

Invited Lectures

Plenary lecture

- Continuous Oscillatory Baffled Reactors as an alternative – or not – to stirred tank reactors

Dr. Joelle Aubin (University of Toulouse)

Keynote lectures

- Viscoelastic instabilities in microfluidic flows

Prof. Amy Shen (Okinawa Institute of Science and Technology, OIST)

- Numerical simulations of aeration in stirred vessels

Prof. Omar Matar (Imperial College London)

- Mixing in dairy and confectionery: Controlling complexity and heterogeneity

Dr. Tetsu Kamiya (NAGASE & CO. LTD.)

- From single bubble Stress Tensor Sensor to complex micro-foam structuring in extrusion flows of viscoelastic protein melts

Prof. Erich Windhab (ETH Zurich)

- Mixing and De-Mixing in Granular Systems

Prof. Richard Lueptow (Northwestern University)

- Numerical simulations of flows with drops and bubbles using phase-field models

Prof. Alexandra Komrakova (University of Alberta)

Young researcher's session

- Intensified mixing for scalable production of luminescent nanomaterials: viewpoint of a chemical engineer

Prof. Dan Wang (Beijing University of Chemical Technology)

List of Presentations

(*) Times are based on JST (Japan Standard Time)

Day2 (30th Nov)

<u>Keynote lecture 1 (9:20-9:50)</u>	
	Chair: Y. Komoda, Kobe University
Viscoelastic instabilities in microfluidic flows	
A. Shen (Okinawa Institute of Science and Technology, OIST)	
<u>Oral Session 1-1 (9:50-10:50)</u>	
Chair: K. Nishi, Chiba Institute of Technology	
O-111	Representative Shear Rate for Agglomeration in Mixing Tank: Impeller Type and Particle Concentration
Y. Ochi, Y. Komoda, N. Ohmura (Kobe University)	
O-112	An experimental and numerical study of particle mixing in a specially designed rotating drum
H. P. Kuo ^{1,2} , A.N. Huang ² , X. Wang ² , T.C. Cheng ² , W.Y. Hsu ² (¹ National Taiwan University, ² Chang Gung University)	
O-113	Reconsideration of Metzner and Otto's concept and constant in the field of the mixing engineering
M. Kaminoyama ¹ , Y. Kawaguchi ² (¹ Yokohama National University, ² Kawaguchi Engineering Consulting Office)	
<u>Oral Session 1-2 (11:10-12:30)</u>	
Chair: R. Parthasarathy, RMIT University	
O-121	Using Electrical Resistance Tomography for the mixing time measurement in a tank stirred with a Maxblend impeller
S. Iwasawa ¹ , H. Kubo ¹ , K. Takenaka ¹ , F. Maluta ² , G. Montante ² , A. Paglianti ³ (¹ Sumitomo Heavy Industries Process Equipment, ^{2,3} University of Bologna)	
O-122	The Effect of Impeller Pumping Direction and Impeller Spacing on Mixing Performance in a Fermenter
R. O. Kehn ¹ , K. Logsdon ² , S. Xu ³ (^{1,2,3} SPX FLOW (Lightnin Mixers))	
O-123	Local Distribution of Oxygen Mass Transfer Coefficient and Interfacial Area in non-Newtonian solutions in Bioreactors Furnished with Different Types of Coaxial Mixers
M. Jamshidzadeh, F. Ein-Mozaffari, A. Lohi (Ryerson University)	

