RESEARCH CENTER

FIELD
Applied Mathematics, Computation and Simulation

Activity Report 2019

Section Dissemination

Edition: 2020-03-21

ACUMES Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

9.1.1. Scientific Events: Organisation

9.1.1.1. General Chair, Scientific Chair

- P. Goatin is member of the the scientific committee of the annual seminar CEA-GAMNI *"Numerical fluid-mechanics"*.
- P. Goatin was member of the scientific committee of the CIRM conference *"Crowds: models and control"*, Marseille (France), 2019.

9.1.1.2. Member of the Organizing Committees

- R. Duvigneau and A. Habbal are members of the Organizing Committee for the FGS French-German-Swiss Conference on Optimization, Nice, September 2019.
- A. Habbal co-organized the mini-symposium *Game Theory Approaches in Inverse Problems and Control*, French-German-Swiss Conference on Optimization, Nice, September 2019.
- P. Goatin co-organized the mini-symposium *"Numerical methods for traffic flow problems"*, WONAPDE 2019 - 6th Chilean Workshop on Numerical Analysis of Partial Differential Equations, Conception (Chile), 2019 (with L.M. Villada).
- P. Goatin was member of the organizing committee of the IPAM (UCLA) workshop *"Autonomous Vehicles"*, Los Angeles (USA), 2019.
- P. Goatin and E. Rossi co-organized the mini-symposium *"Non Local Balance Laws and their applications"*, ICIAM2019 - 9th International Congress on Industrial and Applied Mathematics, Valencia (Spain), 2019.

9.1.2. Scientific Events: Selection

9.1.2.1. Member of the Conference Program Committees

A. Habbal was program committee member of The 3rd International Conference on Information Technology & Electrical Engineering - ITEE'19 El Jadida - Morocco, 2019. (http://www.ucd.ac.ma/ITEE19/)

9.1.2.2. Reviewer

- M. Binois reviewed for the following conferences: AISTATS 2020, NeurIPS 2019, and Winter Simulation Conference 2019.
- P. Goatin reviewed for the 11th IFAC Symposium on Nonlinear Control Systems.
- A. Habbal reviewed for the FGS French-German-Swiss Conference on Optimization, Nice, September 2019.

9.1.3. Journal

9.1.3.1. Member of the Editorial Boards

- P. Goatin is Managing Editor of *Networks and Heterogeneous Media*.
- P. Goatin is Guest Editor for the special issue "Mathematical Modeling with Measures" of *Mathematical and Bioscience Engineering*.

9.1.3.2. Reviewer - Reviewing Activities

- M. Binois is a reviewer for the following international journals: Aerospace Science and Technology, Annals of Applied Statistics, Journal of Aerospace Engineering, Computational Optimization and Applications, Computational Statistics and Data Analysis, Informs Computing, International Journal on Artificial Intelligence Tools, Integrating Materials and Manufacturing Innovation, Optimization and Engineering, The Computer Journal
- R. Duvigneau is reviewer for the following international journals: Computers & Fluids, International Journal for Numerical Methods in Fluids, Journal of Fluid & Structures, Computer Methods for Applied Mechanics Engineering, Computer Aided Geometric Design, Applied Mathematics & Mechanics, Engineering Optimization, Ocean Engineering
- P. Goatin reviewed for the following international journals: Acta Applicandae Mathematicae; Communications of the Korean Mathematical Society; ESAIM: Mathematical Modelling and Numerical Analysis; IEEE Transactions on Automatic Control; Nonlinear Differential Equations and Applications NoDEA; SIAM Journal on Mathematical Analysis; Transportmetrica A: Transport Science.
- J.-A. Désidéri has made reviews for: Mathematical Problems in Engineering; Numerical Algorithms; Algorithms; Operations Research and Decisions; Journal of Computational Design and Engineering; AIAA Journal.
- A. Habbal is a reviewer for the AMS Math Reviews, and for the following international journals: SIAM Scientific Computing ; Eur. Journal of Operation Research ; Systems & Control Letters.

9.1.4. Invited Talks

- M. Binois: Séminaire LJK-Probabilités & Statistique, Grenoble (France), April 2019.
  Invited talk: *"Heteroskedastic Gaussian Processes for Simulation Experiments"*.
- M. Binois: SRC 2019 - 2019 IMS/ASA Spring Research Conference, Blacksburg (VA, USA), May 2019.
  Invited talk: *"Sequential Learning of Active Subspaces"*.
- M. Binois: ICIAM 2019 - 9th International Congress on Industrial and Applied Mathematics, Valencia (Spain), July 2019. Mini-symposium: "Mathematical Optimization for Industrial and Scientific Applications".
  Invited talk: *"Bayesian Optimization and Dimension Reduction with Active Subspaces"*.
- P. Goatin: Program on "Data Assimilation: Theory, Algorithms, and Applications", Montreal (Canada), May 2019.
  Workshop "Data Assimilation: Methodology and Applications".
  Invited talk: *"Data driven traffic flow models"*.
- P. Goatin: Workshop "Nonlinear Hyperbolic Problems: modeling, analysis, and numerics", Mathematisches Forschungsinstitut, Oberwolfach (Germany), May 2019.
  Invited talk: *"Regularity results for the solutions of a non-local model of traffic flow"*.
- P. Goatin: "30 Years of SIMAI: status and perspectives of applied and industrial mathematics in Italy and in Europe", Milano (Italy), July 2019.
  Invited talk: *"Traffic management by macroscopic models: present and future challenges"*.
- P. Goatin: ICIAM 2019 - 9th International Congress on Industrial and Applied Mathematics, Valencia (Spain), July 2019. Mini-symposium: "Modelling and calibration in pedestrian dynamics: analysis and numerics".
  Invited talk: *"Non-local macroscopic models for crowd motion"*.
- P. Goatin: Workshop "Resilient Control of Infrastructure Networks", Politecnico di Torino (Italy), September 2019.
  Invited talk: *"Macroscopic traffic flow models on road networks"*.
- A. Habbal: ICIAM 2019 - 9th International Congress on Industrial and Applied Mathematics, Valencia (Spain), July 2019. Mini-symposium: "Geometric inverse problems and parameter estimation".
  Invited talk: *"Fractional Flow Reserve in a stenosed coronary artery"*.

- A. Habbal: MYRPAM 2019 - First Maghrebian Young Researchers in Pure and Applied Mathematics, Hammamet (Tunisia), December 2019. Plenary talk: *"Game Strategies to Solve and Model PDE-constrained Problems"*.

9.1.5. Scientific Expertise

- P. Goatin is member of the advisory board of DISMA Excellence Project of Politecnico di Torino (2018-2022).
- A. Habbal was member of the evaluation panel of the SiRIC CURAMUS Project (Integrated Research in Cancerology) https://curamus-cancer.fr/

9.1.6. Research Administration

- P. Goatin is member of the board of the Doctoral School of Fundamental and Applied Sciences (ED SFA) of Université Côte D'Azur.
- P. Goatin was vice-president of the local selection committee for Inria Sophia Antipolis competitive selection of young graduate scientists (CRCN) (2019).
- R. Duvigneau is member of CSD ("Comité Suivi Doctoral) at Inria Sophia Antipolis Méditerranée.
- R. Duvigneau is head of the Scientific Steering Committee of Platforms (cluster and immersive space) at Inria Sophia Antipolis Méditerranée.

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

Master: M. Binois, Design of experiments, 6 hrs, M2, Ecole Nationale Supérieure des Mines de Saint-Étienne, Saint-Étienne.

Master: R. Duvigneau, Advanced Optimization, 40 hrs, M2, Ecole Polytechnique Universitaire (EPU), Nice Sophia Antipolis.

Master: R. Duvigneau & A. Habbal, Numerical Methods for Partial Differential Equations, 66 hrs, M1, Ecole Polytechnique Universitaire (EPU), Nice Sophia Antipolis.

Master: J.-A. Désidéri, Multidisciplinary Optimization, 22.5 hrs, joint *Institut Supérieur de l'Aéronautique et de l'Espace* (ISAE Supaéro, "Complex Systems") and M2 (Mathematics), Toulouse.

Master: A. Habbal, Optimization, 66 hrs, M1, Ecole Polytechnique Universitaire (EPU), Nice Sophia Antipolis.

Master: A. Habbal, Stochastic Processes, 24 hrs, M1, Ecole Polytechnique Universitaire (EPU), Nice Sophia Antipolis.

Master: A. Habbal, Combinatorial optimization, 15 hrs, M1, Mohammed VI Polytechnic University, Morocco.

Licence (L3): A. Habbal, Implement and Experiment PSO, 48 hrs, L3 Semester Project, Ecole Polytechnique Universitaire (EPU), Nice Sophia Antipolis.

9.2.2. Supervision

PhD in progress: S. Pezzano, *Isogeometric analysis with moving grids*, Univ. Nice Sophia-Antipolis. Supervisor: R. Duvigneau.

PhD defended in September 2019: Nicolas Laurent-Brouty (ENPC), *Macroscopic traffic flow models for pollution estimation and control*, September 2016. Supervisor: P. Goatin.

PhD defended in October 2019: Nikodem Dymski (Maria Curie Sklodowska University & Université de Nice Sophia Antipolis), *Conservation laws in the modeling of collective phenomena*, October 2016. Supervisors: P. Goatin and M.D. Rosini (UMCS).

PhD defended in December 2019: Felisia Angela Chiarello (Université de Nice Sophia Antipolis), *Conservation laws with non- local flux*, October 2016. Supervisor: P. Goatin.

PhD in progress: S. Chabbar, *Modeling and simulation of tumor growth ; the case of prostate cancer*, Jan 2019, Supervisors: A. Habbal, Rajae Aboulaich (LERMA, EMI, Rabat), A. Ratnani (UM6P, Benguerir, Morocco).

PhD in progress: Marwa Ouni, *Solving inverses problems in fluid mechanics with game strategies*, October 2016, Supervisors: A. Habbal, Moez Kallel (LAMSIN, ENIT, Tunis).

PhD defended in December 2019: Rabeb Chamekh, *Game strategies to solve some inverse problems*, Jan 2015, Supervisors: A. Habbal, Moez Kallel (LAMSIN, ENIT, Tunis).

PhD defended in December 2019: Keltoum Chahour, *Modeling coronary blood flow using a non newtonian fluid model : fractional flow reserve estimation*, Nov 2015, Supervisors: A. Habbal, Rajae Aboulaich (LERMA, EMI, Rabat).

9.2.3. Juries

- R. Duvigneau was member of the committee of David Gaudrie's PhD thesis *"High-dimensional multi-objective Gaussian optimization"*, Ecole des Mines de St Etienne, October 28th, 2019.
- P. Goatin was reviewer of D. Inzunza's PhD thesis *"Implicit-explicit methods for nonlinear and nonlocal convection-diffusion-reaction problems"*, Universidad de Concepción, December 2019.

9.3. Popularization

9.3.1. Articles and contents

- "On the optimal shape of a wing", R. Duvigneau, Interstices, September 2019.
- A.S. Ackleh, R.M. Colombo, P. Goatin, S. Hille and A. Muntean, *Mathematical modeling with measures*, Nieuw Archief voor Wiskunde, Part 20 n. 3, September 2019.

9.3.2. Interventions

- R. Duvigneau gave three talks on "Modeling and simulation: when engineering becomes numerical" at Lycée Jules Ferry, Cannes, March 2019.
- P. Goatin gave the talk *"Le trafic routier en équations"* in Biot (Alpes Maritimes, France) on January 31, 2019, as part of the conference cycle "Science pour Tous 06".
- A. Habbal contributed to Cafe'In talks on *"Tumoral Angiogenesis"*, June 2019.

CAGIRE Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Member of the Organizing Committees

- Organizer and scientific chair of the mini-symposium "Numerical method for multi-scale fluid problems" at ICIAM 2019 [JJ].

10.1.2. Journal

10.1.2.1. Member of the Editorial Boards

- Visualization of Mechanical Processes [PB]
- Advisory Board of International Journal of Heat and Fluid Flow [RM]
- Advisory Board of Flow, Turbulence and Combustion [RM]

10.1.2.2. Reviewer - Reviewing Activities

During 2019, the team members reviewed papers for the following journals:

- AIAA Journal [PB, RM]
- Computer & Fluids [RM]
- Int. J. Heat Fluid Flow [RM]
- Journal of Computational Physics [JJ]
- J. Hydr. Res. [RM]
- Physics of Fluids [FM]
- Phys. Rev. Fluids [RM]
- SIAM Journal on Scientific Computing [VP]

10.1.3. Invited Talks

- J. Jung [19]
- R. Manceau [20]

10.1.4. Leadership within the Scientific Community

- Rémi Manceau co-organizes the activities of the Special Interest Group 15 (Turbulence modelling) of ERCOFTAC (European Research Community on Flow, Turbulence and Combustion) as a member of the Steering Committee. The main activity of this group in 2019 was the organization of a workshop in Ljubljana, Slovenia.
- Rémi Manceau coordinates the ANR Project MONACO_2025, a 4-year project started in 2018. The partners are: the institute PPrime, PSA Group and EDF.

10.1.5. Scientific Expertise

- Evaluation of one Ecos Sud project [PB]

10.1.6. Research Administration

- Co-responsible for the organisation of the LMAP seminar of Mathematics and their Applications [JJ].
- Member of the LMAP council [JJ, PB].
- Member of the IPRA research federation scientific council [RM].
- Vincent Perrier is a member of the CUMI-R.
- Vincent Perrier is a member of the CDT, in charge of the evaluation of software projects at the Inria Bordeaux center.
- Vincent Perrier is an elected member of the Inria evaluation committee, and member of the board. [0]
- Vincent Perrier is a member of the CT3-Num committee of Pau University, in charge of managing the computing resources and projects at Pau University.

[0] https://www.inria.fr/en/inria-evaluation-committee

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

Licence : [JJ], Descriptive statistical, 24h, L1 - MIASHS, Université de Pau et des Pays de l'Adour, Pau, France.

Licence : [JJ], Scientific computing, 40.5h, L2 - Informatic, Université de Pau et des Pays de l'Adour, Pau, France.

Licence : [JJ], Numerical analysis for vectorial problems, 33.75h, L2 - Mathematics, Université de Pau et des Pays de l'Adour, Pau, France.

Master : [JJ], Data analysis, 68h25, M1 - GP, Université de Pau et des Pays de l'Adour, Pau, France.

Master : [JJ], Tools for scientific computing, 48h75, M1 - MMS-MSID, Université de Pau et des Pays de l'Adour, Pau, France.

Master : [JJ], Finite volume methods for hyperbolic systems, 15h, Master ANEDP, ENS, Casablanca, Maroc.

Master: [VP], Numerical analysis of PDE 1, Master MMS, Pau.

Master : "Turbulence modelling" (in English), 27h30, M2 - International Master program Turbulence, Université de Poitiers/Ecole centrale de Lille, France. [RM]

Eng. 3 : "Industrial codes for CFD" (in English), 12h30, 3rd year of engineering school (M2), ENSMA, Poitiers, France. [RM]

Eng. 3 : "Advanced physics–Turbulence modelling for CFD", 16h, 3rd year of engineering school (M2), ENSGTI, France. [RM]

10.2.2. Supervision

- PhD in progress : Puneeth Bikkanahally Muni Reddy, "Modelling turbulent flows in natural convection regimes using hybrid RANS-LES approaches, UPPA, October 2018, Rémi Manceau.
- PhD in progress : Gaëtan Mangeon, "Advanced modelling of heat transfer for industrial configurations with or without accounting of the solid wall", UPPA, February 2017, Rémi Manceau.
- PhD in progress : Vladimir Duffal, "Hybrid RANS/LES modelling for unsteady loadings in turbulent flows", UPPA, November 2017, Rémi Manceau.
- PhD in progress : Hassan Al Afailal: "3D simulation of non-reactive internal aerodynamics of spark-ignition engines using an hybrid RANS/LES method", September 2017, Rémi Manceau.
- PhD in progress Saad Jameel : "Turbulence modelling in the mixed and natural convection regimes in the context of automotive applications", UPPA, February 2017, Rémi Manceau.
- PhD in progress : Gustave Sporschill, "Amélioration des modèles pour la turbulence. Applications à la prédiction des écoulements aérodynamiques", UPPA, May 2018, Rémi Manceau.

10.2.3. Juries

The participation in the following thesis juries is noted ("referee" in a French doctoral thesis jury is more or less equivalent to an external opponent in an Anglo-Saxon like PhD jury):

- Thomas Kaiser, "Impact of flow rotation on flame dynamics and hydrodynamic stability", University of Toulouse (France), 31 January 2019. Supervisor: T. Poinsot [PB, Referee].
- Joao Rodrigo Andrade, "Spectral analysis of the turbulent energy cascade and the development of a novel nonlinear subgrid-scale model for large-eddy simulation", Universidade Federale de Uberlândia (Brazil) and University of Lille (France), 27 March 2019. Supervisors: A. S. Neto, G. Mompean and R.L. Thompson [RM, Referee]
- Adithya Ramanathan Krishnan, "Explicit algebraic subfilter scale modeling for DES-like methods and extension to variable density flows", University of Aix-Marseille 3 April 2019. Supervisor: P. Sagaut [RM, Referee]
- Benjamin Lorendeau, "Amélioration des performances via un parallélisme multi-niveaux sur un code CFD en maillages non structurés", University of Bordeaux (France), 16 December 2019. Supervisor: E. Jeannot [PB, Referee]

CARDAMOM Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

9.1.1. Scientific Events: Organisation

9.1.1.1. Member of the Organizing Committees

- M. Ricchiuto co-organized the workshop Hywec2 on the hydrodynamics of wave energy converters. The workshop has been organized in the framework of the work packages 3 and 5 of the Excellence Cluster Sysnum as one of two twin events devoted to marine renewable energies organized in Bilbao (the VI Marine Energy Conference, June 25th) and Bordeaux. The event is also supported by the Oceanera-net Midwest and the Fondation Del Duca. Its main goals have been to focus on PDE and numerical modelling techniques, with attention on advanced and recent approaches, and to give an overview of examples of industrial techniques and applications with several European industrial actors. For more info refer to the web https://hywec2.sciencesconf.org.

9.1.2. Scientific Events: Selection

9.1.2.1. Chair of Conference Program Committees

Mathieu Colin is a member of the scientific committee of the JEF day's.

9.1.2.2. Member of the Conference Program Committees

M. Ricchiuto has co-organized the mini-symposium "Some modern questions in the simulation of advection dominated problems", MS FT-1-10 at the ICIAM conference in Valencia

9.1.2.3. Member of the Editorial Boards

- Mathieu Colin is a member of the board of the journal Applications and Applied Mathematics: An International Journal (AAM)
- M. Ricchiuto is a member of the editorial boards of Computers & Fluids (Elsevier) and of Water Waves (Springer)

9.1.2.4. Reviewer - Reviewing Activities

We reviewed papers for top international journals in the main scientific themes of the team : Nonlinearity, Water Waves, Analysis and PDE, Comm. Cont. Math., Journal of Scientific Computing, Open Physics, Computational and applied mathematics, Journal of Fluid Mechanics.

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

- License: Nicolas Barral, TD d'Analyse Numérique, 24h, L3, ENSEIRB-MATMÉCA, France
- Master : Nicolas Barral, TD C++, 48h, M1, ENSEIRB-MATMÉCA, France
- Master : Nicolas Barral, Techniques de maillage, 36h, M2, ENSEIRB-MATMÉCA et Université de Bordeaux, France
- License: Héloïse Beaugendre, Encadrement de projets sur la modélisation de la portance, 20h, L3, ENSEIRB-MATMÉCA, France
- Master : Héloïse Beaugendre, TD C++, 48h, M1, ENSEIRB-MATMÉCA, France
- Master : Héloïse Beaugendre, Calcul Haute Performance (OpenMP-MPI), 40h, M1, ENSEIRB-MATMÉCA et Université de Bordeaux, France

- Master : Héloïse Beaugendre, Responsable de filière de 3ème année, 15h, M2, ENSEIRB-MATMÉCA, France
- Master : Héloïse Beaugendre, Calcul parallèle (MPI), 39h, M2, ENSEIRB-MATMÉCA, France
- Master : Héloïse Beaugendre, Encadrement de projets de la filière Calcul Haute Performance, 6h, M2, ENSEIRB-MATMÉCA, France
- Master : Héloïse Beaugendre, Encadrement de projets sur la modélisation de la pyrolyse, 20h, M1, ENSEIRB-MATMÉCA, France
- Master : Héloïse Beaugendre , Projet fin d'études, 4h, M2, ENSEIRB-MATMÉCA, FRANCE
- Master : Mathieu Colin : Integration, M1, 54h, ENSEIRB-MATMÉCA, FRANCE
- Master : Mathieu Colin : Fortran 90, M1, 44h, ENSEIRB-MATMÉCA, FRANCE
- Master : Mathieu Colin : PDE, M1, 30h, University of Bordeaux, FRANCE
- Master : Mathieu Colin : Analysis, L1, 47h, ENSEIRB-MATMÉCA, FRANCE
- Master : Mathieu Colin : projet professionnel and internship responsibility : 15 h, ENSEIRB-MATMÉCA, FRANCE
- Master : Mathieu Colin : Encadrement de projets TER, 20h, ENSEIRB-MATMÉCA, FRANCE
- Master : Mathieu Colin : responsable relation entreprise formation en alternance ENSEIRB-MATMECA (30h)
- Master : Mathieu Colin : suivi d'apprenti en entreprise (28h)
- Master : Mario Ricchiuto, Multiphysics Course, 21h cours magistrale, M2, ENSEIRB-MATMÉCA, FRANCE

9.2.2. Supervision

PhD : Umberto Bosi, A unified spectral/hp element depth-integrated Boussinesq model for nonlinear wave-floating body interaction, U. Bordeaux, defended in June 2019, supervised by M. Ricchiuto (see [1])

PhD in progress : E. Solai, Multi-fidelity modeling of an immersive battery cooling system for electric vehicles, started in November 2018, co-supervised by H. Beaugendre and P.M. Congedo

PhD in progres: B. Constant, high order immersed methods for turbulent flows, started in September 2019, supervised by H. Beaugendre

PhD in progress : S. Michel, shallow water simulations with immersed higher order residual methods on adaptive meshes, started in November 2018, supervised by M. Ricchiuto

PhD in progress : G. Bellezza, multi scale modelling for self-healing composite materials, started in February 2019, supervised by M. Ricchiuto and G. Vignoles (LCTS)

PhD in progress : M. Ciallella, bridging shock fitting and embedded methods to handle shock waves in hyperbolic systems, started in October 2019, supervised by M. Ricchiuto and R. Paciorri (U. Roma La Sapienza)

PhD in progress : A. Cauquis, high order shock capturing methods for tsunami simulations, started in November 2019, supervised by M. Ricchiuto and P. Heinrich (CEA)

9.2.3. Juries

Héloïse Beaugendre has contributed to the following theses defense:

- Iñigo Bidaguren, BCAM, Bilboa, Spain in June 2019 (as examiner)
- Pierre Trontin HDR, Toulouse University in September 2019 (as examiner)
- Quentin Carmouze, Côte D'Azur University in November 2019 (as reviewer)

Maria Kazolea has contributed to the following theses defense:

- Umberto Bosi PhD, University of Bordeaux, April 2019 (as examiner)

Mario Ricchiuto has participated to the following juries:

- A. Menasria, PhD ENSAM Paritech, in March 2019 (as president)
- Julien Carlier, PhD U. Paris-Saclay, in December 2019 (as reviewer)

DEFI Project-Team

8. Dissemination

8.1. Promoting Scientific Activities

8.1.1. General Chair, Scientific Chair

- P.M Congedo is the Chair of the CWI-Inria workshop at CWI in Amsterdam on September 19, 20 2019.
- P.M. Congedo is the Chair of UQOP2020 Conference, organized in Paris on March 18-21, 2019.

8.1.2. Member of the Organizing Committees

- L. Chesnel co-organizes the Journée de rentrée (2019) of the Centre de Mathématiques Appliquées of École Polytechnique.
- L. Chesnel co-organizes the seminar of the Centre de Mathématiques Appliquées of École Polytechnique.
- L. Chesnel co-organizes the seminar of the Inria teams Defi-M3DISIM-Poems.
- M. Bonazzoli organizes the working group of Defi team.
- J.R. Li is organizer of Ecole d'ete d'excellence for Chinese Master's students funded by French Embassy in China, 07/2019.

8.1.3. Journal

8.1.3.1. Member of the Editorial Boards

- G. Allaire is member of the editorial boards of
  - Book series "Mathématiques et Applications" of SMAI and Springer,
  - ESAIM/COCV, Structural and Multidisciplinary Optimization,
  - Discrete and Continuous Dynamical Systems Series B,
  - Computational and Applied Mathematics,
  - Mathematical Models and Methods in Applied Sciences (M3AS),
  - Annali dell'Universita di Ferrara,
  - OGST (Oil and Gas Science and Technology),
  - Journal de l'Ecole Polytechnique - Mathématiques,
  - Journal of Optimization Theory and Applications.
- P.M. Congedo is Editor of Mathematics and Computers in Simulation, MATCOM (Elsevier).
- H. Haddar is member of the editorial boards of
  - Inverse Problems
  - SIAM Journal on Scientific Computing
  - SIAM Journal of Mathematical Analysis

8.1.3.2. Reviewer - Reviewing Activities

We reviewed papers for top international journals in the main scientific themes of the team.

8.1.4. Invited Talks

- G. Allaire
  - SIAM Geosciences, Houston, March 11-14, 2019.
  - DCAMM seminar, DTU, Copenhagen, April 5, 2019.
  - WCSMO, Beijing, May 20-24, 2019.
  - Mathematical Design of New Materials, Cambridge, June 3-14, 2019.
  - Chalmers Colloquium, Sweden, August 26-30, 2019.
  - Sim-AM, Pavia, September 11-13, 2019.
  - Shape Optimization and Isoperimetric and Functional Inequalities, Levico Terme, September 23-27, 2019.
  - Computational modelling of Complex Materials across the Scales, Glasgow, October 1-4, 2019.
  - New trends in PDE constrained optimization, Linz, October 15-18, 2019.
- M. Bonazzoli
  - Seminar at POEMS lab, ENSTA-ParisTech, Palaiseau, France.
  - ENUMATH 2019, European Numerical Mathematics and Advanced Applications Conference, Egmond aan Zee, Netherlands.
  - Parallel Solution Methods for Systems Arising from PDEs, Marseille, France (Plenary invited talk).
- L. Chesnel
  - Waves conference, Vienna, August 2019.
  - Applied Inverse Problems conference, Grenoble, 2019.
- H. Haddar
  - Applied Inverse Problems conference, Grenoble, July 2019
  - International Conference on Antenna Measurements & Applications, Bali, October 2019
  - New Trends in Analysis and Probability, Sousse, September 2019
  - Workshop in the memory of A. Lechleiter, Bremen, May 2019
  - La journée des rencontres DEFI-MEDISIM-POEMS, December, 2019
- P.M. Congedo
  - Workshop "Numerical simulation of hypersonic flows, July 8, 2019.
  - Seminar at ONERA, Meudon, November 29, 2019.

8.1.5. Leadership within the Scientific Community

- G. Allaire is a board member of Institut Henri Poincaré (IHP). He is the chairman of the scientific council of IFPEN (French Petroleum Institute and New Energies). He is the chairman of the scientific council of AMIES (Agency for Interaction in Mathematics with Business and Society).

8.1.6. Scientific Expertise

- G. Allaire is a member of the "comité national" CNRS, section 41 (mathematics).
- G. Allaire is a member of the scientific board of the Gaspard Monge program on optimization (PGMO) at the Jacques Hadamard Mathematical Foundation.
- J.R. Li is Member of the SIAM Committee on Programs and Conferences 2017-2019.
- J.R. Li is Member Elu of Inria Commission d'Evaluation, 2015-2019.
- M. Bonazzoli was a member of the Evaluation committee for the 2020 call of Inria Associate Teams programme.

- H. Haddar was the president of the evaluation committee for mathemùatical laboratries at the Universities of Sfax and Sousse (Tunisia)

8.1.7. Research Administration

- J.R. Li is correspondant International for Centre de Mathematiques Appliquees, Ecole Polytechnique, 2018-present.
- J.R. Li is responsable for the Ecole Polytechnique part of the French-Vietnam Master Program in Applied Mathematics, 2016-present.
- M. Bonazzoli is the International partnerships Scientific Correspondent for Inria Saclay.

8.2. Teaching - Supervision - Juries

8.2.1. Teaching

- Master: Grégoire Allaire, Approximation Numérique et Optimisation, for students in the second year of Ecole Polytechnique curriculum: 8 lessons of 1h30.
- Master: Grégoire Allaire, Transport and diffusion, for students in the third year of Ecole Polytechnique curriculum. 9 lessons of 2h jointly with F. Golse.
- Master: Houssem Haddar, Waves and imaging: Concepts, Theory and Applications, Master M2 "mathematical modeling": 9 lessons of 3h.
- Master: Houssem Haddar, Inverse scattering problems, Master M2, ENIT, 10 lessons of 3h.
- Master: Lucas Chesnel, Elementary tools of analysis for partial differential equations, for students in the first year of Ensta ParisTech curriculum, 25 equivalent TD hours.
- Master: Lucas Chesnel, Numerical approximation and optimisation, for students in the second year of Ecole Polytechnique curriculum: 2 TDs of 4h + one project.
- Master: Lucas Chesnel, Modal Modélisation mathématique par la démarche expérimentale, for students in the second year of Ecole Polytechnique curriculum: 5 TDs of 2h.
- Master: Grégoire Allaire, Optimal design of structures, for students in the third year of Ecole Polytechnique curriculum. 9 lessons of 1h30.
- Master: Grégoire Allaire, Theoretical and numerical analysis of hyperbolic systems of conservation laws, Master M2 "mathematical modeling", 8 lessons of 3h.
- Master: Jing Rebecca Li, Lecturer of course Mathematical and numerical foundations of modeling and simulation using partial differential equations French-Vietnam Master in Applied Mathematics, University of Science, Ho Chi Minh City, 9/2019. 2 weeks.
- Master: P.M. Congedo, Numerical methods in Fluid Mechanics, ENSTA ParisTech, 12 h.
- Master: P.M. Congedo, Numerical methods for Hyperbolic Problems, von Karman Institute for Fluid Dynamics, 12 h.
- Doctorat: Houssem Haddar, Inverse problems, Executive Education, Ecole Polytechnique, 9h

8.2.2. Supervision

- PhD: K. Napal, On the use of sampling methods and spectral signatures for the resolution of inverse scattering problems (defended, December 2019), L. Audibert, L. Chesnel and H. Haddar.
- PhD: F. Feppon (defended, December 2019) sur l'optimisation topologique de systèmes couplés fluide-solide-thermique, G. Allaire and Ch. Dapogny.
- PhD: M. Kchaw, Higher order homogenization tensors for DMRI modeling (defended July 2019), H. Haddar and M. Moakher
- PhD: B. Charfi, Identification of the singular support of generalized impedance boundary conditions (defended September 2019), S. Chaabane and H. Haddar.

- PhD: F. Sanson, Estimation du risque humain lié à la retombée d'objets spatiaux sur Terre (defended in September 2019), P.M. Congedo, O. Le Maitre.
- PhD: N. Razaaly, Rare Event Estimation and Robust Optimization Methods with Applications to ORC Turbine Cascade (defended in July 2019), P.M. Congedo.
- PhD: G. Gori, Non-ideal compressible-fluid dynamics: developing a combined perspective on modeling, numerics and experiments (defended in January 2019), A. Guardone, P.M. Congedo.
- PhD: J. Carlier, Schémas aux résidus distribués et méthodes à propagation des ondes pour la simulation d'écoulements compressibles diphasiques avec transfert de chaleur et de masse (defended in December 2019), M. Pelanti, P.M. Congedo.
- Ph.D. in progress: S. Houbar sur la cavitation dans le fluide caloporteur induite par les mouvements des assemblages d'un réacteur (CEA, to be defended in 2020). G. Allaire and G. Campioni.
- Ph.D. in progress: M. Boissier, Optimisation couplée de la topologie des formes et de la trajectoire de lasage en fabrication additive (to be defended in 2020). G. Allaire and Ch. Tournier.
- L. Rakotondrainibe sur l'optimisation des liaisons enre pièces dans les système mécaniques (Renault, to be defended in 2020). G. Allaire.
- J. Desai sur l'optimisation topologique de structures au comportement non-linéaire avec des méthodes de déformation de maillage (IRT SystemX, to be defended in 2021). G. Allaire and F. Jouve,
- PhD in progress: H. Girardon, Non destructive testing of PWR tubes using eddy current rotating coils, to be defended in 2021, H. Haddar and L. Audibert
- PhD in progress: M. Rihani, Maxwell's equations in presence of metamaterials (to be defended in 2021), A.-S. Bonnet-BenDhia and L. Chesnel.
- PhD in progress: Chengran Fang, Enabling cortical cell-specific sensitivity on clinical multi-shell diffusion MRI microstructure measurements. (to be defended in 2022) Jing Rebecca Li and Demian Wassermann
- PhD in progress: Nouha Jenhani, Differential sampling methods for defect imaging in periodic layers. (to be defended in 2022) Houssem Haddar and Mourad Bellasoued
- PhD in progress: Amal Labidi, Inverse problems for wave equation with magnetic potential. (to be defended in 2022) Houssem Haddar and Mourad Bellasoued
- PhD in progress: Marwa Mansouri, Inside outside duality for artificial backgrounds. (to be defended in 2022) Houssem Haddar, Lucas Chesnel and Moez Khenissi
- PhD in progress: M. Bihr sur la fabrication additive et l'optimisation topologique de structures (to be defended in 2022) G. Allaire and B. Bogosel.
- PhD in progress: R. Delvaux sur les algorithmes de couplage à convergence super-linéaire entre neutronique, thermohydraulique et thermique (to be defended in 2022) G. Allaire and C. Patricot,.
- PhD in progress: A. Touiti sur l'optimisation de l'anisotropie pour des structures issues de la fabrication additive (to be defended in 2022) G. Allaire and F. Jouve.
- PhD in progress: M. Rivier, optimization under uncertainty through a Bounding-Box concept (to be defended in May 2020), P.M. Congedo.
- PhD in progress: Joao Reis, Advanced methods for stochastic elliptic PDEs (to be defended in October 2020), P.M. Congedo, O. Le Maitre.
- PhD in progress: Anabel Del Val, Advanced bayesian methods for aerospace applications (to be defended in October 2020), P.M. Congedo, O. Le Maitre, O. Chazot, T. Magin.
- PhD in progress: P. Novello, Deep learning for reentry atmosperic flows (to be defended in November 2021), P.M. Congedo, D. Lugato, G. Poette.
- PhD in progress: E. Solai, Virtual Prototyping of the EVE expander (to be defended in October 2021), P.M. Congedo, H. Beaugendre.

- PhD in progress: N. Leoni, Bayesian inference of model error in imprecise models (to be defended in February 2022), P.M. Congedo, O. Le Maitre, M.G. Rodio.

8.3. Popularization

- M. Bonazzoli and L. Chesnel made a presentation in the context of the Fête de la science 2019 to several groups of young students (from 10 to 17 years old).
- M. Bonazzoli was representative for SMAI at the Métiers des Maths stand at the 20th Salon Culture et Jeux Mathématiques.

8.3.1. Internal or external Inria responsibilities

- P.M. Congedo is Deputy Coordinator of "Maths/Engineering" Program of the Labex Mathématiques Hadamard.
- J.R. Li is Member Elu of Inria Commission d'Evaluation, 2015-2019.
- M. Bonazzoli is the International partnerships Scientific Correspondent for Inria Saclay.

8.3.2. Internal action

- M. Bonazzoli, H. Haddar and J.R. Li monitored an internship at Defi team for 6 middle school students (one afternoon).

ECUADOR Project-Team

7. Dissemination

7.1. Promoting Scientific Activities

7.1.1. Scientific Events: Organisation

7.1.1.1. Member of the organizing committees

- Laurent Hascoët is on the organizing commitee of the EuroAD Workshops on Algorithmic Differentiation (http://www.autodiff.org).
- Laurent Hascoët was on the organizing and program committees of the workshop "Program Transformations for Machine Learning" at NeurIPS2019, Vancouver Canada, December 14th.

7.1.2. Invited Talks

Laurent Hascoët was invited to give a talk on AD for the "GdR Calcul", at "Institut de Physique du Globe", Paris, January 24th.

7.1.3. Scientific Expertise

Alain Dervieux is Scientific Director for the LEMMA company.

ELAN Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

9.1.1. Scientific Events: Organisation

9.1.1.1. General Chair, Scientific Chair

- Florence Bertails-Descoubes was co-founder and co-chair (together with Basile Audoly, École Polytechnique) of the new graphics-physics worskhop Graphyz, held at Inria in Montbonnot on October 24-25 2019. The ELAN team was the local organizer of the event.

9.1.1.2. Member of the Organizing Committees

- Florence Bertails-Descoubes, together with the help of Inria and of the ELAN team, has organized the new graphics-physics workshop Graphyz at Inria in Montbonnot. See above.

9.1.2. Scientific Events: Selection

9.1.2.1. Member of the Conference Program Committees

- Florence Bertails-Descoubes was member of the ACM SIGGRAPH Technical Program Committee in 2019, and of the Eurographics Technical Program Committee in 2019.

9.1.3. Journal

9.1.3.1. Reviewer - Reviewing Activities

- Florence Bertails-Descoubes was reviewer in 2019 for ACM Transaction on Graphics, ACM SIGGRAPH 2019, ACM SIggraph Asia 2019, ACM-EG Symposium on Computer Animation, UIST 2019, Nonlinear Dynamics, Computer Graphics Forum, SIAM Journal on Scientific Computing, Elsevier Computer Methods in Applied Mechanics and Engineering.
- Thibaut Metivet was reviewer in 2019 for Elsevier Computer Methods in Applied Mechanics and Engineering and Coupled Systems Mechanics.

9.1.4. Invited Talks

- Florence Bertails-Descoubes, Keynote speaker at Eurographics 2019, Genova, Italy, May 2019.
- Florence Bertails-Descoubes, invited talk at Matherials, a series of cross-disciplinary seminars jointly organized by Laboratoire Jean Kuntzmann, SIMAP and Institut Fourier, June 2019.
- Florence Bertails-Descoubes, Exposé invité aux Journées Françaises d'Informatique Graphique, Marseille, November 2019.
- Florence Bertails-Descoubes, invited talk at the HCERES evaluation of Laboratoire Jean Kuntzmann, Inria Montbonnot, December 2019.
- Thibaut Metivet, invited poster at RheoSuNN, a workshop on the numerical simulation of suspensions organised at Ecole Polytechnique in March 2019.

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

Licence : Raphaël Charrondière, TP Projet Logiciel, 13h éq TD, L2 STG Grenoble, Université Grenoble Alpes.

Licence : Florence Bertails-Descoubes, Méthodes Numériques, 18h éq TD, L3, ENSIMAG 1A, Grenoble INP.

License : Thibaut Metivet, Analyse, 33h éq TD, L3, ENSIMAG 1A, Grenoble INP.

Master : Raphaël Charrondière, Complexité Algorithmique Des Problèmes, 15h éq TD, M1, Université Grenoble Alpes.

Master : Florence Bertails-Descoubes, Special Course for M2 at École Normale Supérieure de Lyon, entitled "Numerical Mechanics: From Lagrangian mechanics to simulation tools for computer graphics", 19h éq TD.

Master : Mickaël Ly, Special Course for M2 at École Normale Supérieure de Lyon, entitled "Numerical Mechanics: From Lagrangian mechanics to simulation tools for computer graphics", 14h éq TD.

9.2.2. Supervision

PhD in progress : Mickaël Ly, Static inverse modelling of cloth, 01 octobre 2017, Florence Bertails-Descoubes and Mélina Skouras.

PhD in progress : Haroon Rasheed, Inverse dynamic modeling of cloth, 01 novembre 2017, Florence Bertails-Descoubes, Jean-Sébastien Franco, and Stefanie Wuhrer

PhD in progress : Raphaël Charrondière, Modeling and numerical simulation of elastic inextensible surfaces, 01 septembre 2018, Florence Bertails-Descoubes and Sébastien Neukirch.

PhD in progress : François Der Hovsepian, Modélisation et simulation d'écoulement de cellules tumorales dans le sang et de l'adhésion aux parois, 19 October 2017, Christophe Prud'homme, Vincent Chabannes (Université de Strasbourg) and Thibaut Metivet.

9.2.3. Juries

Florence Bertails-Descoubes, member (Examinatrice) of Ph.D. Thesis committee of A. Sibellas (8 March 2019), INSA Lyon (directeur de thèse : E. Maire)

Florence Bertails-Descoubes, member (Présidente du jury) of Ph.D. Thesis committee of V. Leroy (17 October 2019), Inria Rhône-Alpes Montbonnot (directeur de thèse : E. Boyer, co-encadrant : J.-S. Franco).

Thibaut Metivet, member (Encadrant, invité) of Ph.D. Thesis committee of A. Sengers (19 July 2019), Université Grenoble-Alpes (directeur de thèse : E. Maitre).

9.3. Popularization

9.3.1. Articles and contents

- Focus on our cloth simulator Argus, on a video prepared by A. Aftalion and published in February 2019 in http://video.math.cnrs.fr.

GAMMA Project-Team (section vide)

MATHERIALS Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

E. Cancès

- has been director (until August 2019) and is now co-director (starting September 2019) of CERMICS, the Applied Mathematics department at École des Ponts,
- is a member of the editorial boards of Mathematical Modelling and Numerical Analysis (2006-), SIAM Journal of Scientific Computing (2008-), SIAM Multiscale Modeling and Simulation (2012-), and the Journal of Computational Mathematics (2017-),
- has co-organized the 4th international conference on Mathematical and Numerical Analysis of Electronic Structure Models (Suzhou, China, June), an interdisciplinary summer school on Mathematical Methods for Molecular Simulation at Jussieu (Paris, June), a series of minisymposia at ICIAM 2019 (Valencia, Spain, July), and the FSMP Horizon Maths 2019 conference (Paris, December).

V. Ehrlacher

- is a member of the "Conseil d'Enseignement et de Recherche" of Ecole des Ponts,
- co-organizes the colloquium of the CERMICS lab,
- co-organized a minisymposium at the ICIAM conference in Valencia, July.

C. Le Bris is a managing editor of Networks and Heterogeneous Media. He is a member of the editorial boards of Annales mathématiques du Québec (2013-), Archive for Rational Mechanics and Analysis (2004-), Calcolo (2019-), COCV (Control, Optimization and Calculus of Variations) (2003-), Mathematics in Action (2008-), Nonlinearity (2005-), Journal de Mathématiques Pures et Appliquées (2009-), Pure and Applied Analysis (2018-). He is a member of the editorial boards of the monograph series Mathématiques & Applications, Series, Springer (2008-), Modelling, Simulations and Applications, Series, Springer (2009-), Springer Monographs in Mathematics, Springer (2016-). He is a member of

- the "Conseil de la Faculté des sciences et ingénierie", Sorbonne Université,
- the "Conseil scientifique" of SMAI.

He is the president of the scientific advisory board of the Institut des Sciences du calcul et des données, Sorbonne Université. He holds a regular position of Visiting Professor at the University of Chicago.

T. Lelièvre

- is editor-in-chief of ESAIM: Proceedings and Surveys (with D. Chafai, C. Imbert and P. Lafitte),
- is a member of the editorial boards of IMA: Journal of Numerical Analysis, SIAM/ASA Journal of Uncertainty Quantification, Communications in Mathematical Sciences and Journal of Computational Physics,
- is a member of the "Conseil d'Administration" of SMAI and École des Ponts,
- has co-organized the CECAM workshop "Learning the collective variables of biomolecular processes" at Inria Paris July 10-12th 2019 (with L. Delemotte, J. Hénin and G. Stock),
- has co-organized the ICL/CNRS workshop on "Interacting Particle Systems and applications" at Imperial College of London, December 9-10th 2019 (with G. Pavliotis),
- holds a visiting professorship position at Imperial College of London (from August 2019).

F. Legoll

- is a member of the editorial board of SIAM MMS (2012-) and of ESAIM: Proceedings and Surveys (2012-),
- is a member of the ANR committee CES-40 "Mathématiques et informatique",
- has co-organized, with U. Hetmaniuk (U. of Washington, USA), the mini-symposium "Multiscale and domain decomposition approaches for PDEs with rough coefficients" within the SIAM CSE 2019 conference (Spokane, USA, February),
- has co-organized, with C. Le Bris, the mini-symposium "Computational approaches for multiscale, possibly random problems" within the ICIAM 2019 conference (Valencia, Spain, July).

A. Levitt co-organises the applied mathematics seminar of the CERMICS lab.

G. Robin

- co-organizes the working group “Machine learning and optimization” of the Labex Bezout (with G. Stoltz, as well as W. Hachel and R. Elie),
- is the president of the group "Jeunes de la Société Française de Statistique" (SFdS).

G. Stoltz

- is a member of the scientific council of UNIT (Université Numérique Ingénierie et Technologie),
- is a member of the "Conseil d’Enseignement et de Recherche" of Ecole des Ponts.

9.2. Teaching - Supervision - Juries

The members of the project-team have taught the following courses.

At École des Ponts 1st year (equivalent to L3):

- Analyse et calcul scientifique, 30h (V. Ehrlacher, O. Gorynina, R. Goudey, A. Lesage, S. Siraj-Dine, G. Stoltz),
- Équations aux dérivées partielles et éléments finis, 15h (F. Legoll, P.-L. Rothé),
- Hydraulique numérique, 15h (S. Boyaval),
- Mécanique quantique, 10h (E. Cancès, A. Levitt),
- Méthodes numériques pour les problèmes en grande dimension, 17h30 (V. Ehrlacher, S. Boyaval),
- Optimisation, 15h, L3 (G. Kemlin, A. Lesage), Outils mathématiques pour l’ingénieur, 15h (E. Cancès, G. Ferré, F. Legoll, T. Lelièvre, P-L. Rothé),
- Projet de première année, 15h (G. Ferré).

At École des Ponts 2nd year (equivalent to M1):

- Analyse de Fourier, 15h (A. Levitt),
- Problèmes d’évolution, 36h (F. Legoll, V. Ehrlacher),
- Contrôle de systèmes dynamiques et équations aux dérivées partielles, 18h (E. Cancès),
- Projet du département IMI, 12h (G. Ferré, M. Ramil, J. Roussel, L. Silva Lopes),
- Projets Modéliser Programmer Simuler (V. Ehrlacher, G. Robin),
- Statistics and data sciences, 24h (G. Stoltz),
- Techniques de développement logiciel, 18h (M. Herbst).

