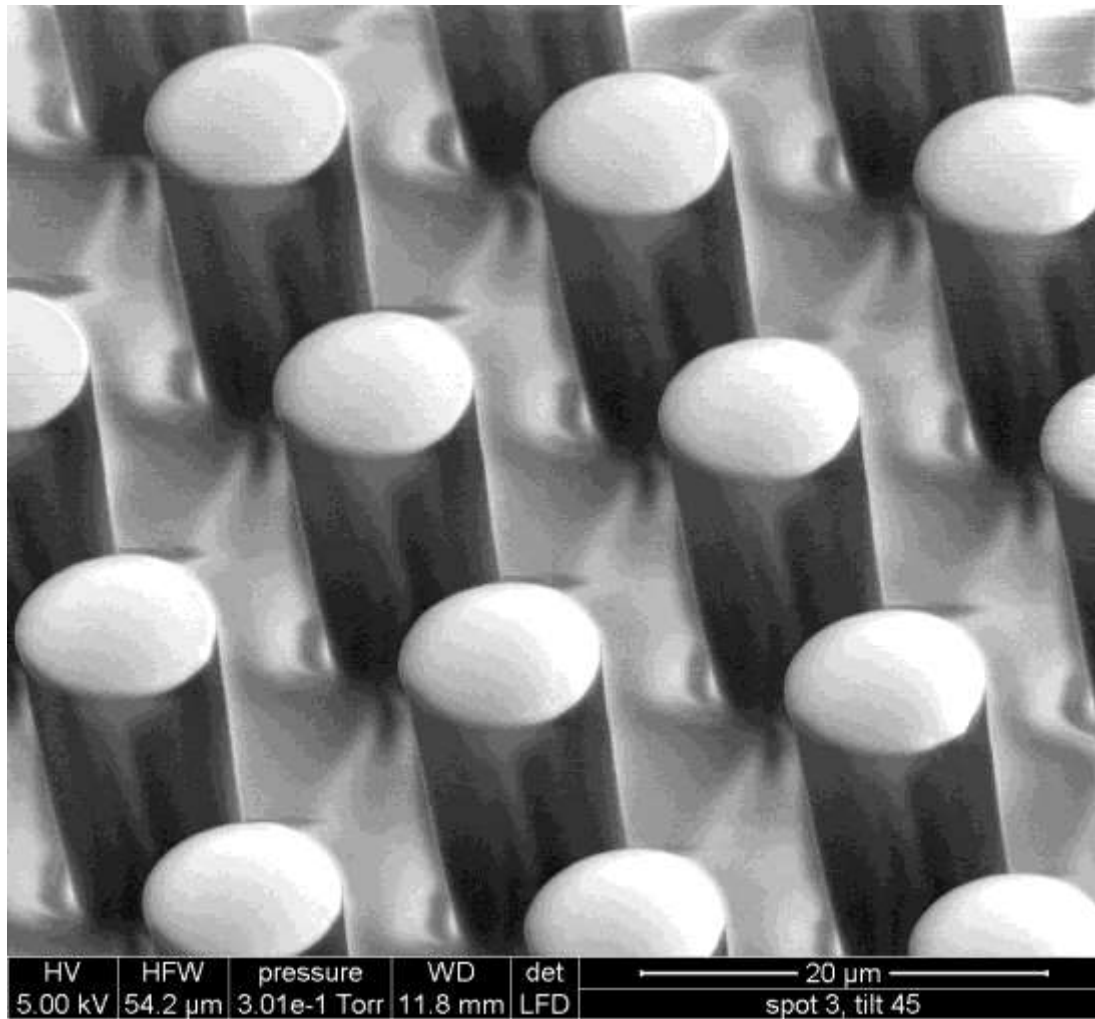


# Future Research Cont.

- Establish deeper insights into fundamental mechanisms of adhesion
- Peel test samples well characterized in normal adhesion
- Investigate effect of pillar geometry, size, length, etc.



# Questions



# Work Cited

E. Arzt, S. Gorb, R Spolenak, Proc. Natl. Acad. Sci. U. S. A. 100 (2003) 10603

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