

## CURRICULUM VITAE

### 1. Personal and professional information :

**Magali RIBOT**, born September 3rd 1977

French citizenship

Current situation: professeur des universités 2nde classe, Université d'Orléans

Lab: Institut Denis Poisson, UMR CNRS 7013

Email :

Webpage : \_

### 2. Carreer and studies:

From September 2015 : **Professor** at Orléans University

December 2014 : **Habilitation à Diriger les Recherches** ( « Habilitation Thesis », i. e. French academic qualification required to supervise PhD students) in applied mathematics

Title : Systems of PDEs for biology : modeling, numerical analysis and simulations

Defended on December 12<sup>th</sup>, 2014 in Nice Sophia Antipolis University

Referees : J.Carrillo, M. Doumic and F. Lagoutière; committee : J.Carrillo, M. Doumic, F. Lagoutière, R. Abgrall, C. Chainais-Hillairet, S. Descombes, T. Goudon and R. Natalini.

2004 – 2015 : **Maître de conférences** in Laboratoire Dieudonné, Nice-Sophia Antipolis University.

2000 - 2003 : **PhD Thesis** in Applied Mathematics in Lyon 1 University under the supervision of Michelle Schatzman.

Title : Theoretical study of numerical methods for reaction-diffusion systems; application to non-linear and non-local parabolic equation.

Defended on December 11<sup>th</sup>, 2003 in Lyon 1 University

Referees : A. Cohen, D. Gottlieb and F. Poupaud; committee : S. Benzoni, A. Cohen, M. Schatzman, D. Serre, J. Sommeria

1997 - 2001 : Student in **Ecole Normale Supérieure in Lyon.**

### 3. Research activities:

#### 3.1. **Research subjects** :

- Modeling for biology and medicine using PDE models : biofilm growth, micro-algae biofilms, gut microbiota, adipocyte growth, salmonella infection, ...
- Hyperbolic and parabolic PDE models for chemotaxis : analytical and numerical studies; application to pursuit-evasion dynamics
- Hyperbolic PDE models on networks : analytical and numerical studies; application to biology and irrigation
- Well-balanced and asymptotic-preserving numerical schemes; application to biology and traffic

3.2. **Publications** : 19 in peer-reviewed journals and 4 proceedings

#### 3.3. **Scientific awards and responsibilities:**

Team direction :

2018- ... : **Co-head of "EDP, Modélisation et Simulations" team**, Institut Denis Poisson Orléans-Tours (with B. Andreianov).  
2011-2015 : Vice-head of EDP-Analyse Numérique team, Laboratoire Dieudonné, Nice (head : J. Blum, then R. Masson).  
2011-2015 : Vice-head of INRIA COFFEE team, Nice (head : T. Goudon).

Research projects :

2015 - 2017 : PI of Italian – French project PICS CNRS/CNR "Mathematical models and numerical simulations for cell movement (with Roberto Natalini)

2011-2014 : **PI of Junior ANR (French National Agency for Research) project MONUMENTALG** "Mathematical modeling and numerical simulations for biological degradation of monuments and algae proliferation"

| 2008 - 2009 : PI of Italian – French project PICS CNRS/CNR "Mathematical modeling for biological degradation of monuments" (with Roberto Natalini)

Grants : from 2008, awardee of PEDR (French grant for research and doctoral supervision)

Fellowships :

2015 : **CNRS- Imperial College fellowship** for a 4 month stay in London.

2007 : **INDAM Italian fellowship** for a 4 month stay in Rome.

International invitations :

Invitation by R. Natalini in Rome in 2007 ( 4 months), 2008 (2 months), 2010 (1 month) and 2011-2017 (1 week)

Invitation by JA Carrillo at Imperial College in 2015 (4 months)

Invitation by K. Aoki in Kyoto in 2015

Invitation by M. Briani in Rome in 2014, 2015

Invitation by G. Puppo in Como in 2014, 2015

Invitation in IFCAM Bangalore (India) to give a lesson in the summer school "Numerics and Control of PDEs" in 2013

Invitation by Jan S.Hesthaven in Providence in 2004 (2 months)

Invited conferences and workshops since 2013:

2018 : workshop Mathematics for Complex Microbial Systems in Toronto; **Plenary talk** at Forum Jeunes Mathématiciennes et Mathématiciens : Mathématiques et Sciences du Vivant, Orléans; workshop CASCIMODOT, Orléans.

2017 : **Plenary talk** in Gaeta 2017; workshop Piecewise Deterministic Markov Processes in Seillac

2016 : **Plenary talk** CANUM 2016; "Asymptotic Behavior of systems of PDE arising in physics and biology : theoretical and numerical points of view" (ABPDE II) in Lille; Journées CEA-GAMNI in Paris ; Journées Algae in Silico in Nantes; Journées de la Fédération Denis Poisson in Orléans ; journées interdisciplinaires MOCA in Orléans.

2015 : Workshop biofilms in Rouen ; workshop "applications des mathématiques à la biologie" in Rabat.

