

## *Integration of Resilience and Optimization in Chemical Process Design*

Abstract: Despite many efforts by chemical engineers to improve the safety of the chemical industry, plants are still vulnerable to unexpected uncertain changes. Causes such as operation disturbance, extreme weather, and intentional human acts can result in process plant upsets and severe consequences. One way to respond to loss events is to include resilience in chemical process design. Because process resilience is a new research area, finding a good conceptual approach is the most important task at this phase. A new conceptual approach is to start with categorization of resilience aspects. For each category, a methodology will be developed to quantify the resiliency in terms of the characteristic variable for that category. Based on this quantification approach, a methodology is proposed for chemical engineers to include resilience considerations into process design.