

LOUIS-PIERRE CHAINTRON

2nd year PhD student in Mathematics

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EXPERIENCE AND TEACHING

(September 2022 -) PhD supervised by Julien Reygner and Philippe Moireau: Constrained large deviations and related control problems, with application to multi-scale modelling of cardiac muscles.

(March 2022 - August 2022) Research internship at Inria Paris Saclay, team MΞDISIM, on non-linear filtering and control of constrained dynamics, under the supervision of Philippe Moireau.

(October 2021 - February 2022) Research internship at CERMICS Ecole des Ponts Paris on metastability for mean-field particle systems, under the supervision of Tony Lelièvre and Julien Reygner.

(February 2020 - May 2020) Research internship about persistent random walks for cells at London Imperial College, under the supervision of Pierre Degond.

(2022-) Teaching assistant at ENS-DMA (“caïman”, 120 hours per year): in charge of M1 exercise sessions, and projects with industrial partners (Artelys, EP Tender, Qair, IFPEN, Quobly, Callyope).

(2023) In charge of schedule organisation for entrance exams at ENS-PSL.

(2021-2022) Exercise sessions in Mathematics at CPES (first year undergraduate).

(2018-2019) Oral examiner in MPSI at Lycée Sainte-Geneviève.

EDUCATION

M2 Sorbonne Universités, *Partial differential equations and numerical analysis*. 2020 - 2021

M1 ENS Paris, *Master of Applied Mathematics*. 2019 - 2020

L3 ENS Paris, *Bachelor of Fundamental Mathematics*. 2018 - 2019

Classes Préparatoires aux Grandes Ecoles, MPSI/MP* at Lycée Sainte Geneviève. 2016 - 2018

Baccalauréat Général S at Lycée Janson de Sailly. 2016

NUMERICAL SKILLS AND LANGUAGES

Python (including molecular dynamics and PDE schemes), L^AT_EX.

French: *native*, English: *fluent*, German: *intermediate*.

PUBLICATIONS

Propagation of chaos: a review of models, methods and applications. I. Models and methods, L. Chaintron, A. Diez, *Kinetic and Related Models*, 2022, 15(6): 895-1015.

Propagation of chaos: a review of models, methods and applications. II. Applications, L. Chaintron, A. Diez, *Kinetic and Related Models*, 2022, 15(6): 1017-1173.

Mortensen Observer for a class of variational inequalities - Lost equivalence with stochastic filtering approaches, L. Chaintron, A. González, L. Mertz, P. Moireau, *ESAIM: Proceedings and Surveys*, September 2023, Vol. 73, p. 130-157.

Modeling actin-myosin interaction: beyond the Huxley-Hill framework, L. Chaintron, M. Caruel, F. Kimmig, *MathematicS In Action*, Tome 12 (2023) no. 1, pp. 191-226.

A jump-diffusion stochastic formalism for muscle contraction models at multiple timescales, L. Chaintron, F. Kimmig, M. Caruel, P. Moireau, submitted in June 2023.

Existence and global Lipschitz estimates for unbounded classical solutions of a Hamilton-Jacobi equation, L. Chaintron, submitted in September 2023.

INVITED TALKS

CEMRACS 2021 (CIRM, Marseille, August 2021): Deterministic filtering for non-smooth dynamical systems.

Les probabilités de demain (IHP, Paris, November 2022): Gibbs principle on path space and link with stochastic control.

Analysis and simulations of metastable systems (CIRM, Marseille, April 2023): Large mean-field systems conditioned by rare events.