2014 : French-japanese conference on mathematics and medicine in Osaka ; journées du GDR Metice in Paris ; journées "Physique du Vivant" in Nice.

2013 : Journées Nice-Toulon-Marseille in Porquerolles ; **Plenary talk** at NumHyp 2013 in Aachen.

Student supervision:

2017 -... : PhD supervision of Thuy Phan, Orléans University.

2013 - 2016 : PhD co-supervision of Bastien Polizzi, Nice Sophia Antipolis University (with T. Goudon)

2009 - 2013 : PhD co-supervision of Monika Twarogowska, L'Aquila University (with R. Natalini)

2007 - 2011 : PhD co-supervision of Cristiana Di Russo, Roma Tre University (with R. Natalini)

2017 : Master 2 supervision of Ngoc Hoang Phuong Le, Orléans University.

2016 : Master 2 supervision of Hoai Thuong Nguyen, Orléans University.

2015 : Master 2 supervision of Julie Llobell with T. Goudon and S. Minjeaud, Nice Sophia Antipolis University.  
2014 : Pre-doctoral supervision of Tathagata Goswami and Pratik Kumbhar with T. Goudon, Nice Sophia Antipolis University.  
2013 : Master 2 supervision of Bastien Polizzi with F. Berthelin, Nice Sophia Antipolis University.  
2007 : Master 2 supervision of Cristiana Di Russo with R. Natalini, Roma

Organization of conferences and workshops :

2018 : Organization of " Balance laws in fluid mechanics, geophysics, biology (theory, computation, and application) " workshop in Orléans.

2018 : **Head of the organization committee of CEMRACS 2018** (6 week workshop in Marseille) on Mathematics and Biology  
<http://smi.emath.fr/cemracs/cemracs18/>

2014 : Organization of the interdisciplinary conference "Models for bacterial biofilms formation : mathematical, physical and biological perspectives" in Nice.

Others :

2018 - ... : Creation and animation of a thematic group MABIOME (Mathematics for Biology and Medicine) for SMAI (French Society for Applied Maths and Industry)

**3.4. Scientific expert:**

National evaluation committee :

2015 - ... : Member of **CNU 26** ( French National Council for University, Applied mathematics section)

2015 - ... : Member of **Jury de l'Agrégation de Mathématiques** (highest national competitive exam for teaching in France.)

PhD and HDR committees :

Since 2015 : **16 PhD and HDR committees**, more precisely :

referee for 2 PhD thesis (D. Peurichard, Toulouse; C. Emako, Paris 6)

referee for 2 HDR (P. Redou, Brest; P. Thomen, Paris 6)

Barlukova, Marseille; M. Deville, Bordeaux; R. Tesson, Marseille; A. Marly, ENS Lyon; Q. Richard, Besançon)

member of 3 PhD thesis committee (C. Taing, Paris 6; T.M.N. Vo, Orléans; S. Girel, Lyon 1)

member of 1 HDR committee (C. Lucas, Orléans)

Hiring committees:

Since 2009, member of **11 hiring committees** in Nice, Toulouse, Orsay, Paris 5, Orléans.

Scientific committees :

Scientific committee for the GAMNI-SMAI prize Blaise Pascal de l'Académie des Sciences

Scientific committee for SMAI2017 and 2020 thematic month on Mathematical Issues in Biology, CIRM, Marseille

Referee : for the following journals : SIAM J.Numer. Anal, SIAM J. Sci Comp., SIAM J. Math. Anal., M2AN, J. Sci. Comput., Numer. Math, KRM, Esaim Proc, ...

for ANR (French National Research Agency)

**3.5. Public awareness:**

I am doing regularly conferences on population dynamic modeling for high school classes and I have a regular participation to the Science Festival in Lyon, in Nice and now in Orléans.

**4. Teaching activities and pedagogic responsibilities** : see § IX – among which

2018- .. : **Responsible of the 2<sup>nd</sup> year of mathematical studies** in Université d'Orléans (L2 Maths)

**IN FRANCE : At Université d'Orléans from 2015 :**

Licence level : - 2015 - ... : Course in 2<sup>nd</sup> year of Licence on **sequences and series of functions** (64h per year). I am responsible for this course, coordinating, doing lessons and exercises sessions. The content is sequences of functions, series of functions, power series, Fourier series.

- 2016 – 2017 : Course in 3<sup>rd</sup> year of Licence on differential calculus (36h), responsible of the course.

- 2018- ...: Courses in 3<sup>rd</sup> year of Licence on **numerical analysis** (66h per year). I am responsible for one of these two courses, composed of lessons, exercises sessions and practical programming sessions. The topics are resolution of non-linear equations, interpolation and numerical integration. The second course is devoted to numerical matrix analysis and optimization.

- 2015 - ... : I am tutoring a **third year students' project** nearly every year. The subjects were : application of ODEs to kinetic chemistry, applications of Perron-Frobenius theorem to Google pagerank.