At École des Ponts 3rd year (equivalent to M2):

- Méthodes de quantification des incertitudes en ingénierie, 18h (V. Ehrlacher),
- Remise à niveau: outils mathématiques, 9h (A. Lesage).

At the M2 "Mathématiques de la modélisation" of Sorbonne Université:

- Introduction à la physique statistique computationnelle, 20h (G. Stoltz),
- Méthodes numériques probabilistes, 24h (T. Lelièvre),
- Problèmes multiéchelles, aspects théoriques et numériques, 24h (F. Legoll),
- Théorie spectrale et variationnelle, 10h (E. Cancès).

At other institutions:

- Homogenization theory and multiscale problems, 21h, University of Chicago (C. Le Bris).
- Maths 2, 3h, L3, École des Mines (G. Stoltz),
- Probabilités de 1ère année, 27h, L3, Ecole des Mines (M. Ramil),
- Supervision of M2 projects, Master Mathématiques pour les sciences du vivant (MathSV) Université Paris-Saclay (G. Robin).

The following PhD theses supervised by members of the project-team have been defended:

- Ling-Ling Cao, Mathematical analysis of models of electronic structure for defected materials, Université Paris-Est, École des Ponts, defended on October 29th, 2019, supervised by E. Cancès and G. Stoltz,
- Grégoire Ferré, Large deviations theory in statistical physics: some theoretical and numerical aspects, Université Paris-Est, École des Ponts, defended on November 27th, 2019, supervised by G. Stoltz,
- Pierre-Loik Rothé, Numerical methods for the estimation of fluctuations in multi-scale materials and related problems, Université Paris-Est, École des Ponts, defended on December 12th, 2019, supervised by F. Legoll,
- Laura Silva Lopes, Rare event simulation and applications to biological systems, Université Paris-Est, Ecole des Ponts, defended on December 19th, 2019, supervised by J. Hénin (IBPC) and T. Lelièvre.

The following PhD theses supervised by members of the project-team are ongoing:

- Zineb Belkacemi, thèse CIFRE SANOFI, Machine learning for reaction coordinates in molecular dynamics, Université Paris-Est, since November 2018, supervised by T. Lelièvre and G. Stoltz,
- Robert Benda, Multiscale modeling of functionalized nanotube networks for sensor applications, École Polytechnique, started September 1st, 2018, supervised by E. Cancès and B. Lebental (École Polytechnique),
- Raed Blel, Monte Carlo methods and model reduction, started October 1st, 2018, supervised by V. Ehrlacher and T. Lelièvre,
- Rafaël Coyaud, Méthodes déterministes et stochastiques pour le transport optimal, Université Paris-Est, École des Ponts, started october 2017, supervised by A. Alfonsi (CERMICS), co-supervised by V. Ehrlacher,
- Qiming Du, Mathematical analysis of splitting methods, Ecole Doctorale Sciences Mathématiques de Paris Centre, started September 1st, 2016, supervised by A. Guyader (UPMC) and T. Lelièvre,
- Rémi Goudey, Problèmes d'homogénéisation en présence de défauts, Université Paris-Est, started in September 2019, supervised by C. Le Bris.
- Gaspard Kemlin, Mathematical and numerical analysis for electronic structures, École des Ponts, started September 1st, 2019, supervised by E. Cancès and co-supervised by A. Levitt.
- Adrien Lesage, Multi-scale methods for calculation and optimization of thin structures, started October 1st, 2017, supervised by F. Legoll, co-supervised by V. Ehrlacher and A. Lebée (Ecole des Ponts),
- Mouad Ramil, Metastability for interacting particle systems, started October 1st 2017, supervised by T. Lelièvre and J. Reygner (CERMICS),

- Lise Maurin, Non reversible and adaptive biasing processes for sampling, started 1st October 2018, supervised by T. Lelièvre and J.-P. Piquemal (Sorbonne Université), together with P. Monmarché (Sorbonne Université),
- Idrissa Niakh, Réduction de modèles pour les inégalités variationnelles, Université Paris-Est, École des Ponts, thèse CIFRE EDF, started november 2019, supervised by A. Ern (CERMICS), co-supervised by V. Ehrlacher,
- Inass Sekkat, Large scale Bayesian inference, Université Paris-Est, since March 2018, supervised by G. Stoltz,
- Sami Siraj-Dine, Modélisation mathématique des matériaux 2D, École des Ponts, started October 1st, 2017, supervised by E. Cancès, C. Fermanian and co-supervised by A. Levitt.

Project-team members have participated in the following PhD juries:

- S. Boyaval, PhD of Olivier Ozenda (“Continuous modelisation of suspension rheology and migration processes”), defended at Université Grenoble Alpes in Mars 2019,
- S. Boyaval, PhD of Sofiane Martel (“Numerical and theoretical analysis of invariant measures of scalar stochastic viscous conservation laws”), defended at Ecole des Ponts in December 2019,
- E. Cancès, PhD of Amaury Hayat (“Stabilisation de systèmes hyperboliques non-linéaires en dimension un d’espace”), defended at Sorbonne University in May 2019,
- V. Ehrlacher, PhD of Nadia Jbili (“Design and analysis of optimization schemes for nuclear magnetic resonance”), defended at Université Paris-Dauphine in December 2019,
- V. Ehrlacher, PhD of Charles Paillet (“Nouvelles démarches de réduction de modèles pour le traitement des problèmes à très grand nombre de paramètres”), defended at Ecole Normale Supérieure Paris-Saclay in June 2019,
- F. Legoll, referee for the PhD of Qingqing Feng (“Développement d’une méthode d’éléments finis multi-échelles pour les écoulements incompressibles dans un milieu hétérogène”), defended at École Polytechnique in September 2019,
- T. Lelièvre, referee for the PhD of Augustin Chevallier ("Random walks for estimating densities of states and the volume of convex bodies in high dimensional spaces"), defended at Université Côte d’Azur in April 2019,
- T. Lelièvre, referee for the PhD of Oleg Balabanov ("Randomized linear algebra for model order reduction"), defended at Université Bretagne Loire in October 2019,
- T. Lelièvre, referee for the PhD of Lara Neureither ("Irreversible multi-scale diffusions: time scales and model reduction"), defended at Brandenburgische Technische Universität in November 2019,
- G. Stoltz, referee for the PhD of Nicolas Brosse ("Around the Langevin algorithm in high dimension: extensions and applications"), defended at Ecole polytechnique in June 2019,
- G. Stoltz, PhD thesis of Laurent Laflèche ("Large particle dynamical systems"), defended at Université Paris-Dauphine Université Paris-Dauphine in June 2019,
- G. Stoltz, referee for the PhD of Nada Cvtekovic ("Convergent discretization schemes for transition path theory for diffusion processes"), defended at FU Berlin in Fall 2019,
- G. Stoltz, referee for the PhD of Nadia Jbili ("Design and analysis of optimization schemes for nuclear magnetic resonance"), defended at Université Paris-Dauphine in December 2019.

Project-team members have participated in the following habilitation juries:

- S. Boyaval, HdR of Sophie Ricci (“Uncertainties quantification and reduction in the computational geosciences – Application to free-surface hydraulics”), defended at CERFACS in April 2019,
- T. Lelièvre, president of the HDR jury of Denis Villemonais ("Exponential convergence to quasistationary distributions and applications"), defended at Université de Lorraine in November 2019.

9.3. Conference participation

Members of the project-team have delivered lectures in the following seminars, workshops and conferences:

- R. Benda, Informal Scientific Discussion (ISD) seminar of LSI laboratory, Ecole Polytechnique, Palaiseau, March,
- S. Boyaval, ICIAM minisymposia, Valencia (Spain), July,
- S. Boyaval, Workshop in computational hydraulics at UM6P, Ben Guerir (Morocco), September,
- S. Boyaval, 19th day of scientific computing and mathematical modelling in Amiens (France), June,
- E. Cancès University of Strasbourg, colloquium of the mathematics department, January,
- E. Cancès, WONAPDE, Conception, Chile, January (plenary lecture),
- E. Cancès, BIRS workhop, Banff, Canada, January,
- E. Cancès, Sorbonne Université, EMC2 seminar, Paris, February,
- E. Cancès, University of Chicago, Computational and applied mathematics seminar, USA, March,
- E. Cancès, ICMS workshop, Edinburgh, United Kingdom, March,
- E. Cancès, Fields Institute workshop, Toronto, Canada, April,
- E. Cancès, CECAM workshop, Lausanne, Switzerland, May,
- E. Cancès, AMMCS, Waterloo, Canada, August (plenary lecture),
- E. Cancès, IMS workshop, Singapore, September,
- E. Cancès, Sorbonne University, ERC EMC2 kick-off meeting, October,
- E. Cancès, Campus des Cordeliers, laboratoire J.-L. Lions 50th anniversary, Paris, November,
- V. Ehrlacher, GAMM meeting (keynote lecture), Vienna, February,
- V. Ehrlacher, Inria-LJLL seminar, Paris, April,
- V. Ehrlacher, Laboratoire Paul Painlevé seminar, Lille, April,
- V. Ehrlacher, Workshop Cambridge-MMCD, Marne-la-Vallée, April,
- V. Ehrlacher, workshop on “Optimal Transport: from Geometry to Numerics“, Erwin Schrödinger Institut, Vienna, April,
- V. Ehrlacher, workshop on “Scientific Computing Across Scales: Quantum Systems in Cold-matter Physics and Chemistry”, Fields Institut, Toronto, April,
- V. Ehrlacher, ICIAM, Valencia, July,
- V. Ehrlacher, MFO workshop: “Computational Multiscale Methods”, Oberwolfach, August,
- V. Ehrlacher, MORTECH, Paris, November,
- G. Ferré, Young researchers’ seminar, Université Paris-Dauphine, France, February,
- G. Ferré, Probability seminar at Lille University, France, March,
- G. Ferré, Probability seminar at Marseille University, France, May,
- G. Ferré, Congrès SMAI 2019, Lorient, France, May,
- G. Ferré, Journées de Probabilités, Dourdan, France, June,
- G. Ferré, ICIAM 2019, Valencia, Spain, July,
- G. Ferré, SciCADE 2019, Innsbruck, Austria, July
- G. Ferré, GAMM MoAnSi 2019 meeting, Munich, Germany, September,
- G. Ferré, Probability seminar, University Saint-Quentin en Yvelines, France, November,
- O. Gorynina, Congrès SMAI, Guidel, France, May,
- O. Gorynina, ICIAM 2019 conference, Valencia, Spain, July,
- O. Gorynina, Applied Mathematics Seminar, Surgut State University, Russia, December,

- M. Herbst, Université de Lorraine Laboratoire de Physique et Chimie Théoriques seminar, Metz, May,
- M. Herbst, Université de Lille, Laboratoire de Physique des Lasers, Atomes et Molécules seminar, Lille, May,
- M. Herbst, Technische Universität München, seminar Domcke group, München, September,
- M. Herbst, GAMM moansi annual meeting, München, September,
- M. Herbst, Université Paul Sabatier Toulouse, Laboratoire de Chimie et Physique Quantiques seminar, Toulouse, November,
- G. Kemlin, GAMM - MOANSI meeting, München, Germany, September
- C. Le Bris, ICIAM 2019 Invited speaker, July 2019, Valencia, Spain,
- F. Legoll, University of Chicago, CAMP seminar, Chicago, USA, February,
- F. Legoll, SIAM CSE 2019 conference, Spokane, USA, February,
- F. Legoll, Séminaire "Probabilités, Statistiques, Contrôle", ENSTA, Palaiseau, March,
- F. Legoll, CECAM workshop on "Big data and Uncertainty Quantification", Lausanne, Switzerland, March,
- F. Legoll, Colloque national en calcul des structures 2019, Giens, May,
- F. Legoll, ADMOS 2019 conference, Alicante, Spain, May,
- F. Legoll, Coupled problems 2019 conference, Barcelona, Spain, June,
- F. Legoll, MAFELAP (Mathematics of Finite Elements and Applications) 2019 conference, London, United Kingdom, June,
- F. Legoll, Séminaire du Laboratoire de Mécanique et d'Acoustique, Marseille, June,
- F. Legoll, ICIAM 2019 conference, Valencia, Spain, July,
- F. Legoll, Complas 2019 conference, Barcelona, Spain, September,
- F. Legoll, Workshop on "New trends in asymptotic methods for multiscale PDEs", Karlstad, Sweden, October,
- F. Legoll, MORTech 2019 workshop, Paris, November,
- T. Lelièvre, LIA CNRS - UIUC Meeting, Hauteluce, January,
- T. Lelièvre, Séminaire LPCT, Nancy, February,
- T. Lelièvre, Computational and Applied Mathematics / PDE seminar, University of Chicago, February,
- T. Lelièvre, CECAM Workshop, CIB-EPFL, Lausanne, Switzerland, March,
- T. Lelièvre, CECAM Workshop, CIB-EPFL, Lausanne, Switzerland, May,
- T. Lelièvre, CNLS Seminar, Los Alamos National Laboratory, USA, June,
- T. Lelièvre, IPAM, Lake Arrowhead, USA, June,
- T. Lelièvre, CECAM Workshop, Paris, July,
- T. Lelièvre, ICIAM, Valencia, Spain, July,
- T. Lelièvre, HetSys launch event, Warwick, England, September,
- T. Lelièvre, Numerical analysis in Bielefeld, Germany, September,
- T. Lelièvre, ANR QuAMProcs, Bordeaux, November,
- T. Lelièvre, AMMP Colloquium, Imperial College London, November,
- T. Lelièvre, "Fluids and Materials" seminar, Bristol, England, November,
- T. Lelièvre, Newton Institute, Cambridge, England, November,
- T. Lelièvre, Materials Research Society Fall Meeting, Boston, USA, December,

- A. Lesage, Congrès SMAI, Guidel, France, May,
- A. Lesage, ICIAM 2019 conference, Valencia, Spain, July,
- A. Levitt, BIRS workhop, Banff, Canada, January,
- A. Levitt, mathematical physics seminar, Copenhagen, February
- A. Levitt, Workshop Cambridge-MMCD, Marne-la-Vallée, April,
- A. Levitt, Congrès SMAI, Guidel, France, May,
- A. Levitt, Precision quantification in density functional theory, Louvain, Belgique, May,
- A. Levitt, Numerical Analysis of Electronic Structure Models, Suzhou, China, June,
- A. Levitt, ICIAM 2019 conference, Valencia, Spain, July,
- A. Levitt, GAMM - MOANSI meeting, München, Germany, September ,
- A. Levitt, weekly seminar, Aachen, Germany, October,
- A. Levitt, lunchtime seminar, Warwick UK, November,
- A. Levitt, Julia Meetup, Paris, December,
- G. Robin, seminar IACM, FORTH, Heraklion, October,
- G. Robin, seminar "Systèmes Complexes", CAMS, EHESS, November,
- P.-L. Rothé, Arbeitsgemeinschaft Applied Analysis, Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany, April,
- P.-L. Rothé, Groupe de travail des thésards du Laboratoire Jacques-Louis Lions, Paris, May,
- P.-L. Rothé, Congrès SMAI, Guidel, France, May,
- P.-L. Rothé, ADMOS 2019 conference, Alicante, Spain, May,
- P.-L. Rothé, ICIAM 2019 conference, Valencia, Spain, July,
- P.-L. Rothé, Journée "Approches probabilistes en mécanique" de la Fédération Francilienne de Mécanique (F2M), Paris, November,
- L. Silva Lopes, LIA CNRS - UIUC annual Meeting, Hauteluce, France, January,
- L. Silva Lopes, Lorentz Workshop, Leiden, Netherlands, March,
- L. Silva Lopes, IPAM, Lakearrowhead, USA, June,
- L. Silva Lopes, ICIAM, Valencia, Spain, July,
- L. Silva Lopes, MOANSI annual meeting, Munich, Germany, October,
- G. Stoltz, Mathematical Physics Seminar, Institut Henri Poincaré, March,
- G. Stoltz, CECAM workshop “Microscopic simulations: forecasting the next two decades”, Toulouse, France, April,
- G. Stoltz, Workshop Cambridge/Labex MMCD, Champs-sur-Marne, France, April,
- G. Stoltz, CIB workshop “Computational mathematics for model reduction and predictive modelling in molecular and complex systems”, Lausanne, Switzerland, May,
- G. Stoltz, MAP5 Colloquium, Université Paris Descartes, June,
- G. Stoltz, Rencontres prospectives RFCT, Nantes, France, June,
- G. Stoltz, Maths/chemistry seminar EMC2, Sorbonne-Université, June,
- G. Stoltz, DEFI/MEDISIM/POEMS seminar, Inria Saclay, July,
- G. Stoltz, ICIAM 2019, Valencia, Spain, July,
- G. Stoltz, SciCADE 2019, Innsbruck, Austria, July,
- G. Stoltz, seminar CEREMADE, Université Paris-Dauphine, October,
- G. Stoltz, Applied PDEs seminar, Imperial College London, October,
- G. Stoltz, QuAMProcs meeting, Bordeaux, France, November.

Members of the project-team have delivered the following series of lectures:

- M. Herbst, Introduction to the Julia programming language, 6h, Julia Day, Paris, December,
- A. Levitt, Complex analysis and applications in quantum physics and chemistry, 9h, GDR CORREL spring school, Paris, April,
- G. Stoltz, Sampling high-dimensional probability distributions and Bayesian learning, 6h, doctoral school UM6P, Morocco, November,

Members of the project-team have presented posters in the following seminars, workshops and international conferences:

- R. Benda, Ab Init School, CEA Bruyères-Le-Châtel (DAM), January.
- R. Benda, Journées Théorie, Modélisation et Simulations (JTMS) , Institut de Biologie Physico-chimique (IBPC), Paris, June.
- R. Benda, PhD day LPICM, Ecole Polytechnique, Palaiseau, April.
- R. Benda, LPICM Congress, Cap Ferret, October.
- R. Benda, GDR Graphene, Graphene & Co Meeting 2019, Bad Herrenalb, Germany, October.
- M. Herbst, 9th Molecular Quantum Mechanics Conference, Heidelberg, Germany, July,
- G. Ferré, CIB-CECAM meeting, Lausanne, Switzerland, May
- A. Lesage, Workshop “New trends and challenges in the mathematics of optimal design”, Cambridge, United Kingdom, June,
- G. Robin, doctoral school UM6P, Morocco, November,
- L. Silva Lopes, GRC Liquids in Complex Environments, Driving Reactions, Assembling and Pushed to Their Limits, Holderness, USA, August,

Members of the team have benefited from long-term stays in institutions abroad:

- T. Lelièvre, University of Chicago, USA, February 2019 (three weeks),

Members of the project-team have participated (without giving talks nor presenting posters) in the following seminars, workshops and international conferences:

- R. Benda, Mini-school on mathematics for theoretical chemistry and physics, Paris, June,
- O. Gorynina, Oberwolfach summer school "Beyond Numerical Homogenization", Oberwolfach, Germany, June,
- M. Herbst, Mini-school on mathematics for theoretical chemistry and physics, Paris, June
- M. Herbst, Kick-off meeting extreme-scale mathematically-based computational chemistry, Paris, October,
- G. Kemlin, Mini-school on mathematics for theoretical chemistry and physics, Paris, June,
- G. Kemlin, Une giornata con Alessio - Quelques mathématiques autour d’Alessio Figali, Saclay, July,
- G. Kemlin, Kick-off meeting of the ERC project EMC2, Paris, October,
- G. Kemlin, Laboratoire J.-L. Lions 50th anniversary, Paris, November,
- G. Kemlin, Horizon Maths 2019 - Mathématiques et Chimie, Paris, December
- M. Ramil, ANR QuAMProcs, Bordeaux, November 2019,
- P.-L. Rothé, Workshop "Industrial problems solving", Montréal, Canada, August,
- L. Silva Lopes, CECAM Workshop, Paris, France July 2019,
- S. Siraj-Dine, Quantum Transport and Universality, Accademia Nazionale dei Lincei, September,

9.4. Popularization

9.4.1. Internal or external Inria responsibilities

- A. Levitt is a member of the editorial board of Interstices, Inria's popularization website,
- C. Le Bris has presented the project-team at "Mon équipe en 180 secondes", on November 7, 2019.

9.4.2. Articles and contents

- V. Ehrlacher has been interviewed for the online magazine "DigiSchool"
- G. Robin has been interviewed for the online magazine "Usbek et Rica" following her "L'Oréal-UNESCO For Women in Science" prize

9.4.3. Internal actions

- C. Le Bris has organized a research day for the students at École des Ponts on November 6, 2019.
- V. Ehrlacher has participated to a meeting "Mathématiques, nom féminin?" organized at Ecole des Ponts with pupils from middle school.

MEMPHIS Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Reviewer - Reviewing Activities

Journal of Computational Physics, International Journal of CFD, Journal of Non-linear Analysis B, ASME Journal of Computational and Nonlinear Dynamics, Journal of Fluid Mechanics, Acta Mechanica, AIAA Journal, International Journal Numerical Methods in Fluids, Computers & Fluids, Journal of Engineering Mathematics, European Journal of Mechanics / B Fluids, Journal Européen de Systèmes Automatisés, Applied Mathematics and Computation. Nuclear Science and Engineering, Computer Methods in Applied Mechanics and Engineering, Journal of Theoretical Biology, Computational Optimization and Applications, Applied science, Meccanica, SIAM journal on scientific computing, SIAM journal on uncertainty quantification, Advances in Computational Mathematics.

10.1.2. Invited Talks

Angelo Iollo

1. June 5th, 2019. Journées scientifiques Inria, Lyon.

   https://project.inria.fr/journeesscientifiques2019/francais-programme/.
2. May 2019. CIMPA School, Tunis. Science des données pour l'ingénierie et la technologie.

   https://www.cimpa.info/fr/node/6217.
3. March 2019. Conférencier invité à la conférence « Fluid-structure interaction», Politecnico di Milano, Milano, 18/3-20/3/2019.

   http://www1.mate.polimi.it/ gazzola/fs.html.

Tommaso Taddei

1. November 2019. MORTECH 2019, Paris.

   https://mortech2019.sciencesconf.org/

10.1.3. Leadership within the Scientific Community

10.1.3.1. Scientific Expertise

Angelo Iollo is an expert for the European Union for the program FET OPEN.

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

Four members of the team are Professors or Assistant Professors at Bordeaux University and have teaching duties, which consist in courses and practical exercises in numerical analysis and scientific computing. Michel Bergmann (CR) also teaches around 64 hours per year (practical exercises in programming for scientific computing). Tommaso Taddei (CR) also teaches around 50 hours per year (practical exercises in numerical analysis and scientific computing).

10.2.2. Supervision

1. 2019-2022. Giulia Sambataro. Bourse ANDRA. *Component-based reduction strategies for THM equations.* Advisors: Angelo Iollo, Tommaso Taddei.
2. 2018-2021. Michele Giuliano Carlino. Bourse Inria. *Fluid-structure models on Chimera grids*. Advisors: Michel Bergmann, Angelo Iollo.
3. 2018-2021. Antoine Fondanèche. Bourse UB. *Monolithic fluid-structure modeles on parallel hierarchical grids.* Advisors: Michel Bergmann, Angelo Iollo.
4. 2017-2020. Sebastien Riffaud. *Convergence between data and numerical models.* Advisor: Angelo Iollo.
5. 2017-2020. Luis Ramos Benetti. Bourse ERC Aeroflex (O. Marquet, ONERA). *Monolithic fluid-structure modeles on parallel hierarchical grids.* Advisors: Michel Bergmann, Angelo Iollo.

10.2.3. Juries

Angeo Iollo: reviewer of 3 PhD theses, president of one PhD jury, member of one PhD jury, in France and abroad.
Michel Bergmann: reviewer of 2 PhD theses.

MEPHYSTO Team

7. Dissemination

7.1. Promoting Scientific Activities

7.1.1. Scientific Events: Organisation

7.1.1.1. Member of the Organizing Committees

A. de Laire co-organized the "Journée des Doctorants en Mathématiques du Nord-Pas-de-Calais".

7.1.2. Journal

7.1.2.1. Member of the Editorial Boards

S. De Bièvre is Associate Editor of the Journal of Mathematical Physics since January 2019.

7.1.2.2. Reviewer - Reviewing Activities

M. Simon is reviewer for the main international peer-reviewed journals in probability and statistical physics. In 2019, G. Dujardin served as a reviewer for the numerical analysis journals ESAIM:M2AN, Numerische Mathematik and IMA Journal of Numerical Analysis.

7.1.3. Invited Talks

M. Simon has been invited speaker at several conferences, among them:

- *Interactions PDEs/Probability: particle systems, hyperbolic conservation laws*, CIRM, Marseille
- *1st SFB International Workshop Taming Complexity in Partial Differential Systems*, University of Vienna, Austria

7.2. Teaching - Supervision - Juries

7.2.1. Teaching

Licence: A. de Laire, Mathématiques fondamentales 1, 54 TD, L1, Université de Lille

Licence: G. Dujardin, Calcul différentiel et intégral, 60h, BA2, Université Libre de Bruxelles, Belgium.

Master: A. de Laire, "Etude de Problèmes Elliptiques", 60h, M1, Université de Lille

Master: A. Hardy, "Probabilité, modèles et applications" 60h, M1, Université de Lille

Master: A. Hardy, "Séries temporelles", 30h, M1, Université de Lille

Master: M. Simon, "Introduction à la physique statistique", 56h, M2, Université de Lille

Master: M. Simon, "Markov Chains and Applications", Université de Lille and École Centrale Lille

In addition, A. de Laire is in charge of the Master 2 of Applied Mathematics at Université de Lille.

7.2.2. Supervision

PhD: P. Mennuni, "Ondes progressives de l'équation de Gross–Pitaevskii non locale : analyse et simulations", Université de Lille, defended on the November 4, 2019; advisors: S. De Bièvre, A. de Laire, G. Dujardin.

7.3. Popularization

7.3.1. Interventions

M. Simon participated in the programs "Chercheurs itinérants" and "Fête de la Science", and gave several lectures aimed at high-school students.

MINGUS Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

9.1.1. Scientific Events: Organisation

9.1.1.1. Member of the Organizing Committees

- F. Castella organized the MINGuS team meeting, Dinard, december 2019. [15 participants]
- P. Chartier, N. Crouseilles, M. Lemou and F. Méhats organized a workshop on "Asymptotic methods and numerical approximations of multi-scale evolution problems, and uncertainty quantification", ENS Rennes, May 2019. [30 participants]
- N. Crouseilles is co-organizer of the weekly seminar "Mathematic and applications" at ENS Rennes.
- P. Chartier and M. Lemou co-organized (with M. Thalhammer, university of Innsbruck) the mini-symposium "Advanced numerical methods for differential equations" in the ICIAM 2019 conference, Valencia, Spain, July 2019.
- F. Méhats co-organized (with W. Bao, National University of Singapore) the mini-symposium "Multiscale methods and analysis for oscillatory PDEs" in the Scicade conference, Innsbruck, Austria, July 2019.

9.1.1.2. Member of the Conference Program Committees

- N. Crouseilles was member of the scientific committee of the SMAI-19 Conference, June 2019.
- E. Faou was member of the scientific committee of the Scicade Conference, July 2019.

9.1.2. Journal

9.1.2.1. Member of the Editorial Boards

- P. Chartier is member of the editorial board of "Mathematical Modelling and Numerical Analysis" (M2AN).
- A. Debussche is editor in chief of Stochastic Partial Differential Equations: analysis and computations (2013-).
- A. Debussche is member of the editorial board of the collection "Mathématiques & Applications".
- A. Debussche is associate editor of Differential and Integral Equations (2002-19).
- A. Debussche is associate editor of Potential Analysis (2011-2019).
- A. Debussche is associate editor of Journal of Evolution Equation (2014-).
- A. Debussche is associate editor of Applied Mathematics & Optimization, SIAM JUQ (2016-2019).
- M. Lemou is member of the editorial committee of "Communications in Mathematical Sciences" (CMS).

9.1.2.2. Reviewer - Reviewing Activities

The members of the MINGuS team are reviewers for almost all the journals in which they publish (SIAM, JCP, CPDE, CMP, ARMA, JSP, JSC, JMAA, ANM, JCAM, NMPDE, Numer. Math., $\cdots$).

9.1.3. Invited Talks

- J. Bernier gave a talk in the seminar of Columbia university, New York, USA, June 2019.
- P. Chartier gave a talk in the workshop *Nonlinear Evolution Equations: Analysis and Numerics*, organized by M. Hochbruck, H. Koch, S.-J. Oh, and A. Ostermann, Oberwolfach, Germany, February 2019.
- P. Chartier gave a talk in the workshop HaLu, Gran Sasso Science Institute (GSSI) School of Advanced Studies, L'Aquila, Italy, June 2019.
- P. Chartier gave a talk in the ICIAM conference, Valencia, Spain, July 2019.
- P. Chartier gave a talk in the Scicade conference, University of Innsbruck, Austria, July 2019.
- N. Crouseilles gave a talk at the workshop *Quantum and Kinetic Transport*, Shanghai, China, April 2019.
- N. Crouseilles gave a talk in the workshop *Numerical Methods for Multiscale Models arising in Physics and Biology*, University of Nantes, France, June 2019.
- N. Crouseilles gave a talk in the Scicade conference, University of Innsbruck, Austria, July 2019.
- A. Debussche gave a talk in the conference *Partial Differential Equations: from theory to applications*, Nancy, France, March 2019.
- A. Debussche gave a talk in the workshop *Numerical Methods for SPDE: 20 Successful Years and Future Challenges*, Reims, France, June 2019.
- A. Debussche gave a mini-course in the workshop *PROPAL : propagation d'ondes en milieux aléatoires*, Mittag-Leffler Institute, Stockholm, Sweden, May 2019
- A. Debussche gave a talk in the workshop *Recents Trends in Stochastic Analysis and SPDEs*, University of Pisa, Italy, July 2019.
- A. Debussche gave a talk in the workshop *Touch down of Stochastic Analysis*, University of Bielefeld, Germany, September 2019.
- A. Debussche gave a talk in the conference *Challenges and New Perspectives in Mathematics*, Hassan II Academy of Sciences and Technology, Morocco, November 2019.
- A. Debussche gave a talk in the conference *Paths between probability, PDEs and physics*, Imperial College, July 2019.
- E. Faou gave a talk in the workshop *The future of structure-preserving algorithms*, ICMS, Edinburgh, UK, October 2019.
- E. Faou gave a talk in the Analysis seminar, CMS University of Cambridge, UK, October 2019.
- E. Faou gave a talk in the *Plasma day* session, at the Isaac Newton Institute, Cambridge, UK, October 2019.
- E. Faou gave a Colloquium talk at the University of Bielefeld, Germany, April 2019.
- E. Faou gave a talk in the workshop *Dynamics of nonlinear dispersive PDEs*, La Thuile, Italy, February 2019.
- E. Faou gave a talk in the workshop *Nonlinear Evolution Equations: Analysis and Numerics*, organized by M. Hochbruck, H. Koch, S.-J. Oh, and A. Ostermann, Oberwolfach, Germany, February 2019.
- Y. Li gave a talk in the Scicade conference, University of Innsbruck, July 2019.
- Y. Li gave a talk in the NumKin conference, Max Planck Institute, Garching, October 2019.
- M. Lemou gave a talk at the Albert Einstein Institute, Golm, Germany, February 2019.
- M. Lemou gave a talk at the workshop *Quantum and Kinetic Transport*, Shanghai, China, April 2019.
- M. Lemou gave a talk at the university of Cardiff seminar, Cardiff, UK, May 2019.

- M. Lemou gave a talk in the ICIAM conference, Valencia, Spain, July 2019.
- M. Lemou gave a talk in the Scicade conference, Innsbruck, Austria, July 2019.
- M. Lemou gave a talk at the university of Wisconsin seminar, Madison, USA, September 2019.
- M. Lemou gave a talk at the Georgia Tech seminar, Atlanta, USA, September 2019.
- M. Lemou gave a talk in the workshop *Recent Progress and Challenge in Quantum and Kinetic Problems*, Singapore, October 2019.
- J. Massot gave a talk in the NumKin conference, Max Planck Institute, Garching, October 2019.
- F. Méhats gave a talk in the workshop *Recent Progress and Challenge in Quantum and Kinetic Problems*, Singapore, October 2019.
- F. Méhats gave a talk in the NumKin conference, Max Planck Institute, Garching, October 2019.
- P. Navaro participated at the conference JuliaCon 2019, Baltimore, USA, August 2019.
- A. Rosello gave a talk in the conference *Paths between probability, PDEs and physics*, Imperial College, July 2019.

9.1.4. Scientific Expertise

- N. Crouseilles was member of the committee of the Blaise Pascal prize (GAMNI-SMAI), 2019.
- N. Crouseilles was member of the committee of the best PhD talk in the Scicade conference, 2019.
- N. Crouseilles was member of the committee of the expert reviewers for the European Doctoral programme of the University of Innsbruck.
- A. Debussche was reviewer for ERC projects.
- E. Faou was member of the committee of the PhD prize SMAI-GAMNI, 2019. 2019).

9.1.5. Research Administration

- F. Castella is member of the UFR mathématiques council, University Rennes 1.
- N. Crouseilles is responsible of Fédération Recherche Fusion for the University of Rennes I.
- N. Crouseilles is member of the IRMAR laboratory council, University Rennes 1.
- N. Crouseilles is member of the scientific council of ENS Rennes (until september 2019).
- A. Debussche is member of the scientific council of the Fédération Denis Poisson.
- A. Debussche is member of the administrative council of ENS Paris-Saclay.
- A. Debussche is scientific vice-deputy and international relations of ENS Rennes.
- A. Debussche is co-director of the Henri Lebesgue Center (Excellence laboratory of the program investissement d'avenir).
- A. Debussche is vice-head of the Lebesgue agency for Mathematic and Innovation.
- E. Faou is co-director of the Henri Lebesgue Center (Excellence laboratory of the program investissement d'avenir).
- E. Faou is member of the Scientific Council of the Pôle Universitaire Léonard de Vinci.
- M. Lemou is the head of the IRMAR team "Analyse numérique" composed of 48 members.
- M. Lemou is member of the scientific council of ENS Rennes.
- M. Lemou is member of the scientific council of the Henri Lebesgue Center.
- P. Navaro is member of the national network "calcul" http://calcul.math.cnrs.fr. This network is well known for interdisciplinarity of CNRS dedicated to technological aspects of scientific computing (programming, optimization, architectures, $\cdots$).

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

Master :

- F. Castella, Numerical methods for ODEs and PDEs, 60 hours, Master 1, University of Rennes.
- N. Crouseilles, Numerical methods for PDEs, 24 hours, Master 1, ENS Rennes.
- E. Faou, Normal forms, 24 hours, Master 2, University of Rennes.
- M. Lemou, Numerical methods for kinetic equations, 18 hours, Master 2, University of Rennes.
- M. Lemou, elliptic PDEs, 36 hours, Master 1, University of Rennes.
- P. Navaro, Python courses, Master 2 Smart Data, ENSAI.
- P. Navaro, Scientific computing tools for big data, Master 2, University of Rennes.

9.2.2. Supervision

PhD : G. Barrué, Approximation diffusion pour des équations dispersives, University of Rennes I, started in september 2019, A. Debussche.

PhD : J. Bernier, Study of some perturbation of equations which involve symmetries: resonancy and stability, University of Rennes I, defended in july 2019, E. Faou and N. Crouseilles.

PhD : Q. Chauleur, Equation de Vlasov singulière et équations reliées, University of Rennes I, started in september 2019, R. Carles (CNRS, Rennes) and E. Faou.

PhD: Y. Li (Chinese Academy of Sciences), Structure preserving methods for Vlasov equations, march 2019-february 2020, Y. Sun (Chinese Academy of Sciences) and N. Crouseilles.

PhD in progress : J. Massot, Exponential methods for hybrid kinetic models, started in october 2018, N. Crouseilles.

PhD in progress : A. Rosello, Approximation-diffusion pour des équations cinétiques pour les modèles de type spray, started in september 2016, A. Debussche and J. Vovelle (CNRS, Lyon).

PhD in progress : L. Trémant, Asymptotic analysis methods and numerical of dissipative multi-scale models: ODE with central manifold and kinetic models, started in october 2018, P. Chartier and M. Lemou.

9.2.3. Juries

- F. Castella was referee for the PhD thesis of H. Moundoyi (Laboratoire de biologie marine de Roscoff, France), supervised by P. Cormier and B. Sarels.
- F. Castella was referee for the PhD thesis of F. Patout (ENS Lyon, France), supervised by V. Calvez and J. Garnier.
- N. Crouseilles was referee for the PhD thesis of B. Fedele (University Toulouse 3, France), supervised by C. Negulescu and M. Ottaviani (CEA).
- A. Debussche was referee for the PhD of E. Altmann (Sorbonne Université, France), supervised by L. Zambotti.
- A. Debussche was member of the defense committee of the PhD of B. Kouegou Kamen (Aix-Marseille Université, France), supervised by E. Pardoux.
- A. Debussche was referee for the PhD of T. Yeo (Aix-Marseille université, France) supervised by E. Pardoux.
- E. Faou was referee for the Habilitation degree of Karolina Kropielnicka (Univ. Gdansk, Poland).
- M. Lemou was referee of the PhD thesis of X. Li (University Paris-Dauphine, France), supervised by J. Dolbeault.
- F. Méhats was referee of the PhD thesis of T. Dolmaire (university Paris Diderot, France), supervised by L. Desvillettes and I. Gallagher.

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

- F. Castella was member of the HCERES committee for the evaluation of the laboratory "Mathématiques et Informatique pour la Complexité et les Systèmes (MICS)", CentraleSupelec, Gif-sur-Yvette.
- P. Chartier was member of the hiring committee CR2-Inria (Bordeaux)
- P. Chartier was member of the hiring committee for the Inria promotion DR1-DR0.
- N. Crouseilles is member of the Inria Evaluation Committe (2019-2023).
- N. Crouseilles was member of the Inria hiring committee for the following Inria promotions: CRHC, DR2-DR1, DR1-DR0, DR0-DR02.
- N. Crouseilles is member of the hiring committee of the professor position, ENS Rennes.
- E. Faou was member of the CNU 26 until the summer 2019.
- E. Faou was member of the HCERES committee for the evaluation of the Mathematics Institute of Toulouse, University Paul Sabatier.
- E. Faou is AMIES correspondent (Agency for Interaction in Mathematics with Business and Society) for Inria Rennes Bretagne atlantique and IRMAR.

9.3.2. Interventions

- N. Crouseilles: participation to high school students internship at IRMAR laboratory (one week), June 2019.
- N. Crouseilles: interview by a first year student of University Rennes I (in order to inform the different ways to become Inria researcher).
- J. Massot: talk at the N. Mandela high school (terminal S classes) about the links between astronomy and mathematics, April 2019.
- J. Massot: participation to high school students internship at IRMAR laboratory (one week), June 2019.
- P. Navaro: participation to the Julia day, Lyon, France, January 2019.
- P. Navaro: participation to the Julia day, Nantes, France, June 2019.
- A. Rosello: participation to "MATHC2+", June 2019, ENS Rennes.
- L. Trémant: participation to "Maths en Jean", June 2019, University of Rennes.

9.3.3. Internal action

- J. Massot: writing of a Python library *ponio* (Python Objects for Numerical IntegratOr) https://pypi.org/project/ponio/0.1/
- P. Navaro: Python training at the IRMAR laboratory.
- P. Navaro: Julia training at the IRMAR laboratory.
- P. Navaro: R training at the Finist'R internal workshop, Roscoff, France, August 2019.
- P. Navaro, Python courses, within the exchange program between ENSAI and Hong Kong university.

MOKAPLAN Project-Team

7. Dissemination

7.1. Promoting Scientific Activities

7.1.1. Scientific Events: Organisation

7.1.1.1. General Chair, Scientific Chair

- School, A Numerical introduction to optimal transport https://team.inria.fr/ecoleceainriaedf/en/
- School, Sparsity for Physics, Signal, Learning https://sparsity4psl.github.io/

7.1.1.2. Member of the Organizing Committees

I. Waldspurger has co-organized a session on phase retrieval at the SamTA conference 2019.

7.1.2. Scientific Events: Selection

7.1.2.1. Reviewer

V. Duval has reviewed several contributions for the GRETSI conference.

7.1.3. Journal

7.1.3.1. Member of the Editorial Boards

G. Carlier is on the Editorial board of J. Ec. Polytechnique, Mathematics and Fin. Econ., Applied Math. and Optim., Journal of Mathematical Analysis and Applications and J. Dyn. Games,

7.1.3.2. Reviewer - Reviewing Activities

I. Waldspurger has performed reviews for several journals (Applied and Computational Harmonic Analysis, Journal of Fourier Analysis and Applications, IEEE Transactions on Signal Processing and IEEE Transactions on Information Theory) and for the ICML conference.
V. Duval has performed reviews for SIAM Journal on Imaging Sciences, Information and Inference: a Journal of the IMA, Bulletin of the London Mathematical Society, Inverse Problems.
T. O. Gallouët has performed reviews for Analysis & PDE, Archive for Rational Mechanics and Analysis ARMA, Mathematics of computation (Math. of Comp.).
A. Natale has performed reviews for Journal of Scientific Computing (JOMP).
P. Pegon has performed reviews for Journal of Mathematical Analysis and Applications and Advances in Calculus of Variations.

7.1.4. Invited Talks

- J-D. Benamou, Seminar Monash University (Aug., Melbourne), Workshop on Monge-Ampère in honor of Prof. J. Urbas (Aug. , Kiama), Workshop on Optimal Transport and Optimal Patterns (Sept. , Edinburgh), Workshop on Risk in Finance (Oct. , Marseille)
- V. Duval: Workshop Variational methods and optimization in Imaging (IHP, Paris), Workshop on Signal and Image Analysis (MSIA'19, Burghausen, Germany), Two workshops at Conference on Applied Inverse Problems (AIP'19, Grenoble), Workshop Computational aspects of Geometry (U. Paul Sabatier, Toulouse), Conference Optimization on Measure Spaces (U. Paul Sabatier, Toulouse)
- G. Carlier Orsay (ANEDP), workshop Transport optimal Toulouse, ANR Shapo (Paris 7), Workshop Optimal Transport and Economics (Fields Institute, Toronto), Optimal transport in analysis and probability (Vienne, E. Schrodinger Institute).
- I. Waldspurger: Workshop on operator theoretic methods in dynamic data analysis and control (UCLA, États-Unis), workshop on imaging and machine learning (IHP, Paris), series of lectures on waves and imaging (ETH Zurich), séminaire parisien d'optimisation (IHP, Paris), workshop on computational aspects of geometry (U. Paul Sabatier, Toulouse)
- A. Natale: MAGA days (Université Paris-Sud, Paris), Journé de rentrée de l'equipe ANEDP (Université Paris-Sud, Paris), Rencontres Inria-LJLL en calcul scientifique (LJLL, Paris), Workshop on Variational Discretization for GFD (Fields Institute, Canada).
- P. Pegon: Séminaire d'analyse (EPFL, Lausanne, Suisse)
- T. O. Gallouët: Séminaire CMAP, École polytechnique.

7.2. Teaching - Supervision - Juries

7.2.1. Teaching

- Licence : J-D. Benamou, Méthodes Numériques , 39 H. équivalent TD, niveau (L2), université Paris Dauphine , FR
- Licence : V. Duval, Probabilités Multidimensionnelles, 39 h équivalent TD, niveau L2, Université Paris-Dauphine, FR
- Master : V. Duval, Optimization for Machine Learning, 9h, niveau M2, Université PSL/ENS, FR
- Licence : I. Waldspurger, Analyse 2, 45 h équivalent TD, niveau L1, Université Paris-Dauphine, FR
- Master : I. Waldspurger, Optimization for Machine Learning, 6h, niveau M2, Université PSL/ENS, FR
- Licence : G. Carlier, algebre 1, L1 78h, Dauphine, FR
- Master : G. Carlier Variational and transport methods in economics, M2 Masef, 27h, Dauphine, FR
- Licence : A. Natale, Python, 44 h équivalent TD, niveau L2, Université Paris-Sud , FR
- Licence : P. Pegon, Analyse 3, 51 H. équivalent TD, TD niveau L2, Université Paris-Dauphine, FR
- Licence : P. Pegon, Intégrale de Lebesgue et probabilités, 44 H. équivalent TD, TD niveau L3, Université Paris-Dauphine, FR
- Master : P. Pegon, Pré-rentrée d'analyse, 16 H. équivalent TD, cours/TD niveau M1, Université Paris-Dauphine, FR
- Licence : T. O. Gallouët, Optimisation, 24h équivalent TD, niveau L3, Université d'Orsay), FR

7.2.2. Supervision

- PhD in progress : Paul Catala, Optimisation polynomiale pour les problèmes inverses en imagerie, 01/10/2016, V. Duval
- PhD in progress : Romain Petit, Méthodes sans grille pour l'imagerie, 01/10/2019, V. Duval

- PhD in progress : J-D. Benamou, Miao Yu, Application of optimal transport theory in seismic full waveform inversion, 1/10/2016. Co-supervised by J.-P. Vilotte (IPGP)
- PhD in progress : J-D. Benamou, Lucas Martinet, Calcul Haute Performance pour le Transport Optimal, application en Astrophysique, 1/10/2017
- PhD in progress : J-D. Benamou, Giorgi Rukhaia , An Optimal Transportation computational approach of inverse free-form optical surfaces design for extended sources, 1/05/2018
- PhD in progress: G. Carlier, Quentin Petit, mean-field games for cities modeling, (co-supervision with Y. Achdou and D. Tonon), 1/09/2018
- PhD in progress: G. Carlier, Katharina Eichinger, Systems of Monge-Ampere equations: a variational approach 1/09/2019
- PhD in progress: T. O. Gallouët, Gabriele Todeschi, Optimal transport and finite volume schemes, 1/09/2018

7.2.3. Juries

J-D. Benamou, PhD Defense of Aude Genevay (13/03).
G. Carlier was in the Ph.D committee of Michael Orieux, Aymeric Baradat and Rui Chen.

