

Winter School
**"Fluid
Foam Physics:**

**A Model For
Complex Systems"**

9th - 20th January 2006

Rhône-Alpes ^{Région}

ÉCOLE DE PHYSIQUE
LES HOUCHES



Winter School

"Fluid Foam Physics: A Model For Complex Systems"

at Ecole de Physique, Les Houches in the heart of the French Alps.
9th - 20th January 2006

Soap froths are a model for various other complex systems. Foam coarsening parallels grain growth and emulsion ripening, bubble walls are experimental realisations of mathematical minimisation of surfaces under constraints, drainage in foams is similar to flow across a deformable porous material. Briefly speaking, foams are probably the "simplest complex fluid": their mechanical behaviour has common points with the rheology of granular materials, biological cell aggregates, and various soft glassy materials. This stirs a constant flux of ideas, researchers and techniques between the foam community and other disciplines.

The aim of the school is to give to young researchers a complete overview of the present knowledge and current subjects of investigation in the physics of foams, in order to build a community centered on the subject. Different approaches (foam structure, rheology, drainage, coarsening) will be brought together. Other approaches coming from chemistry, mathematics and engineering, necessary for the understanding of the physical properties of foams, will be tackled. A particular interest will be given to the teaching of experimental and numerical methods of investigations, which will be organised as labs in small groups of people.

SCIENTIFIC COMMITTEE

Michèle Adler	(Université Marne-la-Vallée, France)
Renaud Delannay	(Université Rennes, France)
James Glazier	(University of Indiana, Bloomington, USA)
Dominique Langevin	(Université Paris Sud, Orsay, France)
Howard Stone	(Harvard University, Cambridge, USA)
Denis Weaire	(Trinity College Dublin, Ireland)

ORGANISING COMMITTEE

Francois Graner	(Université Grenoble, France)
Florence Elias	(Université Paris 7, France)
Wiebke Drenckhan	(Trinity College Dublin, Ireland)

CONTACT

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WEB

[www.maths.tcd.ie / ~foams](http://www.maths.tcd.ie/~foams)

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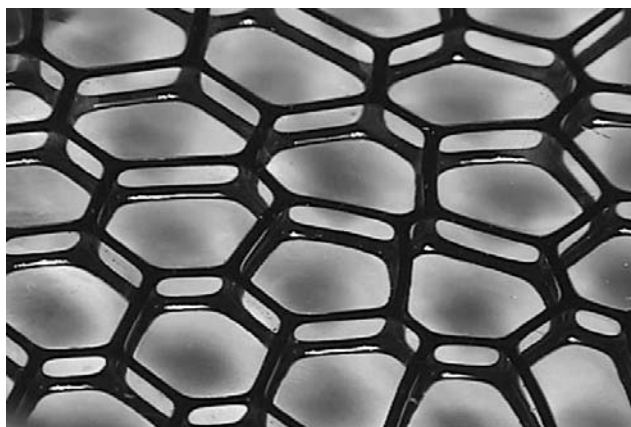
GENERAL SCHEDULE

The detailed Schedule of lectures, demonstrations and participants presentations is presented in the following pages.

The detail schedule of evening and afternoon programs is advertised during the school.

	Mon 9	Tue 10	Wed 11	Thu 12	Fri 13	Sat 14	Sun 15	Mon 16	Tue 17	Wed 18	Thu 19	Fri 20
- 8.30		Breakfast										
8.45-9.40 9.50-10.45 11.00-12.00		Lectures						Lectures				
12.00-13.00		Lunch										
14.00-17.00		Afternoon programs/ spare time										
17.00-18.00		Demonstrations/ Tutorials						Demonstrations/ Tutorials				
18.00-19.00		Participants' presentations						Participants' presentations				
19.00-20.00	Dinner											
		Various Evening programs / spare time										

**"Ferrofluid-foam between
Plexiglas plates"** (E. Janiaud)



LECTURES

Each morning 8.45 – 12.00
(8.45-9.40, 9.50-10.45, 11.45-12.00)

Abbreviations :

AB Andrew Belmonte

SCA Sylvie Cohen-Addad

SJC Simon Cox

RdA Rita de Almeida

ND Nikolai Denkov

WD Wiebke Drenckhan

FE Florence Elias

FG François Graner

AM Andre Moreira

ASJ Arnaud Saint-Jalmes



"Ordered micro-bubble crystals" (A. van der Net)

Tuesday 10 - chair : FG

WD: Introduction to the school

Introduction to foams : history, definitions (film / wall / edge, Plateau borders / vertices, bubbles, foams, emulsions; 2D and 3D; fluid fraction; T1 and T2)

ND: Monolayer, surface tension, critical micellar concentration, Marangoni effect

RdA: Foam topology: Euler and topological Gauss theorems in 2D and 3D

Wednesday 11 - chair : FE

FG: Applications of fluid foams: properties of foams, industry, daily life

AM: Plastic polymeric foams I : physics and chemistry, industrial process

RdA: Foam topology and geometry

Plateau rules in 2D and 3D, consequences.

Thursday 12 - chair : FG

ASJ: Pressures in foams: disjoining, osmotic, hydrostatic, Laplace

ND: Chemistry: foaming and antifoaming agents, including proteins and solid particles

Single film: stability, rupture, matching films to Plateau borders

AB: Coarsening in other diphasic systems: Ostwald ripening, colloids, pastes, emulsions, wet foams

Friday 13 - *chair : FE*

AM: Plastic polymeric foams II : mechanical properties, thermal properties, nanoporous foams

RdA: Dry foam and concentrated emulsion coarsening: review in 2D and 3D, growth law, scaling exponent, scaling state

ND: Interface mechanics: surface elasticity and viscosity, dilational viscosity
Friction on a solid wall

Saturday 14 - *chair : WD*

AB: Complex fluids in general (1st part)
Steady flow, basic notions, yield, viscoelasticity, normal stress
Slow dynamics and aging in general, memory effects, relaxations

FG: Basic notions of rheology in the case of foams
Phenomenology : triple behaviour (elastic, plastic, fluid), basic experiments
Stresses, normal stresses, deformation and strains

SCA: Waves and random media: sound, light, shocks
Non-invasive probes: conductivity, acoustics
Introduction to DWS demonstration

Monday 16 - *chair : WD*

AB: Complex fluids in general (2nd part)
Dynamic shear rheology, storage and loss moduli. Soft glassy rheology, stz, jamming
Granular media
2D hydrodynamics in general, and in particular within soap films

SJC: Minimal surfaces: equations, zero or constant mean curvature, relations with fluid foams
Energy minimisation in foams. Simulations of statics.
Compared advantages of the Surface Evolver and Potts model.
Other models, Voronoi.

SCA: Foam elasticity: elastic modulus, effect of fluid fraction

Tuesday 17 - *chair* : FG

- SCA:** Foam plasticity: rearrangements, slow dynamics, coupling with aging
- FE:** Pattern formation: different mechanisms leading to cellular patterns in physics and biology
Equilibrium and metastability, time scales, grains
- SJC:** Simulations of rheology.
Continuous media, viscous froth, bubble model.

Wednesday 18 - *chair* : WD

- SCA:** Dissipation: foam flows, oscillatory and permanent flows, non-linear visco-elasticity
Time and frequency responses
- FG:** 3D non-invasive imaging: optical and X-ray tomography, NMR, confocal and stereo microscopy
- ASJ:** Drainage : introduction
History, basic concepts, scaling arguments, different regimes

Thursday 19 - *chair* : FE

- SJC:** Drainage equation and its solutions
Drainage instabilities: convective, meandering
- ASJ:** Drainage : advanced results.
Viscosity, extreme regimes, coupling with coarsening, microgravity
- WD:** Microfluidics: confined flows, including discrete microfluidics with foams (1/2)
- AS:** Fluid dynamics simulations of foams with finite element methods (COMSOL) (1/2)

Friday 20 - *chair* : FG

- SJC:** Solid cellular materials: metallic and ceramic foams.
Structure and fabrication (in relation with fluid foams), applications, microgravity
- WD:** Open problems and current debates: including yield, fractures, scaling state, elastic turbulence, rheology, dilatancy, thixotropy, convective instability
- ASJ:** Emerging questions in 2006, future research directions
Summary and conclusion

DEMONSTRATIONS / TUTORIALS

Every day 5 pm – 6 pm

The demonstrations are organised in small groups of participants. Each demonstration is presented in 15 or 30 minutes every day for four days. The participants are asked to register for the demonstrations at the beginning of each week.

First week (Tuesday 10th – Friday 13th January)

Experimental demonstrations:

- *Physico-chemistry of foams and interfaces*

Part 1. Spreading of surfactants and oils on solution surfaces; Marangoni effect.

Part 2. Effect of surfactant on foaminess and foam stability; antifoam effects.

Presented by: Nikolai Denkov, Sofia University, Bulgaria

- *Two-dimensional foam flow*

Presented by Christophe Raufaste, Université Joseph Fourier Grenoble, France

- *Creative foams*

Basic foam fabrication and manipulation, multiscalefluidics, create your own foam...