Master level : - 2016 - ... : Course to prepare 1<sup>st</sup> year of Master students to **CAPES of Maths** (teaching competition), revising in depth standard notions of real analysis (60h per year)

- 2015 - ... : Course about **modeling and scientific computing** for 1<sup>st</sup> year of Master students (50h per year). I am responsible of the course, in charge of course, exercises sessions and practical programming sessions. The topics are numerical methods for integration, ordinary differential equations : Cauchy problem and Dirichlet problem.

PhD level : I am also teaching two courses dedicated to PhD students, whose speciality is not maths, among a team of other teachers :

- course "Numerical experiments", Graduate School Orléans Numérique (4h)

- course "Dynamic systems modeling in agronomy, ecology and molecular biology" in Tours (2h)

- **In other institutions**

**At Université Nice Sophia Antipolis, as a maître de conférence until 2015 :**

Licence level : 2013-2015 : Courses of **numerical analysis** in 2<sup>nd</sup> year of Licence (30h per year).

Master level : - 2014 – 2015 : two courses for 2<sup>nd</sup> year of Master students on **Numerical Analysis for PDEs and numerical simulations for hyperbolic PDE problems**. I was in charge of the course and the programming sessions. I taught finite difference methods, finite element methods, finite volume methods for elliptic equations and Stokes system in the first semester. In the second semester, the program of the course was finite difference and finite volume methods for the heat equation, transport equation, wave equation and scalar conservation laws, as well as kinetic schemes for scalar conservation laws.

-2010 – 2015 : Courses for 2<sup>nd</sup> year of Master students preparing the « **agrégation de mathématique** », national competitive exam to become high school teacher. These are lectures, exercise classes, programming classes, oral exams... I was in charge of the **real analysis course** and the **numerical analysis course** (79h per year).

**Summary :**

2014-2015 : 101 h teaching (6 month sabbatical at INRIA in order to prepare HDR, teaching duty : 96h)

2015-2016 : 98 h teaching (6 month sabbatical at Imperial College, teaching duty : 96h)

2016-2017 : 226 h teaching (teaching duty : 192h)

2017-2018 : 199 h teaching (teaching duty : 192h)

2018-2019 : 210 h teaching (teaching duty : 192h)

**IN OTHER COUNTRIES :**

- 2013 : IFCAM Summer school "Numerics and Control of PDEs" in Bangalore, India.  
Course for Master and PhD students about **Numerical methods for systems of Conservation Laws** with Thierry Goudon and Frédéric Coquel, where I was mainly in charge of the tutorial part.

## 5. **Administrative activities:**

### **Pedagogic responsibilities :**

2018- ... : **Responsible of the 2<sup>nd</sup> year of mathematical studies** in Université d'Orléans (L2 Maths), I am in charge of the organization of the 2<sup>nd</sup> year, the coordination of the curriculum and the teachers, the communication with students and with the administrative staff.

### **Administrative duties :**

#### Team direction :

2018- ... : **Co-head of "EDP, Modelisation et Simulations" team**, Institut Denis Poisson Orléans-Tours (with B. Andreianov).

2011-2015 : Vice-head of EDP-Analyse Numerique team, Laboratoire Dieudonné, Nice (head : J. Blum, then R. Masson).

2011-2015 : Vice-head of INRIA COFFEE team, Nice (head : T. Goudon).

#### National committees :

2015 - ... : Member of **CNU 26** ( French National Council for University, Applied mathematics section)

2015 - ... : Member of **Jury de l'Agrégation de Mathématiques** (highest teaching diploma in France)

#### Local committees :

2017 - ... : Member of the **Teaching and Research committee for Sciences** (UFR Sciences), Orléans University.

2016 - ... : Member of the **committee of experts** in maths in charge of preparing hiring committees, Orléans University.

2015 - ... : Member of the **Department committee**, IDP, Orléans University.

2014 - 2015: Member of the committee for the interdisciplinary project "Living sciences", Nice Sophia Antipolis University.

2012 - 2015 : Vice-head of the committee of experts in maths in charge of preparing hiring committees, Nice Sophia Antipolis University.

2010 – 2015 : Member of the Department committee, Laboratoire Dieudonné, Nice Sophia Antipolis University.

#### Hiring committees:

Since 2009, member of **11 hiring committees** in Nice, Toulouse, Orsay, Paris 5, Orléans.

#### Organization of regular events :

2018 - ... : Organization of team "EDP, Modélisation et Simulations" days in Institut Denis Poisson (once a year).

2016 - ... : Organization of PhD students days in Institut Denis Poisson (once a year).

2015- ... : Organization of **Maths & Biology seminar** in Orléans-Tours (once a month)

2012-2015 : Organization of **Colloquium**, Laboratoire Dieudonné (once a month).

2014- 2015 : Organization of "Living sciences" seminar, Nice University (twice a year).

2014 – 2015 : Organization of " Numerical days in Nice" (twice a year).