# Materials Chemistry Seminar

## Friday, March 22, 2024
## 11:30 a.m. ~ BRWN 4102

***"Large-Scale Synthesis of Poly(Vinyl Catechol-Styrene) and Its Uses for Emergency Maritime Maintenance"***



## Mikolaj Balawender

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**Bio:**

.Mikołaj is a second-year graduate student. He received his B.S. in Chemistry from Western Illinois University (WIU). While at WIU, he performed research in solid-state synthesis of costibite (CoSbS) and optics studies on samarium doped glasses under Dr. Brian Bellott and Dr. P.K. Babu, respectively. For the past 5 years Mikołaj has worked as an aerospace propulsion technician for the United States Air Force. Upon becoming a student at Purdue in the Fall of 2022, Mikołaj joined the Wilker lab where he researches new methods and applications for underwater adhesion.


## Abstract:

Mussels and other marine organisms produce adhesives that allow them to adhere to each other to form colonies for mutual protection against waves and predators. The presence of the catechol moiety in the amino acid 3,4-dihydroxyphenylalanine (DOPA), found in mussel foot proteins, is responsible for surface bonding of mussels and is an inspiration for biomimetic adhesives. In our lab, we have recently developed a method for synthesizing large quantities of one such adhesive, poly(vinylcatechol-styrene) or PCS up to a 60-gram scale using radical suspension polymerization and avoiding harsh reaction conditions. We have optimized an adhesive formulation containing PCS, methyl ethyl ketone, and hexanes. We have evaluated its performance using various testing methods, including a dead weight peel test. We are working to incorporate this polymer, which has shown promising adhesive properties underwater, into an easy-to-apply putty that can eventually replace the archaic methods used today to temporarily repair cracks and holes in ship hulls in emergency situations.


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