Ivan Fumagalli

Curriculum Vitae

Personal data and contacts

Born in:	Ponte San Pietro (BG), Italy, on 21/11/1989
Home address:	via Cimarosa 16, 24046 Osio Sotto (BG), Italy
Mobile:	+39 3471287649
E-mail:	ivan.fumagalli@polimi.it, ivanfumagalli.if@gmail.com
Web page:	www1.mate.polimi.it/~ifumagalli

Research interests

I am interested in the **numerical analysis** and **optimal control** of **industrial, bio and real-life applications**. In particular, my main focus is on **free boundary** problems (in fluid dynamics, but not exclusively) and in the treatment of **moving contact lines**. I am intrigued by all the levels of the mathematical description of a phenomenon, ranging from modeling and theoretical analysis, to numerical approximation, and to scientific computing. Concerning optimal control, I am particularly attracted to **shape optimization** and other control problems involving geometry displacements. I am also interested in **model order reduction**: for many applications, computational efficiency is a must.

Education

2014 – Jul 2017	Ph.D. in Mathematical Models and Methods in Engineering at MOX – Department of Mathematics, Politecnico di Milano, Italy Thesis: Numerical approximation and optimal control of free surface problems with moving contact line Supervisors: Profs. Nicola Parolini, Marco Verani
2011 – Dec 2013	Master of Science in Mathematical Engineering at Politecnico di Milano, Italy orientation "Computational Sciences for Engineering" Thesis: Shape Optimization for Stokes flows: a reference-domain approach Supervisors: Profs. Nicola Parolini, Marco Verani Grade: 110/110 cum laude
2008 – 2011	Bachelor Degree in Mathematical Engineering at Politecnico di Milano, Italy Thesis: Test a priori di modelli LES per la turbolenza omogenea e isotropa (A priori tests on LES models for homogeneous and isotropic turbulence) Supervisor: Prof. Lorenzo Valdetttaro Grade: 110/110 cum laude
2003 – 2008	Scientific High School Degree at Liceo Scientifico "F. Lussana", Bergamo, Italy Grade: 100/100 cum laude

Visiting experience

Feb – Apr 2016	Visiting student at the Department of Mathematics (group of Prof. R.H. Nochetto), University of Maryland, College Park, USA

Teaching and other professional experience

Sep 2016 – Jul 2017	Project fellow at Moxoff s.p.a. (www.moxoff.com) (company focused on advanced applied math solutions and technology transfer)
A.Y. 2014/15 – 2016/17	Teaching assistant and computer laboratory tutor at Politecnico di Milano courses: Mathematical methods for engineering (in English) – M.Sc. Eng. Physics Ordinary differential equations – B.Sc. Environmental Eng. Analytical and numerical methods for engineering – B.Sc. Energy Eng.

Language skills

Italian	English		French
native language	2009 TOEFL IBT (100/120) 2008 FCE (grade B)	CEF level C2 CEF level B2	basics

Computer skills

Operative systems	Windows, Debian-based Linux, basics of other Unix OS's
Programming languages	C, C++, Matlab, FreeFem – very good Python, OpenMP, MPI – good Fortran, CUDA, R, AMPL – basic
Software libraries	FEniCS-dolfin (Python and C++ – finite element methods) – very good rbMIT (Matlab – finite element, reduced basis methods) – good GALib (C++ – genetic algorithms) – basic
CFD software	Phoenics – good
Typographical languages	LaTeX – very good
Certification	European Computer Driving License (ECDL)

Publications

- I. Fumagalli, *A free-boundary problem with moving contact points*, submitted (preprint: MOX report 33/2017).
- I. Fumagalli, N. Parolini, M. Verani, *On a free-surface problem with moving contact line: from variational principles to stable numerical approximations*, Journal of Computational Physics, under review (preprint: MOX report 03/2017).
- I. Fumagalli, A. Manzoni, N. Parolini, M. Verani. *Reduced basis approximation and a posteriori error estimates for parametrized elliptic eigenvalue problems,* ESAIM: Mathematical Modelling and Numerical Analysis, 50 (6), 1857–1885, 2016.
- I. Fumagalli, N. Parolini, and M. Verani, *Shape Optimization for Stokes flows: a finite element convergence analysis*, ESAIM: Mathematical Modelling and Numerical Analysis, 49 (4), 921–951, 2015.

Participation to conferences (with presentation)

12/04/2017	PhD Day, Università degli Studi di Milano, Milan, Italy Talk: *Stability analysis and optimal control of a free-surface problem with moving contact line*
05-07/04/2017	IACM 19th International Conference on Finite Elements in Flow Problems (FEF 2017), Università la Sapienza, Rome, Italy Talk: *Stability analysis of a free-surface problem with moving contact line*
14-17/06/2016	The Mathematics of Finite Elements and Applications (MAFELAP 2016), Brunel University, London, United Kingdom Talk: *RB approximation and a posteriori error estimates for parametrized elliptic eigenvalue problems*

15-16/04/2016	Finite Element Circus, University of Maryland, College Park, MD, USA Talk: *An ALE approach to free-surface problems with moving contact points*
14-18/09/2015	ENUMATH – European conference on Numerical Mathematics and advanced applications, Middle East Technical University, Ankara, Turkey Talk: *Reduced basis approximation and a posteriori error estimates for parametrized elliptic eigenvalue problems*, in the mini-symposium: A posteriori error estimates for linear and nonlinear eigenvalue problems
13-14/04/2015	Lions-Magenes Days, Università degli Studi di Pavia, Italy Poster: *Shape optimization for Stokes flows: a finite element convergence analysis*

Invited seminars

09/07/2017	CATS chair, Rheinisch-Westfälische Technische Hochschule, Aachen, Germany Talk: *Numerical approximation and optimal control of free surface problems with moving contact line*
29/03/2016	Department of Mathematics, University of Maryland, College Park, MD, USA Talk: *Reduced basis approximation and a posteriori error estimates for parametrized elliptic eigenvalue problems*
23/06/2016	MOX – Department of Mathematics, Politecnico di Milano, Milan, Italy Talk: S*imulation and control of moving-contact-line problems*

Participation to other conferences, workshops, schools

26-27/05/2017	European Finite Element Fair (EFEF 2017) Università degli Studi di Milano, Milan, Italy
12/05/2017	MediolaNum Università degli Studi di Milano, Milan, Italy
03-07/10/2016	Advanced Numerical Methods: recent developments, analysis, and applications Institut Henri Poincaré, Paris, France
30/09/2015	Reduced Order Modeling Techniques & Applications. École Polytechnique Fédérale de Lausanne, Switzerland
29/06-03/07/2015	Summer school: Innovative concepts for complexity reduction in numerical PDEs: nonlinear approximation, sparsity, adaptivity, model reduction. Dobbiaco (BZ), Italy
23-29/11/2014	Oberwolfach seminar: Projection based model reduction: Reduced Basis Methods, Proper Orthogonal Decomposition, and Low Rank Tensor Approximations. Mathematisches Forshungsinstitut Oberwolfach, Germany
17-25/11/2012	ATHENS course: Isogeometric simulation & beyond. Technische Universität München, Germany

Rewards

2017	Attribution of contribution for scientific events by GNCS-INdAM.
2008	Admission to the Albo Nazionale delle Eccellenze (National Excellence Register), for the achievement of High School Degree cum laude.

Personal interests

2015 – today	member of La Gilda delle Arti, acting company
2010 – 2012	member of ShArt - Show and Art, acting and music company