

## January 1, 2011-December 31, 2013

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### **Aleksandar Mojsic - ESR 1, 2, 3.**

Poster presented in the Workshop on *Singular reaction-diffusion*, Université catholique de Louvain, Louvain-la-Neuve, Belgium, June 27-29, 2011: "*On a fourth order nonlinear degenerate problem for noise removal*"

*A. Mojsic: Article under the advises of Prof. M. Chipot on the asymptotic behaviour of some non local elliptic equation (in preparation).*

*A. Mojsic Article under the advises of Prof. J.I. Díaz on a fourth order equation arising in image processing (in preparation).*

The thesis exam has to be in the next 12 months at the Universidad Complutense de Madrid. Adviser J.I. Diaz.

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### **Jose Alberto Iglesias Martinez - ESR 4.**

José A. Iglesias, Alfred M. Bruckstein. On the Gamma-convergence of some polygonal curvature functionals. Accepted for publication in *Applicable Analysis*.

José A. Iglesias, Ron Kimmel. Schrödinger Diffusion for Shape Analysis with Texture. ECCV 2012. Workshops and Demonstrations. Lecture Notes in Computer Science Volume 7583, 2012, pp 123-132.

Currently pursuing the Ph.D. degree in mathematics in the University of Vienna, funded by the Austrian Science Fund (FWF) within the NFN S117. Graduation is expected by the end of 2015.

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### **Vijaya Kumar Ghorpade - ESR 5.**

Lecture in the Eindhoven workshop: Retinal Vessels: Impressions of IQ, dementia, heart ailments. Automatic segmentation of retinal blood vessels with Anisotropic Fast Marching algorithm and Geodesic voting

Lecture in the Final Worksop Madrid, December 2013.

## Automatic segmentation with Anisotropic Fast Marching and Geodesic voting Application: Retinal Vessel and Natural Images

Vijaya Ghorpade - Article under the advises of Prof. L. Cohen on the use of minimal geodesic paths for the automatic segmentation of natural images (in preparation).

The thesis exam has to be in the next 12 months at the Université de Paris-Dauphine. Adviser L. Cohen

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### Arpan Ghosh - ESR 6, 7,8.

R. Duits, A. Ghosh, T. C. J. Dela Haije, Y. L. Sachkov : Cuspless Sub-Riemannian Geodesics within the Euclidean Motion Group  $SE(d)$ , p.165—204, Chapter 5, Book title : Neuromathematics of Vision, Springer 2014.

Ghosh, A., Duits, R., Dela Haije, T.C.J. : On the Cuspless Sub-Riemannian Geodesics in  $R^3 \times S^2$ , Submitted to Journal of Dynamical and Control Systems (Under review).

Duits, R., Dela Haije, T.C.J., Creusen, E.J., Ghosh, A.: Morphological and Linear Scale Spaces for Fiber Enhancement in DW-MRI, Journal of Mathematical Imaging and Vision, November 2012.

Duits, R., Dela Haije, T.C.J., Ghosh, A., Creusen, E.J., Vilanova, A., ter Haar Romeny, B.: Enhancement of DW-MRI Scale Space and Variational Methods in Computer Vision (Lecture Notes in Computer Science), September 2011.

Duits, R., Creusen, E., Ghosh, A., Dela Haije, T.C.J.: Diffusion, Convection and Erosion on  $R^3 \times S^2$  and their Application to the Enhancement of Crossing Fibers, CASA report, Eindhoven University of Technology, March 2011.

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### Le Trong Thanh Bui - ESR 9,10.

L.T.T Bui, F. Smarrazzo, A. Tesei, Sobolev regularization of a class of forward-backward parabolic equations, 2013 (submitted).

- L.T.T Bui, F. Smarrazzo, A. Tesei, Passage to the limit over small parameters of a viscous Cahn-Hilliard equation, 2013 (submitted).

- L.T.T Bui, S. Tozza, On the Cahn-Hilliard regularization of Forward-backward parabolic equations, 2013 (submitted).

Bui Le Trong Thanh, FORWARD-BACKWARD PARABOLIC EQUATIONS

Ph.D. Thesis in Mathematics, Sapienza University of Rome, Faculty of Mathematical, Physical and Natural Sciences, Department of Mathematics "G. Castelnuovo". Advisor: Prof. Alberto Tesei  
Date: December 19, 2013, Committee: M. Bertsch, A. Novick-Cohen, A. Terracina

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### **Hoang Hung Vo - ESR 11,12,13.**

Hoang-Hung Vo : Traveling fronts for equations with forced speed in mixed environments (submitted).

