

Fronts and InteRfaces in Science and Technology

THE OPENING MEETING

Université de Paris - Sud 11 - Orsay, Bât. 425 - Petit Amphithéâtre June 28 - 30, 2010

[PROGRAM IN PDF FORMAT](#)

MONDAY JUNE 28TH

Chairperson: Ildefonso Diaz

10:10 - 11:00 Michiel Bertsch

11:00 - 11:30 Coffee break

11:30 - 12:20 Jean-Michel Coron

12:20 - 14:00 Lunch

HOME	PARTICIPANTS	WORK PACKAGES/AVAILABLE CONTRACTS	RECRUITED STUDENTS	TRAINING	MEETINGS/EVENTS	NEWSLETTER	INTRANET
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Initial Training Network **FIRST**

June, 16th, 2010 (see other up)

Fronts and **I**nte**R**faces in **S**cience and **T**echnology

- [Initial Training Network](#) of the European Commission (Grant Agreement Number 238702), PITN-GA-2009-238702.

[SEVENTH FRAMEWORK PROGRAMME, PEOPLE](#) Work Programme 2008



Network Participants	Legal Entity	Department	Person-in-charge
1. UCM	Universidad Complutense de Madrid	Departamento de Matemática Aplicada	Jesús Ildefonso Díaz
2. FAUEN	Friedrich-Alexander-Universität Erlangen-Nürnberg	Department of Mathematics	Günther Grün
3. PARIS-SUD	Université de Paris-Sud XI	Département de Mathématiques	Danielle Hilhorst
4. SUR	Sapienza Università di Rome	Dipartimento di Matematica "Guido Castelnuovo"	Alberto Tesei
5. TUE	Technische Universiteit Eindhoven	Faculteit Wiskunde en Informatica	Mark A. Peletier
6. TIT	Technion - Israel Institute of Technology	Department of Mathematics	Haim Brezis
7. UB	University of Bath	Mathematical Sciences	Christopher Budd
8. UZH	University of Zurich	Institut für Mathematik	Michel Chipot
9. Guigues Environnement	Guigues Environnement	GED-ATOS-Hydro Expert	Lionel Demongodin
10. Siemens AG	Siemens AG	IIS MT EA T	Matthias Kurz
Associated Partners			
A. CU	Comenius University	Department of Applied Math. and Statistics	Pavol Quittner
B. UA	University of Athens	Department of Mathematics	Nicholas Alikakos
C. UCL	Université Catholique de Louvain	AMM	Jean Van Schaftingen
D. UFR	Université de Tours	Faculté des Sciences et Techniques	Laurent Véron

Distribution of tasks:	
Madrid	Coordination of Network and training, web-page and Financial management
Erlangen	Recruitment
Paris	Career guidance / Complementary skills and Evaluation
Rome	Workshop coordination
Eindhoven	Equal opportunities
Haifa	Computation facilities
Bath	Industrial links & Video lectures
Zurich	Coordination of participation of associated members
Guigues and Siemens	Career guidance / Complementary skills and Evaluation

Meetings and Visiting scientists

Date	Event	Location	Topic	Duration
2010 (Year 1) June, 28 -30, 2010.	Opening Meeting	Paris	State of the art and network goals	June, 28 -30, 2010.
2010 (Year 1) November 29th- December 1st, 2010	Workshop	Rome	Ill-posed problems	November 29th- December 1st, 2010
2011 (Year 2) March (Month 15)	Workshop	Bratislava	Blow-up and singularities	3 days
2011 (Year 2) June (Month 18)	Workshop	Louvain	Singular Reaction-diffusion	3 days
2011 (Year 2) September Month 21	<i>Complementary skills</i> <i>Workshop</i>	Paris	<i>Complementary skills for ESRs (organized by Guigues)</i>	2 days
2011 (Year 2) December (Month 24)	Mid-term meeting	Bath	Review progress, set new objectives, finalise mid-term report	3 days
2012 (Year 3) March (Month 27)	<i>Workshop and Complementary skills</i>	Erlangen	<i>Complementary skills for ESRs (organized by Erlangen and Siemens)</i>	3 days
2012 (Year 3) June (Month 30)	Workshop	Tours	Quasilinear PDEs	3 days
2012 (Year 3) September (Month 33)	Workshop	Haifa	Image processing and Reaction-Diffusion	3 days
2012 (Year 3)	Workshop	Zurich	Nonlocal problems	3 days