Presented by: Antje van der Net and Wiebke Drenckhan, Trinity College Dublin, Ireland

Numerical demonstrations:

- *Image analysis*

Part 1: basic presentation

Part 2: advanced tutorial

Presented by Eric Janiaud, Trinity College Dublin, Ireland

Second week (Monday 16th – Friday 20th January)

Experimental demonstrations:

- *Diffusing Wave Spectroscopy on foams*

Application to the study of slowly evolving foams

Presented by: Sylvie Cohen-Addad, University Marne-la-Vallée, France.

- *Conducivity of foams and light scattering*

Application to the study of foam drainage

Presented by: Arnaud St-Jalmes, University Paris Sud Orsay, France.

- *Creative foams*

Basic foam fabrication and manipulation, multiscalefluidics, create your own foam...

Presented by: Antje van der Net and Wiebke Drenckhan, Trinity College Dublin, Ireland

- *Microfoams: generation and flow*

Presented by: Presented by: Philippe Marmottant and Jan-Paul Raven, University Joseph Fourier Grenoble, France

Numerical demonstrations:

- *Surface Evolver*

Part 1: basic presentation

Part 2: advanced tutorial

Presented by: Simon Cox, University of Aberystwyth, UK

- *Potts model for foams*

Presented by: Rita de Almeida, Universidade Federal do Rio Grande do Sul Porto Alegre, Brazil

- *COMSOL (former FEMLAB) for fluid dynamics of foams*

Presented by: Anthony Saugey (all Thursday afternoon)

PARTICIPANTS' PRESENTATIONS

Every day 6 – 7 pm

Tuesday 10

Films and Interfaces/Microgravity

Andretta, Gaelle
Santinit, Eva
Tchoukov, Plamen
Carrier, Vincent
Marze, Sebastien

Wednesday 11

*Foam formation/
Foamability/Stability*

Cervantes, Alfredo
Somosvari, Bela Marton
Bikard, Jerome
Babcsan, Norbert

Thursday 12

Imaging/Structure

Mokso, Rajmund
Terriac, Emmanuel
Van der Net, Antje
Delaney, Gary

Friday 13

Rheology

Durand, Mark
Gay, Cyprien
Janiaud, Eric
Du, DonhXing

Monday 16

Granular Media

Krishan, Kapil
Goldenberg, Chay
Cixous, Pierre
Ramaoli, Marco
Fritz, Christelle

Tuesday 17

Micro-foams/ microfluidics

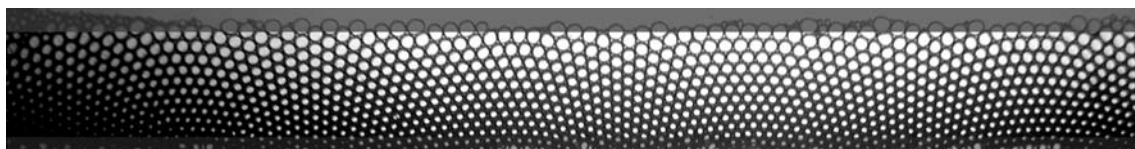
Raven, Jan-Paul
Lorenceanu, Elise
Yip Cheung, Sang Yann
Marchalot, Julien

Wednesday 18

Miscellaneous

Feitosa, Klebert
Boyaval, Sebastien
Kaefer, Jos
Canete, Antonio
Gochew, Georgi

"Conformal Foam"
(by W. Drenckhan)



TEACHERS' INFORMATION

Andrew L. BELMONTE

Born: 1st of January 1966 (age 40)
Country: USA
Adresse : W. G. Pritchard Laboratory
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Since 2004 : **Associate Professor,**
Department of Mathematics, Pennsylvania State
University.
1998 – 2004 : Assistant Professor, Department of Mathematics,
Pennsylvania State University.
1996 – 1998 : Postdoctoral Associate, Department of Physics, University
of Pittsburgh.
1996 – 1998 : Postdoctoral Associate, CNRS Institut non-linéaire de Nice,
France.

Research interests:

Mechanical and Hydrodynamic instabilities. Pattern formation. Non-linear dynamics. Mathematical Physics.

Teaching:

Advanced Calculus for Engineers/Scientists; Mathematical Modeling of the Physical World; Introduction to Applied Mathematics; Partial Differential Equations; Statistical Mechanics; Mathematical Fluid Dynamics; Calculus with Applications in Biology

5 Selected publications from the last 5 years:

1. J. R. Gladden, N. Z. Handzy, A. Belmonte and E. Villermaux, « Dynamic buckling and fragmentation in brittle rods », Phys. Rev. Lett 94, 35503 (1-4) (2005)
2. N. Z. Handzy and A. Belmonte, « Oscillatory rise of bubbles in wormlike micellar fluids with different microstructures », Phys. Rev. Lett. 92, 124501 (1-4) (2004)
3. M. C. Sostarecz and A. Belmonte, « Motion and shape of a viscoelastic drop falling through a viscous fluid », J. Fluid Mech. 497, 235 (2003)
4. T. Podgorski and A. Belmonte, « Surface folds during the penetration of a viscoelastic fluid by a sphere », J. Fluid Mech. 460, 337 (2002)
5. A. Belmonte, M. J. Shelley, S. T. Eldakar and C. H. Wiggins, « Dynamic pattern and self-knotting of a driven hanging chain », Phys. Rev. Lett. 87, 114301-4 (2001).

Surname	Cohen-Addad	Photograph: 
First name	Sylvie	
Gender	F	
Year of birth	29/11/1965	
Position	Prof	
Institution / Company	UMLV / CNRS	
Address	Laboratoire Physique des Matériaux Divisés et des Interfaces / UMR 8108, Université de Marne-la-Vallée, 5 Bd Descartes, Champs-sur-Marne-, 77454 Marne-la-Vallée cedex 2, France	
Phone number	01 60 95 72 83	
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Research background and interest: Aqueous foams: Structure, ageing, rheology. Froth flotation. Multiple light scattering. Diffusing-wave spectroscopy		
Abstract for presentation:		
Additional information: 1. Hohler R, Cohen-Addad S, "Rheology of liquid foam" JOURNAL OF PHYSICS-CONDENSED MATTER 17 (41): R1041-R1069, 2005 2. Rouyer F, Cohen-Addad S, Hohler R, "Is the yield stress of aqueous foam a well-defined quantity?", COLLOIDS AND SURFACES A-PHYSICOCHEMICAL AND ENGINEERING ASPECTS 263 (1-3): 111-116 AUG 1 2005 3. Cohen-Addad S, Hohler R, Khidas Y, "Origin of the slow linear viscoelastic response of aqueous foams", PHYSICAL REVIEW LETTERS 93 (2): Art. No. 028302 JUL 9 2004 4. Hohler R, Cohen-Addad S, Labiausse V, "Constitutive equation to describe the nonlinear elastic response of aqueous foams and concentrated emulsions ", JOURNAL OF RHEOLOGY 48 (3): 679-690 MAY-JUN 2004 5. Hohler R, Labiausse V, Cohen-Addad S, "High-resolution diffusing-wave spectroscopy using optimized heterodyne detection" JOURNAL OF THE OPTICAL SOCIETY OF AMERICA A-OPTICS IMAGE SCIENCE AND VISION 20 (11): 2179-2184 NOV 2003 6. Rouyer F, Cohen-Addad S, Vignes-Adler M, et al. Dynamics of yielding observed in a three-dimensional aqueous dry foam PHYSICAL REVIEW E 67 (2): Art. No. 021405 Part 1 FEB 2003 7. Cohen-Addad S, Hohler R, "Bubble dynamics relaxation in aqueous foam probed by multispeckle diffusing-wave spectroscopy" PHYSICAL REVIEW LETTERS 86 (20): 4700-4703 MAY 14 2001 8. Hohler R, Cohen-Addad S, Asnacios A, "Rheological memory effect in aqueous foam" EUROPHYSICS LETTERS 48 (1): 93-98 OCT 1 1999 9. Cohen-Addad S, Hoballah H, Hohler R, "Viscoelastic response of a coarsening foam", PHYSICAL REVIEW E 57 (6): 6897-6901 JUN 1998		

Simon J. Cox

Born: 19 September 1972 (age 33)
Country: UK
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Since 2005 : Lecturer in Mathematics,
University of Wales
Aberystwyth

2002 – 2004 : Temporary Lecturer, Physics
department of Trinity College
Dublin, Ireland.

1998 – 2002 : Postdoctoral Fellow, Physics department of Trinity College
Dublin, Ireland.

1998 : PhD in Applied Mathematics, University of East Anglia,
Royaume-Uni.

Research interests:

Structure, drainage and rheology of foams and cellular materials.
Minimal Surfaces.

Teaching:

Numerical Analysis; Computational Rheology; Mathematical Biology;
Applied Mathematics and Computational Physics.