7.3. Popularization

- I. Waldspurger, *Quand les films prennent des couleurs*, exposé au cycle SMAI & Musée des arts des métiers

NACHOS Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

9.1.1. Scientific Events: Organisation

9.1.1.1. General Chair, Scientific Chair

- Stéphane Lanteri has chaired the second workshop of the PHOTOM (PHOTOvoltaic solar devices in Multiscale computational simulations) project that took place at Inria Sophia Antipolis-Méditerranée, France, Jan 28-Feb 01, 2019.
- Stéphane Lanteri has chaired the third workshop of the CLIPhTON (advanCed numericaL modelIng for multiscale and multiphysics nanoPhoTONics) network that took place ati Inria Sophia Antipolis-Méditerranée, France, October 24-25, 2019.

9.1.2. Journal

9.1.2.1. Reviewer - Reviewing Activities

- Théophile Chaumont-Frelet: ESAIM Math. Model. Numer. Anal., NUMA, NME
- Yves D'Angelo: Nanotechnology, Journal of Geophysical & Astrophysical Fluid Dynamics
- Claire Scheid: SIAM J. Numer. Anal., SIAM J. Sci. Comput.
- Stéphane Lanteri: J. Comput. Phys., Comp. Meth. Appl. Mech. Engrg.

9.1.3. Invited Talks

- Théophile Chaumont-Frelet, Journées Ondes Sud-Ouest, MIOS, France , January 2019.
- Théophile Chaumont-Frelet, Séminaire LJAD, Nice, France , November 2019.
- Théophile Chaumont-Frelet at University of Basel, Switzerland, December 11-13, 2019.
- Théophile Chaumont-Frelet at University of Bath, UK, November 11-15, 2019.
- Théophile Chaumont-Frelet at the Basque Center for Applied Mathematics, Spain, May 1-3, 2019.

9.1.4. Scientific Expertise

Stéphane Lanteri is a member of the Scientific Committee of CERFACS.

9.1.5. Research Administration

- Yves D'Angelo is the head of the "Laboratoire J.A. Dieudonné" (LJAD, UMR 7351).
- Stéphane Descombes is the head of the "Maison de la Modélisation, de la Simulation et des Interactions" (MSI) of Université Côte d'Azur
- Stéphane Lanteri is a member of the Project-team Committee's Bureau of the Inria Sophia Antipolis-Méditerranée research center.

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

License: Yves D'Angelo, *Analyse des Séries de Fourier* , 30 h, L3, Univ. Côte d'Azur

Lisence: Claire Scheid, *Fondements 2* , 24 h, L1, Univ. Côte d'Azur

Master: Yves D'Angelo, *Modélisation et Simulation Numérique* , 48 h, M1, Univ. Côte d'Azur

Master: Yves D'Angelo, *Modélisation de la Turbulence fluid* , 30 h, M2, Univ. Côte d'Azur

Master: Claire Scheid, *Analyse, Lecture and practical works* , 27 h, M2, Univ. Côte d'Azur

Master: Claire Scheid, *Méthodes numériques en EDP, Lectures and practical works* , 63 h, M1, Univ. Côte d'Azur

Master: Claire Scheid, *Option Modélisation, Lectures and practical works* , 48 h, M2, Univ. Côte d'Azur

Master: Claire Scheid, *Soutien Analyse Fonctionnelle et Esepacde de Hilbert* , 18 h, M1, Univ. Côte d'Azur

Master: Stéphane Descombes, *Introduction aux EDP* , 30 h, M1, Univ. Côte d'Azur

Master: Stéphane Descombes, *ACP et reconnaissance de caractères* , 9 h, M2, Univ. Côte d'Azur

License: Stéphane Descombes, *Travaux dirigés de mathématiques pour l'économie*, 18 h, L1, Univ. Côte d'Azur

Engineering: Stéphane Lanteri, *High performance scientific computing*, , 24 h, MAM5, Polytech Nice Sophia

9.2.2. Supervision

PhD in progress: Alexis Gobé, Multiscale hybrid-mixed methods for time-domain nanophotonics, vNovember 2016, Stéphane Lanteri

PhD in progress: Georges Nehmetallah, Efficient finite element type solvers for the numerical modeling of light transmission in nanostructured waveguides and cavities, November 2017, Stéphane Descombes and Stéphane Lanteri

PhD in progress: Zakaria Kassali, Multiscale finite element simulations applied to the design of photovoltaic cells, November 2019, Théophile Chaumont-Frelet and Stéphane Lanteri

PhD in progress: Massimiliano Montone, High order finite element type solvers for the coupled Maxwell-semiconductor equations in the time-domain, December 2019, Stéphane Lanteri and Claire Scheid

9.2.3. Juries

Yves D'Angelo: Basile Radisson, IRPHE Marseille, France, Avril 2019, Rapporteur.

Claire Scheid: Pierre Mennuni, Lille, France, November 2019, Examinatrice.

Claire Scheid: Weslley Da Silva Peireira, LNCC, Petropolis, Brazil, September 2019, Examinatrice.

Stéphane Lanteri: Aurélien Citrain, Inria Pau, December 2019, Rapporteur.

Stéphane Lanteri: Nicolas Lebbe, CEA LETI, Grenoble, Novembre 2019, Examinateur.

Stéphane Lanteri: Matthieu Patrizio, ISAE, Toulouse, Mai 2019: Examinateur.

NANO-D Team

8. Dissemination

8.1. Promoting Scientific Activities

8.1.1. Scientific Events: Organisation

8.1.1.1. Member of the Organizing Committees

- Sergei Grudinin coorganized CECAM workshop simSAS 2019, April 8-11, 90 participants, at ILL Grenoble, with Jean-Louis Barrat (UGA), Anne Martel (ILL), Sylvain Prévost (ILL), https:// workshops.ill. fr/event/143/overview.

8.1.2. Scientific Events: Selection

8.1.2.1. Member of the Conference Program Committees

International Conference on Bioinformatics and Computational Biology (Devaurs)

8.1.3. Journal

8.1.3.1. Member of the Editorial Boards

- Biophysical Reviews (Devaurs)
- Current Proteomics (Devaurs)

8.1.3.2. Reviewer - Reviewing Activities

- Applied Sciences (Devaurs)
- Autonomous Robots (Devaurs)
- Bioinformatics (Oxford Press) (Devaurs, Grudinin)
- Current Proteomics (Devaurs)
- IEEE Transactions on Automation Science and Engineering (Devaurs)
- Journal of Bioinformatics and Computational Biology (Devaurs)
- Sensors (Devaurs)
- PLOS Computational Biology (Grudinin)
- Journal of Computational Chemistry (Grudinin)
- BMC Bioinformatics (Grudinin)
- Computational and Structural Biotechnology Journal (Elsevier) (Grudinin)
- Accounts of Chemical Research (ACS) (Grudinin)
- Computational Biology and Chemistry (Grudinin)
- Journal of Chemical Information and Modeling (Grudinin)
- Journal of Computer-Aided Molecular Design (Grudinin)
- Nature (Grudinin)
- Proteins: Structure, Function, and Bioinformatics (Grudinin)

8.1.4. Invited Talks

- D. Devaurs. Efficient strategies to explore the conformational space of proteins and molecular complexes. Seminar of the Functionality and Protein Engineering Unit, University of Nantes, France, 09/2019

- D. Devaurs. Efficient strategies to explore the conformational space of proteins and molecular complexes. CAPSID Seminar, Loria (Inria, CNRS, University of Lorraine), Nancy, France, 09/2019
- D. Devaurs. Efficient strategies to explore the conformational space of proteins and molecular complexes. ABS Seminar, Inria Sophia Antipolis - Méditerranée, France, 11/2019
- S. Grudinin. What does deep learning see in 3d protein structures? In 5th Korean Polish Conference on Protein Folding, September 16-18, 2019, Seoul, 2019.
- S. Grudinin. What does artificial intelligence see in 3d protein structures? In Workshop on Artificial Intelligence Applied to Photon and Neutron Science, 12-14 November, Grenoble, France, https://workshops.ill.fr/event/209/, 2019.
- S. Grudinin. Symmetry in protein complexes. In 7th CAPRI evaluation meeting, EMBL-EBI, Hinxton, UK, April 3-5, 2019, 2019.
- S. Grudinin. SAXS/SANS-assisted flexible fitting and docking. In EMBO Practical course on small angle neutron and X-ray scattering from biomolecules in solution, http://meetings.embo.org/event/19-small-angle-scattering, 2019.
- S. Grudinin. The least constraint approach for automatic coarse-graining of macromolecules. In The First International Conference on Mathematical Multiscale Modeling in Biology, Guanacaste, October 21-25, Costa Rica, 2019.
- S. Grudinin. Deep learning and artificial intelligence applied to the prediction of protein structure and interactions. In Aviesan ITMO Molecular and Structural Basis of Life Sciences : Deciphering The Functional Mechanisms Of Biological Macromolecules: Upcoming Challenges In Bioinformatics, Modelling And Experimental Validations, October 7-8, Paris, France, 2019.
- S. Grudinin. Challenges of modern structural bioinformatics. At the biological department, MSU Minsk, December 26, Minsk, Belarus, 2019.
- S. Grudinin. Novel software tools for small angle scattering. Seminar at the Synrotron SOLEIL, 13th May, 2019.
- S. Grudinin. On the analysis of macromolecular flexibility. Seminar at STFC Rutherford Appleton Laboratory, UK, March 2019.
- S. Grudinin. Novel algorithms for rapid modeling and analysis of flexibility and symmetry in macromolecules. Seminar at Cambridge Institute for Medical Research, UK, April 2019.
- S. Grudinin. Modeling and analysis of flexibility and symmetry in macromolecules. Seminar at Computational Biophysics department, Nagoya University, Japan, March 2019.
- S. Grudinin. On the nonlinear normal mode analysis. Seminar at the department of Chemistry, University of Bergen, Norway, August 2019.
- S. Grudinin. Novel computational tools for biomolecular small-angle scattering. Seminar at the department of Chemistry, University of Oslo, Norway, August 2019.
- S.Grudinin. Integrative Approaches for Current Problems in Structural Biology. Seminar at Laboratory of Theoretical Biochemistry, Institut de Biologie Physico-Chimique, Paris, 31 Jan 2019.
- S.Grudinin. New methods for protein-protein docking. Seminar at the bioinformatics unit, Kansas University, Lawrence, USA, October 2019.

8.1.5. Research Administration

- Sergei Grudinin is a member of IA working group at LINX, Lund Institute Of Advanced Neutron And X-Ray Science, Sweden.

8.2. Teaching - Supervision - Juries

8.2.1. Teaching

- Sergei Grudinin gave 2 public lecture and tutorials for Master and PhD level students on structural bioinformatics at the biology department of BSU Minsk, Belarus in December 2019.
- Sergei Grudinin prepared 2 tutorials for the EMBO school and CECAM workshop on small-angle scattering.

8.2.2. Supervision

PhD : Phd thesis defence of Guillaume Pagès, Université Grenoble Alpes, 12 septembre 2019
Title: Novel computational developments for protein structure analysis and prediction.
Thesis committee: Sergei Grudinin, Pablo Chacón, Česlovas Venclovas, Elodie Laine, Konrad Hinsen, Stéphane Redon, Arne Elofsson.
Summary: Proteins are ubiquitous for virtually all biological processes. Identifying their role helps to understand and potentially control these processes. However, even though protein sequence determination is now a routine procedure, it is often very difficult to use this information to extract relevant functional knowledge about system under study. Indeed, the function of a protein relies on a combination of its chemical and mechanical properties, which are defined by its structure. Thus, understanding, analysis and prediction of protein structure are the key challenges in molecular biology.

Prediction and analysis of individual protein folds is the central topic of this thesis. However, many proteins are organized in higher-level assemblies, which are symmetric in most of the cases, and also some proteins contain internal repetitions. In many cases, designing a fold with repetitions or designing a symmetric protein assembly is the simplest way for evolution to achieve a specific function. This is because the number of combinatorial possibilities in the interactions of designed folds reduces exponentially in the symmetric cases. This motivated us to develop specific methods for symmetric protein assemblies and also for individual proteins with internal repeats. Another motivation behind this thesis was to explore and advance the emerging deep neural network field in application to atomistic 3-dimensional (3D) data.

This thesis can be logically split into two parts. In the first part, we propose algorithms to analyse structures of protein assemblies, and more specifically putative structural symmetries. We start with a definition of a symmetry measure based on 3D Euclidean distance, and describe an algorithm to efficiently compute this measure, and to determine the axes of symmetry of protein assemblies. This algorithm is able to deal with all point groups, which include cyclic, dihedral, tetrahedral, octahedral and icosahedral symmetries, thanks to a robust heuristic that perceives correspondence between asymmetric subunits. We then extend the boundaries of the problem, and propose a method applicable to the atomistic structures without atom correspondence, internal symmetries, and repetitions in raw density maps. We tackle this problem using a deep neural network (DNN), and we propose a method that predicts the symmetry order and a 3D symmetry axis.

Then, we extend the DNN architecture to recognise folding quality of 3D protein models. We trained the DNN using as input the local geometry around each residue in a protein model represented as a density map, and we predicted the CAD-scores of these residues. The DNN was specifically conceived to be invariant with respect to the orientation of the input model. We also designed some parts of the network to automatically recognise atom properties and robustly select features. Finally, we provide an analysis of the features learned by the DNN. We show that our architecture correctly learns atomic, amino acid, and also higher-level molecular descriptors. Some of them are rather complex, but well understood from the biophysical point of view. These include atom partial charges, atom chemical elements, properties of amino acids, protein secondary structure and atom solvent exposure. We also demonstrate that our network learns novel structural features.

This study introduces novel tools for structural biology. Some of them are already used in the community, for example, by the PDBe database and CASP assessors. It also demonstrates the power of deep learning in the representation of protein structure and shows applicability of DNNs to computational tasks that involve 3D data.

PhD : Phd thesis defence of François Rousse, Université Grenoble Alpes, 2019
Title: Incremental Algorithm for Orbital-Free Density Functional Theory.
Thesis committee: Stéphane Redon, Jean Clérouin, Reinhold Schneider, Johannes Dieterich, Philippe Blaise, Florent Calvo, Xavier Bouju.
Summary: The ability to model molecular systems on a computer has become a crucial tool for chemists. Indeed molecular simulations have helped to understand and predict properties of nanoscopic world, and during the last decades have had large impact on domains like biology, electronic or materials development. Particle simulation is a classical method of molecular dynamic. In particle simulation, molecules are split into atoms, their inter-atomic interactions are computed, and their time trajectories are derived step by step. Unfortunately, inter-atomic interactions computation costs prevent large systems to be modeled in a reasonable time. In this context, our research team looks for new accurate and efficient molecular simulation models. One of our team's focus is the search and elimination of useless calculus in dynamical simulations. Hence has been proposed a new adaptively restrained dynamical model in which the slowest particles movement is frozen, computational time is saved if the interaction calculus method do not compute again interactions between static atoms. The team also developed several interaction models that benefit from a restrained dynamical model, they often updates interactions incrementally using the previous time step results and the knowledge of which particle have moved.

In the wake of our team's work, we propose in this thesis an incremental First-principles interaction models. Precisely, we have developed an incremental Orbital-Free Density Functional Theory method that benefits from an adaptively restrained dynamical model. The new OF-DFT model keeps computation in Real-Space, so can adaptively focus computations where they are necessary. The method is first proof-tested, then we show its ability to speed up computations when a majority of particle are static and with a restrained particle dynamic model. This work is a first step toward a combination of incremental First-principle interaction models and adaptively restrained particle dynamic models.

PhD in progress : Maria Kadukova, "Novel computational approaches for protein ligand interactions", Sep 2016-, supervisors: Sergei Grudinin (France) and Vladimir Chupin (MIPT, Russia).

8.2.3. Juries

Sergei Grudinin served as an opponent at the defence of David Menéndez Hurtado's PhD thesis entitled 'Structured Learning for Structural Bioinformatics'. The defence took place at the Department of Biochemistry and Biophysics, Stockholm University, Sweden on the 11th of October.

POEMS Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

9.1.1. Scientific Events: Organisation

9.1.1.1. General Chair, Scientific Chair

- Several members of POEMS team were members of the scientific committee of the WAVES conference, organized in Vienna in August 2019.
- J.-F. Mercier co-organized a summer school on *"Wave propagation in complex and microstructured media"* at Cargèse (Corsica), August 20th to 30th, 2019
- A.-S. Bonnet-Ben Dhia co-organized a workshop entitled *"Advanced Theoretical and Numerical Methods for waves in structured Media"* in Marseille in June 2019, in the framework of the GDR Ondes. They were about 90 attendees.

9.1.1.2. Member of the Organizing Committees

- S. Chaillat is a co-animator of the topic *"Modeling and simulation"* of the GDR Ondes.
- J.-F. Mercier is a co-animator of the topic *"Effective dynamics of microstructured media"* of the GDR MecaWaves.

9.1.2. Journal

9.1.2.1. Member of the Editorial Boards

- A. S. Bonnet-Ben Dhia is an associate editor of SIAP *(SIAM Journal of Applied Mathematics)*.
- M. Bonnet is an associate editor of *Engineering Analysis with Boundary Elements*, *Journal of Optimization Theory* and *Application and Journal of Integral Equations and Applications*. He is in the editorial board of *Inverse Problems* and *Computational Mechanics*.
- P. Ciarlet is an editor of ESAIM:M2AN *(Mathematical Modeling and Numerical Analysis)*.
- P. Joly is a member of the Book Series Scientific Computing of Springer Verlag.

9.1.2.2. Reviewer - Reviewing Activities

The team members regularly review papers for many international journals.

9.1.3. Research Administration

- E. Lunéville was chair of the *Applied Mathematics Department* (UMA) at ENSTA Paris until September 2019.
- A. S. Bonnet-Ben Dhia is deputy-chair of the *Applied Mathematics Department* (UMA) at ENSTA Paris since October 2019.
- P. Ciarlet is coordinator of the *Mathematics in Computational Science and Engineering Program* of the Mathematics Hadamard Labex (LMH).
- E. Bécache is a deputy chair of the Doctoral School EDMH since December 2019.

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

The permanent members of POEMS are involved in the engineering program at ENSTA Paris, the master program *"Analyse, Modélisation et Simulation"* (AMS) and the master program *"Modélisation et Simulation en Mécanique des Structures et Systèmes Couplés"* (MS2SC) of Université Paris-Saclay.

Eliane Bécache

- *Fonctions de variable complexe*, ENSTA (1st year)
- *Introduction à la discrétisation des équations aux dérivées partielles*, ENSTA (1st year)
- *La méthode des éléments finis*, ENSTA (2nd year) and Master AMS (M1)
- *Analyse et approximation par éléments finis d'EDP*, ENSTA (2nd year) and Master AMS (M1)
- *Résolution des problèmes de diffraction par équations intégrales*, ENSTA (3rd year), Master AMS (M2) and Master MS2SC (M2)

Marc Bonnet

- *Problème inverses et Identification*, Master MS2SC (M2)

Anne-Sophie Bonnet-Ben Dhia

- *Fonctions de variable complexe*, ENSTA (1st year)
- *Théorie spectrale des opérateurs autoadjoints*, ENSTA (2nd year) and Master AMS (M1)
- *Propagation et diffraction dans les guides d'ondes*, ENSTA (3rd year) and Master AMS (M2)
- *Non Destructive Testing*, Master "Acoustical Engineering" (M2)
- *Propagation des ondes élastiques dans les solides*, Master MS2SC (M2)

Laurent Bourgeois

- *Outils élémentaires pour l'analyse des équations aux dérivées partielles*, ENSTA (1st year)
- *Fonctions de variable complexe*, ENSTA (1st year)
- *Complétion de données et identification dans les problèmes gouvernés par des équations aux dérivées partielles*, ENSTA (3rd year) and Master AMS (M2)

Stéphanie Chaillat

- *Introduction à l'environnement UNIX*, ENSTA (1st year)
- *Systèmes d'exploitation*, ENSTA (1st year)
- *Introduction à la discrétisation des équations aux dérivées partielles*, ENSTA (1st year)
- *Résolution des problèmes de diffraction par équations intégrales*, ENSTA (3rd year), Master AMS (M2) and Master MS2SC (M2)
- *Equations intégrales et multipôles rapides*, Ecole doctorale MODES (Univ. Paris Est, Marne la Vallée)

Colin Chambeyron

- *Remise à niveau en maths*, Licence (1st year), Paris-Dauphine University
- *Outils mathématiques*, Licence (L1), Paris-Dauphine University
- *Analyse - Optimisation*, Licence (L1), Paris-Dauphine University
- *Algèbre linéaire*, Licence (L2), Paris-Dauphine University

Patrick Ciarlet

- *Analyse et approximation par éléments finis d'EDP*, ENSTA (2nd year) and Master AMS (M1)
- *Préformation filière ModSim*, ENSTA (3rd year)
- *Modèles mathématiques et leur discrétisation en électromagnétisme*, ENSTA (3rd year) and Master AMS (M2)

Luiz Faria

- *La méthode des éléments finis*, ENSTA (2nd year) and Master AMS (M1)

Sonia Fliss

- *La méthode des éléments finis*, ENSTA (2nd year) and Master AMS (M1)
- *Introduction à la discrétisation des équations aux dérivées partielles*, ENSTA (1st year)
- *Homogénéisation périodique*, ENSTA (3rd year), Master AMS(M2), Masters ANEDP, M4S
- *Propagation des ondes dans des milieux périodiques*, ENSTA (3rd year) and Master AMS (M2)

Laure Giovangigli

- *Introduction aux probabilités et aux statistiques*, ENSTA (1st year)
- *Martingales et algorithmes stochastiques*, ENSTA (2nd year)
- *Calcul stochastique*, ENSTA (3rd year) and Master MMMEF (M2)

Christophe Hazard

- *Outils élémentaires d'analyse pour les équations aux dérivées partielles*, ENSTA (1st year)
- *Théorie spectrale des opérateurs autoadjoints*, ENSTA (2nd year) and Master AMS (M1)

Patrick Joly

- *Introduction à la discrétisation des équations aux dérivées partielles*, ENSTA (1st year)
- *Fonctions de variable complexe*, ENSTA (1st year)
- *Analyse fonctionnelle*, ENSTA (2nd year) and Master AMS (M2)
- *Propagation des ondes dans des milieux périodiques*, ENSTA (3rd year) and Master AMS (M2)

Maryna Kachanovska

- *Fonctions de variable complexe*, ENSTA (1st year)
- *Analyse fonctionnelle*, ENSTA (2nd year) and Master AMS (M1)
- *Modèles mathématiques et leur discrétisation en électromagnétisme*, ENSTA (3rd year) and Master AMS (M2)

Nicolas Kielbasiewicz

- *Programmation scientifique en C++*, ENSTA (2nd year) and Master AMS (M1)
- *Projet de simulation numérique*, ENSTA (2nd year) and Master AMS (M1)
- *Calcul scientifique parallèle*, ENSTA (3rd year) and Master AMS (M2)

Eric Lunéville

- *Introduction au calcul scientifique*, ENSTA (2nd year).
- *Programmation scientifique en C++*, ENSTA (2nd year) and Master AMS (M1)
- *Projet de simulation numérique*, ENSTA (2nd year) and Master AMS (M1)
- *Propagation et diffraction dans les guides d'ondes*, ENSTA (3rd year) and Master AMS (M2)

Jean-François Mercier

- *Outils élémentaires d'analyse pour les équations aux dérivées partielles*, ENSTA (1st year)
- *Fonctions de variable complexe*, ENSTA (1st year)
- *Théorie spectrale des opérateurs autoadjoints*, ENSTA (2nd year) and Master AMS (M1)

Axel Modave

- *Calcul scientifique à haute performance*, ENSTA (2rd year) and Master AMS (M1)
- *Calcul scientifique parallèle*, ENSTA (3rd year) and Master AMS (M2)

9.2.2. Supervision

PhD: Yohanes Tjandrawidjaja, *"Quelques contributions à l'analyse de la Half-Space Matching Method pour les problèmes de diffraction et son extension aux plaques 3D élastiques"*, December 2019, A.-S. Bonnet-Ben Dhia, S. Fliss and V. Baronian

PhD in progress: Sandrine Paolantoni, *"Analyse spectrale et simulation numérique de la diffraction électromagnétique par des métamatériaux"*, October 2016, C. Hazard

PhD in progress: Emile Parolin, *"Non overlapping domain decomposition methods with non local transmission conditions for electromagnetic wave propagation"*, October 2017, P. Joly and X. Claeys

PhD in progress: Clément Bénéteau, *"Asymptotic analysis of time harmonic Maxwell equations in presence of metamaterials"*, October 2017, S. Fliss and X. Claeys

PhD in progress: Hajer Methenni, *"Mathematical modelling and numerical method for the simulation of ultrasound structural health monitoring of composite plates"*, October 2017, S. Fliss and S. Impériale

PhD in progress: Damien Mavaleix-Marchessoux, *"Modeling of the fluid-structure interaction resulting from a remote underwater explosion"*, December 2017, M. Bonnet and S. Chaillat

PhD in progress: Nicolas Trafny, *"Development of semi-analytical models to predict the noise produced by turbulence-edges interactions"*, April 2018, J.-F. Mercier and B. Cotté

PhD in progress: Damien Chicaud, *"Méthodes de décomposition de domaine pour la résolution de problèmes harmoniques d'ondes électromagnétiques en milieux complexes"*, October 2018, P. Ciarlet and A. Modave

PhD in progress: Mahran Rihani, *"Équations de Maxwell en présence de méta-matériaux"*, November 2018, A.-S. Bonnet-Ben Dhia and L. Chesnel

PhD in progress: Akram Beni Hamad, *"Propagation d'ondes électromagnétiques dans les cables coaxiaux"*, Septembre 2019, S. Imperiale, P. Joly and M. Khenissi

PhD in progress: Jean-François Fritsch, *"Imagerie dans les guides d'ondes enfouis"*, Octobre 2019, L. Bourgeois and C. Hazard

PhD in progress: Amandine Boucart *"Modélisation d'une couche mince de nanoparticules réparties aléatoirement pour les ondes électromagnétiques*, Octobre 2019, S. Fliss and L. Giovangigli

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

- A.-S. Bonnet-Ben Dhia is a member of the *bureau du comité des équipes-projets* (BCEP)
- P. Joly is a member of the *commission consultative paritaire scientifique* of Inria
- M. Kachanovska is a member of the *comité scientifique* of Inria-Saclay

9.3.2. Education

- Permanent members of POEMS are involved in the management of the engineering program at ENSTA Paris, the program in applied mathematics at IP Paris, the master 2 program *"Analyse, Modélisation et Simulation"* (M1 AMS) and the master 2 program *"Modélisation et Simulation en Mécanique des Structures et Systèmes Couplés"* (M2 MS2SC) of Université Paris-Saclay:
  - M. Bonnet: co-chair of the M2 MS2SC;
  - L. Bourgeois: co-chair 1A ENSTA until August 2019; co-responsible 2A ENSTA since Septembre 2019; co-chair of the M1 in applied mathematics since Septembre 2019;
  - P. Ciarlet: co-chair 3A ENSTA; deputy head of the M2 AMS until August 2019; coordinator of the master program in applied mathematics at IP Paris;
  - S. Fliss: co-chair of the M2 AMS since septembre 2019.

9.3.3. Interventions

- P. Joly presented a talk entitled *"Mathématiques autour de la musique et d'un piano"* during a scientific session at the *Musée des arts et métiers* (March 12, 2019 at Paris) and at the IECL (October 17, 2019 at Nancy).

RAPSODI Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events: Organisation

M. Herda co-organized the yearly Journée de la Fédération de Recherche Mathématique du Nord-Pas-de-Calais which took place on October 15 in Lille. This one-day conference brought together all the maths research laboratories from the Hauts-de-France region and gave the opportunity to new permanent members to present their research.

E. Creusé was part of the organizing committee of the first Rencontres Mathématiques Valenciennoises, that were held on March 13. This meeting was organized for maths students at Université Polytechnique Hauts-de-France as well as for high-school students of Lycée Wallon in Valenciennes. Several researchers presented some applications of mathematics in industry as well as in academic research. This meeting gathered around 500 participants.

T. Rey organized the yearly ANEDP team day at Laboratoire Paul Painlevé on December 17.

C. Cancès and T. Rey co-organized mini-symposia on, respectively, (i) cross-diffusion systems and (ii) novel time discretization methods and moment models for kinetic equations at ICIAM 2019 in Valencia. S. Lemaire co-organized a mini-symposium on polytopal methods at MAFELAP 2019 in Brunel University, London.

10.1.2. Journal

10.1.2.1. Member of the Editorial Boards

C. Chainais-Hillairet is a member of the editorial board of the North-Western European Journal of Mathematics.

10.1.2.2. Reviewer - Reviewing Activities

RAPSODI team members are regular reviewers for all the main international journals in numerical analysis/scientific computing and PDEs.

10.1.3. Invited Talks

C. Calgaro was one of the speakers of the seventh Amarena Days held in Amiens.

C. Cancès was invited to give a talk in Paris during the closure workshop of the MANON common laboratory (CEA Saclay / LJLL Sorbonne Université). He was also invited to give a talk in Kalvåg (Norway) during the workshop Analysis and Computation of Coupled Systems. He finally gave seminars in Compiègne and at the University of Lisbon.

C. Chainais-Hillairet was an invited plenary speaker at the POEMs conference held at CIRM in Marseille, and for the Journées Corrosion `MaNu` 2019 held in Orsay. She also gave a talk at ENUMATH 2019 that was held in Egmond aan Zee. She finally gave seminars in Nice, Orsay and Paris (Laboratoire Jacques-Louis Lions), as well as a talk for the ANEDP team day.

F. Chave was an invited speaker in ENUMATH 2019 that was held in Egmond aan Zee. He also presented a poster at the POEMs conference held at CIRM in Marseille. He finally gave a seminar for the ANEDP team at Laboratoire Paul Painlevé.

B. Gaudeul was an invited speaker of the Journées Corrosion `MaNu` 2019 held in Orsay. He also presented a poster at the conference Numerical Methods for Multiscale Models arising in Physics and Biology held in Nantes. He finally gave a seminar at WIAS Berlin, as well as a talk for the PhD students seminar in Lille.

M. Herda was an invited speaker in the workshop Analytical and Computational Problems for Mixtures and Plasma Dynamics which took place at the Hausdorff Research Institute for Mathematics in Bonn in the framework of the Junior Trimester Program in Kinetic Theory. He was also one of the speakers of the mini-symposium "Novel time discretization methods and moment models for kinetic equations" co-organized by T. Rey at ICIAM 2019 in Valencia. Finally, he gave a talk in the Applied PDEs seminar of Imperial College London.

I. Lacroix-Violet was an invited speaker in the workshop Women in PDEs that was held in Vienna. She also gave several seminars in Université Paris-Est Créteil, Nancy, Dijon, and Lyon, as well as a talk for the ANEDP team day.

S. Lemaire was an invited speaker at the GAMM 2019 conference held in Vienna, and for the POEMs conference held at CIRM in Marseille. He also gave a talk for the yearly Journée de la Fédération de Recherche Mathématique du Nord-Pas-de-Calais held in Lille, and a seminar at ENSTA ParisTech.

B. Merlet was an invited speaker of the fourth Journées Optimisation de Formes et Applications held in Palaiseau. He also gave two seminars in École Polytechnique and at the University of Lisbon, as well as a talk for the ANEDP team day.

T. Rey was an invited plenary speaker in the Summer School Trails in kinetic theory: foundational aspects and numerical methods from the Junior Trimester Program in Kinetic Theory of the Hausdorff Research Institute for Mathematics, held in Bonn. He was also one of the speakers of the conference Numerical Methods for Multiscale Models arising in Physics and Biology held in Nantes. He finally gave a colloquium in the mathematics department of Université Paris-Est Créteil, and a seminar at ENS Ker Lann in Rennes.

A. Zurek was an invited speaker of the Journée EDP held in Calais. He was also a contributed speaker in the conference Numerical Methods for Multiscale Models arising in Physics and Biology held in Nantes. He finally gave a talk during the thirteenth Journée des Doctorants en Mathématiques du Nord-Pas-de-Calais in Lens.

10.1.4. Leadership within the Scientific Community

C. Cancès is the head of the French Research Group GdR MaNu on Mathematics for Nuclear Energy (funded by CNRS's INSMI).

He is also the leader of the task "Numerical methods for high-performance computing of coupled processes" within the EURAD project (H2020, EJP COFUND); cf. Section 9.3 .

10.1.5. Research Administration

C. Calgaro is a member of the Conseil de Département de Mathématiques. She has been a member of the CNU 26 until September.

C. Cancès is a member of the Scientific Board of the Inria Lille - Nord Europe research center.

Until September, C. Chainais-Hillairet has been a member of the Conseil de Département de Mathématiques. Since September, she is a member of the Conseil de la Faculté des Sciences et Technologies of Université de Lille. She also joined in January the CNRS evaluation committee of the Laboratoire de Mathématiques de Reims.

B. Gaudeul is the delegate of the PhD students at the Commission Mixte in Mathematics of Université de Lille.

I. Lacroix-Violet is an elected member of the Conseil du Laboratoire Paul Painlevé. She is also a member of the Comité d'Éthique de la Recherche.

S. Lemaire is a member of the Commission de Développement Technologique of the Inria Lille - Nord Europe research center.

B. Merlet is an elected member of the Conseil du Laboratoire Paul Painlevé.

T. Rey is also an elected member of the Conseil du Laboratoire Paul Painlevé. T. Rey and M. Herda (since September) are in charge of the organization of the weekly seminar of the ANEDP team at the Laboratoire Paul Painlevé. T. Rey is a member of the team of Opération Postes.

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

RAPSODI team members are strongly involved in teaching at Université de Lille. C. Calgaro is in charge of the Master of Mathematical Engineering. I. Lacroix-Violet is responsible of the IESP2A's third year at Polytech Lille. B. Merlet is in charge of the Master 2 of Scientific Computing. E. Creusé is the director of the Mathematics Department of the Université Polytechnique Hauts-de-France.

In 2019, C. Cancès gave practicals (16h) of scientific computing at the École Centrale de Lille. He also gave lectures (32h) on fundamental notions in mathematics in the framework of the newly created Master on Data Sciences of the Université de Lille and the École Centrale de Lille. F. Chave gave practicals to first-year students at Polytech Lille. M. Herda gave lectures (26h) on mathematical methods for signal processing in the Master of Numerical and Statistical Engineering of Université de Lille. S. Lemaire gave lectures (32h) on mathematical tools for simulation in the Master 2 of Scientific Computing at Université de Lille.

C. Chainais-Hillairet gave lectures about "Finite volume methods, dissipative problems, and long-time behavior" in 2 Summer Schools, at Le Lioran (GdR EGRIN) in June, and at CIRM in Marseille (CEMRACS 2019) in July.

10.2.2. Supervision

Post-doc in progress: F. Chave, on "High-order polytopal discretization methods for electromagnetism", since 12/01/2018; supervisors: S. Lemaire and E. Creusé.

PhD in progress: A. Nahas, on "Vortices in Bose–Einstein condensates", since 09/01/2019; advisors: I. Lacroix-Violet and G. Dujardin (Inria Lille - Nord Europe). The thesis is half funded by the LabEx CEMPI.

PhD in progress: S. Bassetto, on "Towards a more robust and accurate treatment of capillary effects in multiphase flow simulations in porous media", since 01/01/2019; advisors: C. Cancès, G. Enchéry and Q.-H. Tran (IFPEN).

PhD in progress: B. Gaudeul, on the "Numerical approximation of cross-diffusion systems arising in physics and biology", since 09/01/2018; advisors: C. Chainais-Hillairet and C. Cancès.

PhD: A. Zurek defended his PhD thesis [11] entitled "Problèmes à interface mobile pour la dégradation de matériaux et la croissance de biofilms : analyse numérique et modélisation" on September 26; advisors: C. Chainais-Hillairet and B. Merlet.

PhD: C. Colin defended her PhD thesis [12] entitled "Analyse et simulation numérique par méthode combinée Volumes Finis - Éléments Finis de modèles de type faible Mach" on May 10; advisors: E. Creusé and C. Calgaro.

M2 Modélisation - Optimisation - Sécurité group research in progress (Université Polytechnique Hauts-de-France): L. Romanowicz and A. Violet, on the "Numerical study of the rise of a suspension bridge", 2019-2020; advisor: E. Creusé.

M2 internship: L. Maisonneuve, on the "Mathematical modeling of a knowledge model in structured populations", from April to September; advisors: T. Rey, S. Billiard and M. Derex.

M2 internship: A. Nahas, on the "Numerical study of the local minimizers of a Bose–Einstein energy functional in 2D", from January to July; advisors: I. Lacroix-Violet and G. Dujardin (Inria Lille - Nord Europe).

M2 internship: N. Aghouzzaf, on "Keller–Segel equations for chemotaxis", from December 2018 to July; advisor: T. Rey.

M1 internship: Q. Fourche, on "Spectral moment methods for linear kinetic equations", from June to July; advisor: T. Rey.

M1 internship: M. Jonval, on "Nonlinear numerical schemes for drift-diffusion equations", from June to July; advisor: C. Chainais-Hillairet.

M1 CHPS group research (Université de Lille): M. Ghestin and A. Rotolo, on "Systems of interacting particles and their mean-field limits", from February to May; advisor: T. Rey.

M1 MAS group research (Université de Lille): C. Germain and A. Jossien, on "Deterministic predictive models of the average annual temperature in Morocco in 2019", 2019; advisor: C. Calgaro.

M1 Modélisation - Optimisation - Sécurité group research (Université Polytechnique Hauts-de-France): I. Kahiyehmoumin, A. Ndao and M. Fall, on a "Domain decomposition method for the finite difference approximation of a diffusion problem", 2019; advisor: E. Creusé.

L3 internship: G. Helbecque, on the "Numerical simulation of charged particles in a strong magnetic field", from April to May; advisor: M. Herda.

10.2.3. Juries

C. Calgaro was a jury member for the PhD defense of M. Tsegmid (Université du Littoral-Côte-d'Opale). She is also a member of the Jury de l'Agrégation de Mathématiques, which is a national hiring committee for the highest level of high-school teachers.

C. Cancès reported on T. Beltzung's (CEA / UVSQ), J. W. Both's (University of Bergen, Norway), and D. Shylaja's (Monash University / ITT Bombay, Australia / India) PhD theses. He is also a member of the Jury de l'Agrégation de Mathématiques.

C. Chainais-Hillairet reported on A. Gerstenmayer's (T.U. Vienna) PhD thesis. She was also a jury member for the PhD defenses of L. Boittin (Paris), C. Colin (Lille), R. Chalayer (Clermont-Ferrand), P. Mennuni (Lille), and M. Id Moulay (Pau). She finally was part of the selection committee for an associate professor (MCF) position at Orsay.

E. Creusé reported on P. Daniel's PhD thesis, defended on March 22 at Sorbonne Université, and entitled "Éléments finis hp-adaptatifs avec contraction d'erreur garantie et solveurs multi-niveaux inexacts". He was also a jury member for the PhD defenses of J. Tomezyk (Université Polytechnique Hauts-de-France) and G. Jeanmasson (Université de Bordeaux). He finally was part of the selection committee for an associate professor (MCF) position at Université Polytechnique Hauts-de-France.

B. Gaudeul was a jury member for the Tournoi Français des Jeunes Mathématiciennes et Mathématiciens.

I. Lacroix-Violet was a jury member for the PhD defense of I. Bensouilah (Lille), and for the habilitation of D. Sanchez (Toulouse).

B. Merlet reported on M. Bonafini's PhD thesis, defended on April 11 at the University of Trento (Italy), and entitled "Variational and convex approximations of 1-dimensional optimal networks and hyperbolic obstacle problems".

10.3. Popularization

C. Calgaro is in charge of the communication of the Laboratoire Paul Painlevé. She organized in 2019 various events to promote mathematics among young people:

- "Les mathématiciens de Lille fêtent les 80 ans du CNRS" (about 600 participants from high-school or Classes Préparatoires);
- a conference of E. Ghys for the presence of the Jury de l'Agrégation de Mathématiques in Lille (about 200 participants);
- les "Mathématiques itinérantes", a series of conferences in high-schools.

E. Creusé gave two popularization talks at Université Polytechnique Hauts-de-France:

- "Le calcul scientifique pour la simulation et le contrôle des écoulements" for the first Rencontres Mathématiques Valenciennoises in March;
- "Comment prévoir la population de poissons dans l'océan ou le déplacement d'oiseaux migrateurs dans le ciel ? Les maths nous répondent !" for the Semaine des Mathématiques 2019 in March.

M. Herda gave a talk at Inria Lille - Nord Europe for the internal scientific popularization event "30 minutes of Science" in January.

T. Rey was one of the four speakers of the event "Les mathématiciens de Lille fêtent les 80 ans du CNRS".

CAGE Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

9.1.1. Scientific Events: Organisation

9.1.1.1. Member of the Organizing Committees

- Ugo Boscain, Jean-Michel Coron, and Mario Sigalotti organized the workshop "Quantum day: analysis and control", December 16, Paris
- Ugo Boscain and Emmanuel Trélat organized the minisymposium "Degenerate diffusion processes and their control" at Equadiff 2019, July 8-12, Leiden, The Netherlands
- Ugo Boscain organized (with Aleksey Kostenko and Konstantin Pankrashkin) the workshop "Self-adjoint Extensions in New Settings", October 6–12, Mathematisches Forschungsinstitut Oberwolfach, Germany
- Barbara Gris organized the minisymposium "Analyse des formes anatomiques" at Smai, May 13–17, Guidel Plages (Morbihan)
- Barbara Gris organized the workshop "Shape analysis in biology", November 21–22, Paris
- Emmanuel Trélat organized (with Roland Herzog) the workshop "New Trends in PDE-constrained Optimization", October 14–18, RICAM, Linz, Austria

9.1.2. Scientific Events: Selection

9.1.2.1. Member of the Conference Program Committees

Emmanuel Trélat was member of the Conference Program Committee of the SIAM Conference on Control and its Applications (CT 2019), Chengdu, China.

9.1.3. Journal

9.1.3.1. Member of the Editorial Boards

- Ugo Boscain is Associate editor of SIAM Journal of Control and Optimization
- Ugo Boscain is Managing editor of Journal of Dynamical and Control Systems
- Jean-Michel Coron is Editor-in-chief of Comptes Rendus Mathématique
- Jean-Michel Coron is Member of the editorial board of Journal of Evolution Equations
- Jean-Michel Coron is Member of the editorial board of Asymptotic Analysis
- Jean-Michel Coron is Member of the editorial board of ESAIM : Control, Optimisation and Calculus of Variations
- Jean-Michel Coron is Member of the editorial board of Applied Mathematics Research Express
- Jean-Michel Coron is Member of the editorial board of Advances in Differential Equations
- Jean-Michel Coron is Member of the editorial board of Math. Control Signals Systems
- Jean-Michel Coron is Member of the editorial board of Annales de l'IHP, Analyse non linéaire
- Mario Sigalotti is Associate editor of ESAIM : Control, Optimisation and Calculus of Variations
- Mario Sigalotti is Associate editor of Journal on Dynamical and Control Systems
- Emmanuel Trélat is Editor-in-chief of ESAIM : Control, Optimisation and Calculus of Variations
- Emmanuel Trélat is Associate editor of SIAM Review
- Emmanuel Trélat is Associate editor of Syst. Cont. Letters

- Emmanuel Trélat is Associate editor of J. Dynam. Cont. Syst.
- Emmanuel Trélat is Associate editor of Bollettino dell'Unione Matematica Italiana
- Emmanuel Trélat is Associate editor of ESAIM Math. Modelling Num. Analysis
- Emmanuel Trélat is Editor of BCAM Springer Briefs
- Emmanuel Trélat is Associate editor of J. Optim. Theory Appl.
- Emmanuel Trélat is Associate editor of Math. Control Related fields

9.1.4. Invited Talks

- Ugo Boscain was invited speaker at the School and Workshop "Random Matrix Theory and Point Processes", Trieste, Italy, September.
- Barbara Gris was invited speaker at "Young researchers Imaging Seminars", IHP, Paris, February.
- Barbara Gris was invited speaker at GDR MAMOVI, Tours, February.
- Barbara Gris was invited speaker at "Information Geometry", Toulouse, October.
- Emmanuel Trélat was plenary speaker at "Equadiff 2019", Leiden, The Netherlands, July.
- Emmanuel Trélat was invited speaker at "Colloquium du Laboratoire de Mathématiques d'Avignon", Mars.
- Emmanuel Trélat was invited speaker at "DEA 2019", Krakow, Poland, September.
- Emmanuel Trélat was invited speaker at "Quantization in Symplectic Geometry", Cologne, Germany, July.
- Emmanuel Trélat was invited speaker at "Mathematical Models and Methods in Earth and Space Science", Rome, Italy, March.
- Emmanuel Trélat was invited speaker at "Sub-Riemannian Geometry and beyond", Jyväskylä, Finland, February.

9.1.5. Leadership within the Scientific Community

Emmanuel Trélat was director of the Fondation Sciences Mathématiques de Paris (FSMP) until June.

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

- Ugo Boscain thought "Controllability of Closed Quantum Systems" to PhD students at the first QUSCO School, Saarbrucken, Germany.
- Ugo Boscain thought "Automatic Control" (with Mazyar Mirrahimi) at Ecole Polytechnique
- Ugo Boscain thought "MODAL of applied mathematics. Contrôle de modèles dynamiques" at Ecole Polytechnique
- Ugo Boscain thought "Control theory and applications in Quantum Mechanics" to PhD students at SISSA, Trieste, Italy
- Mario Sigalotti thought "Geometric Control Theory" to PhD students at "29th Jyväskylä Summer School", Jyväskylä, Finland
- Mario Sigalotti thought "Équations d'évolution, stabilité et contrôle" to M1 students at Sorbonne Université
- Emmanuel Trélat thought "Control in finite and infinite dimension" to M2 students at Sorbonne Université

9.2.2. Supervision

PhD: Nicolas Augier, "Contrôle adiabatique des systèmes quantiques", September 2019, supervisors: Ugo Boscain, Mario Sigalotti.