O-124	Heat Transfer Characteristics of Newly Developed Enclosed Induction Heating Mixing Impeller K. Nakao ¹ , K. Kashiya ¹ , Y. Hirata ² , N. Ohmura ³ , N. Nakao ⁴ , K. Miyabo ⁵ (¹ Fukui University of Technology, ² Osaka University, ³ Kobe University, ⁴ Kansai Electric Power, ⁵ Kajiwara Kogyo)
<u>Oral Session 1-3 (13:30-14:50)</u>	
Chair: H. Furukawa, Nagoya Institute of Technology	
O-131	Mechanical structure and mixing characteristics of SWINGSTIR® reactor T. Ogawa ¹ , N. Yamagami ¹ , T. Kato ¹ , S. Yamada ² , N. Ohmura ² (¹ Kobelco Eco-Solutions, ² Kobe University)
O-132	Experimental study on non-Newtonian mixing in biogas plants S. Annas ^{1,2} , M. Elfering ^{1,2} , H.-A. Jantzen ¹ , J. Scholz ¹ , U. Janoske ² (¹ FH Münster, ² Bergische Universität Wuppertal)
O-133	Multiscale simulation of a high-shear mixer for food emulsion production M. Ferrari ¹ , G. Boccardo ¹ , A. Buffo ¹ , M. Vanni ¹ , J.W. Handgraaf ² , D. L. Marchisio ¹ (¹ Politecnico di Torino, ² Culgi BV)
O-134	Assessment of Different Mixing Scales by PEPT Lagrangian Trajectories C. Savari, K. Li, M. Barigou (University of Birmingham)
<u>Plenary lecture (15:10-15:50)</u>	
Chair: N. Ohmura, Kobe University	
Continuous Oscillatory Baffled Reactors as an alternative – or not – to stirred tank reactors J. Aubin (University of Toulouse)	
<u>Oral Session 1-4 (15:50-16:50)</u>	
Chair: R. Misumi, Yokohama National University	
O-141	Axial and Radial Mixing Characteristics in a Micro-Scale Oscillatory Baffled Reactor T. Horie ^{1,3} , A. Machida ² , N. Numata ² , N. Kumagai ² , K. Suzuki ² , Y. Komoda ² , N. Ohmura ² (¹ Osaka Prefecture University, ² Kobe University, ³ Complex Fluid and Thermal Engineering Research Center)
O-142	Mitigation of scale formation in an agitated vessel using via baffle modification S. M. Khayry ¹ , E. Sato ² , M. Davoody ^{1,3} , J. Wu ³ , N. Ohmura ² , S. Madapusi ¹ , S. Bhattacharya ¹ , R. Parthasarathy ¹ (¹ RMIT University, ² Kobe University, ³ CSIRO Mineral Resources)

O-143	How Coherent Structures Dominate Fluid Motion in Turbulent Flow in Stirred Vessels	K. Li, M. Barigou (University of Birmingham)
<u>Keynote lecture 2 (17:10-17:40)</u>		
Chair: J. Aubin, University of Toulouse		
Numerical simulations of aeration in stirred vessels		
O. Matar (Imperial College London)		
<u>Oral Session 1-5 (17:40-19:00)</u>		
Chair: G. Ozcan-Taskin, Loughborough University		
O-151	Investigation of the mixing process with a large-type impeller in laminar state using mixing tracer particles	K. Nishi, K. Sakata, M. Oishi, R. Takani (Chiba Institute of Technology)
O-152	Performance of Fine Particles Suspension at High Loadings using Various Impeller Designs in Flat and Dished Base Tanks	N. S. Janurin ¹ , C. E. Choong ¹ , Z. Zamzamm ² , S. Ibrahim ³ , M. I. I. Z. Abidin ⁴ (^{1,3,4} University of Malaya, ² Satake MultiMix Corporation)
O-153	Scale-down methodology to study the effect of fluid dynamic stress and oxygen gradients on filamentous fungal fermentations producing cellulases	F. B. Chaabane ¹ , T. Goncalves-Roque ¹ , C. Beal ² , A. W. Nienow ¹ , F. Augier ⁴ (^{1,4} IFP Energies nouvelles, ² UMR 782 Agroparis Tech Inra, ³ University of Birmingham)
O-154	Dynamic CFD-based compartment models for the assessment of gradients in large-scale fermentation processes with diverse mixing strategies	G. Nadal-Rey ^{1,2} , D. D. McClure ³ , J. M. Kavanagh ³ , B. Cassells ² , S. Cornelissen ^{2,4} , D. F. Fletcher ³ , K. V. Gernaey ¹ (¹ Technical University of Denmark, ² Novozymes A/S, ³ The University of Sydney, ⁴ Centrient Pharmaceuticals)