Hoang-Hung Vo : Liouville-type result for semilinear elliptic equations with possibly vanishing potentials and applications (submitted).

Henri Berestycki, Jerome Coville, Hoang Hung Vo: Nonlocal Reaction-Diffusion Equation with a heterogeneous KPP type nonlinearity in  $\mathbb{R}^N$  (submitted).

Hoang-Hung Vo, "Liouville-type result involving p-Laplacian and slowly decaying potential in  $\mathbb{R}^N$ " (submitted).

Hoang Hung Vo should complete his Thesis manuscript in April or May and will defend his Thesis at Université Pierre et Marie Curie in July or September 2014. Adviser, H. Berestycki.

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### **Paris Paraskevas-Kyriazopoulos - ESR 14**

Poster presented in the Workshop on *Singular reaction-diffusion*, Université catholique de Louvain, Louvain-la-Neuve, Belgium, June 27-29, 2011:

*"On the multiplicity of stationary solutions for a reaction diffusion system arising in a dry-land vegetation model"*

*J.I. Díaz, P. Kyriazopoulos, On an elliptic system related to desertification studies, RACSAM DOI 10.1007/s13398-012-0108-0.*

*P.Kyriazopoulos, J. Nathan, E. Meron, A pattern formation mechanism for species coexistence, Submitted to the journal of Ecological Complexity.*

*P. Kyriazopoulos, E. Meron, Désert et maths, Brief published on 24/10/2013 "Mathématique de la planète terre": <http://mpt2013.fr/desert-et-maths/>*

P. Kyriazopoulos should complete his Thesis manuscript in March and will defend his Thesis at Universidad Complutense de Madrid in May or June 2014. Adviser J.I. Diaz.

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### **Hüseyin Koçak - ESR 17,18.**

A. Yıldırım, H. Koçak: A more approximate Green's function for the electric field vector with anisotropic properties, *Journal of Electromagnetic Waves and Applications*, 26 (1), 24-33, 2012, DOI:10.1163/156939312798954964

U. Erdogan, H. Koçak: Numerical Study of the Asymptotics of the Second Painlevé Equation by a Functional Fitting Method, *Mathematical Methods in the Applied Sciences*, 36 (17), 2347-2352, 2013, DOI: 10.1002/mma.2757

H. Koçak, A. Yıldırım: An efficient new iterative method for finding exact solutions of nonlinear time-fractional partial differential equations, *Nonlinear Analysis: Modelling and Control*, 16 (4), 403-414, 2011

U. Erdogan, H. Koçak: A reliable scheme with large time steps for second order initial value problems, submitted

H. Vazquez-Leal, H. Koçak, I. Ates,: A Rational Approximation for Nonlinear Ordinary Differential Equations, submitted

H. Koçak: Blow-up and Global Similarity solutions for Semilinear Third-Order PDEs, in preparation.

As he started his Thesis phd on February 2011, he cannot finish the thesis before 3 years according to the part-time PhD rules in the UK. It is expected to finish the thesis before August, 2014 in the University of Bath.

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### **Tetiana Savitska - ESR 19, 20.**

Ivancho M., Savitska T. An inverse problem for a parabolic equation in a free boundary domain degenerating at the initial moment. (Ukrainian) *Ukrainian Mathematical Bulletin* 8 (2011), 3, 381-403, 461 - 462; translation in *J. Math. Sci. (N. Y.)* 181 (2012), no.1, 47-64. DOI-10.1007/s10958-012-0675-9

Punzo F., Savitska T. Local versus nonlocal interactions in a reaction-diffusion system of population dynamics. To appear in *Rendiconti Lincei: Matematica e Applicazioni*, 2014)

Chipot M., Savitska T. Nonlocal p-Laplace Equations Depending on the  $L_p$

Norm of the Gradient. (To appear)

The thesis exam has to be in the next 12 months at the University of Zurich. Adviser M. Chipot.

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## Hui Wang - ESR 21

HW-ESR21-1: H. Castro, J. Dávila, H. Wang, *A Hardy type inequality for  $W_0^{2,1}(\Omega)$  functions*. Published in Comptes Rendus Mathématique Acad. Sci. Paris, Volume 349, Issues 13-14, July 2011, Pages 765-767

H. Castro, H. Wang, *A singular Sturm-Liouville equation under homogeneous boundary conditions*. Published in Journal of Functional Analysis, Volume 261, Issue 6, 15 September 2011, Pages 1542-1590

H. Castro, H. Wang, *A singular Sturm-Liouville equation under non-homogeneous boundary conditions*. Differential and Integral Equations, Volume 25 (2012), 85–92.

