Characterizations performed in collaboration with G. Chen and T. Clare & J. Finlay.

Preventing Marine Fouling
- Marine fouling is an economic and environmental problem, and regulations on toxic organists paint a need for safer coatings.
- The diversity of fouling organisms and environmental conditions makes a universal solution a challenge.

Ambiguous surface chemistries show success against fouling
- SEBS Incorporate into layered Environment Protection O
- Molecular Fouling release Objective: Study the interplay between chemistry and spacing to improve design of new antifouling materials

Modular Coating Design
Molecular-scale control over amphiphilic functionalities
- Hydrophilic
- Hydrophobic-surface-active
- Sequence-defined side chain
- Hydrogen bond donors
- Hydrogen bond acceptors
- Chirality
- Peptide
- Peptoid
- Modular architecture for efficient and direct comparisons

1) Modify antifouling polymer to make surface-active copolymer
- P(DMA-VES) or VES Fouling release 

2) Incorporate into layered system for mechanical stability
- PS spheres prevent delamination between layers

Surface Characterization
- Sum Frequency Generation (SFG)1
- Captive Bubble Contact Angle
- Antifouling/Fouling Release Performance2

- Strongly hydrated
- Oily or fluorinated
- Fine spacing

Peptide vs. Peptide Fouling Behavior
- Analogous peptides and peptoids were compared by antifouling and fouling release behavior.

New peptoid side chains differ only in hydrogen bond donation
- Hydrogen bond donating
- No hydrogen bond donating

Fouling properties correlate with peptide/peptoid findings
- U. linza
- N. incerta

Peptide Hydrogen Bonding

- Hydrogen bonds induce water structuring, which reduces settlement, but also increase U. linza attachment strength.
- The non-H-bonding sample lacks strong water bonding, increasing U. linza settlement, but with weaker adhesion.

Future Directions: XPS in a Hydrated Atmosphere
- XPS shows elemental surface presentation in vacuum. Polymer restructuring makes it inaccurate for hydrated applications.

- CONVENTIONAL with Ethan Churnin, ALS beamline scientist
- EXPAND TO POLYMERS
- PROPOSED

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