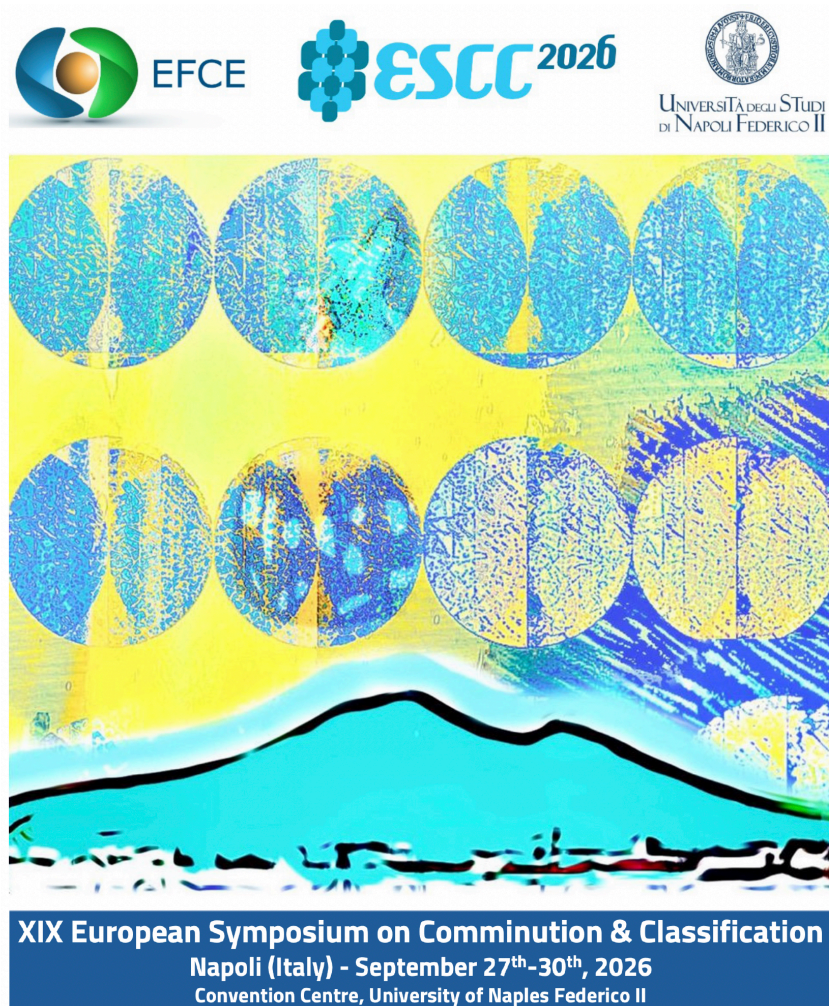
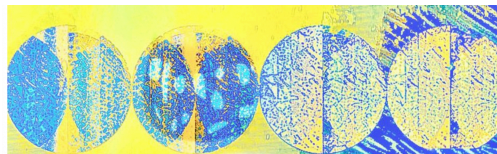




CONFERENCE PROGRAMME & INFO

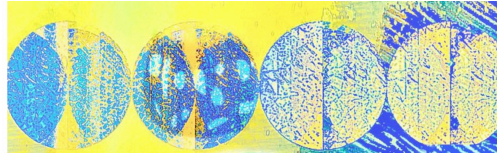


GOLD SPONSOR & EXHIBITOR



XIX European Symposium on Comminution & Classification
Napoli (Italy) - September 27th-30th, 2026
Convention Centre, University of Naples Federico II



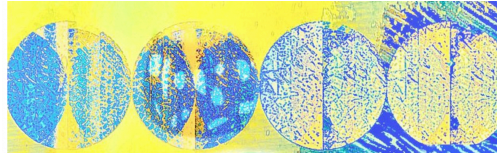


SILVER SPONSOR



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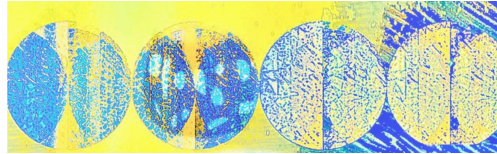


BRONZE SPONSOR & EXHIBITOR



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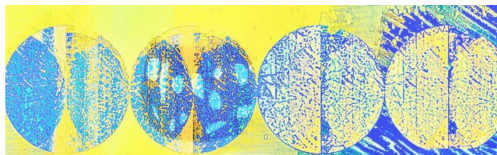


EXHIBITOR



XIX European Symposium on Comminution & Classification
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UNDER THE PATRONAGE OF:

University of Naples Federico II – Department of Chemical Sciences

University of Naples Federico II – Department of Chemical, Materials and Industrial Production Engineering

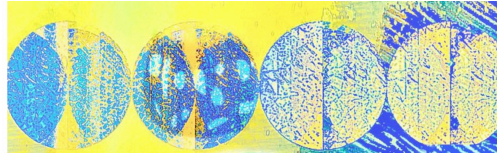
National Research Council – Institute of Sciences and Technologies for Sustainable Energy and Mobility

GRICU Italian University Chemical Engineering Group



XIX European Symposium on Comminution & Classification
Napoli (Italy) - September 27th-30th, 2026
Convention Centre, University of Naples Federico II





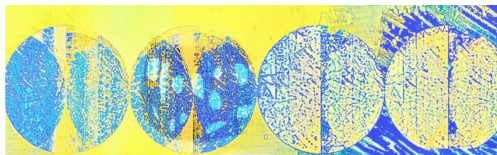
UNDER THE PATRONAGE OF THE CITY OF NAPLES



COMUNE DI NAPOLI

XIX European Symposium on Comminution & Classification
Napoli (Italy) - September 27th-30th, 2026
Convention Centre, University of Naples Federico II





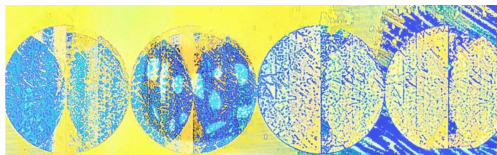
AN EVENT BY:

European Federation of Chemical Engineering



XIX European Symposium on Comminution & Classification
Napoli (Italy) - September 27th-30th, 2026
Convention Centre, University of Naples Federico II





A CONFERENCE ORGANISED BY:

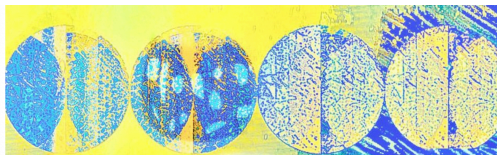
AIDIC, The Italian Association of Chemical Engineering



esc2026@aidic.it
www.aidic.it/esc2026

XIX European Symposium on Comminution & Classification
Napoli (Italy) - September 27th-30th, 2026
Convention Centre, University of Naples Federico II





WELCOME

The Conference, the 19th in a series started in 1962, is organised on behalf of the Working Party on Comminution and Classification, European Federation of Chemical Engineering (EFCE), welcoming scientific and technological contributions on traditional and innovative aspects as indicated in the list of topics.