H. Castro, J. Dávila, H. Wang, *A Hardy type inequality for  $W_0^{m,1}(\Omega)$  functions*. Journal of the European Mathematical Society Volume 15 (2013), no. 1, 145–155.

H. Wang: *A singular Sturm-Liouville equation involving measure data*, Commun. Contemp. Math., Volume 15 (2013), no. 4, 1250047, 42 pp.

H. Wang: *A Semilinear singular Sturm-Liouville equation involving measure data, to appear in Ann. Inst. H. Poincaré Anal. Non Linéaire.*

Hui Wang: *ON A HARDY TYPE INEQUALITY AND A SINGULAR STURM-LIOUVILLE EQUATION*, Thesis Ph.D. of Mathematics, Graduate School—New Brunswick Rutgers, The State University of New Jersey  
Written under the direction of Haim Brezis at December 16, 2013.

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## Anh Nguyen Dao- ESR 22

A. N. Dao, J.I, Díaz, and P. Sauvy, *Quenching phenomenon of singular parabolic problems with L1 initial data*, Submitted .

A. N. Dao, and J.I, Díaz, *On quenching phenomenon to one dimensional degenerate parabolic problems with a singular absorption term and integrable initial datum*, In preparation.

A. N. Dao, TRACE INITIALE DES SOLUTIONS D'ÉQUATIONS D'HAMILTON-JACOBI AVEC TERMES D'ABSORPTION, These ; Université de Tours, France, December 19, 2013.

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## **Guigues ESR 23 and Egis ESR 26**

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### **Huy Cuong Vu Do - ESR 25,**

Danielle Hilhorst, Huy Cuong Vu Do, Yushan Wang, A finite volume method for density driven flows in porous media, ESAIM: PROCEEDINGS (2012), Vol. 38, p. 376-386. DOI: <http://dx.doi.org/10.1051/proc/201238001>.

K. BRENNER, D. HILHORST and H.C. VU DO, A Gradient scheme for the discretization of Richards Equation, Submitted to the Proceedings of the Conference FVCA7.

Yueyuan Gao, Danielle Hilhorst, Huy Cuong Vu Do, A generalized finite volume method for density driven flows in porous media (in preparation).

The doctoral thesis of Huy Cuong VU DO, who has obtained a contract as a doctoral student at Orsay in the year 2014, is planned to take place at the end of 2014. Adviser D. Hilhorst.

### **Manh Hong Duong - ESR 27, 28.**

Manh Hong Duong, Mark A. Peletier, Johannes Zimmer. Conservative-dissipative approximation schemes for a generalized Kramers equation. To appear in Mathematical Methods in the Applied Sciences, 2014. DOI: 10.1002/mma.2994

Manh Hong Duong, Mark A. Peletier, Johannes Zimmer. GENERIC formalism of a Vlasov-Fokker-Planck equation and connection to Large Deviation Principle. Nonlinearity 26 (2013) 2951-2971. DOI: 10.1088/0951-7715/26/11/2951

Manh Hong Duong, Vaios Laschos, Michiel Renger. Wasserstein gradient flows from large deviations of thermodynamic limits. ESAIM: Control, Optimisation and Calculus of Variations, 19(4), 1166-1188, 2013. DOI: <http://dx.doi.org/10.1051/cocv/2013049>

Manh Hong Duong. Asymptotic equivalence of the discrete variational functional and a rate-large-deviation-like functional in the

Wasserstein gradient flow of the porous medium equation.  
Submitted, 2013.

Manh Hong Duong, Mark A. Peletier, Upanshu Sharma, Passing to the limits in the Kramers equation using variational methods. In preparation, 2014.

Manh Hong Duong, Max Fathi. The two-scale approach to hydrodynamic limits for non-reversible dynamics. In preparation, 2014.

Manh Hong Duong, Mark A. Peletier, Johannes Zimmer. Thermo-visco-elasticity equation: microscopic model, large deviation principle and passing to the limits. Work in progress, 2014.

The defense of the PhD thesis is expected for September 25, 2014 at the Department of Mathematics and Computer Sciences at the Eindhoven University of Technology. The committee members for the exam thesis will be formed by professors from UK, Germany and the Netherlands.

