

# 1<sup>st</sup> Announcement

## Seminar on Emerging Dairy and Food Technologies

### Separation Technologies and Design of Complex Food Systems

Sept. 12-14<sup>th</sup>, 2018

Technical University of Munich  
School of Life Sciences Weihenstephan

Organisation:

Univ.-Prof. Dr.-Ing. Ulrich Kulozik

Registration details/Participation fee:

850 € for two-days seminar (780 € for members of dairy research foundation and Weihenstephan alumni associations);

500 € for one-day participation;

600 € for members of public institutions (2 days); 350 € (1 day)

150 € for optional one-day workshop (day 3)  
with hands-on demonstrations of special topics

Early-bird registration before May 31<sup>st</sup>: 780 € / 720 € / 450 €

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Hotel information see our website

Homepage: [www.technologieseinar-lmvt.de](http://www.technologieseinar-lmvt.de)

# Seminar on Emerging Dairy and Food Technologies

## Separation Technologies and Design of Complex Food Systems

### - P R O G R A M -

September 12<sup>th</sup>, 2018

#### Separation Technologies: Recent Topics

- State of the art and current trends in separation technologies
- Process design of membrane plants and criteria for the selection of membranes

#### Efficient Fractionation using Membrane and Centrifugal Systems

- Length effects on filtration performance in spiral-wound membranes: A key to increase filtration efficiency
- In-situ analysis of cake layer formation in hollow fiber membrane systems during milk protein fractionation
- Efficient fractionation of whey proteins by means of continuous centrifugal separation

#### Sustainable Processing by means of Membrane Technologies

- Fouling mitigation and filter life cycle extension by alternating and oscillating tangential flow
- Valorization of processing side streams as diafiltration media - Effects on filtration process and casein functionality
- Physical cleaning by rinsing of spiral wound modules – Increasing sustainability by process optimization

#### Fractionation of Milk Components and their Innovative Applications

- Prevention of human gastro-intestinal infection with functionalized bovine anti-body-enriched ideal whey obtained by microfiltration
- Efficient production of whey protein hydrolysates for special nutritional needs
- Whey concentrates with extended shelf life and high protein functionality as a substitute for whey powder

September 13<sup>th</sup>, 2018

#### Design of Complex Food Systems: Recent Topics

- Technofunctional properties of animal and plant proteins: Opportunities and challenges
- Handling of complex food systems in practical reality

#### Efficient Processing of Complex Food Systems by Novel Drying Technologies

- Microwave-enhanced drying - Efficient production of foamed fruit snacks
- Novel microwave technology for homogeneous and safe heating and drying of complex food matrices

#### Better Understanding of Complex Food Systems

- Stabilization of emulsions by biogenic particles – A mechanistic approach
- Molecular background for optimizing microfiltration of skim milk at low temperatures
- Identification of mechanisms of multistage structure formation in processed, dispersed protein systems at high concentration

#### Designing Special Food Systems for Innovative Applications

- Innovative application of protein gel systems: Supercritically dried aerogels as transportation vehicles or protective matrix
- Possibilities for the production of cold-renneted, spray dried milk concentrates for application in dairy products

**Reception and Networking Event** at the Chair of Food and Bioprocess Engineering Pilot Plant Facility

## Practical Demonstrations at the Food and Bioprocess Engineering Pilot Plant Facility & Labs

By special registration (only in addition to seminar participation), delegates can select certain areas of special relevance for their own professional function. These topics will be emphasized according to individual interests and training needs. This will enable us to form small groups with intense interaction, also allowing hands-on work.

Thus, topics presented during the seminar will be amended to combine recent insights with ideas on how to convert these into practical reality. For analytical aspects participants can bring own samples to be used as objects in their individual practical programme (subject to special arrangement prior to seminar).

Examples to choose from are listed below.

### Pilot Plant Demonstrations

- **Separation Techniques**
  - Membrane Techniques**
    - Micro-, Ultra-, Nanofiltration and Reverse osmosis in tangential crossflow mode
    - Dynamic crossflow membrane techniques:
      - Rotating membranes, Membranes with oscillating and alternating flow
  - Centrifugal Separation**
    - Removal of aggregated proteins by decantation centrifugation
    - Novel decantation centrifuge for separation of products with special rheological profiles
- **Thermal Processing Techniques**
  - Special techniques allowing precise heating profile for reaction kinetic studies
  - Direct steam injection and infusion for UHT/ESL-heating of milk and whey protein concentrates
- **Drying Techniques and Powder Handling**
  - Spray drying with nozzle and rotating disc systems
  - Vacuum drying; Low temperature vacuum drying
  - Conventional freeze drying in comparison to microwave enhanced vacuum and freeze drying
- **Food Structuring and Texturization**
  - Microencapsulation Technologies**
    - Mechanisms for matrix formation by proteins and hydrocolloids
    - Aerogel methodology
    - Spray drying methods
  - Protein Microparticulation** by extrusion cooking technology
  - Emulsification, Foaming and Gel Formation Techniques**
    - Colloid mill; Toothed disc systems; Homogenizer
    - Membrane aeration and emulsification
- **Bioprocessing Technologies**
  - Batch and continuous fermentation of microbial cultures
  - Hydrolysis of proteins by immobilized enzymes on monolithic chromatographic columns
  - Enzymatic crosslinking of proteins

### Analytical Techniques (Examples)

- **High Performance Liquid Chromatography (HPLC)**
  - Novel analytical techniques for precise, simultaneous and quantified whey protein and casein analysis
  - Anion and cation analysis in comparison to flame photometry
- **Gel Electrophoresis (SDS-PAGE)**
  - Novel rapid electrophoresis techniques without staining agents
  - Quantification by fluorescence technique without analytical standard substance
- **Particle and Surface Characterization**
  - Contact angle measurement and interfacial tension
  - Hydrophobicity of molecules
  - Surface charge of particles or droplets (Zeta potential)
  - Understanding of interactions between proteins and particles (Multi-angle light scattering)
  - Laser diffraction for particle size analysis of powders or emulsion droplets
  - Fourier Transformed Infrared Technology (ATR-FTIR) and Calorimetry (DSC)
- **Rheological Profiling and Texture Characterization**