Visiting scientists

To complement the network's capacity to transfer new knowledge and strengthen supervision of the network-wide training activities, the following Visiting Scientists will be recruited for multiple stays within the network. Their involvement in the project will be stronger than the external researchers invited for the workshops, as they will spend longer time in the different laboratories, and will have more time to discuss with the participants. They will also be asked to present seminars during some workshop to broaden the scientific training part. For simplicity of organization, each scientist will be linked to one partner, but the aim of their participation is to have them visit other different universities of the network. Each of them will spend 1 month within FIRST.

Visiting Scientist	Topic	Participation	Month
VS1: Michiel Bertsch	Pattern formation	June 26-July 26 Paris	6 and 7
VS2	Reaction-Diffusion	1 month, Bratislava	15
VS3	Signal processing	1 month, Bath	24
VS4	Nonlinear PDEs	1 month, Haifa	33
VS5	interfaces	1month, Zurich	36
VS6	Signal processing	1 month, Madrid	48

WPA1. Mathematical analysis of the total variation based denoising problem: total variation flows.

The role of total variation in developing image models and algorithms has been increasing since its introduction by Rudin-Osher-Fatemi in 1992. To understand its qualitative properties, we propose to compute explicit solutions of the total variation denoising problem. We propose also to study the regularity properties of its solutions of and of solutions of the minimizing total variation flow. We will study primal-dual algorithms and work on the development of fast algorithms to solve these problems. Finally, we will consider its application to image segmentation and disparity computation in stereo.

WPA2. Non-local variational formulation of the image inpainting problem and High Angular Resolution Diffusion Imaging: a multi-scale geometrical point of view.

The unification of geometric and texture-based methods is a very interesting research trend that can lead to the development of robust and performant inpainting methods. Diffusion Magnetic Resonance Imaging is a biomedical acquisition protocol that produces in vivo images of fibrous tissue, such as brain white matter and muscle. Popular approaches utilise Diffusion Tensor Imaging (DTI) or, more generally, High Angular Resolution Diffusion Imaging (HARDI), to obtain information on local water diffusivity profiles, which are believed to be indicative of underlying fibrous structures. Tractography and connectivity analysis can be employed to extract candidate fibres in the form of geodesic curves, or congruences of such curves emanating from a fiducial origin or region of interest in a Hamilton-Jacobi framework.

WPA3. Adaptive and directional local processing in Image processing

We propose to go beyond of this idea (proposed by Bruckstein et al in 1994) in several different directions. In particular connecting this idea with a different approach to image processing and analysis, closely related to and influenced by a multi-scale view that comes from diffusion-based "scale-space" ideas: an approach based on a new way of doing harmonic analysis by wavelet bases.

WPA4. Variational methods in Image Processing: application to ill-posed problems.

An application of variational methods is related to optical flow based upon mean curvature will be developed with special application to models which initially are ill-posed (as it is the case of the *Perona-Malik equation*) but for which it is possible to get a coherent theory on their solutions, at least for suitable initial data.