PhD: Amaury Hayat, " Stabilisation de systèmes hyperboliques non-linéaires en dimension un d'espace", May 2019, supervisors: Jean-Michel Coron and Sébastien Boyaval
PhD: Mathieu Kohli, "On the notion of geodesic curvature in sub-Riemannian geometry", September 2019, supervisors: Davide Barilari, Ugo Boscain.
PhD: Jakub Orłowski, "Adaptive control of time-delay systems to counteract pathological brain oscillations", December 2019, supervisors: Antoine Chaillet, and Mario Sigalotti.
PhD: Shengquan Xiang, "Stabilisation rapide d'équations de Burgers et de Korteweg-de Vrie", June 2019, supervisor: Jean-Michel Coron.
PhD: Christophe Zhang, "Contrôle et stabilisation internes de systèmes hyperboliques 1-D", October 2019, supervisor: Jean-Michel Coron.
PhD in progress: Gontran Lance, started in September 2018, supervisors: Emmanuel Trélat and Enrique Zuazua.
PhD in progress: Cyril Letrouit, "Équation des ondes sous-riemanniennes", started in September 2019, supervisor Emmanuel Trélat.
PhD in progress: Emilio Molina, "Application of optimal control techniques to natural resources management", started in September 2018, supervisors: Pierre Martinon, Héctor Ramírez, and Mario Sigalotti.
PhD in progress: Eugenio Pozzoli, "Adiabatic Control of Open Quantum Systems", started in September 2018, supervisors: Ugo Boscain and Mario Sigalotti.
PhD in progress: Rémi Robin, "Orbit spaces of Lie groups and applications to quantum control", started in September 2019, supervisors: Ugo Boscain and Mario Sigalotti.

9.2.3. Juries

- Ugo Boscain and Mario Sigalotti were supervisors and members of the jury of the PhD thesis of Nicolas Augier, Université Paris Saclay
- Ugo Boscain was co-supervisor and member of the jury of the PhD thesis of Mathieu Kohli, Université Paris Saclay
- Jean-Michel Coron was supervisor and member of the jury of the PhD thesis of Christophe Zhang, Sorbonne Université.
- Jean-Michel Coron was supervisor and member of the jury of the PhD thesis of Shengquan Xiang, Sorbonne Université.
- Mario Sigalotti was opponent of the PhD thesis of Eero Hakavuori, Jyväskylä University, Finland
- Mario Sigalotti was president and member of the jury of the PhD thesis of Gerardo Cardona, École des Mines, Paris.
- Emmanuel Trélat was referee and member of the jury of the HDR of Patrick Martinez, Université de Toulouse.
- Emmanuel Trélat was member of the jury of the HDR of Max Cerf, Sorbonne Université.
- Emmanuel Trélat was referee and member of the jury of the PhD thesis of Mathieu Granzotto, Université de Lorraine.
- Emmanuel Trélat was member of the jury of the PhD thesis of Christophe Zhang, Sorbonne Université.
- Emmanuel Trélat was president and member of the jury of the PhD thesis of Armand Koenig, Université de Nice.
- Emmanuel Trélat was member of the jury of the PhD thesis of Shengquan Xiang, Sorbonne Université.
- Emmanuel Trélat was member of the jury of the PhD thesis of Nicolas Hegoburu, Université de Bordeaux.

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

Emmanuel Trélat is member of the Comité d'Honneur du Comité International des Jeux Mathématiques

9.3.2. Articles and contents

- The work [7] by Pierre Martinon has been popularized in the article “Athlétisme, affaire Dreyfus, itinéraire des éboueurs... Comment les maths irriguent notre monde” by Soline Roy, appeared in *Le Figaro*, 1/1/2019.
- Emmanuel Trélat has been interviewed, as director of the Fondation Sciences Mathématiques de Paris, in *Le Figaro*, 2/1/2019.

9.3.3. Interventions

- Emmanuel Trélat gave a cycle of lectures at “Sciences et Société”, Nancy
- Emmanuel Trélat gave a lecture at Bibliothèque Nationale de France (BNF) (https://vimeo.com/313123529)
- Emmanuel Trélat gave a general public lecture at “Mois de l’optimisation”, Limoges
- Emmanuel Trélat gave a general public lecture in Padua, Italy

COMMANDS Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

9.1.1. Scientific Events: Selection

9.1.1.1. Member of the Conference Program Committees

- F. Bonnans: PGMO Days, EDF'Lab Palaiseau,Dec. 3-4, 2019.

9.1.2. Journal

9.1.2.1. Member of the Editorial Boards

- F. Bonnans: Associate Editor: Math. & Appl. / Annals of the Academy of Romanian Scientists (AOSR)

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

Master :
F. Bonnans: *Numerical analysis of partial differential equations arising in finance and stochastic control*, 18h, M2, Ecole Polytechnique and U. Paris 6, France.
F. Bonnans: *Optimal control of ordinary differential equations*, 15h, M2, Optimization master (U. Paris-Saclay) and Ensta, France.
A. Kröner : Optimal control of partial differential equations, 20h, M2, Optimization master (U. Paris-Saclay), France.
L. Pfeiffer: *Optimal control of ordinary differential equations*, 18h, M2, Optimization master (U. Paris-Saclay) and Ensta, France.
L. Pfeiffer: *Optimisation continue et combinatoire*, 17h, Ensta, France.

9.2.2. Supervision

Finished PhD : A. Le Rhun, Optimal and robust control of hybrid vehicles. Started September 2016 (IFPEN fellowship), finished December 2019, F. Bonnans and P. Martinon.

PhD in progress : G. Bonnet, Efficient schemes for the Hamilton-Jacobi-Bellman equation. Started Oct. 2018. F. Bonnans and J.-M. Mirebeau, LMO, U. Orsay.

PhD in progress : P. Lavigne, Mathematical study of economic equilibria for renewable energy sources. Started Oct. 2018. F. Bonnans and L. Pfeiffer.

9.3. Popularization

- F. Bonnans: codirection of a joint Allistene-Ancre commission (contribution to the national strategy for research), Numerics and Energy committee (2017-2019).
- F. Bonnans: Dimitrie Pompeiu Prize Committee (Academy of Romanian Scientists).

DISCO Project-Team

7. Dissemination

7.1. Promoting Scientific Activities

7.1.1. Scientific Events: Organisation

7.1.1.1. General Chair, Scientific Chair

Islam Boussaada is co-leading the national research group *Tools for analysis and synthesis of infinite-dimensional systems* (GT OSYDI) of the CNRS/GDR MACS (https://gdr-macs.cnrs.fr/groupe-de-travail/osydi).

7.1.1.2. Member of the Organizing Committees

Catherine Bonnet was member of the organizing committee of SIAM CT19, Chendu China, July 2019.

7.1.2. Scientific Events: Selection

- Catherine Bonnet was Associate Editor for the 2019 American Control Conference, Philadelphia, USA and the 2020 American Control Conference, Denver, USA.
- Catherine Bonnet and Islam Boussaada were Associate Editor for the Joint IFAC Conference 7th Symposium on System Structure and Control (SSSC 2019) and 15th IFAC Workshop on Delay Systems, Sinaia, Roumania, Sept 2019.
- Frédéric Mazenc was Associate Editor for the conferences 2019 American Control Conference, Philadelphia, USA and for the European Control Conference 2020, St Petersburg.
- Giorgio Valmorbida was an Associate Editor for the 2019 American Control Conference, Philadelphia, USA and the 2020 American Control Conference, Denver, USA. He was also Associate editor for the 58th Conference in Decision and Control, Nice, France. Silviu Niculescu is the IEEE CSS (Control System Society) representative for the series of IEEE Conferences (nternational Conference on System Theory, Control and Computing,): http://icstcc2019.cs.upt.ro

7.1.2.1. Member of the Conference Program Committees

- Catherine Bonnet and Giorgio Valmorbida are members of the scientific committee of the GDRI (International Research Group funded by CNRS) SpaDisco since 2017.
- Giorgio Valmorbida is a member of the steering committee of the GDRI (International Research Group funded by CNRS) SpaDisco since 2017.
- Catherine Bonnet and Islam Boussaada were members of the International Program Committee of the Joint IFAC Conference 7th Symposium on System Structure and Control (SSSC 2019) and 15th IFAC Workshop on Delay Systems, Sinaia, Roumania, Sept 2019.

7.1.2.2. Reviewer

The team reviewed papers for several international conferences including IEEE Conference on Decision and Control, IEEE American Control Conference, European Control Conference ...

7.1.3. Journal

7.1.3.1. Member of the Editorial Boards

Frédéric Mazenc is member of the editorial boards of the following journals:

- Asian Journal of Control : Editor;
- IEEE Transactions on Automatic Control, Associate Editor;
- European Journal of Control, Associate Editor;
- Journal of Control and Decision, Associate Editor;
- IEEE Control Systems Letters, Associate Editor.

Silviu Niculescu is the Founding Editor and the Editor-in-Chief (since its creation in 2012) of the Springer (hard-cover) book series Advances in Delays and Dynamics ADD@S https://www.springer.com/series/11914.

He is Associate Editor at European Journal of Control (since 2011).

7.1.3.2. Reviewer - Reviewing Activities

The team reviewed papers for several journals including SIAM Journal on Control and Optimization, Automatica, IEEE Transactions on Automatic Control, Systems and Control Letters ...

7.1.4. Invited Talks

Giorgio Valmorbida was invited to give a talk in the workshop Scientific Computing Across Scales: Extreme Events and Criticality in Fluid Mechanics in April 15 - 18, 2019, at The Fields Institute 15-17, Toronto, CA.

Frédéric Mazenc was invited to give a talk in the CINVESTAV, IPN: Model Reduction and Predictor Control, in August 2, 2019, Mexico City, Mexico.

7.1.5. Leadership within the Scientific Community

Catherine Bonnet is a member of the IFAC Technical Committees on *Distributed Parameter Systems* and on *Biological and Medical Systems*. She is a member of the management committee of the COST Action FRACTAL (2016-2020).

Silviu Niculescu is the chair of the IFAC TC 2.2 "Linear Control Systems" since 2017 (including 300-350 researchers throught the world). The TC is coordinating 4 "Working Groups" (WG) including the WG on "Time-Delay Systems".

7.1.6. Scientific Expertise

Since September 2015, Catherine Bonnet is a member of the Evaluation Committee of Inria and since 2019 of the Bureau of the Evaluation Committee of Inria.

Since September 2016, Islam Boussaada is a member of the Scientific Council of IPSA (Engineering School in Aeronautic and Aerospace approved by CTI).

Since September 2018, Islam Boussaada is a member of the Development Council of Sup'Biotech (Engineering School in Biotechnologies approved by CTI).

Since 2014, Frédéric Mazenc is an expert for the FNRS (Belgium). His mission consists in evaluating research projects funded by this institution.

Since 2012, Frédéric Mazenc is a, expert for the ANVUR (National Agency for the Evaluation of Universities and Research Institutes, Italy). His mission consists in evaluating the contribution of Italian scientists.

Since 2011, Frédéric Mazenc is a, expert for the Romanian National Council for Development and Innovation (Romania). His mission consists in evaluating research projects funded by the this institution.

7.1.7. Research Administration

Catherine Bonnet is a member of the

- *Parity Committee* of Inria created sice its creation in 2015.
- Bureau du Comité des Projets du CRI Saclay-Ile-de-France since 2018.
- Coordination committee of the Mentoring Program of Inria Saclay-Île-de-France.
- PhD referent committee at L2S, CentraleSupelec.
- Administration council of the association *Femmes et Mathématiques*

Since October 2017, Frédéric Mazenc is Correspondant Inria Saclay A.M.I.E.S., http://www.agence-maths-entreprises.fr/. Since September 2019, he is member of "la Commission de Déloppement Technologique". He is member of the "Conseil du Laboratory of Signal and Systems".

7.2. Teaching - Supervision - Juries

7.2.1. Teaching

Licence: Islam Boussaada, *Control of bioprocesses*, 27h, 1st year, CentraleSupélec Université Paris-Saclay, France.

Licence: Silviu Niculescu, *Mathematics*, 15h, 1st year, ENSMP Paris, France.

Licence: Silviu Niculescu, *Introduction to optimization*, 30h, 1st year, ESIEE Paris, France.

Licence: Giorgio Valmorbida, *Signal Processing*, 1st year, 43h CentraleSupélec Université Paris-Saclay.

Master: Giorgio Valmorbida, *Tutorials - Modelling, Control, Optimization and Electrical Machines*, 1st and 2nd years, 55.5h, CentraleSupélec Université Paris-Saclay.

Master: Giorgio Valmorbida, *Projects and Internship supervision*, 2nd and 3rd years, 81h, CentraleSupélec Université Paris-Saclay.

Master: Giorgio Valmorbida, *Nonlinear Systems*, 3h, CentraleSupélec Executive Education, Université Paris-Saclay.

Master : Catherine Bonnet, *Stability properties and stabilization of interconnected dynamical systems involving delays*, 20h, IPSA, France.

Master : Silviu Niculescu, *Signals and Systems*, 12h, ESIEE Paris, France.

Master : Giorgio Valmorbida, *Control*, 40.5, Master MAE (M1), Université Paris-Saclay.

Master : Giorgio Valmorbida, *Stability of Dynamical Systems*, Master ATSI (M2), Université Paris-Saclay.

Doctorat : Silviu Niculescu, *Controlling Delayed Dynamics: Advances in Theory, Methods and Applications*, 7h, CISM Udine, Italy.

7.2.2. Supervision

PhD in progress: Souad Amrane, on real pole-placement for retarded functional differential equations, University Mouloud Mammeri. Since 09/2017. Supervisors: Fazia Bedouhene and Islam Boussaada.

PhD in progress: Amina Benarab, Characterization of the exponential decay of linear delay systems solutions, University Paris Saclay. Since 10/2019. Supervisors: Catherine Bonnet, Islam Boussaada and Karim Trabelsi.

PhD: Caetano Cardeliquio, Contributions to the Theory of Time-Delay Systems: Stability and Stabilisation, UNICAMP & Université Paris Saclay, 27 September 2019; Supervisors : Catherine Bonnet and André Fioravanti.

PhD in progress: Leonardo Broering Groff, Commande Périodique Déclenché par Événements, Université Paris-Saclay et UFRGS. Since 03/2017. Supervisors: Giorgio Valmorbida and Joao Manoel Gomes da Silva Jr.

PhD in progress: Jose Castillo, Design, Modeling and control of multi drones for aerial handling, University Paris Saclay, 10/2018, Islam Boussaada and Juan Escareno.

PhD in progress: Naouel Debiane, Bond Graph modeling for robust control and diagnosis of macatronic systems, University of Lille. Since 03/2017. Supervisors: Belkacem Ould-Bouamama and Islam Boussaada.

PhD in progress: Ali Diab, Commande par filtrage non linéaire des systèmes d'assistance direction, Université Paris-Saclay. Since 10/2019. Supervisors: Giorgio Valmorbida and William Pasillas-Lepine.

PhD in progress: Ricardo Falcon Prado, Active vibration control of flexible structures under input saturation through delay-based controllers and anti- windup compensators, University Paris Saclay. Since 10/2019. Supervisors: Islam Boussaada and Sami Tliba.

PhD in progress: Javier Eduardo Pereyra Zamundio, New backstepping design for systems with delay: finite time stabilization, robust stabilization, CINVESTAV, Instituto Politecnico Nacional. Since 10/2019. Supervisors: Sabine Mondié and Frédéric Mazenc.

PhD in progress : Amira Remadna, On pole-placement approach for retarded functional differential equations, University Badji Mokhtar-Annaba. Since 09/2019. Supervisors: Islam Boussaada and Azzedine Benchettah.

Postdoc: Da-Jung Cho, Modelling of bacteria communication, May-August 2019. Supervisors: Catherine Bonnet, Matthias Fuegger and Thomas Nowak.

7.2.3. Juries

- Catherine Bonnet was member of the Grenoble and Nancy Junior Researcher Inria recruiting committees.
- Catherine Bonnet was President of the PhD thesis of Yanqiao Wei *'Non-asymptotic and Robust fractional order differentiators using generalized modulating functions'*, 15 November 2019, INSA Val de Loire.

7.3. Popularization

7.3.1. Interventions

- The team welcomed Sophie Merheb, high-school student of Lycée privé Notre-Dame Les Oiseaux, Verneuil-sur-Seine, for the period 17-26 June 2019.

FACTAS Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

- L. Baratchart gave an oral communication at NCMIP 2019 in Cachan,
- V. L. Coli gave oral communications at the 2nd "Journée Matériaux UCA", Sophia Antipolis, September, and at the workshop "Céramiques imprimées de Méditerranée occidentale. Matières premières, productions, usages" of the ANR CIMO, Nice, France, March, http://www.cepam.cnrs.fr/sites/cimo/.
- D. Martinez Martinez gave an oral communication at «Journées Nationales des Microondes», Caen, France and at «European microwave Conference (EuMC) 2019», Paris, France.
- F. Seyfert was invited to give a lecture at the Technical University of Cartagena University (Spain) and gave an invited talk at the workshop «Rational approximation for Electrical Engineering», Moscow, Russia sponsored by Huawei.

9.1.1. Scientific Events: Selection

9.1.1.1. Member of the Conference Program Committees

L. Baratchart was on the program committee of "Applied Inverse Problems" (AIP) 20019, Grenoble, France http://www.aip2019-grenoble.fr.

9.1.2. Journal

9.1.2.1. Member of the Editorial Boards

L. Baratchart is on the editorial board of the journals "Computational Methods and Function Theory" and "Complex Analysis and Operator Theory".

9.1.2.2. Reviewer - Reviewing Activities

- J. Leblond was a reviewer for the journals *Engineering with Computers*, *Inverse Problems*.
- F. Seyfert was a reviewer for IEEE Transactions on Microwave Theory and Techniques

9.1.3. Invited Talks

- L. Baratchart gave an invited address at the conference "One-Dimensional Complex Analysis and Operator Theory" in Saint Petersburg, May 13-17, https://sites.google.com/view/sft2019/home/conference. He was an invited speaker at the workshop «Rational approximation for Electrical Engineering», Moscow, Russia, sponsored by Huawei, and lectured at the Macao university of sciences and techniques, in April. Macao University of Sciences and Technology in April.
- L. Baratchart and J. Leblond were invited to give talks at AIP 2019, Grenoble, France, July, http://www.aip2019-grenoble.fr.
- S. Chevillard was invited to give a talk at a NFS-sponsored workshop on magnetic imaging organized outside the American Geophysical Union meeting (December 7-8).
- J. Leblond was an invited speaker at the final workshop of the ANR FastRelax, Lyon, France, May, http://fastrelax.gforge.inria.fr/FastRelax2019.html.

9.1.4. Scientific Expertise

- L. Baratchart was a member of selection panel 40 (Mathematics) of the Agence Nationale de la Recherche (ANR).

- J. Leblond was an external reviewer for a promotion evaluation process at Chapman University (Orange, CA, USA).
- F. Seyfert was a reviewer for the National Science Centre of Poland

9.1.5. Research Administration

- J. Leblond is a member of the "Conseil Scientifique" and of the "Commission Administrative Paritaire" of Inria.
- M. Olivi is a member of the CLDD (Commission Locale de Développement Durable) and in charge, with P. Bourgeois, of coordination.

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

Colles: S. Chevillard has given "Colles" (oral examination preparing undergraduate students for the competitive examination to enter French Engineering Schools) at Centre International de Valbonne (CIV) (2 hours per week) until June 2019.

9.2.2. Supervision

PhD in progress: K. Mavreas, *Inverse source problems in planetary sciences: dipole localization in Moon rocks from sparse magnetic data*, since October 2015, advisors: S. Chevillard, J. Leblond; defense scheduled January 31, 2020.

PhD in progress: G. Bose, *Filter Design to Match Antennas*, since December 2016, advisors: F. Ferrero, F. Seyfert and M. Olivi.

PhD in progress: S. Fueyo, *Cycles limites et stabilité dans les circuits*, since October 2016, advisors: L. Baratchart and J.-B. Pomet (Inria Sophia, McTao).

PhD in progress: P. Asensio, *Inverse source estimation problems in EEG and MEG*, since November 2019, advisors: L. Baratchart, J. Leblond.

PhD in progress: M. Nemaire, *Inverse potential problems with application to quasi-static electromagnetics*, since October 2019, advisors: L. Baratchart, J. Leblond, S. Kupin (IMB, Univ. Bordeaux).

Post-doc. in progress: V. L. Coli, *Multiscale Tomography: imaging and modeling ancient materials*, since March 2018, advisors: J. Leblond, L. Blanc-Féraud (project-team Morpheme, I3S-CNRS/Inria Sophia/iBV), D. Binder (CEPAM-CNRS, Nice).

9.2.3. Juries

L. Baratchart was a reviewer of the "Mémoire d'habilitation" of Moncef Mahjoub, ENIT, Tunis, September 2.

J. Leblond was a member of the PhD committees of I. Santos (Univ. Paul Sabatier, Toulouse, February), S. Amraoui and K. Maksymenko (Univ. Côte d'Azur, December).

M. Olivi was a member of the HdR committees of F. Seyfert (Univ. Côte d'Azur, February 6), C. Poussot-Vassals (Univ. Toulouse, July 12) and of the PhD committees of D. Martinez Martinez (Univ. Limoges, June 20) and P. Kergus (Univ. Toulouse, October 18)

F. Seyfert was a member of the PhD committee of Johan Sence (Univ. Limoges, November 15) and D. Martinez Martinez (Univ. Limoges, June 20).

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

M. Olivi was responsible for Scientific Mediation and president of the Committee MASTIC (Commission d'Animation et de Médiation Scientifique) https://project.inria.fr/mastic/ until October 30.

9.3.2. Articles and contents

M. Olivi wrote a review of the book "Algorithms: la bombe à retardement" by C. O'Neil for Interstice https://interstices.info/sciences-du-numerique-et-impact-sur-la-societe/

9.3.3. Education

"La fête des Maths de l'ESPE Nice-Liégeard" (March 5 and 26): M. Olivi animated two half-day workshop sessions "jouons avec des expériences scientifiques" https://pixees.fr/jouons-avec-des-experiences-scientifiques/ for primary school students.

9.3.4. Interventions

- "Fête de la science: Mouans-Sartoux fête les sciences du quotidien" (October 10-11 for scholars: 8 classes, October 12 for public: 1000 people): M. Olivi animated the activity "jouer à transmettre des images" in collaboration with the "espace de l'art concret" https://www.espacedelartconcret.fr/.
- "Stage MathC2+" (June 19-22): M. Olivi animated a workshop session on "How to analyze sounds with mathematical functions".
- V. L. Coli gave a talk "Archéologie et mathématiques : algorithmes pour l'identification des gestes des premiers potiers", and participated to the organization of the exhibition of the ANR project CIMO, Forum des Sciences, 80 years of CNRS, October, CIV, Valbonne.
- Fabien Seyfert gave a pitch on Factas activities during the visit of the company SICAME (March 27) and Martine Olivi gave a pitch on Factas activities for the celebration of InriaTech 10th birthday (April 3)

9.3.5. Internal action

- S. Chevillard gave a talk "Réchauffement climatique : où en est-on ? où va-t-on ?" at the c@fé-in of the Research Center, November.
- V. L. Coli gave a talk "Archéologie et mathématiques : algorithmes pour l'identification des gestes des premiers potiers" at the c@fé-in of the Research Center, October. She also participated to the organization of the "1er Colloque doctoral préhistoire, paléoenvironnement, archéosciences", November, MSHS, Nice, https://www.cepam.cnrs.fr/evenement/1er-colloque-doctoral-prehistoire-paleoenvironnement-archeosciences/, where she gave a talk "Approches mathématiques pour la caractérisation des potteries néolithiques".
- M. Olivi co-organized about 10 "cafés scientifiques" (c@fé-in's and cafés Techno, 30 to 80 participants each) https://project.inria.fr/mastic/category/cafein/

9.3.6. Creation of media or tools for science outreach

M. Olivi co-supervised the creation of new scientific wooden objects by SNJ AZUR (funds from APOCS region): pixel art and transmission of images https://pixees.fr/jouer-a-transmettre-des-images/, IA machine. She also co-supervised the creation of videos by Thibaut Ehlinger (internship) and Gregory Casala (apprenti), funds from Class'Code and the national network, see https://pixees.fr/pause-ta-science-une-chaine-pour-decrypter-les-objets-scientifiques/.

I4S Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

9.1.1. Scientific events selection

9.1.1.1. Member of the Conference Program Committees

J.Dumoulin is

- member of the scientific committee of the GI Division (Geosciences Instrumentation and Data Systems) of EGU (European Geosciences Union) for infrastructure instrumentation and monitoring since April 2013. (http://www.egu.eu/gi/structure/)
- member of the scientific committee of QIRT (quantitative Infrared Thermography) since February 2014 (http://www.qirt.org/)
- Co-organizer of sub-Program group PG4: Earth Surface Investigation Method at General Assembly of EGU 2019 (http://www.egu2019.eu/).

Q. Zhang is

- member of the international program commitee (technical associate editor) of the 21st IFAC World Congress that will take place in Berlin, Germany, July 12-17, 2020.
- member of IFAC Technical Committee on Modelling, Identification and Signal Processing (TC 1.1).
- member of IFAC Technical Committee on Adaptive and Learning Systems (TC 1.2).
- member of IFAC Technical Committee on Fault Detection, Supervision and Safety of Technical Processes (TC 6.4).

L. Mevel is

- member of the EWSHM scientific committee.

V. Le Cam is

- member of the IWSHM scientific committee.
- head and general secretary of the EWSHM scientific committee.
- member of the Asian Pacific Workshop

M. Doehler is

- member of IFAC Technical Committee on Modelling, Identification, and Signal Processing.
- member of the IOMAC scientific committee.

9.1.1.2. Reviewers

M. Doehler was reviewer for ECC 2020.

J. Dumoulin was reviewer for EGU 2019, QIRT ASIA 2019 and SFT 2019.

Q. Zhang was reviewer for CDC 2019, IFAC Word Congress 2020.

9.1.2. Journal

9.1.2.1. Member of the Editorial Boards

L. Mevel is member of the editorial board of the journal Mathematical Problems in Engineering, and of the journal Shock and Vibration.

Q. Zhang is member of the editorial board of the journal of Intelligent Industrial Systems.

J. Dumoulin is member of the editorial board of the journal Quantitative Infrared Thermography, and Executive Editor for the journal Geoscientific Instrumentation and Data Systems.

9.1.2.2. Reviewer - Reviewing Activities

L. Mevel was reviewer for Mechanical Systems and Signal Processing, Engineering Structures.Structural Control and Health Monitoring

M. Doehler was reviewer for Mechanical Systems and Signal Processing, Engineering Structures, Philosophical Transactions A Mathematical, Physical and Engineering Sciences, Computers and Structures, Structural Health Monitoring.

J. Dumoulin was reviewer for Quantitative Infrared Thermography Journal, GI Journal (EGU), SFT conference, Engineering Geology, International Journal of Pavement Research and Technology, Remote sensing of environment, Structural Health Monitoring, Composites Structures

9.1.3. Invited Talks

L. Ibos and J. Dumoulin, « Thermographie infrarouge: du laboratoire vers les mesures de terrain », Atelier Métrologie Thermique Avancée, SFT 2019 (Congrès annuel de la Société Française de Thermique), Nantes, France, 3 – 6 juin 2019.

9.1.4. Leadership within the Scientific Community

V. Le Cam organized the 2nd SHM France meeting in Nantes, together with CEA and Precend.

9.1.5. Scientific Expertise

V. Le Cam did an expertise in the context of EFFICACITY IRT. The expertise was about the instrumentation of RATP station and the control of the speed of escalators.

V. Le Cam helped SNCF Reseau to dissiminate at industrial results the monitoring of axle counters developed in 2018.

Arthur Bouché did an expertise for SNCF about electromagnetism and axle counters.

Ivan Guéguen did an expertise for ASCQUER for labelization of Lacroix Millenium lights for construction sites.

9.1.6. Research Administration

V. Le Cam is member of the scientific council of WEN (West Electronic Network) since 2014, which is a cluster of about 200 companies, academics and research laboratories active in electronics.

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

J. Dumoulin

- Licence Professionnelle TAM (Techniques Avancées en Maintenance): thermographie infrarouge active, 24h, Université Paris-Est Créteil (UPEC), France
- Master 2 ITII, BTP, module Maintenance et réhabilitation des ouvrages, Transferts thermiques dans les Structures : Des principes physiques à l'application sur site réel, 12 h, Ecole Centrale de Nantes(ECN), France.
- With Nicolas Le Touz lecture on Solar Hybrid Roads at SMARTIE ETN Training week 2019
- Lecture on Long term thermal monitoring of Structures at SMARTIE ETN Training week 2019
- Lecture on IR for inspection and/or thermal monitoring of infrastructures: scope of application, technical solutions and analysis methods, at QIRT ASIA 2019 courses day.
- Lecture on Active Thermography for NDE at APESS 2019 (Asia-Pacific-Euro Summer School on Smart Structures).

V. Le Cam

- Master 2 Civil engineering, Structural Monitoring, 4h, Université de Nantes, France
- Licence 3 Professional SEICOM, 3h of theoretical lessons and 20H of practical lessons on Embedded and Smart Systems, Université de Nantes, France
- ESEO, 16h, practical lessons on embedded and smart systems under Linux, France
- Master 2 Electrical Engineering (GEII), 4h on electronic systems and Structural Monitoring, Université Bretagne Sud, France
- Polytech la Roche sur Yon, 8h embeded wireless algorithms §8h for David Pallier

M. Doehler

- Cycle préparatoire intégré, STPI, mathématiques, 48h TD, INSA Rennes, France

X. Chapeleau

- Licence Pro Mesures physiques, Mesures optiques, 15h, IUT de St Nazaire, Université de Nantes, France

T. Toullier

- Master 1, TP Capteurs (12h), contrôle, commandes, École Centrale de Nantes, France
- Foundation Master, TD Programming and Data Analysis (14h), École Centrale de Nantes, France

F. Gillot

- Master 1, Conception optimale robuste de systèmes mécaniques (10h), École Centrale de Lyon, France
- Master 1, Dynamique des systèmes biologiques humains (4h), École Centrale de Lyon, France
- Formation initiale des ingénieurs de l'École Centrale de Lyon, TP, TD, BE, niveau L3, (50h), France

9.2.2. Supervision

PhD : Thibaud Toullier. *Simultaneous characterization of the radiative properties and temperatures of envelopes of structures in natural environment by multispectral infrared thermography* L. Mevel, J. Dumoulin and M. Doehler. Ecole doctorale MathSTIC, Université de Rennes 1,defended on 6th November 2019. [15].

PhD : Antoine Bassil, *Fibre-optic sensor for fatigue monitoring*, D. Leduc, O. Abraham and X. Chapeleau. Ecole doctorale SPIGA, Université de Nantes, defended on 26 November 2019.

PhD : Bian Xong, *Vibration analysis by video image processing for civil engineering structure monitoring*, Q. Zhang, V. Balthazar. Ecole doctorale MathsTIC, Université de Rennes 1, since October 2018.

PhD : Eva Viefhues, *Statistical damage localization for civil structures*, L. Mevel and M. Doehler. Ecole doctorale MathSTIC, Université de Rennes 1, since November 2016.

PhD : David Pallier, *Sensor Enhancement to Augmented Usage and Reliability*, S. Pillement, IETR, V. Le Cam, Ecole doctorale MathSTIC

PhD : Alexander Mendler, *Vibration-based structural health monitoring of road bridges*, C. Ventura and M. Doehler. University of British Columbia, Vancouver, Canada, since September 2018.

Ludovic Gavérina post-doctoral project on in-situ measurement of thermal resistance of building envelopes, J. Dumoulin, march 2017- february 2019.

Nicolas Le Touz post-doctoral project on in-situ measurement of thermal resistance of building envelopes, J. Dumoulin, December 2018- august 2019.

9.2.3. Juries

Q. Zhang participated in the following PhD defense committees:

- Missie Aguado Rojas at CentraleSupélec, on June 14, 2019.
- Tzila Ajamian at Centrale Nantes on October 24, 2019.

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

L. Mevel is member of CLHSCT committee in Rennes.

L. Mevel is member of Comité de centre committee in Rennes.

L. Mevel is Head of Science in 2nd of Inria Rennes Center.

V. Le Cam is Head of SII LAb at IFSTTAR Nantes.

J. Dumoulin is scientific Head SII LAb at IFSTTAR Nantes.

9.3.2. Articles and contents

9.3.2.1. Encycopedia article on nonlinear system identification

In the second edition of Encyclopedia of Systems and Control, published by Springer in September 2019, the article on nonlinear system identification authored by Q. Zhang has been updated with the latest progresses on this topic.

Nonlinear mathematical models are essential tools in various engineering and scientific domains, where more and more data are recorded by electronic devices. How to build nonlinear mathematical models essentially based on experimental data is the topic of this entry. Due to the large extent of the topic, this entry provides only a rough overview of some well-known results, from gray-box to black-box system identification. DOI: https://doi.org/10.1007/978-1-4471-5102-9_104-2

9.3.3. Interventions

M. Doehler and Q. Zhang participated the outreach activity "J'peux pas, j'ai informatique" for school classes on April 2, 2019.

9.3.4. Creation of media or tools for science outreach

9.3.4.1. Showroom demonstrations

A damage localization mockup has been developed and installed in the showroom of Inria Rennes. It has been the support for a demonstration for the outreach activity "J'peux pas, j'ai informatique" for school classes on April 2, 2019, showing that computer science also can be related to physics and statistics. An ADT Carnot has been funded on that topic and will help the maturation of such project.

MCTAO Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events: Organisation

10.1.1.1. General Chair, Scientific Chair

- J.-B. Caillau has been chair (with Didier Auroux, Castor team) of the 19th French-German-Swiss conference, held in Nice from September 17 to 19, 2019. The conference gathered around 150 researchers in optimization. More information on fgs-2019.sciencesconf.org
- L. Giraldi together with M. Chaves (Biocore) organized an invited session at the Conf. Decision and Control (Nice, France).

10.1.1.2. Member of the Organizing Committees

J.-B. Caillau has been member of the organizing committee of PGMO days held in Paris Saclay from December 3 to 4, 2019.

10.1.2. Journal

10.1.2.1. Reviewer - Reviewing Activities

The team members are regular reviewers for the leading journal in control (SIAM J. Control, ESAIM COCV...) and, more generally, for journals of pure and applied mathematics.

10.1.3. Invited Talks

- L. Rifford gave a plenary talk at the *2nd International Conference of Mathematics in Erbil* (Iraq), .
- L. Rifford was a keynote speaker at the *1st International MIPAnet Conference on Science and Mathematics* (Parapat, Indonesia), .
- L. Rifford gave a talk during the workshop *Real and Complex Singularities in Cargèse* at the IESC (Cargèse, France). .
- B. Bonnard gave the seminar *"Techniques Géométriques pour le Contrôle Optimal des Réacteurs Chimiques"* at the Department of Mathemathics of the Université de Genève, October 2019.
- L. Dell'Elce was a keynote speaker at the *4th International Workshop on Key topics in orbit Propagation Applied to Space Situational Awareness* (Logrono, Spain), .
- L. Dell'Elce gave the seminar *"Multi-Phase Averaging of Time-Optimal Low-Thrust Transfers"* at the Surrey Space Center in the Universitéy of Surrey, Octobre 19.
- J.-B. Caillau gave an invited talk at the *Learning week* if Air France, in Sophia Antipolis, December 2019.

10.1.4. Scientific Expertise

L. Giraldi is reviewer for DFG the Deutsche Forschungsgemeinschaft (German Research Foundation).

10.1.5. Research Administration

J.-B. Caillau is

- member of the Scientific Council of CNRS GdR Calcul Scientifique
- member of the Scientific Council of Programme Gaspard Monge pour l'Optimisation (PGMO)
- member of the Scientific Council of Institut de Mécanique Céleste et de Calcul des Ephémérides (Observatoire de Paris)
- member of the Scientific Council of 3IA

Jean-Baptiste Pomet is

- a member of the steering committee of the Center for Planetary Origin (C4PO),
- a member of the scientific council of Académie 2 "Complex system", both for Université Côte d'Azur (UCA),
- an elected member of Commission d'Évaluation (Inria permanent evaluation committee).

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

Master in Astrophysics Université Côte Azur (MAUCA): Lamberto Dell'Elce, Build a Nanosatellite (Attitude Determination and Control System), 6 hours TH, niveau M1, Université Côte Azur, France.

Engineering school: J.-B. Caillau has a full teaching duty of Professor at L3, M1 and M2 level of the Applied Math. department of Polytech Nice Sophia. (He is the head of the department since September 2018.)

Licence : L. Giraldi, Colles de mathématiques, 90h (2h en MPSI et 2h en MP par semaine), MPSI-MP, Lycée internationale de Valbonne, France.

Master : L. Giraldi, Natation à bas nombre de Reynolds, 6h, Master 2 Recherche, Université de Srasbourg, France.

10.2.2. Supervision

PhD in progress : Sébastien Fueyo, "Testing stability of nonlinear amplifier by frequency-domain methods", started October, 2016, co-supervised by J.-B. Pomet and L. Baratchart (FACTAS team).

PhD in progress : Yacine El alaoui-faris, "modeling magnetico-elastic micro-robot from theory to experiment", started October, 2017, co-supervised by L. Giraldi, J.-B. Pomet and Stephane Régnier (Univ. Paris Sorbonne).

PhD in progress : Clément Moreau, "Contrôlabilité de systèmes en dimension finie ou infinie issus du vivant", started September, 2017, co-supervised by L. Giraldi, Pierre Lissy and J.-B. Pomet.

PhD in progress : Agustín Yabo, "Optimal control of microbial cells", started October, 2018, co-supervised by J.-L. Gouzé (Biocore team) and J.-B. Caillau.

10.2.3. Juries

L. Giraldi is member of the jury of agrégation de mathématiques.

L. Giraldi was examiner of the PhD Thesis of Fatima Tani (supervised by A. Rapaport).

J.-B. Pomet sat in the jury for Armand Koenig's PhD (Université côte d'Azur).

J.-B. Caillau sat in the PhD jury of Isabelle Santos (Toulouse), HDR jury of Max Cerf (Paris). He is member of the jury of agrégation de mathématiques.

10.3. Popularization

10.3.1. Internal or external Inria responsibilities

J.-B. Caillau belongs to the MASTIC initiative at Inria Sophia.

10.3.2. Interventions

Lamberto Dell'Elce is involved in the PoBot challenge promoted by MEDITES. Specifically he supervises a class in the College Emile Roux in Cannes.

J.-B. Caillau has given several talks at high-school level in Nice and Sophia on application of mathematics in social choice.

NECS Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events: Organisation

10.1.1.1. General Chair, Scientific Chair

- C. Canudas-de-Wit was the General Chair of IEEE Conference on Decision and Control 2019 (CDC) in Nice (11-13 Dec. 2019).

10.1.1.2. Member of the Organizing Committees

- Maria Laura Delle Monache organized the workshop on "Lagrangian Control for Traffic Flow Smoothing in Mixed Autonomy Settings ", CDC December 2019 (with Alexandre Bayen*, George J. Pappas, Benedetto Piccoli, Daniel B. Work, Jonathan Sprinkle, Maria Laura Delle Monache, Benjamin Seibold, Cathy Wu, Abdul Rahman Kreidieh, Eugene Vinitsky, Yashar Zeiynali Farid).
- Maria Laura Delle Monache organized a tutorial session on "Autonomous Vehicles and Traffic Control in Mixed Autonomy Environments" at CDC, December 2019 (with Jonathan Sprinkle, Ram Vasudevan, Dan Work).
- Team members organized the following invited sessions at the CDC 2019:

  • "Novel Approaches to Traffic Estimation and Control Using Automated Vehicles" (M.L. Delle Monache with R.Stern (University of Minnesota))
  • "Control for Large Scale Traffic Networks" (M.L. Delle Monache, C. Canudas de Wit with N. bekiaris-Liberis (Univeristy of Crete))
  • "Models and Control Methods Tor Traffic Networks" (M. L. Delle Monache with S. Siri and C. Pasquale (University of Genoa))
  • "Multi-Sensor Fusion Techniques for State Estimation in Navigation" (H. Fourati with A. Barrau (Safran), J. Farrell (University of California Riverside), M. Liu (Hong Kong University of Science) and Z. Zhou (University of Electronic Science and Technology of China).

10.1.2. Scientific Events: Selection

10.1.2.1. Member of the Conference Program Committees

- F. Garin is Associate Editor in the IEEE Control System Society Conference Editorial Board (this year, she served for CDC 2019, ACC 2020) and Associate Editor in the European Control Association (EUCA) Conference Editorial Board (this year, she served for ECC 2020).
- H. Fourati is member of (1) the International Program Committee (IPC) of international conferences STA'19, ICCAD'19, ISAECT'19 (2) the Technical Program Committee (TCP) for the International Conference on Indoor Positioning and Indoor Navigation (IPIN'19), Pisa (Italy), Sep. 2019 (3) Member of the publication chairs of the International Conference on Control, Automation and Diagnosis (ICCAD'19), Grenoble (France), Jul. 2019.

10.1.2.2. Reviewer

Team members have been reviewers for several conferences, including the most prestigious ones in their research area: IEEE Conference on Decision and Control CDC, European Control Conference ECC, American Control Conference ACC, European Signal Processing Conference, IEEE International Conference on Robotics and Automation ICRA, IEEE/RSJ International Conference on Intelligent Robots and Systems IROS, IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys), IFAC Workshop on Control for Transportartion Systems (CTS), IEEE Intelligent Transportation Systems Society Conference, Transportation Research Board Annual Meeting.

10.1.3. Journal

10.1.3.1. Member of the Editorial Boards

- C. Canudas-de-Wit is Associate Editor of the IEEE Transactions on Control of Networks Systems IEEE-TCNS (since June 2013) and Editor of the Asian Journal of Control AJC (since 2010).
- P. Frasca is Subject Editor of the International Journal of Robust and Nonlinear Control (Wiley) (since February 2014), Associate Editor of the IEEE Control System Letters (from February 2017) and Associate Editor of the Asian Journal of Control (Wiley) (since January 2017).
- H. Fourati is Associate Editor of the Asian Journal of Control (Wiley) (since January 2016) and of the Open Transportation Journal. He has also been lead guest editor of the special issue "Recent Advances on Data Fusion, Estimation in Navigation and Control" for Asian Journal of Control (AJC), 2019.

10.1.3.2. Reviewer - Reviewing Activities

Team members have been reviewers for several journals, including the most prestigious ones in their research area: IEEE Trans. on Automatic Control, IEEE Trans. on Control of Network Systems, IEEE Trans. on Signal Processing, Automatica, IEEE Signal Processing Letters, Systems and Control Letters, Int. Journal of Robust and Nonlinear Control, Elsevier Transportation Research Part B, IEEE Trans. on Intelligent Transportation Systems, IEEE/ASME Trans. on Mechatronics, IEEE Trans. on Instrumentations and Measurements, IEEE Sensors journal, IEEE Trans. on Robotics, AIMS Networks and Heterogeneous Network (NHM), Wiley Mathematical Methods in the Applied Sciences (MMAS), Journal of Mathematical Analysis and Applications (JMMA), Journal of Nonlinear Science and Applications (JNSA), Journal of the Franklin Institute, AMS Mathematical Reviews, Asian Journal of Control.

10.1.4. Invited Talks

P. Frasca gave the following talks:

• "The closed loop between opinion formation and personalised recommendations", Workshop "Network Dynamics in the Social, Economic, and Financial Sciences", Turin, Italy, November 5-8, 2019.

• "Non-smooth opinion dynamics", Workshop "European Network for Nonsmooth Dynamical Systems, Grenoble, September 18, 2019.

• "The closed loop between opinion formation and personalised recommendations", Workshop "Reti sociali e comportamenti emergenti", Napoli, February 4, 2019.

M.L. Delle Monache gave the following talks:

• Traffic flow implications of autonomous and partially autonomous vehicles, Workshop on "Connected and automated vehicles for energy efficient and environmental impact", IFPEN, Rueil-Malmaison, France, September 2019.

• Modeling autonomous vehicles in traffic flow, International Congress on Industrial and Applied Mathematics (ICIAM) 2019, Valencia, Spain, July 2019.

• Micro - macro models for traffic with autonomous vehicles, IPAM workshop on Autonomous vehicles, IPAM (UCLA), USA, February 2019.

• Traffic control and estimation with autonomous vehicles, Journée du groupe de travail en automatique et transports terrestres, Université Grenoble Alpes, France, January 2019.

• Traffic reconstruction using autonomous vehicles, Sixth Chilean Workskshop on Numerical Analysis of Partial Differential Equations (WONAPDE), Concepción, Chile, January 2019.

10.1.5. Leadership within the Scientific Community

- Team members participate to the following technical committees of IEEE Control Systems Society and of the International Federation of Automatic Control (IFAC):

  • IEEE-CSS Technical Committee “Networks and Communications Systems” (P. Frasca and F. Garin);

  • IFAC Technical Committee 1.5 on Networked Systems (P. Frasca and C. Canudas-de-Wit);

  • IFAC Technical Committee 2.5 on Robust Control (P. Frasca);

  • IFAC Technical Committee 7.1 Automotive Control (C. Canudas-de-Wit);

  • IFAC Technical Committee 7.4 Transportation systems (C. Canudas-de-Wit);

  • IFAC Technical Committee 9.2 on Social Impact of Automation (P. Frasca);
- C. Canudas-de-Wit is member of the advisory board (2017-21) of the project ”Societal-Scale Cyber-Physical Transport Systems” supported by the Swedish Strategic Research Foundation, KTH Sweden.
- P. Frasca is member of the “Comité de Direction du GdR MACS ”, term 2019-2023.
- A. Kibangou reviewed project proposals for NRF (South-African research agency)

10.1.6. Research Administration

- From July 2019, F. Garin is ‘Présidente du CES du Centre (Comité des Emplois Scientifiques)’.
- In Nov. 2019, F. Garin has been elected as ‘responsable du pôle Automatique et Diagnostic (PAD)’ at GIPSA-Lab, a role to be started in Jan. 2020.
- Since Nov. 2019, F. Garin is co-head of the CSP (Cyber-Physical Systems) action of Persyval2.
- A. Kibangou has been elected member of the research department MSTIC (mathematics, information and communication sciences) of Univ. Grenoble Alpes.
- A. Kibangou is co-head of the PCS (Pervasive Computing Systems) action of Persyval-Lab (until November 2019).
- A. Kibangou is academic director (L2) IUT1 (GEII).
- A. Kibangou is co-head for higher studies opportunities (Responsable poursuite d’études) (IUT1-GEII).
- H. Fourati is member of the Department of Electrical Engineering Council, IUT1 Grenoble, France (2018-2021)
- H. Fourati is member of CNU61 (Conseil national des universités, Génie informatique, Automatique et Traitement du Signal) since 2016.
- H. Fourati is in charge of communication mission and visits to high school within the Department of Electrical Engineering, IUT1 Grenoble, France (2017-present).
- M.L. Delle Monache is member of two local committees at Inria Rhône-Alpes: ”Commission de développement technologique (research engineers) and Comité des Études Doctorales (PhD grants CORDI-S).

