

# Chemical Engineering Thesis Defense

Engineering of *Corynebacterium glutamicum* for  
the secretion of lignin-modifying enzymes


School for Engineering of Matter, Transport and Energy

**Dylan Ellis**

Advisor: Dr. Arul Mozhy Varman

## Abstract

Lignin is a naturally abundant source of aromatic carbon but is largely underutilized in industry because it is difficult to decompose. Recent research activity has targeted the development of a biological platform for the conversion of lignin. *Corynebacterium glutamicum* is a standout candidate for the bacterial depolymerization and assimilation of lignin because of its performance as an industrial producer of amino acids, resistance to aromatic compounds in lignin, and low extracellular protease activity. Under the current study, nine experimental strains of *C. glutamicum* were engineered to overexpress and secrete lignin-modifying enzymes with the eventual goal of using lignin as raw feed for the sustainable production of valuable chemicals. Within the study, laccase and peroxidase expression was discovered to be inhibited within *C. glutamicum* culture media. Hypothesized reasons for this inhibitory effect are discussed here, but further work is needed to identify causative factors and realize the potential of *C. glutamicum* for waste biomass valorization.



March 28, 2022; 1 PM; ERC 490;

Zoom Link:

<https://asu.zoom.us/j/884298582452?pwd=dW5KOHlHlUWEsbTlRdnZBQlIdGWIjNzQ0OQ>