WP	ESR	Partner			Topic
WPA1	ESR 1	Madrid (18)			Total variation based denoising problem
	ESR 2		Zurich (12)		
	ESR 3			Rome (6)	
WPA2	ESR 4	Haifa (23)			Non-local variational formulation of the image inpainting problem and High Angular Resolution Diffusion Imaging: a multi-scale geometrical point of view
	ESR 5		Paris (12)		
WPA3	ESR 6	Eindhoven (12)			Adaptive and directional local processing
	ESR7		Haifa (12)		
	ESR8			Paris (12)	
WPA4	ESR 9	Rome (30)			Variational methods: ill-posed problems
	ESR 10		Zurich (6)		
WPA	Total=143 Researcher-months				

<u>WPB1</u>	ESR 11	Paris (12)			<u>Flame propagation</u>
	ESR 12		Haifa (12)		
	ESR 13			Eindhoven (12)	
<u>WPB2</u>	ESR 14	Madrid (18)			<u>Plant community patches</u>
	ESR 15		Haifa (6)		
	ESR16			Paris (12)	
<u>WPB3</u>	ESR 17	Bath (30)			<u>Higher order reaction-diffusions: blow-up</u>
	ESR 18		Madrid (6)		
<u>WPB4</u>	ESR 19	Zurich (23)			<u>Reaction –diffusion with non local terms and other effects</u>
	ESR 20		Rome (12)		
<u>WPB5</u>	ESR 21	Haifa (18)			<u>Singular terms in reaction-diffusion systems</u>
	ESR 22		Madrid (12)		
	ESR 23			Paris(6)	
<u>WPB6</u>	ESR 24	Guigues(24			<u>Finite volume methods for transport of contaminants in porous media</u>
	ESR 25		Paris(6)		
	ESR 26			Zurich (6)	
<u>WPB7</u>	ESR 27	Bath (23)			<u>Upscaling of interacting particle systems</u>
	ESR 28		Eindhoven (12)		
WPB		Total=250 Researcher-months			

<u>WPC1</u>	ESR 29	Erlangen (24)		<u>Colloid-enhanced flow of contaminants in porous media</u>
	ESR 30		Eindhoven (12)	
<u>WPC2</u>	ESR 31	Erlangen (36)		<u>Electrowetting: modeling, analysis, and simulation</u>
<u>WPC3</u>	ESR 32	Bath (24)		<u>Level Set Methods for Multilayer Geological Folding</u>
	ESR 33		Eindhoven (12)	
<u>WPC4</u>	ESR 34	Haifa (12)		<u>Non linear systems in some technology problems</u>
	ESR 35		Madrid (12)	
	ESR 36			Rome (12)
<u>WPC5</u>	ESR 37	Siemens (36)		<u>Reduced order plasticity models for the real-time control for hot rolling of steel (Siemens)</u>
<u>WPC6</u>	ESR 38	Madrid (16)		<u>Models with a not controllable linearized control system and Computational aspects of interfaces</u>
	ESR 39		Paris (11)	
	ESR 40			Zurich (6)
<u>WPC7</u>	ESR 41	Erlangen (24)		<u>Control and stabilization in networked transportation</u>
	ESR 42		Paris (12)	
WPC	Total= 249 Researcher-months			

Initial Training Network **FIRST**

Annex I

Everything You Always Wanted to Know About FIRST Implementation

Documents and data submitted by ESR applicants (in preparation June 21, 2010)

Distribution of ESR applicants according to the contracts (June, 21, 2010)

Applicants ESR 1 (Madrid)

Applicants ESR 4 (Haifa)

Applicants ESR 6 (Eindhoven)

Applicants ESR 9 (Rome)

Applicants ESR 11 (Paris)

Applicants ESR 14 (Madrid)

Applicants ESR 17 (Bath)

Documents and data submitted by the ESR applicants

(in preparation)

