



## CHEMICAL & BIOMOLECULAR ENGINEERING KEN NOBE FOUNDERS LECTURE



**Friday, May 25th, 2018 | 3:00PM**  
**Reception: 2:30 – 3:00 PM**

**Mong Learning Center**

Presented by:

**Gintaras Reklaitis**

Professor

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### **“Process Systems Engineering Contributions to Pharmaceuticals Development, Manufacture and Delivery”**

The pharmaceutical industry is a \$1 trillion business that has a global reach and an impact on every patient. While the annual expenditure for pharmaceuticals only constitutes some 10% of total US healthcare expenditures, this component has been receiving heightened attention both due to its immediate impact on healthcare budgets and patient pocketbooks and due to concerns about drug safety, quality and even availability. Process systems engineering (PSE) contributions in the pharmaceuticals domain have facilitated improvements in the design of processes for the production of the active ingredients, the design and development of formulated drug products and the robust operation of associated manufacturing processes. In recent years, the accelerating transition from batch to continuous manufacturing has driven changes in other components of the product life cycle, from process development to supply chain management. This openness to change has stimulated further innovations in manufacturing methods such as 3D- and drop-on-demand printing of dosage, production of film-based products, roll-to-roll printing, and scaled-down point of use manufacturing systems. An additional application area is to support clinical decisions and improve the care of patients through the individualized administration of medicine in real time or via regularly timed administration of specific dosage amounts. PSE modeling and optimization methodologies deployed in the form of automated closed loop or open-loop physician advisory systems can offer significant benefits to the patient, the clinician and the healthcare system. This bridging between the medicine and the clinical service provider offers further opportunities for PSE methodology in the healthcare services sector. In this presentation, we will show that process systems engineering approaches and tools can and are addressing these concerns. We will review a sampling of the developments and accomplishments in this domain while also highlighting some important research challenges and opportunities that need to be addressed going forward.

Gintaras.V. (Rex) Reklaitis is Burton and Kathryn Gedge Distinguished Professor of Chemical Engineering at Purdue University (USA). He has served as Head of the School of Chemical Engineering and deputy director of the NSF Engineering Research Center on Structured Organic Particulate Systems, among other appointments. His expertise lies in process systems engineering, the application of information and computing technologies to process and product design, process operations and supply chain management. Current research interests include applications of process systems methodology to improve pharmaceutical product design, development, manufacture and delivery. He was educated at the Illinois Institute of Technology (BS ChE), and received MS and PhD degrees from Stanford University. He is a member of the US National Academy of Engineering, fellow of AIChE, and past Editor-in-Chief of Computers & Chemical Engineering. Among the recognitions he has received are the Warren K Lewis and Van Antwerpen Awards of AIChE, the Pruitt Award (CCR), the Long Term Achievements in Computer Aided Process Engineering Award of the EFChE and the 2017 John M Prausnitz AIChE Institute Lecturer. He has served on the Board of Directors of AIChE, the Council for Chemical Research and the CACHE Corporation and continues to serve on the editorial boards of several journals. He has published over 280 papers and book chapters and edited/authored nine books.