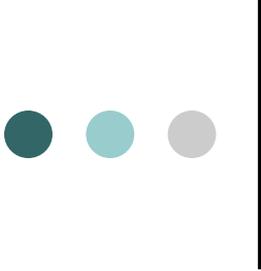


IFPRI VIRTUAL AGM 2020 SIZE REDUCTION AREA

Consultant's Review
Mojtaba Ghadiri

University of Leeds



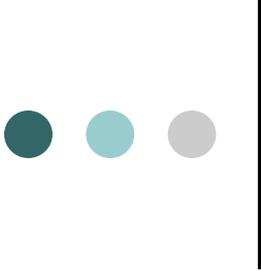
2019 Comminution Highlights

European Symposium on Comminution and Classification:



16th European Symposium
on Comminution &
Classification

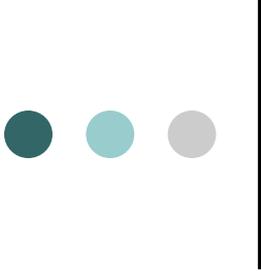




2019 Comminution Highlights ESCC2019

80 Contributions in two parallel session covering:

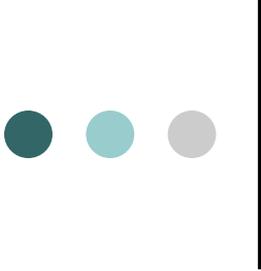
- **Fundamentals of size reduction**
- **Innovations in milling and classification**
- **Nanomilling**
- **Mechano-chemistry and solid state transformations**
- **Pharmaceuticals and foods**
- **Attrition and wear**
- **Modelling: mechanistic, population balance, DEM and coupling with CFD**



2019 Comminution Highlights ESCC2019

Book of abstracts has been archived at the following repository:

- <http://eprints.whiterose.ac.uk/150219/>
- Work is in progress publishing a special issue of Powder Technology based on the ESCC2019 contributions
- Next ESCC will be in Toulouse, hosted by Profs Christine Frances and Alain Chamayou



2019 Comminution Highlights

ESCC2019 Plenary and Keynote Talks



Prof. Arno Kwade

Technical University of Brunswick

Production, tailoring, formulation of nano and micro sized particles and their use for the design of structured products like battery electrodes, pharmaceutical active ingredients and nano-composites.



Dr Michael Juhnke

Novartis Pharma AG, Basel

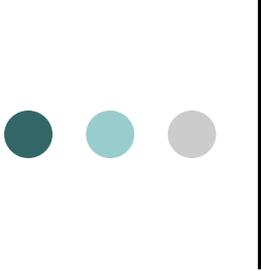
Process development of engineered drug particles for oral, parenteral and respiratory applications from pre-clinical to production scale.



Prof. Malcolm Powell

University of Queensland

Milling of minerals, linking fundamental research into applied outputs in liner design, SAG mill modelling and control, the unified comminution model (UCM), ore characterisation, flexible circuits and application of novel processes to reducing the environmental impact of mining.



2019 Comminution Highlights

ESCC2019 Plenary and Keynote Talks



Prof. Aubrey Mainza

University of Cape Town

Comminution and classification, using DEM and CFD and PEPT as tools in his modelling methods.



Dr Lian Liu

University of Surrey

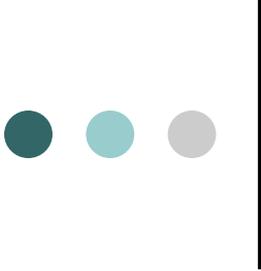
Comminution, granulation. powder flow and compaction



Dr.-Ing. Steffen Sander

Hosokawa Alpine

Powder and particle processing business with a strong focus on size reduction and classification



2019 Comminution Highlights

ESCC2019 Plenary and Keynote Talks



Prof. Wolfgang Peukert

University of Erlangen-Nuremberg

Formulation of functional particle systems, involving milling, classification and characterisation with a unifying approach in the design of particulate products using modelling and optimization strategies, and covering both dry and wet systems.