Day3 (1st Dec)

Young invited lecture (13:30-13:50)

Chair: T. Horie, Osaka Prefecture University

Intensified mixing for scalable production of luminescent nanomaterials: viewpoint of a chemical engineer

D. Wang (Beijing University of Chemical Technology)

Oral Session 2-1 (13:50-14:50) – Young researcher's session –

Chair: S. Wang, City University of Hong Kong

O-211 Effect of Inner Baffle on Mixing Performance with small impellers in shear thinning fluid

H. Furukawa, Y. Mizuno, Y. Kato (Nagoya Institute of Technology)

O-212 Bubble Plume Induced Mixing

D. Laupsien, C. L. Men, A. Cockx, A. Liné (University of Toulouse)

O-213 Identification of suspension state and solid particles physical properties using Passive Acoustic Emission and Machine Learning in a solid-liquid mixing system

A. Rossi^{1,2}, F. Alberini², E. Brunazzi¹
(¹ University of Pisa, ² University of Birmingham)

Keynote lecture 3 (15:10-15:40)

Chair: H. Masuda, Osaka City University

Mixing in dairy and confectionery: Controlling complexity and heterogeneity

T. Kamiya (NAGASE & CO., LTD.)

Oral Session 2-2 (15:40-16:40)

Chair: H.-P. Kuo, National Taiwan University

O-221 De-agglomeration of polyacrylonitrile (PAN) particles aggregate by mixing

T. Yazawa, Y. Murakami, M. Naya, H. Matsukawa, K. Otake, A. Shono
(Tokyo University of Science)

O-222 Efficient numerical methods for multi-objective design optimization of stirred tanks

M. Wu¹, N. Jurtz¹, A. Walle², M. Kraume¹
(¹ TU Berlin, ² Astrid Walle CFDsolutions)

O-223 How to trigger mixing, or demxing in a mixer?

L. Kahouadji¹, O Matar¹, S. Frey², E. Windhab², S. Wang³
(¹ Imperial College, ² ETH Zurich, ³ City University of Hong Kong)

Keynote lecture 4 (17:10-17:40)

Chair: T. Horie, Osaka Prefecture University

From single bubble Stress Tensor Sensor to complex micro-foam structuring in extrusion flows of viscoelastic protein melts

E. J. Windhab (Swiss Federal Institute of Technology, Zürich (ETH))

Oral Session 2-3 (17:40-19:00)

Chair: A. Federico, University of Birmingham

O-231 Estimation of the just suspended impeller speed for mixed slurries in a stirred tank

M. Aida², H. Kobayashi¹, Y. Murakami¹, H. Matsukawa¹, K. Otake¹, A. Shono¹
(¹ Tokyo University of Science, ² Idemitsu Kosan)

O-232 Improve Agitation Reliability of Minerals Processing Tanks

J. Wu¹, B. Ngyuen¹, M. Hurley¹, L. Graham¹, W. Bruckard¹,
G. Short, D. Harris, J. Kieruj¹, R. Parthasarathy²
(¹ CSIRO Mineral Resources, ² RMIT University)

O-233 Interfacial instabilities and mixing during microchannel displacement with a pure viscoelastic fluid

S. H. Hue, L. Chagot, P. Angeli (University College London)

O-234 Effect of mixing on the reactive crystallization of $\text{Ni}_x\text{MnyCo}_{1-x-y}(\text{OH})_2$ hydroxides for battery applications

M. L. Para, M. Shiea, G. Tronci, M. Alidoost, A. Buffo, G. Boccardo,
A. Barresi, D. Marchisio (Politecnico di Torino)

Day4 (2nd Dec)

Keynote lecture 5 (10:40-11:10)

Chair: H. Masuda, Osaka City University

Mixing and De-Mixing in Granular Systems

R. M. Lueptow (Northwestern University)

Oral Session 3-1 (11:10-12:30)