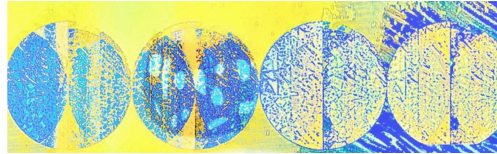


On behalf of the Organising Committees,
welcome to Napoli at XIX EFCE ESCC Conference ☺

Prof. Fabio Montagnaro, *Conference Chair*

XIX European Symposium on Comminution & Classification
Napoli (Italy) - September 27th-30th, 2026
Convention Centre, University of Naples Federico II



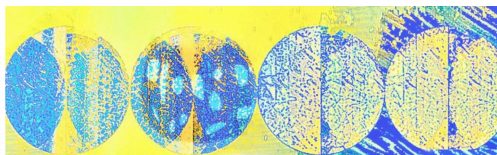


The Symposium will be held at the [Convention Centre of the University of Naples Federico II \(via Partenope 36\)](#). The building is located in a magnificent position on the city seafront, in a pedestrian area and close to many hotels for your stay. The Convention Centre, in the vicinity of which are located some of the main sites of artistic and landscape interest, is also connected, by public transport, to the historic center of the city (approximately 2.5 km away).



XIX European Symposium on Communitation & Classification
Napoli (Italy) - September 27th-30th, 2026
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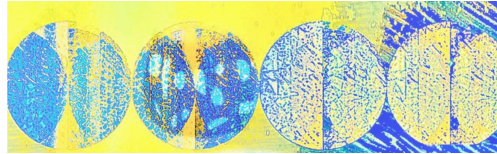


Naples hosts one of the oldest state University in the world: the present [University of Naples Federico II](#) was founded by the Emperor Frederick II in 1224, and today counts approx. 72000 students, 4000 teaching staff, articulated in 26 Departments covering all the aspects of knowledge.



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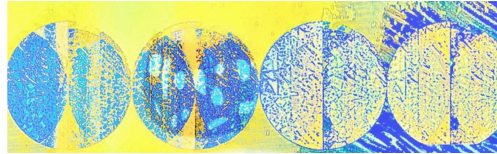
Describing the city of Naples in a few lines is a "mission impossible". Therefore, limiting to some basic information, we welcome you to the main city of the Campania Region, and one of the main Italian cities. The foundation of Naples dates back to the 8th century BC, with the name of Partenope (a Greek mermaid). With the name Neapolis ("new city") as a relevant Magna Graecia city, it was Roman, then Byzantine; starting from the 13th century, it was the capital of the Kingdom of Naples/of the Two Sicilies, until the Unification of Italy (year 1861).

From 1995, its historic center is a UNESCO World Heritage Site. The city bears witness, thanks also to the continuous exchanges due to its unique position on the sea, to its multi-millenary history with contributions of the highest level in the fields of human and technological sciences, music, figurative arts, culinary art, just to name a few examples.



XIX European Symposium on Comminution & Classification
Napoli (Italy) - September 27th-30th, 2026
Convention Centre, University of Naples Federico II





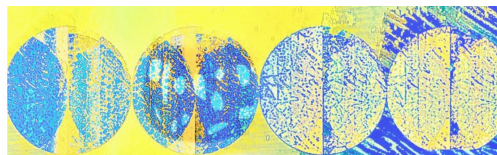
A classical destination for tourism, in recent years Naples has seen its attractiveness increase significantly, also thanks to the famous and iconic destinations in its surroundings (just to list a few: archaeological park of Pompeii, Sorrento and Amalfi coast, islands of Capri and Ischia). Countless is the list of the places to visit and things to do (museums, outdoor places, excursions, cuisine, and much more); we leave to you all the pleasure of discovering the part of the city closest to your tastes.

Welcome to Napoli!



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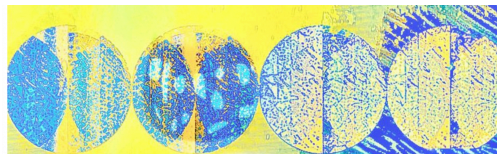


THE EFCE ESCC SERIES

	Year	Location	Country	
1 st	1962	Frankfurt am Main	Germany	
2 nd	1966	Amsterdam	Netherlands	
3 rd	1971	Cannes	France	
4 th	1975	Nuremberg	Germany	
5 th	1980	Amsterdam	Netherlands	
6 th	1986	Nuremberg	Germany	
7 th	1990	Ljubljana	Slovenia (Yugoslavia)	
8 th	1994	Stockholm	Sweden	
9 th	1998	Albi	France	
10 th	2002	Heidelberg	Germany	
11 th	2006	Budapest	Hungary	
12 th	2009	Espoo	Finland	
13 th	2013	Braunschweig	Germany	
14 th	2015	Göteborg	Sweden	
15 th	2017	İzmir	Turkey	
16 th	2019	Leeds	United Kingdom	
17 th	2022	Toulouse	France	
18 th	2024	Miskolc	Hungary	

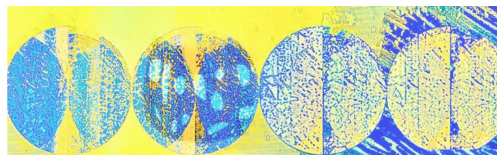
XIX European Symposium on Comminution & Classification
Napoli (Italy) - September 27th-30th, 2026
 Convention Centre, University of Naples Federico II





EXECUTIVE ORGANISING COMMITTEE

Baláž	Peter	Slovak Academy of Sciences, Slovakia
Breitung-Faes	Sandra	Technical University of Nuremberg, Germany
Čelko	Ladislav	Brno University of Technology, Czech Republic
Chamayou	Alain	École des Mines d'Albi, France
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Montagnaro	Fabio	University of Naples Federico II, Italy



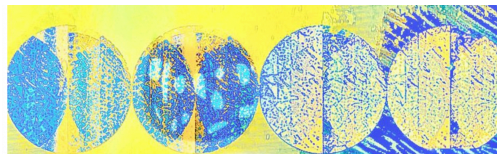
INTERNATIONAL SCIENTIFIC COMMITTEE

It is composed by the E.O.C. plus the following members:

Benassi	Andrea	Chiesi Farmaceutici S.p.A., Italy
Cravotto	Giancarlo	University of Turin, Italy
Mainza	Aubrey	University of Cape Town, South Africa
Mayer-Laigle	Claire	INRAE, France
Peukert	Wolfgang	Friedrich-Alexander-University Erlangen-Nuernberg, Germany
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Scala	Fabrizio	University of Naples Federico II, Italy
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Williams	Orla	University of Nottingham, United Kingdom
Yahyaei	Mohsen	University of Queensland, Australia

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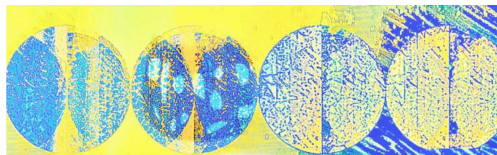


ORGANISING COMMITTEE

Conference Chair	Fabio Montagnaro	University of Naples Federico II
Coordinating Members	Marco Balsamo	University of Naples Federico II
	Roberto Solimene	National Research Council (STEMS-CNR)
Members	Antonio Coppola	National Research Council (STEMS-CNR)
	Francesca Di Lauro	University of Naples Federico II
	Fatima Hassan	University of Naples Federico II
	Giusy Marotta	University of Naples Federico II
	Fiorella Massa	National Research Council (STEMS-CNR)
	Stefano Padula	National Research Council (STEMS-CNR)
	Claudio Tregambi	University of Sannio of Benevento
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XIX European Symposium on Comminution & Classification
Napoli (Italy) - September 27th-30th, 2026
 Convention Centre, University of Naples Federico II



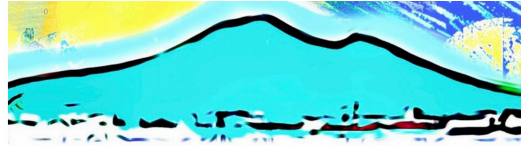


CONFERENCE TOPICS

- I. Fundamentals of particle breakage.
- II. Particulate characterisation.
- III. Mechanisms of grinding, dispersing and classification.
- IV. Modelling of comminution and classification processes.
- V. Wear, erosion, contamination.
- VI. Technological application fields of comminution and classification such as: chemical engineering operations and reactors, recycling industry and waste processing, environmental applications and renewable energy, mining, food, pharma, battery industry.
- VII. Mechanochemical and mechanofusion processes, bulk and surface mechanical transformations, mechanical alloying.
- VIII. Plant operation, control and energy optimisation in milling and classification processes.
- IX. Innovative materials for comminution and classification.
- X. Powders flowability and floodability in milling operations, grinding aids.
- XI. Cell disintegration and recovery of high added-value products.
- XII. Application of machine learning, automation and artificial intelligence to comminution and classification processes.

