



IFPRI BRIEF TEMPLATE

Check One: **Project** **Review** **Collaboration**
 Workshop **Other**

Descriptive Title	Dynamic Optimization and Control Theory for Continuous Particle Processes
Working Title¹	Particle Processing 4.0
Technical Area²	Systems Engineering
Date	26 th June 2019
Short Description	<p>Recent advances in solids processing flowsheet modeling enable dynamic simulation of multi-unit operation processes. We want to know how to use these in combination with classical chemical engineering control theory and modern AI/machine-learning methodologies.</p> <p>We want a methodology that we can reapply to our own process systems. Specifically, we want to understand how to get control of a continuous powder processing system, complete with a particle-formation step, a classification step, and a recycle.</p> <p>Learn to apply modern machine learning and artificial intelligence to particulate process control and flowsheet modeling; and to use flowsheet-based control to optimize a powder process.</p> <ul style="list-style-type: none"> • What measurement data are needed and what is the minimum instrumentation needed and where should it be placed? • What is the sensitivity of the process quality output to the control variables and the measurement errors and lags?
Objectives	Maximize process efficiency and output quality while being able to adjust for dynamically variable feeds.
Scope	Develop dynamic flowsheet model, apply control theory, develop & apply AI methodologies for tuning and continuous machine learning. Demonstrate on an experimental powder process that includes particle formation, classification, ad recycle. Give us clear rules and methods that we can apply to other systems.

Recommended Contractors (2 or 3)		
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Brent Young	U. of Auckland	b.young@auckland.ac.nz

¹ Title used in meeting agendas and file archives

² One or more from the following list: W = wet systems; D = dry systems; F = particle formation; SR = size reduction; M = modeling; SE = systems engineering

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