



**ICEF13**  
INTERNATIONAL CONGRESS  
ON ENGINEERING AND FOOD

MELBOURNE, AUSTRALIA  
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*Engineering Innovations  
for Food Supply Chains*

## Congress Themes

### **Food Engineering Across the Supply Chain**

On farm processing; Decentralised productions, Modular and small scale food processes; Postharvest Storage and food handling; Food process design; Food safety; Validation of processes; Supply chain optimisation; Mobile food processing; Next generation equipment (including kitchen equipment); Robotics; Food process engineering to address climate change problems.

### **Sustainable Food Systems**

Food process sustainability; Life Cycle Assessment (including economic, social and environmental impacts); Carbon and water footprint; Using renewable energy; Sustainability of traditional processes; Waste reduction and remediation; Improving process efficiencies; Waste processing and management; Recycling waste streams and reuse of energy ('closing the loop'; zero waste); Stabilisation and value addition to food waste; Use of other bioresources; Biorefineries; Biosystems Engineering; Innovations in packaging to minimise food waste; 'Green' processing; Centralised vs. distributed processing and its impact on sustainability.

### **Food Security**

Food security systems; Feeding the world with finite resources; Application of Food Process Engineering for food security and resilience; Use of appropriate food processing technologies for developing countries (including reduction of waste in supply chains); Food Process Engineering in managing humanitarian and emergency situations; Food processing technologies for alternative raw materials; Efficient food storage and distribution systems; Cost effective Food Process Engineering (use of 'cheap' equipment and simple processes); Synthetic biology and genetic engineering in food processing; Space applications; Life support systems.

### **Advances in Food Process Engineering**

Drying and dehydration; Fermentation; Cooling and freezing; Thermal processing; Extraction; Mixing; Extrusion; Separation, fractionation and purification; Mass transfer operations; Membrane processes; Homogenisation and hydrothermodynamic processing; Crystallisation; Nano-emulsion and encapsulation processes; Hygiene and cleaning (including design); Multiphase fluid mechanics; Enzymatic and chemical reaction processes; Active and smart packaging; Scale up engineering; New applications adapted from other industries.

### **Novel Food Processing Technologies**

Non-thermal and minimal processing; Microwave, ohmic, dielectric, IR and radiofrequency processing; Irradiation; Electron beam; Ozone applications; High pressure processing; UV and high intensity pulsed light; Pulsed electric fields; Ultrasonics and megasonics; Cool plasma; Magnetic fields; Shockwave processing; Nanoengineering; 3D and 4D printing.

### **Food Process Systems Engineering and Modelling**

Modelling and simulation; Transport phenomena; Sensor (physical, chemical and biological) development and applications (e.g., e-tongue and e-nose); Automation and process control; Process optimisation; Product and process predictive risk assessment (chemical, biological, quality and shelf life) Risk assessment (for chemical, mechanical and biological safety); Novel approaches in modelling;

Kinetics modelling (microbiology, quality); Image processing; data mining; modelling the supply chain; application of dimensional analysis for food processing applications; Multiscale simulation of oral and digestion processes of food.

### **Engineering Properties of Food and Packaging**

Mechanical properties; Thermophysical properties; Dielectric properties; Physicochemical properties; Phase transitions; Textural, rheological and structural properties; Mixing properties; Transport properties; Equilibrium properties; Functional properties; Property characterisation methods and techniques; Structure and dynamics of water in foods.

### **Food Engineering for Nutrition and Health**

Impact of process and food structure on nutrient stability and bioavailability (retaining heat-sensitive nutrients; Gentle technologies to enable claims for 'raw food'; Reduction of allergenicity by processing).

Physiology and digestion (Oro-Gastro-Intestinal Structure Engineering of Food (OGISEng)); Nutrition for specialised groups (Rheological requirements for infants, the elderly, hospital patients; precision nutrition); Hospitality industry.

### **Food Engineering Education**

*Education delivery* (University degrees; hands-on training courses and professional development; availability to the whole world, in particular to poorer countries; Food Engineering without borders)

*Curriculum* (Accreditation - examples of successful integration of Food Engineering into a degree that still passes accreditation as Chemical Engineering; examples of successful Food Engineering undergraduate degrees; Masters by coursework to extend chemical engineering into food. How to include leadership, entrepreneurship, mentoring, ethics; process optimisation of quality/safety by predictive quantitative risk assessment; Industry partnerships with universities on training highly skilled graduates)

*Resources* (New tools - online and apps; publications; books; webinars; courses; case studies. Hands-on experience of available online resources)

*Research* (Scholarly research on what is needed in Food Engineering Education; what is being done?)

Food Engineering Education: Challenges and Opportunities.

### **Innovations of Food Engineering in Australasia**

Case studies of the commercialisation of Food Engineering innovations in Australasia.

### **Other/Special Sessions**

- Future trends in food engineering
- Engineering challenges in the factories of the future
- Risk analysis
- Industry 4.0, big data, and Internet of things
- Robotics
- Manufacturing the foods of the future: Challenges
- Food Engineering in a Clean Label Era
- Commodity-oriented Food Engineering. The challenges for dairy vs. meat vs. fruits & veg vs. grains
- Young Engineers
- Knowledge and Innovation Community (KIC)
- Food Engineering opportunities in emerging markets