Chair: A. Shono, Tokyo University of Science

O-311 Role of central slits of a rotationally reciprocating plate on fluid mixing

K. Komoda¹, T. Date¹, H. Hirose¹, T. Horie², N. Ohmura¹
(¹ Kobe University, ² Osaka Prefecture University)

O-312 Shear environment and mass transfer coefficient in aerated coaxial mixing systems containing power-law fluids

A. Rahimzadeh, F. Ein-Mozaffari, A. Lohi (Ryerson University)

O-313 Single Drop Breakage in Karr Column

J. Y. Z. Zhang¹, J. D. Berry², Y.D. Wang¹,
K. A. Mumford², G.W. Stevens², D. J. E. Harvie², W. Y. Fei¹
(¹ Tsinghua University, ² The University of Melbourne)

O-314 Mixing enhancement of Taylor-Couette flow reactor with ribbed inner cylinder in continuous starch hydrolysis process

H. Masuda^{1,2,5}, M. Matsumoto¹, M. Shimoyamada¹, R. Hubacz³, N. Ohmura^{2,4}
(¹ University of Shizuoka, ² Complex Fluid and Thermal Engineering Research Center,
³ Warsaw University of Technology, ⁴ Kobe University, ⁵ Osaka City University)

Keynote lecture 6 (13:00-13:30)

Chair: S. Fujioka, Keio University

Numerical simulations of flows with drops and bubbles using phase-field models

A. Komrakova (University of Alberta)

Oral Session 3-2 (13:30-14:30)

Chair: J. Wu, CSIRO Mineral Resources

O-321 Flow regimes of double emulsion production by a flow focusing technique

R. Hidema, R. Ohashi, H. Suzuki (Kobe University)

O-322	DEM-VOF simulations on the drawdown mechanism of floating particles in turbulent stirred tanks Q. Kang ¹ , X. Feng ^{2,3} , J. Wang ¹ , C. Yang ^{2,3} (¹ Tianjin University, ² Chinese Academy of Sciences, ³ University of Chinese Academy of Sciences)
O-323	Novel Bach Impeller for Microcarrier Cell Culture in Stirred-Tank Bioreactors T. A. Wyrobnik ^{1,2} , S. Oh ² , A. Ducci ³ , M. Micheletti ¹ (¹ University College London, ² A*STAR Bioprocessing Technology Institute, ³ University College London)
<u>Oral Session 3-3 (17:20-18:20)</u> Chair: H. Masuda, Osaka City University	
O-331	Wastewater aeration system with novel conical mixer A. Grigoreva, R. Abiev (St. Petersburg State Institute of Technology)
O-332	Pressure drop oscillations during gelation inside mixing systems A. S. Madhavikutty ¹ , T. Hozumi ¹ , S. Ohta ² , T. Ito ^{1,2} (¹ The University of Tokyo, ² The University of Tokyo)
O-333	Toward a 3D description of the flow in a stirred tank using POD C. Mayorga, J. Morchain, A. Liné (Université Fédérale Toulouse Midi-Pyrénées)
<u>Oral Session 3-4 (18:20-19:20)</u> Chair: J. Morchain, Toulouse Biotechnology Institute	
O-334	Numerical and experimental investigation of the flow generated by a flat blade impeller used in perfusion processes A. D. Charalambidou ¹ , A. Ducci ² , M. Micheletti ¹ (¹ University College London, ² University College London)
O-335	Development of a scale-up methodology for batch phase separation of stirred liquid-liquid systems J. Villwock, M. Kraume (Technische Universität Berlin)
O-336	Volumetric mass transfer coefficient in mechanically agitated vessels. Experimental study T. Kracík, T. Moucha, A. Žák (University of Chemistry and Technology, Prague)

Poster session (2nd Dec)

Poster session 1 [15:00-16:00(JST)]

