

Solvay Workshop

“Chemo-hydrodynamic patterns and instabilities”

28 -30 October 2009
ULB – Campus Plaine – Salle Solvay
5th Floor, Building NO

Programme

Wednesday 28 October

8:15 9:00 Registration

Chemical reactions in complex flows

Chair: **A. Pocheau** (IRPHE)

9:00 9:10 Welcoming Address by A. De Wit

9:10 9:50 **T. Solomon** *Experimental studies of front propagation and pattern formation in advection-reaction-diffusion system*
(Bucknell University)

9:50 10:30 **Z. Neufeld** *Chemical and biological dynamics in prescribed chaotic and turbulent flows*
(University College Dublin)

10:30 – 11:00 Coffee Break

11:00 11:20 **A. Tzella** *Spatial structures of chaotically advected scalars: the role of a delay time*
(Ecole Normale Supérieure)

11:20 11:40 **H. Hastings** *Mixing effects in the ferroin-catalyzed BZ: reaction – physics versus chemistry*
(Hofstra University)

11:40 12:00 **A. Munuzuri** *External convective forcings effects on patterning in reaction-diffusion systems: experiments and theoretical studies*
(Santiago de Compostela)

12:00 – 14:00 Lunch

Biological and microfluidic applications

Chair: **S. Kalliadasis** (Imperial College)

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| 14:00 | 14:40 | P. Tabeling
(ESPCI, Paris) | <i>Microfluidic droplet stories</i> |
| 14:40 | 15:20 | J.-M. Garcia Ruiz
(Universidad de Granada) | <i>The role of fluid dynamics in protein crystallization</i> |
| | | 15:20 – 15:50 | Coffee Break |
| 15:50 | 16:30 | M. Bees
(University of Glasgow) | <i>Bioconvection: instability and Taylor dispersion in a tube</i> |
| 16:30 | 16:50 | J. Bois
(Max Planck Institute for
Physics of Complex
Systems) | <i>Polarity establishment in the one-cell <i>C. elegans</i> embryo as an active reaction-diffusion-advection process</i> |
| 16:50 | 17:10 | G. Guria
(Moscow Institute of
Physics and Technology) | <i>Pattern Formation in Intensive Blood Flow</i> |

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Thursday 29 October

Convection around chemical fronts I

Chair: **K. Eckert** (Technische Universität Dresden)

9:00	9:40	S. Morris (University of Toronto)	<i>Autocatalytic plumes</i>
9:40	10:20	M. Hauser (Otto-von-Guericke-Universität Magdeburg)	<i>TBA</i>
10:20 – 10:50		Coffee Break	
10:50	11:10	J. Merkin (Leeds University)	<i>The interaction between buoyancy and diffusion-driven instabilities of a propagating autocatalytic reaction front</i>
11:10	11:30	A. Toth (University of Szeged)	<i>Density fingering in horizontally propagating reaction fronts</i>
11:30	12:10	N. Vladimirova (University of New Mexico)	<i>Reactive Rayleigh-Taylor Instability in the Boussinesq Buoyancy Approximation</i>

12:10 – 14:00 **Lunch**

Convection around chemical fronts II

Chair: **V. Pimienta** (Université Paul Sabatier)

14:00	14:40	A. D'Onofrio (Universidad de Buenos Aires)	<i>Buoyancy-driven instabilities of miscible reactions fronts with double diffusion</i>
14:40	15:00	A. Taylor (Leeds University)	<i>Convection in pH fronts in reverse micelle systems</i>
15:00	15:20	M. Sheintuch (Technion)	<i>Transversal patterns in moving or oscillatory fronts of advection-reaction-diffusion systems</i>

15:30 – 17:30 **Poster session**

19:30 **Banquet**

Friday 30 October

Marangoni effects and reactive drops

Chair: **U. Thiele** (Loughborough University)

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|---------------|-------|--|---|
| 9:00 | 9:40 | D. Quéré
(Ecole Polytechnique
Palaiseau) | <i>On capillary propulsion</i> |
| 9:40 | 10:00 | T. Ban
(Doshisha University) | <i>Chemical control of droplet motion</i> |
| 10:00 | 10:20 | Y. Sumino
(University of Tokyo) | <i>Bebbling instability of oil droplet induced by growth/collapse of elastic complex</i> |
| 10:20 – 10:50 | | Coffee Break | |
| 10:50 | 11:30 | K. Eckert
(Technische Universität
Dresden) | <i>Marangoni cells in interaction with chemical reactions in liquid-liquid systems</i> |
| 11:30 | 11:50 | V. Pimienta
(Université Paul Sabatier
Toulouse) | <i>Reactive autocatalytic transfer of surfactant leading to Marangoni instability</i> |
| 11:50 | 12:10 | J. Pojman
(Louisiana State University) | <i>Buoyancy-driven and interfacial-tension-driven convection caused by polymerization</i> |

12:10 – 14:00 **Lunch**

Chemical réactions, fingering and instabilities in porous media and Hele-Shaw cells

Chair: **A. De Wit** (ULB)

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| 14:00 | 14:40 | G. Desmet
(VUB, Brussels) | <i>Visualization and quantification of the onset and the extent of viscous fingering in micro-pillar array columns for liquid chromatography</i> |
| 14:40 | 15:00 | Y. Nagatsu
(Nagoya Institute of
Technology) | <i>Experiments on viscous fingering involving viscosity changes due to chemical reactions</i> |
| 15:00 | 15:20 | M. Kawaguchi
(Mie University) | <i>Path instabilities of bubbles in aqueous solutions in a Hele-Shaw cell</i> |
| 15:20 – 15:50 | | Coffee Break | |
| 15:50 | 16:30 | M. Quintard
(IMFT, Toulouse) | <i>Reactive transport in porous media: multiple-scale analysis and dissolution instabilities</i> |
| 16:30 | 16:50 | D. Salin
(FAST, Paris) | <i>Autocatalytic reaction front: an active tracer for flow in fractures</i> |