XIX European Symposium on Comminution & Classification
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Convention Centre, University of Naples Federico II





XIX European Symposium on Comminution & Classification
September 27th–30th, 2026
Convention Centre, University of Naples Federico II, Italy

Venue - Address: via Partenope 36, Napoli

Sky Room (Auditorium) on 1st floor; *Sea Room* on ground floor; Coffee Break, Lunch, Poster and Sponsor & Exhibitor Rooms on 1st floor.
Oral presentations: 15 min + 5 min (Q&A). Keynote Lectures: 25 min + 5 min (Q&A). Plenary Lectures: 40 min + 5 min (Q&A).



SYNOPTIC PROGRAMME

Sunday 27 th September	Monday 28 th September	Tuesday 29 th September	Wednesday 30 th September
	08:00-09:00 Registration	08:00-09:00 Registration	08:00-09:00 Registration
	09:00-09:30 Welcome & Opening	09:00-09:45 Plenary Lecture	09:00-09:45 Plenary Lecture
	09:30-10:15 Plenary Lecture	09:45-10:30 Coffee Break & Poster	09:45-10:30 Coffee Break & Poster
	10:15-10:50 Coffee Break & Poster	10:30-11:00 Keynote Lecture	10:30-11:00 Keynote Lecture
	10:50-11:20 Keynote Lecture	11:10-12:30 Parallel Sessions	11:10-12:30 Parallel Sessions
	11:30-12:30 Parallel Sessions	12:30-13:40 Lunch	12:30-12:40 Closing & Farewell
	12:30-13:40 Lunch	13:40-14:10 Keynote Lecture	12:40-13:40 Lunch
	13:40-14:10 Keynote Lecture	14:20-15:20 Parallel Sessions	
	14:20-15:40 Parallel Sessions	15:20-16:00 Coffee Break & Poster	
	15:40-16:20 Coffee Break & Poster	16:00-16:30 Keynote Lecture	
	16:20-17:20 Parallel Sessions	16:40-17:40 Parallel Sessions	
17:00-19:00 Registration & Light Refreshment	19:30 Welcome Reception	20:00 Conference Gala Dinner	

Sky Room (Auditorium) on 1st floor; Sea Room on ground floor; Coffee Break, Lunch, Poster and Sponsor & Exhibitor Rooms on 1st floor.
 Oral presentations: 15 min + 5 min (Q&A). Keynote Lectures: 25 min + 5 min (Q&A). Plenary Lectures: 40 min + 5 min (Q&A).



CONFERENCE PROGRAMME

Sunday 27th September

17:00-19:00	Registration & Light Refreshment
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Sky Room (Auditorium) on 1st floor; *Sea Room* on ground floor; Coffee Break, Lunch, Poster and Sponsor & Exhibitor Rooms on 1st floor.
Oral presentations: 15 min + 5 min (Q&A). Keynote Lectures: 25 min + 5 min (Q&A). Plenary Lectures: 40 min + 5 min (Q&A).



Monday 28th September

08:00-09:00	Registration	
09:00-09:30	Welcome & Opening (Sky Room) Fabio Montagnaro, <i>Conference Chair</i> Arno Kwade, <i>European Federation of Chemical Engineering, Working Party on Comminution and Classification, Chair</i> Spokeperson TBD, <i>University of Naples Federico II</i> Spokeperson TBD, <i>City of Naples</i>	
09:30-10:15	Plenary Lecture (Sky Room) SUSTAINABILITY IN COMMINTION - FROM MAXIMUM ENERGY EFFICIENCY TO CIRCULAR ECONOMY Arno Kwade (Braunschweig University of Technology, Germany) Chairperson: Mojtaba Ghadiri	
10:15-10:50	Coffee Break & Poster	
10:50-11:20	Keynote Lecture (Sky Room) MILLING OF PHARMACEUTICAL ACTIVE INGREDIENTS FOR ORALLY INHALED DRUG PRODUCTS Andrea Benassi (Chiesi Farmaceutici R&D, Italy) Chairperson: Holger Lieberwirth	
	SESSION 1.A (Sea Room) PARTICLE CHARACTERISATION Chairperson: TBD	SESSION 1.B (Sky Room) COMMINTION MECHANISMS Chairperson: TBD
11:30-11:50	On the measurement of the work-hardening effects of mechanical grinding (P. Scardi, M. D’Incau)	Impact of grinding processes on the microstructure and porosity of wheat bran (S. Srghir, F. Chauveau, C. Rondeau-Mouro, C. Deborde, M. Lahaye, X. Falourd, C. Mayer, R. Barbar)
11:50-12:10	Automation of the sieving technique for online particle size analysis within a milling circuit (T.T. Chautsane, T. Phadi-Shivambu, E. Boje)	Mutual interactions in multi-component commintion with stirred media mills: effects on breakage rate and particle transport (M. Tobaben, A. Kwade)

Sky Room (Auditorium) on 1st floor; *Sea Room* on ground floor; Coffee Break, Lunch, Poster and Sponsor & Exhibitor Rooms on 1st floor.
 Oral presentations: 15 min + 5 min (Q&A). Keynote Lectures: 25 min + 5 min (Q&A). Plenary Lectures: 40 min + 5 min (Q&A).



12:10-12:30	Laboratory-scale assessment of shear and impact attrition of carbamazepine dihydrate crystals during agitated filter bed drying (W.P. Goh, M. Ghadiri)	CO ₂ capture performance and particle comminution behavior of Brazilian dolomite in a lab-scale dual interconnected fluidized bed for calcium looping application under simulated natural gas combustion (F. Massa, R.C. Toledo, F. Scala, F. Montagnaro, J.A. de Carvalho, I. Ávila, A. Coppola)
12:30-13:40	Lunch	
13:40-14:10	Keynote Lecture (Sky Room) THE DARK ART OF MILLING: OPTIMISING THE MILLING OF LOW CARBON FUELS FOR ENERGY APPLICATIONS Orla Williams (University of Nottingham, UK) Chairperson: Maurizio Troiano	
	SESSION 1.C (Sea Room) BREAKAGE FUNDAMENTALS & MODELLING Chairperson: Claire Mayer-Laigle	SESSION 1.D (Sky Room) APPLICATION-DRIVEN PARTICLE PROCESSING Chairperson: Mohsen Yahyaei
14:20-14:40	Rethinking breakage for mineral recovery (M.S. Powell)	Size reduction, classification, spheronization, and recycling of electrode active raw and recycling materials (D.C. Karhoff, F. Mertens, M. Giersemehl)
14:40-15:00	Breakage behavior of a layer of corn kernels under uniaxial compression (W. Kruszelnicka, A. Tomporowski, K. Ambrose)	Thermochemical storage of solar energy via fluidised bed calcium looping – relationship between sorbent properties and process performances under variable operating conditions (G. Marotta, S. Li, C. Tregambi, F. Di Lauro, M. Balsamo, F. Montagnaro, M. Järvinen, P. Salatino, R. Solimene)
15:00-15:20	In situ characterization of deformation and fracture mechanisms in bi-component agglomerates using μ CT-based digital volume correlation and spatial statistics (Y. Sinnwell, V. Schäfer, K. Nikolaus, S. Antonyuk)	Development of an axial gap rotary shear for the sampling of sorted food waste sub-category (A. Rácz, J. Faitli)