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

Master: F. Garin, Distributed Algorithms and Network Systems, 13.5h, M2, Univ. Grenoble Alpes, France.

Licence: H. Fourati, Mathématiques, 30h, L2, IUT1 (GEII1), Univ. Grenoble Alpes, France.

Licence: H. Fourati, Informatique Industrielle, 111h, L1, IUT 1 (GEII), Univ. Grenoble Alpes, France.

Licence: H. Fourati, Réseaux locaux industriels, 34h, L2, IUT1 (GEII), Univ. Grenoble Alpes, France.

Licence: H. Fourati, Automatique, 39h, L3, UFR physique, Univ. Grenoble Alpes, France.

Licence: H. Fourati, Automatique continue et discrete, 27h, L2, IUT1 (GEII), Univ. Grenoble Alpes, France.

Licence: A. Kibangou, Automatique, 75h, L2, IUT1(GEII), Univ. Grenoble Alpes, France.

Licence: A. Kibangou, Mathématiques, 44h, L2, IUT1 (GEII), Univ. Grenoble Alpes, France.

Licence: A. Kibangou, Mathématiques, 126h, L1, IUT1 (GEII), Univ. Grenoble Alpes, France.

10.2.2. Supervision

- PhD: Stéphane Mollier, Aggregated Scale-Free Models for 2-D Large-scale Traffic Systems, from Oct. 2016, co-advised by C. Canudas de Wit, M. L. Delle Monache and B. Seibold.
- PhD in progress: Liudmila Tumash, Traffic control in large-scale urban networks, from Sept. 2018, co-advised by C. Canudas de Wit and M. L. Delle Monache.
- PhD in progress: Ujjwal Pratap, Resilient control in scale-free networks, from Feb. 2019, co-advised by C. Canudas-de-Wit, F. Garin, and H. Sandberg (KTH Stockholm).

10.2.3. Juries

- P. Frasca was committee member of the PhD defense of:

  • Wenjing Yang. Influence Maximization in Social Networks. Universit Aix-Marseille, France. PhD advisors: Alessandro Giua and Leonardo Brenner. November 2019.

  • Zhiyang Ju. Persistent Communication Connectivity of Multi-agent Systems. University of Melbourne, Australia. PhD advisors: Dragan Nesic and Iman Shames. February 2019.
- F. Garin was committee member of the PhD defence of Gustav Nilsson, Lund Univ., in Feb. 2019; Thesis: On robust distributed control of transportation networks, supervisor: Giacomo Como, co-supervisor: Anders Rantzer.
- F. Garin was committee member of the PhD defence of Han Zhang, KTH Stochkolm, in Feb. 2019; Thesis: Optimizing Networked Systems and Inverse Optimal Control, supervisor: Xiaoming Hu, co-supervisor: Elias Jarlebring.
- F. Garin was committee member of the PhD defence of Tommaso Borzone, Univ. Lorraine, Nancy, in Sept. 2019; Thesis: Decentralised control of multi-agent systems: a hybrid formalism, supervisor: Irinel-Constantin Morarescu, co-supervisor: Marc Jungers.

10.3. Popularization

10.3.1. Education

Maria Laura Delle Monache gave a talk to students of 8th grade (4ème) and 11th Grade (1ère) in the Cérémonie de remise de prix des Olympiades de Mathématiques, La mobilité et les vehicules autonomes, , Université Grenoble Alpes, France, May 2019.

QUANTIC Project-Team

8. Dissemination

8.1. Promoting Scientific Activities

8.1.1. Journal

8.1.1.1. Member of the Editorial Boards

Pierre Rouchon is member of the editorial board of Annual Reviews in Control.

8.1.1.2. Reviewer - Reviewing Activities

- Philippe Campagne-Ibarcq was a reviewer for Physical Review Letters.
- Zaki Leghtas was a reviewer for Physical Review Letters, Physical Review X and Nature Physics.
- Alain Sarlette was a reviewer for several automatic control and dynamical systems journals and conferences, as well as for Physical Review Journals

8.1.2. Invited Talks

- Philippe Campagne-Ibarcq : GDR-IQFA (Groupement de Recherche sur l'Ingénierie Quantique, des Aspects Fondamentaux aux Applications).
- Jeremie Guillaud: CEA Leti innovation day, Grenoble.
- Jeremie Guillaud: Byron Bay Quantum Workshop on Bosonic Error-Correcting Codes, Australia.
- Zaki Leghtas: GDR Physique Mésoscopique, Aussois.
- Zaki Leghtas: CIFAR Workshop on Quantum Cavities, Jouvence, Canada.
- Zaki Leghtas: American Physical Society march meeting, Boston, USA.
- Zaki Leghtas: Les Houches summer school on Quantum Information Machines.
- Zaki Leghtas: CEA Leti innovation day, Grenoble.
- Zaki Leghtas: Oulu university, Finland.
- Zaki Leghtas: Quantum and neuromorphic computing, C2N Saclay.
- Mazyar Mirrahimi: Lecture series at Les Houches summer school on Quantum Information Machines.
- Mazyar Mirrahimi: Conference on "Marching towards quantum supremacy", Princeton Univ., USA.
- Mazyar Mirrahimi: Conference for "20'th anniversary of superconducting qubits", Tsukuba, Japan.
- Pierre Rouchon: First Quantum Science, Engineering and Technology (qSET) conference, UNSW Canberra, Australia.
- Pierre Rouchon: IFAC Mechatronics and Nolcos Conference, Semi-plenary speaker, Vienna, Austria.
- Pierre Rouchon: 21-hour course on quantum control in the International Graduate School on Mathematical Control, Mathematical College Sichuan University, Chengdu, China.
- Pierre Rouchon: 6-hour course on flat system in the 8eme École d'été de mécanique théorique à destination des doctorants et chercheurs en Mécanique, Quiberon.
- Alain Sarlette: GANIL (Grand Accélérateur National d'Ions Lourd), Caen.
- Alain Sarlette: CIGREF (Club Informatique des Grandes Entreprises Françaises), Paris.
- Alain Sarlette has given an overview of the mathematics involved in quantum dynamics at Ghent University at several occasions.

8.1.3. Scientific Expertise

- Pierre Rouchon is a member of the scientific committee of LAGEP (Laboratoire d'Automatique et de Génie des Procédés) since 2017.
- Pierre Rouchon is a member of the "Conseil Scientifique du DIM Math Innov" since 2017.
- Pierre Rouchon is a member of the "Conseil de la recherche de PSL " since 2016.
- Mazyar Mirrahimi is the co-president of Inria's comité des emplois scientifiques.
- Mazyar Mirrahimi was the vice-president of ANR Comité d'Evaluation Scientifique on Quantum Technologies.

8.2. Teaching - Supervision - Juries

8.2.1. Teaching

Cycle Ingénieur : Zaki Leghtas, Quantum Mechanics and Statistical Physics, Mines ParisTech, 12 hours, France.

Cycle Ingénieur : Zaki Leghtas, Quantum Computing, Mines ParisTech, 20 hours, France.

Cycle ingénieur: Alain Sarlette, Probabilities and Stochastic Processes, 24 hours TD, Mines Paristech, France.

Master: Alain Sarlette, Robotics, 24 hours, Ghent University, Belgium.

Cycle Ingénieur : Mazyar Mirrahimi, Automatic control with Applications in Robotics and in Quantum engineering, 8 hour amphi and 16 hours TD, 3rd year, Ecole Polytechnique, France.

Cycle Ingénieur : Mazyar Mirrahimi, Control of dynamical models, 30 hours TD, 2nd year, Ecole Polytechnique, France.

Cycle Ingénieur : Mazyar Mirrahimi, Module algorithmique quantum control, 24 hours TD, 2nd year, Ecole Polytechnique, France.

Master: Mazyar Mirrahimi and Pierre Rouchon, Dynamics and control of quantum systems, 18 hours amphi, M2, Sorbonne Université, France.

8.2.2. Supervision

PhD in progress : Michiel Burgelman, A systematic study of strongly driven and dissipative quantum systems towards high-accuracy quantum control designs, advisors: Pierre Rouchon and Alain Sarlette, starting date: Nov 2018.

PhD in progress : Jérémie Guillaud, Fault-tolerant quantum computation with cat-qubits, advisor: Mazyar Mirrahimi, starting date: Nov 2017.

PhD in progress : Vincent Martin, Fault-tolerance of quantum systems under continuous-time feedback stabilization, advisor: Mazyar Mirrahimi and Alain Sarlette, starting date: Oct 2018.

PhD in progress: Raphaël Lescanne, Engineering Multi-Photon Dissipation In Superconducting Circuits For Quantum Error Correction, advisors: Zaki Leghtas and Takis Kontos, starting date Sept 2016.

PhD in progress: Marius Villiers, Probing the spin entanglement of single Cooper pair, advisors: Zaki Leghtas and Takis Kontos, starting date: September 2019.

PhD in progress: Camille Berdou, A cat-qubit repetition code, advisors: Zaki Leghtas and Pierre Rouchon, starting date Sept 2019.

PhD in progress: Christian Siegele, Quantum error correction with grid states of light, advisors: Philippe Campagne-Ibarcq and Mazyar Mirrahimi.

PhD: Lucas Verney, Strongly driven quantum Josephson circuits, advisors: Zaki Leghtas and Mazyar Mirrahimi, Defended on July 11th 2019.

PhD: Gerardo Cardona Sanchez, Exponential stabilization of quantum systems subject to non-demolition measurements in continuous time, advisors: Pierre Rouchon and Alain Sarlette, Defended on October 30th 2019.

8.2.3. Juries

- Zaki Leghtas was a PhD opponent of Iivari Pietikainen, Oulu Finland.
- Zaki Leghtas was a PhD jury member of Romain Albert, CEA Grenoble.
- Mazyar Mirrahimi was an examiner in the PhD defense of Filippo Vicentini, Paris Diderot University.
- Mazyar Mirrahimi was an examiner in the HDR defense of Igor Dotsenko, Collège de France.
- Pierre Rouchon was reviewer for the Habiliation thesis of Hector Ramirez Estay, Université de Franche-Comté.
- Pierre Rouchon was a reviewer of the PhD thesis of Andreas Deutschmann (TU Vienna), Amira Amraoui (Université de Nice), Yuanlong Wang (University of New South Wales in Canberra).
- Pierre Rouchon was a committee member for the PhD thesis of Christophe Zhan (Sorbonne Université), Vincent Metillon (ENS Paris), Yahao Chen (Universté de Rouen), Weichao Liang (Université Paris-Saclay).
- Alain Sarlette has been member of the PhD jury of Nicolas Augier (Ecole Polytechnique) and of Estelle Massart (Université Catholique de Louvain-la-Neuve).

8.3. Popularization

8.3.1. Articles and contents

- Zaki Leghtas article in Usbek and Rica (https://usbeketrica.com/article/aucun-etat-veut-rater-coche-ordinateur-quantique)

8.3.2. Interventions

- Zaki Leghtas: Pint of Science on quantum computing

SPHINX Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events: Organisation

10.1.1.1. General Chair, Scientific Chair

- David Dos Santos Ferreira is the head of the Organization Committee of the next national conference of the SMF (French Mathematical Society) that will take place in Nancy from 25th-29th may 2020 (see: https://smf2020.math.cnrs.fr/).
- David Dos Santos Ferreira is, with Laurent Thomann, co-organizer of the national conference "Journées EDP". (see : http://jedp-2019.iecl.univ-lorraine.fr/).
- Julien Lequeurre and Alexandre Munnier are the heads of the national workshop "Journées EDP de l'Institut Elie Cartan de Lorraine" (see: http://journeesedp.iecl.univ-lorraine.fr/2019/).This an annual conference whose themes are those of the team PDE of the IECL (waves, fluid and fluid-structure interaction, form optimization,...).

10.1.1.2. Member of the Organizing Committees

- Karim Ramdani is a member of the Organizing Committee of the next national conference of the SMF (French Mathematical Society) (see: https://smf2020.math.cnrs.fr/).
- Thomas Chambrion was the organizer of the invited session "Analytic and Geometric Tools in Quantum Control", in the Conference on Decision and Control (CDC 2019, Nice, France).
- Ludovick Gagnon was an organizer of the CRAN/IECL day (November 22, 2019).
- Jean-François Scheid was a member of the organizing committee of the workshop "Journées Corrosion et Analyse Numérique", Laboratoire de Mathématiques d'Orsay, 4 – 5 July 2019.
- David Dos Santos Ferreira was a member of the scientific committee of the "Journées des Jeunes Edpistes Français", Rennes, 20-22 March 2019, https://jjedp19.sciencesconf.org/.

10.1.2. Scientific Events: Selection

10.1.2.1. Member of the Conference Program Committees

Xavier Antoine was a member of the scientific council of the international conference Waves 2019, Vienna, Austria, August, 2019.

10.1.3. Journal

10.1.3.1. Member of the Editorial Boards

- Xavier Antoine is an associate editor of "Multiscale in Science and Engineering" (Springer) and "International Journal of Computer Mathematics" (Taylor and Francis);
- David Dos Santos Ferreira is a member of the editorial board of "Mathematical Control and Related Fields";
- Jean-Claude Vivalda is a member of the editorial board of the "Journal of Dynamical and Control System".

10.1.3.2. Reviewer - Reviewing Activities

Jean-Claude Vivalda is a reviewer for the "Mathematical reviews".

10.1.4. Invited Talks

- Rémi Buffe was an invited speaker at the “International itinerant workshop in PDEs” (Roma (Italy), February 2019).
- Rémi Buffe was an invited speaker at the “Journées Jeunes Contrôleurs” (Paris, June 2019).
- Rémi Buffe was an invited speaker at the “Conférence THESPEGE - Spectral Theory and Geometry”, (Seillac (France), September 2019).
- Thomas Chambrion took part to the invited session “Control of nonlinear PDEs” in Conference on Nonlinear Control Systems (NOLCOS 2019, Vienna (Austria)).
- Ludovick Gagnon was an invited speaker at the first Joint Meeting Brazil-France in Mathematics (Rio de Janeiro, July 2019).
- Jean-François Scheid was invited at the “Journées Corrosion et Analyse Numérique”, (Orsay, 4–5 July 2019).
- Jean-François Scheid was invited at the workshop “New Trends in Probability and Analysis” (NTPA), (Hammamet, Tunisia, 23–26 September 2019).
- Takéo Takahashi was an invited speaker at the congress VII MACI 2019, Río Cuarto (Argentina), May 2019.
- Takéo Takahashi was an invited speaker at the workshop PDE 2019, Berlin (Germany), September 2019.
- Takéo Takahashi was an invited speaker at the workshop “Franco-Brazilian meeting in mathematical fluid mechanics”, Lyon (France), October 2019.
- Takéo Takahashi was an invited speaker at the workshop “Feedback Control”, Linz (Austria), November 2019.

10.1.5. Leadership within the Scientific Community

David Dos Santos Ferreira is one of the coordinators of the GDR “Analyse des EDP”.

10.1.6. Research Administration

- Xavier Antoine is the director of the maths laboratory IECL and an elected member of the scientific council of the “Université de Lorraine”.
- Xavier Antoine was the president of the HCERES evaluation panel of the laboratory Lamav, (Valenciennes, February 2019). He was also a member of the HCERES evaluation panel of the “Fédération de Recherche des Hauts de France”, (February 2019).
- Xavier Antoine is the local coordinator of the France-Chinese CNRS LIASFMA in applied mathematics.
- David Dos Santos Ferreira is the treasurer of the SMF (French Mathematical Society).
- Karim Ramdani is member of the board of the RNBM (Réseau National des Bibliothèques de Mathématiques) and is in charge of Open Access issues (with Benoît Kloeckner). Since October 2018, he is also a member of the Working Group “Publications” of the national “Comité pour la Science Ouverte” of the French ministry of Higher Education, Research and Innovation.
- Ludovick Gagnon is International in charge of international relations for the Inria Nancy Grand-Est.
- Julie Valein was a member of the selection committee of new "maître de conférences" at “Université de Besançon-ISIFC” in April-May 2019.
- Julie Valein is a co-organizer of the “Séminaire EDP de l’Institut Elie Cartan de Lorraine, site de Nancy”.
- Julien Lequeurre is the organizer of the “Séminaire EDP de l’Institut Elie Cartan de Lorraine, site de Metz”.

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

Except L. Gagnon, K. Ramdani, T. Takahashi and J.-C. Vivalda, SPHINX members have teaching obligations at “Université de Lorraine” and are teaching at least 192 hours each year. They teach mathematics at different level (Licence, Master, Engineering school). Many of them have pedagogical responsibilities.

Moreover, Julie Valein is a member of the managing board and of the selection committee of the engineer school “Polytech Nancy”, she is also a member of the “personnel commission” of IECL.

10.2.2. Supervision

- PhD in progress
  - I. Badia, HPC simulation by domain decomposition methods of electromagnetic problems, (started in september 2019), X. Antoine and Ch. Geuzaine.
  - I. Djebour, Controlability and stabilization of fluid-structure interaction problems, (started in November 2017), T. Takahashi.
  - D. Gasperini, design of a new multi-frequency PDE-based approach for the numerical simulation of the Doppler effect arising in acoustic and electromagnetism, X. Antoine.
  - Z. Liu, Statistical methods for the automatic generation of efficient command laws without model, April 2018, Th. Chambrion.
  - Ph. Marchner, Numerical simulation by domain decomposition methods of aeroacoustic problems, Sept. 2019, X. Antoine and Ch. Geuzaine.
  - Julie Valein is a member of the monitoring committee of the theses of Imène Djebour (september 2018 and 2019, advisor Takéo Takahashi) and Ibtissem Zaafrani (september 2019, advisor Simon Labrunie)

10.2.3. Juries

- Takéo Takahashi reviewed the PhD thesis of Jiao He, Université de Lyon, 2019.
- Xavier Antoine reviewed the PhD theses of
  - M. Averseng, Université de Saclay, 2019.
  - P. Mennuni, Université de Lille, 2019.
  - P. Marchand, Université de Sorbonne Université, 2020 (defense).
- Xavier Antoine reviewed the HDR of S. Chaillat, ENSTA, 2019.
- Jean-Claude Vivalda was a member of the thesis jury of Missie María del Rocío Aguado Rojas defended at June 2019 at “Centrale-Supélec”.
- David Dos Santos Ferreira was the president of the HDR thesis jury of Matthieu Léautaud (University of Paris Diderot).
- David Dos Santos Ferreira was a member of the HDR thesis jury of Thierry Daudé (University of Cergy-Pontoise).
- David Dos Santos Ferreira reviewed the PhD thesis of Cristóbal Meroño Moreno (Universidad Autónoma de Madrid)

TRIPOP Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

9.1.1. Scientific Events: Selection

9.1.1.1. Member of the Conference Program Committees

1. Vincent Acary is co-organisor (with O. Bruls and R. Leine) of the mini-symposium Nonsmooth Dynamics, 10th Nonlinear Dynamics Conference (ENOC 2020), Lyon, July 2020.
2. Vincent Acary was co-organisor (with O. Bruls and R. Leine) of the Eighth Symposium of the European Network for Nonsmooth Dynamics at Inria Grenoble Rhone–Alpes. 17–18 September 2019 http://ennsd.gforge.inria.fr/eighthsymposium.html
3. Bernard Brogliato is member of the National Organization Committee of the 10th Euromech Nonlinear Dynamics Conference (ENOC 2020), Lyon, 5-10 July 2020. https://enoc2020.sciencesconf.org/resource/page/id/3
4. Bernard Brogliato is co-organisor (with N. van de Wouw and A. Pavlov) of the mini-symposium Control and Synchronization in Nonlinear Systems, 10th Nonlinear Dynamics Conference (ENOC 2020), Lyon, July 2020. https://enoc2020.sciencesconf.org/resource/page/id/8
5. Bernard Brogliato was co-organisor (with M. Reichhartinger and A. Polyakov) of the invited session Approximation-Methods, Discrete-time Equivalents and Analysis of Sliding Mode Control Systems, conférence NOLCOS 2019, Wien.

9.1.1.2. Reviewer

1. Vincent Acary was reviewer for IFAC World Congress, American Control Conference.
2. Bernard Brogliato was reviewer for IFAC NOLCOS, IFAC World Congress, IEEE International Conference on Decision and Control.

9.1.2. Journal

9.1.2.1. Member of the Editorial Boards

1. Bernard Brogliato was Associate Editor for ASME Journal of Nonlinear and Computational Dynamics (ending December 2019).
2. Bernard Brogliato was Associate Editor for Nonoinear Analysis: Hybrid Systems (ending December 2019).

9.1.2.2. Reviewer - Reviewing Activities

1. Vincent Acary was reviewer for IEEE Transactions on Automatic Control, Multibody Systems Dynamics, Applied Mathematics and Computation, ASME Journal of Nonlinear and Computational Dynamics, Nonlinear Dynamics, International Journal for Numerical Methods in Engineering, SIAM Journal on Control and Optimization.
2. Bernard Brogliato is a regular reviewer for Automatica, IEEE Transactions on Automatic Control, SIAM Journal on Control and Optimization, Multibody Systems Dynamics, European Journal of Mechanics A/Solids, Set-Valued and Variational Analysis, *etc*.
3. Franck Bourrier was reviewer for International Journal for Numerical and Analytical Methods in Geomechanics, International Journal of Solids and Structures, Computers and Geotechnics, Soils and Foundation, Rock Mechanics and Rock Engineering, European Journal of Environmental and Civil Engineering, Landslides.

4. Guillaume James was reviewer for Multibody System Dynamics, Communications in Mathematical Physics, Physica D.

9.1.3. Invited Talks

1. Vincent Acary gave a keynote lecture at Multibody Dynamics Workshop 2019 2nd International Multibody Summer School, 20-24 May 2019, Parma, Italy http://www.multibodysummerschool.eu/index.html
2. Bernard Brogliato gave a plenary talk at the workshop Control of State-Constrained Dynamical Systems in Valparaiso, September 2019 (http://coscds2019.mat.utfsm.cl/).
3. Guillaume James gave a talk at the conference Equadiff 2019, July 2019, Leiden, in the minisymposium *Coherent structures of nonlinear evolution and lattice equations*.

9.1.4. Leadership within the Scientific Community

- V. Acary is coordinator with R. Leine of the Europe Network for Nonsmooth Dynamics http://ennsd.gforge.inria.fr/.

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

- Licence : G. James, Introduction to Numerical Methods, 31 hETD, L3, Grenoble INP - Pagora (1st year).
- Licence : G. James, Normed Vector Spaces, 26 hETD, L2, Prépa INP, Grenoble.
- Master : G. James, Numerical Methods, 91 hETD, M1, Grenoble INP - Ensimag (1st year).
- Master : G. James, Dynamical Systems, 45 hETD, M1, Grenoble INP - Ensimag (2nd year).
- Master : Vincent Acary, 17H éq TD Systèmes dynamiques, ENSIMAG 2A.
- Master : Franck Bourrier, 5H éq TD Modélisation des chutes de blocs, Master GAIA, Université Savoie Mont-Blanc.

9.2.2. Supervision

- PhD in progress : Rami Sayoud, Analyse vibratoire des armoires électriques, January 2018, université Grenoble Alpes, Vincent Acary and Bernard Brogliato
- PhD in progress : Benoit Viano, Nonsmooth modelling of impacted elastoplastic beams, November 2019, université Grenoble Alpes, Vincent Acary and Franck Bourrier.
- PhD in progress : Charlélie Bertrand, September 2018, Mechanical model for cable vibrations, ENTPE, Claude Lamarque and Vincent Acary.
- PhD in progress : Christelle Kozaily. Structural analysis for multi-mode DAE systems, Octobre 2018, V. Acary and B. Caillaud.
- PhD in progress : Vivien Cros, Analyse de la réponse vibratoire d'arbres sous sollicitations dynamiques, November 2018, université Grenoble Alpes, Franck Bourrier.

9.2.3. Juries

1. Bernard Brogliato was referee for the Ph.D. thesis of Arindam Bhattacharjee (April 2019), IIT Kanpur, India, (supervisor Prof. Anindya Chaterjee, Mechanical Engineering Dept. IIT Kanpur), *New approximations in vibroimpact problems*.

TROPICAL Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events: Organisation

10.1.1.1. General Chair, Scientific Chair

- M. Akian is co-chair of the organizing committee of the next 2020 SMAI MODE days, see http://smai-mode2020.inria.fr/.
- Stéphane Gaubert is the coordinator of the Gaspard Monge Program for Optimization, Operations Research and their interactions with data sciences (PGMO), a corporate sponsorhip program, operated by Fondation Mathématique Jacques Hadamard, supported by Criteo, EDF, Orange and Thales, see http://www.fondation-hadamard.fr/fr/pgmo/.

10.1.1.2. Member of the Organizing Committees

- S. Gaubert co-organizes the "Séminaire Parisien d'Optimisation" at Institut Henri Poincaré. https://sites.google.com/site/spoihp/.
- A. Sagnier co-organized the JAMI Workshop, Riemann-Roch theorem in characteristic one and related topics, Univ. Baltimore, Oct. 2019.

10.1.2. Scientific Events: Selection

10.1.2.1. Chair of Conference Program Committees

- S. Gaubert, Chair of the PGMO days, EDF Lab Paris Saclay, Dec 3-4, 2019. http://www.fondation-hadamard.fr/fr/pgmo/pgmodays

10.1.2.2. Member of the Conference Program Committees

- Marianne Akian is member of the scientific committee of the next 2020 SMAI MODE days, see http://smai-mode2020.inria.fr/.
- S. Gaubert has been a member of the scientific committee of the JAMI Workshop, Riemann-Roch theorem in characteristic one and related topics, Univ. Baltimore, Oct. 2019.

10.1.3. Journal

10.1.3.1. Member of the Editorial Boards

- S. Gaubert is member of the editorial committee of the collection Mathématiques et Applications, SMAI and Springer.
- S. Gaubert is associate editor of Linear and Multilinear Algebra.
- S. Gaubert is associate editor of RAIRO Operations research.
- S. Gaubert is associate editor of the Journal of dynamics and games.

10.1.4. Invited Talks

- M. Akian
  - "Complexity of policy and value iterations for ergodic zero-sum two player games: non-linear Perron-Frobenius methods", Journées annuelles du GDR MOA, Rennes, October 2019.
- S. Gaubert

  - "Condition numbers in nonarchimedean semidefinite programming ...and what they say about stochastic mean payoff games", Tropical Mathematics group of the London Math. Soc, Birmingham, January 2019.
  - "Nonarchimedean convex programming and its relation to mean payoff games", Game theory conference, CIRM, Luminy, June 2019.
- X. Allamigeon
  - "Tropical geometry meets optimization", conference "Network Games, Tropical Geometry, and Quantum Communication", ZIB, Berlin, June 2019

10.1.5. Leadership within the Scientific Community

- See Section 10.1.1.1 (coordination of PGMO).

10.1.6. Research Administration

- M. Akian :
  - Member of the "comité de liaison SMAI-MODE" since June 2015.
  - Member of the laboratory council of CMAP.
  - Member of the scientific board of Inria.
- S. Gaubert :
  - Chairman of the Gaspard Monge Program for Optimization, Operations Research and their interactions with data sciences (PGMO), see 10.1.1.1 for details.
  - Member of the scientific council of CMAP.
- X. Allamigeon:
  - Member of the scientific committee of Inria Saclay – Ile-de-France.
  - Member of the Applied Mathematics Department committee at Ecole Polytechnique.

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

- M. Akian
  - Course "Markov decision processes: dynamic programming and applications" joint between (3rd year of) ENSTA and M2 "Mathématiques et Applications", U. Paris Saclay, "Optimization", and shared with Jean-Philippe Chancelier (ENPC), 15 hours each.
- X. Allamigeon
  - Petites classes et encadrement d'enseignements d'approfondissement de Recherche Opérationnelle en troisième année à l'École Polytechnique (programme d'approfondissement de Mathématiques Appliquées) (niveau M1).
  - Cours du M2 "Optimisation" de l'Université Paris Saclay, cours partagé avec Manuel Ruiz (RTE) et Dominique Quadri (LRI, Université Paris Sud).
  - Co-responsabilité du programme d'approfondissement en mathématiques appliquées (troisième année) à l'École Polytechnique.
- S. Gaubert
  - Course "Systèmes à Événements Discrets", option MAREVA, ENSMP.
  - Course "Algèbre tropicale pour le contrôle optimal et les jeux" of "Contrôle, Optimisation et Calcul des Variations" (COCV) of M2 "Mathématiques et Applications" of Paris 6 University and École Polytechnique.
  - Lecture of Operations Research, third year of École Polytechnique. The lectures notes were published as a book [60].

- O. Saadi
  - Exercises classes in the framework of a “Monitorat”.
- B. Tran
  - Exercises classes for the first year of Bachelor program of Ecole polytechnique in the framework of a “Monitorat”.

10.2.2. Supervision

- PhD: Paulin Jacquot, registered at Univ. Paris Saclay since November 2016, thesis supervisor: Stéphane Gaubert, cosupervision: Nadia Oujdane, Olivier Beaude (EDF), the defense took place in Dec. 2019.
- PhD in progress: Benoît Tran, registered at Univ Paris-Est Marne La Vallée, since September 2017, thesis supervisor: Jean-Philippe Chancelier (ENPC), cosupervision: Marianne Akian.
- PhD in progress: Maxime Grangereau, registered at Univ. Paris Saclay since Jan 2018, thesis supervisor: Emanuel Gobet, cosupervision: Stéphane Gaubert.
- PhD in progress: Omar Saadi, registered at Univ. Paris Saclay since October 2018, thesis supervisor: Stéphane Gaubert, cosupervision: Marianne Akian.
- PhD in progress: Marin Boyet, registered at Univ. Paris Saclay since October 2018, thesis supervisor: Stéphane Gaubert, cosupervision: Xavier Allamigeon.
- PhD in progress: Maël Forcier, registered at ENPC since September 2019, thesis supervisor: Vincent Leclère, cosupervision Stéphane Gaubert.

10.2.3. Juries

- M. Akian
  - Jury of the 2019 competition for a full professor position in Applied Mathematics at Avignon University.
- S. Gaubert
  - Jury of the 2019 competition for CR positions of Inria Saclay–Île-de-France.
  - Jury of the HdR of Pascale Bendotti (Sorbonne Universités, reviewer, June 2019).
  - Jury of the HdR of Arnau Padrol (Sorbonne Universités, examiner, December 2019).
  - Jury of the PhD thesis of Aiwen Li (Angers, reviewer, Sep 2019).
  - Jury of the PhD thesis of J. Trunk (TU-Berlin, reviewer, Oct 2019),
  - Jury of the PhD thesis of Paul Beaujean (Dauphine, reviewer, Dec. 2019).
  - Jury of the PhD thesis of Paulin Jacquot (Ecole Polytechnique, examiner, Dec. 2019).
  - Jury of the PhD thesis of Arnaud Le Rhun (Ecole Polytechnique, president, Dec. 2019).
- C. Walsh
  - Jury of the PhD thesis of Armando Gutiérrez (Aalto University, pre-examiner, Dec. 2019).

10.3. Conferences, Seminars

- M. Akian
  - “Linear algebra and convexity over symmetrized semirings, hyperfields and systems”, SIAM Conference on Applied Algebraic Geometry, Bern, July 2019.
  - “The operator approach to entropy games”, International Workshop on Operator Theory and Applications (IWOTA), Lisbonne, July 2019.
  - “Linear algebra and convexity over symmetrized semirings, hyperfields and systems”, International Conference on Matrix Analysis and its Applications, MAT TRIAD 2019, Liblice, Czech Republic, September 2019.

  - "A game theory approach to the existence and uniqueness of nonlinear Perron-Frobenius eigenvectors", French-German-Swiss (FGS) conference in Optimization, September 2019, Nice.
  - "De l'ergodicité des jeux à somme nulle à l'existence et l'unicité de vecteurs propres de Perron non linéaires", Workshop "Jeux dynamiques: temps discret, temps continu", Fréjus, October 2019.
  - "Complexity of policy and value iterations for ergodic zero-sum two player games: nonlinear Perron-Frobenius methods", Journées annuelles du GDR MOA, Rennes, October 2019.
- X. Allamigeon
  - Condition numbers of stochastic mean payoff games and what they say about nonarchimedean semidefinite programming, SIAM Conference on Applied Algebraic Geometry, Bern, July 2019.
- M. Boyet
  - The shadow vertex algorithm solves colorful one-versus-all tropical polynomial systems, PGMO Days, Nov. 21, 2018, Palaiseau.
- S. Gaubert
  - Condition numbers in nonarchimedean semidefinite programming ...and what they say about stochastic mean payoff games, Tropical Mathematics group of the London Math. Soc, Birmingham, January 2019.
  - Nonarchimedean convex programming and its relation to mean payoff games, Séminaire, Université de Perpignan, March 2019.
  - Nonarchimedean convex programming and its relation to mean payoff games, Game theory conference, CIRM, Luminy, June 2019.
  - Dynamics of priority: from emergency call centers to tropical polynomial systems, SIAM Conference on Applied Algebraic Geometry, Bern, July 2019.
  - Dynamic programming operators over noncommutative spaces: an approach to optimal control of switched systems, International Workshop on Operator Theory and Applications (IWOTA), Lisbonne, July 2019.
  - The operator approach to entropy games, French-German-Swiss conference in Optimization, September 2019, Nice.
  - "Convexité ambitropicale – ou comment caractériser les rétracts de Shapley", Workshop "Jeux dynamiques: temps discret, temps continu", Fréjus, October 2019.
  - From tropical to ambitropical convexity, JAMI Workshop, Riemann Roch in characteristic one and related topics, Baltimore, October 2019.
- P. Jacquot
  - A Privacy-preserving Disaggregation Algorithm for Non-intrusive Management of Flexible Energy, IEEE 58th Conference on Decision and Control, Nice, France, December 2019.
  - Peer-to-Peer Electricity Market Analysis: From Variational to Generalized Nash Equilibrium, PGMO Days, December 2019, EDF Saclay, France.
  - A Privacy-Preserving Disaggregation Algorithm for Nonconvex Optimization based on Alternate Projections, French-German-Swiss Conference on Optimization (FGS), Nice, France, September 2019.
  - Nonatomic Aggregative Games with Infinitely Many Types, Game Theory Seminar, Insitut Henri Poincaré, Paris, France, October 2019.

  - A Privacy-preserving Method to Optimize Distributed Resource Allocation, Journée de rentrée du CMAP (Invited), Ecole polytechnique, France, October 2019.
- A. Sagnier
  - Talk at University of Strasbourg on «An arithmetic site at the complex place», April 2019
  - Talk at University of Antwerp on «An arithmetic site at the complex place»,

    April 2019
  - Short communication at JAMI 2019 «Riemann-Roch in characteristic one and related topics» on «An arithmetic site at the complex place», Johns Hopkins University, Baltimore, October 2019
- B. Tran
  - "A Min-Plus / SDDP Algorithm for
    Multistage Stochastic Convex Programming", The XV international conference on stochastic programming (ICSP 2019), Trondheim, July 2019.
  - "A Min-plus-SDDP Algorithm for Multistage Stochastic Convex Programming", French-German-Swiss Conference on Optimization (FGS), Nice, France, September 2019.
  - "A Min-plus-SDDP Algorithm for Deterministic Multistage Convex Programming", 58th IEEE Conference on Decision and Control (CDC 2019), Nice, December 2019.
- C. Walsh
  - "For which ordered vector spaces are all order isomorphisms affine linear?", Advances in the Geometric and Analytic Theory of Convex Cones, Jeju, Korea, May 27–31, 2019.
  - "Approximability of convex bodies and volume growth in Hilbert geometries", Perspectives on convex projective geometry, Sète, France, 24–28 June 2019.
  - "For which ordered vector spaces are all order isomorphisms affine linear?", Positivity X, Pretoria, South Africa, 8–12 July, 2019.
  - "For which ordered vector spaces are all order isomorphisms affine linear?", 30th International Workshop on Operator Theory and its Applications, IWOTA 2019, Lisbon, Portugal, 22–26 July, 2019.

10.4. Popularization

10.4.1. Articles and contents

- The collaboration developed by our team since 2014, with Préfecture de Police, on the performance evaluation of the new organization (PFAU, Plate forme d'appels d'urgences) to handle the calls to the emergency numbers 17-18-112 in the Paris area is described in the following article, published on the Inria web site, https://www.inria.fr/centre/saclay/actualites/gestion-des-appels-d-urgence-une-geometrie-tropicale-pour-les-secours-parisiens

VALSE Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

9.1.1. Scientific Events: Selection

9.1.1.1. Member of the Conference Program Committees

- J.-P. Richard, EUCA-IEEE ECC (Napoli, Italy)
- J.-P. Richard, IFAC TDS (Sinaia, Romania)
- J.-P. Richard, IEEE CODIT (Paris, France)
- D. Efimov, IFAC ALCOS (Winchester, UK)

9.1.1.2. Reviewer

The members of the team participate in reviewing for all major international conferences in the domain of control theory.

9.1.2. Journal

9.1.2.1. Member of the Editorial Boards

- R. Ushirobira, Guest editor, European Journal of Control
- A. Polyakov, Associate editor, Automation and Remote Control
- D. Efimov, Guest editor, International Journal of Control
- D. Efimov, Guest editor, European Journal of Control
- D. Efimov, Guest editor, International Journal on Robust and Nonlinear Control
- D. Efimov, Associate editor, IFAC Journal on Nonlinear Analysis: Hybrid Systems
- D. Efimov, Associate editor, Asian Journal of Control
- D. Efimov, Associate editor, IEEE Transactions on Automatic Control

9.1.2.2. Reviewer - Reviewing Activities

The members of the team participate in reviewing for all major international journals in the domain of control theory: IEEE Transactions on Automatic Control, Automatica, European Journal of Control, International Journal of Control, International Journal on Robust and Nonlinear Control, Asian Journal of Control, SIAM Journal on Control and Optimization etc.

9.1.3. Invited Talks

D. Efimov and A. Polyakov participated in organization of a workshop Finite-, fixed-, and prescribed-time stabilization and estimation for IEEE Conference on Decision and Control (CDC) at Nice.

9.1.4. Research Administration

- J.-P. Richard, Director of the professional training “Researcher” for last year students at Centrale Lille
- R. Ushirobira, a member of the executive board of CIMPA
- R. Ushirobira, the vice-president of the Recruitment research committee of Inria Lille (PhD, postdoc, secondments, visitors)

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

Master: J.-P. Richard, Dynamical systems, 10h, M2, Université de Lille, France

Licence: R. Ushirobira, Basic courses in Linear algebra and Calculus, 75h, L3, Polytech Lille, France

Master: D. Efimov, Dynamical systems, 17h, M2, Université de Lille, France

Licence: D. Efimov, Estimation for engineers, 24h, L3, École Centrale de Lille, France

9.2.2. Supervision

PhD: Y. Wang, Development of a blimp robot for indoor operation, École Centrale de Lille, 15/03/2019

PhD: T. Kharkovskaya, Design of interval observers for uncertain distributed systems, École Centrale de Lille & ITMO University (Russia), 02/12/2019

9.2.3. Juries

- R. Ushirobira, a member of PhD thesis committee of D. Yamalova (Uppsala University, Sweden), June 2019

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

At Inria (Lille), R. Ushirobira is responsible for a monthly organized talks “30 minutes de sciences”.

9.3.2. Education

- R. Ushirobira, referent researcher for projects with middle-school students at Collège A. Daudet (Leers) within the framework of Math en Jeans

BONUS Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events: Organisation

10.1.1.1. General Chair, Scientific Chair

- E-G. Talbi (Conference chair): Intl. Conf. on Multiple Objective Programming and Goal Programming (MOPGP'2019), Marrakech, Morocco, Oct 28-31, 2019.
- N. Melab (Workshop co-chair): Intl. Workshop on the Synergy of Parallel Computing, Optimization and Simulation (HPCS/PaCOS'2019), Dublin, Ireland, Jul 15-19, 2019.
- E-G. Talbi (Steering committee Chair): Intl. Conf. on Optimization and Learning (OLA'2019), Bangkok, Thailand, Jan 29-31, 2019.
- E-G. Talbi (Steering committee): 9th IEEE Workshop Parallel Distributed Computing and Optimization (IPDPS/PDCO'2019), Rio de Janeiro, Brazil, May 20-24, 2019.
- O. Abdelkafi, B. Derbel and A. Liefooghe (workshop co-chairs): 2nd Intl. Workshop on Computational Intelligence for Massive Optimization (CIMO 2019), Lille, France, July 2019 (with H. Aguirre, K. Tanaka and S. Verel).
- B. Derbel (workshop co-chair): Decomposition Techniques in Evolutionary Optimization (DTEO), workshop at GECCO 2019, Prague, Czech Republic, July 2019 (with K. Li, X. Li, S. Zapotecas, and Q. Zhang).
- A. Liefooghe (workshop co-chair): Landscape-aware heuristic search (LAHS), workshop at GECCO 2019, Prague, Czech Republic, July 2019 (with N. Veerapen, S. Verel and G. Ochoa).
- B. Derbel (special session co-chair): Advances in Decomposition-based Evolutionary Multi-objective Optimization (ADEMO), special session at CEC 2019, Wellington, New Zealand, June 2019 (with S. Zapotecas, K. Li and Q. Zhang).
- A. Liefooghe (track chair): GECCO 2019: Genetic and Evolutionary Computation Conference, Evolutionary multi-objective Optimization (EMO) track (Prague, Czech Republic, 2019).
- N. Melab: Chair of 4 simulation and HPC-related seminars at Université de Lille: The Arctic University of Norway (HPC Group, UiT), IBM, DSI (Supercomputing division) Ulille, Inria Lille), Oct-Dec 2019.

10.1.2. Scientific Events: Selection

10.1.2.1. Chair of Conference Program Committees

- A. Liefooghe (program co-chair): EvoCOP 2019: 19th European Conference on Evolutionary Computation in Combinatorial Optimisation (Leipzig, Germany, 2019).

10.1.2.2. Member of the Conference Program Committees

- IEEE Congress on Evolutionary Computation (CEC), Wellington, New Zealand, Jun 10-13, 2019.
- IEEE Workshop on Understanding of Evolutionary Optimization Behavior, Wellington, New Zealand, Jun 10-13, 2019.
- The ACM Genetic and Evolutionary Computation Conference (GECCO), Prague, Czech Republic, July 13-17, 2019.
- 13th Metaheuristics International Conference (MIC), Cartagena, Colombia, July 28-31, 2019.

- The 2018 International Conference on High Performance Computing & Simulation (HPCS), Dublin, Ireland, July 15–19, 2019.
- IEEE Intl. Workshop on Parallel/Distributed Computing and Optimization (IPDPS/PDCO), Rio de Janeiro, Brazil, May 20-24, 2019.
- EvoCOP'2019, 19th European Conference on Evolutionary Computation in Combinatorial Optimization, Leipzig, Germany, Apr 24-26, 2019.
- Int. Conf. on Multiple objective Programming and Goal Programming (MOPGP'2019), Marrakech, Morocco, Oct 28-31, 2019.
- Intl. Conf. on Optimization and Learning (OLA'2019), Bangkok, Thailand, Jan 29-31, 2019.
- Int. Conf. on Computing (ICC 2019), Springer's CCIS Book Series, Riyadh, Saudi Arabia, Oct 22-24, 2019.
- 15th Workshop on Foundations of Genetic Algorithms (FOGA), Potsdam, Germany, 2019.
- 10th Intl. Conference on Evolutionary Multi-criterion Optimization (EMO), Michigan, USA, 2019.
- ICANN'2019 28th Intl. Conf. on Artificial Neural Networks, Munich, Germany, Sept 2019.
- Metaheuristics Intl. Conference (MIC'2019), Cartagena, Colombia, July 2019.
- Intl. Conference on Industrial Engineering and Systems Management (IESM 2019), Shanghai, China, Sept 2019.
- 8th Intl. Conf. on Modeling, Simulation and Applied Optimizaiton (ICMSAO'2019), Bahrin, April 2019.
- Colloque sur l'Optimisation et les Systèmes d'information (COSI), Tizi-Ouzou, Algérie, Jun 24-26, 2019.

10.1.3. Journal

10.1.3.1. Member of the Editorial Boards

- N. Melab: Associate Editor of ACM Computing Surveys (IF: 6.131) since 2019.
- N. Melab: Guest and Managing Editor (in collaboration with P. Korosec, J. Gmys and I. Chakroun) of a special on *Synergy between Parallel Computing, Optimization and Simulation* in *Journal of Computational Science (JoCS)*, 2019.
- E-G. Talbi: Guest Editor (with L. Amodeo and F. Yalaoui) of a special issue on *Metaheuristics in Industry 4.0* in *Swarm and evolutionary computation*, 2019.
- E-G. Talbi. Guest Editor (with H. Masri) on *Multiple criteria decision making models for economic developement* in *JMCDA Journal of Multi-Criteria Decision Analysis*, 2019.
- B. Derbel: Associate Editor, IEEE Transactions on Systems, Man and Cybernetics: Systems (IEEE).

10.1.3.2. Reviewer - Reviewing Activities

- Transactions on Evolutionary Computation (IEEE TEC, IF: 8.508), IEEE.
- ACM Computing Surveys (IF: 6.131), ACM.
- Swarm and Evolutionary Computation (SWEVO, IF: 6.330), Elsevier.
- Future Generation Computer Systems (FGCS, IF: 5.7), Elsevier.
- European Journal of Operational Research [15], Elsevier.
- IEEE Transactions on Parallel and Distributed Systems (IEEE TPDS, IF: 3.4), IEEE.
- Journal of Computational Science (JoCS, IF: 2.5), Elsevier.
- Annals of Operations Research (IF: 2.284), Springer.
- Journal of Heuristics (JoH, IF: 1.392), Springer.
- Intl. Journal on Artificial Intelligence Tools (IJAIT, IF: 0.8), World Scientific.

10.1.4. Invited Talks

- E-G. Talbi. Learning-based metaheuristics, Distinguished seminar, University of Michigan, USA, Jan 2019.
- E-G. Talbi. Machine learning and optimization: inseparable disciplines, Keynote speaker, KST'2019 11th Intl. Conf. on Knowledge and Smart Technology, Phuket, Thailand, Jan 2019.
- E-G. Talbi. How machine learning can help metaheuristics?, Invited seminar, American University of Sharjah, Emirates Arabs United, Feb 2019.
- E-G. Talbi. Machine learning into optimization, Invited seminar, University of Elche, Spain, Nov 2019.

