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CURRENT POSITION

Permanent Research Engineer, since Feb 2018 Institute Pasteur - Bioinformatics and Biostatistics Hub - C3BI, USR 3756 IP CNRS - Paris, France.

Currently embedded in two research units of the institute:

- InBio with Gregory Batt and Jakob Ruess
- Physics of Biological Function with Thomas Gregor

PREVIOUS EXPERIENCE

Post-doc, Nov 2016 - Jan 2018

PHD in Applied Mathematics and Scientific Computing, Oct 2012 - Dec 2016

Multiscale Mathematical Modelling of the Structural Heterogeneities in Cardiac Electrophysiology.

Supervised by: Yves Coudière and Clair Poignard.

- Derivation of the mathematical models for cardiac electrophysiology.
- Thorough study about cardiac electrophysiology: ionic models, monodomain and bidomain models, gap junction functionality.
- Mathematical analysis of parabolic-elliptic systems of equations, semigroup approach, multiscale modelling, two-scale homogenisation.
- Numerical simulations with finite elements, FreeFem++, C++, FORTRAN.
- Image processing of cardiac high resolution MRI using MUSIC, Seg3D, SCIRun, Matlab.
- Implementation of modified bidomain model into CEPS (C++ parallel software for finite element simulations, specialized in cardiac electrophysiology), and running simulation on platforms such as Plafim and Avakas.

Post-doc and PhD performed in CARMEN team at INRIA Bordeaux Sud-Ouest and IHU-LIRYC.

STUDY VISITS

July-Aug 2015 3 weeks study visit to Uni. of Ottawa, Canada. Work with Yves Bourgault on the project: Heterogeneous cardiac conductivity models based on medical image segmentation.

Jun 2017 2 weeks study visit to Uni. of Ottawa, Canada. Continuation of the work with Yves Bourgault.

PAPERS

- Image-based modeling of the heterogeneity of propagation of the cardiac AP. Example of rat heart HR-MRI.*, A. Davidović, Y. Coudière, Y. Bourgault, International Conference on Functional Imaging and Modeling of the Heart. Springer International Publishing, 2017.
- Microscopic modelling of the non-linear gap junction channels*, A. Davidović, Y. Coudière, T. Desplantez, C. Poignard, Computing in Cardiology Conference (CinC), 2015. IEEE, 2015.
- The modified bidomain model with periodic diffusive inclusions*, A. Davidović, Y. Coudière, C. Poignard, Computing in Cardiology Conference (CinC), 2014. IEEE, 2014.
- Modified bidomain model with passive periodic heterogeneities*, A. Davidovic, Y. Coudière, C. Poignard. *submitted to DCDS*
- Methodology for studying propagation of action potential in a heart with structural heterogeneities: from HR-MRI to numerical simulation.*, A. Davidovic, Y. Coudière, Y. Bourgault. *to be submitted*

SELECTED TALKS AND POSTERS

- FIMH** Functional Imaging and Modelling of the Heart, June 2017, Toronto, Canada.
Talk: *Image-based modeling of the heterogeneity of propagation of the cardiac AP. Example of rat heart HR-MRI.*
- Uni. Bordeaux** PhD defense, December 2016, Bordeaux, France.
Talk: *Multiscale Mathematical Modelling of the Structural Heterogeneities in Cardiac Electrophysiology.*
- CINC** Computing in Cardiology, September 2015, Nice, France. Best poster award.
Poster: *Microscopic Modelling of the Non-Linear Gap Junction Channels.*
- Uni. Ottawa** August 2015, Ottawa, Canada.
Invited Talk: *Role and modelling of some heterogeneities for cardiac electrophysiology.*
- CINC** Computing in Cardiology, September 2014, Cambridge, MA, USA.
Poster: *Influence of periodic diffusive inclusions on the bidomain model.*

PRE-DOCTORAL EXPERIENCE

- Mar - Sept 2011** Master thesis at Autonomous University of Barcelona, Spain. Topic: Modelling Quantum Detection. Application of hidden Markov models on quantum inference. Supervisors: Alex Monras, Ramon Muñoz Tapia.
- Aug - Sep 2010** Intership at INRIA Sophia Antipolis-Méditerranée, France. Project: Convolution surface for non planar basic - skeleton elements, as in modelling hair locks. Supervisor: Evelyne Hubert, GALAAD group.
- Jun - July 2010** Intership at INRIA Sophia Antipolis-Méditerranée, France. Project: Detection and analysis of axons in microscopic 3D bi-photon neuronal images. Supervisor: Xavier Descombes.

TEACHING AND SCIENTIFIC POPULARIZATION

- Participated on the Cap Science stand during the Night of researchers, September 2014, Talence.
- One of the researchers for Cap-Science project: "Visages des Sciences", 2013, Bordeaux.
- Professor of Mathematics at Public school Sutjeska, Podgorica, Montenegro. Feb - July 2012.
- As a member of NGO PRONA, I was one of the creators, organizers and mentors of the Summer School of Physics 2008, Ivanova Korita, Montenegro and Winter School of Physics 2009, Podgorica, Montenegro. These were the first two events organized in Montenegro, that aimed at the popularization of mathematics and physics among high school students.
- Assistant at Conference on Quantum Transport and Fluctuations at Nano Scale, 2008, Budva, Montenegro.