Sky Room (Auditorium) on 1st floor; *Sea Room* on ground floor; Coffee Break, Lunch, Poster and Sponsor & Exhibitor Rooms on 1st floor.
 Oral presentations: 15 min + 5 min (Q&A). Keynote Lectures: 25 min + 5 min (Q&A). Plenary Lectures: 40 min + 5 min (Q&A).



15:20-15:40	From breakage initiation to fragmentation: structure-dependent breakage and modeling of multicomponent synthetic lithium slags (S. Bahnmüller, A. Kwade, C. Schilde)	Modification of magnesium-aluminate spinel powder for thermal spray applications (L. Čelko, V. Bednaříková, M. Micháľková, S. Tkachenko, J. Petruš, J. Kraxner, M. Remešová, A. Pakseresht)
15:40-16:20	Coffee Break & Poster	
	SESSION 1.E (Sea Room) MECHANOCHEMICAL PROCESSES <i>Chairperson: Maria Rosaria Acocella</i>	SESSION 1.F (Sky Room) MILLS & CIRCUITS <i>Chairperson: Steffen Sander</i>
16:20-16:40	Mechanochemical clay activation: energy demand, stressing mechanics, and implications for industrial scalability (A.C. Brandt, M. Stolz)	Improving comminution circuit performance in an iron processing plant: no-capital-investment approach (S. Zare, M. Yahyaei)
16:40-17:00	Stress-based modelling of mechanochemical reaction kinetics (V.M. Oldhues, S. Breitung, A. Kwade)	A comparison between lab scale and pilot scale ball mill for the grinding of wet switchgrass (M. Thouret, K. Lampoh, M.G. Soriano, J.Y. Delenne, C. Mayer-Laigle)
17:00-17:20	Role of milling stress in the mechanochemical activation of clay (T. Sulaiman, A. Kwade)	Roller press applications along the value chain of iron (F. Heinicke)
17:30-18:30	Meeting of the members of the EFCE Working Party on Comminution and Classification	
19:30	Welcome Reception ("Informal banquet" in Underground Naples) Agorà Morelli, via Domenico Morelli 61/A	

Sky Room (Auditorium) on 1st floor; *Sea Room* on ground floor; Coffee Break, Lunch, Poster and Sponsor & Exhibitor Rooms on 1st floor.
Oral presentations: 15 min + 5 min (Q&A). Keynote Lectures: 25 min + 5 min (Q&A). Plenary Lectures: 40 min + 5 min (Q&A).



Tuesday 29th September

08:00-09:00	Registration	
09:00-09:45	Plenary Lecture (Sky Room) MECHANOCHEMICAL AND CAVITATION METHODS IN THE CONVERSION OF AGRO-INDUSTRIAL WASTE TO VALUABLE PRODUCTS, MATERIALS AND ENERGY Giancarlo Cravotto (University of Turin, Italy) Chairperson: Ladislav Čelko	
09:45-10:30	Coffee Break & Poster	
10:30-11:00	Keynote Lecture (Sky Room) GREEN CRUSHING? THE POTENTIAL OF MECHANICAL PATHWAYS TO ENGINEER POWDERS FROM LIGNOCELLULOSIC BIOMASS FOR ENERGY, MATERIALS AND GREEN CHEMISTRY Claire Mayer-Laigle (National Research Institute for Agriculture, Food and Environment (INRAE), Montpellier, France) Chairperson: Antonio Coppola	
	SESSION 2.A (Sea Room) MECHANICAL BEHAVIOUR Chairperson: Weronika Kruszelnicka	SESSION 2.B (Sky Room) SIMULATION & MODELLING Chairperson: TBD
11:10-11:30	Influence of microstructure on slag breakage behavior (T.T. Vo, U.A. Peuker)	Modelling wet-operated stirred media mills with population balances based on mechanistic models (A.C. Brandt, C. Schilde, A. Kwade)
11:30-11:50	Mechano-grinding of platinum slags using stirred mills – key things to consider (L. Ponto, S. Bremner, A. Mainza)	Validating the improved energy transfer model in stirred media mills with different ores (A. Wuschke, M. Tobaben, I. Gurnett, A. Kwade)
11:50-12:10	DEM simulation of the compaction behaviour of lactose powder combined with μ CT analysis (A. Lier, Y. Sinnwell, K. Nikolaus, S. Antonyuk)	Investigation of composition dependent breakage in high pressure grinding rolls (HPGR) using a novel breakage model in discrete element method (DEM) simulations (P. Hirschberger, H. Kruggel-Emden)

Sky Room (Auditorium) on 1st floor; *Sea Room* on ground floor; Coffee Break, Lunch, Poster and Sponsor & Exhibitor Rooms on 1st floor.
Oral presentations: 15 min + 5 min (Q&A). Keynote Lectures: 25 min + 5 min (Q&A). Plenary Lectures: 40 min + 5 min (Q&A).



12:10-12:30	Wet grinding of thermoplastics (J. Schmidt, F. Tischer, W. Peukert)	Simulation of classification in a gravitational inertial air classifier using a fast CFD-DPM approach method (H.A. Petit, E. Guimaraes, L.M. Tavares)
12:30-13:40	Lunch	
13:40-14:10	Keynote Lecture (Sky Room) WHEN COMMINUTION AND CLASSIFICATION CIRCUITS START TALKING: COMMUNICATIVE PROCESS AUTOMATION AND THE FUTURE OF AUTONOMY Mohsen Yahyaei (The University of Queensland, Australia) Chairperson: Sandra Breitung-Faes	
	SESSION 2.C (Sea Room) AI & DIGITALISATION Chairperson: Aubrey Mainza	SESSION 2.D (Sky Room) PARTICLE & SEPARATION TECHNOLOGY Chairperson: Orla Williams
14:20-14:40	AI-driven surrogate modelling of wet stirred media mills (Y.S. Tanneru, C. Thon, C. Schilde, A. Kwade)	Different top-down approaches to two-dimensional nanoparticles with plate-like geometry (C. Damm, P.C. Lopez, J. Walter, B. Winzer, M. Moß, W. Peukert)
14:40-15:00	Artificial intelligence in comminution: from predictive models to agentic discovery (C. Thon, S. Hosseinihashemi, T. Xu, C. Schilde)	A digital ecosystem for environmental benchmarking and decision support in aggregate production (G. Asbjörnsson, K. Bhadani, E. Hulthén, M. Evertsson)
15:00-15:20	Investigation on selected methods for condition and process monitoring in mineral processing of lithium ore (P. Eitz, M. Mezzetti, H. Lieberwirth)	Using an innovative size-exclusion extraction system aimed at the isolation of plant-derived exosomes (R.C. Cante, G. Lentini, A. Nigro, A. Gaeta, L. Pisapia, R. Nigro)
15:20-16:00	Coffee Break & Poster	
16:00-16:30	Keynote Lecture (Sky Room) DEFECTS IN PARTICLES - THE UNIVERSE INSIDE Wolfgang Peukert (Friedrich-Alexander-University Erlangen-Nürnberg, Germany) Chairperson: Malcolm Powell	

Sky Room (Auditorium) on 1st floor; Sea Room on ground floor; Coffee Break, Lunch, Poster and Sponsor & Exhibitor Rooms on 1st floor.
 Oral presentations: 15 min + 5 min (Q&A). Keynote Lectures: 25 min + 5 min (Q&A). Plenary Lectures: 40 min + 5 min (Q&A).



