

Aiiiso Yufeng Li Family Department of
Chemical and Nano Engineering

Department Seminar

Wednesday, March 11, 2026

11:00am – 12:00pm PT

SME 248



Dr. Yoan Simon, PhD

“Point Break(able): Seeing the waves and harnessing dynamic covalent bonds for adaptive materials”

Associate Professor

Biodesign Center for Sustainable Macromolecular Materials
and Manufacturing

School of Molecular Sciences (SMS)

Arizona State University

Abstract: Nature leverages non-covalent interactions and has perfected multiple reversible systems to accomplish complex functions such as repair, plasticity, or haptic perception. It is also able to construct and deconstruct molecules with a set of building blocks. Drawing inspiration from these abilities, we have created a series of polymeric materials that include weak links capable of reporting on mechanical activation and/or to achieve reprocessability. First, we will look into remoldable polymeric chains and networks. Specifically, we will focus on unravelling the governing principles of supramolecular interactions in zwitterionic systems and associative dynamic exchanges by modulating the chemistry of uncatalyzed exchanges in diketoenamines and diketoxime structures by utilizing orthogonal thiol-ene photopolymerization. Specifically, we will broach the topics of chemical exchange and chain dynamics and their overall impact on the rheological properties of the materials. Additionally, we will discuss our latest finding in mechanochemistry that could help transform our understanding of how shockwaves are dissipated in materials at high velocity. Time permitting, we will also discuss some of our findings with respect to network formation and characterization as well as shape transformation of complex architected molecules. We believe that these findings can have huge influence on understanding impact mitigation, transport properties, and reprocessability of such systems.

Bio: Yoan holds a Bachelor's and Master's degree from the Ecole Nationale Supérieure de Chimie de Montpellier. His first contact with research was in the labs of Prof. Bernard Boutevin where he worked on controlled radical polymerization. He started a Ph.D. in Polymer Science and Engineering from the University of Massachusetts, Amherst under the guidance of Prof. E. Bryan Coughlin working on hybrid organic/inorganic materials. In 2008, Yoan got an ETH Fellowship to work on two-dimensional polymers under the supervision of Prof. A. Dieter Schlüter at the Swiss Polytechnic Institute of Technology in Zürich. After a year, he took on a position as junior Faculty (maître-assistant) at the Adolphe Merkle Institute in Fribourg, Switzerland where he stayed for six years developing new research avenues in the field of optically and mechanically active polymeric materials in the Polymer Chemistry and Materials group led by Prof. Christoph Weder. In January 2016, Yoan joined the School of Polymer Science and Engineering at the University of Southern Mississippi as an Assistant Professor and was promoted to Associate Professor in August 2021. In January 2024, he became a faculty within SMS and SM3 at ASU.

Yoan's research was recognized at several stages in his career being the recipient of a Leonardo Da Vinci Fellowship, two Massachusetts Space Grant Consortium Grant, an ETH Fellowship. In 2015, Yoan was the Hans and Marlies Zimmer International Scholar at the University of Cincinnati and now holds the Southern Society for Coatings Technology Professorship in Polymer Science at Southern Miss and received an NSF CAREER award in 2020.

Seminar Host: Jon Pokorski