5 Selected publications from the last 5 years:

1. S. J. Cox, « A viscous froth model for dry foams in the Surface Evolver », *Coll. Surf. A* **263**, 81 (2005)
2. S. J. Cox and F. Graner, « Three-dimensional bubble clusters : shape, packing and growth rate », *Phys. Rev. E* **69**, 031409 (2004)
3. S. J. Cox and G. Verbist, « Liquid flow in foams under microgravity », *Microgravity Sci. Tech. XIV* **4**, 45 (2003)
4. S. J. Cox and M. A. Fortes, « Properties of three-dimensional bubbles of constant mean curvature », *Phil. Mag. Letts* **83**, 281 (2003)
5. S. J. Cox, M. F. Vaz and D. Weaire, « Topological changes in a two-dimensional foam cluster », *Eur. Phys. J. E* **11**, 29 (2003).

Rita Maria Cunha DE ALMEIDA

Born : 21 April 1958 (age 47)
Country: Brazil
Address : Universidade Federal do Rio Grande do Sul - Av. Bento Gonçalves 9500
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Since 1985 : **Adjunct Professor**, Physics Institute, Federal University of Rio Grande do Sul, Brésil
Pesquisadora (Research Fellow) CNPq (I-C)
1988 : **Doutorado em Ciências (PhD)**, Physics Institute, Federal University of Rio Grande do Sul

Research interests:

Complex systems, simulations and theory.
Biologically motivated problems: theory, simulations and experiments.
Diffusion related problems: theory and simulations. Application to
Oxygen reaction and diffusion in Si.

Teaching:

Basic Physics (entry course for Physics and Engineering undergraduate students)
Statistical Physics (for undergraduate Physics students)
Foams (for Physics graduate students)

List of 10 publications:

1. R.M.C. de Almeida and J.R. Iglesias, « Equilibrium States of 2D Cellular Structures », *Phys. Lett. A* **138**, 253 (1989).
2. J.C.M. Mombach, M.A.Z. Vasconcellos and R.M.C. de Almeida, « Arrangement of Cells in Vegetable Tissues », *J. Phys. D* **23**, 600 (1990).
3. J.R. Iglesias and R.M.C. de Almeida, « Statistical Thermodynamics of a Two Dimensional Cellular System », *Phys. Phys. Rev. A* **43** 2763 (1991).
4. J.C. Mombach, R.M.C. de Almeida and J.R. Iglesias, « Mitosis and Growth in Biological Tissues », *Phys. Rev. E* **48**, 598(1993).
5. G.D. Burnett, J.J. Chae, W.Y. Tam, R.M.C. de Almeida and M. Tabor, « The Structure and Dynamics of Breaking Foams », *Phys. Rev. E* **51**, 5788 (1995).
6. R.M.C de Almeida, and J.C.M. Mombach, « Scaling States of Three Dimensional Foams », *Physica A* **236**, 268 (1997).
7. R.M.C. de Almeida and M.A. P. Idiart, « Information space dynamics for neural networks », *Phys. Rev. E* **65**, 061908 (2002).
8. R.M.C. de Almeida and I.J.R. Baumvol, « Reaction-diffusion in high-k dielectrics on Si », *Surface Science Reports*, **49**, 1, (2003).
9. Profiling cytogenetic diversity with entropy-based karyotypic analysis, Castro MAA, Onsten TTG, de Almeida RMC, Moreira JCF. *Journal of Theoretical Biology* **23**, 487 (2005).
10. Mauro A.A. Castro, Verônica A. Grieneisen and Rita M. C.de Almeida, « Disrupt and de novo formation of nanotubular membrane extensions in SW620 colon carcinoma cell line during cell division », *Cell Biology International* (2005), to appear.

Nikolai DENKOV

Born: 3 September 1962 (43 ans)
Country : Bulgaria
Address : Laboratory of Chemical Physics & Engineering (LCPE)
Faculty of Chemistry, Sofia University
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Since 1998 : Associate Professor of Theoretical Chemistry, Sofia University, Bulgaria
2001-2004 : External Consultant to Rhodia Silicones Europe, Lyon, France.
2003-2004 : Leading scientist, Unilever R&D, Edgewater NJ, USA
1997-1998 : Senior Research Associate in Rhone-Poulenc Silicones, Lyon, France.
1996-1997 : Assistant Professor, Laboratory of Thermodynamics & Physico-chemical Hydrodynamics (LTPH), Faculty of Chemistry, Sofia University.
1994-1995 : Research Associate in Nagayama Protein Array Project, ERATO, JRDC, Tsukuba, Japan.
1991-1994 : Chemist - researcher in LTPH.
1991 : Ph. D. at LTPH, Faculty of Chemistry, Sofia University.

Research Interests:

Surface forces and Stability of thin films (colloidal structure forces, stratification); Foam generation, rheology, and stability; Antifoam effect; Formation and Stability of Emulsions; Colloid crystals; Mechanisms of detergency; Experimental methods in colloid and interface science

Teaching:

Stability of Dispersions, Separation Processes in Colloid Systems, Interfacial Phenomena and Stability of Dispersions, Chemical Kinetics and Catalysis.

5 Selected publications from the last 5 years:

2. P. A. Kralchevsky, N. D. Denkov, "Capillary Forces and Structuring in Layers of Colloid Particles", *Current Opinion Colloid Interface Sci.* **6** (2001) 383-401.
3. N. Denkov, S. Tcholakova, K. Marinova, A. Hadjiiski, "Role of Oil Spreading for the Efficiency of Mixed Oil-Solid Antifoams", *Langmuir* **18** (2002) 5810-5818.
4. N. D. Denkov, "Mechanisms of foam destruction by oil-based antifoams", Invited Feature article *Langmuir*, **20** (2004) 9463-9505.

5. N. D. Denkov, et al. "Wall slip and viscous dissipation in sheared foams", *Colloids Surfaces A: Physicochem. Engin. Aspects* **263** (2005) 129-145.
6. N. D. Denkov, K. G. Marinova, "Antifoam effects of solid particles, oil drops and oil-solid compounds in aqueous foams", Chapter 10 in *Colloidal Particles at Liquid Interfaces*, B. P. Binks and T. S. Horozov Eds., Cambridge University Press, in press.

Wiebke DRENCKHAN

Born: 06 April 1977 (age 28)
Country: Ireland
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 Trinity College Dublin,
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Since 2004 : **postdoc** (EMBARC Fellow) at Trinity College Dublin
2004 : **PhD**, Physics department, Trinity College Dublin
1997-2004: Fellow of the German National Merit

Research interests:

Soft condensed matter (in particular foams), Fluid dynamics, Drainage and rheology of foams, Morphogenesis and self-organisation, Microfluidics, Computational Physics.

Teaching:

Teaching at primary and secondary school, Tutorials at University

5 Selected publications from the last 5 years:

1. W. Drenckhan, S. Cox, G. Delaney, H. Holste, D. Weaire, « Rheology of ordered foams - on the way to Discrete Microfluidics », *Coll. Surf. A* **263**, 52 (2005)
2. W. Drenckhan, S. Gatz, D. Weaire, « Wave patterns of a rivulet of surfactant solution in a Hele-Shaw cell », *Phys. Fluids*, **16**, 31115 (2004)
3. W. Drenckhan, S. Cox, D. Weaire, « The demonstration of conformal maps with two-dimensional foams », *Eur. J. Phys.* **25**, 429 (2004)
4. W. Drenckhan, F. Elias, S. Hutzler, D. Weaire, E. Janiaud, J.-C. Bacri, « Bubble size control and measurement in the generation of ferrofluid foams », *J. App. Phys.* **93**, 10078 (2003)
5. P. McGuinness, W. Drenckhan, D. Weaire, « The optimal tap: investigations in nozzle design », à paraître dans *Eur. J. Phys.* (2005)

Andre G. MOREIRA

Born : 3 May 1973 (age 32)
Country: Germany
Address : BASF AG – Polymer Physics,
67056 Ludwigshafen,
Germany
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Since 2003 : **Scientist**, BASF AG, Ludwigshafen, Allemagne.
Responsable du laboratoire *Permeation, Sorption and Foams* au Polymer Physics Department.

2001 – 2003 : Postdoc, Materials Research Laboratory, Univ. Of California, Santa Barbara, USA

2001 : Postdoc, Max Planck Institute for Colloids and Interfaces, Golm, Allemagne.

2004 : **PhD** in Theoretical Physics, University of Potsdam and Max Planck Institute for Colloids and Interfaces, Golm, Germany.

Research interests:

Foam formation, Nucleation in polymer foams, Adhesion of polymers, Interactions in ionic fluids.