	SESSION 2.E (Sea Room) MECHANOCHEMICAL SYNTHESIS & REACTIVITY <i>Chairperson: TBD</i>	SESSION 2.F (Sky Room) FLUIDISED BED PROCESSING <i>Chairperson: TBD</i>
16:40-17:00	Mechanochemical leaching of lithium from battery slags: balancing recovery and processability (L. Büttner, S. Breitung)	An overview of attrition in the jetting region of fluidised beds (M. Ghadiri, W.P. Goh)
17:00-17:20	Sustainable mechanochemical engineering of biochar for advanced hydrophobic coatings (M.R. Acocella, A. Kiani, G. Viscusi, C. di Stasi, G. Gorrasi)	Surface finishing of additively manufactured aluminum parts through fluidized beds (A. El Hassanin, M. Troiano, F. Scala, R. Solimene, A. Squillace, P. Salatino)
17:20-17:40	Effects of high-energy kinetic milling conditions on the mechanochemically assisted synthesis of lanthanum cobalt oxide (S. Tkachenko, M. Remešová, V. Bednaříková, P. Gejdoš, M. Vrankić, K. Zoz, L. Čelko)	Optimization of the specific energy consumption of fluidized bed opposed jet mills for high-performance materials (S. Sander, P. Schönfeld)
20:00	Conference Gala Dinner Roof of Hotel Royal Continental, via Partenope 38	

Sky Room (Auditorium) on 1st floor; *Sea Room* on ground floor; Coffee Break, Lunch, Poster and Sponsor & Exhibitor Rooms on 1st floor.
 Oral presentations: 15 min + 5 min (Q&A). Keynote Lectures: 25 min + 5 min (Q&A). Plenary Lectures: 40 min + 5 min (Q&A).



Wednesday 30th September

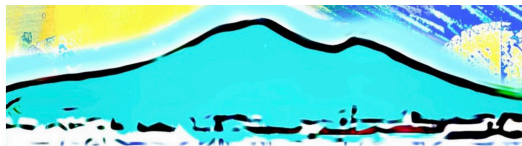
08:00-09:00	Registration	
09:00-09:45	Plenary Lecture (Sky Room) ADVANCES IN MODELLING OF MEDIA MILLS Luís Marcelo Tavares (Federal University of Rio de Janeiro, Brazil) Chairperson: József Faitli	
09:45-10:30	Coffee Break & Poster	
10:30-11:00	Keynote Lecture (Sky Room) UNDERSTANDING THE SYMBIOTIC RELATIONSHIP BETWEEN COMMINUTION AND CLASSIFICATION EQUIPMENT IN DESIGNING AND OPTIMISING CIRCUITS FOR EFFICIENT OPERATION Aubrey Mainza (University of Cape Town, South Africa) Chairperson: Jochen Schmidt	
	SESSION 3.A (Sea Room) CLASSIFICATION & MODELLING Chairperson: TBD	SESSION 3.B (Sky Room) RECYCLING & RESOURCE VALORISATION Chairperson: TBD
11:10-11:30	Modelling and calibration of the Andrews-Mika diagram with a texture-dependent liberation model (T.M. Campos, M. Hilden, M. Powell, L.M. Tavares)	Concrete as a simulant for selective comminution and material recovery in vertical roller mills (O. Schindler, P. Landgraf, O. Popov, H. Lieberwirth)
11:30-11:50	Mathematical modelling of a vertical shaft impact crusher in size reduction of aggregate rock (E.F. Guimarães, T.S.M. Gama, L.M. Tavares)	Recycling of lithium-ion battery cells – modelling the crushing and mixing process (F. Klein-Punt, J.G. Born, A. Kwade)
11:50-12:10	Potential of air classification in process-plant dust recycling: a mini-review (C. Lanzerstorfer)	Electrical impulse fragmentation pre-treatment of hard rock Li-ores (M. Mezzetti, P. Eitz, A. Durjagina, L.M. Artuso, H. Lieberwirth)

Sky Room (Auditorium) on 1st floor; *Sea Room* on ground floor; Coffee Break, Lunch, Poster and Sponsor & Exhibitor Rooms on 1st floor.
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12:10-12:30		Effect of dry vs. wet grinding on the catalytic performance of pyrite (FeS_2) in NaBH_4 methanolysis for hydrogen generation (I. Tokcan, D. Yildiz)
12:30-12:40	Closing & Farewell (Sky Room)	
12:40-13:40	Lunch	

Sky Room (Auditorium) on 1st floor; *Sea Room* on ground floor; Coffee Break, Lunch, Poster and Sponsor & Exhibitor Rooms on 1st floor.
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POSTER SESSION

PARTICLE SIZE EFFECTS AND CHARACTERISATION ACROSS DIVERSE MATERIALS

Characterization of impact-induced fracture in copper ore specimens using compact instrumentation as an alternative to the Hopkinson bar method for application in discrete element breakage models

(G. Mella, E. López, C.G. Rodríguez, C. Cid, M. Moncada)

Comparison of industrial and laboratory grinding specific energies in magnetite ore processing using Donda's approach

(N. Bottosso, J. Mesquita, H. Turrer, V. Yevtekhov)

Effect of particle size and processing conditions on the production of powdered collagen from *Arapaima gigas* scales and its application in functional products

(B.D. Ruiz, C.E. Moreno, F.V.G. Salazar, W.C.S. Tello, J.R.R. De la Cruz, K.F.C. De Ruiz, L.A.O. Trigozo, V.J.C. Garnique)

Optimization of cellular disintegration and particle size of *Musa paradisiaca* rachis for ecological paper production

(B.D. Ruiz, C.E. Moreno, F.V.G. Salazar, W.C.S. Tello, J.R.R. De la Cruz, K.F.C. De Ruiz, L.A.O. Trigozo, V.J.C. Garnique)

Kinetics and adsorption isotherms of Pb (II) in soils using zero-valent iron nanoparticles functionalized with quinoa residual biomass

(E.M. Contreras, B.H.F. Ochoa, M.C. Tejeira, F.V.G. Salazar, W.C.S. Tello, L.A.M. Marcavillaca, P.P.P. Rojas, J.H.O. Gavino)

Pressure oxidation of refractory tailings in an autoclave for gold recovery optimization

(M.C. Tejeira, J.M.S. Bazo, G.A.A. Manrique, O.F.A. Puitiza, R.M. Huaman, F.V.G. Salazar, W.C.S. Tello, E.M. Contreras)