Name	Data	Curriculum Vitae	Cover Letter	Research Interests in One Page	Qualification Certificates	Recommendation Letter 1	Recommendation Letter 2	Degree Final Marks	
								Bachelor	Master
Abera Ayalew Muhamed	Application Form	CV	CL	RIOP	QC	RL1	RL2		
Afshan Jamshaid	Application Form	CV	CL	RIOP	QC	RL1	RL2		
Amin Amani	Application Form	CV	CL	RIOP	QC	RL1	RL2		
Andrea Cadarso Rebolledo	Application Form	CV	CL	RIOP	QC	RL1	RL2		
Anna Morra	Application Form	CV	CL	RIOP	MC BC	RL1	RL2		
Arpan Ghosh	Application Form	CV	CL	RIOP	QC	RL1	RL2		
Asmaa Elbeidaq	Application Form	CV	CL	RIOP	QC	RL1	RL2		
Azhar Mahmood	Application Form	CV	CL	RIOP	QC Other Docs	RL1	RL2		
Behnam Hosseini	Application Form	CV	CL	RIOP	QC	RL1	RL2		
Bolor Jargalsaikhan	Application Form	CV	CL	RIOP	QC	RL1	RL2	4,635	4,3625
Boussaid Samira	Application Form	CV	CL	RIOP	QC	RL1	RL2		

Applicants for ESR 1 (Madrid)

Name	Surnames	Gender	Nationality	Date of Birth	University and country
Thi Thuong Huyen	Nguyen	Male	Vietnamese	07/04/1965	Université de La Rochelle
Sergio Federico	Yapur	Male	Argentinian	21/11/1980	Universidad Nacional del Litoral, Argentine
Faizullah Khan	Faiz	Male	Pakistani	14/07/1974	PIEAS, Islamabad, Pakistan
Muhammad Waseem	Khan	Male	Pakistani	25/06/1985	Comsats, Pakistan
Mozhdeh	Selfi	Female	Iranian	21/03/1984	CIMET Erasmus Mundus
Nguyen	Thanh Nam	Male	Vietnamese	24/12/1986	University of Paris 13, France
Sari	Haj Husseln	Male	Syrian	14/04/1981	Chalmers University of Technology, Gothenburg, Sweden
Julian	Ting	Male	Taiwan	05/12/1960	University of Southern California, USA
Dilla	Handini	Female	Indonesian	26/06/1979	Nanyang Technological University, Singapore
Tahir	Jameel	Male	Pakistani	08/01/1982	GIK Institute, Pakistan
Vinh	Nguyen	Male	Vietnamese	03/02/1987	HoChiMinh University of Science, Vietnam
Mikalai	Zhudro	Male	Belorussian	18/12/1979	Johann Kepler University
Abera Ayalew	Muhammed	Male	Ethiopian	26/09/1983	Addis Ababa University, Ethiopia
Afshan	Jamshaid	Female	Pakistani	02/03/1982	Peshawar University, Pakistan
Thi Trang	Nguyen	Female	Vietnamese	05/11/1987	University of Orleans, France (Pole Universitaire Français in Ho Chi Minh City)
Labiba	Gillani	Female	Pakistani	22/03/1980	GIKI-NWFP
Moresmau	Frédéric	Male	French	15/02/1983	Technical University Munich, Germany
Le Trong Thanh	Bui	Male	Vietnamese	20/12/1987	University of Sciences, Vietnam National University, Ho Chi Minh City, Vietnam
Oleksandr	Kirichuk	Male	Ukrainian	01/05/1984	Prydniprovsk State Academy of Civil Engineering and Architecture, Ukraine
Werner	Wee	Male	Philippine	03/06/1985	University of the Philippines Diliman, Philippines
Mahfoudh	Melma	Female	Mauritanian	31/08/1988	University of La Rochelle, France
Anna	Morra	Female	Italian	28/12/1983	Università degli Studi di Torino, Italy
Sara	Sharfzadeh	Female	Iranian	16/08/1979	Mazandaran University, Iran
Oleh	Krehel	Male	Ukrainian	29/04/1986	Hamburg University, Germany
Cosimo-Andrea	Munari	Male	Italian	23/01/1984	University of Milan, Italy
Nicodemus	Banagaaya	Male	Ugandan	06/02/1985	JKU, Austria and Technical University Eindhoven, Netherlands
Philipp	Öffner	Male	German	27/02/1984	Julius-Maximilian University, Germany
İnan	Ates	Male	Turkish	22/08/1984	Ege University, Turkey

Governing Board Meeting

**Wednesday June 30th:
9.30-11.00**