

# 機械工学セミナー

## Mechanical Engineering Seminar

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主催：慶應義塾大学工学部機械工学科  
Department of Mechanical Engineering, Keio University

日時(Date):

2018年12月17日(月) (December. 17, 2018 (Mon.)) 10:45~11:45

場所(Venue):

12-102

講演題目(Title)

### **Bioinspired Adhesion and Its Properties**

講演者(Speaker)

**Kollbe Ahn**, Assistant Professor

Department of Chemistry, University of Central Florida



Abstract:

Nature employs sophisticated control of structural properties at multiple length scales to obtain its unique adhesion properties. However, the translation of such structures has very often been missing in biomimetic adhesives, in turn, their performance is significantly limited as compared to biological adhesion, e.g., from mussels. Mussels have the amazing ability to adhere firmly to wet surfaces. They do so by sending out sticky filaments, known as byssus, which allow them to stay anchored to rocks in the midst of pounding waves. For years, researchers have been striving to replicate mussels' adhesive properties in a laboratory setting, with a major focus on the functional group known as catechols, which are abundant in byssus and are comprised of benzene rings presenting vicinal hydroxyl groups that interact strongly with mineral surfaces, for example, via hydrogen and coordination bondings in a bidentate fashion. In this seminar, Dr. Kollbe Ahn corrects the widespread misconception on bioinspired wet adhesion and argues that focus on a single molecular entity is too narrow and has hampered efforts to emulate biomimetic adhesion for applications ranging from dental and medical to industrial applications. He makes the case that the mussels' abilities rely on a host of other functional groups on proteins that work together to achieve strong and robust adhesion. He also introduces numerous recent advances that demonstrate a more holistic approach to biomimetic design, which may be key to future advances in the area of high-performance polymeric materials.