5 Selected publications from the last 5 years:

1. G. Moreira and V. Schädler, « Plastic foams : an industrial perspective », in the Proceedings of the conference *Blowing agents and foaming processings*, RAPRA publications (2005)
2. G. Moreira and C. M. Marques, « The role of polymer spacers in specific adhesion », J. Chem. Phys. **120**, 6229 (2004)
3. G. Moreira, S. A. Baeurle and G. H. Fredrickson, « Global stationary phase and the sign problem », *Phys. Rev. Lett.* **91**, 150201 (2003)
4. J. Dzubiella, A. G. Moreira and P. Pincus, « Polyelectrolyte – colloid complexes : polarizability and effective interaction », *Macromolecules* **36**, 1741 (2003)
5. G. Moreira and R. R. Netz, « Binding of similarly charged plates with counterions only », *Phys. Rev. Lett.* **87**, 078301 (2001).

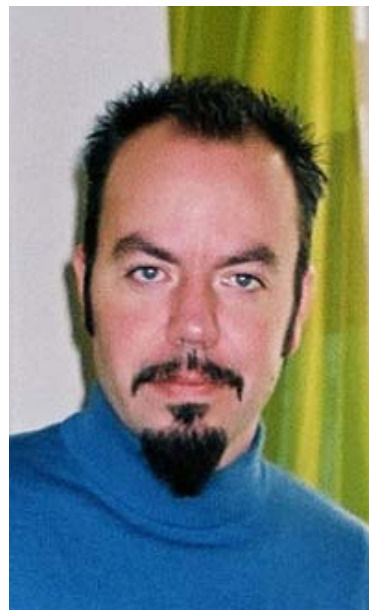
Arnaud SAINT-JALMES

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Research: Soft Matter and Physic-Biology
Interface: structure and dynamics of liquid
interfaces and thin liquid films, foams and
emulsions



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Research: Anything that has to do with foam,
physics and life in general!



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Research: ferrofluids, ferrofluid
foams, acoustic properties of
foams



PARTICIPANTS' INFORMATION

Surname	ANDREATTA	Photograph: 
First name	Gaëlle	
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Year of birth	1982	
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Research background and interest:		
I have studied physical chemistry of complex systems in ESPCI, Paris, and physics of liquids for my master degree in Université Pierre et Marie Curie, Paris 6. I started a PhD one month ago, in which I am going to study the self assembling properties in freestanding films of complex molecules. I will investigate the possibilities of ordering different inorganic molecules in films stabilized by different surfactants.		
Abstract for presentation:		
I would like to present interactions in films stabilized by a polymer (pNIPAM) interacting surfactant (SDS). This system presents interesting macroscopic properties (gas permeability) which were correlated to the microscopic structure of a black film investigated by X-Ray reflectivity.		
Additional information:		

Surname	Babcsan	Photograph:
First name	Norbert	
Gender	male	
Year of birth	1972	
Position	Scientific Coworker	
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Fax	+49-30-8062-3059	
Email	babcsan@hmi.de	
Research background and interest:		
2006	Scientific Coworker at <i>HMI Berlin, Germany</i>	
2003-2005	Postdoctoral researcher and International Trainee of the European Space Agency at <i>TU and HMI Berlin, Germany</i> . Work on in-situ examination of liquid-metal foam stability by X-ray radiography.	
2003	Summa cum laude PhD on the subject of "Ceramic Particles Stabilized Metal Foams" at <i>University of Miskolc, Hungary</i> with cooperation of <i>Technical University of Vienna, Austria</i>	
2001-2002	Scientific Advisor at <i>Leichtmetall Kompetenzzentrum Ranshofen, Austria</i> . Work on aluminum metal foam research and development. Advisor on stability criteria of particle-stabilized foamed metallic melts and metallographical examination of solidified metal foams.	
1996-2001	Assistant lecturer at <i>University of Miskolc / Materials and Metallurgical Engineering Faculty, Hungary</i> .	
1994-1995	Research visit to NASA / Marshall Space Flight Center / US , Employed by NASA Marshall Space Flight Center at Huntsville, Alabama, US. Research work on space related materials science on the field of crystal growth. Installed the Hungarian Space Furnace called UMC at NASA.	
Main Interest: <i>liquid metal foams, foam stabilization by particles, X-ray monitoring of foam formation and decay</i>		
Abstract for presentation:		
Liquid Metal Foams: High Temperature Colloids		
Any liquid matter should be foamable and so is liquid metal. The question is what kind of additive can stabilize the foam structure. In case of liquid metal foams these stabilizers are solid inclusions. The role of the inclusions will be shown by using ex situ microstructural and in situ X-ray radioscopy investigations. Classification of the foamable precursors is made based on the analogy with colloid systems. The effect of the foaming gas on foam stability will also be introduced.		
Additional information:		

Surname	Bikard	Photograph: 
First name	Jérôme	
Gender	Male	
Year of birth	1976	
Position	Junior Researcher	
Institution / Company	CEMEF - Ecole des Mines de Paris	
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Fax	0033 (0) 4 92 38 97 52	
Email	Jerome.bikard@ensmp.fr	
Research background and interest:		
Modelling, foam expansion description (microscale and macroscale), polymer processing (moulding), thermomechanical couplings ...		
Abstract for presentation:		
The quality of thermosetting polymer foams (like polyurethane foam, used for example in car industry) depends mainly on the manufacturing process. A micro/macro model of expansion by chemical reaction is implemented in the study. At a microscopic scale, the foam is modelled by the expansion of N gas bubbles in a pseudoplastic matrix of polymer whose rheology evolves with polymerization. The initial bubbles correspond to germs, which are supposed quasi-homogeneously distributed in the polymer. An elementary volume of foam ($\sim 1 \text{ mm}^3$) is phenomenologically modelled by a diphasic medium (polymer and immiscible gas bubbles). The evolution of each component is governed by equations resulting from thermodynamics of irreversible processes: the relevant state variables are pressure, temperature, the conversion rate of the reaction creating gas in the bubbles and the rate of polymerization in the fluid. At the macroscopic scale, the foam can be modelled by a quasi-homogeneous compressible fluid, whose thermomechanical behaviour depends on the porosity, size of cells distribution, thickness of the walls for example. The evolution of the mixture in a moulding process is governed by equations resulting from thermodynamics of irreversible processes and homogenisation considerations. A mixed finite element method with multidomain approach is developed for mesoscopic and macroscopic simulations in order to simulate the average growth rate of the foam during its manufacture (coupling temperature) and to characterize the influence of the process conditions and the microscopic structure on the parameters of the macroscopic model.		
Additional information:		

Surname	BOYAVAL	Photograph:
First name	Sébastien	
Gender	Male	
Year of birth	1982	
Position	Ph.D. student	
Institution / Company	CERMICS / ENPC	
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Research background and interest:		
Multi-scale simulations (micro-macro) ; (complex) fluid mechanics		
Abstract for presentation:		
(possible) generalities with micro-macro		
Additional information:		

Surname	CAÑETE	Photograph:
First name	ANTONIO	
Gender	Male	
Year of birth	1977	
Position	Ph. D. student, and also assistant teacher	
Institution / Company	Universidad de León	
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Research background and interest:		
I am a graduate student in Mathematics at the University of Granada (Spain), finishing my Ph. D. Thesis on (multiple) isoperimetric problems. Some of the questions I am studying deal with planar multiple bubble problems, where the main difficulty is managing the large number of possible configurations. Hence, methods for classifying the configurations (and even for discarding them!) would be interesting to me. Also computational simulations will be of interest, and of course, meeting other people studying similar topics to mine.		
Abstract for presentation:		
Least-perimeter partitions of the disk: In this talk we will consider the isoperimetric problem of partitioning a planar disk into n regions of prescribed areas, using the least possible perimeter. This problem models properly a big range of phenomena, as the shape of a cellular tissue in its division process, or the interfaces separating several fluids. We will give the regularity conditions that least-perimeter partitions must satisfy, obtain the solutions for the cases of two and three regions, and conjecture the expected solutions in the unsolved cases.		
Additional information:		
Currently, I have a position as assistant teacher in the Department of Mathematics of the University of León (Spain).		

