

**Research Seminar Series**

**University of Nebraska-Lincoln**

**Department of Chemical and Biomolecular Engineering**



Evolutionary Principles as an Engineering Design Paradigm

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3:30 p.m. – 4:30 p.m.

Othmer Hall, Room 106

*\*Refreshments provided*

**Abstract**

The principles of evolution represent the blueprint for a powerful dynamic force capable of giving rise to objects, entities, and even processes of extraordinary sophistication and complexity. If one can understand the basis on which evolution operates, the potential exists to harness this force. Such knowledge can provide us with a better understanding of the world around us. Additionally, one could use the insights gleaned to design and engineer items ranging from electronic devices to recombinant organisms. The potential for evolution to be applied in this way has been recognized and used computationally, in the form of evolutionary algorithms, and experimentally, such as with “directed evolution.” Our group has attempted to take advantage of evolutionary processes in a variety of ways. I will share a few of our efforts in this regard. I will discuss our use of genetic algorithms to carry out curation and fundamental analysis of genome-scale metabolic networks of various infectious agents, including *Mycoplasma gallisepticum* and *Bacillus anthracis*. I will also discuss how we have validated an antisense design scheme based on the assumption that naturally occurring antisense has evolved for optimal efficiency.