

SPEAKERS EXTERNAL



Dr.-Ing. Lennart Fries
Nestlé Research Center, Lausanne, CH

studied Process Engineering at the TUHH and received his diploma in 2008. Afterwards he was research assistant at the SPE and obtained the doctoral degree in 2012 for his work on "Discrete particle modelling of a fluidized bed granulator", which was honoured with the Johannes-Möller-Award 2013. Since 2012 he is working as R&D Specialist in the Food Science and Technology Department at the Nestlé Research Center (NRC). His working fields include particle structure and functionality design, drying and milling processes.



Dr.-Ing. Michael Jacob
Glatt Ingenieurtechnik GmbH, Weimar

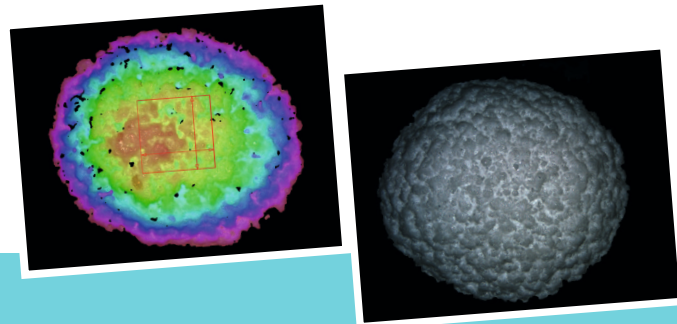
is Head of the Process Engineering Department and member of the general management at Glatt Ingenieurtechnik GmbH. Dr. Jacob graduated at the OVGU in 1995 and since this time he worked for Glatt in many leading positions (Head of R&D and Head of Technology Center in Weimar). He obtained his doctoral degree at the OVGU in 2010 on "Experimental studies and modeling of processes in horizontal fluidized beds for spray granulation".



Prof. Dr.-Ing. Mirko Peglow
IPT-PERGANDE GmbH, Weißandt-Gölzau

graduated in Business Engineering with specialization Process and Energy Engineering at the OVGU in 2000, where he obtained his PhD (2005) and was a Junior Professor (2008-2012). Since 2012 he is the CEO of the Pergande Group. Prof. Peglow is Appointed member of the cluster and innovation council of the Ministry of Economics Affairs,

Science and Digitalization of federal state Saxony-Anhalt, for which he also acts as chairmen of the Hugo-Junkers-Innovation-Award. He is Honorary Professor at the OVGU and chairmen of state association Saxony-Anhalt of Association of German Engineers (VDI).



COURSE PROGRAM

Introduction to fluid-mechanical principles

- Operation limits, elutriation, scale-up rules and state diagrams
- Dimensioning of gas distributors
- Practical fluidization experiments in the laboratory

Local fluid mechanics

- Bubble development, growth and coalescence
- Gas jets in fluidized beds
- CFD modeling of the fluid mechanics
- DEM/CFD modeling of the fluid mechanics

Methods for the characterization of fluidized beds

- Particle attrition and mechanical strength
- Breakage behaviour of granules and agglomerates
- Particle velocity and particle concentration
- Practical particle characterization experiments in the laboratory

Heat transfer in fluidized beds

- between fluid and particles
- between fluidized bed and internals
- Influence of backmixing and bubbles
- Cooling and heating of solids (batch, continuous)

Mass transfer in fluidized beds

- between fluid and particles
- Drying of solids (batch, continuous)
- Practical drying experiments in the laboratory

Vacuum drying in fluidized beds

- Fundamentals and modeling
- Equipment

Fundamentals of granulation and agglomeration

- Adhesive forces and binding mechanisms
- Influence of material properties

Fluidized bed spray granulation

- Fundamentals, kinetics and micro-mechanisms
- Operation regime maps
- Modeling of granulation (batch, continuous)
- Modeling of apparatus configurations and scale-up (Wurster-coater, top vs. bottom spray, spouted bed, rotor granulator)
- Processes, design options and equipment
- Practical granulation experiments in the laboratory

Flowsheet simulation of complex solids processes

- Introduction
- Flowsheet simulation of continuous fluidized bed drying
- Flowsheet simulation of batch and continuous fluidized bed spray granulation
- Multi-scale simulation of fluidized bed spray granulation

Date and venue

Tutech Innovation GmbH
Harburger Schlossstraße 6-12
21079 Hamburg, Germany
Phone +49 40 76629-0

Contact

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www.tuhh.de/spe

Start Monday, November 4th, 2019, 1:00 p.m.

