PROFESSIONAL OCCUPATION

Since September 2009, I am an assistant professor at the "Université de Paris-Dauphine" in Paris (France)

Université de Paris Dauphine Laboratoire CEREMADE Place du maréchal de Lattre de Tassigny 75775 Paris Cédex 16 FRANCE

Personal address : 51 rue Notre Dame de Nazareth, 75003 PARIS, FRANCE. Phone : +33 6 75 25 31 80. Mail : jimmy.lamboley@ceremade.dauphine.fr Web home page : http://w3.bretagne.ens-cachan.fr/math/people/jimmy.lamboley/

HIGHER EDUCATION

2005–2009 **PhD of mathematiques** supervised by Michel PIERRE, at ENS Cachan (Brittany site), in the laboratory IRMAR of the university of Rennes 1,

Subject : Variations around irregular and optimal shapes.

PhD defense : December 5^{th} 2008, with the following committee : A. Henrot, D. Bucur, P. Freitas, P. Cardaliaguet, F. Gazzola, M. Pierre

- 2002–2006 Student at École Normale Supérieure de Cachan, Britanny site.
- 2004–2005 Master's degree in mathematical research, University of Rennes 1, analysis and applications, with honors, rank 1,
 Laureate of the Agregation competitive exam (National exam for being teacher in high-school), rank 20 (1800 participants, 380 admitted).

RESEARCH FIELD

My PhD takes place in the mathematic field called **shape optimization**. More precisely, we focus on difficulties linked to the writing of optimality conditions, and how to use them. The two main obstacles that have been analysed are the following :

- to deal with shape whose **regularity** is a priori unknown,
- to deal with **strong geometrical constraints**, i.e. which allow very few variations in the writing of optimality (for example the **convexity**).

The results are described in the four chapters of the thesis :

- the first one aims at developing a framework of shape derivatives, well adapted for shapes with very poor regularity,
- the chapter 2 deals with the analysis of optimality conditions under convexity constraints, in dimension 2, and their applications to a class of problems whose solutions are necessarily polygons,
- the third one focuses on two classical problems of shape optimization for eigenvalues, which enlighten the difficulties previously mentioned. We prove some regularity and also non-regularity results, of optimal shapes for these problems; we get some maximal regularity in $C^{1,\frac{1}{2}}$, which are new and shapp.
- the last chapter is motivated by the question of partially overdetermined problems, and we build some counter-examples linked with shape optimization.

Through the theory of shape optimization, I have been using many tools of Modern Analysis :

- in order to write shape derivatives, we use infinite dimensional differential calculus, geometrical measure theory, differential geometry and PDE,
- in order to write optimality conditions, I used optimization theory, especially with infinite dimensional constraints, possibly formulated in the optimal control framework,
- about regularity of optimal shapes, we use several fine tools about elliptic PDE (capacity, quasiopen sets, Sobolev and Hardy spaces, asymptotic expansion in corner domains...), and tools from free boundary problems (blow-up techniques, methods introduced by A. Caffarelli, monotonicity formula...),
- I have also been interested in the theory of front propagation, using many similar tools as in shape optimization, and also the formulation of viscosity solutions,
- for numerical computation of optimal shapes, I studied and sometimes program several methods for shape optimization (gradient, Newton, level-set...).
- I am also interested in convex analysis, and the use of Brunn-Minkowski type inequalities (especially on some functional coming from PDE, like the electrostatic capacity and the first eigenvalue of the Laplacian).