### **Oleh Krehel - ESR 29, 30.**

Poster presented in the Workshop on *Singular reaction-diffusion*, Université catholique de Louvain, Louvain-la-Neuve, Belgium, June 27-29, 2011:  
"Flocculation in the context of the advection-diffusion-reaction equation"

Poster presented in Workshop on Porous media Location University of Eindhoven Date February 1, 2013

Poster presented in Symposium "Mathematics of Planet Earth" Location University of Utrecht. Date December 21, 2013

O. Krehel: "Flocculation in the context of the advection-diffusion-reaction equation". Proceedings of CMWR 2012, Urbana IL, USA,  
Link <http://www.tue.nl/en/publication/ep/p/d/ep-uid/273014/>

O. Krehel: On modeling and simulation of flocculation in porous media,  
<http://purl.tue.nl/391716084929304.pdf>

O. Krehel: "Non-imaging optics for LEDlighting", Proceedings of 84th European Study Group Mathematics with Industry (SWI 2012) pp.70-103

<http://purl.tue.nl/935697958058002.pdf>

O. Krehel: "Pedestrians moving in dark: Balancing measures and playing games on lattices", Submission to arxiv, <http://alexandria.tue.nl/repository/books/758011.pdf>

O. Krehel: A thermo-diffusion system with Smoluchowski interactions: well-posedness and homogenization (In Preparation)

O. Krehel: Multiscale Modeling of Colloidal Dynamics in Porous Media Including Aggregation and Deposition (In Preparation)

*Details about the thesis exam: Place University of Eindhoven. Tentative date October 1, 2014. Adviser. P. Knabner.*

## **Eduard Campillo - ESR 31**

Poster presented in the Workshop on *Singular reaction-diffusion*, Université catholique de Louvain, Louvain-la-Neuve, Belgium, June 27-29, 2011: *Phase-field models for electrowetting, in ITN-FIRST Workshop: Singular Reaction-Diffusion.*

E. Campillo-Funollet, G. Grün, F. Klingbeil, *On modeling and simulation of electrokinetic phenomena with general mass densities*, SIAM J.Appl.Math 72 (6) 2012, pp. 1899-1925.  
DOI: 10.1137/120861333

Poster: *Phase-field models for electrowetting*, ITN-FIRST Workshop on Singular Reaction-Diffusion, Tours 2012. June 4th-6th 2012.

Poster: Thermodynamically consistent models for electrowetting with mass density contrast, in ITN-Workshop on Image Processing and Reaction-Diffusion, Jerusalem (Israel), September 12th 2012

Poster: On a phase-field model for electrowetting, in ITN-Workshop on Nonlocal Problems, Zurich (Switzerland), December 13th 2012

E. Campillo-Funollet, PhD-thesis, in preparation. Erlangen, 2014. Adviser G. Grün.

## **Amine N. Chakhchoukh: - ESR 32**

C. Budd, A. N. Chakhchoukh and T. Dodwell, 'Twin layer buckling of geological structures', submitted.



Now registered for a Bath University funded PhD at the University of Bath, in 'Integrable configurations, groups and geometries', due to complete in Sept 2015.

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### **Cosmin-Bogdan Dita - ESR 33**

Alexandru, A., Lup, S., & Dita, B. (2013, May). Gds2m: Preprocessing tool for mems devices. In Advanced Topics in Electrical Engineering (ATEE), 2013 8th International Symposium on (pp. 1-4). IEEE.

Andrei, M. I., Dita, C. B., Ciuprina, G., & Ioan, D. (2013, May). Effective modeling of HF integrated components with domain partitioning and order reduction. In Advanced Topics in Electrical Engineering (ATEE), 2013 8th International Symposium on (pp. 1-4). IEEE.

Ciuprina, G., Ioan, D., Lazar, I. A., & Dita, C. B. (2012). Vector Fitting Based Adaptive Frequency Sampling for Compact Model Extraction on HPC Systems. *Magnetics, IEEE Transactions on*, 48(2), 431-434.

Ioan, D., Ciuprina, G., Dita, C. B., & Andrei, M. I. (2012, September). Electromagnetic models of integrated circuits with coupled magnetic circuits. In *Electromagnetics in Advanced Applications (ICEAA), 2012 International Conference on* (pp. 768-771). IEEE.

Ciuprina, G., Ioan, D., Dita, C. B. and Andrei, M. I. Optimal terminals identification for domain partitioning of electro-magnetic circuit elements. Submitted.

Thesis: MULTIPROCESSOR ELECTROMAGNETIC MODELLING OF INTEGRATED MICROSYSTEMS: I stage: department defense - Completed - December 2013, Bucharest. II stage: Public defense - scheduled for March 2014, Bucharest.

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### **Lázaro René Izquierdo Fábregas - ESR 34, 35,36.**

Poster: A mathematical model for the progression of dental caries. Workshop on Image Processing and Reaction-Diffusion, Sept 11-13, 2012, Jerusalem, Israel.