Prof. Marcelo Luis Tavares

Federal University of Rio de Janeiro

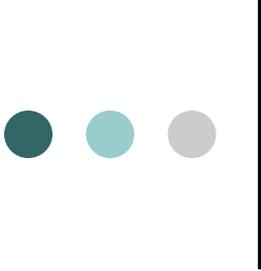
Milling research is focussed on Mineral Processing, working mainly in the topics of modelling and simulation of comminution and mineral concentration processes and fundamentals of particle breakage.



Prof. Jerry Heng

Imperial College London

Research is focussed on control of nucleation and crystallisation of organic solids (polymorphism), the role of surface properties in processability and manufacturability of powders, with emphasis on surface energy distributions.



Some of the Rising Stars in Size Reduction and Classification to Follow



Prof. Sergiy Antonyk

TU Kaiserslautern

Particle Technology, with a focus on fundamentals of breakage, granulation and coating using modelling and simulation by DEM



A/Prof. Ecevit Bilgili

New Jersey Institute of Technology

Particle Technology, modelling and simulation of milling by PBM, drying



Prof. Thomas Mütze

University of Freiberg

Milling, grinding and flow of bulk solids



A/Prof. Mohsen Yahyaei

University of Queensland

Modelling, optimisation, and control of comminution circuits

2019 Comminution Highlights

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International Fine Particle Research Institute

Silver Sponsors



ROCKY

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a micromeritics company

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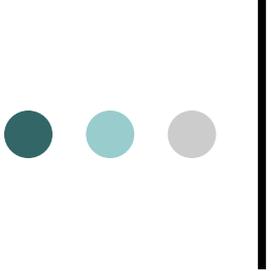


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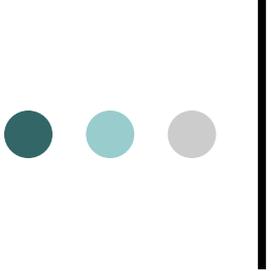


Recently Concluded Projects:

1. Grindability testing: modelling (**Ooi's work**)
2. Review of dry/wet grinding and processing aids (**Kwade's report**), now led to a full project

Comments:

- Addition of grinding aids: mass basis or surface area basis? This necessitates a study of the effect of particle size using the same material
- How to decouple the role of grinding aid from flow aid?



Plan for 2021 and Beyond

Two unfunded proposals:

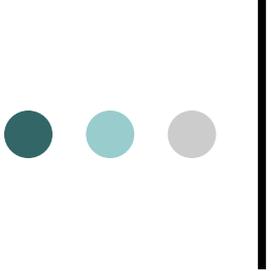
- Molecular modelling of mechanical properties and fracture
- Stress-induced transformations due to milling

Past Review Proposals for Fresh Consideration:

- Milling of soft matter
- Milling of multicomponent materials/ comilling
- Engineering scaling of mills

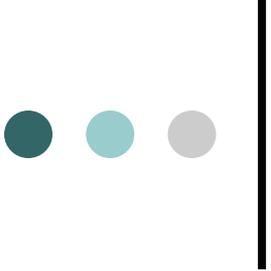
Workshop: **Not supported last year!**

- Challenges and trends in comminution & classification



What is Ongoing on Milling at Leeds?

- Modelling of spiral jet mills (AZ)
- Grindability inferred from breakability testing using Scirocco and G3 dispersers of Malvern Pananalytical
- Attrition in CLC systems (TOTAL & IFPEN)
- For more information:
<https://ghadiri-group.leeds.ac.uk/>



Related Activities at Leeds

- Virtual Formulation Laboratory (EPSRC)
PI:Csaba Sinka, Leicester, Leeds, ICL, Greenwich
- Centre for Manufacturability Design (AZ, Syngenta, UCB
Pharma, Merck)
Ali Hassanpour & John Blacker
- Centre of Doctoral Training for Complex Particulate
Products and Processes (EPSRC)
Kevin Roberts & Frans Muller
- New CDT Centre: From Molecules to Product (EPSRC)
Elaine Martin