CURRICULUM VITAE

Dr. Abdeslem Lyaghfouri
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Department of Mathematics and Statistics
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Ph.D. in Mathematics, University of Zürich, Zürich, Switzerland, 1997.

I. EMPLOYMENT HISTORY

- Associate Professor, KFUPM, Dhahran, Saudi Arabia (2005-)
- Assistant Professor, KFUPM, Dhahran, Saudi Arabia (2001-2004)
- Assistant Professor, Ibn Zohr University, Agadir, Morocco (1999-2001)
- Post-doc, ICTP, Trieste, Italy (Mar. 98-Jun. 99)
- Assistant, University of Zürich, Switzerland (Apr. 96-Jul. 97)
- Fellowship from ESF, University Complutense, Madrid, Spain (Oct. 95-Mar. 96)
- Teaching and Research Position(Attaché temporaire à l'enseignement et à la recherche), University of Metz, Metz, France (1993-1995)
- Teaching Assistant(Vacataire), University of Metz, Metz, France (1990-1992)

II. TEACHING

Name of Institution	Academic year	Courses
King Fahd University	2006-2007	Real Analysis Methods of Applied Mathematics Complex Analysis Element of Differential equations
King Fahd University	2005-2006	Calculus I Element of Differential equations
King Fahd University	2004-2005	Elements of Differential Equations, Advanced Calculus II Calculus I
King Fahd University	2003-2004	Methods of Applied Mathematics Advanced Partial Differential Equations
King Fahd University	2002-2003	Calculus II Methods of Applied Mathematics
King Fahd University	2001-2002	Calculus I, Calculus II, Introduction to Topology Ordinary Differential Equations
King Fahd University	2000-2001	Calculus I
Ibn Zohr University	2000-2001	Analysis II
Ibn Zohr University	1999-2000	Algebra I, Analysis I, Analysis II & Calculus II
University of Zürich	1996-1997	Analysis I & Seminar in Mathematics
University of Metz	1994-1995	Topology
University of Metz	1993-1994	Topology
University of Metz	1991-1992	Analysis II
University of Metz	1990-1991	Analysis I

Courses Coordination

- Element of Differential equations : Term 061.
- Calculus I : Term 042.
- Methods of Applied Mathematics : Terms 022, 031 and 032

III. RESEARCH

III.1. RESEARCH INTEREST

My research falls within the area of free boundary problems with a recent interest to regularity of elliptic equations. The tools I use come from the theory of partial differential equations and functional analysis: in particular elliptic and parabolic equations, fixed point theory, variational inequalities. I have worked in the past on the dam problem and on a two phases flow of salt and fresh water in a porous medium. Currently I am interested in more general class of free boundary problems.

III.2. FUNDED RESEARCH PROJECTS

Project Title	**Funding Agency**	**Status**	**Role**	**Budget**
On the Dam Problem with Two Fluids	KFUPM	C	PI	35500 SR
On the Continuity of the Free Boundary in a Class of Two Dimensional Problems	SABIC	C	PI	26400 SR
The Heterogeneous Dam Problem with Dirichlet Boundary Conditions: The N Dimensional Case	SABIC	IP	PI	25400 SR
On the Flow of Three Immiscible Fluids in an Unbounded Porous medium	SABIC	IP	PI	28800 SR
On the Continuity of the Free Boundary in a Class of Elliptic Free Boundary Problems with Neumann Boundary Condition	KFUPM	IP	PI	34600 SR

C: Completed, IP: In progress, S: Submitted, PI: Principal Investigator, $1\ US\$ \approx 3.75\ SR$.

III.3. PUBLICATIONS

a) Papers published in referred journals

[1] - A. Lyaghfouri : The inhomogeneous dam problem with linear Darcy's law and Dirichlet boundary conditions. *Mathematical Models and Methods in Applied Sciences* Vol. 6, No. 8, 1051-1077, (1996).

[2] - M. Chipot & A. Lyaghfouri : The dam problem with nonlinear Darcy's law and leaky boundary conditions. *Mathematical Methods in the Applied Sciences* Vol. 20, No. 12, 1045-1068, (1997).

[3] - S. Challal & A. Lyaghfouri : A stationary flow of fresh and salt groundwater in a coastal aquifer with nonlinear Darcy's law. *Applicable Analysis* Vol. 67, 295-312, (1997).

[4] - M. Chipot & A. Lyaghfouri : The dam problem with linear Darcy's law and nonlinear leaky boundary conditions. *Advances in Differential Equations* Vol. 3, No. 1, 1-50, (1998).

[5] - A. Lyaghfouri : On the uniqueness of the solution of a nonlinear filtration problem through a porous medium. *Calculus of Variations and Partial Differential Equations* Vol. 6, No. 1, 67-94, (1998).