Poster: A mathematical model for dental caries: A realistic geometry, Workshop on Nonlocal Problems (FIRST), Dec 12-14, 2012, University of Zurich, Zurich, Switzerland

Poster: A mathematical model for the progression of dental caries, Numerical Simulation in Physics and Engineering (EHF2012), Sept 24-28, 2012, Málaga, Spain

L. René Izquierdo Fábregas and Pedro J. Torres, *Global dynamics of tumour-immune system interaction under nonstationary therapy*

R. Fabregas and J. Rubinstein, A three-dimensional model for the initial progress of caries, *Journal of Dental Research*, (submitted). 2013

R. Fabregas and J. Rubinstein, A mathematical model for the progression of dental caries, *Math. Med. Biol.* 2013  
DOI: 10.1093/imammb/dqt008

Thesis: A Mathematical Model for the Progression of Dental Caries, Universidad Complutense de Madrid. April 25, 2014. Adviser: Jacob Rubinstein

## **Hamidreza Khajeh Alizadeh Attar - ESR 37**

Poster presented in the Workshop on *Singular reaction-diffusion*, Université catholique de Louvain, Louvain-la-Neuve, Belgium, June 27-29, 2011: "Elastoplastic Deformation of Metal in Steel-Rolling process".

H. K. A. Attar, Simulation of Elastoplastic Deformation of Steel in Rolling Process, ITN Report, Siemens AG, Supervisor: Dr. Johannes Dagner. February 14, 2014, 67 pp.

## **Tommaso Mingazzini - ESR 38, 39, 40.**

Poster presented in the Workshop on *Singular reaction-diffusion*, Université catholique de Louvain, Louvain-la-Neuve, Belgium, June 27-29, 2011: "On the control of non-differentiable problems: an optimal control problem involving a free boundary"

J.I. Díaz, T. Mingazzini and A. M. Ramos, On the optimal control for a semilinear equation with cost depending on the free boundary, *NETWORKS AND HETEROGENEOUS MEDIA* Vol. 7, Number 4, December 2012.  
DOI: 10.3934/nhm.2012.7.605

J.-M. Coron, J. I. Díaz, A. Drici, T. Mingazzini, Global Null Controllability of the 1-Dimensional Nonlinear Slow Diffusion Equation, *Chinese Annals of Mathematics*, 34B(3), 2013, 333-344.  
DOI: 10.1007/s11401-013-0774-z

A. Drici, T. Mingazzini, Feedback Stabilization of the 1-Dimensional Porous Medium Equation. (submitted).

J.I. Díaz, T.Mingazzini, A criterion on the boundary non-diffusion or expansion of the support for some reaction-diffusion free boundary problems, or how the free boundary approaches to the boundary. (In preparation).

Thesis: Free Boundary problems: qualitative behaviour and control results, Universidad Complutense de Madrid. April 25, 2014. Advisers: Jesus Idefonso Díaz and Angel Manuel Ramos.

## **Simona Oana Tamasoiu - ESR 41,42.**

Poster presented in the Workshop on *Singular reaction-diffusion*, Université catholique de Louvain, Louvain-la-Neuve, Belgium, June 27-29, 2011: "*Fault localization in transportation systems*".

Poster presented at the Workshop on Quasilinear PDE's, Tours (France), June 04-06, 2012, Boundary feedback stabilization for quasilinear hyperbolic balance laws.

M. Gugat, G. Leugering, S. Tamasoiu, K. Wang:  $H^2$ -Stabilization of the Isothermal Euler Equations : a Lyapunov function approach -, *Chin. Ann. Math.*, 33(B), 2012, 479-500.

M. Gugat, G. Leugering, S. Tamasoiu, K. Wang: Boundary feedback stabilization for second-order quasilinear hyperbolic systems: A strict  $H^2$ -Lyapunov function, submitted, 2012.  
DOI: 10.1007/s11401-012-0727-y

G. Bastin, J.-M. Coron, S. O. Tamasoiu, Exponential stability of linear density-flow hyperbolic systems under PI boundary control, submitted, 2013.

J.-M. Coron, S. O. Tamasoiu: Feedback stabilization for a scalar conservation law with PID boundary control, submitted, 2014.

S. O. Tamasoiu, PhD-thesis, Stabilization and Boundary Control for Balance and Conservation Laws, in preparation. Erlangen, 2014. Tentative Date: expected by April 2014. Commission: President of the Commission - Prof. Dr. Johannes Barth, Examiners - Prof. Dr. Guenter Leugering, Prof. Dr. Martin Gugat, Prof. Dr. Wolfgang Borchers. Adviser G. Leugering.