ARTICLES

Published papers :

2007	LAMBOLEY J PIERRE M. Structure of shape derivatives around irregular domains and applications, Journal of Convex Analysis 14 (2007), No. 4, 807–822
2008	FRAGALÀ I GAZZOLA F LAMBOLEY J PIERRE M. Counterexamples to Symmetry for Partially Overdetermined Elliptic Problems, Analysis, Vol. 29, N. 1 : pp. 85-93
	BRIANÇON T LAMBOLEY J. Regularity of the optimal shapes for the first eigenvalue with volume and inclusion constraints, Annales de l'IHP, Analyse non linéaire, Volume 26, Issue 4, pp 1149-1163
2009	LAMBOLEY J NOVRUZI A. Polygon as optimal shapes with convexity constraint, SIAM Control and Optimization, Volume 48, Issue 5, pp. 3003-3025 (2009).
2010	LAMBOLEY J. About Hölder-regularity of the optimal convex shape for λ_2 , Applicable Analysis,

Submitted papers :

2010 BUCUR D., FRAGALÀ I., LAMBOLEY J. Optimal convex shapes for concave functionals,

Papers in preparation :

2010 LAMBOLEY J., NOVRUZI A., PIERRE M. Optimal convex planar shapes, HARRELL E., HENROT A., LAMBOLEY J. About local minimizers of the Mahler functional,

TALKS AND CONFERENCES

2009	Seminar at the Scuola Normale Superiore di Pisa, Italy (invitation of professor Giuseppe Buttazzo), in march
	Seminar at the university of Paris Orsay, in april
	Seminar at the university of Polytecnico di Milano, Italy, in june
2008	Seminar at the university of Marrakech, Marocco (invitation of professor NourEddine Alaa), in december
	Talk at the international conference ${\bf CVA}~{\bf 2008}$ in september, at Lisboa (Portugal)
	Talk at the international conference FBP 2008 in june, at Stockholm (Sweden), Title : Regularity of the boundary of an optimal shape with convexity constraints
	Seminar of analysis at the university of Ottawa (Canada), in april, invitation of professor A. Novruzi
2007	Talk to the national french conference SMAI 2007 in june, in Praz-sur-Arly (France), Title : Structure of shape derivatives around irregular sets
	Seminar of analysis of the university of Brest, invitation of professor P. Cardialaguet.
2005-2010	I also went to the following conferences :
	Queen Dido conference 2010 on the isoperimetric problems (course by R. Benguria, B. Colbois and O. Druet)
	Srping school PDE 2008 (course by H. Berestycki, D.G. de Figueiredo, S. Terracini and M. Willem) in may 2008, in Louvain-La-Neuve (Belgium)
	Evolution of Interfaces and Applications in may 2007, in Roscoff (France)
	International conference of the AIMS in may 2006 in Poitiers (France)
	Autumn School and Workshop on Moving boundaries in december 2005 in Lyon (France)
	GDR CNRS ANOFOR "New applications of shape optimization" in october 2005, in Nancy (France)
Research VI	ISIT

Visit in Ottawa (Canada), from avril 2^{nd} to may 10^{th} 2008 for a collaboration with A. Novruzi. Visit in Pisa (Italy), from february 15^{th} to june 2009, invitation of Prof. L. Ambrosio (SNS Pisa) and G. Buttazzo (University of Pisa).

2009 - 2011	Assistant professor at "Université de Paris-Dauphine" :	
	- Exercises for the lectures about "Differential calculus and optimization" (third year stu-	
	dents),	
	- Exercises for the lectures on the "Optimal control of Markov chains" (fourth year students)	
	- Exercises for the lectures on "Functional and Fourier Analysis" (third year students)	
	- Exercises for the lectures on the "Differential equations" (third year students)	
2008-2009	Third year as a teaching assistant at the ENS Cachan Brittany site :	
	- Exercises for the lectures about "Integration and probability" (third year students),	
	- Lectures on the Fourier transform (fourth year students)	
2007 - 2008	Second year as a teaching assistant at the ENS Cachan Brittany site :	
	- Functional analysis and distributions theory (fourth year students)	
2006-2007	First year as a teaching assistant at the ENS Cachan Brittany site :	
	- Exercises for the lectures about "Numerical analysis of PDE" (fourth year students)	
Other abilities		

- \triangleright Languages : French and english.
- ▷ **Programming** : C/C++, Fortran 77, Caml. **Numerical software :** Matlab/Scilab, R, Maple. Use of the Finite elements softwares : FreeFem++ et Comsol.