- P-101 Prediction of averaged shear rate in a static mixer using Metzner-Otto type correlation
Y. Konishi¹, T. Horie², T. Toyoda³, N. Ohmura¹
(¹ Kobe University, ² Osaka Prefecture University, ³ Kaneka Corporation)
- P-102 Scaleup of inline mixer in 3D printing of concrete
T. Wangler (ETH Zürich)
- P-103 Evaluation of mixing characteristics of a helical pipe type static mixer with Kenics type element using CFD
K. Ikeda, H. Furukawa, Y. Kato (Nagoya Institute of Technology)
- P-104 Incorporation of fine powders into a liquid using an in-line rotor-stator
A. Utomo¹, G. A. Padron¹, N. G. Özcan-Taşkın^{1,2}
(¹ BHR Group, ² Loughborough University)
- P-105 Cancelled
- P-106 Influence of dispersed phase fraction on droplet sizes and separation time in batch settler
S. Ye, L. Hohl, M. Kraume (Technische Universität Berlin)
- P-107 Prediction of the Bubble Size Distribution and the Mass Transfer Coefficient for an Aerated Stirred Tank
S. Fujioka¹, T. Mashima¹, H. Jansen², Y. Yamamoto¹, K. Terasaka¹, M. Schlüter²
(¹ Keio University, ² Hamburg University of Technology)
- P-108 Gas holdup formation and power consumption in mechanically agitated vessel
T. Kracík, T. Moucha (University of Chemistry and Technology, Prague)
- P-109 Modelling of 3D Particle-Liquid Flows Using a Data-Driven Machine Learning Approach
H. A. Sheikh, A. J. Jadhav, M. Barigou (University of Birmingham)
- P-110 Bioinspired synthesis of silica nanoparticles: degree of mixing and mixing time analysis
Y. Baba¹, M. Chiacchia^{1,2}, S. V. Patwardhan¹ (¹ The University of Sheffield, ² Nexxon)
- P-111 Polystyrene particle synthesis using ultrasound for preparation of emulsion
D. Kobayashi¹, A. Kawashima¹, R. Hiwatashi², K. Otake², A. Shono²
(¹ Tokyo Denki University, ² Tokyo University of Science)

- P-112 Effect of geometrical configuration of baffles on power consumption in a stirred vessel with different impellers
 Y. Ochi¹, E. Sato¹, H. Horiguchi², T. Horie³, Y. Komoda¹, N. Ohmura¹
 (¹ Kobe University, ² Sumitomo Heavy Industries Process Equipment, ³ Osaka Prefecture University)
- P-113 Effect of impeller speed on scale mitigation in an agitated vessel using maxblend impeller
 S. M. Khayry¹, E. Sato², M. Davoody^{1,3}, J. Wu³, N. Ohmura²,
 S. Madapusi¹, S. Bhattacharya¹, R. Parthasarathy¹
 (¹ RMIT University, ² Kobe University, ³ CSIRO Mineral Resources)
- P-114 CFD modelling of two-phase particle-liquid flow in a stirred vessel using a Eulerian- Lagrangian approach
 A. J. Jadhav, M. Barigou (University of Birmingham)
- P-115 Cancelled
- P-116 Mixing assessment of bi-disperse non-cohesive solid particles in a horizontal double paddle blender through experiments and DEM
 B. Jadidi, M. Ebrahimi, F. Ein-Mozaffari, A. Lohi (Ryerson University)
- P-117 Investigation of dispersion of solid particles in Newtonian and non-Newtonian fluids with coaxial mixers through tomography and numerical modelling methods
 P. Mishra, F. Ein-Mozaffari (Ryerson University)
- P-118 Micromixing time characterisation in continuous oscillatory baffled reactor
 M. Avila^{1,2}, D.F. Fletcher³, M. Poux¹, C. Xuereb¹, J. Aubin¹
 (¹ Université de Toulouse, ² Université de Toulouse, ³ The University of Sydney)
- P-119 Image analysis quantification of additive solution dispersion and mixing in a turbulent stirred tank
 D. Asano¹, R. Misumi¹, K. Tsuchioka²
 (¹ Yokohama National University, ² Sumitomo Metal Mining)
- P-120 Control of microstructure in ice cream by agitation speed during freezing
 M. Sawano¹, H. Masuda², M. Shimoyamada¹
 (¹ University of Shizuoka, ² Osaka City University)

