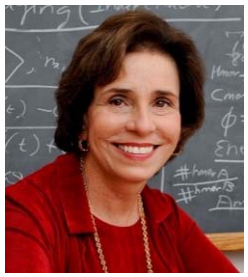
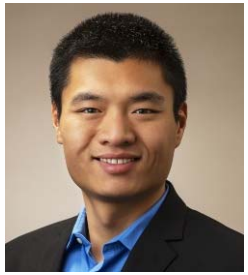
EFRI E3P: Massive microplastics remediation using novel microcleaners and microbiome processing accelerated by artificial intelligence



Carol Hall

Orlin Velev

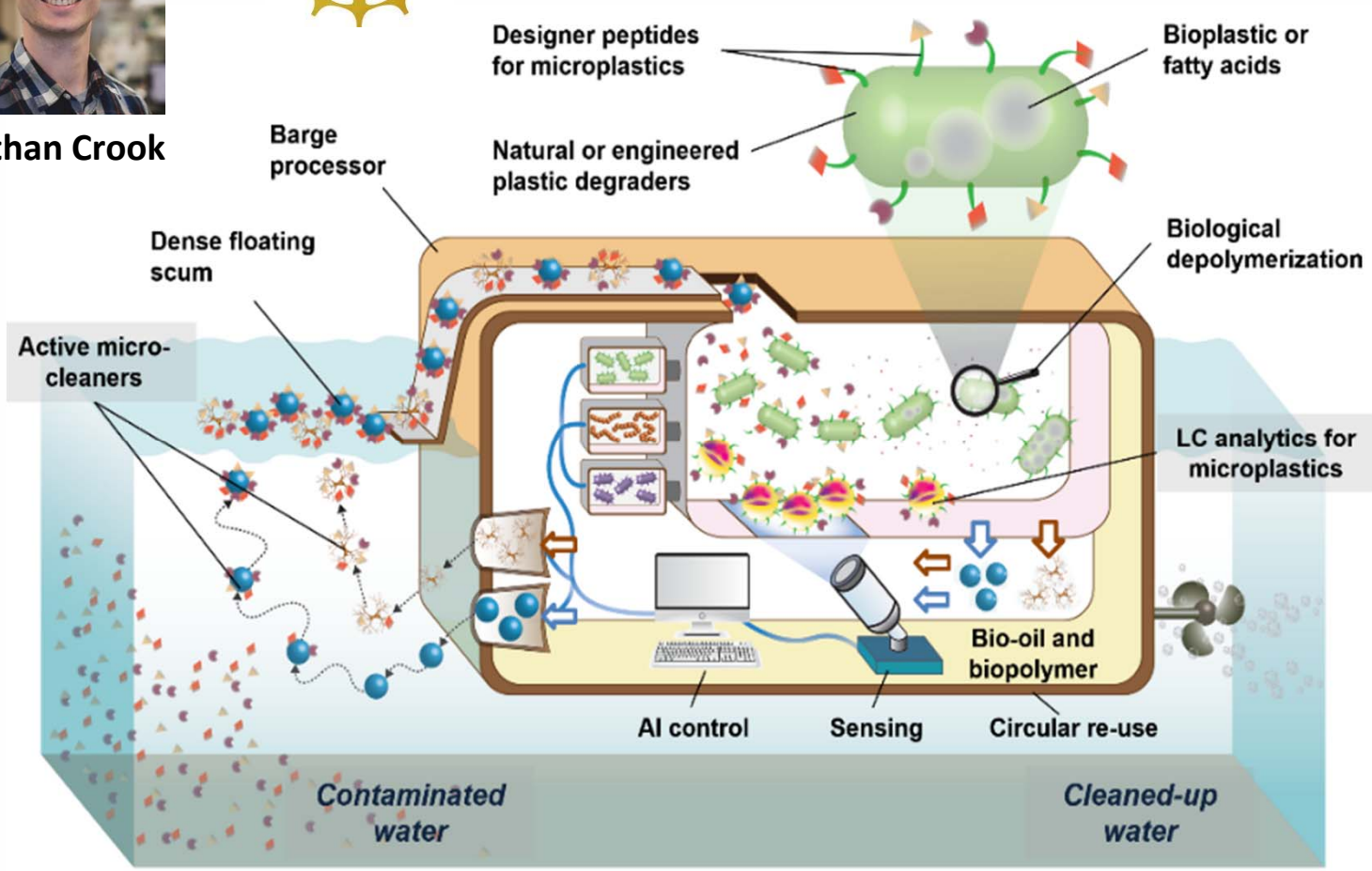
Nathan Crook



Fengqi You

Nicholas Abbott

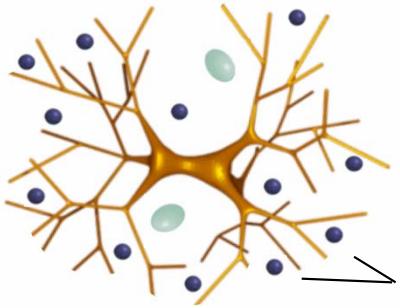
NSF EFMA 2029327



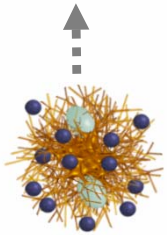
Issue must be tackled from multiple directions with expertise in various specialties

Seeking to solve an important problem for society: Microcleaners for capturing microplastics

Soft dendricolloid



Condense after bead capture



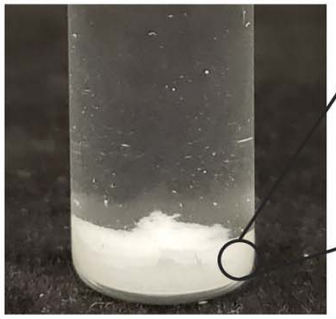
Float up for collection

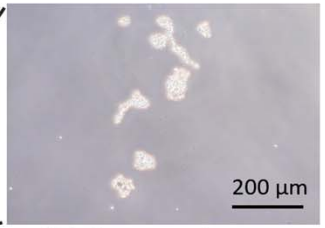
Microplastic capture by van der Waals forces

Preliminary data with SDCs from chitosan and PLA

Latex beads

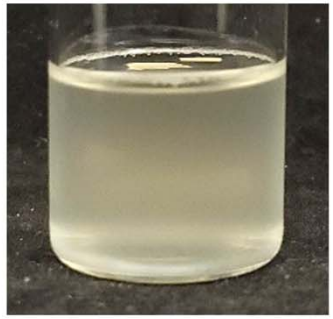
150 µg CS SDCs

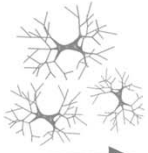




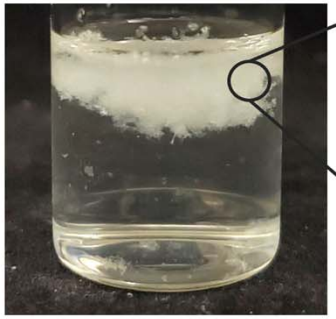
SDCs condense after bead capture

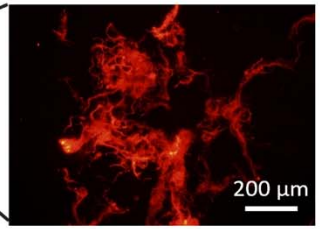
Oil droplets





5 mg PLA SDCs





Oil spreads over surface of SDC

- ✓ **Efficient collection and self-separation of microplastics and droplets**
- ✓ **We foresee a circular process if microcleaners made of biopolymer**

Goal: Active SDCs microcleaners as "mini-Roombas" of the sea