Surname	Carrier	Photograph:
First name	Vincent	
Gender	Male	
Year of birth	1973	
Position	Post-doc	
Institution / Company	Trinity College	
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Research background and interest:		
PhD on foam drainage and coalescence, compared also with biliquid foams. Post-docs on nanotube dispersions, rheology and dynamics of colloidal glasses. Now coming back on the foam drainage study. Interested in the role of films in drainage, the drainage in every aspect, the coalescence also. Interested also in biliquid foams.		
Abstract for presentation:		
We have measured the thickness of foam films inside draining foams and found that their thickness was increasing approx. linearly with the liquid fraction, reaching 2 microns close to 4% in liquid fraction. This thickness is huge and demonstrates that the flow of liquid inside the films (shown to be complex), can not always be neglected. We'll strengthen the fact that this opens a large area of study as this film swelling as well as the pattern of water flow through the films seems to depend on numerous parameters such as surfactant nature and concentration and bubble size.		
Additional information:		

Surname	Cervantes	Photograph: 
First name	Alfredo	
Gender	Male	
Year of birth	1974	
Position	Student	
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alfredo@cervantes.uson.mx		
Research background and interest:		
I am doing my PhD in Universidad de Sonora (Mexico). My work is on the structure and dynamics of polymer-surfactant stabilized foams. My PhD advisor is Dr. Amir Maldonado. My co-advisor in France is Profr. Dominique Langevin. In a visit to the Dominique Langevin`s group in 2003, I performed several experiments on foam drainage. I have investigated the role of the surfactant-cosurfactant mass ratio on the drainage regime. Results of this work were presented in the 2004 March Meeting of the American Physical Society. A paper has been accepted for publication the Journal of Colloid and Interface Science (2005). I am very interested in this winter school. I think it will be very useful for my PhD work.		
Abstract for presentation:		
I would present preliminary results on the formability, foam stability and drainage of SDS-HEUR and SDS-PEO Stearate foams. We studied the role of polymer-surfactant mass ratio. I will send the final abstract later.		
Additional information:		
After the Foam School I will make a visit to the Dominique Langevin`s group in order to perform experiments with different techniques.		

Surname	Cixous	Photograph: 
First name	Pierre	
Gender	Male	
Year of birth	1979	
Position	Student	
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Research background and interest:		
I am presently beginning a PhD on experiments on dense granular matter aiming to understand the coupling between the topological organization of grains and the mechanical or rheological properties of this complex material. In its dense phase, granular matter is a macroscopic example of structural disorder complex system. I would like to participate in the winter school for having a broad view of the field of complex fluids and to understand the possible connections between foams and granular materials.		
Abstract for presentation:		
I am working on a 2D disordered granular matter crossed by an intruder displaced at a constant velocity. I will introduce preliminary results on the grain motions around an intruder and on the forces applied on it as a function of packing fraction and speed.		
Additional information:		
First year of PhD.		

Surname	Delaney	Photograph:
First name	Gary	
Gender	male	
Year of birth	1981	
Position	PhD Student	
Institution / Company	Physics, Trinity College Dublin	
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Phone number	+353 1 608 8453	
Fax	+353 1 671 1759	
Email	garyd@maths.tcd.ie	
Research background and interest:		
I am chiefly interested in the computational modeling of Foams, Soft Matter and Granular Materials.		
Abstract for presentation:		
I will present results of foam simulations that I have done during my PhD. These will include simulations of 3D bubble packings in wet foams, where I have employed a simple model based on interacting spheres. These will be compared and contrasted with experimental results obtained by members of the Foam Physics group in TCD.		
Additional information:		
I am in the process of completing my PhD and intend to submit my thesis in early 2006.		

Surname	Derec	Photo 
First name	Caroline	
Gender	F	
Year of birth	29/04/1974	
Position	Teacher and Researcher	
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Research background and interest: <i>previous topics :</i> • Aging in colloidal pasty phases • Fast settling of a colloidal gel <i>actual topics :</i> • Magneto-convective instability in Hele-Shaw cells • Diffusion in ferrofluid/water laminar flow in microchannels upon magnetic field • Mixing in microchannels using magnetic properties of ferrofluids		

Surname	DU	Photograph: 
First name	Dongxing	
Gender	Male	
Year of birth	1971	
Position	Postdoctoral Research Associate	
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Research background and interest:		
I have worked on the foam rheology in porous media in Delft University of Technology for more than one year. In detail, my research interest focus on the foam propagation process in porous media in lab scale and the foam flow characteristics in a waving tube for understanding the microscopic transportation mechanism for foam flow in porous media.		
Abstract for presentation:		
I'd like to present the experimental results on the CO2 and N2 foam propagations in sandcore samples with the aid of CT-scanner, for investigating the effect of water solubility on foam displacement in porous media. If possible, I would like also to present the preliminary results on our foam rheology experiments in a waving tube.		
Additional information:		

Surname	Durand	Photograph: 
First name	Marc	
Gender	male	
Year of birth	1975	
Position	Research Associate Prof.	
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Research background and interest:		
After a few years working on foam drainage, I recently oriented my research on the geometrical and topological aspects of natural cellular networks, like the leaf venation or blood circulatory systems. So, maybe one of my last foam conference ?...		
Abstract for presentation:		
2 talks:		
- " <u>The (very) long story of the T1 process dynamics</u> ": It takes few milliseconds for a fourfold junction of a 2D foam to switch to a more stable configuration, by splitting up into two threefold junctions (half of a so-called "T1 process", or T-1/2 process). It has been few weeks for realizing experiments on the timing of this phenomenon. It took me several months to produce a theory in agreement with the data. I will try to sum it up in 15 minutes...		
- " <u>Cellular networks with optimal transport and mechanical properties</u> ": I will present theoretical works about cellular structures optimizing transport and mechanical properties, and discuss the consequence of these considerations on the specific case of foams.		
Additional information:		

Surname	EMBLEY	Photograph:
First name	BEN	
Gender	Male	
Year of birth	1983	
Position	Student	
Institution / Company	University of Manchester	
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Email	benjamin.embley@ postgrad.manchester.ac.uk	
Research background and interest:		
I studied Chemical Engineering at the University of New Brunswick, Canada, and in July 2005 I began a PhD at Manchester, where my research project deals with the effects of 3D gravitational loading on foam structure and drainage.		
Abstract for presentation:		
Additional information:		

Surname	Farajzadeh	Photograph: 
First name	Rouhollah	
Gender	Male	
Year of birth	20-03-1979	
Position	PhD Student	
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Research background and interest: Dynamics of Complex Fluids in Porous Media		
Abstract for presentation: none		
Additional information:		

Surname	Feitosa	Photograph:
First name	Klebert	
Gender	Male	
Year of birth	1971	
Position	Postdoc	
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Research background and interest:

I did my PhD at the Univ. of Massachusetts Amherst, focusing in granular gases. After my graduation in 2004, I joined the lab of Dr. Douglas J. Durian at Penn working with steady state foams. Questions regarding foam evolution, coarsening and drainage are the central part of my current research in foams. We collaborate with other Penn condensed matter researches that have similar interests such as Dr. A. Liu and Dr. R. Kamien. I have a broad interest in complex fluids in general, but particularly granular media and foams. I plan to explore in the future more of the underlying physics that connects these two kinds of soft matter. Attending the winter school will be of great value to strengthen my background on foams and complex fluids.

Abstract for presentation:

TRANSPORT OF GAS IN STEADY STATE AQUEOUS FOAMS-

I will discuss an experiment performed to investigate the transport of gas in a column of aqueous foam. The foam is maintained in steady state by a constant flux of gas at the bottom. The bubble velocity, liquid-fraction and bubble-size vertical profiles are measured in the sample. The results show that in steady state the bubble velocity is constant, the liquid-fraction profile is set predominantly by the viscous drag, and the coarsening rate depends on the inverse of the square root of liquid fraction. These findings provide a simple description of steady state foams via the drainage and coarsening equations.

Surname	Francis	Photograph:
First name	Timothy	
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Year of birth	1978	
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Email	Timothy.francis@basf-ag.de	
Research background and interest:		
I started with a BS Chemical Engineering, Rowan University (USA), then got my PhD in Chemical Engineering at University of Massachusetts (USA). During my PhD I studied high temperature, high pressure thermodynamics of gas impregnated homopolymers and block copolymers. Now I work at BASF in the polymer physics division, and a current area of interest is thermoplastic polymer nanofoams.		
Abstract for presentation:		
Additional information:		

Surname	GAY	Photograph:
First name	Cyprien	
Gender	Male	
Year of birth	1970	
Position	CNRS CR1	
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Research background and interest:		
I do theory in soft matter physics. For the last six or seven years I have been working mainly on the mechanisms displayed by adhesive materials (cavitation, fracture) and how they are related to the material rheology. Other topics of interest include entangled polymers, hydrodynamics, granular materials. Recently I have been working with François Molino (Montpellier, France) on a simulation of soft glassy materials made of convex objects (foams, emulsions, etc). The simulation now runs, but it is still in the qualitative state. I would like to meet people interested in discussing these points.		
Abstract for presentation:		
The plasticity of soft glassy materials made of convex objects relies on T1 and similar processes. We present a simulation based on T1 processes independently of the physics at lower length scales. It uses only information about topology (which objects are in mutual contact), which may make it fast some day. The criterion for a T1 process to occur needs to be adapted if one wishes to be able to reflect the behaviour of any particular system. There exists a simple scheme to exploit existing experiments or realistic simulations to adapt our T1 criterion.		
Additional information:		
http://www.crpp-bordeaux.cnrs.fr/~cgay/index.html		