10.1.5. Leadership within the Scientific Community

- N. Melab: scientific leader of Grid'5000 (https://www.grid5000.fr) at Lille, since 2004.
- E-G. Talbi: Co-president of the working group "META: Metaheuristics - Theory and applications", GDR RO and GDR MACS.
- E-G. Talbi: Co-Chair of the IEEE Task Force on Cloud Computing within the IEEE Computational Intelligence Society.
- A. Liefooghe: co-secretary of the association "Artificial Evolution" (EA).

10.1.6. Scientific Expertise

- N. Melab: Member of the advisory committee for the IT and maganement engineer training at Faculté Polytechnique de Mons, BELGIUM.

10.1.7. Research Administration

- N. Melab: Member of the Scientific Board (Bureau Scientfique du Centre) for the Inria Lille - Nord Europe research center.
- N. Melab: Member of the steering committee of "Maison de la Simulation" at Université de Lille.

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

- International Master lecture: N. Melab, Supercomputing, 24h ETD, M2, Université de Lille, FRANCE.
- Master lecture: N. Melab, Operations Research, 72h ETD, M1, Université de Lille, FRANCE.
- Master leading: N. Melab, Co-head (with B. Merlet) of the international Master 2 of High-perforpmance Computing and Simulation, Université de Lille, FRANCE.
- Licence: A. Liefooghe, Algorithmic and Data structure, 36h ETD, L2, Université de Lille, FRANCE.
- Licence: A. Liefooghe, Algorithmic for Operations Research, 36h ETD, L3, Université de Lille, FRANCE.
- Master: A. Liefooghe, Databases, 30h ETD, M1, Université de Lille, FRANCE.
- Master: A. Liefooghe, Advanced Object-oriented Programming, 53h ETD, M2, Université de Lille, FRANCE.
- Master: A. Liefooghe, Combinatorial Optimization, 10h ETD, M2, Université de Lille, FRANCE
- Master: A. Liefooghe, Multi-criteria Decision Aid and Optimization, 25h ETD, M2, Université de Lille, FRANCE.
- Master leading: A. Liefooghe, superviser of the Master 2 MIAGE IPI-NT.
- Master: Bilel Derbel, Combinatorial Optimization, 35h, M2, Université de Lille, FRANCE.

- Master: Bilel Derbel, Grid Computing, 16h, M2, Université de Lille, FRANCE.
- Master: Bilel Derbel, Parallel and Distributed Programming, 35h, M1, Université de Lille, FRANCE.
- Master: Bilel Derbel, Algorithms and Applications, 28h, M1, Université de Lille, FRANCE.
- Engineering school: El-Ghazali Talbi, Advanced optimization, 36h, Polytech'Lille, Université de Lille, FRANCE.
- Engineering school: El-Ghazali Talbi, Data mining, 36h, Polytech'Lille, Université de Lille, FRANCE.
- Engineering school: El-Ghazali Talbi, Operations research, 60h, Polytech'Lille, Université de Lille, FRANCE.
- Engineering school: El-Ghazali Talbi, Graphs, 25h, Polytech'Lille, Université de Lille, FRANCE.
- Master leading: B. Derbel, head of the Master MIAGE, Université de Lille, FRANCE.
- Licence: O. Abdelkafi, Computer Science, 46.5 ETD, L1, Université de Lille, FRANCE.
- Licence: O. Abdelkafi, Web Technologies, 36 ETD, L1, Université de Lille, FRANCE.
- Licence: O. Abdelkafi, Unix system introduction, 6 ETD, L2, Université de Lille, FRANCE.
- Licence: O. Abdelkafi, Web Technologies, 24 ETD, L2 S3H, Université de Lille, FRANCE.
- Licence: O. Abdelkafi, object-oriented programming, 36 ETD, L2, Université de Lille, FRANCE.
- Licence: O. Abdelkafi, Relational Databases, 36h ETD, L3, Université de Lille, FRANCE.
- Licence: O. Abdelkafi, Algorithmic for Operations Research, 36h ETD, L3, Université de Lille, FRANCE.
- Master leading: O. Abdelkafi, superviser of the Master MIAGE alternance, Université de Lille, FRANCE.

10.2.2. Supervision

- PhD: Z. Garroussi, Multi-objective matheuristics for demand-side management in smart grids, To be defended on December 21th, 2019. PhD supervised by El-Ghazali Talbi and Rachid Ellaia (EMI, MOROCCO).
- PhD in progress: J. Pelamatti, Multi-disciplinary design of aerospace vehicles, Jan 2017, El-Ghazali Talbi.
- PhD in progress: Ali Hebbal, Deep Gaussian processes and Bayesian optimization for non-stationary, multi-objective and multi-fidelity problems, Oct 2017, El-Ghazali Talbi and Nouredine Melab.
- PhD in progress (cotutelle): Maxime Gobert, Parallel multi-objective global optimization with applications to several simulation-based exlporation parameter, Oct 2018, Nouredine Melab (Université de Lille) and Daniel Tuyttens (Université de Mons, BELGIUM).
- PhD in progress (cotutelle): Guillaume Briffoteaux, Bayesian Neural Networks-assisted multi-objective evolutionary algorithms: Application to the Tuberculosis Transmission Control, Oct 2017, Nouredine Melab (Université de Lille) and Daniel Tuyttens (Université de Mons, BELGIUM).
- PhD in progress: Jeremy Sadet, Surrogate-based optimization in automotive brake design, El-Ghazali Talbi (Université de Lille), Thierry Tison (Université Polytechnique Hauts-de-France, FRANCE).
- PhD in progress: Geoffrey Pruvost, Machine learning and decomposition techniques for large-scale multi-objective optimization, Oct 2018, Bilel Derbel and Arnaud Liefooghe.
- PhD in progress: Nicolas Berveglieri, Meta-models and machine learning for massive expensive optimization, Oct 2018, Bilel Derbel and Arnaud Liefooghe.
- PhD in progress (cotutelle): Alexandre Jesus, Algorithm selection in multi-objective optimization, Bilel Derbel and Arnaud Liefooghe (Université de Lille), Luís Paquete (University of Coimbra, PORTUGAL).

10.3. Popularization

10.3.1. Internal or external Inria responsibilities

- N. Melab: Chargé de Mission of High Performance Computing and Simulation at Université de Lille, since 2010.

10.3.2. Internal action

- A. Liefooghe: 30 minutes de sciences, Inria Lille-Nord Europe, Lille, France, June 2019.
- O. Abdelkafi: Intervention auprès des inspecteurs d'académie, Inria Lille-Nord Europe, Lille, France, Mars 2019.

CELESTE Project-Team

8. Dissemination

8.1. Promoting Scientific Activities

8.1.1. Scientific Events: Organisation

8.1.1.1. Member of the Organizing Committees

Semaine SEME - Orsay 14/01-18/01-2019, https://www.math.u-psud.fr/seme2019/index.php. G. Stoltz was part of the organizing and scientific committees. C. Keribin was part of the scientific committee.

8.1.2. Scientific Events: Selection

8.1.2.1. Member of the Conference Program Committees

- S. Arlot was member of the steering committee of the 4th Junior Conference on Data Science and Engineering at Paris-Saclay (Sept. 2019), CentraleSupélec, Paris-Saclay campus, Gif-sur-Yvette.
- C. Keribin is member of steering committee of the the bi-montly Seminar of probability and statistics (Laboratoire de mathématiques d'Orsay)
- C. Giraud is co-organiser (with E. Kuhn) of the conference StatMathAppli at Fréjus (1-6 september 2019)
- C. Giraud is local member of scientific committee of the Institut Pascal (year around program)

8.1.2.2. Reviewer

We performed many reviews for various international conferences.

8.1.3. Journal

8.1.3.1. Member of the Editorial Boards

S. Arlot is associate editor of Annales de l'Institut Henri Poincaré B – Probability and Statistics.

8.1.3.2. Reviewer - Reviewing Activities

We performed many reviews for various international journals.

8.1.4. Invited Talks

- S. Arlot, Changepoint Workshop, Nov. 2019, Institut des Systèmes Complexes, Paris.
- S. Arlot, Thematic week "Data and Analytics for Short-Term Operations", Feb. 2019, Isaac Newton Institute for Mathematical Science, Cambridge, UK.
- C. Keribin, Some asymptotic properties of model selection criteria in the latent block model. 12th Scientific meeting CLADAG 2019, Cassino (Italie), September 11 – 13, 2019
- C. Giraud, Community detection and sequential learning, IOPS 2019, Bordeaux, June 19-21, 2019
- C. Giraud, Sequential learning in random graph, Genova, May 2019.
- P. Pamphile, Maintenance cost forecasting for a feet of vehicles, IMDR, Paris, April 2019

8.1.5. Research Administration

S. Arlot coordinates the math-AI (mathematics for artificial intelligence) program of the Labex Mathématique Hadamard and is member of the executive comittee of Fondation Mathématique Jacques Hadamard (FMJH).
S. Arlot is member of the steering committee of the Paris-Saclay Center for Data Science.
S. Arlot is member of the prefiguration group of the Computer Science Graduate School of University Paris-Saclay.
P. Massart is Director of the Fondation Mathématique Jacques Hadamard (FMJH).

C. Giraud has coordinated the math-SV (mathematics for life science) program of the Labex Mathématique Hadamard and is member of the executive comittee of Fondation Mathématique Jacques Hadamard (FMJH).
C. Giraud is member of the scientific committee of the Labex IRMIA (Strasbourg)
C. Giraud is local member of the scientific committee of the Pascal Institute (Saclay)
C. Giraud is member of the prefiguration group of the Mathematics Graduate School of University Paris-Saclay.
C. Giraud is member of the steering committee of the Mathematics Modelisation and Biodiversity chair.
C. Giraud is in charge of the whole master program in Mathematics of Paris Saclay.
C. Giraud is in charge of the Statistics and Machine Learning track in the master program in Mathematics of Paris Saclay.

8.2. Teaching - Supervision - Juries

8.2.1. Teaching

Licence: S. Arlot, Probability and Statistics, 68h, L2, Université Paris-Sud

Master: S. Arlot, Statistical learning and resampling, 30h, M2, Université Paris-Sud

Master: S. Arlot, Probability and Statistics M2 seminar, 30h, M2, Université Paris-Sud

Master: S. Arlot, Preparation to French mathematics agrégation (statistics), 50h, M2, Université Paris-Sud

Master: C. Giraud, High-Dimensional Statistics, 45h, M2, Université Paris-Sud

Master: C. Giraud, Theoretical Guidelines in Data Analysis, 45h, M2, Université Paris-Sud

Master: C. Giraud, Lecture Group, 25h, M2, Université Paris-Sud

Master: C. Giraud, Mathematics for AI, 75h, M1, Université Paris-Sud

8.2.2. Supervision

PhD in progress: Guillaume Maillard, Aggregated cross-validation, started Sept. 2016, co-advised by S. Arlot and M. Lerasle

PhD in progress: El Mehdi Saad, Interactions between statistical and computational aspects in machine learning, started Sept. 2019, co-advised by S. Arlot and G. Blanchard

PhD in progress: Tuan-Binh Nguyen, Efficient Statistical Testing for High-Dimensional Models, co-advised by S. Arlot and B. Thirion

PhD in progress: Rémi Coulaud, Forecast of dwell time during train parking at station, started Oct. 2019, co-advised by G. Stoltz and C. Keribin, Cifre with SNCF

PhD in progress: Olivier Coudray, Fatigue aided-design, started Nov. 2019, co-advised by C. Keribin and P. Pamphile, Cifre with PSA

PhD: Solène Thépaut, Problèmes de clustering liés à la synchronie en écologie, Université Paris Saclay, Dec. 2019, C. Giraud.

PhD: Théophile Olivier, Le role de la diversité et des perturbations environnementales sur la stabilité temporelle des communautés animales en milieu naturel, Museum National Histoire Naturelle, Sep. 2019, co-advised by E. Porcher and C. Giraud.

PhD in progress: Yann Issartel, Non-parametric estimation in random networks, started Sep. 2017, C. Giraud.

PhD in progress: Solenne Gaucher, Sequential learning in random networks, started Sep. 2018, C. Giraud.

8.2.3. Juries

S. Arlot: referee for the HdR of Servane Gey, Université Paris Descartes, 07/02/2019.
S. Arlot: member of the PhD committee of Solène Thepaut, Université Paris-Sud, 06/12/2019.

C. Giraud: many HDR and PhD juries as referee or member of the committee

8.3. Popularization

8.3.1. Interventions

- Public exhibitions: S. Arlot is member of the steering committee of a general-audience exhibition about artificial intelligence, that is co-organized by Fermat Science (Toulouse), Institut Henri Poincaré (IHP, Paris) and Maison des Mathématiques et de l'Informatique (MMI, Lyon).

GEOSTAT Project-Team

10. Dissemination

10.1. Introduction

10.1.1. Member of the Editorial Boards

- H. Yahia is Review Editor for the journal Frontiers in Physiology (Fractal Physiology).

10.1.2. Invited Talks

- Journée des Systèmes et de la Matière Complexe 4ème édition, Paris-Saclay, October 2019: G. Attuel gave the presentation *Voir au coeur d'une turbulence forte sans cascade et mourir...*, link.

10.2. Introduction

10.2.1. Teaching

Master : K. Daoudi, Data mining, 20 hours, M2 MIAGE, University of Lorraine.

Master : A. Rashidi, Introduction to deep learning, 12 hours, M1, course given in the team during D. Singh's visit.

10.2.2. Supervision

PhD : A. El Aouni, Lagrangian coherent structures and physical processes of coastal upwelling, Bordeaux University, September 24, 2019, supervisors: H. Yahia, K. Minaoui.

Master : H. Belmajdoub, Upwelling dynamics along the Atlantic coast of Morocco, Rabat University, supervised by A. El Aouni.

PhD in progress : H. Belmajdoub, Upwelling dynamics along the Atlantic coast of Morocco, Rabat University, cosupervised by A. El Aouni.

PhD in progress : Z. El Abidi, caractérisation multicapteur de l'upwelling marocain, Rabat University, cosupervised by A. El Aouni.

INOCS Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events: Organisation

10.1.1.1. General Chair, Scientific Chair

- 23rd Belgian Mathematical Optimization Workshop, La Roche, Belgium, April 25-26, 2019: Bernard Fortz (Organizer)

10.1.1.2. Member of the Organizing Committees

- 8th Winter School on Network Optimization, Estoril, Portugal, January 14-18, 2019: Bernard Fortz

10.1.2. Scientific Events: Selection

10.1.2.1. Member of the Conference Program Committees

LI Brazilian Symposium on Operational Research (LI SBPO), Limeira/SP - Brazil, September 2019: Martine Labbé

ORBEL 2019, Hasselt, Belgium, January 2019: Bernard Fortz, Martine Labbé

ROADEF2019 - 19ème Conférence de la Société Française de Recherche Opérationnelle et d'Aide à la Décision, Le Havre, France, February 2019: Luce Brotcorne, Diego Cattaruzza, Bernard Fortz, Frédéric Semet

INOC 2019, International Network Optimization Conference, Avignon, France, June 2019: Bernard Fortz

EURO 2019, European Conference of Operational Research Societies, Dublin, Ireland, June 2019: Bernard Fortz

5th JuliaCon, Baltimore, USA, July 22-26, 2019: Mathieu Besançon

TRISTAN X-Triennial Symposium on Transportation Analysis, Jun 2019, Hamilton Island, Australia, June 2019: Frédéric Semet

Workshop of the Transportation and Logistics Society, INFORMS, Jun 2019, Vienna, Austria, June 2019: Frédéric Semet

10.1.3. Journal

10.1.3.1. Member of the Editorial Boards

- EURO Journal on Computational Optimization: Martine Labbé - Editor in chief, Bernard Fortz - Editor
- Computers and Operations Research: Luce Brotcorne - Member of the Advisory Board
- INFORMS Journal on Computing: Bernard Fortz - Associate editor
- International Transactions in Operations Research: Bernard Fortz, Martine Labbé - Associate editors
- Transportation Science: Martine Labbé - Member of the Advisory Board

10.1.3.2. Reviewer - Reviewing Activities

Annals of Operations Research, Applied Computing and Informatics, Central European Journal of Operations Research, Computers & Operations Research, Computational Optimization and Applications, Discrete Applied Mathematics, EURO Journal on Transportation and Logistics, European Journal of Operational Research, IISE Transactions, INFORMS Journal on Computing, International Journal of Management Science and Engineering Management, Mathematical Programming Computation, Networks, Omega, Operations Research, Optimization and Engineering, RAIRO - Operations Research, Transportation Science, IEEE Transactions on Power Systems, IEEE Transactions on Smart Grids, IEEE Power Engineering Letters: Mathieu Besançon, Luce Brotcorne, Diego Cattaruzza, Bernard Fortz, Martine Labbé, Maxime Ogier, Frédéric Semet.

10.1.4. Invited Talks

- Mathieu Besançon was invited speaker at the JuliaNantes workshop in Nantes, France, June 2019
- Martine Labbé was plenary speaker at CPAIOR in Tessalonik, Greece, June 2019
- Martine Labbé was plenary speaker at AMSI Optimise in Perth, Australia, June 2019
- Martine Labbé was plenary speaker at the 7th International Conference on Variable Neighborhood Search, Rabat, Marocco, October 2019
- Frédéric Semet was invited speaker at the Workshop on the Logistics of Autonomous Vessels, Bergen, Norway, May 2019

10.1.5. Leadership within the Scientific Community

EURO Working Group “Pricing and Revenue Management”: Luce Brotcorne - coordinator

EURO Working Group “European Network Optimization Group (ENOG)”: Bernard Fortz - coordinator

EURO Working Group “Vehicle routing and logistics optimization (VEROLOG)”: Frédéric Semet - Member of the board

INFORMS Women in OR/MS: Luce Brotcorne - International liaison

ORBEL (Belgian Operations Research Society): Bernard Fortz - Member of the board of administration

ORBEL representative for EURO and IFORS: Bernard Fortz

CNRS GdR 3002: Operations Research: Frédéric Semet - Member of the steering committee

10.1.6. Scientific Expertise

Scientific orientation committee of the Interuniversity Centre on Entreprise Networks, Transportation and Logistics (CIRRELT), Canada: Bernard Fortz, Frédéric Semet - Members

Center for Mathematics, Fundamental Applications and Operations Research, University of Lisbon: Martine Labbé - Member

DFG Review Panel “Mathematics” for Clusters of Excellence, 2018: Martine Labbé - Member

Scientific committee of France-Netherlands Exchange Program: Luce Brotcorne - Member

Evaluation committee for Inria/MITACS Exchange Program: Luce Brotcorne - Member

Evaluation committee COST GTRI: Luce Brotcorne - Member

Fund for research training in industry and agriculture (FRIA) PE1 - jury 1: Bernard Fortz - Member

Scientific board of PICOM competitiveness cluster: Frédéric Semet - Member

Agence Nationale de la Recherche (ANR): Luce Brotcorne, Frédéric Semet - Reviewer

Fond de Recherche Nature et Technologie du Québec: Frédéric Semet - Reviewer

Research Council of Norway: Frédéric Semet - Reviewer

Evaluation committee NSERC - EG 1509: Bernard Fortz - Member

10.1.7. Research Administration

Committee for the Technological Development (CDT): Luce Brotcorne - Member

CRIStAL: Frédéric Semet - Deputy-director

Scientific council of Centrale Lille: Frédéric Semet - Elected member

Scientific council of OPTIMA thematic group of CRIStAL: Diego Cattaruzza Member

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

Master: Bernard Fortz, Recherche Opérationnelle et Applications, 30hrs, M1, University of Mons (Charleroi campus), Belgium

Master: Bernard Fortz, Continuous Optimization, 24hrs, M1 & M2, Université libre de Bruxelles, Belgium

Master: Frédéric Semet, Non-linear Optimization, 30hrs, M2, Centrale Lille

Master: Frédéric Semet, Operations Research, 28hrs, M2, Centrale Lille

Master: Luce Brotcorne, Optimisation, 14hrs, M1, Polytech Lille

Master: Luce Brotcorne, Recherche opérationnelle, 16hrs, M1 apprentissage, Polytech Lille

Master: Diego Cattaruzza, Maxime Ogier, Frédéric Semet, Prescriptive analytics and optimization, 64hrs, M1, Centrale Lille

Master: Diego Cattaruzza, Maxime Ogier, Object-Oriented Programming, 48hrs, M1, Centrale Lille

Master: Diego Cattaruzza, Maxime Ogier, Operations Research, 16hrs, M1, Centrale Lille

Licence: Diego Cattaruzza, Maxime Ogier, Object-Oriented Programming, 36hrs, L3, Centrale Lille

Licence: Frédéric Semet, Advanced programming and Complexity, 24hrs, L3, Centrale Lille

Licence: Diego Cattaruzza, Maxime Ogier, Object-Oriented Programming, 40hrs, L2, Centrale Lille

Licence: Bernard Fortz, Algorithmique 1, 12hrs, L1, Université libre de Bruxelles, Belgium

Licence: Bernard Fortz, Algorithmique et Recherche Opérationnelle, 24hrs, L3, Université libre de Bruxelles, Belgium

10.2.2. Supervision

PhD: Simon Bélières, Mathematical programming for tactical transportation planning in a multi-product supply chain, November 2019, Nicolas Jozefowiez, Frédéric Semet

PhD: Wenjuan Gu, Location routing for short and local fresh food supply chain, November 2019, Maxime Ogier, Frédéric Semet

PhD: Yuan Yuan, Vehicle Routing Problems with Synchronization for City Logistics, October 2019, Diego Cattaruzza, Frédéric Semet

PhD: Léonard Von Niederhausern, Design and pricing of new services in energy in a competitive environment, March 2019, Luce Brotcorne, Didier Aussel

PhD in progress: Luis Alberto Salazar Zendeja, Formulations and resolution methods for network interdiction problems, from November 2018, Diego Cattaruzza, Martine Labbé, Frédéric Semet

PhD in progress: Matteo Petris, Column generation approaches for integrated operationnal problems, from October 2019, Diego Cattaruzza, Maxime Ogier, Frédéric Semet

PhD in progress: Concepción Domínguez Sánchez, Mixed Integer Linear Models and Algorithms for Pricing Problems, from October 2017, Martine Labbé

PhD in progress: Moises Rodriguez Madrena, Problems in data analysis and location Theory, from January 2019, Martine Labbé, Justo Puerto

PhD in progress: Fränk Plein, Models and methods for the robust verification of booked capacities in gas networks in a decentralized setting, from October 2017, Martine Labbé

PhD in progress: Jérôme De Boeck, Optimization problems in energy, from October 2015, Bernard Fortz

PhD in progress: Mathieu Besançon, Approche bi-niveau de réponse à la demande dans les réseaux électriques intelligents, from September 2018, Miguel Anjos, Luce Brotcorne, Frédéric Semet

PhD in progress: Yaheng Cui, Models and methods for decentralized decision in logistics networks, from Oct 2016, Luce Brotcorne, Eric Ballot

10.2.3. Juries

- Ikram Bouras, PhD, Université de Montpellier, 2019, “Fixed Charge Network Design Problem with User Optimal flows”: Luce Brotcorne (reviewer)
- Umar Hashmi, PhD, Université PSL, Paris, 2019, “Optimization and Control of Storage in Smart Grids”: Luce Brotcorne (reviewer)
- Léonard von Niederhäusern, PhD, Centrale Lille, 2019, “Design and pricing of new energy services in a competitive environment”: Bernard Fortz (president)
- Meihui Gao, PhD, Université de Lorraine, 2019, “Models and methods for Network Function Virtualization (NFV) architectures”: Bernard Fortz (reviewer)
- Yuan Yuan, PhD, Centrale Lille, 2019, “Models and Algorithms for Last Mile Delivery Problems with Multiple Shipping Options”: Martine Labbé (member)
- José Neto, HDR, Université Evry, 2019, “Some contributions to mathematical programming and combinatorial optimization”: Bernard Fortz (reviewer)
- Marc-Antoine Coindreau, PhD, University of Lausanne, Switzerland, 2019, “Managing Advanced Synchronization Aspects in Logistics Systems”: Frédéric Semet (reviewer)
- Ruslan Sadykov, HDR, Université de Bordeaux, 2019, “Modern Branch-Cut-and-Price”: Frédéric Semet (reviewer)

10.3. Popularization

- Luce Brotcorne, Journées scientifiques de l’Inria, Lyon, June 2019
- Frédéric Semet, Cité de l’IA - Intelligence Artificielle, MEDEF Lille Métropole, April 2019
- Maxime Ogier, Frédéric Semet, 4ème séminaire humAIn : IA, optimisation et retail - logistique, Polytech Lille, October 2019

10.3.1. Internal or external Inria responsibilities

- Frédéric Semet, 30 minutes de sciences, Inria Lille Nord Europe, April 2019

MISTIS Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events Organisation

10.1.1.1. General Chair, Scientific Chair

- Stéphane Girard was chairman at the 2nd workshop on Multivariate Data and Software (Limassol, Cyprus) and at the International Workshop on Stress Test and Risk Management (Paris).

10.1.1.2. Member of the Organizing Committees

- Florence Forbes is a member of the scientific committees of the Bayes Comp 2020 conference in Gainesville, Florida, USA (January 2020) and of the Research school on Networks and molecular biology at CIRM in Marseille (March 2020).
- Sophie Achard was a member of the scientific committee of the Wavelet & Sparsity XVIII 2019 in San Diego and the organizer of a special session within this conference.
- Stéphane Girard and Julyan Arbel were members of the organizing committee of the 10th Statlearn international workshop "Challenging problems in Statistical Learning", Grenoble, http://statlearn.sfds.asso.fr. Stéphane Girard also co-organized (with D. Fraix-Burnet, IPAG) the 4th international school Stat4Astro "Variability and Time Series Analysis", Autrans, http://stat4astro2019.sciencesconf.org.
- Julyan Arbel was a member of the scientific committee of *Statistical Methods for Post Genomic Data analysis (SMPGD)*, link. Julyan Arbel organized the session entitled 'Bayesian Machine Learning' at the 12th International Conference of Computational and Methodological Statistics (CMStat), University of London, UK (14-16 December 2019).

Seminars organization

- MISTIS participates in the weekly statistical seminar of Grenoble. Several lecturers have been invited in this context.
- Julyan Arbel is organizing monthly reading group Bayes in Grenoble on Bayesian statistics.

10.1.2. Scientific Events Selection

10.1.2.1. Reviewer

- In 2019, Florence Forbes has been a reviewer for CAP 2019 in Toulouse and for ICDHT 2019 in Tunis.
- In 2019, Julyan Arbel has been a reviewer for the *Bayesian Young Statisticians Meeting proceedings* (BAYSM).
- In 2019, Florence Forbes and Julyan Arbel have been reviewers for the *Research School on Statistics and Data Science* (RSSDS2019).

10.1.3. Journal

10.1.3.1. Member of the Editorial Boards

- Stéphane Girard is Associate Editor of the *Statistics and Computing* journal since 2012, Associate Editor of the *Journal of Multivariate Analysis* since 2016 and Associate Editor of *REVSTAT - Statistical Journal* since 2019. He is also member of the Advisory Board of the *Dependence Modelling* journal since December 2014.

- Florence Forbes is Associate Editor of the journal *Frontiers in ICT: Computer Image Analysis* since its creation in Sept. 2014. She is also Associate Editor of the *Computational Statistics and Data Analysis* journal since May 2018.
- Julyan Arbel is Associate Editor of *Bayesian Analysis* (BA) and of Statistics & Probability Letters (SPL) since 2019.
- Julyan Arbel and Florence Forbes are Associate Editors for the *Australian & New Zealand Journal of Statistics* (ANZJS), since 2018.
- Sophie Achard is Associate Editor of *Neural Processing Letters* and *Network Neuroscience* since 2016.

10.1.3.2. Reviewer - Reviewing Activities

- In 2019, Florence Forbes has been a reviewer for *IEEE Transactions on Pattern Analysis and Machine Intelligence* (TPAMI), *Statistics and Computing* (STCO), and *Neural Processing Letters*.
- In 2019, Stéphane Girard has been a reviewer for *Journal of the American Statistical Association* (JASA), *Journal of Statistical Planning and Inference* (JSPI), *Communications in Statistics - Theory and Methods, Spatial Statistics.*
- In 2019, Jean-Baptiste Durand has been a reviewer for *Behavior Research Methods* (BRM) and *Statistics and Computing* (STCO).
- In 2019, Julyan Arbel has been a reviewer for: *Annals of Applied Statistics* (AOAS), *Annales de l'Institut Henri Poincaré, Probabilités et Statistiques* (AIHP), *Bernoulli*, *Biometrika*, *Entropy*, *Journal of the American Statistical Association* (JASA), *Journal of Computational and Graphical Statistics* (JCGS), *Journal of Nonparametric Statistics* (JNS), *Sankhyā*, *Stats*, *Statistica Sinica*, *Statistics and Probability Letters* (SPL), *Stochastic Processes and their Applications* (SPA), *IEEE Transactions on Pattern Analysis and Machine Intelligence* (TPAMI).

10.1.4. Invited Talks

Florence Forbes has been invited to give talks at the following seminars and conferences:

- Glasgow Statistics Department, March 2019
- Conference on Applied Inverse Problems, AIP 2019, July 2019 [34]
- 51ème Journées de la Statistique, Nancy, France, June 2019 [35]
- Workshop on Model-based clustering, Vienna, Austria, July 15-19, [32]
- Research School on Statistics and Data Science, Melbourne, Australia, July 24-26, [33]

Julyan Arbel has been invited to give talks at the following seminars and conferences:

- Applied Inverse Problems conference, Grenoble, France, July 8-12, 2019. Invited talk: Understanding Priors in Bayesian Neural Networks at the Unit Level.
- 11th Workshop on Bayesian Inference in Stochastic Processes (BISP), Madrid, Spain, June 12-14, 2019. Invited talk: Understanding Priors in Bayesian Neural Networks at the Unit Level.
- Workshop on Multivariate Data Analysis, Limassol, Cyprus, April 14-16, 2019. Invited talk: Some distributional properties of Bayesian neural networks.
- Seminar, Laboratoire d'Informatique de Grenoble, Grenoble, France, September 19, 2019. Invited talk: On some theory for Bayesian neural networks.
- Grenoble R User Group, Grenoble, France, April 11, 2019. Invited talk: R Markdown.

Sophie Achard has been invited to give talks at the following seminars and conferences:

- Workshop ATLAS, GDR MADICS, November 2019, Grenoble http://ama.liglab.fr/ATLAS/Wksp-22112019.html. Invited talks: Assessing reliability of resting-state fMRI graph analysis: challenges in measuring brain connectivity networks alterations for clinical applications.
- NeuroSTIC, GDR BioComp et ISIS, October 2019, Nice http://www.gdr-isis.fr/neurostic/?p=452. Invited talks: Brain connectivity for patients with consciousness disorders: statistical and clinical challenges

Stéphane Girard has been invited to give talks at the following seminars and conferences:

- 2nd workshop on Multivariate Data and Software (Limassol, Cyprus) [37],
- Workshop "Appréhender la grande dimension" (Paris) [36],
- Seminar, Nottingham University, UK "Estimation of extreme risk measures based on L_p- quantiles".

Antoine Usseglio-Carleve was invited to give a talk [38] at the 12th International Conference of Computational and Methodological Statistics, London, UK.

Marta Crispino was invited to give a talk [31] at the 12th International Conference of Computational and Methodological Statistics, London, UK.

10.1.5. Scientific Expertise

Florence Forbes is Scientific Advisor since March 2015 for the Pixyl company.

10.1.6. Research Administration

- Stéphane Girard is a member of the "Comité des Emplois Scientifiques" at Inria Grenoble Rhône-Alpes since 2015.
- Since 2015, Stéphane Girard is a member of the INRA committee (CSS MBIA) in charge of evaluating INRA researchers once a year in the MBIA dept of INRA.
- Florence Forbes is a member of the "Comité Développement Technologique" for software development projects at Inria Grenoble Rhône-Alpes since 2015.
- Florence Forbes is a member of the "Comite d'organisation stratégique" of Inria Grenoble Rhône-Alpes since 2017.
- Florence Forbes is a member of the Executive Committee of the Grenoble data institute.
- Florence Forbes has been a member of the Selection committee for assistant professors at Ensimag Grenoble and at Ecole Centrale Lille in 2019.
- Florence Forbes is a member of the advisory committee of the Helmholtz AI Cooperation Unit https://helmholtz.ai/, since 2019.
- Sophie Achard is co-director of pôle MSTIC whithin Université Grenoble Alpes, since 2017.
- Julyan Arbel is a scientific committee member of the Data Science axis of Persyval Labex (Machine learning: fundamentals and applications, and Data linking, sharing and privacy), link, since 2019.

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

- Master : Stéphane Girard, *Statistique Inférentielle Avancée*, 18 ETD, M1 level, Ensimag. Grenoble-INP, France.
- PhD course: Julyan Arbel, *Bayesian nonparametrics*, Jyväskylä Summer School, Finland, August 2019, 25 ETD.
- Master and PhD course: Julyan Arbel, *Bayesian statistics*, Ensimag, Université Grenoble Alpes (UGA), 25 ETD.
- Master and PhD course: Julyan Arbel, *Bayesian nonparametric statistics*, Master Mathématiques Apprentissage et Sciences Humaines (M*A*S*H), Université Paris-Dauphine, 25 ETD.
- Master and PhD course: Julyan Arbel, *Bayesian machine learning*, Master Mathématiques Vision et Apprentissage Master MVA, École normale supérieure Paris-Saclay, 36 ETD.
- Master: Jean-Baptiste Durand, *Statistics and probability*, 192H, M1 and M2 levels, Ensimag Grenoble INP, France. Head of the MSIAM M2 program, in charge of the data science track.
- Jean-Baptiste Durand is a faculty member at Ensimag, Grenoble INP.

- Sophie Achard M1 course Théorie des graphes et réseaux sociaux, M1 level, MIASHS, Université Grenoble Alpes (UGA), 14 ETD.

10.2.2. Supervision

- PhD defended: Karina Ashurbekova "*Robust Structure Learning*", December 2019, Sophie Achard and Florence Forbes, Université Grenoble Alpes.
- PhD defended: Brice Olivier "*Joint analysis of eye-movements and EEGs using coupled hidden Markov models*", June 2019, Jean-Baptiste Durand and Anne Guérin-Dugué, Université Grenoble Alpes.
- PhD defended: Chun-Chen Tu,"*Gaussian mixture sub-clustering/reduction refinement of Non-linear high-to-low dimensional mapping*", "Date", Florence Forbes and Naisyin Wang, University of Michigan, Ann Arbor.
- HDR: Julyan Arbel, Université Grenoble Alpes, "*Bayesian Statistical Learning and Applications*" [11], October 2019.
- PhD in progress: Veronica Munoz,"*Extraction de signatures dans les données IRM de patients parkinsoniens de novo*", Florence Forbes and Michel Dojat, Université Grenoble Alpes, started on October 2017.
- PhD in progress: Fabien Boux,"*Développement de méthodes statistiques pour l'imagerie IRM fingerprinting*", Florence Forbes and Emmanuel Barbier, Université Grenoble Alpes, started on October 2017.
- PhD in progress: Benoit Kugler, "*Massive hyperspectral images analysis by inverse regression of physical models*", Florence Forbes and Sylvain Douté, Université Grenoble Alpes, started on October 2018.
- PhD in progress: Mariia Vladimirova, "*Prior specification for Bayesian deep learning models and regularization implications*", started on October 2018, Julyan Arbel and Jakob Verbeek.
- PhD in progress: Aboubacrène Ag Ahmad "*A new location-scale model for heavy-tailed distributions*", started on September 2016, Stéphane Girard and Alio Diop (Université Gaston Berger, Sénégal).
- PhD in progress: Meryem Bousebata "*Bayesian estimation of extreme risk measures: Implication for the insurance of natural disasters*", started on October 2018, Stéphane Girard and Geffroy Enjolras (Université Grenoble Alpes).
- PhD in progress: Alexandre Constantin "*Analyse de séries temporelles massives d'images satellitaires : Applications à la cartographie des écosystèmes*", started on November 2018, Stéphane Girard and Mathieu Fauvel (Université Grenoble Alpes).
- PhD in progress: Daria Bystrova, "*Joint Species Distribution Modeling: Dimension reduction using Bayesian nonparametric priors*", started on October 2019, Julyan Arbel and Wilfried Thuiller.
- PhD in progress: Giovanni Poggiatto , "*Scalable Approaches for Joint Species Distribution Modeling*", started on November 2019, Julyan Arbel and Wilfried Thuiller.

10.2.3. Juries

- Julyan Arbel has been reviewer for the PhD thesis of Romain Mismer, LPSM, Sorbonne Université, Paris.
- Stéphane Girard has been reviewer for the PhD thesis of Maxime Baelde, Université de Lille.
- Stéphane Girard has been the president of the HDR committee of Julie Carreau, Université de Montpellier, and an examinator for the HDR of Julyan Arbel.
- Stéphane Girard has been a member of the PhD committee of Abdul-Fattah Abu-Awwad, Université de Lyon.

- Florence Forbes has been reviewer for the PhD thesis of Lê-Huu D. Khuê, Université Paris Saclay, CentraleSupelec, Cedric Meurée, Université de Rennes, Bao Tuyen Huynh Université de Caen and for the HDR thesis of Christine Keribin, Université Paris Orsay.
- Florence Forbes has been a member of the PhD committee of Charlotte Maugard, Université Grenoble Alpes and Esteban Bautista, ENS Lyon.
- Sophie Achard has been reviewer for the HDR of Julien Modolo, Université Rennes 1.

10.3. Popularization

10.3.1. Interventions

- Sophie Achard has been invited to Festival des Nouvelles Explorations https://nouvellesexplorations.com/.
- Julyan Arbel gave a presentation for ISN conference, March 2019.

MODAL Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events: Organisation

10.1.1.1. General Chair, Scientific Chair

- Hemant Tyagi and Pascal Germain are the organizers of the MODAL team scientific seminar.
- Sophie Dabo-Niang is the co-organizer of:
  - Session "Recent non-parametric approaches: Applications to envi- ronmental, hydrological, oceanological and economic data analyzes" of the ISI conference (62nd World Statistics Congress), 18-23, August, 2019, Kuala Lumpur, Malaysia.
  - Session "Modeling dependence through graphical models", CMStatistics, 14-16 December 2019, London.
- Christophe Biernacki is a co-organizer (and the chair) of the special session on co-clustering called "Co-clustering: model-based or model-free approaches" at the 62nd ISI World Statistics Congress 2019 in Malaysia [45]
- Alain Celisse is the organizer and the chair of two sessions on change-points detection and early stopping rules at ERCIM 2019, London.
- Vincent Vandewalle organized a session on Model-based and multivariate functional data at CRoNoS & MDA 2019.

10.1.2. Scientific Events: Selection

10.1.2.1. Member of the Conference Program Committees

- Sophie Dabo-Niang was a member of the scientific program committee of: CRONOS-MDA2019, 14-16 April 2019, Limassol, Cyprus and African Econometric Society Conference, 11-13 July 2019, Rabat, Morocco.
- Benjamin Guedj has been a PC member for UAI 2019 and IJCAI 2019.

10.1.2.2. Reviewer

- Hemant Tyagi acted as a reviewer for journals (Foundations of Computational Mathematics, Journal of Machine Learning Research, SIAM Journal on Scientific Computing, Advances in Data Analysis and Classification) and a conference (NeurIPS 2019).
- Pascal Germain acted as a reviewer for a journal (IEEE Transactions on Pattern Analysis and Machine Intelligence) and conferences (ICML 2019, ICLR 2019, NeurIPS 2019, COLT 2019, PHM 2019).
- Benjamin Guedj served as a reviewer for journals (JMLR, Neurocomputing, Journal of international research on robotics,...) and conferences (ICML 2019, ICLR 2019, NeurIPS 2019, COLT 2019, IJCAI 2019, UAI 2019, AISTATS 2019 & 2020).
- Alain Celisse acted as a reviewer for journals (IEEE Transactions on Pattern Analysis and Machine Intelligence, Annals of Statistics, JMLR,...) and conferences (ALT 2019, COLT 2019).
- Sophie Dabo-Niang acted as a reviewer for journals Annals of Statistics, JASA, Journal of Nonparametric statistics, TEST, METRIKA.
- Christophe Biernacki acted as a reviewer for CSDA, ESWA, JCGS, JMIV.
- Serge Iovleff acted as a reviewer for CSDA and Journal of Statistics and Computing.

- Vincent Vandewalle acted as a reviewer for ADAC, Statistics in Medicine, COST.
- Cristian Preda is a reviewer for Bernoulli, MCAP, ADAC.

10.1.3. Journal

10.1.3.1. Member of the Editorial Boards

- Christophe Biernacki is an Associate Editor of the North-Western European Journal of Mathematics (NWEJM) and for Frontiers on the topic "Computational Methods for Data Analytics". He is also a Guest Editor for the Special Issue on Innovations in Model-Based Clustering and Classification of the journal Advances Data Analysis and Classification (ADAC).
- Cristian Preda is an associate editor for Methodological and Computing in applied probability (MCAP) and for Journal of Mathematical and Computer Science.
- Serge Iovleff is member of the Editorial Board of Astrostatistics (specialty section of Frontiers in Astronomy and Space Sciences)

10.1.4. Invited Talks

- Christophe Biernacki:
  - 3rd International Conference on Econometrics and Statistics (EcoSta 2019), Taiwan, June 25, 2019 [42]
  - 12th Scientific Meeting Classification and Data Analysis Group (CLADAG 2019), Italy, September 12, 2019 [41]
  - APSEM 2019 (Apprentissage et SEMantique) : écosystèmes pour la science ouverte et recherche par les données, Toulouse [39]
  - Séminary of Probability and Statistics of the University of Nice - Sophia Antopolis, France, November 19, 2019
- Hemant Tyagi:
  - Probability-Statistics seminar, Laboratoire de Mathematiques, Universite de Franche-Comte, Besancon, France, June 13, 2019
  - Probability-Statistics seminar, Université de Lille, France, September 18, 2019
- Pascal Germain:
  - Journées de la statistique, Nancy, France, June 6, 2019
- Benjamin Guedj:
  - Speaker (with John Shawe-Taylor) for a plenary tutorial at ICML 2019 (June 2019).
  - Several seminars in the UK (Gatsby unit, UCL CSML, UCL stats, ElementAI).
- Sophie Dabo-Niang:
  - 62nd World Statistics Congress, August, 18-23, 2019, Kuala Lumpur, Malaysia.
  - 7th Statistical Meeting of Avignon-Marseille, 14 June, 2019, Avignon, France.
  - Workshop on Non-Parametric Statistics, 18th, September, 2019, Grenoble, France.
  - CFIES 2019, 24-27 September 2019, Strasbourg, France.
  - Symposium of young Senegalese researchers in Pured and Applied Mathematics, December, 16-19, 2019, Mbour, Senegal.
- Cristian Preda:
  - Conference on scan statistics, IMS China, Dalian, 6-10 july, 2019.
  - Conference on categorical functional data at Romanian statistical society, 10-11 May 2019.
- Alain Celisse:

  - Session on Model selection at ERCIM 2018, London.
  - Several seminars in France (Nantes, Paris,...) and abroad WIAS Institute of Berlin.
- Vincent Vandewalle:
  - Session clustering categorical and mixed type data at IFCS 2019, Thessaloniki.

10.1.5. Leadership within the Scientific Community

- Benjamin Guedj and Pascal Germain are founding members of the Machine Learning and Artificial Intelligence group (MALIA) of the French statistical association (SFdS).
- Benjamin Guedj is the new French representative at the board of ECAS (since Nov 2019).
- Since 2017, Benjamin Guedj is an elected member of the board of the Statistical French Society (SFdS).

10.1.6. Scientific Expertise

Christophe Biernacki reviewed one project as an expert for the ANR and for Innoviris (Brussels).

10.1.7. Research Administration

- Sophie Dabo-Niang is the person in charge of the MeQAME axis of laboratory LEM, CNRS 9221.
- Christophe Biernacki is Scientific Head of the Inria Lille center since June 2017.
- Benjamin Guedj has been the list head for the election of the Evaluation Committee in June 2019. He has been an elected member of CE since 2017 and is a member of its executive board since Sept 2019.

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

- Pascal Germain taught

  Master: Introduction aux réseaux de neurones, 15 heures, M2, Université de Lille, France
- Sophie Dabo-Niang is teaching

  Master: Spatial Statistics, 24h, M2, Université de Lille, France

  Master: Advanced Statistics, 24h, M2, Université de Lille, France

  Master: Multivariate Data Analyses, 24h, M2, Université de Lille, France

  Licence: Probability, 24h, L2, Université de Lille, France

  Licence: Multivariate Statistics, 24h, L3, Université de Lille, France
- Cristian Preda is teaching

  Polytech'Lille engineer school: Linear Models, 48h.

  Polytech'Lille engineer school: Advanced statistics, 48h.

  Polytech'Lille engineer school: Biostatistics, 10h.

  Polytech'Lille engineer school: Supervised clustering, 24h. France
- Christophe Biernacki is teaching

  New Master Data Science: Statistics, 24h, M1, Université de Lille, France
- Benjamin Guedj is teaching

  Advanced machine learning (M2, 6h), University College London, UK
- Serge Iovleff is teaching

  Licence: Analyse et méthodes numériques, 56h, Université de Lille, DUT Informatique

  Licence: R.O. et aide à la décision, 32h, Université de Lille, DUT Informatique

- Vincent Vandewalle is teaching

  Licence: Probability, 60h, Université de Lille, DUT STID

  Licence: Case study in statistics, 45h, Université de Lille, DUT STID

  Licence: R programming, 45h, Université de Lille, DUT STID

  Licence: Supervised clustering, 32h, Université de Lille, DUT STID

  Licence: Analysis, 24h, Université de Lille, DUT STID

10.2.2. Supervision

10.2.2.1. PhD defense:

- Maxime Baelde, September 20th 2019, supervised by Christophe Biernacki and Raphaël Greff on "Generative models for the classification and separation of real-time sound sources" [11].
- Anne-Lise Bedenel, April 1st 2019, supervised by Christophe Biernacki and Laetitia Jourdan on "Matching descriptors evolving over time: application to insurance comparison" [12].
- Adrien Ehrhardt, September 3rd 2019, supervised by Christophe Biernacki, Philippe Heinrich and Vincent Vandewalle on "Formalization and study of statistical problems in Credit Scoring" [13].