Optimization of hydrothermal synthesis of lanthanum-cobalt perovskite (LaCoO_3): influence of pH, stoichiometry, and sintering temperature

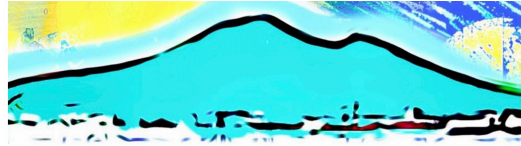
(V. Bednaříková, M. Remešová, S. Tkachenko, M. Vrankić, L. Čelko)

The role of powder size distribution on the flowability of ceramic thermal spray powders

(M. Remešová, C. Hebenstreit, S. Tkachenko, K. Körner, V. Bednaříková, R. Trache, L. Čelko)

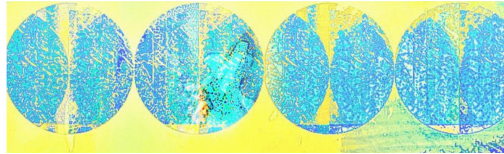
Sky Room (Auditorium) on 1st floor; *Sea Room* on ground floor; Coffee Break, Lunch, Poster and Sponsor & Exhibitor Rooms on 1st floor.

Oral presentations: 15 min + 5 min (Q&A). Keynote Lectures: 25 min + 5 min (Q&A). Plenary Lectures: 40 min + 5 min (Q&A).



Recycling of lithium-ion batteries – The UPRAISE project
(F. Klein-Punt, H. Zetzener, A. Kwade)

Sky Room (Auditorium) on 1st floor; *Sea Room* on ground floor; Coffee Break, Lunch, Poster and Sponsor & Exhibitor Rooms on 1st floor.
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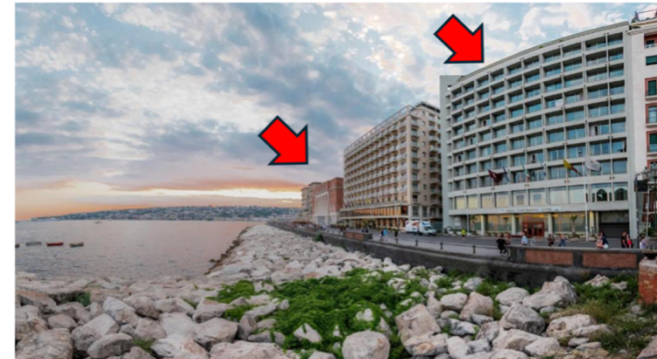


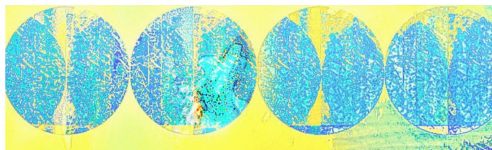
SOCIAL EVENTS

- **MONDAY Sept. 28th** "Informal banquet" (evening) in Naples underground. 5-10 mins-walking from the Conference location.



- **TUESDAY Sept. 29th** Conference Dinner on the roof of Hotel Continental, adjacent to the Conference location.

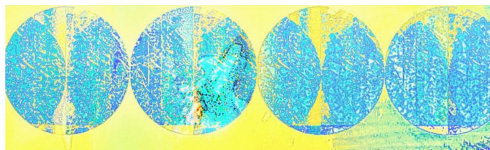




PLENARY LECTURES

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Napoli (Italy) - September 27th-30th, 2026
Convention Centre, University of Naples Federico II





Sustainability in comminution – from maximum energy efficiency to circular economy

Arno Kwade

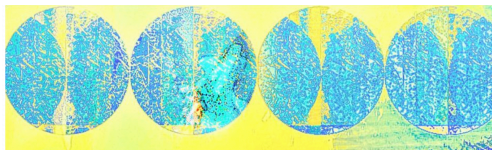
Braunschweig University of Technology, Germany



Comminution is a process of high energy requirement and is therefore often classified as an energy-intensive process. However, on the other hand, comminution is indispensable for the manufacture of numerous products across a wide variety of industries. Recently, comminution processes have increasingly been used to produce innovative products for the energy transition, products with a lower CO₂ footprint, and to replace primary materials with secondary materials derived from end-of-life products. Consequently, comminution processes are now of great importance for the manufacture of sustainable products with low CO₂ footprint and resilient raw material supply chains. Regardless of the area of application, in the interests of sustainability, but also in the interests of cost-effective operation, it is essential to minimise both the specific energy consumption and machine wear. Accordingly, exciting new areas of application for shredding machines are presented – ranging from the dry production of cement substitutes and solid-state electrolytes using mechanochemical processes, through battery recycling, to the processing of artificial minerals, i.e. slags from pyrometallurgical processes. In addition to achieving the highest possible product quality, minimising costs and the environmental footprint play a decisive role in the selection and design of comminution processes. It is very helpful in this regard to characterise the various comminution processes in terms of the types and intensities of stresses involved. By selecting an appropriate stress intensity and ensuring efficient energy transfer to the material being comminuted, it is possible not only to minimise the specific energy requirement, but also, in many cases, to improve product quality, as demonstrated by the examples provided.

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Mechanochemical and cavitation methods in the conversion of agro-industrial waste to valuable products, materials and energy

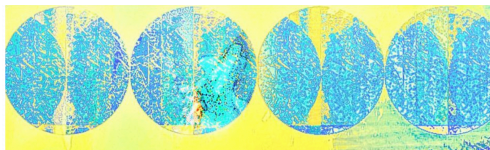
Giancarlo Cravotto
University of Turin, Italy



Several enabling technologies for biomass processing have been investigated, including ultrasound, hydrodynamic cavitation, subcritical water, dielectric heating, enzymatic protocols and mechanochemical methods such as ball milling and reactive extrusion. Following appropriate grinding, solid/solid separation using cyclones and vibrating sieves can be highly effective. Fractionation is primarily governed by differences in particle size, shape, density, surface properties, and composition, including moisture, lipid, and protein content. Biomass conversion under solvent-free or slurry conditions using mechanochemical methods results in significant process intensification. In parallel, hydrodynamic cavitation with rotor/stator reactors and flow-through ultrasonic units represents a competitive approach for the treatment of aqueous suspensions and slurries. The interplay between mechanochemical and cavitational methods is highly complementary, as both rely on energy localisation, albeit through distinct mechanisms. Their combination enhances reactivity, selectivity, and overall process efficiency. These approaches enable access to a broad range of platform chemicals through intensified depolymerisation, oxidation, and extraction pathways under solvent free or aqueous conditions. From cellulose and hemicellulose, key products include glucose, xylose, 5-hydroxymethylfurfural and carboxylic acids (levulinic, glycolic, formic etc.). Lignin conversion yields aromatic compounds such as vanillin, syringaldehyde, and other phenolics. The same technologies are also applied in biomass pretreatment for biofuel and biogas production. For continuous processing, reactive extrusion using multiscrew reactors offers significant advantages in terms of process intensification and energy efficiency. In addition, novel materials with enhanced physical properties have been developed from agro-industrial by-products, including hemp stalks and residual bagasse from *Agave tequilana* Weber and sugarcane. In conclusion, our technological platform developed over the past decade will be presented. These facilities have enabled the scale up of all reported processes to a semi industrial level, effectively bridging the gap between laboratory research and industrial application.

