**Project Title:** Self-Protecting Coatings

**Advisers:** Michael Odarczenko (AE graduate student) and Prof. Scott White

**Project Description:**

Coatings are often used to protect a substrate from corrosion or bacterial damage. However, the integrity of the coating can be compromised by impact or scratch damage exposing the underlying substrate to a corrosive environment. Current industry standards in corrosion protection include the addition of zinc in the coating. A self-protecting coating is an improved method to continually protect the substrate. The self-protecting coating automatically responds to damage by releasing protective chemicals into the damage zone. The release of protective chemicals is accomplished by dispersing microcapsules that contain the chemical throughout the coating. When the coating is damaged, the embedded microcapsules are ruptured and release their protective payload. One example self-healing coating is shown below. In this case, the embedded microcapsules contain a UV curable material and after the material is released into the damage zone, UV light or sunlight will cure the release core material thereby healing the coating damage. The main focus of this project will be to encapsulate a variety of protective agents (healing chemistries, anticorrosive chemicals, etc.) and assess their performance to inhibit corrosion.

![Image of self-healing coating](image)

Figure 1. (a) UV curable microcapsules are embedded in an epoxy coating and applied to a steel substrate. (b) Scratch damage to the coating releases the UV active core material. (c) Upon UV exposure, the released core material cures and continues to protect the substrate.

**Student background and expected research activities:**

We are looking for an individual with interest in material science and/or corrosion prevention and can manage their own time while working independently. Experience in experimental lab work is preferred but not required. The student will encapsulate protective agents and complete image analysis with optical and scanning electron microscope images.

**Points of contact:**

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