Poster Session 2 [16:00-17:00(JST)]

- P-201 Analysis of vessel bottom type single-shaft composite mixer “MIXILATORTM”
K. Kanazawa¹, S. Nii², H. Nishikawa² (¹ CFDLAB, ² PRIMIX Corporation)
- P-202 Development of a High Performance Digest Reactor
K. Ago¹, T. Nemoto¹, Y. Kato¹, T. Kurinami², K. Igarashi², S. Inoue²
(¹ Satake MultiMix Corporation, ² Metawater)
- P-203 Effect of geometry of a stirring rod rotating agitator SWINGSTIR® on mixing performance
S. Yamada¹, N. Yamagami², T. Kato², T. Ogawa², N. Ohmura¹
(¹ Kobe University, ² Kobelco Eco-Solutions)
- P-204 Effect of rheological properties on the mixing pattern induced by a rotationally reciprocating anchor impeller
H. Hirose¹, Y. Komoda¹, T. Horie², N. Ohmura¹
(¹ Kobe University, ² Osaka Prefecture University)
- P-205 Influence of impeller projection area on heat transfer performance of mixing equipment
S. Kamakura, K. Takata (Kure National College of Technology)
- P-206 Mixing Time, Power Consumption, and Flow Dynamics in a 1 L Allegro™ STR Bioreactor Mimic
J. Delbridge¹, T. Barret², A. Ducci³, M. Micheletti¹
(^{1,3} University College London, ² Pall Corporation)
- P-207 Cancelled
- P-208 Fluid flow and mixing in an intermittently rotating vertical cylinder used for T-cell culture
G. Atanasova, A. Ducci, M. Micheletti (University College London)
- P-209 A two-layer PDMS microfluidic device for plant roots growth observation
D. Kralik¹, Z. Slouka¹, M. Fendrych²
(¹ University of Chemistry and Technology, Prague, ² Charles University)
- P-210 Fluid dynamics investigation of a single phase tank stirred by close-clearance impellers based on 3D-PIV measurements
H. Kubo¹, S. Iwasawa¹, K. Takenaka¹, F. Maluta², G. Montante², A. Paglianti³
(¹ Sumitomo Heavy Industries Process Equipment, ^{2,3} University of Bologna)
- P-211 Flow Pattern and Velocity Characteristics of Radial and Axial Impellers and the Effects on Mixing Time over a Range of Operating Conditions
Nor. Abdullahi¹, S. Ibrahim², C. E. Choong¹, N. S. Mohd¹, M. I. I. Z. Abidin³
(^{1,2,3} University of Malaya)

- P-212 CFD evaluation of impeller shape on the discharge performance in turbulent mixing
K. Morita, K. Takata (Kure National College of Technology)
- P-213 Cancelled
- P-214 CFD simulation of high-viscosity fluid in a stirred tank and verification by PIV measurement
N. Ogawa, R. Misumi (Yokohama National University)
- P-215 Data driven reconstruction of 3D large-scale structures inside a stirred tank from limited velocity measurements
K. Mikhaylov¹, S. Rigopoulos², G. Papadakis¹
(^{1,2} Imperial College London)
- P-216 Gas dispersion in yield-pseudoplastic fluids with coaxial mixers
P. L. Barros, F. Ein-Mozaffari, A. Lohi (Ryerson University)
- P-217 Mixing viscoelastic fluids with side-entering impellers – Control and optimized agitator designs
M. Kolano, M. Kraume (Technical University of Berlin)
- P-218 Scaling of compartment sizes in stirred viscoelastic fluids
A. Maywurm, M. Kolano, M. Kraume (Technical University Berlin)
- P-219 Using Alternating High-and-Low-Shear Environments to Examine the Build-up of Localized Yield Stress in Mineral Slurries of Nickel Laterite
Mohie A. Chaaban, Suzanne M. Kresta (University of Saskatchewan)

