UNIVERSITY OF RHODE ISLAND
Department of Chemistry
SEMINAR

Room 105 Beaupre
3:00 P.M., Wednesday, Sept. 25, 2019

Prof. Severin T. Schneebeli

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Burlington, VT

"Biomimetic Synthesis of Macromolecules with Controlled Shapes and Sequences"

HOST

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Biomimetic Synthesis of Macromolecules with Controlled Shapes and Sequences

Inspired by nature, we are inventing new ways to create precision macromolecules with programmable shapes to enable selective supramolecular recognition, self-assembly, and catalysis. We create these structures with chirality-assisted synthesis (CAS, see: S. T. Schneebeli *et al. Angew. Chem. Int. Ed.* **2015**, *54*, 12772), which has emerged as a versatile method to control the shapes of π-conjugated macromolecules and supramolecular assemblies. With CAS, the sequence and chirality of the monomeric building blocks dictates the shape and functions of the resulting macromolecules in a programmable fashion. Supramolecular materials with special functions, e.g. the ability to encapsulate macrocycles in a manner analogous to how a wrench binds to a nut, can be created with CAS. Applications, challenges, and future directions of the growing CAS field will be discussed in the light of the unique shape-control abilities CAS has to offer. New enantioselective synthetic methodology required to access the building blocks for CAS will also be introduced. In particular, I will demonstrate how through-space control of electrophilic aromatic nitration reactions has recently led (see: S. T. Schneebeli *et al. Angew. Chem. Int. Ed.* **2019**, *58*, 1035) to the first enantioselective aromatic nitration reactions with the help of chiral auxiliaries. We are able to access new chiral materials with this bioinspired nitration approach, which are now being used as catalysts to build, replicate, and translate precision polymers.