Surname	Gochew	Photograph:
First name	Georgi	
Gender	Male	
Year of birth	1977	
Position	PhD Student	
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Research background and interest: Interactions between small droplets of a liquid phase through a thin layer of another liquid phase are very often seen in the nature, or in several technologies (formation of foams, emulsions etc.). The aim of our research is to investigate interfaces, using the model of Thin Liquid Films which provides the opportunity to study the stability of disperse systems, O/W and W/O emulsions in particular. Our main target is to investigate and determine surface forces – classic DLVO forces and non-DLVO forces with different nature. The emulsion films obtaining and stability will be studied. We shall look for the reasons for DLVO and non-DLVO forces action, which stabilize either single emulsion films, or the real emulsions. The methodology of researching emulsion films is based on the Microinterferometric method of Scheludko and Exerowa. By this method surface forces and other parameters related to the film formation and stability can be directly measured. These results can be used in all productions connected with emulsions, as well as in solving ecological and pollution problems. Particularly interesting is the formation of bilayers, i.e. Newton black films (NBF), allowing the investigation of the bilayer contact in the disperse systems, especially in emulsions. The thin liquid film investigation is a new modern approach toward the study of the interfaces. It allows to obtain fundamental results and to apply them in the practice as well. The purification of wastewaters from oils and surfactants is an appropriate object for the application of the knowledge of emulsion films. Abstract for presentation: INUTEC SP1 is an amphiphile polymeric surfactant based on inulin, used as an emulsifier in oil-in-water emulsions. The stability of such emulsions is determined by the interactions between two oil droplets, covered with polymeric adsorption layers at close distance in water, in presence of electrolyte and in particular by the stability of the thin film, formed there. The <i>microinterferometric method of Scheludko and Exerowa</i> was used to investigate the interaction forces (DLVO and non-DLVO) acting in symmetric, horizontal films. In a special measuring cell three types of microscopic, equilibrium O/W emulsion films ($r_f = 100 \mu m$) were obtained, depending on the electrolyte concentration C_{el} and capillary pressure P_c: Common Films (CF) with equivalent film thickness $h_w \approx 20 \div 70$ nm; Common Black Films (CBF) with $h_w \approx 10$ nm and Newtonian Black Films (NBF or emulsion amphiphile bilayers) with $h_w \approx 7$ nm. The dependence of the equivalent film thickness on electrolyte concentration (h_w/C_{el} isotherms) is experimentally studied at constant temperature T, P_c and surfactant concentration C_s. The critical electrolyte concentration $C_{el,cr}$ is found, which is considered to divide the action of DLVO and non-DLVO surface forces. The course of the dependence demonstrates the transition from electrostatic to steric interactions. The experimental results on the dependence of the disjoining pressure Π on equivalent film thickness at constant T, C_s, C_{el} give us more detailed information for the nature of interacting forces. With increasing P_c all films reach a metastable zone, within which the energy barrier is overcome and spontaneous transitions from higher h_w values to NBF are observed. Emulsion amphiphile bilayers obtained in this way are stable up to $P_c \approx 4,5 \times 10^4$ Pa (maximum P_c, which can be reached with the used cells), which is considered to be the reason for high stability of real emulsions from this surfactant in presence of big amounts of electrolyte. Such emulsions live more than a year at $T \approx 50^\circ C$.		

Surname	Goldenberg	Photograph: 
First name	Chay	
Gender	Male	
Year of birth	1971	
Position	Postdoctoral Associate	
Institution / Company	Theory and Modeling Group Laboratoire de Physique de la Matière Condensée et Nanostructures	
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Research background and interest:		
My Ph.D. (Tel-Aviv University, Israel, 2004) focused on the problem of force transmission in granular solids, as well as the development of a systematic coarse graining method for relating macroscopic, continuum descriptions to the microscopic (grain level) scale. My first year of postdoctoral research (PMMH-ESPCI, Paris, France, 2005) concerned the study of fluctuations and averaging in experiments and simulations of granular material. I also started collaborating with Prof. Graner (Université Grenoble, France) on extending the above methods to foams, in particular on microscopic expressions for the strain field. I have recently (October 2005) moved to the LPMCN in Lyon, where my research is focused on the study of elasticity and heat transfer in disordered solids, in particular in small (nanoscale) systems and on small scales.		
Abstract for presentation:		
Spatial Coarse Graining: Deriving Continuum Equations from the Microscale		
I will present a method, based on spatial averaging, for the systematic derivation of the equations of continuum mechanics (and expressions for macroscopic fields) from the microscopic (atomic/particle scale) description. This method does not rely on ensemble averaging, and therefore pertains to single realizations. Hence, it may be used for the description of nonequilibrium disordered systems, such as granular materials, glasses and foams. I will discuss a new microscopic definition for the strain field, and present a derivation of elasticity in disordered systems which does not rely on the assumption of a locally affine deformation. I will present some applications to simulations and experiments of granular materials and other disordered systems, and discuss some issues pertaining to the extension of the method to foams.		
Additional information:		

Surname	GOYON	Photograph: 
First name	Julie	
Gender	F	
Year of birth	1981	
Position	PhD student	
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Research background and interest: Jamming.		
I am a PhD student for Annie Colin, working on phase diagram on a microfluidic chip. I am studying how does a concentrated emulsion flow in a microchannel. We measure the local velocity profile using PIV device and the concentration profile in droplets using Raman spectroscopy.		
Abstract for presentation:		
Additional information:		

Surname	Ha	Photograph: 
First name	Jae Seung	
Gender	Male	
Year of birth	1979	
Position	student	
Institution / Company	Gyeong Sang National University	
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Phone number	82557515303	
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Research background and interest:		
Now. I have an experiment and research about closed cell. I want to understand about foaming theory. Like a Rheology, filling pattern etc. So I want to join here. And then, improve my theoretical background in physical and chemical metallurgy.		
Abstract for presentation:		
Additional information:		

Surname	Halt	Photograph: 
First name	Olivia	
Gender	Female	
Year of birth	1982	
Position	Graduate Student	
Institution / Company	University of Pennsylvania	
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Email	halt@sas.upenn.edu	
Research background and interest:		
I am a second year graduate student pursuing a PhD in Physics at the University of Pennsylvania. Over the past summer I have begun work with Dr. Randall Kamien in soft condensed matter theory. The research, thus far, has focused on applying a mean-field like theory for foams to other systems in soft matter physics. Also, I am interested in packing problems, biophysics, and broadening my computation skills.		
Abstract for presentation:		
Additional information:		
Favorite bubble quote - "Life is mostly froth and bubble, Two things stand like stone, Kindness in another's trouble, Courage in your own." - Adam Lindsay Gordon		

Surname	Hjelt	Photograph: 
First name	Tuomo	
Gender	male	
Year of birth	1968	
Position	Research Scientist	
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Research background and interest:		
I have PhD in computational physics. My main interest was surface diffusion and I used Monte Carlo simulation models as a research tool. I have been also involved with phase transition models (KPZ dynamical exponents). Currently I am making computer simulations concerning paper physics. In papermaking foams are encountered in many processes, thus we want to increase our knowledge on that field.		
Abstract for presentation:		
I have no presentation		
Additional information:		

Surname	Jae-Young	Photograph: 
First name	Kim	
Gender	Male	
Year of birth	1980	
Position	Student	
Institution / Company	Gyung-Sang National University	
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Phone number	82164054563	
Fax	82557532270	
Email	rick7500@nate.com	
Research background and interest:		
I have studied Materials Science in the Gyung-Sang National University in Korea. I have started to study about Metal Foam 2 months ago. There are many theory that I have to know. So I want to learn theories in the course you made.		
Abstract for presentation:		
Additional information:		

Surname	Käfer	Photograph: 
First name	Jos	
Gender	male	
Year of birth	1980	
Position	PhD student	
Institution / Company	UJF Grenoble	
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Fax	(33) 04 76 63 54 95	
Email	jos.kaefer@gmail.com	
Research background and interest:		
I am a biologist, and in december 2005 I start(ed) a PhD in Grenoble on the effect of adhesion on cell rearrangements. Biological morphogenesis is brought about by rearrangements of cells, which are driven by the physical properties of the cells. In a joint project of experimental biologists and physicists, I will use computer simulation to find out the similarities and differences between foams and biological tissues, and use this to understand biological morphogenesis.		
Abstract for presentation:		
During my master thesis at Theoretical Biology and Bioinformatics in Utrecht, NL, we studied the effect of chemotaxis on biological cell sorting due to differential adhesion, using the Cellular Potts Model. Surprisingly, even when chemotaxis is equal for all cells, differences in cell size or differential adhesion can cause directional sorting. We found conditions for which 'minority sorting' and absolute negative mobility occur. We applied the model to slime moulds, which have wave-like chemotaxis, to explain the role that differential adhesion in combination with non-differential chemotaxis can play in biological morphogenesis.		
Additional information:		
I'm a Dutch biologist, who still has to learn some basic things for doing a PhD in Grenoble. This winter school I hope to learn how to ski, as well as a lot about foam physics.		