[6] - J. Carrillo & A. Lyaghfouri : On the dam problem with nonlinear Darcy's laws and Dirichlet boundary conditions. *Annali della Scuola Normale Superiore di Pisa Cl. Sci.* (4) Vol. 26, 453-505, (1998).

[7] - A. Lyaghfouri : A unified formulation for the dam problem. *Rivista di Matematica della Università di Parma.* (6) 1, 113-148, (1998).

[8] - A. Lyaghfouri : The evolution dam problem with nonlinear Darcy's law and leaky boundary conditions. *Ricerche di Matematica* Vol. XLVII, Fasc. 2, 297-357, (1998).

[9] - A. Lyaghfouri : The evolution dam problem with nonlinear Darcy's law and Dirichlet boundary conditions. *Portugaliae Mathematica* 56 (1), 1-38 (1999).

[10] - A. Lyaghfouri : On the uniqueness of the solution of a unified formulation for the boundary conditions in the dam problem. *Annali dell' Universita di Ferrara* Sez. VII 45, 91-122 (1999).

[11] - J. Carrillo & A. Lyaghfouri : A filtration problem with nonlinear Darcy's law and generalized boundary conditions. *Advances in Differential Equations* Vol. 5, No. 4-6, 515-555 (2000).

[12] - S. Challal & A. Lyaghfouri : A stationary flow of fresh and salt groundwater in a heterogeneous coastal aquifer. *Bollettino della Unione Matematica Italiana* (8) no 2, 505-533 (2000).

[13] - S. Challal & A. Lyaghfouri : A nonlinear two phase fluid flow through a porous medium in presence of a well. *Nonlinear Differential equations and Applications* 8, 117-156 (2001).

[14] - J. Carrillo, S. Challal & A. Lyaghfouri : A free boundary problem for a flow of fresh and salt groundwater with nonlinear Darcy's law. *Advances in Mathematical Sciences and Applications* 12, no. 1, 191-215 (2002).

[15] - S. Challal & A. Lyaghfouri : On the Behavior of the Interface Separating Fresh and Salt Groundwater in a Heterogeneous Coastal Aquifer. *Electronic Journal of Differential Equations*, Vol. 2003, No. 44, pp. 1-27 (2003).

[16] - A. Lyaghfouri : A free boundary problem for a fluid flow in a heterogeneous porous medium. *Annali dell' Universita di Ferrara-Sez. VII-Sc. Mat.*, Vol. IL, 209-262 (2003).

[17] - S. Challal & A. Lyaghfouri : A Filtration Problem through a Heterogeneous Porous Medium. Interfaces and Free Boundaries Vol. 6, No. 1, 55-79 (2004).

[18] - A. Lyaghfouri : A Regularity Result for a Heterogeneous Evolution Dam Problem. Zeitschrift f*ü*r Analysis und ihre Anwendungen, Vol. 24, No. 1, 149-166 (2005).

[19]- S. Challal & A. Lyaghfouri : On the Continuity of the Free Boundary in Problems of type $div(a(x)\nabla u) = -(\chi(u)h(x))_{x_1}$. Nonlinear Analysis : Theory, Methods & Applications, Vol. 62, No. 2, 283-300 (2005).

[20] - S. Challal & A. Lyaghfouri : A New Formulation of the Dam Problem. European Journal of Applied Mathematics, Vol. 16, No. 5, 583-599 (2005).

[21]- S. Challal & A. Lyaghfouri : On a class of Free Boundary Problems of type $div(a(X)\nabla u) = -div(H(X)\chi(u))$. Differential and Integral Equations, Vol. 19, No. 5, 481-516 (2006).

[22]- S. Challal & A. Lyaghfouri : On the Dam Problem with Two Fluids Gov-

erned by a Nonlinear Darcy's Law. Advances in Differential Equations, Vol. 11, No. 8, 841-892 (2006).

b) Papers Accepted for publication in referred journals

c) Papers submitted to referred journals

[23]- S. Challal & A. Lyaghfouri : Continuity of the Free Boundary in the Problem $\Delta_p u = -(h(x,y)\chi(u))_x$ with $h_x \geqslant 0$.

[24] - S. Challal & A. Lyaghfouri : On the Continuity of the Free Boundary in a Heterogeneous Dam with a Leaky Boundary Condition.

[25]- A. Lyaghfouri : On the Lipschitz Continuity of the Solutions of a Class of Elliptic Free Boundary Problems.

[26]- S. Challal & A. Lyaghfouri : Lipschitz Continuity of Solutions of a Free Boundary Problem Involving the p-Laplacian.

[27]- S. Challal & A. Lyaghfouri : Porosity of Free Boundaries in $A-$Obstacle Problems.

[28]- S. Challal & A. Lyaghfouri : Hölder Continuity of Solutions to the A-Laplace Equation Involving Measures.

