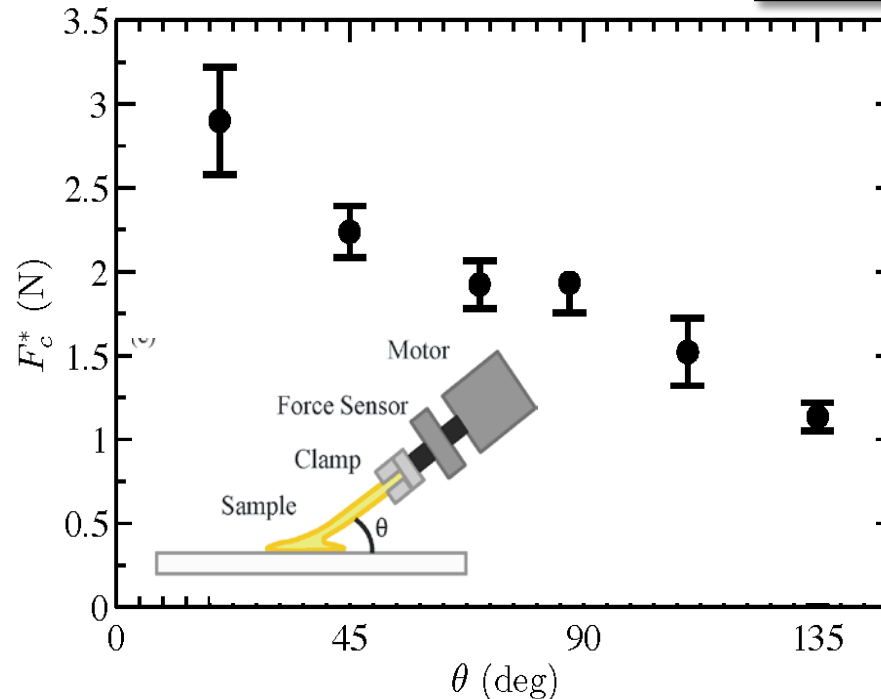
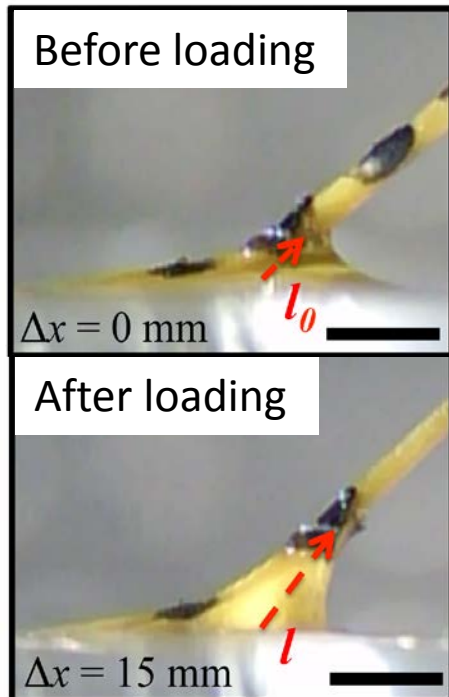
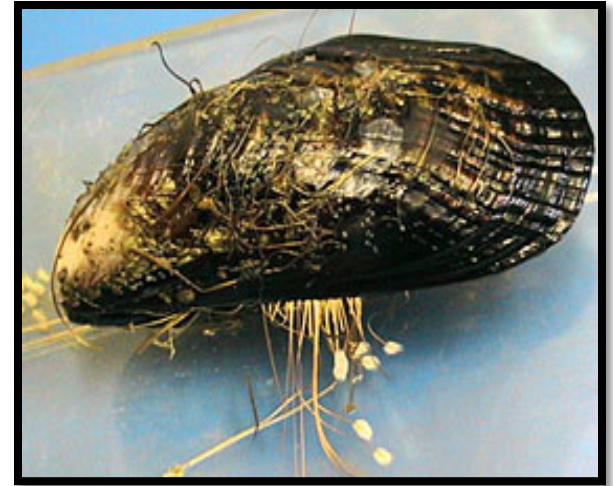


Designing adhesive structures inspired by nature

Megan Valentine, Department of Mechanical Engineering, UC Santa Barbara

- **Grand Challenge: engineer durable adhesive structures that perform underwater**
- **Mussels are excellent model system:**
 - *Attachment is critical to survival*
 - *Strong bonds form quickly in hostile conditions*
 - *Optimized for attachment to foreign surfaces*



- *Energy to detach is $\sim 10^4$ - 10^6 x's higher than that predicted by interfacial energy.*
- *Plaque geometry & rate-independent plasticity govern response.*