Surname	Katgert	Photograph: 
First name	Gijs	
Gender	Male	
Year of birth	1981	
Position	PhD Student	
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Research background and interest:		
I studied experimental physics at Utrecht University. I am just starting my 2 nd year of PhD research in the Granular Matter group of Dr. Martin van Hecke. I am currently looking at jamming and yielding behaviour of 2D emulsions		
Abstract for presentation:		
Additional information:		

Surname	Krishan	Photograph: 
First name	Kapil	
Gender	Male	
Year of birth	1977	
Position	PostDoc	
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Research background and interest:		
My recent interests have been in developing topological characterizations of dynamical systems. These characterizations have been used to understand flows in experiments on weakly turbulent Rayleigh-Benard convection and sheared bubble rafts.		
Abstract for presentation:		
In many complex fluids, the microscopic structure is coarse grained, leading to deviations from continuum approximations for the dynamics. Examples of such materials include colloids, sand, foams etc. where the underlying granularity is apparent in many macroscopic properties. The characterization of the local rearrangements of the granular structure in such materials is of importance in detailing mechanisms of their flow. We present results from our recent experiments on bubble rafts, that have been developed to investigate large scale statistics of T1 events and their relationship to the convergence of velocity profiles of the flow.		
Additional information:		

Surname	Langlois	Photograph:
First name	Vincent	
Gender	Male	
Year of birth	1979	
Position	postdoc	
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Email	vincent.langlois@ens- lyon.org	
Research background and interest:		
During my PhD I worked on the interaction between a granular medium and a flowing fluid, that is, problems of sediment transport and formation of sand ripples and dunes. My future research subject deals with the "rivulet" flows and their instability. More details on http://www.perso.univ-rennes1.fr/vincent.langlois/		
Abstract for presentation:		
Additional information:		

Surname	Lescanne	Photograph:
First name	marion	
Gender	Female	
Year of birth	1972	
Position	Post-doc	
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Research background and interest:		
PhD on organogels: formation and rheophysics. Post-doc on the dynamics of polymers and interfaces. Now orientating towards single soap films.		
Abstract for presentation:		
Additional information:		

Surname	Lopes	Photograph:
First name	Pedro	
Gender	Male	
Year of birth	1979	
Position	Student	
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Research background and interest:		
Just finished a degree in Physics. Special interest on polymeric foams processed by physical processes.		
Abstract for presentation:		
Additional information:		

Surname	Lorenceau	Photograph: 
First name	Elise	
Gender	Female	
Year of birth	18 mai 1975	
Position	Academic	
Institution / Company	CNRS	
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Research background and interest:		
I have studied air entrainment by liquid during my PhD thesis, microfluidics during my post-doc and started to work on foams six months ago. I am also interested in impact of drops on different surfaces.		
Abstract for presentation:		
Multiphase flow can be controlled on a microscopic scale to produce fluid structures using microfluidic techniques. Thus, micrometric droplets or bubbles of uniform size can be formed one by one shearing a liquid/ liquid interface in a microchannel. The frequency of this process can be large enough to produce a large number of those entities in a short period of time using a single microdevice. Under specific conditions, the polydispersity of the obtained emulsion is striking; the obtained droplets or bubbles are highly calibrated. We discuss the reason of this low polydispersity, and then we demonstrate how more complex structures such as polymerosomes or hard capsules can be obtained. Eventually, we focus on the crystallization of aqueous monodisperse foam obtained through this technique.		
Additional information:		

Surname	MARCHALOT	Photograph: 
First name	Julien	
Gender	Male	
Year of birth	1980	
Position	PhD student	
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Research background and interest: I started a PhD 2 months ago in which I will study foams in microsystems		
Abstract for presentation: I will present my first results in the study of aging foams in microsystems		
Additional information:		

Surname	Marmottant	Photograph: 
First name	Philippe	
Gender	M	
Year of birth	1975	
Position	Researcher	
Institution / Company	CNRS	
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Research background and interest:		
Microfoams, microbubbles, foam flows		
Abstract for presentation:		
Additional information:		
Attending Monday 16 and Tuesday 17		

Surname	Sébastien	Photograph: 
First name	MARZE	
Gender	Male	
Year of birth	1978	
Position	Doctorate	
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Research background and interest:

Foam rheology and stability. Ph.D. student with D. Langevin

Abstract for presentation:

Diffusive liquid transport in aqueous foams under microgravity

On Earth, surfactant solution flows inside a foam are essentially controlled by two mechanisms : gravity and capillarity. The Bond number quantifies the balance between gravitational and capillary effects. It decreases significantly below 1 under microgravity conditions, and one gets then a new situation with only capillarity-induced flows. This talk will present our experiments, performed during parabolic flights and sounding rockets, focusing on these capillary transports of liquid (imbibition experiments). Different setup geometries, type of imbibition and bubble surface mobilities are studied. Comparisons with theoretical models are also presented, evidencing some good agreement, even up to high liquid fractions where the models are no longer supposed to be valid.

Additional information:

Surname	MASSELON	Photograph: 
First name	Chloé	
Gender	F	
Year of birth	1982	
Position	PhD Student	
Institution / Company	LOF (CNRS Rhodia)	
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Research background and interest: Porous Media		
I am a PhD student for Annie Colin, working on the flow of complex fluids in porous medium. When wells are drilled to extract oil, it is necessary to inject drilling fluids nearby the extraction area in order to maintain the network formed by cavities to prevent it to collapse. Drilling fluids ought to have particular properties to satisfy the wanted applications, at least the followings: shear thinning, fast viscosity dynamic, not blocking the cavities. That is why the oil industry uses complex fluids. My project consists in mimicking a porous material in the lab, studying the flow of a drilling fluid in it, and then studying the flow of oil in that porous mimicked system previously filled with a drilling fluid. Although that work is at the very beginning, we are already able to draw some observations. Millifluidic experiments lead us to observe that complex fluids, when arriving at a junction leading to two different ways (with different hydrodynamic resistances, different lengths), largely prefer to flow in the short ways, which have the lower hydrodynamic resistance. Those experiments, combined with PIV (Particle Imaging Velocimetry) in microfluidic, also allow us to notice a strong influence of the junction on the fluid behaviour.		
Abstract for presentation:		
Additional information:		

Surname	Miles	Photograph: 
First name	Frampton	
Gender	Male	
Year of birth	October 7 th , 1984	
Position	Student	
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Research background and interest: Elasticity, Dynamic Buckling, Anything Interesting		
Abstract for presentation:		
Additional information:		

Surname	Min-jae	Photograph: 
First name	Jeong	
Gender	Male	
Year of birth	1981	
Position	Student	
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Research background and interest:		
I have studied Materials Science in the Gyung-Sang National University in Korea. I have started to study about Metal Foam 1 month ago. There are many theories that I have to know. So I want to learn theories in the course you made.		
Abstract for presentation:		
Additional information:		

Surname	Mokso	Photograph: 
First name	Rajmund	
Gender	male	
Year of birth	1977	
Position	PhD student	
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Research background and interest:		
X-ray tomography with phase retrieval at high temporal and spatial resolution.		
Abstract for presentation:		
The possibilities of x-ray tomography to foam imaging. I would like to share some experiences we have with the application of x-ray tomography for imaging of liquid foams. Paying special attention on how to meet the various requirements that would assure good quality of images when following the evolution of different types of foams.		
Additional information:		
Favorite winter activities: ski touring, cross country skiing at full moon and drinking tea (with rum?) afterwards.		

Surname	Pertu	Photograph: 
First name	Niga	
Gender	male	
Year of birth	1974	
Position	PhD student	
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Research background and interest:		
I have studied Physics at "Al. I. Cuza" University, Iasi Romania and I have a Master in Plasma Physics. My last year of Master I have spent it at UCD University in Ireland doing Spectroscopy research. For about 3 months I have started a PhD at KTH in Sweden where I am going to use Sum Frequencies Generation for probing structure-function relationships of surfactants at the liquid-air interface and relating the information to foam properties.		
Abstract for presentation:		
Additional information:		

Surname	Rajchenbach	Photograph: 
First name	Jean	
Gender	male	
Year of birth	1955	
Position	Directeur de Recherche	
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Email	Jean.Rajchenbach@unice.fr	
Research background and interest: Granular Materials, foams, glass,...		
Abstract for presentation: Deformation waves in foams.		
Additional information:		

Surname	RAMAIOLI	Photograph: 
First name	Marco	
Gender	M	
Year of birth	1974	
Position	PhD student	
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Research background and interest:		
I have studied chemical engineering at Politecnico di Milano. I then worked on modelling heat/mass transfer of food processes and structural mechanics simulations. I am presently doing a PhD on the simulation of granular food flow and segregation. I would like to build competence in foam physics and modelling...		
Abstract for presentation:		
Modelling granular flow of non-spherical particles.		
Additional information:		

Surname	Christophe	Photograph: 
First name	Raufaste	
Gender	M	
Year of birth	1980	
Position	PhD student	
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Research background and interest:		
flow of foam around an obstacle, experimental and numerical aspects		
Abstract for presentation:		
Additional information:		