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Advances in modelling of media mills

Luís Marcelo Tavares

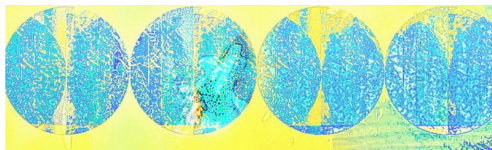
Federal University of Rio de Janeiro, Brazil



Mathematical modeling of media mills has evolved tremendously from the empirical energy-size reduction relationships to the recent advanced mechanistic models, which rely on multiphysics tools. The work summarizes some of the recent advances in mathematical modelling of media mills led by the author. The role of the so-called UFRJ mechanistic mill model in integrating information from both the material and the machine is outlined. The central role of the discrete element method (DEM) in providing information on the mechanical environment inside different types of mills and of the Tavares model in describing the material breakage response is analysed. In addition, the interaction of the grinding media with the fluid, described using tools such as computational fluid dynamics (CFD), smoothed particle hydrodynamics (SPH) and the liquid bridge model (LBM) is analysed. The work then analyses examples of application, starting with the case of autogenous mills, in which the media is not only involved in transferring the energy to the particles, but also being the object of breakage, requiring iterative solutions of the mechanistic model and DEM. The case of modelling a pilot-scale vertical stirred mill by coupling CFD and DEM is analysed, being able to account for variations in rheology associated with increases in fineness of the feed. The last case study is the modelling of the planetary ball mill, in which SPH/LBM are coupled with DEM, allowing to describe widely varying rheological responses.

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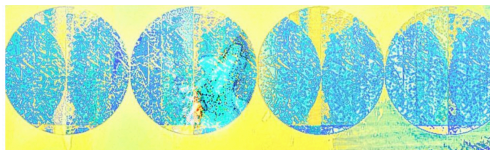




KEYNOTE LECTURES

XIX European Symposium on Comminution & Classification
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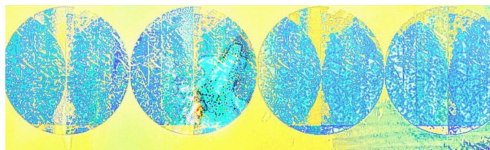
Designing milling processes of pharmaceutical active ingredients for orally inhaled drug products

Andrea Benassi

Chiesi Farmaceutici R&D, Italy



Jet mills are widely adopted to reduce pharmaceutical powder particles to the inhalable range (roughly 0.5–5 microns) owing to their ease of cleaning and absence of additives in the process. In these devices size reduction and classification occur at the same time; although convenient, this point makes their operating regimes highly non-linear, unstable and difficult to control. Pharmaceutical powders can be significantly expensive and the typical batch size quite small. Designing a size reduction process from scratch for a new product, solely based on trial-and-error approaches, can be very time and resource consuming. Therefore, predicting particle size and yield as a function of process and product parameters would be highly desirable during design and scale-up phases. Mechanistic models based on dimensional analysis and scale invariance have been demonstrated to fail when adopted in scale-up trials. Computational fluid/particle dynamics simulations have also been applied to the task showing significant limitations too. A third possibility is to adopt empirical approaches, based on the measurement of powder mechanical properties. All these methods will be reviewed, highlighting their pitfalls and limitations currently preventing us from achieving predictive capabilities.



The dark art of milling: optimising the milling of low carbon fuels for energy applications

Orla Williams

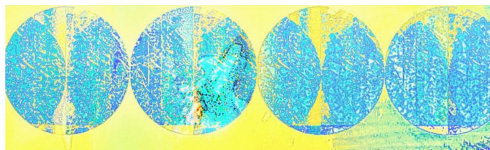
University of Nottingham, UK



Milling is one of the largest consumers of energy globally and is widely used in material processing. This presentation demonstrates how recent advances in milling science from the power sector can inform more efficient and reliable milling practices. Over the past two decades, solid fuel combustion has shifted from coal to biomass in many countries. Most large-scale power station conversions have relied on adapted coal mills that use impact and abrasion to fracture brittle coal, even though biomass preferentially fails by shear fracture. This mismatch between fracture mechanisms and material properties has resulted in significant operational challenges, including mill choking and mill explosions. These challenges have driven advances in milling knowledge, including the development of novel milling metrics and increased recognition of the limitations of impact-based milling for ductile materials. Ball milling relies on impact fracture mechanisms, but the effectiveness of impact milling is fundamentally limited by a material's critical particle size for brittle fracture. This constraint is particularly problematic for biomass, leading to high energy consumption and poor particle size reduction. Recent work on the co-milling of brittle and ductile materials has demonstrated synergistic effects, enabled enhanced size reduction of the ductile fraction and eliminated the choking issues that can arise when ductile materials are milled alone. Laboratory scale milling trials also provide a powerful tool for diagnosing and mitigating problems observed in industrial systems. For example, olive residues transported through screw feeders in power stations frequently cake and cause blockages. By investigating ball milling conditions for olive cake, the influence of moisture content and temperature on the glass transition behaviour of olives was identified. Finally, this presentation shows how novel milling metrics can be used at laboratory scale to rank milling performance across materials and successfully correlate these results to full scale mills.

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Green crushing? The potential of mechanical pathways to engineer powders from lignocellulosic biomass for energy, materials and green chemistry

Claire Mayer-Laigle

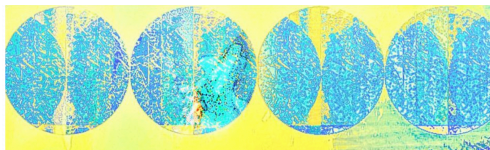
National Research Institute for Agriculture, Food and Environment (INRAE), Montpellier, France



Plant biomass, a vast yet underutilized resource, contains functional components embedded within a complex and resilient lignocellulosic structure. Reducing it to below cell size induces profound physical and chemical transformations that can be leveraged as valuable building blocks for advanced energy vectors, smart materials, and cosmetic or biomedical applications. This presentation will address the fundamentals of mechanical deconstruction from a physical perspective, with a focus on modes of energy transmission (type, intensity, and duration) and their impact on the physicochemical properties of powders. We will then show how controlling these mechanisms enables the design of tailored particles and the emergence of new functionalities, illustrated through applications such as plant-derived powdered fuels, fluorophore grafting onto plant powders for sensing, fully biobased materials for 3D printing, and hybrid strategies coupling milling with deep eutectic solvents for the targeted extraction of high-value molecules.

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When comminution and classification circuits start talking: Communicative process automation and the future of autonomy

Mohsen Yahyaei

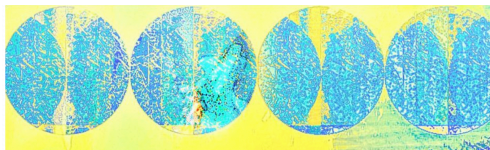
The University of Queensland, Australia



Comminution and classification remain the most energy-intensive stages in mineral processing, yet they are also the least adaptable to variability and uncertainty. Traditional approaches – whether empirical, mechanistic, or advanced process control – have aimed to stabilise circuits within narrow performance windows. However, the increasing complexity of ores, circuits, and sustainability demands exposes the limitations of command-and-control paradigms. This talk introduces Communicative Process Automation (CPA) as a new framework for mineral processing automation. CPA treats the mill, cyclone, sensors, and operators not as isolated components but as agents in dialogue, negotiating trade-offs among throughput, recovery, energy, water, and wear. Drawing on principles from complexity science, advanced logic, and systems modelling, CPA extends beyond conventional optimisation by embedding explainability, adaptability, and value-sensitive decision making at the heart of circuit operation. Through case studies and conceptual demonstrations, the talk will illustrate how CPA reframes comminution and classification: from deterministic control problems to decision-centric, communicative systems capable of self-adjustment, transparency, and resilience. This paradigm shift opens new pathways towards truly autonomous, sustainable mineral processing and invites collaboration across engineering, computational, and social sciences to realise the next generation of mining autonomy.