End Thursday, November 7th, 2019, 3:00 p.m.



Information and registration

www.fluidization-course.com

Hamburg University of Technology
Institute of Solids Process Engineering
and Particle Technology

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21073 Hamburg, Germany

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Fax +49 40 4273-13621
swantje.pietsch@tuhh.de

Course fee

1650 Euro

The participation fee includes extensive course-ware (lecture and practical course material), refreshments, coffee and dinner at the 3rd evening. The course fee can be transferred after the official confirmation of participation by TuTech. The course fee is tax free in Germany (§ 4 (22) UStG-MWSt.). Cancellations until October 24th, 2019 are free of charge. Thereafter, no refunding is possible, however another participant can be denominated.

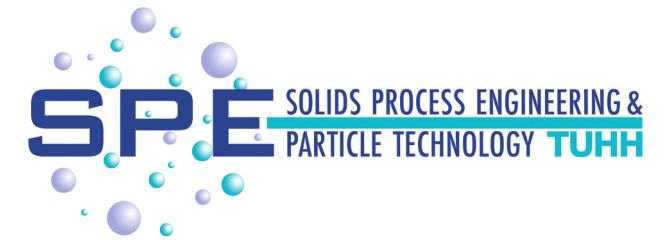
Accommodation

Hotel Panorama (15 min. walking distance) will guarantee room reservations until October 24th, 2019.

Single room 94 Euro

Keyword: University course Fluidization Technology

Phone +49 40 76695-0 | www.panorama-hotels-hamburg.de



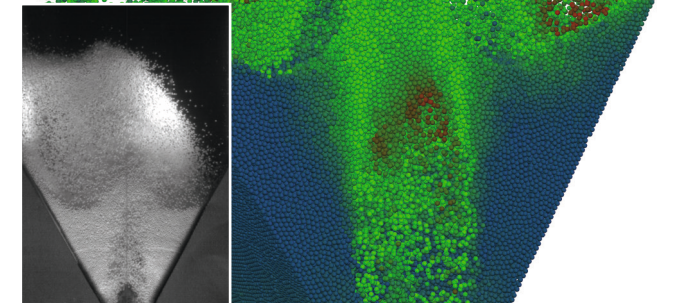
11th University Course Fluidization Technology

**Fundamentals and Applications in Drying,
Granulation and Agglomeration**

**November 4th - 7th, 2019
in Hamburg, Germany**

Organized by

- Prof. Stefan Heinrich, Hamburg University of Technology
Institute of Solids Process Engineering and Particle Technology
- Prof. Evangelos Tsotsas, Otto von Guericke University Magdeburg
Chair of Thermal Process Engineering