Surname	Raven	Photograph: 
First name	Jan-Paul	
Gender	M	
Year of birth	1979	
Position	Ph. D. student	
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Research background and interest: After studying Applied Physics at the University of Twente in The Netherlands I started a Ph. D. on microfoams in Grenoble, France. I try to study the flow of microfoams to learn more about the properties of foams and how to use these in microfluidic applications.		
Abstract for presentation: I'll present some results for a foam flowing in a channel with a height of 200μm. Among other things we saw that the discrete nature of the foam topology causes discontinuities in the pressure-flowrate relation. I'll also talk about an ultraflat foam (height 8 μm, aspect ratio 0.02) showing a marked change in bubble shape during the flow.		
Additional information:		

Surname	Somosvári	Photograph: 
First name	Béla Márton	
Gender	Male	
Year of birth	1978	
Position	PhD Student	
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Research background and interest: I am a PhD student in the University of Miskolc, this is my third year now. I am interested in the stabilizing effect of particles in aqueous foams. This summer I was in Berlin at the HMI Structural Research Group, as a LEONARDO –granted PhD student. I studied particle stabilized aqueous foams with the help of in situ X-ray radioscopy and optical image capturing. In 2004 I spent 1 month at the Brandenburg University of Technology Cottbus, investigated SiO₂ particles loaden foams.		
Abstract for presentation: I would like to make a presentation about the foaming of water-ethanol-PVC system. An experimental series were carried out using these materials. Our aim was to investigate the effect of contact angle on the stability of foams. Concentration of PVC was kept constant. With the variation of the ethanol concentration I could change the contact angle between the mixture and the PVC particles. In the experiments I measured the initial height of the blown up foams. Results show that the initial foam height had a maximum at 83 degrees, when there were no ethanol in the system.		
Additional information: In my recent work I would like to make more sophisticated measurements with the same mixture and I also deal with the development of a cartridge for investigation of aqueous suspension foams. This cartridge is designed and developed by a small Hungarian R&D venture called ADMATIS Ltd.		

Surname	Song	Photograph: 
First name	Yeong Hwan	
Gender	Male	
Year of birth	1981	
Position	student	
Institution / Company	Gyeong Sang National University	
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Research background and interest:		
Now. I have an experiment and research about closed cell. I can make foamed Al by casting method easily. But I Can't understand about foaming theory. For example.. Rheology, filling pattern etc. So I want to join here. And then, improve my theoretical background in physical and chemical metallurgy.		
Abstract for presentation:		
Additional information:		

Surname	Tchoukov	Photograph: 
First name	Plamen	
Gender	male	
Year of birth	1968	
Position	PhD student	
Institution / Company	Institute of Physical Chemistry, Bulgarian Academy of Sciences	
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Research background and interest:		
My Master degree is in Physics, specialization "Optics and Spectroscopy". Now I am finalizing my PhD study in Physical Chemistry under supervision of Assoc. Prof. Dr. Elena Mileva and Prof. Dotchi Exerowa (expected to graduate in February-March of 2006). The topic of my thesis is "Experimental Investigation of Self-Assembled Amphiphilic Structures in Foam Films". The experimental part of my research on self-assembly in thin liquid films was focused on studying different parameters of foam films at dynamic conditions. The theoretical part of my work is aimed at modeling the self-assembly of amphiphilic molecules, as well as 2D-aggregation at the water/air interface.		
Abstract for presentation:		
Study of foam film drainage via microinterferometric techniques of Sheludko-Exerowa of films stabilized with sodium dodecylsulfate is presented. The specific run of foam film parameters, life time, velocity of thinning and critical thickness of rupture is related to the affect of self assembled structures in foam films on their hydrodynamics in dynamic conditions. The results are juxtaposed to the previous measurements of the surface tension of surfactant solutions at identical conditions that showed kinks and plateau regions. The key idea in the interpretation of the experimental results is the assumption that self-assembled structures (premicelles) exist in the initial solutions. When the van der Waas component of the disjoining pressure in the film is dominant these premicelles are reorganized and destroyed in the foam film (Mileva&Exerowa/1999). An explanation was proposed that relates the specific hydrodynamics of the film, the mass transfer of amphiphilic molecules, and the existence of self-assembled structures.		
Additional information:		

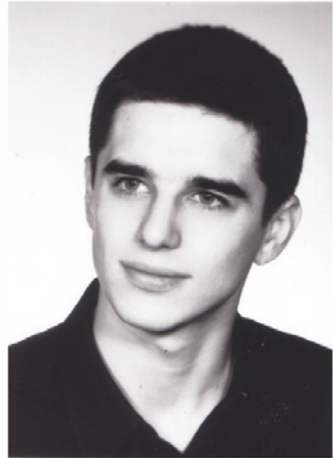
Surname	TERRIAC	Photograph: 
First name	Emmanuel	
Gender	Male	
Year of birth	1980	
Position	Ph D Student	
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Research background and interest:		
After six years studying chemistry I started my PhD one year ago. I'm studying foam film stability and rheology. For those studies we're doing neutron and X-ray scattering measurements and we're developing a home built microscope (Thin film pressure balance). For the rheological aspects we're interested in measuring dissipation forces on films flowing in narrow channels. Up to now we focused our research on classical surfactants like SDS or dish washing fluid and we are now planning on working on protein foam films.		
Abstract for presentation:		
I will introduce results on foam films flowing in narrow channels and our first results on neutron scattering.		
Additional information:		

Surname	van der Net	Photograph: 
First name	Antje	
Gender	female	
Year of birth	1981	
Position	PhD student	
Institution/Company	Trinity College Dublin	
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Email	vanderna@tcd.ie	
Research background and interest: I finished my masters in petroleum engineering in February 2005 (after a bachelor in applied earth sciences). In my thesis project I developed a method to measure capillary pressure during foam flow in a porous medium, practically orientated. In April I started my PhD in foam physics. Currently I am studying ordered foam structures in the wet foam limit and explore how light falls through foams structures; raytracing.		
Abstract for presentation: Ordered foam structures. What features are visible and how raytracing can help finding the ordering?		
Additional information:		

Surname	YIP CHEUNG SANG	Photograph: 
First name	Yann	
Gender		
Year of birth	1981	
Position	Student	
Institution / Company	Matière et Systèmes Complexes (MSC) / Laboratoire de Physique des Matériaux Divisés et des Interfaces (LPMDI)	
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Research background and interest:		
During my Master (March – July 2005), I have studied the elaboration of <i>monodisperse microbubbles</i> (diameter : ~ 50 to $600\ \mu\text{m}$) in using a <i>microfluidic flow-focusing method</i> in LPMDI of University Marne-La-Vallée. We thus obtained <i>a crystalline network of bubbles</i> with f.c.c. and <i>probably b.c.c. lattices</i>. Then we used this special aqueous foam to detect the <i>transition f.c.c. to b.c.c. structure</i> in regarding to osmotic pressure within ordonné foam versus liquid fraction. The main results are f.c.c. structure dominant for wet "monodisperse microfoam", while the structure of dry "monodisperse microfoams " is b.c.c. with the apparition of <i>Kelvin's cells</i>. Now, I am performing a PhD in MSC (started in October 2005) to study the properties of adaptative magnetic dispersed media as <u>alginate ferrogels</u> in presence or not of magnetic fields. Moreover <u>monodisperse microfoams of alginate ferrogel</u> will be also studied to attempt to have a new material coupling with light and magnetic field (diameter of bubbles $\sim 1\text{-}10\ \mu\text{m}$).		
Abstract for presentation:		
<u>Tentative title :</u>		
Structural transition in aqueous foams obtained by a microfluidic device		

Additional information:

Surname	Zaitlen	Photograph: 
First name	Benjamin	
Gender	Male	
Year of birth	1981	
Position	Graduate Student	
Institution / Company	Indiana University	
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Research background and interest:		
Interested in large-Q Potts model simulations to look at rheological and coarsening properties of foams . Currently working for Prof. James Glazier developing such models to investigate gastrulation.		
Abstract for presentation:		
Additional information:		

Surname	ZIETARA	Photograph: 
First name	RAFAL	
Gender	Male	
Year of birth	02 Dec 1979	
Position	PhD Student	
Institution / Company	The University of Manchester	
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Email	rafal.zietara@postgrad.manchester.ac.uk	
Research background and interest: I am a PhD student at The University of Manchester. I am interested in foam behavior and rheology from both purely physical and computational points of view. I would like to gain information about all sub-processes associated with the flowing foam and gather up to date knowledge.		
Abstract for presentation: My project focus on building of a steady state time averaged model of a behavior of froth during flotation process. The aim of the project is to combine two phases, froth (above) and pulp (below the free surface) and investigate mutual interaction between them. Pulp phase is a mixture of water, air and solid particles. It is commonly simulated as interpenetrating phases (Euler-Euler approach), whereas behavior of froth phase is approximated by behavior of flowing foam. I will show current stage of the model I am building and preliminary results.		
Additional information:		