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Education

April 2008 **Physics PhD** at the University Pierre and Marie Curie, Paris (With Highest Honors).

2004 **Fifth year of university studies in liquid physics (DEA)** at University Denis Diderot, Paris.

2003 **Fourth year of university studies in physics (Maîtrise)** : mechanics and transfer phenomenon at University Denis Diderot, Paris.

1998 **French high-school diploma in sciences.**

Research

September 2008 at august 2009 :
Post-Doctoral position: Experimental simulation of thermal erosion of fluvial islands in cold environment - laboratory IDES (Geology) (Orsay, France)
Contact : François Costard francois.costard@u-psud.fr 33 1 69 15 49 10

October 2004 at august 2008:
Thesis on Shear instabilities in a two miscible fluids core-annular flow in the laboratory FAST (hydrodynamics) (Orsay, France)
Contact : Dominique Salin salin@fast.u-psud.fr 33 1 69 15 80 38

January-June 2004:
Meanders in a Hele-Shaw Cell in the laboratory PMMH of ESPCI. (hydrodynamics)

Skills

Experiments in fluid mechanics
Particle Image Velocimetry (PIV)
Image processing
Softwares and development languages: Davis, ImageJ, Matlab, Mathematica, Kaleidagraph, LateX, Microsoft Office Suite

Languages

French: native speaker; English : intermediate level; Spanish : basic knowledge

Teaching experience

2007-2008 **Instructor** at University Pierre et Marie Curie, Paris :

Seminars of physics in first year of university study: 46h.
Contact : Nicolas Menguy
Nicolas.Menguy@impmc.jussieu.fr 33 1 44 27 37 85

Seminars of **mechanics** in first year of university study: 36h.
Practical works of **mechanics** in first year of university study: 12h.
Contact : Paul Windey
windey@lpthe.jussieu.fr 33 1 44 27 74 56

2004-2007 **Practical work** of **chemical engineering** in IUT (first year of university of technology) : 236h.
Fluid mechanics applied to chemical engineering
Contact : Jean Nahmias
nahmias@iut-orsay.fr 33 1 69 33 60 31

Practical work of **fluid mechanics** in first year of ENSTA (third year of engineering study): 18h

Publications, presentations and posters

Publications

Convective/absolute instability in miscible core--annular flow. Part 1. Experiments
M. d'Olce, J. Martin, N.Rakotomalala, D. Salin, and L. Talon
Journal of Fluid Mechanics, 618 , 305 – 322, 2009

Pearl and mushroom instability patterns in two miscible fluids core annular flows
M. d'Olce, J. Martin, N.Rakotomalala, D. Salin, and L. Talon
Physics of Fluids, 20 :Issue 2, 2008

Conferences - Workshops : oral presentations

Instability patterns in a miscible core annular flow
M. d'Olce, J. Martin, N.Rakotomalala, D. Salin, and L. Talon APS 59th Annual Meeting of the Division of Fluid Dynamics, GD7
Tampa, Etats-Unis – november 2006

Visualisation d'instabilités interfaciales dans l'écoulement concentrique de deux fluides

miscibles
M. d'Olce, J. Martin, N.Rakotomalala, D. Salin, and L. Talon JMC 10 Minicolloque Dynamique spatio-temporelle des motifs dans les milieux complexes
Toulouse - August 2006

Visualisation d'instabilités interfaciales dans l'écoulement concentrique de deux fluides miscibles
M. d'Olce, J. Martin, N.Rakotomalala, D. Salin, and L. Talon Journée du Plateau – Orsay, november 2005

Instabilités interfaciales entre deux fluides miscibles en écoulement concentrique
M. d'Olce, J. Martin, N.Rakotomalala, D. Salin, and L. Talon Journée des doctorants du FAST – Orsay, june 2006

Posters

Threads of Miscible Pearls
M. d'Olce, J. Martin, N.Rakotomalala, D. Salin, and L. Talon Gallery of Fluids Motion - APS 59th Annual Meeting of the Division of Fluid Dynamics
Tampa, Etats-Unis – november 2006

Visualisation d'instabilités interfaciales dans l'écoulement de deux fluides miscibles: perles et champignons
M.d'Olce, J.Martin, N.Rakotomalala, D.Salin, L.Talon
Colloque Alain Bouyssy 2005, Orsay – February 2006

Research: summaries

Post-Doctoral position: Experimental simulation of thermal erosion of fluvial islands in cold environment

Experiments have been performed in a cold room in order to understand the erosion of fluvial islands in the Lena river (Siberia). Those fluvial islands are made of permafrost. At spring, during the outflow, the islands are greatly eroded by mechanic and thermal processes. Thus, gradually, islands take the shape of a lemniscate. This shape is known to minimize the drag force in the flow. Those shapes can be observed in Martian channels and are evidences of past flows.

By simulating erosion of the islands at a smaller scale in a hydraulic channel placed in a cold room, we wanted to study the behavior of the flow and the erosion process . We wanted also to determine the characteristics of the flow (Reynolds number, water depth, temperature etc…) and those of the island (proportion of sand and ice, initial shape etc...) which was the most influential on the island morphology. Our aim is to link the current shape of an island with the flow which have eroded it.

Experiments have been filmed and an image processing have been built up to quantify the island erosion and the evolution of the deposits.

Those results will be compared to field work measurements on the Lena river as well as mechanic and thermal erosion models. They may help to predict the effect of global warming on the Lena river. They may also be an aid to understand what kind of flow have shaped Martian channels.

Thesis on Shear instabilities in a two miscible fluids core-annular flow

In this report, experiments of shear instabilities in a co-current and core-annular flow of two miscible fluids are presented. The two fluids have the same density but the annular fluid has a higher viscosity than the core fluid. Two control parameters have been used, the Reynolds number and the core fluid radius. We have always obtained an unstable flow and two instability patterns have been observed : pearls and mushrooms. We have built the diagram of occurrence of the patterns in the map of the two control parameters.
For mushroom patterns, and for some values of control parameters, instabilities appear near the inlet and exhibit a thin spectral width. This behavior might be a signature of a transition between convective and absolute instabilities. We have tried to characterize the convective or absolute nature of the system with experimental measurements, such as frequency forcing experiments. Our experimental results agree partly with numerical simulations, and reasonably well with a longwave linear stability analysis.
Thesis on http://tel.archives-ouvertes.fr/
identifiant : 00276589