10.2.2.2. PhD in progress:

- Felix Biggs, Generative models and kernels, University College London, Sep 2019, Benjamin Guedj.
- Antoine Vendeville, Learning on graph to stop the propagation of fake news, University College London, Sep 2019, Benjamin Guedj.
- Luxin Zhang, Domain adaptation from a pre-trained source model – Application to fraud detection in electronic payments, February 2019, Christophe Biernacki, Pascal Germain, Yacine Kessac.
- Paul Viallard, Interpreting representation learning through PAC-Bayes theory, September 2019, Amaury Habrard, Emilie Morvant, Pascal Germain.
- Dang Khoi Pham, Planning and re-planning of nurses in an oncology department using a multi-objective and interdisciplinary approach, September 2016, Sophie Dabo-Niang.
- Solange Doumun, Performance evaluation and contribution to the development of multispectral image analysis strategies for automatic and rapid diagnosis of malaria, December 2018, Sophie Dabo-Niang.
- Alaa Ali Ayad, Statistical modeling of large spatial data and its applications in health, September 2018, Sophie Dabo-Niang.
- Wilfried Heyse, Prise en compte de la structure temporelle dans l'analyse statistique de données protéomiques à haut débit, October 2019, Christophe Bauters, Guillemette Marot and Vincent Vandewalle.
- Margot Selosse, October 2017, Christophe Biernacki and Julien Jacques.
- Filippo Antonazzo, October 2019, Christophe Biernacki and Christine Keribin.
- Yaroslav Averyanov, September 2016, Early stopping and filters estimators, Alain Celisse.

10.2.3. Juries

- Sophie Dabo-Niang acted as a reviewer and an examinator for PhD theses.
- Christophe Biernacki acted as a reviewer for the following PhD theses: Keefe Murphy December 17th 2019 (UCD Dublin), Jocelyn Chauvet April 19th 2019 (University of Montpellier).
- Christophe Biernacki acted as an examinator for the following HdR defenses: Madalina Olteanu December 10th 2019 (University Paris 1), Servane Gey February 7th 2019 (University Paris 5).
- Christophe Biernacki participated in the following juries of recruitment: MC jury université d'Avignon, Jury CR Lille, Jury DR Inria.

- Christophe Biernacki participated in the following juries of recruitment: MCF jury Université de Nice May 2019, Jury CR Paris 2019, Jury CR Inria (nationwide) 2019.
- Vincent Vandewalle participated in an MC jury Université Versailles Saint Quentin May 2019.
- Alain Celisse acted as a reviewer for the HdR defense of Zoltan Szabo in December 2019 at Ecole Polytechnique, Palaiseau.
- Cristian Preda acted as a referee for the PhD thesis of Amandine Schmutz, Université de Lyon 2, November 15, 2019.
- Cristian Preda acted as a referee for the HDR defense of Raluca Vernic, July 10, 2019, Universitatea Ovidiu, Constanta, Romania.

10.3. Popularization

10.3.1. Internal or external Inria responsibilities

Christophe Biernacki acts as a member of the working group calculation for Inria.

10.3.2. Interventions

- Pascal Germain participated in the school activity "Jouer à débattre" of the organization "L'arbre des connaissances", as an expert in artificial intelligence (Lycée EIC de Tourcoing, February 7, 2019).
- Pascal Germain gave a vulgarization talk about neural networks and deep learning at the "Journée de l'Enseignement de l'Informatique et de l'Algorithmique" (Université de Lille, March 6, 2019).
- Christophe Biernacki participated in a round table "Deep Learning for PHM: Opportunities and Challenges", The 10th Prognostics and System Health Management Conference Paris, France, May 2 - May 5, 2019.
- Christophe Biernacki gave a talk at the Forum Teratec in June 12nd 2019, Ecole Polytechnique, Palaiseau with Margot Correard (DiagRAMS) on Predictive maintenance solution without additional sensors [40].
- Cristian Preda was invited as a speaker at IoT Week on predictive maintenance, Méaulte, December 4, 2019.
- Cristian Preda was invited as a speaker at IT Tour by Le Monde Informatique on artificial inteligence, November 14, 2019.

RANDOPT Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events: Organisation

10.1.1.1. General Chair, Scientific Chair

- Anne Auger: general chair of the ACM-GECCO 2019 conference that took place in July in Prague and welcomed ca. 700 participants.

10.1.1.2. Member of the Organizing Committees

- Dimo Brockhoff: co-organizer of the Lorentz Center Workhop "MACODA: Many Criteria Optimization and Decision Analysis", September 2019, Leiden, The Netherlands, 42 participants
- Anne Auger, Dimo Brockhoff, Nikolaus Hansen, and Konstantinos Varelas: co-organizers of the Black-Box Optimization Benchmarking workshop (BBOB) at the ACM-GECCO 2019 conference.
- Anne Auger: Organizer of an **invited session** on *Recent Advances on Randomized Derivative Free Optimization* at the EURO conference, Dublin.

10.1.2. Scientific Events: Selection

10.1.2.1. Reviewer

- Dimo Brockhoff and Nikolaus Hansen: ACM-GECCO 2019

10.1.3. Dagstuhl seminar invitations

- Anne Auger, Dimo Brockhoff and Nikolaus Hansen invited at the Dagstuhl Seminar 19431 on "Theory of Randomized Optimization Heuristics", October 2019
- Dimo Brockhoff invited at the Dagstuhl Seminar 20031 on "Scalability in Multiobjective Optimization", January 2020

10.1.4. Journal

10.1.4.1. Member of the Editorial Boards

- Anne Auger, Dimo Brockhoff and Nikolaus Hansen: Associate Editor of the ACM Transactions on Evolutionary Learning and Optimization
- Anne Auger and Nikolaus Hansen: Associate Editor of the Evolutionary Computation Journal
- Anne Auger is guest editor of an Algorithmica special issue of papers selected from the ACM-GECCO'2018 theory track
- Anne Auger is guest editor of the IEEE Transactions on Evolutionary Computation special issue on Theoretical Foundations of Evolutionary Computation

10.1.4.2. Reviewer - Reviewing Activities

- Dimo Brockhoff: reviewed papers for IEEE Transactions on Evolutionary Computation (IEEETEC), European Journal of Operational Research (EJOR), Evolutionary Computation, and Journal of Global Optimization

10.1.5. Invited Talks

- Dimo Brockhoff: "Quality Indicator Maximization in Multiobjective Optimization Via Single-Objective Solvers: Unflattened Hypervolume Improvement in the Sofomore Framework", Jozef Stefan Institute, Ljubljana, Slovenia, April 2019

- Nikolaus Hansen: “How to Evolve Gradient Descent into Evolution Strategies and CMA-ES”, Journée de Rentrée du CMAP, Ecole polytechnique, Paris, October 2019
- Nikolaus Hansen: “How to Evolve Gradient Descent into Evolution Strategies and CMA-ES”, Symposium on Evolutionary Algorithms: Back to the Future and Beyond—Traversing the Ever-Evolving Landscape of Evolutionary Algorithms, Delft, The Netherlands, September 2019
- Nikolaus Hansen: Keynote lecture at the Workshop on Machine-Learning-Assisted Image Formation entitled “From Gradient-Based to Evolutionary Optimization”, Nice, France, June 2019
- Anne Auger: Convergence Results of Adaptive Evolution Strategies: an Overview, Lifeware seminar, January 2019
- Anne Auger: COMO-CMA-ES a linearly convergent multi-objective solver, ICCOP conference, Berlin

10.1.6. Leadership within the Scientific Community

- Anne Auger, Elected Member of the ACM-SIGEVO executive board
- Dimo Brockhoff: member of the International Advisory Committee for EMO-2019 in East Lansing, USA
- Anne Auger, member of the conseil de laboratoire of the CMAP, Ecole Polytechnique.

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

Master: Anne Auger, “Optimization without gradients”, 22.5h ETD, niveau M2 (Optimization Master of Paris-Saclay)

Master: Dimo Brockhoff, “Algorithms and Complexity”, 36h ETD, niveau M1/M2 (joint MSc with ESSEC “Data Sciences & Business Analytics”), CentraleSupelec, France

Master: Anne Auger and Dimo Brockhoff, “Introduction to Optimization”, 31.5h ETD, niveau M2 (MSc Informatique - Parcours Apprentissage, Information et Contenu (AIC)), U. Paris-Saclay, France

Master: Anne Auger and Dimo Brockhoff, “Advanced Optimization”, 31.5h ETD, niveau M2 (MSc Informatique - Parcours Apprentissage, Information et Contenu (AIC)), U. Paris-Saclay, France

10.2.2. Tutorials

- Dimo Brockhoff: tutorial on Evolutionary Multiobjective Optimization, 3h ETD, niveau PhD, ACM-GECCO conference, Czech Republic
- Nikolaus Hansen: tutorial “A Practical Guide to Experimentation”, 3h ETD, niveau PhD, ACM-GECCO conference, Czech Republic
- Nikolaus Hansen: tutorial on “CMA-ES and Advanced Adaptation Mechanisms”, 3h ETD, niveau PhD, ACM-GECCO conference, Czech Republic, with Youhei Akimoto

10.2.3. Supervision

- PhD in progress: Konstantinos Varelas, “Large-Scale Optimization, CMA-ES and Radar Applications”, Dec. 2017, Anne Auger and Dimo Brockhoff
- PhD in progress: Cheikh Touré, “Linearly Convergent Multi-objective Stochastic Optimizers”, Dec. 2017, Anne Auger and Dimo Brockhoff
- PhD in progress: Paul Dufossé, “Constrained Optimization and Radar Applications”, Oct. 2018, Nikolaus Hansen
- PhD in progress: Marie-Ange Dahito, “Mixed-Integer Blackbox Optimization for Multiobjective Problems in the Automotive Industry”, Jan 2019, Dimo Brockhoff and Nikolaus Hansen

- PhD in progress: Eugénie Marescaux, Theoretical Analysis of convergence of multi-objective solvers (2019–), supervisor A. Auger
- PhD in progress: Alann Cheral, "Black-box optimization for the optimization of hyperspectral bandwidth for anomaly detection" (2019–), supervisor A. Auger
- Jingyun Yang, Ecole Polytechnique, since September 2019
- Eugenie Marescaux, ENSTA, April–September 2019
- Julien Bonneville, U. Versailles, March–August 2019

10.2.4. Juries

- Anne Auger: member of the **PGMO PhD award** scientific committee. Representing the committee for the PGMO PhD award ceremony at the PGMO days
- Dimo Brockhoff: jury member for the PhD thesis of David Gaudrie, École des Mines de Saint-Étienne, October 2019

10.3. Popularization

- Scientific mediation by Cheikh Touré: presentation on poker in the context of the visit of college and high school students to Inria Saclay

10.3.1. Internal or external Inria responsibilities

- Anne Auger: member of the BCEP of Saclay.
- Dimo Brockhoff: member of the CDT committee of Saclay (since February 2019).

REALOPT Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events: Organisation

10.1.1.1. General Chair, Scientific Chair

- François Clautiaux: Conférence Dataquitaine (around 300 participants) in Bordeaux, February 2019
- François Clautiaux: Workshop on Integer Programming and Algorithms in Marne-La-Vallée, November 2019

10.1.1.2. Member of the Organizing Committees

- François Clautiaux: Conférence Dataquitaine (around 300 participants) in Bordeaux, February 2019
- François Clautiaux: Workshop on Integer Programming and Algorithms in Marne-La-Vallée, November 2019

10.1.2. Scientific Events: Selection

10.1.2.1. Member of the Conference Program Committees

- François Clautiaux: Conference ROADEF 2019, Le Havre
- Pierre Pesneau: INOC 2019, in Avignon

10.1.3. Journal

10.1.3.1. Member of the Editorial Boards

- François Clautiaux : editor for Open Journal on Mathematical Optimization (OJMO)

10.1.3.2. Reviewer - Reviewing Activities

- François Clautiaux : European Journal of Operational Research, Discrete Applied Mathematics, Discrete Optimization, International Transactions on Operations Research,
- Aurélien Froger: European Journal of Operational Research, Transportation Science, Computers & Operations Research, Journal of Heuristics
- Ruslan Sadykov: Mathematical Programming, Transportation Science, International Transactions of Operations Research, ACM Transactions on Parallel Computing, Integer Programming and Combinatorial Optimization conference

10.1.4. Invited Talks

- François Clautiaux: Invited talk at the ESICUP Workshop, in Mexico (April 10th, 2019)
- Aurélien Froger: Invited talk [10] at the 2nd International Workshop on Synchronisation in Transport, SynchroTrans 2019, in Nantes (September 10th, 2019)
- Ruslan Sadykov: Invited talk [12] at the 9th International Network Optimization conference, invited talk [11] at the POC Autumn School on Advanced BCP Tools

10.1.5. Leadership within the Scientific Community

François Clautiaux has been elected president of the French O.R. association, ROADEF.

10.1.6. Scientific Expertise

François Clautiaux has been expert for HCERES

François Clautiaux has been expert for the Flander's Innovation and Entrepreneurship Agency.

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

Licence : François Clautiaux, Projet d'optimisation, L3, Université de Bordeaux, France

Licence : François Clautiaux, Grands domaines de l'optimisation, L1, Université de Bordeaux, France

Master : François Clautiaux, Introduction à la programmation en variables entières, M1, Université de Bordeaux, France

Master : François Clautiaux, Integer Programming, M2, Université de Bordeaux, France

Master : François Clautiaux, Algorithmes pour l'optimisation en nombres entiers, M1, Université de Bordeaux, France

Master : François Clautiaux, Programmation linéaire, M1, Université de Bordeaux, France

Master: Boris Detienne, Combinatoire et routage, ENSEIRB INPB

Licence : Boris Detienne, Optimisation, L2, Université de Bordeaux

Licence : Boris Detienne, Groupe de travail applicatif, L3, Université de Bordeaux

Master : Boris Detienne, Optimisation continue, M1, Université de Bordeaux

Master : Boris Detienne, Integer Programming, M2, Université de Bordeaux

Master : Boris Detienne, Optimisation dans l'incertain, M2, Université de Bordeaux

Licence : Aurélien Froger, Groupe de travail applicatif, L3, Université de Bordeaux, France

Master : Aurélien Froger, Optimisation dans les graphes, M1, Université de Bordeaux, France

Master : Aurélien Froger, Gestion des opérations et planification de la production, M2, Université de Bordeaux, France

Master : Ruslan Sadykov, Introduction to Constraint Programming, M2, Université de Bordeaux, France

Licence : Pierre Pesneau, Grands domaines de l'optimisation, L1, Université de Bordeaux, France

Licence : Pierre Pesneau, Programmation pour le calcul scientifique, L2, Université de Bordeaux, France

Licence : Pierre Pesneau, Optimisation, L2, Université de Bordeaux, France

DUT : Pierre Pesneau, Recherche Opérationnelle, DUT Informatique 2ème année, Université de Bordeaux, France

Master : Pierre Pesneau, Algorithmique et Programmation 1, M1, Université de Bordeaux, France

Master : Pierre Pesneau, Algorithmique et Programmation 2, M1, Université de Bordeaux, France

Master : Pierre Pesneau, Programmation linéaire, M1, Université de Bordeaux, France

Master : Pierre Pesneau, Integer Programming, M2, Université de Bordeaux, France

10.2.2. Supervision

HdR : Ruslan Sadykov, Modern Branch-Cut-and-Price, Université de Bordeaux, 4/12/2019.

PhD : Imen Ben Mohamed, Designing Two-Echelon Distribution Networks under Uncertainty [1], Université de Bordeaux, 27/05/2019, Walid Klibi (dir), Ruslan Sadykov (dir), François Vanderbeck (co-dir).

PhD in progress : Alena Shilova, Scheduling for Deep Learning Frameworks from October 2018, Olivier Beaumont (dir) and Alexis Joly (dir)

PhD in progress: Tobias Castanet, Use of Replication in Distributed Games from September 2018, Olivier Beaumont (dir), Nicolas Hanusse (dir) and Corentin Travers (dir).

PhD in progress : Guillaume Marques, Planification de tournées de véhicules avec transbordement en logistique urbaine : approches basées sur les méthodes exactes de l'optimisation mathématique, from September 2017, Ruslan Sadykov (dir)

PhD in progress : Gaël Guillot, Aggregation and disaggregation methods for hard combinatorial problems, from November 2017, François Clautiaux (dir) and Boris Detienne (dir).

PhD in progress : Orlando Rivera Letelier, Bin Packing Problem with Generalized Time Lags, from May 2018, François Clautiaux (dir) and Ruslan Sadykov (co-dir), a co-tutelle with Universidad Adolfo Ibáñez, Peñalolén, Santiago, Chile.

PhD in progress: Mohamed Benkirane, "Optimisation des moyens dans la recomposition commerciale de dessertes TER" from November 2016, François Clautiaux (dir), Boris Detienne (dir)

PhD in progress: Xavier Blanchot, "Accélération de la Décomposition de Benders à l'aide du Machine Learning : Application à de grands problèmes d'optimisation stochastique two-stage pour les réseaux d'électricité" from September 2019, François Clautiaux (dir), Aurélien Froger (co-dir)

PhD in progress: Johan Levêque, "Conception de réseaux de distributions urbains mutualisées en mode doux", from September 2018, François Clautiaux (dir), Gautier Stauffer (co-dir)

10.2.3. Juries

- François Clautiaux: external referee for the thesis of Arthur Kramer (Bologna), referee for the thesis of Arnaud Lazare (Université Paris Saclay) jury member for Simon Bélières (Université de Toulouse), Imen Ben Mohamed (Université de Bordeaux) jury member for the habilitation of Ruslan Sadykov (Université de Bordeaux)
- Boris Detienne: jury member for Ikram Bouras (Université de Montpellier) and Imen Ben Mohamed (Université de Bordeaux)
- Ruslan Sadykov: member of of the selection committee of the Maitre de Conference position (Université de Bordeaux)

10.3. Popularization

- Local events: Participation to "Journée emploi maths et interaction 2019". This day aims to bring together students, researchers and practitioners in mathematics in the Bordeaux area. https://uf-mi.u-bordeaux.fr/sites/jemi/

10.3.1. Interventions

- Participation to Circuit Scientifique Bordelais (Fête de la Science)
- Participation to the 80th anniversary of CNRS

SEQUEL Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events: Organisation

- the 1st Reinforcement Learning Summer Scool, July 1-12, 2019, Villeneuve d'Ascq
- the 3rd Vigil workshop at NeurIPS 2019

10.1.1.1. Member of the Organizing Committees

- F. Strub, co-organizer of the workshop "Visually Grounded Interaction and Language (ViGIL)" at NeurIPS 2019
- The whole SEQUEL team has organized RLSS

10.1.2. Scientific Events: Selection

10.1.2.1. Member of the Conference Program Committees

- Émilie Kaufmann: ALT
- Odalric-Ambrym Maillard: ICML, ECAI, SIF
- Philippe Preux: ECML, EGC, SFC

10.1.2.2. Reviewer

In 2019, we have reviewed submissions for: AI&Stats, NeurIPS, ALT, ICML, COLT, IJCAI, AAAI, CDC, ECAI

10.1.3. Journal

10.1.3.1. Reviewer - Reviewing Activities

- Journal of Machine Learning Research
- Journal of Artificial Intelligence Research
- The Annals of Statistics
- Bernoulli
- IEEE Transactions on Knowledge and Data Engineering
- Machine Learning
- Information and Inference: A Journal of the IMA

10.1.4. Invited Talks

- E. Kaufmann
  - "Beyond Classical Bandit Tools for Monte-Carlo Tree Search", AAAI workshop on Reinforcement Learning for Games, Honolulu, Jan 2019
  - "New tools for Adaptive Testing and Applications to Bandit Problems", Machine Learning and Optimization Working Group, Ecole des Ponts, Feb 2019
  - "Generalized Likelihood Ratios Tests applied to Sequential Decision Making", Statistics Seminar, Agro ParisTech, Paris, May 2019
  - "Generalized Likelihood Ratios Tests applied to Sequential Decision Making", Machine Learning Seminar, University of Leiden, The Netherlands, May 2019
  - "Quelques outils statistiques pour la prise de décision séquentielle", Conférence plénière du GRETSI, Lille, Aug 2019

  - "Practical algorithm for multi-player bandits", MAPLE workshop, Milan, Italy Sep 2019
  - "Practical algorithm for multi-player bandits", Invited session of the Allerton Conference, Urbana-Champaign, USA Sep 2019
- Odalric-Ambrym Maillard:
  - "La prise de décision séquentielle au service de la société de demain", Euratechnologie, Lille, Feb 2019
  - "Change of mean detection, non-asymptotic delay and aggregation", 3rd non-stationary day, Institut Henry Poincaré, Paris, Mar 2019
  - "A tour of time-uniform concentration inequalities: Laplace, Peeling, Kernel", Workshop on empirical Processes and Applications to Statistics, Besançon, May 2019
  - "A tour of time-uniform concentration inequalities: Laplace, Peeling, Kernel", CWI, Amsterdam, The Netherlands, Jun 2019
  - "Reinforcement Learning: successes and promises", Ecole Polytechnique, Palaiseau, Nov 2019
- Philippe Preux:
  - A brief introduction to supervised learning and reinforcement learning, 1st humAIn seminar, Villeneuve d'Ascq, Feb 2019
  - "Sous le contrôle des bandits", AFCE, June 2019
  - Explainability in machine learning, 3rd humAIn seminar, Lille, June 2019
  - "Learning to act", ENS-Paris-Saclay, Conférence de rentrée, Sep 2019
  - "Apprentissage par renforcement : mythe et réalité", FOOR, Tourcoing, Nov 2019
- Jill-Jênn Vie:
  - "IA, éducation et formation", Hermès, Paris, Oct 2019
  - "JJ Vie's Factorization IV", LaBRI, Bordeaux, Nov 2019
  - "Deep Learning for Anime & Manga", Paris Open Source Summit, Dec 2019
  - "Deep Learning for Recommender Systems", Université Cergy-Pontoise, Dec 2019
- R. Gautron, O-A. Maillard, Ph. Preux, "Reinforcement learning for crop-management: a sequential decision-making under uncertainty approach", CGIAR convention, Hydebarad, India, Oct 2019
- Ph. Preux, M. Seurin, "L'IA, les données, ... et l'Homme dans tout ça ?", congress "Les données et leurs usages dans les technologies du numérique", Douai, Oct 2019

10.1.5. Scientific Expertise

- Émilie Kaufmann:
  - member of the hiring committee for an assistant professor in probability/statistics at Université Paris-Sud
- Odalric-Ambrym Maillard:
  - member of the hiring committee for CRCN at Inria Lille
- Philippe Preux:
  - member of the hiring committee for CRCN at Inria Rennes
  - member of the hiring committee for CRCN at Inria (national)
  - evaluation of submissions to ANRT (he also declined many such invitations due to lack of time, *e.g.* with ANR)

10.1.6. Research Administration

- Odalric-Ambrym Maillard is:

  - member of the CER at Inria Lille
- Philippe Preux is:
  - "délégué scientifique adjoint" of the Inria center in Lille
  - member of the Inria evaluation committee (CE)
  - member of the Inria internal scientific committee (COSI)
  - member of the scientific committee of CRIStAL until Jan 2019
  - the head of the "Data Intelligence" thematic group at CRIStAL until Jan 2019

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

Doctorat: Émilie Kaufmann and Odalric-Ambrym-Maillard, "Bandit algorithms I", RLSS Summer School, Lille, 9h, July 2019

Master: Émilie Kaufmann, "Data Mining", 36h, M1, Université de Lille, Jan-Apr 2019

Master: Émilie Kaufmann, "Reinforcement Learning", 24h, M2, Ecole Centrale de Lille, Nov 2019-Jan 2020

Master: Odalric-Ambrym Maillard, "Reinforcement Learning", 38h equivalent TD, M2, Ecole Polytechnique, Palaiseau, Jan-Mar 2019

Doctorat: Odalric-Ambrym Maillard, "Bandit algorithms II", RLSS Summer School, Lille, 9h, July 2019

Doctorat: Philippe Preux, "Reinforcement Learning", Fall School on AI (IA2) of the GDR IA (CNRS), Lyon, 3h, Oct 2019

Doctorat: Philippe Preux, "AI learns to act", MOMI, Sophia-Antipolis, 1h30, Feb 2019

10.2.2. Supervision

HdR: Odalric-Ambrym Maillard, Mathematics of Sequential Decision Making, Université de Lille, Feb 11, 2019

PhD: Lilian Besson, Multi-players Bandit Algorithms for Internet of Things Networks, Centrale-Supélec Rennes, Nov 20, 2019, supervisors: Christophe Moy (Université de Rennes) et Émilie Kaufmann

PhD: Ronan Fruit, Exploration–exploitation dilemma in Reinforcement Learning under various form of prior knowledge, Université de Lille, Nov 6, 2019, supervisor: Alessandro Lazaric

PhD: Nicolas Carrara, "Apprentissage par renforcement pour optimisation de systèmes de dialogue via l'adaptation à chaque utilisateur", Université de Lille, Dec 18, 2019, supervisor: Oliier Pietquin

PhD in progress: Dorian Baudry, "Efficient Exploration for Structured Bandits and Reinforcement Learning", since Nov 2019, supervisors: É. Kaufmann, O-A. Maillard

PhD in progress: Omar Darwiche Domingues, "Sequential Learning in Dynamic Environments", since Oct 2018, supervisors: É. Kaufmann, M. Valko

PhD in progress: Johan Ferret, "Explainable Reinforcement Learning via Deep Neural Networks", since Fall 2019, supervisor: Ph. Preux, O. Pietquin

PhD in progress: Yannis Flet-Berliac, "Deep reinforcement learning in stochastic and non stationary environments", since Oct 2018, supervisor: Ph. Preux

PhD in progress: Guillaume Gautier, DPPs in ML, started Oct 2016, defense scheduled in March 2020. Supervisors: R. Bardenet, M. Valko.

PhD in progress: Jean-Bastien Grill, "Création et analyse d'algorithmes efficaces pour la prise de décision dans un environnement inconnu et incertain", started Oct 2014, defended on Dec 19, 2019. Supervisors: R. Munos, M. Valko

PhD in progress: Nathan Grinsztajn, “Apprentissage par renforcement pour la résolution séquentielle de problèmes d’optimisation combinatoire incertains et partiellement définis”, since Fall 2019, supervisor: Ph. Preux

PhD in progress: Léonard Hussenot, “Adversarial reinforcement learning: attacks and robustness”, since Fall 2019, supervisor: Ph. Preux, O. Pietquin

PhD in progress: Édouard Leurent, “Autonomous vehicle control: application of machine learning to contextualized path planning”, since Oct 2017, supervisors: O-A. Maillard, D. Effimov (Valse), W. Perruquetti (CRIStAL)

PhD in progress: Reda Ouhamma, “Automated feature representation”, since Fall 2019, O-A. Maillard

PhD in progress: Pierre Perrault, “Online Learning on Streaming Graphs”, since Sep 2017, supervisors: M. Valko, V. Perchet

PhD in progress: Sarah Perrin, “Reinforcement Learning in Mean Field Games”, since Fall 2019, supervisors: O. Pietquin, R. Elie

PhD in progress: Hassan Saber, “Structured multi-armed bandits”, since Oct 2018, Structured Multi-armed bandits, supervisor: O-A. Maillard.

PhD in progress: Mathieu Seurin, “Multi-scale rewards in reinforcement learning”, since Oct 2017, supervisors: O. Pietquin, Ph. Preux

PhD in progress: Julien Seznec, “Sequential Learning for Educational Systems”, since Mar 2017, supervisors: M. Valko, A. Lazaric, J. Banon

PhD in progress: Xuedong Shang, “Adaptive methods for optimization in stochastic environments”, started Oct 2017, supervisors: É. Kaufmann, M. Valko

PhD in progress: Florian Strub, “Reinforcement Learning for visually grounded interaction”, since Jan 2016, defense scheduled for Jan 2020, supervisors: O. Pietquin and J. Mary

PhD in progress: Kiewan Villatel, “Deep Learning for Conversion Rate Prediction in Online Advertising”, started Oct 2017, aborted June 2019, supervisor: Ph. Preux

10.2.3. Juries

- Émilie Kaufmann:
  - Aristide Tossou, member of the jury, Chalmers University, Sweden, Nov 18, 2019
  - Rémi Degenne, member of the jury, Université Paris-Diderot, Dec 18, 2019
  - member of the Mathematics jury for the admission competition of ENS, section B/L
- Odalric-Ambrym Maillard:
  - Léonard Torossian, reviewer, Université Toulouse III, Dec 17, 2019.
- Philippe Preux:
  - Quentin Waymel (medical doctorate), member of the jury, Université de Lille, Jun 2019
  - Adrien Legrand, reviewer, Université de Picardie, Amiens, Nov 29, 2019
  - Erinc Merdivan, reviewer, Centrale-Supélec Metz, Dec 17, 2019
  - Nicolas Carrara, member of the jury, Université de Lille, Dec 18, 2019
- Michal Valko:
  - Aristide Tossou, opponent, Chalmers University, Sweden, Nov 18, 2019

10.3. Popularization

10.3.1. Articles and contents

- Philippe Preux:

- interviewed by *Le Monde* pulished in Sep 2019
- interview on I-SITE project B4H, Inria

10.3.2. Education

- Odalric-Ambrym Maillard:
  - "Reinforcement Learning: successes and promises", Executive Master, Ecole Polytechnique, Palaiseau, Nov 2019

10.3.3. Interventions

- Philippe Preux:
  - panel on "Promises and perils of AI", CGIAR, Hyderabad, India, Oct 2019
  - panel on "AI and man", Euratechnologies, Lille, Sep 2019
- Yannis Flet-Berliac and Philippe Preux: panel on "Who's the pilot: man of software?", FOOR, Le Fresnoy, Tourcoing, Nov 2019
- Yannis Flet-Berliac: "Princess of parallelograms" installation (with Thomas Depas), Le Fresnoy, Tourcoing, "Damien & The Love Guru" gallery in Brussels, Belgium, Sep–Dec 2019

Figure 1.

Princess of parallelograms is a collaborative project between Yannis Flet-Berliac and a student from Le Fresnoy National Studio of Contemporary Arts. They created an interactive sculpture made of a variety of computer vision attributes: a support for anthropomorphic projections, a set of generated virtual masks, or a new form of photographic trap. When visitors stand in front of the device's webcam, a Deep Convolutional Conditional-GAN Auto-Encoder model applies a filter on their face with virtual flesh, hair, and facial expressions in real-time. In the meantime, an emotion detection model trained on the FER-2013 dataset is running in the background. The system allows the users to actively interact with the installation. So far, the project has been exposed at Le Fresnoy and in Brussels.

SIERRA Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

- Adrien Taylor, ICCOPT session organizer: *Performance Estimation of First-Order Methods* (with F. Glineur), *Splitting Methods and Applications (Part I)* (with P. Giselsson and E. Ryu), *Splitting Methods and Applications (Part III)* (with P. Giselsson and E. Ryu).

10.1.1. Scientific Events: Organisation

10.1.1.1. Member of the Organizing Committees

- Alexandre d'Aspremont, co-organizer, Les Houches Workshop on Optimization and Machine Learning, March 2019.

10.1.2. Scientific Events: Selection

10.1.2.1. Member of the Conference Program Committees

- Senior Area Chair, NeurIPS conference 2019 (Francis Bach).

10.1.2.2. Reviewer

Most of the team referees for the major machine learning conferences such as NIPS, AISTATS, ICML.

10.1.3. Journal

10.1.3.1. Member of the Editorial Boards

- Alexandre d'Aspremont: SIAM Journal on Optimization, Associate Editor
- Alexandre d'Aspremont: SIAM Journal on the Mathematics of Data Science, Associate Editor
- Alexandre d'Aspremont: Mathematical Programming B, Associate Editor
- Alexandre d'Aspremont: Mathematics of Operations Research, Associate Editor
- Francis Bach: Journal of Machine Learning Research, co-editor-in-chief
- Francis Bach: Information and Inference, Associate Editor
- Francis Bach: Electronic Journal of Statistics, Associate Editor.
- Francis Bach: Mathematical Programming, Associate Editor
- Francis Bach: Foundations of Computational Mathematics, Associate Editor

10.1.3.2. Reviewer - Reviewing Activities

1. Adrien Taylor, reviewer for Automatica.
2. Adrien Taylor, reviewer for SIAM Journal on Numerical Analysis (SINUM).
3. Adrien Taylor, reviewer for SIAM Journal on Optimization (SIOPT).
4. Adrien Taylor, reviewer for Mathematical Programming (MPA).
5. Adrien Taylor, reviewer for International Conference on Machine Learning 2019 (ICML19).

10.1.4. Invited Talks

- Alexandre d'Aspremont, ICCOPT 2019, Berlin, August 2019.
- Alexandre d'Aspremont, CIMI Workshop, Toulouse, October 2019.
- Alexandre d'Aspremont, France-Germany-Swiss Optimization conference, Nice, September 2019.
- Alexandre d'Aspremont, BIRS Workshop, Oaxaca, Oct. 2019.
- Alexandre d'Aspremont, SAMPTA, Bordeaux, July 2019.

- Francis Bach,Optimization workshop, Les Houches, March 2019.
- Francis Bach, Oberwolfach, Germany, May 2019.
- Francis Bach, AI Global summit, Geneva, Switzerland, May 2019.
- Francis Bach, ETH Data science seminar, Zurich, Switzerland, June 2019.
- Francis Bach, ETH Imaging workshop, Zurich, Switzerland, June 2019.
- Francis BACH, ICIAM invited session, Valencia, Spain, July 2019.
- Francis Bach, Workshop on covariance operators, Germany, Berlin, September 2019.
- Francis Bach, GAMM Workshop COMinDS2019, Berlin, Germany, October 2019.
- Francis Bach, DIMS workshop, Leipzig, Germany, November 2019.
- Francis Bach, Conference on Decision and Control, Nice, December 2019.
- Adrien Taylor, SPOT optimization seminar, Toulouse, February 2019.
- Adrien Taylor, Optimization workshop, Les Houches, March 2019.
- Adrien Taylor, CWI Network & Optimization Seminar, Amsterdam, April 2019.
- Adrien Taylor, Summer school on Optimization (MIPT & HSE), Moscow, June 2019.
- Adrien Taylor, ICCOPT 2019, Berlin, August 2019.
- Alessandro Rudi, *Recent developments on kernel methods*, RKM 2019 (Sept. 2019, London, UK)
- Alessandro Rudi, *Data, Learning and Inference meeting*, DALI 2019 (Sept. 2019, San Sebastian, Spain)
- Alessandro Rudi,*32nd European Meeting of Statisticians*, EMS 2019 (July 2019 , Palermo, Italy)
- Alessandro Rudi,*Applied Inverse Problems Conference*, AIP 2019 (July 2019, Grenoble, France)
- Alessandro Rudi, *Imaging and Machine Learning Conference* (April 2019, Paris, France)
- Alessandro Rudi, *Seminar on the Mathematics of Imaging* (March 2019, Paris, France)

10.1.5. Scientific Expertise

- Alexandre d'Aspremont. Conseil scientifique, Vivienne Investissement.

10.1.6. Research Administration

- Alexandre d'Aspremont. Reponsable scientifique, IRIS PSL, "Sciences des données, données de la science".
- Francis Bach, Deputy Scientific Delegate for Inria Paris research center, member of the Inria Evaluation Committee.

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

Master: Alexandre d'Aspremont, Optimisation Combinatoire et Convexe, avec Zhentao Li, (2015-Present) cours magistraux 30h, Master M1, ENS Paris.

Master: Alexandre d'Aspremont, Optimisation convexe: modélisation, algorithmes et applications cours magistraux 21h (2011-Present), Master M2 MVA, ENS PS.

Summer school: Francis Bach, optimization for machine learning, 12 heures, AIMS Master, Kigali, Rwanda

Summer school: Francis Bach, optimization for machine learning, 4 heures, D3S summer school, Ecole Polytechnique.

Master : Francis Bach, Optimisation et apprentissage statistique, 20h, Master M2 (Mathématiques de l'aléatoire), Université Paris-Sud, France.

Master: Pierre Gaillard, Alessandro Rudi, Introduction to Machine Learning, 52h, L3, ENS, Paris.

10.2.2. Supervision

PhD in progress : Thomas Kerdreux, New Complexity Bounds for Frank Wolfe, 2017, Alexandre d'Aspremont

PhD in progress : Radu - Dragomir Alexandru, Bregman Gradient Methods, 2018, Alexandre d'Aspremont

PhD in progress : Mathieu Barré, Accelerated Polyak Methods, 2018, Alexandre d'Aspremont

PhD in progress : Grégoire Mialon, Sample Selection Methods, 2018, Alexandre d'Aspremont

PhD in progress : Raphaël Berthier, started September 2017, supervised by Francis Bach and Pierre Gaillard.

PhD in progress: Loucas Pillaud-Vivien, supervised by Francis Bach and Alessandro Rudi.

PhD in progress: Alexandre Défossez, supervised by Francis Bach and Léon Bottou (Facebook AI Research).

PhD in progress: Alex Nowak-Vila, supervised by Francis Bach and Alessandro Rudi.

PhD in progress: Ulysse Marteau Ferey, supervised by Francis Bach and Alessandro Rudi.

PhD in progress: Vivien Cabannes, supervised by Francis Bach and Alessandro Rudi.

PhD in progress: Eloise Berthier, supervised by Francis Bach.

PhD in progress: Theo Ryffel, supervised by Francis Bach and David Pointcheval.

PhD in progress: Margaux Brégère, supervised by Pierre Gaillard and Gilles Stoltz (Université Paris-Sud).

PhD in progress: Rémi Jezequel, supervised by Pierre Gaillard and Alessandro Rudi.

PhD defended: Dmitry Babichev, co-advised by Francis Bach and Anatoly Judistky, defended February 22 2019

PhD defended: Tatiana Shpakova, advised by Francis Bach, defended February 21 2019

10.2.3. Juries

- HdR Pierre Weiss, IMT Toulouse, September 2019 (Alexandre d'Aspremont).
- HDR Rémi Flamary, Université de Nice, November 2019 (Francis Bach).

10.3. Popularization

- Participation to "Fête de la Science" (with the Apprenti Illustrateur).

TAU Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events: Organisation

10.1.1.1. General Chair, Scientific Chair

Isabelle Guyon - Competition co-chair, ECMLPKDD 2019

Michele Sebag - Area Chair NIPS 2017-2019, ICLR 2020

Flora Jay - PASADENA workshop co-chair, Paris, 2019

10.1.1.2. Member of Organizing Committees

Guillaume Charpiat - Organizing & scientific committee of the ForMaL summer school, at ENS Cachan, June 2019, and of WAISE (Second International Workshop on Artificial Intelligence Safety Engineering) held at SafeComp in September 2019.

Flora Jay - Organizing & scientific committee of Research Program "Ecosystem dynamics : stakes, data and models" at Institut Pascal, Paris-Saclay, 2019.

Isabelle Guyon - Advisory committee BayLearn 2019; Co-organizer NeurIPS 2019 workshop on Challenges in Machine Learning; Co-organizer NeurIPS 2019 NewInML workshop.

Marc Schoenauer - Steering Committee, Parallel Problem Solving from Nature (PPSN); Steering Committee, Learning and Intelligent OptimizatioN (LION).

Michele Sebag - President of Steering Committee, Eur. Conf. on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD).

10.1.2. Scientific Events: Selection

10.1.2.1. Reviewer

All TAU members are reviewers of the main conferences in their respective fields of expertise.

10.1.3. Journal

10.1.3.1. Member of the Editorial Boards

Isabelle Guyon - Action editor, *Journal of Machine Learning Research* (JMLR); series editor, *Springer series Challenges in Machine Learning* (CiML).

Marc Schoenauer - Advisory Board, *Evolutionary Computation Journal*, MIT Press, and *Genetic Programming and Evolutionary Machines*, Springer Verlag; Action editor, *Journal of Machine Learning Research* (JMLR).

Michèle Sebag - Editorial Board, Machine Learning, Springer Verlag.

Paola Tubaro - Associate Editorial Board *Sociology*, Sage; Co-editor, *Revue Française de Sociologie*, Presses de Sciences Po.

10.1.3.2. Reviewer - Reviewing Activities

All members of the team reviewed numerous articles for the most prestigious journals in their respective fields of expertise.

10.1.4. Invited Talks

Guillaume Charpiat - *Deep Learning for Satellite Imagery* in the Imagine team (ENPC), at Champs-sur-Marne, March 2019; and at LRDE lab (EPITA), at Kremlin-Bicêtre, April 2019; *Deep Learning for Storm Trajectory Prediction and Remote Sensing* at the seminar AI for Climate, at Jussieu (Paris), December 2019.

Cyril Furtlehner - *A machine learning approach to solar wind speed forecasting from solar images*, Machine Learning in Heliophysics conference, Amsterdam September 2019.

Flora Jay - *Machine Learning and Deep Learning for Population Genetics*, Statistics/Machine Learning at Paris-Saclay, Bures-sur-Yvette, Jan 2019; *Inferring Demography? A Deep Learning Approach for Population Genetic Data*, ALPHY 7-8 Feb. 2019; *Génomes présents, histoires d'antan: Apprentissage profond pour la génétique des populations*, Inria Seminar Unithé ou Café with G Charpiat, Feb 2019; *When AI & Big Data meet life sciences - Advances in research and ethical questions*, Round Table at YLRS2019, Paris, Jun 2019; *Inferring past history from genetic data using ABC and Deep Learning approaches*, Seminar at Lille University, Jan 2019; *Creating Artificial Human Genomes Using Generative Models*, Seminars at LCQB and Evolmol IBENS, Paris, Nov and Dec 2019.

Julien Girard - *Formal validation for machine learning*, DataIA day on Safety & AI, Palaiseau, Sept. 11th.

Isabelle Guyon - Invited talk at 2019 Sackler Coloquium of the Science of Deep Learning, and Keynote IJCNN 2019: "Neural network solvers for power transmission problems" (https://youtu.be/YBcRzIAFDYU).

Michèle Sebag - *Meta-Learning*, Kickoff of the Kompetenz Center in Machine Learning, Rhine Ruhr Region, Jan. 2019; *Structural Agnostic Models*, Oberwolfach Symposium on Causality, May 2019; *Artificial Intelligence & Causal Modeling*, CREST Big Data Applications Symposium, Tokyo, Sept. 24, 2019; *Some news and questions about AI and Machine Learning*, Arensberg Symposium, Leuven, Nov. 2019.

Marc Schoenauer - *Intelligence Artificielle Mythes et réalités*, audition par la Fédération Française du Bâtiment, Feb. 13, 2019; *Intelligence Artificielle : du congrès de Dartmouth au rapport Villani*, Séminaire IFPEN, Apr. 4. 2019; *Intelligence Artificielle : de Dartmouth à l'apprentissage profond et au rapport Villani*, Rencontres Franciliennes de Mécanique, May 28, 2019; *A gentle introduction to AI and (Deep) Learning*, Mexican-French Workshop, Aug. 27. 2019, Mexico; *Intelligence artificielle : certification, transparence, et impact sur la société*, Data Science Day, Mines Paris Tech, Sept. 18, 2019; *When Big Data and Machine Learning meet Partial Differential Equations*, CREST Big Data Applications Symposium, Tokyo, Sept. 25, 2019;

Paola Tubaro - *Sélectionné.e par une IA ? Algorithmes, inégalités, et les "humains dans la boucle"*, Centre D'Alembert, Orsay, 18/04/2019; *Dans la fabrique des algorithmes : plateformes, micro-travail et dynamiques d'externalisation*, INSEE, 14/05/2019; *The human labour that makes AI possible: An empirical study of micro-work in France*, Alan Turing Institute, London, 22/01/2019; *Que font les big data aux sciences sociales ? Retour sur une 'crise' annoncée*, EHESS, 21/02/2019.

10.1.5. Leadership within the Scientific Community

Isabelle Guyon - President and co-founder of ChaLearn, a non-for-profit organization dedicated to the organization of challenge.

Marc Schoenauer - Chair of ACM-SIGEVO (Special Interest Group on Evolutionary Computation), 2015-2019, now in Advisory Board; Founding President (since 2015) of SPECIES (Society for the Promotion of Evolutionary Computation In Europe and Surroundings), that organizes the yearly series of conferences *EvoStar*.

Michèle Sebag - Elected Chair of Steering Committee, ECML-PKDD; Board member, Institut de Convergence DataIA.

Paola Tubaro - Convenor of the Social Network Analysis Group of British Sociological Association; co-founder of European Network on Digital Labor.

10.1.6. Scientific Expertise

Guillaume Charpiat - Member of the Inria Saclay Commission Scientifique, and as such, jury committee for grants for PhD theses / postdocs / professor delegations; expertise for DigiCosme grants, ANRT CIFRE PhD grants; for GPU platforms: Jean Zay (GENCI) and Lab-IA (Saclay plateau). Discussion panel of the workshop day IA & Océan-Atmosphère-Climat (IMT Atlantique Rennes), February 6th. Panel of the Machine Learning workshop at CRiP ITES, Deauville, April 5th.

Cécile Germain - Evaluator for the H2020-2016-CNECT program; member of the DFG review panel within Germany's excellence strategy selection process.

Isabelle Guyon - Member of the NeurIPS foundation board.

Marc Schoenauer - Comité Scientifique IA, SCube (Scientipôle Savoirs & Société), Orsay; Scientific Committee, TrackML (see Section 7.6); Comité de sélection, Chaire ABEONA-ENS "Biais et Equité en IA"; Conseil Scientifique, IFPEN; Scientific Advisory Board, BCAM, Bilbao, Spain; Scientific Advisory Board, Tara Oceans, Paris.

Michèle Sebag - Hiring juries : LRI; Centrale-Supélec; ENS-Paris; UCA-Nice; U. Freiburg, Germany. Selection juries: Awards NIPS 2019. Propositions NSERC, Canada; Propositions Dpt STIC; Prix de thèse AFIA. Expert Committee from Finland's Minister of Economic Affairs, AI Strategy, February 2019.

10.1.7. Research Administration

Isabelle Guyon - Representative of UPSud in the DataIA *Institut de Convergence* Program Committee, University of Paris-Saclay. Responsible of Master AIC (becoming Paris-Saclay master in Artificial Intelligence).

Marc Schoenauer - Deputy Scientific Director of Inria (in French, Directeur Scientifique Adjoint, DSA), in charge of AI.

Michele Sebag - Deputy director of LRI, CNRS UMR 8623; elected member of the Research Council of Univ. Paris-Saclay; member of the STIC department council of Univ. Paris-Saclay; member of the Scientific Council of Labex AMIES, Applications des Mathématiques ds l'Industrie, l'Entreprise et la Société.