[29]- A. Lyaghfouri : A Minimum Problem with Free Boundary for the $p(x)-$Laplace Operator.

d) Papers in preparation

[30]- S. Challal & A. Lyaghfouri : Interior and Boundary Regularity for a Free Boundary Problem in Orlicz Sobolev Spaces.

[31]- S. Challal & A. Lyaghfouri : Continuity of the Free Boundary in a Problem involving Orlicz Sobolev Spaces.

[32]- A. Lyaghfouri : Continuity of the Free Boundary for a Class of Elliptic Problems in Higher dimensions.

[33]- A. Lyaghfouri : A Regularity Result for a Class of Non Stationary Free

Boundary problems.

e) Papers published in Proceedings

[1] - M. Chipot & A. Lyaghfouri : An existence theorem for an unbounded dam problem with leaky boundary conditions. Proc. European Conference on Elliptic and Parabolic Problems, Pont-à-Mousson (June 1994). *Pitman Research Notes in Mathematics*. 325, 64-73, (1995).

[2] - M. Chipot & A. Lyaghfouri : On the uniqueness of the solution of the dam problem with leaky boundary conditions. Progress in partial differential equations : the Metz surveys 4. *Pitman Research Notes in Mathematics*. 345, 175-186, (1996).

f) A Contributed Chapter to a Book

- On the Dam Problem. Handbook of Differential Equations: Stationary Partial Differential Equations, Edited by M. Chipot and P. Quittner. Elsevier-North Holland. Volume 3, Chapter 6, 465-552, 2006.

III.4. VISITS TO RESEARCH CENTERS AND UNIVERSITIES

- Centro de Matemática e Aplicações Fundamentais, University of Lisbone, Portugal (2 weeks, Febr. 2003)
- Hill Center, Rutgers University, New Brunswick, USA (4 weeks, Sept. 2000)
- Departamento de Matematica Aplicada, University Complutense de Madrid (Oct. 97-Jan. 98)

III.5. RECENTLY ATTENDED CONFERENCES

- AIM'S Sixth International Conference on Dynamical Systems, Differential Equations and Applications, June 25-28, 2006. Poitiers, France.
- Free Boundary Problems and Nonlinear PDE, October 21-23, 2005. Bonn, Germany.
- Nonlinear Parabolic Problems, October 17-21, 2005. Helsinki, Finland.
- Joint Meeting of AMS, DMV, OMG at Mainz , June 16-19, 2005. Mainz, Germany.
- Nonlinear Elliptic and Parabolic Problems: A Special Tribute to the Work of Herbert Amann, June 28-30, 2004. Zürich, Switzerland.
- Conference in honor of H. Brézis June 21-25, 2004. Paris, France.
- International Conference on Free Boundary Problems, June 5-8, 2002, Trento, Italy.
- 4th European Conference on Elliptic and Parabolic Problems, June 18-22 , 2001, Rolduc, Neitherlands.

III.6. SEMINARS AND ORAL PRESENTATIONS

- On the Continuity of the Free Boundary in a Class of Elliptic Problems with Neumann Boundary Condition. September 2006, King Fahd University, Dhahran, Saudi Arabia.
- On a Class of Elliptic Free Boundary Problems. AIM'S Sixth International Conference on Dynamical Systems, Differential Equations and Applications. June 2006, University of Poitiers, France.
- On the Dam Problem with Two Fluids Governed by a Nonlinear Darcy's Law. June 2006, King Fahd University, Dhahran, Saudi Arabia.

- A free boundary problem for a flow of fresh and salt groundwater with nonlinear Darcy's law. July 2003, Universit*ä*t des Saarlandes, Saarbrucken, Germany.
- A Filtration Problem through a Heterogeneous Porous Medium. February 2003, University of Lisbone, Portugal.
- A free boundary problem for a flow of fresh and salt groundwater with nonlinear Darcy's law. February 2003, Nonlinear PDEs and Interface Pbs, Braga, Portugal
- A Filtration Problem through a Heterogeneous Porous Medium. Conf. on Free Bound. Pbs. June 2002, Trento, Italy.
- On the Behavior of the Interface Separating Fresh and Salt Groundwater in a Heterogeneous Coastal Aquifer. June 2001, 4th Euro. Conf. on Ellip. and Parab. Pbs., Rolduc, Neitherlands
- A free boundary problem for a flow of fresh and salt groundwater with nonlinear Darcy's law. September 2000, Rutgers University, USA.

IV. OTHER ACTIVITIES

Math Seminar Coordinator at the Department of Mathematics and Statistics, King Fahd University of Petroleum and Minerals, from 2002 to 2004.

Reviewer for Zentralblatt MATH

V. LANGUAGES

English, French and Arabic