IFPRI PROJECT / REVIEW BRIEF TEMPLATE

1.0	(Working) Title	Bottom up approach to define reduced-complexity systems that represent the behaviour of real (simplified) colloidal formulations
1.1	Project or Review	Project
1.2	Technical Area[1]	Wet systems
2.0	Submitted by	John Hone, Scott Brown, Chandresh Malde, John Wight, Wilson Poon, Chris Rueb, Eric Furst
2.1	Member company/ies	JM, Syngenta, Aveka, Chemours, Corning
2.2	Idea creation date	26/6/18 (following Slurries & Suspension New Physics Workshop)
2.3	Last modification date	
3.0	Short goal description	There is a need to start to bridge the gap between academic systems (monodisperse HS) and highly complex industrial formulations. A fundamental challenge is to try to ascertain which properties of model systems (e.g. shape, aspect ratio, roughness, porosity, surface chemistry) need to be designed in order to reproduce the same behaviour in the real formulation. To make the problem more tractable, industrial formulations will be "simplified" by removing materials such as perfumes, anti-foams, that are believed to have no or minimal effect on the formulation behaviour.
3.1	Objectives	Work with the industrial supplier of the formulation to understand the detailed composition and function of the ingredients. Characterize the key features of the simplified industrial formulations (SIF), including rheology flow at low and high concentration and long-term structure evolution. Evolve existing "model" systems to incrementally include greater complexity so as to reproduce the SIF.
3.2	Scope	Three SIFs: 1) An aqueous dispersion of a crystalline organic compound with an anti-settling system, failing by long-term aging – gelation, serum formation, sedimentation.

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

		2) Aqueous talc (plate) suspensions with polymer – texturing, 3) Paint formulation, TiO_2, $CaCO_3$, latex, plus polymer – changes in opacity from particle aggregation.
4.0	Contractor(s) with contact information	Jan Vermant (ETH Zürich), jan.vermant@mat.ethz.ch Lilian Hsiao (NCSU), lilian_hsiao@ncsu.edu George Petekidis (U Crete / IESL), georgp@iesl.forth.gr
4.1	Comments / experiences	Arriving at Industrial consensus of simplified formulations of universal interest is hard to achieve. At the workshop there was some movement to a common ground. Initially 6 SIFs were identified, but this is likely to be beyond the reach of a 3 year project. Here we select 3, with the hope the second 3 might be studied at renewal.