Paola Tubaro - Representative of CNRS in the DataIA *Institut de Convergence* Program Committee, University of Paris-Saclay; member of the Board, Maison des Sciences de l'Homme Paris-Saclay; member of CLIP, Institut Pascal, University of Paris-Saclay.

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

Licence : Philippe Caillou, Computer Science for students in Accounting and Management, 192h, L1, IUT Sceaux, Univ. Paris Sud.

Licence : Aurélien Decelle, Computer Architecture, 42h, L2, Univ. Paris-Sud.

Licence : Aurélien Decelle, Introduction to Machine Learning, 57h, L2, Univ. Paris-Sud.

Licence : François Landes, Mathematics for Computer Scientists, 51h, L2, Univ. Paris-Sud.

Licence : François Landes, Intro to Machine Learning, 48h, L2, Univ. Paris-Sud.

Licence and Polytech : Cécile Germain, Computer Architecture

Licence : Isabelle Guyon: Introduction to Data Science, L1, Univ. Paris-Sud.

Licence : Isabelle Guyon, Project: Resolution of mini-challenges (created by M2 students), L2, Univ. Paris-Sud.

Master : François Landes, Machine Learning, 34h, M1 Polytech, U. Paris-sud.

Master : Aurélien Decelle, Machine Learning, 26h, M1, Univ. Paris-Sud.

Master : Aurélien Decelle, Probability and statistics, 26h, M1, Univ. Paris-Sud.

Master : Aurélien Decelle, Probability, statistics and information theory, M1, Univ. Paris-Sud.

Master : Guillaume Charpiat, Deep Learning in Practice, 24h, M2 Recherche, Centrale-Supelec + MVA.

Master : Isabelle Guyon, Project: Creation of mini-challenges, M2, Univ. Paris-Sud.

Master : Michèle Sebag, Machine Learning, 12h; Deep Learning, 9h; Reinforcement Learning, 12h; M2 Recherche, U. Paris-Sud.

Master : François Landes, Machine Learning, 22h, M2 Recherche, U. Paris-Sud.

Master : Paola Tubaro, Start -up project for engineering students, 24h, Telecom ParisTech.

Master : Paola Tubaro, Sociology of social networks, 24h, M2, EHESS/ENS.

Master : Paola Tubaro, Social and economic network science, 24h, M2, ENSAE.

Doctorate: Paola Tubaro, Research Methods, 12h, University of Insubria, Italy.

Summer school: Guillaume Charpiat, Machine Learning & Deep Learning Tutorial, 4h30, ForMaL, ENS Cachan, June 4th

10.2.2. Supervision

HdR - Paola Tubaro, *Decoding the platform society: Organizations, markets and networks in the digital economy*, 11/12/2019, Sciences Po Paris.

PhD - Benjamin DONNOT, *Deep learning methods for predicting flows in power grids : novel architectures and algorithms.*, 13/02/2019, Isabelle Guyon and Antoine Marot (RTE)

PhD - Corentin TALLEC, *Reinforcement Learning and Recurrent Neural Networks: Dynamical approaches*, 7/10/2019, Université Paris-Saclay, Yann Ollivier

PhD - Mandar CHANDORKAR, *Machine Learning in Space Weather*, 14/11/2019, University of Eindhoven, Enrico Camporeale, Cyril Furtlehner, and Michèle Sebag

PhD - Guillaume DOQUET, *Agnostic Feature Selection*, 29/11/2019, Université Paris-Saclay, Michèle Sebag

PhD - Diviyan KALAINATHAN, *Generative Neural Networks to Infer Causal Mechanisms: Algorithms and Applications*, 17/12/2019, Université Paris-Saclay, Michèle Sebag and Isabelle Guyon

PhD - Lisheng SUN, *Meta-Learning as a Markov Decision Process*, 19/12/2019, Université Paris-Saclay, Isabelle Guyon and Michèle Sebag

PhD in progress - Eléonore BARTENLIAN, *Deep Learning pour le traitement du signal*, 1/10/2018, Michèle Sebag and Frédéric Pascal (Centrale-Supélec)

PhD in progress - Victor BERGER, *Variational Anytime Simulator*, 1/10/2017, Michèle Sebag

PhD in progress - Guillaume BIED, *Valorisation des Données pour la Recherche d'Emploi*, 1/10/2019, Bruno Crepon (CREST-ENSAE) and Philippe Caillou

PhD in progress - Leonard BLIER, *Vers une architecture stable pour les systèmes d'apprentissage par renforcement*, 1/09/2018, Yann Ollivier (Facebook AI Research, Paris) and Marc Schoenauer

PhD in progress - Tony BONNAIRE, *Reconstruction de la toile cosmique*, from 1/10/2018, Nabila Aghanim (Institut d'Astrophysique Spatiale) and Aurélien Decelle

PhD in progress - Balthazar DONON, *Apprentissage par renforcement pour une conduite stratégique du système électrique*, 1/10/2018, Isabelle Guyon and Antoine Marot (RTE)

PhD in progress - Victor ESTRADE *Robust domain-adversarial learning, with applications to High Energy Physics,* 01/10/2016, Cécile Germain and Isabelle Guyon.

PhD in progress - Loris FELARDOS, *Neural networks for molecular dynamics simulations*, 1/10/2018, Guillaume Charpiat, Jérôme Hénin (IBPC) and Bruno Raffin (InriAlpes)

PhD in progress - Giancarlo FISSORE, *Statistical physics analysis of generative models*, 1/10/2017, Aurélien Decelle and Cyril Furtlehner

PhD in progress - Julien GIRARD, *Vérification et validation des techniques d'apprentissage automatique*, 1/10/2018, Zakarian Chihani (CEA) and Guillaume Charpiat

PhD in progress - Nicolas GIRARD, *Satellite image vectorization using neural networks*, 1/10/2017, Yuliya Tarabalka & Pierre Alliez (Inria Sophia-Antipolis) and Guillaume Charpiat

PhD in progress - Armand LACOMBE, *Recommandation de Formations: Application de l'apprentissage causal dans le domaine des ressources humaines*, 1/10/2019, Michele Sebag and Philippe Caillou

PhD in progress - Zhengying LIU, *Automation du design des reseaux de neurones profonds*, 1/10/2017, Isabelle Guyon

PhD in progress - Nizam MAKDOUD, *Motivations intrinsèques en apprentissage par renforcement. Application à la recherche de failles de sécurité*, 1/02/2018, Marc Schoenauer and Jérôme Kodjabachian (Thalès ThereSIS, Palaiseau).

PhD in progress - Marc NABHAN, *Sûreté de fonctionnement d'un véhicule autonome - évaluation des fausses détections au travers d'un profil de mission réduit*, 1/10/2017, Marc Schoenauer and Hiba Hage (Renault)

PhD in progress - Adrian POL *Machine Learning Anomaly Detection, with application to CMS Data Quality Monitoring,* 01/10/2016, Cécile Germain.

PhD in progress - Herilalaina RAKOTOARISON, *Automatic Algorithm Configuration for Power Grid Optimization*, 1/10/2017, Marc Schoenauer and Michèle Sebag

PhD in progress - Théophile SANCHEZ, *Reconstructing the past: deep learning for population genetics*, 1/10/2017, Guillaume Charpiat and Flora Jay

PhD in progress - Pierre WOLINSKI, *Learning the Architecture of Neural Networks*, from 1/9/2016, Yann Ollivier (Facebook AI Research, Paris) and Guillaume Charpiat

PhD in progress - Wenzhuo LIU, Machine Learning for Numerical Simulation of PDEs, from 1/11/2019, Mouadh Yagoubi (IRT SystemX) and Marc Schoenauer

PhD in progress - Marion ULLMO, *Reconstruction de la toile cosmique*, from 1/10/2018, Nabila Aghanim (Institut d'Astrophysique Spatiale) and Aurélien Decelle

10.2.3. Juries

Marc Schoenauer: Reviewer for Dennis Wilson, IRIT, Université Toulouse; PhD jury of Patricio Cerda Reyes, U. Paris-Saclay, 28/11/2019.

François Landes: PhD rapporteur of Martina Teruzzi (Condensed matter and Machine Learning PhD, at SISSA, Trieste, Italy).

Paola Tubaro: PhD jury of Sophie Balech, U. Paris Nanterre, 09/07/2019; PhD jury of Linda Rua, U. Paris Dauphine, 13/12/2019.

Guillaume Charpiat: half-way PhD committee ("à mi-parcours") of Rodrigo Daudt (ONERA), of Julie Rivet (EPITA) and of Nissim Zerbib (Institut de la Vision)

Isabelle Guyon: PhD jury Justine Falque, U. Paris-Saclay (29/11/2019).

Michele Sebag: Reviewer for A. Chemla (PhD U. Roma & IRCAM); Pierre Fournier (PhD ISIR).

10.3. Popularization

10.3.1. Articles and contents

- Michèle Sebag - *Il faut dissiper le malentendu sur "les prétentions infondées" de l'intelligence artificielle*, tribune du journal *Le Monde* du 12 août 2019.
- Paola Tubaro - BBC World service, *The 'microworkers' making your digital life possible*, 02/08/2019; Radio France Inter, *Travailleurs du clic, les soutiers du clavier*, 23/03/2019; Science & Vie, *La force de l'IA repose sur des travailleurs bien r'eels*, 24/10/2019; AFP/L'Express, *Les travailleurs du clic, petites mains invisibles de l'économie numérique*, 21/06/2019; CNRS Le Journal, *Ces microtravailleurs de l'ombre*, 24/05/2019; Le Monde, *Jobs du clic : la France compte plus de 250 000 micro-travailleurs*, 15/02/2019; L'Humanité Dimanche, *Travailleuse du clic, la double invisibilité*, 02/05/2019.

10.3.2. Interventions

- Guillaume Charpiat - *Génomes présents, histoires d'antan: Apprentissage profond pour la génétique des populations*, Inria Seminar Unithé ou Café with Flora Jay, Feb 2019.
- Marc Schoenauer - *Intelligence Artificielle Mythes et réalités*, Classe virtuelle de la Délégation Académique du Numérique Educatif, Feb. 2, 2019; *Intelligence Artificielle Mythes et réalités*, Médiathèque George Sand, Palaiseau, Feb. 9, 2019.
- Michèle Sebag - Journées Scientifiques Inria, Lyon 2019; Centre de Recherches Interdisciplinaires, Workshop on Artificial Intelligence and Women Empowerment (Oct. 2019); CRI, *Open AI: From big data to smart data* (Nov. 2019).
- Paola Tubaro - *Le Micro-Travail en France : derrière l'automatisation, de nouvelles précarités au travail ?* CFE-CGC Orange, Paris, 01/07/2019; *Le Micro-Travail en France*, Fondation Gabriel Péri, Paris, 26/06/2019; *Big data et société : vie privée, travail, inégalités*, Banque de France, 06/06/2019.

CQFD Project-Team

9. Dissemination

9.1. Promoting Scientific Activities

9.1.1. Member of the Organizing Committees

Pierrick Legrand is co-organisor of the international conference EA 2019 in Mulhouse https://ea2019.inria.fr/.

9.1.2. Chair of Conference Program Committees

F. Dufour is the chair of the Program Committee of the SIAM Conference on Control and Its Applications (CT19) in Pittsburgh, USA, 2019.

9.1.3. Journal

9.1.3.1. Member of the Editorial Boards

P. Del Moral is an associate editor for the journal Stochastic Analysis and Applications since 2001.

P. Del Moral is an associate editor for the journal Annals of Applied Probability since 2018.

F. Dufour is corresponding editor of the SIAM Journal of Control and Optimization since 2018.

F. Dufour is associate editor of the journal Applied Mathematics & Optimization (AMO) since 2018.

F. Dufour is associate editor of the journal Stochastics: An International Journal of Probability and Stochastic Processes since 2018.

F. Dufour is the representative of the SIAM activity group in control and system theory for the journal SIAM News since 2014.

J. Saracco is an associate editor of the journal Case Studies in Business, Industry and Government Statistics (CSBIGS) since 2006.

9.1.3.2. Reviewer - Reviewing Activities

All the members of CQFD are regular reviewers for several international journals and conferences in applied probability, statistics and operations research.

9.1.4. Scientific Expertise

J. Saracco is elected member of the council of the Société Française de Statistique (SFdS, French Statistical Society). A. Genadot is member of the scientific council of the mathematical institute of Bordeaux.

P. Del Moral is a member of the Data Science Foundation of the American Institute of Mathematical Sciences.

9.1.5. Research Administration

J. Saracco is deputy director of IMB (Institut de Mathématiques de Bordeaux, UMR CNRS 5251) since 2015.

M. Chavent is member of the national evaluation committee of Inria.

M. Chavent and Pierrick Legrand are members of the council of the Institut de Mathématique de Bordeaux.

F. Dufour has been the coordinator for the Inria evaluation of the theme "Stochastic Approaches"

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

Licence : P. Legrand, Algèbre, 129h, L1, Université de Bordeaux, France.

Licence : P. Legrand, Espaces Euclidiens, 46,5h, L2, Université de Bordeaux, France.

Licence : P. Legrand, Informatique pour les mathématiques, 30h, L2, Université de Bordeaux, France.

DU : P. Legrand, Evolution Artificielle, Big data, 8h, DU, Bordeaux INP, France.

Licence : A. Genadot, Bases en Probabilités, 18h, L1, Université de Bordeaux, France.

Licence : A. Genadot, Projet Professionnel de l'étudiant, 8h, L1, Université de Bordeaux, France.

Licence : A. Genadot, Probabilité, 30h, L2, Université de Bordeaux, France.

Licence : A. Genadot, Techniques d'Enquêtes, 10h, L2, Université de Bordeaux, France.

Licence : A. Genadot, Modélisation Statistiques, 16.5h, L3, Université de Bordeaux, France.

Licence : A. Genadot, Préparation Stage, 15h, L3, Université de Bordeaux, France.

Licence : A. Genadot, TER, 5h, L3, Université de Bordeaux, France.

Licence : A. Genadot, Processus, 16.5h, L3, Université de Bordeaux, France.

Licence : A. Genadot, Statistiques, 20h, L3, Bordeaux INP, France.

Master : A. Genadot, Savoirs Mathématiques, 81h, M1, Université de Bordeaux et ESPE, France.

Master : A. Genadot, Martingales, 29h, M1, Université de Bordeaux, France.

Licence : F. Dufour, Probabilités et statistiques, 70h, first year of école ENSEIRB-MATMECA, Institut Polytechnique de Bordeaux, France.

Master : F. Dufour, Approche probabiliste et methode de Monte Carlo, 24h, third year of école ENSEIRB-MATMECA, Institut Polytechnique de Bordeaux, France.

9.2.2. Supervision

PhD: Hadrien Lorenzo, "Supervised analysis of high dimensional multi block data", supervised by Jérôme Saracco (CQFD) and Rodolphe Thebaut (Inserm), thesis defense: 27/11/19 in Bordeaux.

PhD in progress: Alex Mourer, "Variables importance in clustering", CIFRE Safran Aircraft Engines, supervised by Jérôme Lacaille (Safran), Madalina Olteanou (SAMM, Paris1), Alex Mourer (doctorant), Marie Chavent (CQFD).

PhD in progress: de Nathanaël Randriamihamison, "Contiguity Constrained Hierarchical Agglomerative Clustering for Hi-C data analysis", supervised by Nathalie Vialaneix (MIAT, INRA Toulouse), Pierre Neuvial (IMT, CNRS), Marie Chavent (CQFD) .

PhD in progress: Alexandre Conanec, "Modulation et optimisation statistique de données multitableaux : modélisation des facteurs de variations dans la gestion des compromis entre différents jeux de données", supervised by Marie Chavent(CQFD), Jérôme Saracco (CQFD), Marie-Pierre Ellies (INRA).

PhD in progress: Loic Labache , "Création d'un atlas cérébral évolutif de régions fonctionnelles définies à partir d'une cohorte de 297 sujets ayant effectués 20 tâches cognitives en IRMf ", supervised by Jérôme Saracco (CQFD), Marc Joliot (CEA).

PhD in progress: Tiffany Cherchi, "Automated optimal fleet management policy for airborne equipment", Montpellier University, since 2017, supervised by B. De Saporta and F. Dufour.

PhD in progress: Bastien Berthelot, "Algorithmes de traitement du signal pour l'extraction de signatures robustes sur des bio-signaux", CIFRE THALES, supervised by P. Legrand.

PhD in progress: Jimmy Bondu, "Classication de trajectoires d'objets par apprentissage.", CIFRE THALES, supervised by P. Legrand.

PhD in progress: Camille Palmier , “Nouvelles approches de fusion multi-capteurs par filtrage particulaire pour le recalage de navigation inertielle par corrélation de cartes”, CIFRE, supervised by P. Del Moral, Dann Laneuville (NavalGroup) and Karim Dahia (ONERA)

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

Alexandre Genadot is a member of the Commission des emplois de recherche Inria BSO. Pierrick Legrand is a member of the commission consultative section 26 of the IMB.

MATHRISK Project-Team

10. Dissemination

10.1. Promoting Scientific Activities

10.1.1. Scientific Events: Organisation

10.1.1.1. Member of the Organizing Committees

- A. Alfonsi

  Co-organizer of the working group seminar of MathRisk “Méthodes stochastiques et finance”. http://cermics.enpc.fr/~alfonsi/GTMSF.html
- V. Bally

  Organizer of the seminar of the LAMA laboratory of Université Paris-Est.
- A. Sulem

  Co-organizer of the seminar Inria-MathRisk /Université Paris Diderot LPSM “Numerical probability and mathematical finance”. https://www.lpsm.paris/mathfipronum/gt

10.1.2. Journal

10.1.2.1. Member of the Editorial Boards

- B. Jourdain

  Associate editor of:
  - ESAIM : Proceedings and Surveys
  - Stochastic Processes and their Applications (SPA)
- D. Lamberton

  Associate editor of:
  - Mathematical Finance,
  - Associate editor of ESAIM Probability & Statistics
- A. Sulem

  Associate editor of:
  - Journal of Mathematical Analysis and Applications (JMAA)
  - International Journal of Stochastic Analysis (IJSA)
  - SIAM Journal on Financial Mathematics (SIFIN)

10.1.2.2. Reviewer - Reviewing Activities

- B. Jourdain: Reviewer for *Mathematical Reviews*
- A. Sulem: Reviewer for *Mathematical Reviews*

10.1.3. Invited Talks

- Aurélien Alfonsi
  - 4th of April, 2019: "Lifted and Geometric Differentiability of the Squared Quadratic Wasserstein Distance", Séminaire MAD-Stat, Toulouse School of Economics.
  - 16th of May, 2019: "Approximation of OT problems with marginal moments contraints", Séminaire de probabilités et mathématiques financières, Evry.

  - 20th of June, 2019: "A generic construction for high order approximation schemes of semigroups using random grids", Mathematical and Computational Finance Seminar, Oxford.
  - 27th of September, 2019: "A generic construction for high order approximation schemes of semigroups using random grids", Séminaire Bachelier.
  - 24th of October, 2019: "A generic construction for high order approximation schemes of semigroups using random grids", GT Finance mathématique, probabilités numériques et statistique des processus, LPSM.
- Vlad Bally
  - The 22nd Conference of the Romanian Society of Probability and Statistics, Bucharest, May 10-11, Talk "Convergence in the CLT in distribution norms"
  - Analyse stochastique et thèmes connexes. 6-9 mai 2019, Bucarest, Roumanie. Talk "Regularity and estimates for the function solution of the 2D Bolzmann equation"
  - Perturbation Techniques in Stochastic Analysis and its Applications. Luminy 11-15 March. Talk "Regularity and estimates for the function solution of the 2D Bolzmann equation"
  - Conference Unirandom on random nodal sets, Rennes 9-13 September.
  - Conference on asymptotic expansions and Malliavin calculus. Talk:"Regularization lemmas and convergence in total variation".
- Benjamin Jourdain
  - Vienna Seminar in Mathematical Finance and Probability, 10 October 2019 : Differentiability of the squared quadratic Wasserstein distance
  - Inria-CWI workshop, Amsterdam, 17-18 September 2019 : Sampling of probability measures in the convex order and computation of robust option price bounds
  - MCMC 2019, Sydney, 8-12 July 2019 : Weak error analysis for some mean-field SDEs
  - Nine talks on contemporary optimal transport problems, Strasbourg, 4-5 July 2019: The inverse transform martingale coupling
  - 9th general AMAMEF conference, Paris, 11-14 June 2019 : The inverse transform martingale coupling
  - Nancy probability and statistics seminar, 9 May 2019 : A new family of martingale couplings in dimension one
  - Conference Perturbation Techniques in Stochastic Analaysis and its Applications, Marseille 11-15 March 2019 : 3h lectures entitled Stochastic Differential Equations with mean-field rank-based coefficients
- Agnès Sulem
  - Conference on Stochastic Analysis and Applications Risør, Norway, August 26-30 2019. *Nonlinear pricing in incomplete markets with default*.
  - Complex Networks 2919, December 10-12, 2019, Lisbon. (Conference with referee process), *A Dynamic Contagion Risk Model With Recovery Features*.

10.1.4. Research Administration

- A. Alfonsi
  - Deputy director of CERMICS laboratory until August,
  - Director of the CERMICS since September.
  - In charge of the Master “Finance and Data” at the Ecole des Ponts.
- V. Bally
  - Member of the LAMA committee

  - Responsible of the Master 2, option finance.
- Benjamin Jourdain
  - Head of the doctoral school MSTIC, University Paris-Est until February 2019
- D. Lamberton
  - Vice-president for research at Université Paris-Est Marne-la-Vallée
- A. Sulem
  - Member of the Scientific Committee of AMIES
  - Corresponding member of the Operational Committee for the assesment of Legal and Ethical risks (COERLE) at Inria Paris research center
  - Member of the Committee for Inria international Chairs

10.2. Teaching - Supervision - Juries

10.2.1. Teaching

Licence :

- A. Alfonsi: "Probabilités", first year course at Ecole des Ponts.
- V. Bally : "Analyse Hilbertienne", Course L3, UPEMLV

Master :

- Aurélien Alfonsi
  - "Données Haute Fréquence en finance", lecture for the Master at UPEMLV.
  - "Mesures de risque", Master course of UPEMLV and Sorbonne Université.
  - Professeur chargé de cours at Ecole Polytechnique.
- Vlad Bally
  - "Taux d'Intêret", M2 Finance.
  - "Calcul de Malliavin et applications en finance", M2 Finance
  - "Analyse du risque" M2 Actuariat,
  - "Processus Stochastiques" M2 Recherche
- Benjamin Jourdain
  - course "Mathematical finance", 2nd year ENPC
  - course "Monte-Carlo Markov chain methods and particle algorithms", Research Master Probabilités et Modèles Aléatoires, Sorbonne Université
- B. Jourdain, B. Lapeyre
  - course "Monte-Carlo methods", 3rd year ENPC and Research Master Mathématiques et Application, university of Marne-la-Vallée
- J.-F. Delmas, B.Jourdain
  - course "Jump processes with applications to energy markets", 3rd year ENPC and Research Master Mathématiques et Application, University of Marne-la-Vallée
- D. Lamberton
  - "Calcul stochastique pour la finance", master 1 course, Université Paris-Est Marne-la-Vallée
- B. Lapeyre
  - Monte-Carlo methods in quantitative finance, Master of Mathematics, University of Luxembourg,

- A. Sulem
  - "PDE methods in Finance", Master of Mathematics, University of Luxembourg, 22 h lectures and responsible of the module "Numerical Methods in Finance".

10.2.2. Supervision

- PhD: Rui Chen, "Dynamic Optimal Control for Distress in Large Financial Networks and Mean field Systems with Jumps", Université Paris-Dauphine, defended on July 19th 2019, Supervisor: Agnès Sulem [10].
- PhD in progress :
  - Anas Bentaleb (started February 2018) : Mathematical techniques for expected exposure evaluation, Supervisor: B. Lapeyre.
  - Adel Cherchali, “Numerical methods for the ALM”, funded by Fondation AXA, started in September 2017, Supervisor: Aurélien Alfonsi
  - Rafaël Coyaud, “Deterministic ans stochastic numerical methods for multimarginal and martingale constraint optimal transport problems”, started in October 2017, Supervisor: Aurélien Alfonsi
  - Oumaima Bencheikh (started November 2017) "Acceleration of probabilistic particle methods", supervised by B.Jourdain
  - Ezechiel Kahn (started September 2018) "Functional inequalities for random matrices models", supervised by B. Jourdain and D. Chafai
  - Sophian Mehalla (started November 2017), CIFRE agreement Milliman company/Ecole des Ponts (http://fr.milliman.com, Supervisor: B. Lapeyre
  - William Margheriti (started January 2018) "Numerical methods for martingale optimal transport problems", supervised by J.-F. Delmas and B. Jourdain

10.2.3. Juries

- Aurélien Alfonsi:
  - Report and jury of the PhD thesis of Rui Chen, July 19, Paris Dauphine.
  - Report and jury of the PhD thesis of Babacar Diallo, December 9, Evry University.
- Benjamin Jourdain:
  - Report and jury of the PhD of Yating Liu, defended on December 3, Sorbonne University
  - PhD of Victor Marx, defended on October 25, University Nice Côte d’Azur
  - PhD of Nicolas Thomas, defended on June 20, Sorbonne University
- Agnès Sulem:
  - Report and jury of the HdR thesis *"Gestion optimale de Portefeuille: Du contrôle Sensible au Risque, à la Finance Comportementale et à la Science des Données* Sebastien Lleo, CNAM, Paris, 4 February 2019
  - PhD of Cyril Benezet, defended on 5 November 2019, LPSM, Université Paris-Diderot, (Chair of the Committee)
  - Member of the Committee for the recruitment of a Professor in applied mathematics, finance and numerical probability, Laboratoire de probabilités (LPSM), Université Paris-Diderot, Spring 2019.

SIMSMART Project-Team

8. Dissemination

8.1. Promoting Scientific Activities

8.1.1. Member of the Organizing Committees

Cédric Herzet is part of the organizing committee of the iTwist'20 Workshop.

8.2. Teaching - Supervision - Juries

8.2.1. Teaching

Cédric Herzet has given:

- INSA RENNES, 5ième année de l'option Génie Mathématique, cours de Parcimonie en traitement du signal et des images, 10h de cours magistraux + responsable du module
- Ensai RENNES, Master international « Smart Data » , cours « Foundations of Smart Sensing », 9h de cours magistraux
- Ensai RENNES, Master international « Smart Data » , cours « Advanced topics in Smart Sensing » , 3h de cours magistraux
- Ensai RENNES, Master 1, « Régression pénalisée et sélection de modèles » , cours « Advanced topics in Smart Sensing », 6h de cours magistraux + 6 TPs + responsable du module

François Le Gland has given:

- a 2nd year course on introduction to stochastic differential equations, at INSA (institut national des sciences appliquées) Rennes, within the GM/AROM (risk analysis, optimization and modeling) major in mathematical engineering,
- a 3rd year course on Bayesian filtering and particle approximation, at ENSTA (école nationale supérieure de techniques avancées), Palaiseau, within the statistics and control module,
- a 3rd year course on linear and nonlinear filtering, at ENSAI (école nationale de la statistique et de l'analyse de l'information), Ker Lann, within the statistical engineering track,
- and a course on Kalman filtering and hidden Markov models, at université de Rennes 1, within the SISEA (signal, image, systèmes embarqués, automatique, école doctorale MATISSE) track of the master in electronical engineering and telecommunicationst.

8.2.2. Supervision

Cédric Herzet has supervised:

- Soufiane Ait Tilat, PhD, co-supervision with Frédéric Champagnat (Onera, Palaiseau)
- Milan Courcoux-Caro, PhD, co-supervision with Charles Vanwynsberghe (ENSTA Bretagne) and Alexandre Baussard (IUT de Troyes),
- Clément Elvira, postdoc, co-supervision with Rémi Gribonval (Inria Rennes) and Charles Soussen (CentraleSupélec)
- Clément Dorffer, postdoc, co-supervision with Angélique Drémeau (ENSTA Rennes)

Mathias Rousset has supervised:

- Benjamin Dufée, master 2 (with Frederic Cérou).

François Le Gland has supervised

- Audrey Cuillery, PhD, provisional title: *Bayesian tracking from raw data*, université de Rennes 1, started in April 2016, expected defense in early 2020, funding: CIFRE grant with Naval Group, co–direction: Dann Laneuville (Naval Group, Nantes).

V. Monbet has supervised

- Gabriel Jouan, PhD, Univ Rennes, Scalian, granted by CIFRE.
- Esso-Ridah Bleza, PhD, Univ Bretagne Sud, Janasense, granted by CIFRE.
- Said Obakrim, PhD, Univ Rennes, Ifremer.

8.2.3. PhD defended

- Y. Xu (sup.: M. Rousset and P.A. Zitt): Weak over-damped asymptotic and variance reduction
- T.T.T. Chau (sup: V. Monbet): Non-parametric methodologies for reconstruction and estimation in nonlinear state-space models
- M. Morvan (sup: V. Monbet): Modèles de régression pour données fonctionnelles hétérogènes. Application à la modélisation de données de spectrométrie dans le moyen infrarouge

8.2.4. Juries

V. Monbet has been a member of the following juries:

- Anders Hildeman - On flexible random field models for spatial statistics: Spatial mixture models and deformed SPDE models, Chalmers University, Sweden.
- Shuaitao Wang - Simulation du métabolisme de la Seine par assimilation de données en continu" , Mines Paris-Tech (reviewer)
- Alban FARCHI - Localisation des méthodes d'assimilation de données d'ensemble, ENPC

François Le Gland has been a member of the following juries:

- (Reviewer) Julien Lesouple (université de Toulouse, adviser : Jean-Yves Tourneret)
- Émilien Flayac (université Paris–Saclay, Orsay, advisers : Frédéric Jean and Karim Dahia)
- Thi Tuyet Trang Chau (université de Rennes 1, advisers : Valérie Monbet and Pierre Ailliot).

8.3. Popularization

8.3.1. Interventions

Patrick Héas has made a CS workshop for middle school students based on the ideas of 'Computer Science Unplugged'.

TOSCA Team

9. Dissemination

9.1. Promotion of Mathematics in the industry

- A. Lejay is member of the board of AMIES (Agence Mathématiques en Intéractions avec l'Entreprise et la Société). A. Lejay is editor of the *success stories* project.
- D. Talay continued to serve as a member of the Scientific Committee of the AMIES National Agency aimed to promote interactions between Mathematics and Industry.
- D. Talay continued to serve as the Vice-President of the Fondation d'Entreprise Natixis which aims to contribute to develop research in quantitative finance. He also serves as a member of the Scientific Committee of the Foundation.

9.2. Promoting Scientific Activities

9.2.1. Scientific Events: Organisation

- C. Fritsch organizes with Pascal Moyal (Univ. de Lorraine) the weekly Seminar of Probability and Statistics of IECL, Nancy.
- C. Fritsch organized with Constantin Morarescu (CRAN) a scientific day of the *Fédération Charles Hermite* about multiscale models. (IECL, Nancy, 21 June 2019)

9.2.1.1. Member of the Organizing Committees

- N. Champagnat is member of the organizing committee of the conference *Mathematical Models in Evolutionary Biology*, part of the Thematic Month on Mathematical Issues in Biology (CIRM, Luminy, 10–14 Feb. 2020).
- N. Champagnat was member of the organizing committee of the conference ReaDiNet 2019 *Mathematical Analysis for Biology and Ecology* (Inria Nancy – Grand Est, 23–25 Sep.).
- N. Champagnat and U. Herbach organized the workshop *Modélisation de l'hétérogénéité tumorale et thérapies ciblées* (IECL, Univ. Lorraine, 21–22 Oct.).
- C. Fritsch was member of the organizing committee of the conference *51es Journées de Statistiques* (Nancy, 3–7 June).
- A. Lejay organized the conference *TRAG 2019* (Nancy, 9–11 Oct.).
- E. Tanré and R. Veltz organized the workshop on *Mean-field approaches to the dynamics of neuronal networks* (EITN, 3–4 April).

9.2.1.2. Member of the Conference Program Committees

- M. Bossy is member of the SMAI2019 Conference Scientific Committee and MASCOT NUM 2020 Conference.
- D. Talay is serving as a member of the scientific commitee for MasterKesm (Masterclass from kinetic equations to statistical mechanics) summer school to be held in Saint Jean de Monts in 2020.

9.2.2. Journal

9.2.2.1. Member of the Editorial Boards

- A. Lejay is one of the three editors of the *Séminaire de Probabilités* and *Mathematics and Computers in Simulation* (MATCOM).
- N. Champagnat serves as an associate editor of *Stochastic Models*.

- N. Champagnat serves as co-editor-in-chief with Béatrice Laurent-Bonneau (IMT Toulouse) of *ESAIM: Probability & Statistics*.
- D. Talay serves as an Area Editor of *Stochastic Processes and their Applications*, and as an Associate Editor of *Journal of the European Mathematical Society*, *Probability, Uncertainty and Quantitative Risk*, *ESAIM Probability and Statistics*, *Stochastics and Dynamics*, *Journal of Scientific Computing*, *Monte Carlo Methods and Applications*, *SIAM Journal on Scientific Computing*, *Communications in Applied Mathematics and Computational Science*, *Éditions de l'École Polytechnique*. He also served as Co-editor in chief of *MathematicS in Action*.

9.2.2.2. Reviewer - Reviewing Activities

- N. Champagnat wrote reviews for *Stochastic Processes and their Applications* (three times this year), *Electronic Journal of Probability* and *Frontiers of Mathematics in China*.
- C. Fritsch wrote reviews for *PCI Ecology*.
- C. Henry wrote reviews for *Annals of Nuclear Energy*, *Aerosol Science and Technology*, *Building and Environment* and *Journal of Aerosol Science*.
- A. Lejay wrote reviews for *Annals of Institut Henri Poincaré*, *Statistical Inference for Stochastic Processes*, *Journal of Computational and Applied Mathematics*, *Physical Review E*, *Bernoulli*, *Electronic Journal of Probability*, *ESAIM PS*, *Journal Theoretical Probability*, *SIAM Journal on Control and Optimization*, *Applied Probability Journals*, *Journal of Functional Analysis*.
- E. Strickler wrote reviews for *Stochastic Models* and *Stochastic Processes and their Applications*.
- E. Tanré wrote reviews for *The Annals of Applied Probability*, *Electronic Journal of Probability*, *ESAIM PS*, *The Bulletin of the London Mathematical Society*, *Finance and Stochastics*, *The Journal of Mathematical Neuroscience*, *Stochastic Processes and their Applications*.
- E. Tanré serves has a permanent reviewer of *Mathematical Reviews of the American Mathematical Society (MathSciNet)*.
- D. Villemonais wrote reviews for *Markov processes and related fields*, *Electronic communication in Probabilty* (twice), *The Annals of Applied Probability*, *Stochastic processes and Applications*, *Journal of Statistical Physics* and *Electronic Journal of Probability*.
- D. Talay reported on applications to the Swiss National Science Foundation (SNSF).
- D. Talay reported on applications to the Research Grants Council (RGC) of Hong Kong.

9.2.3. Invited Talks

- M. Bossy has been invited to give talks at the conference Simulation and Optimization for Renewable Marine Energies, at Roscoff in July.
- N. Champagnat has been invited to give a Colloquium talk at the Department of Mathematics and Computer Science of the University of Technology in Eindhoven in February.
- N. Champagnat gave a talk at the Journée Charles Hermite *Modélisation fine versus outils d'analyse et simulation, un problème d'échelle* in Nancy in June.
- Q. Cormier has been invited to give a talk at the workshop on *Mean-field approaches to the dynamics of neuronal networks* at EITN in April.
- Q. Cormier and P. Helson have presented posters at the *International Conference on Mathematical Neuroscience* in Copenhagen in June.
- Q. Cormier and E. Tanré have been invited to give talks at the workshop "Nonlinear Processes and their Applications" in St. Etienne in July.
- C. Fritsch has been invited to give a talk at the workshop of the *MAMOVI* group in September.
- C. Fritsch gave a talk at the *Journées de Statistiques* in Nancy in June and at the *Mathematical Models in Ecology and Evolution* conference in Lyon in July.

- V. Hass presented a poster at the conference ReaDiNet 2019 *Mathematical Analysis for Biology and Ecology* in Nancy in September.
- U. Herbach has been invited to give talks at the Journée Charles Hermite *Méthodes et Modèles pour comprendre les réseaux biologiques* in January, at the spring school of *chaire MMB (Modélisation Mathématique et Biodiversité)* in Aussois in May, at the *Journée du RIS (Réseau Interdisciplinaire autour de la Statistique)* in Paris in September and at the workshop *Modélisation de l'hétérogénéité tumorale et thérapies ciblées* in Nancy in October.
- U. Herbach gave seminar talks at the *Séminaire de probabilités et statistiques de l'IECL* in Nancy in April, at the *Groupe de travail Maths-Bio* in Orléans in May, at the *Séminaire CIML (Centre d'immunologie de Marseille-Luminy)* in Marseille in May, at the *Groupe de travail du LBMC (Laboratoire de Biologie et Modélisation de la Cellule)* in Lyon in November, at the *Séminaire de probabilités* in Grenoble in November and at the *Groupe de travail Maths-Bio* in Grenoble in November.
- U. Herbach presented a poster at the conference *Probabilistic Modeling in Genomics* in Aussois in October.
- A. Lejay have been invited to give a mini-talk *A short introduction to Rough Paths* at Ritsumeikan University (Kyoto, Japan) in February.
- A. Lejay gave a talk at the conference *TRAG 2019* (Nancy) in October.
- E. Strickler gave seminar talks at the *Séminaire de probabilités* in Toulouse in October and at the *Séminaire de probabilités et statistiques de l'IECL* in Nancy in November.
- D. Villemonais gave seminar talks at the *Séminaire de Probabilités* of Univ. Paris 13 in April and at the *Probability Seminar* of Zurich Univ. in March.
- D. Villemonais has bee invited to give talks at the *Journées du réseau A2* (Paris-Sorbonne Univ.) in October and at the *Conference ReaDiNet 2019* (Inria Nancy – Grand Est) in September.
- E. Soret has given an invited talk at ICMNS in Copenhagen in June.
- D. Talay was an invited speaker at the Conference in Honor of Philip Protter, Columbia University, New York, USA, September 2019.
- D. Talay was an invited speaker at the Conference in Honor of Nicole El Karoui, Sorbonne University, Paris, 21-24 May 2019.
- D. Talay was an invited speaker at the 'Stochastic Analysis and Related Topics' International Conference, Bucarest, Romania, 6-9 May 2019.
- D. Talay chaired a session at the 'Journées de l'Académie des Sciences en région', Nice and Sophia Antipolis, 2-21 June 2019.
- D. Talay gave a seminar talk at École des Ponts ParisTech on 27 November 2019.

9.2.4. Leadership within the Scientific Community

- M. Bossy was serving as a vice president of the Inria Evaluation Committee until September 2019.
- A. Lejay is head of the Probability and Statistics team of Institut Élie Cartan de Lorraine.
- D. Talay continued to chair the Scientific Council of the French Applied Math. Society SMAI.
- D. Talay is a member of the scientific committee of the 'Institut Mathématiques de la Planète Terre' project suppirted by INSMI-CNRS.
- D. Talay served as a member of the scientific council of the Complex System academy of the Université Côte d'Azur Idex.
- D. Talay is serving as a member of the CMUP Advisory Commission (University of Porto).
- D. Talay is a member of the Comité National Français de Mathématiciens.

9.2.5. Scientific Expertise

- N. Champagnat evaluated a research project submitted to the ANR.
- C. Fritsch is member of the Ph.D. monitoring committee of Léo Darrigade (INRA).
- D. Talay served as a member of the committee for positions in Applied Mathematics at the Ecole Polytechnique.
- D. Talay chaired the HCERES evaluation committee for the Toulouse Mathematics Institute (IMT).
- D. Talay is serving as a member of the evaluation committee of the Charles University (Prague, Czech Republic).

9.2.6. Research Administration

- N. Champagnat is a member of the *Comité de Centre*, the *COMIPERS* and the *Commission Information Scientifique et Technique* of Inria Nancy - Grand Est, *Responsable Scientifique* for the library of Mathematics of the IECL, member of the *Conseil du laboratoire* of IECL (as *responsable scientifique* of the library). He is also local correspondent of the COERLE (*Comité Opérationel d'Évaluation des Risques Légaux et Éthiques*) for the Inria Research Center of Nancy - Grand Est.
- C. Fritsch is member of the *Commission du Développement Technologique* of Inria Nancy - Grand Est, of the *Commission du personnel* and the *Commission Parité-Égalité* of IECL. She is the local Raweb correspondent for the Inria Research Center of Nancy - Grand Est.
- A. Lejay is member of the Executive board of *LUE Impact project digistrust* (Univ. Lorraine), of the Conseil de Pôle AM2I (Univ. Lorraine) and of the CUMI (Inria NGE).
- D. Villemonais is responsible of the "Ingénierie Mathématique" cursus of École des Mines de Nancy and is elected member of the conseil de l'École des Mines de Nancy.

9.3. Teaching - Supervision - Juries

9.3.1. Teaching

Master: N. Champagnat, *Introduction to Quantitative Finance*, 18h, M1, École des Mines de Nancy, France.

Master: N. Champagnat, *Introduction to Quantitative Finance*, 13.5h, M2, École des Mines de Nancy, France.

Master: N. Champagnat, *Problèmes inverses*, 22.5h, M1, École des Mines de Nancy, France.

Master: C. Fritsch, *Probability theory*, 40h, L3, École des Mines de Nancy, France.

Master: A. Lejay, *Probabilités*, 9h, 1st year Mines de Nancy, France.

Master: A. Lejay, *Simulation des marchés financiers*, 29h, M2, Master PSA, Université de Lorraine, France.

Master: E. Tanré (courses and exercices), *Advanced Numerics for Computational Finance*, 30h (20h + 10h), M2, Univ. Côte d'Azur (Mathmods Erasmus Mundus), France.

Master: E. Tanré, *Mathematical Methods for Neurosciences*, 20h, M2, ENS - Master MVA / Paris 6 - Master Maths-Bio, France.

Master: E. Tanré (courses) *Stochastic models in neurocognition*, 15h (7h30 + 7h30), M2, Univ. Côte d'Azur (Master 2), France.

Master: D. Talay *Invariant measures of diffusion processes*, 18h, M2 Probabilité et Applications, Université Paris 6, France.

9.3.2. Supervision

HdR: Denis Villemonais, *Convergence exponentielle vers une distribution quasi-stationnaire et applications*, Université de Lorraine, 28/11/2019.

PhD in progress: Alexis Anagnostakis, *Étude du mouvement brownien collant*, Université de Lorraine, Octobre 2018, A. Lejay and D. Villemonais.

PhD in progress: Lorenzo Campana, *Stochastic modeling of non-spherical particles transport and deposition by turbulent flow*, Université Côte d'Azur, December 2017, M. Bossy.
PhD in progress: Quentin Cormier, *Biological Networks of Spiking Neurons*, September 2017, E. Tanré and R. Veltz (MATHNEURO Inria team).
PhD in progress: Vincent Hass, *Individual-based models in adaptive dynamics and long time evolution under assumptions of rare advantageous mutations*, Université de Lorraine, October 2018, N. Champagnat.
PhD in progress: Pascal Helson, *Plasticity in networks of spiking neurons in interaction*, October 2016, E. Tanré and R. Veltz (MATHNEURO Inria team).
PhD in progress: Rodolphe Loubaton, *Caractérisation des cibles thérapeutiques dans un programme génique tumoral*, Université de Lorraine, October 2018, N. Champagnat and L. Vallat (CHRU Strasbourg).

9.3.3. Juries

- M. Bossy served as a referee for the Ph.D. thesis of Pierre Antoine Joulin, *Modélisation à fine échelle des interactions entre parcs éoliens et météorologie locale* at Institut National Polytechnique de Toulouse, December 2019.
- M. Bossy served as an examiner for the Ph.D. theses of Victor Marx, *Diffusive processes on the Wasserstein space: Coalescing models, Regularization properties and McKean-Vlasov equations*, Université Côte d'Azur, November 2019, and Sebastian Reyes Riffo, *Méthodes mathématiques pour l'extraction d'énergie marine*, PSL University November 2019.
- N. Champagnat will serve as an examiner for the habilitation thesis of Nicolas Gast, *Refinements of Mean Field Approximation*, Univ. de Grenoble, 30/01/2020.
- N. Champagnat served as a referee for the Ph.D. thesis of Paulien Jeunesse, *Estimation non paramétrique du taux de mort dans un modèle de population générale : théorie et applications*, Univ. Paris Dauphine, 08/01/2019.
- N. Champagnat served as an examiner for the Ph.D. theses of Frédérique Robin, *Modeling and analysis of cell population dynamics: application to the early development of ovarian follicles*, Univ. Paris Saclay, 26/09/2019, William Oçafrain, *Quasi-stationarité avec frontières mobiles*, Univ. Toulouse 3, 4/07/2019, Martin Andrade-resptrepo, *Mathematical modeling and evolutionary processes*, Univ. Paris 7, 26/06/2019 and Edouard Strickler, *Persistance de processus de Markov déterministes par morceaux*, Univ. Neuchâtel, 21/03/2019.
- A. Lejay served as an examiner for the habilitation thesis of Nicolas Marie, *Quelques contributions à la contrainte et à la statistique des équations différentielles dirigées par le mouvement brownien fractionnaire ainsi qu'à la sélection de modèle*, Université Paris Nanterre, November 2019.
- A. Lejay served as an examiner for the Ph.D. thesis of Carlo Bellingeri, *Itô formulae on stochastic heat equation via regularity structures and rough paths*, Sorbonne Université, July 2019.
- D. Talay served as a referee for the Ph.D. thesis of Grégoire Ferré, *Large Deviations Theory in Statistical Physics: Some Theoretetical and Numerical Aspects*, Université Paris Est and École des Ponts ParisTech, 27 November 2019.
- D. Talay served as a referee for the habilitation thesis of Adrien Richou, *Quelques Résultats sur les Equations Différentielles Rétrogrades et les Principes de Grandes Déviations pour les Estimateurs de Paramètres de Diffusions*, université de Bordeaux, 4 November 2019.

9.4. Popularization

9.4.1. Interventions

C. Henry gave a presentation at the Inria Café In on the topic of breakup of elongated particles such as spaghettis.

9.4.2. Creation of media or tools for science outreach

- A. Lejay is editor of the project *Success Stories* (AMIES and FSMP) dedicated to create 2-page sheets to present successful interactions between industry and academia.