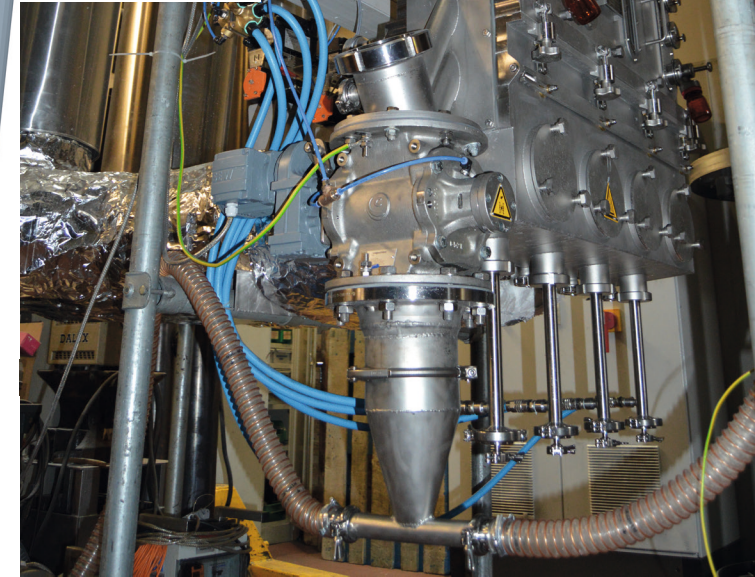
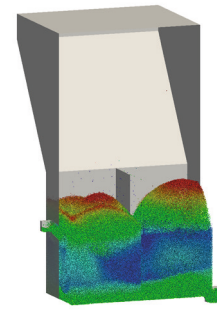
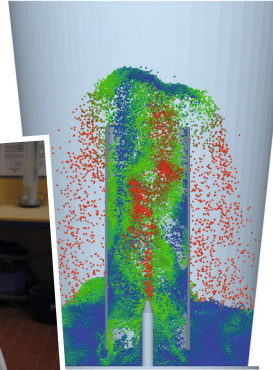
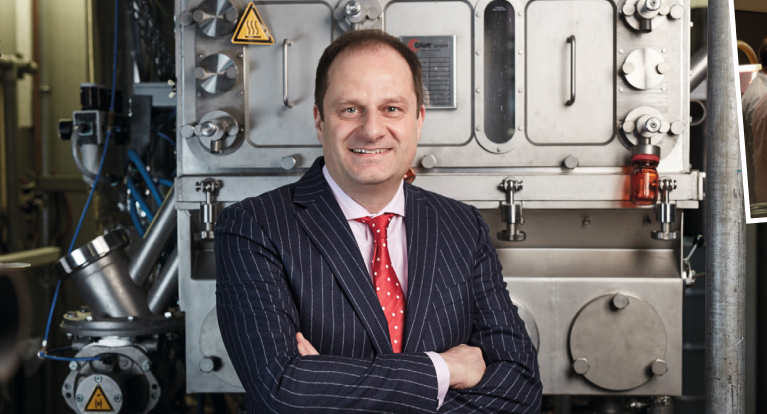


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TUHH
Hamburg University of Technology

TARGET AUDIENCE

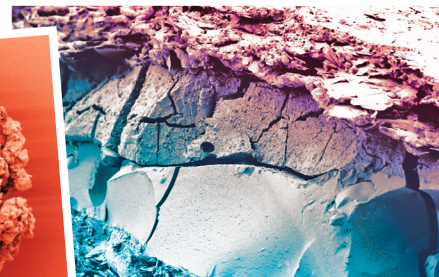
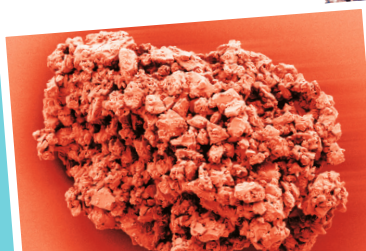
The course is designed for people from various backgrounds (engineers, chemists, food and pharmaceutical technologists) and with different levels of experience, who need to understand the fundamentals of applications of modern and efficient fluidized bed processes. The course language is English.



TOPIC

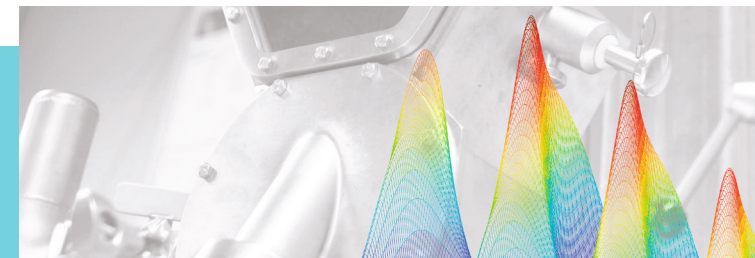
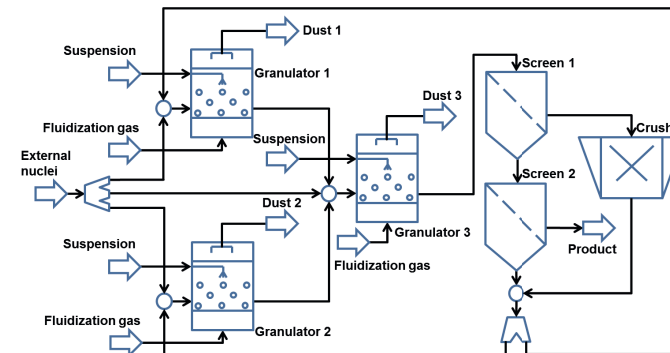
Fluidization technology has a tremendous economic importance and is used for a wide range of physical and chemical processes like classification, drying, adsorption, heating and cooling of solids, combustion, pyrolysis, carbonization, gasification, calcination or gas-solid reactions.

