Full Name : **Siripon Anantawaraskul**

Organization : **Kasetsart University**

Current Position : **Associate Professor**

Title of Presentation : **Application of AI and Machine Learning in Olefin Polymerization**

Presentation Abstract:

Chain microstructures of polyolefin (i.e., molecular weight distribution (MWD), chemical composition distribution (CCD), number and weight average molecular weight) produced at specific polymerization conditions can be calculated using the polymerization kinetic model, a large system of algebraic-differential equations. However, this kinetic model cannot be inversely solved to estimate polymerization conditions from desired microstructures.

In this presentation, two different approaches to address this problem are considered: (1) machine learning based models and (2) swarm intelligence based global optimization techniques. In the first approach, classical forward and inverse artificial neural network (ANN) and denoising autoencoder (DAE) models are developed. The second approach considers and compares four global optimization techniques: genetic algorithm, particle swarm, improved ant colony, and modified artificial bee colony. The estimation results and robustness of each approach will be discussed herein.