



IFPRI BRIEF TEMPLATE

Check One: Project Review Collaboration
 Workshop Other

Descriptive Title	Particle Shape Determination, Description, and Exploitation
Working Title¹	Particle Shape Review
Technical Area²	Wet Systems, Dry Systems, Characterization
Date	June 14, 2022
Short Description	Review to cover what is new in Particle Shape
Objectives	Update on state of the art as we contemplate some projects.
Scope	New techniques for determining particle shape beyond optical microscopy for dry powders, suspensions, and colloids. New shape descriptors. Use of shape descriptors, e.g., for bulk properties, DEM Out of scope: optical microscopy, list of ISO 9276-2 shape parameters, use of equivalent diameters

Recommended Contractors (2 or 3)		
Name	Institution	Email Address
Lilian Hsiao	NCSU	
Bhasa Madivala	IIT, Madras	
Stefano Saccana	NYU	

Submitted By:	
Name	Organization
Paddy McGuire	Unilever
Jarrold Hart	Imerys
Poom Bunchatheeravate	Vertex
Tod Canty	Canty
Jeff Bodycomb	Horiba

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

Particle Shape Determination, Description, and Exploitation

We are soliciting a review to cover the following topics on particle shape.:

How to characterize shape and shape distribution in dry powders, suspensions, and colloids? How are these methods validated (if they are...)?

Imaging **beyond** basic optical microscopy to get to low contrast particles.

Small (<2 micron particles)

Other techniques such as combining Sedigraph (sedimentation) or BET surface area with diffraction measurements.

Comparison of new techniques with microscopy

How to describe it (usefully)?

What descriptors beyond those in ISO standards (e.g., ISO 9276-6) have proven useful?

What has happened since previous IFPRI review ([SAR12_29.PDF](#) (2003), [ARR53_02.pdf](#) (2006))?

What shape descriptors best inform DEM?

What shape descriptors are useful for wet system studies (e.g., particle-particle sliding)?

How do these alternative shape descriptors compare to current descriptors?

What reference materials are available or could be available for particle shape?

How do we use the information?

What are **useful** correlations between shape/particle properties such as bulk flow, suspension rheology, permeability? What work explores these correlations?