

## IFPRI Review Brief

### A Gap Analysis of Particulate Systems Modeling, Sensor Capability, and their Integration

The International Fine Particle Research Institute (IFPRI) wish to commission a critical review of the current capability in modeling and sensors for systems integration of particulate processes. IFPRI will use this review as a foundation for a future workshop on systems engineering and automation of particulate processes.

Rather than a conventional review, IFPRI would like a gap assessment and analysis. This should evaluate the state of the art and identify critical gaps in particulate systems modeling and sensors, including:

- Flowsheets used to integrate unit operations into systems, having mass and energy balances with distributed streams (particulate attributes) that are necessary to control desired product quality attributes.
- Mechanistic models of sensors (e.g. to account for systematic errors in PSD measurements of non-spherical particles by laser diffraction) that will allow better validation of models that are subsequently used for optimal design and operation.
- Additional models such as advanced process control (APC) models suitable to link many-to-many relations among process sensors, actuators, and desired product attributes.
- Sensor and measurement technologies for in-line, on-line, at-line, and inferential sensing of process streams, including distributed attributes.
- Opportunities to adapt sensor models for more efficient process control purposes.