EDUCATION

Ph.D. Applied Mathematics and Scientific Computing University of Bordeaux, France	2012 - 2016
M.Sc. Mathematical Modelling in Engineering MathMods - Erasmus Mundus programme, Joint diploma Uni. of L'Aquila, Italy, Uni. of Nice Sophia Antipolis, France, and Autonomous Uni. of Barcelona, Spain	2009 - 2011
B.Sc. Mathematics and Computer Science University of Montenegro, Montenegro	2006 - 2009
First year of B.Sc. Physics, in parallel University of Montenegro, Montenegro	2007 - 2008

TECHNICAL SKILLS

Lately used: \LaTeX , Git, Matlab, C++, FreeFem++, FORTRAN, MUSIC, SCIRun, SEG3d, Perl.
Also worked with: R, Scilab, Mathematica, Java, Ruby, C#, XML, PHP, Javascript.

COMMUNICATION

- LIRYC** Workshop, September 2016, Bordeaux, France.
Poster: *The effects of the diffusive inclusions in the bidomain model: theoretical and numerical study. Application to the rat heart.*
- ISHR** 33rd Annual Meeting of the European Section of the ISHR, July 2015, Bordeaux, France.
Poster: *Effects of non-linear GJ channels on the AP propagation : a modelling insight*
- SIAM CSE** Computational Science and Engineering, March 2015, Salt Lake City, UT, USA.
Poster: *Modelling cardiac electrophysiology with structural heterogeneities and dynamical gap junctions.*
- FJIM** First Joint International Meeting RSME-SCM-SEMA-SIMAI-UMI, July 2014, Bilbao, Spain.
Invited Talk: *Role and modelling of some heterogeneities for cardiac electrophysiology.*
- MaMoW** Mathematical Modelling workshop, July 2014, L'Aquila, Italy.
Talk: *Role and modelling of some heterogeneities for cardiac electrophysiology.*
- LIRYC** June 2014, Bordeaux, France.
Seminar Talk: *Mathematical modelling of some heterogeneities in cardiac tissue.*
- ICERM** Workshop: From the Clinic to PDEs and Back, January 2014, Providence, USA.
Poster: *Influence of periodic diffusive inclusions on the bidomain model. Theory and numerics.*
- LIRYC** Workshop, October 2013, Bordeaux, France.
Poster: *Influence of periodic diffusive inclusions on the bidomain model.*
- TEMPUS-SEE** SEE Doctoral Year Evaluation Workshop, December 2011, Skopje, Macedonia.
Invited Talk: *Modelling Quantum Detection.*
- INRIA** September 2010, Sophia Antipolis, France.
Seminar Talk: *Helical Pythagorean Hodograph Curves.*
- GF** Generalized Functions, August 2009, Vienna, Austria.
Talk: *3-dimensional photon distribution equation with an infinite absorption point.*

COURSES, SUMMER AND WINTER SCHOOLS

- Semaine d'Etude Maths-Entreprises, MAP5 - Universite Paris Descartes, September 2017, Paris, France.
- CardioFunXion Winterschool on cardiac ultrasound image acquisition and processing, PHILIPS, February 2017, Paris, France.
- Summer Course on Image-based Biomedical Modeling, July 2015, Park City, UT, USA.
- Winter school on Calculus of Variations in Physics and Materials Science, Jan 2012, Wurzburg, Germany.

TEMPUS-SEE PhD course on Data Structures and HPC, Nov-Dec 2011, Skopje, Macedonia.

UCM Modelling Week, June 2011, Madrid, Spain.

Project: *Estimation of Orientation Distribution of Fibers*. Advisor: Jouni Sampo.

PRIZES, GRANTS AND FUNDINGS

CINC Gary and Bill Sanders Poster Awards, Computing in Cardiology Conference, 2015, Nice, France.

INRIA PhD funding by INRIA Cordi-S, 2012-2015. Partial funding, 2015-2016, by the French National Research Agency (ANR), grant references ANR-13-MONU-0004 and ANR-10-IAHU-04.

MATHMODS Full scholarship from European Commission for Erasmus Mundus M.Sc. programme Math-Mods - Mathematical Modelling in Engineering, 2009 - 2011. Awarded to less than 3% of the applicants.

TEMPUS-SEE European Commission funding to attend TEMPUS-SEE PhD course, November 2011, Skopje, Macedonia.

Gov. of Montenegro During the undergraduate studying, 2006-2009, I was awarded various scholarships by the Government of Montenegro and Municipality of Niksic.

Olympiads From 1995-2006 competed in mathematics and physics, and won prizes every year in competitions on school, city, regional and state levels.

LANGUAGES

BCMS (Bosnian, Croatian, Montenegrin and Serbian) - native;
English - fluent; French - intermediate; Russian, Spanish - beginner.

PERSONAL

Nationality: Montenegrin.
Driving license, category B.