

**Synthetic Biology for Microbiome Engineering: Probiotic, Prebiotic,
and Antibiotic Approaches**

Prof. Thomas Mansell

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Iowa State University**

Faculty host: Carmen Gomes

Seminar on February 27, 2018 at 11:00 am in 2004 Black

Abstract

The importance of the makeup of microbial communities to human health is becoming clearer every day. As the links become clearer, the question that arises is "How can we control the makeup of these microbiomes to improve human health outcomes?" Our lab leverages advances in DNA synthesis, high-throughput sequencing, and synthetic biology techniques with the goal of shaping the populations of these communities. First, we have developed high-throughput screens to enable better production of human milk oligosaccharides, which favor the growth of bacteria that benefit the infant gut. Second, we engineer the genomes of probiotic bacteria such as *E. coli* Nissle and *Lactococcus lactis* to produce beneficial compounds such as butyrate and therapeutic proteins. Finally, we are studying ways to replicate quorum sensing of pathogens such as *Staphylococcus aureus* and *Clostridium difficile* in non-pathogenic hosts in hopes of using quorum sensing disruption as a potential non-lethal pathogen management strategy.

Tom Mansell earned B.S. and M.S.E. degrees in Chemical Engineering from Johns Hopkins University and a Ph.D. in Chemical & Biomolecular Engineering from Cornell University. He did postdoctoral training at the University of Colorado-Boulder. In August 2015, Tom began as an Assistant Professor at Iowa State University, hired under a Presidential High Impact Hires Initiative in Translational Health. He is also a member of the Iowa State Interdepartmental Microbiology Graduate Program and the Karen and Denny Vaughn Faculty Fellow in the CBE department. Tom's research interests are in protein engineering, glycobiology, synthetic biology, and genome engineering in bacteria for human health outcomes and biorenewable chemical production.

This seminar counts towards the ME 600 seminar requirement for Mechanical Engineering graduate students.

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