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Defects in particles – the universe inside

Wolfgang Peukert

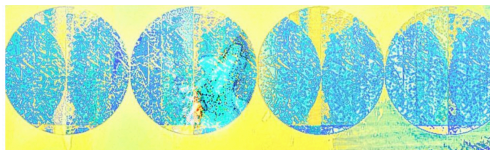
Friedrich-Alexander-University Erlangen-Nürnberg, Germany



An important trend in particle science and technology is aiming for a better understanding and design of systems of increasing complexity. The property function defines the target in product design and is understood along the five dimensions of size, shape, surface, composition and structure (i.e. amorphous, crystalline, internal pore size distributions and defects), and their respective distributions. The presentation will focus on defects in particles, the least understood and investigated dimension of the particle property space. Defects in particles occur inside of a particle or at its surface. Defects largely determine the fracture toughness of a material, the strength of a particle and the required energy to break it. A major challenge in studying defects is their in-depth characterization, which often requires sophisticated and expensive techniques including advanced spectroscopic and scattering techniques (e.g. RAMAN, ESR, XRD) or electron microscopy and tomography. We will discuss the role of defects in size reduction. Defects in crystalline particles are related to grain boundaries and crystal twins, dislocations, stacking faults and shear planes, all are related crystal disorder, whereas defects in amorphous materials depend on the local distributions of bonds and voids. Internal stresses are particularly high at local defects, facilitating crack opening. For energy efficient comminution, the defect density should be high. The grinding limit at the nanoscale strongly depends on the ability of nanoparticles to store defects. In contrast, process conditions for delamination of a bulk material to produce 2D materials (for instance, graphene, MoS₂, BN) must be tuned carefully to minimize any defect formation. Here, weak interactions between the crystal planes shall be overcome, while in-plane fracture should be avoided for the production of large sheets. Compression of particles below their brittle-ductile transition, such as bioglass for bone replacement or Si-Ge particles for battery electrodes, leads also to thin, plate-like morphologies, since these particles are plastically deformed without major fracture events. Based on the given examples, we will discuss white fields in particle science and technology to show unique opportunities for further research of fundamental questions and in pressing fields, such as the development of a sustainable, “green” particle technology.

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Understanding the symbiotic relationship between comminution and classification equipment in designing and optimising circuits for efficient operation

Aubrey Mainza
University of Cape Town, South Africa

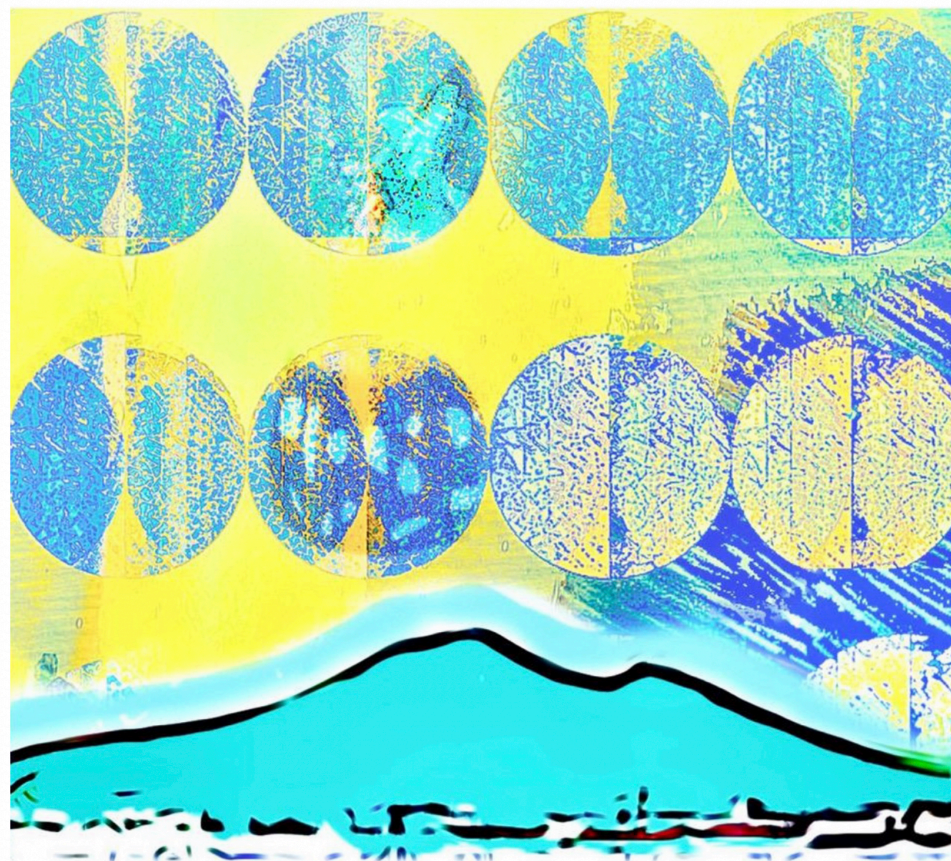


Comminution and classification are the main processes used to prepare particles for the downstream recovery methods such as flotation, magnetic separation, or leaching. Comminution equipment is primarily responsible for size reduction, while classification ensures that particles meeting downstream process requirements report to the recovery section and determines which particles are recycled for further size reduction. For a circuit to operate efficiently, the symbiotic relationship between comminution and classification must be considered during both design and optimisation. At the design stage, material flow must be simulated using dynamic models to capture variations arising from inherent feeding and equipment discharge mechanisms, which rarely operate under steady state conditions.

Optimisation strategies that recognise the interaction between comminution and classification must be adopted for operating plants to ensure that products from each stage meets the required specifications. To process material at optimum energy efficiency and capacity, only particles requiring further size reduction should be recycled. Maximum recovery can be attained by allowing only liberated particles from the comminution circuit to enter the downstream recovery stages. For this to occur, the symbiotic relationship between comminution and classification devices in the circuit must form an integral part of the design and optimisation criteria. For example, in a circuit where a ball mill operates in closed circuit with hydrocyclones, design and optimisation must ensure that the circulating load remains within an acceptable range. This can be achieved by avoiding overloading of the ball mill circuit and by using hydrocyclones that provide sharp separation, minimal water recovery to the underflow, and a cut size that allows liberated particles to pass to downstream recovery processes. It is important to recognise that energy consumption depends not only on the operating parameters of the comminution devices but also on the performance of the classifiers within the circuit. Steady state models are often inadequate for identifying constraints related to material flows in a circuit. Instead, models that account for the dynamic response of all devices in the circuit can be used to identify and evaluate potential solutions for circuits involving comminution and classification devices. This paper discusses the symbiotic nature of comminution and classification in different circuits and how associated challenges in those circuits can be addressed. Advances in comminution circuits, where comminution and classification duties are integrated in the same device, are also explored. Furthermore, optimisation strategies are presented alongside case studies demonstrating how circuits can be fine-tuned to produce desired products at the lowest possible energy consumption.

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