IFPRI BRIEF TEMPLATE

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

Descriptive Title	Smart in-situ pressure sensor particles for process characterization.
Working Title[1]	Smart sensor particles
Technical Area[2]	Characterization
Date	6/25/2019
Short Description	Use of particles as measures of "real" in-line process conditions (e.g. Pressure, Stress, Force)
Objectives	• Identify range of measurable peak pressures, forces, stresses using a micronized smart particle probe • Review the science behind the use of persistent responses such as fluorescent emission (or X-ray/Raman/near-IR/other) under applied force/stress field • List examples of candidate particles and sizes • List detection methodology/science • State the challenges and future outlook Long range objective (beyond this review): Identify or make "smart" fine particles for experimentally evaluating a process? For example, these particles would be used to diagnose peak pressure in a tableting operation, an extruder, a granulator, a pump, a reactor.
Scope	Particles responsive to pressure and/or stress and/or force via emission of light, radiation, X-ray and/or other detectable signal. Particles finer than 100 microns are within scope. Piezochromic coatings are also within scope. Out of scope: Coarse photoelastic particles with reversible birefringence (IFPRI understands these well) Out of scope: Particle position tracking methods such as PEPT Out of scope: Analyses that require high power difficult-to-access resources (e.g. neutron scattering)

Recommended Contractors (2 or 3)		
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[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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