In this course we focus on the drying as well as on the spray granulation, coating and agglomeration in fluidized beds. The particle formulation processes play an important role in the manufacturing of powder granules from liquid educts in the food, fine chemicals, biotechnological and pharmaceutical industries as dust-free and free-flowing particles with defined particle size distribution and desired mechanical strength can be produced in a process with favorable heat and mass transfer conditions and good solids mixing.



Additional advantages of this size-enlargement process are the possibilities to improve particle properties, like appearance, taste and odor or the protection from oxygen, humidity, light or incompatible active agents as well as the adjustment of the controlled release of active components (e.g. drug).

This course highlights the fundamentals and applications of various fluidized bed processes for drying, coating, granulation and agglomeration of particles with practical hints and extensive calculation examples. The focus is on fluid mechanics, mixing, heat and mass transfer and particle formulation mechanisms. Furthermore, actual applications as well as modern computational tools and measuring techniques are presented. Practical process demonstrations in leading laboratories and tutorials will strengthen the acquired knowledge.



SPEAKERS

From the Hamburg University of Technology



Prof. Dr.-Ing. habil. Dr. h.c. Stefan Heinrich

received his diploma in Process Engineering (1996) and a doctoral degree at the University Magdeburg (OVGU) in 2000. Following eight years as Assistant and Junior Professor at the OVGU and with a Habilitation (2006), he became full professor at the TUHH and director of the Institute of Solids Process Engineering and Particle Technology (SPE) in 2008. He is editor of the Elsevier journals "Advanced Powder Technology" and "Particuology", coordinator of the DFG Priority programme 1679 on dynamic flowsheet simulation of solids processes and chairmen of the German Working Party on Agglomeration and Bulk Solids Technology. For his research activities in fluidized bed spray granulation Prof. Heinrich received the DECHEMA-Prize 2015.



Prof. Dr.-Ing. habil. Joachim Werther

graduated 1967 at the University Karlsruhe with a diploma in Chemical Engineering. In 1972 he obtained his doctoral degree and 1976 the Habilitation at the University Erlangen-Nürnberg. He worked for BASF AG from 1977 to 1980. In 1980 he joined the then newly founded TUHH, where he was the first director of the SPE until his retirement in 2008. 1999 to 2001 he served as the Vice President Research of the TUHH.



Prof. Dr.-Ing. Maksym Dosta

is Junior Professor for Multiscale Simulation of Granular Materials at TUHH. He graduated in computer science at Donetsk National Technical University and started his career at the Max-Planck Institute in Magdeburg. He received his doctoral degree at the TUHH in 2012 on flow-sheet simulation of fluidized bed granulation processes. Main focus of his current research work is on development and implementation of complex simulation frameworks and multiscale process treatment of granular materials.



Dr.-Ing. Ernst-Ulrich Hartge

studied Industrial Engineering and Management at the University Hamburg and received the diploma in Industrial Engineering and Management in 1984. In 1989 he obtained his doctoral degree in the field of fluid mechanics of circulating fluidized beds. Since 1989 he is working as senior scientist at the SPE of the TUHH. His research interests are in the field of fluidization and its application to energy conversion processes as well as on flowsheet simulation of solids processes.

From the Otto von Guericke University Magdeburg



Prof. Dr.-Ing. habil. Evangelos Tsotsas

holds the Chair of Thermal Process Engineering at the OVGU since 1994. He has a PhD (1985) and a Habilitation (1990) from University Karlsruhe, and he was a Senior Process Specialist at the Dow Chemical Company (1991 to 1994). Prof. Tsotsas is the editor of the five-volume book series Modern Drying Technology. Recipient of the Hosokawa Award for Innovation and the ProcessNet Award for Excellence in Drying Research, he is chairman of the German Working Party on Drying. The main focus of his work is on drying, and on particle formulation processes related to drying.