



Department of Chemical
and Biological Engineering
UNIVERSITY OF WISCONSIN-MADISON

2020 Fall CBE Seminar Series

presents:



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The Digital Revolution in Developing New Pharmaceutical Products

The impact of computer technology, the digitalization of information, and the super-acceleration of data highways has benefited mankind in forms difficult to imagine just 50 years ago. Travel and commerce (to name a few) have been disrupted by innovations in digital solutions, and arguably the leading companies are those who have adopted and successfully implemented disruption. The healthcare sector is not an exception to the rule, consumers today fulfill

their healthcare needs in a very different way than 50 years ago. a simple example in the US is the drive-thru pharmacy, where medication can be ordered online and picked up from the comfort of a car. Digitalization and computer technology however have had a much deeper impact in the availability and quality of pharmaceutical products. This talk will discuss examples where digitalization of information, computer technology and accelerated data-highways are changing the way new medicines are developed, through the impact of the Systems Engineering community.

About a decade ago the pharmaceutical engineering sector's attention was shifted from empiricism to the formal postulation of mathematical models. Chemical and mechanical engineers have worked to formalize mechanistic models for many of the unit operations found in pharma. These models are now used as a commodity in the development of the manufacturing process for a new product. Their use however is still siloed by discipline. Advances in computer technology have enabled the use of powerful optimization approaches to utilize a set of models simultaneously into making model-based decisions. It has also enabled the use of mathematical formalisms to directly utilize data acquired by convenient and fast, yet indirect, spectroscopic instruments and extract information driven by fundamental knowledge, rather than by empirical calibrations. Last but not least, machine learning and artificial intelligence are changing the mechanics of information consumption by a human, enabling the processing of hundreds of pages of text and providing natural language answers to information contained in such documents. These technologies together are elevating the thought process of the pharmaceutical field, empowering the faster generation of high-quality understanding. This results in better medicines being developed in shorter timelines for the patients we serve.

Tuesday, Sept. 8, 2020

Lecture at 4:00 p.m.

<https://uwmadison.zoom.us/j/91376473708>