

Clément Moreau

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📄 <https://clementmoreau.github.io>

Education

- 2020– **JSPS Fellowship**, *Research Institute for Mathematical Sciences (RIMS), Kyoto University (Japan)*.
Project title : Applications of mathematical control theory to micro-swimming at low Reynolds number
Supervision : Kenta Ishimoto (RIMS)
- 2017–2020 **Doctorat de mathématiques**, *Equipe McTAO - Inria Sophia-Antipolis et CEREMADE - Université Paris-Dauphine PSL*.
Title : Controllability in finite and infinite dimension and applications to bio-inspired nonlinear systems
Supervision : Laetitia Giraldi (Inria), Pierre Lissy (CEREMADE), Jean-Baptiste Pomet (Inria)
Defended on : 17 juin 2020
Reviewers : Eamonn Gaffney (Oxford University), Emmanuel Trélat (LJLL - Sorbonne Université)
Examiners : Karine Beauchard (ENS Rennes), Jean-Baptiste Caillau (Université Côte d’Azur), Antonio DeSimone (SISSA)
- 2016–2017 **“Année de Recherche Prédoctorale à l’Etranger” (Pre-doctoral year abroad)**, *University of York (Royaume-Uni)*.
Project title : Efficient semi-analytical numerical methods for solving the elastohydrodynamics of filaments
Supervision : Hermes Gadêlha (Bristol University)
- 2015–2016 **Master’s degree in "Mathematics and Applications"**, *Université Pierre et Marie Curie*,
Mention : bien (*magna cum laude*).
Thesis title : Partial controllability of magnetic microswimmers
Supervision : Laetitia Giraldi (Inria), Pierre Lissy (CEREMADE), Jean-Baptiste Pomet (Inria)
- 2013–2015 **Master 1 (4th year of university) in "Pure Mathematics"**, *Ecole Normale Supérieure de Cachan, Université Paris Diderot*, Mention : bien (*magna cum laude*).
Thesis title : Real-time sub-optimal control of hybrid vehicles
Supervision : François Chaplais (CAS)
- 2013–2014 **Bachelor’s degree in Mathematics**, *Ecole Normale Supérieure de Cachan, Université Paris Diderot*, Mention : bien (*magna cum laude*).
Thesis title : Numerical reconstruction of Prokudin-Gorskii’s photos
Supervision : Enric Meinhardt-Llopis (CMLA), Jean-Michel Morel (CMLA)
- 2013 **National competitive examination for admission to the French "Grandes Ecoles" - Entered the Ecole Normale Supérieure de Cachan**.
Diploma of ENS Cachan awarded in 2017
- 2011–2013 **“Classe préparatoire” : two-year intensive undergraduate course in mathematics and physics (MPSI/MP*)**, *Lycée Clemenceau, Lycée Clemenceau, Nantes*.
- 2011 **Baccalauréat with major in mathematics**, *Lycée Clemenceau, Nantes*, with highest honours.

Publications

- [3] C. Moreau, *Local controllability of a magnetized Purcell's swimmer*, IEEE Control Systems Letters, vol.3, no.3, pp. 637-642, DOI:10.1109/LCSYS.2019.2915004, 2019.
- [2] C. Moreau, L. Giraldi, H. Gadêlha¹, *The asymptotic coarse-graining formulation of slender-rods, bio-filaments and flagella*, Journal of the Royal Society Interface, vol. 15 (144), DOI:10.1098/rsif.2018.0235, 2018.
- [1] L. Giraldi, P. Lissy, C. Moreau, J.-B. Pomet², *Addendum to "Local Controllability of the Two-Link Magneto-Elastic Micro-Swimmer"*, IEEE Transactions on Automatic Control, vol. 63, pp. 2303-2305, DOI:10.1109/TAC.2017.2764422, 2017.

Preprints

- [P4] B. Walker, K. Ishimoto, E. A. Gaffney, C. Moreau¹, *The control of particles in the Stokes limit*, submitted.
- [P3] C. Moreau, K. Ishimoto, E. A. Gaffney, B. Walker¹, *Control and controllability of microswimmers in a shearing flow*, submitted.
- [P2] P. Lissy, C. Moreau², *State-constrained controllability of reaction-diffusion systems*, accepted for publication in ESAIM :COCV. Lien arxiv
- [P1] L. Giraldi, P. Lissy, C. Moreau, J.-B. Pomet², *A necessary condition for local controllability of systems with two scalar controls* (avec Laetitia Giraldi, Pierre Lissy et Jean-Baptiste Pomet), under revision for ESAIM :COCV. Lien arxiv

Conference proceedings

- Jul 2020 C. Moreau, *Local Controllability of Magnetized Purcell's Swimmers*, IFAC World Congress (online), to appear in IFAC-PapersOnLine.
- Dec 2019 (Joint publication CDC et L-CSS [3]) C. Moreau, *Local controllability of a magnetized Purcell's swimmer*, 58th Conference on Decision and Control (CDC), Nice, France

Communications

- Dec 2020 **Congrès National d'Analyse Numérique pour les jeunes**, *online*.
State-constrained controllability of linear parabolic systems
- May 2020 **Groupe de travail des thésards du LJLL**, *online*.
Necessary conditions of local controllability for control-affine systems and applications to micro-swimming
- Feb 2020 **Research Workshop of the Israel Science Foundation on Micro-Swimmers and Soft-Robotics**, Haïfa, Israël.
Controllability of magnetized Purcell's swimmers (poster presentation)
- Jul 2019 **2019 Equadiff Conference**, Leiden, Pays-Bas.
Necessary Condition for Local Controllability
- May 2019 **Colloque Inter'Actions**, Institut de Mathématiques de Bordeaux, France.
Une condition nécessaire de contrôlabilité locale pour une classe particulière de systèmes à deux contrôles
- May 2019 **Congrès SMAI**, Guidel, France.
Une condition nécessaire de contrôlabilité locale pour une classe particulière de systèmes à deux contrôles
- Dec 2018 **13th International Young Researchers Workshop on Geometry, Mechanics and Control**, Universidade de Coimbra, Portugal.
Necessary Condition for Local Controllability
- May 2018 **Congrès National d'Analyse Numérique (CANUM)**, Agde, France.
Hydrodynamics of elastic micro-filaments : model comparison and applications (poster presentation)
- Avr 2018 **Journée des thèses de l'équipe EDPAN**, LJAD, Nice, France.
Controllability of a magneto-elastic micro-swimmer

1. Author order by contribution
2. Alphabetical author order

- Jan 2018 **12th International Young Researchers Workshop on Geometry, Mechanics and Control**, *Università di Padova, Italie*.
Controllability of a magneto-elastic micro-swimmer
- Nov 2017 **PGMO Days 2017**, *EDF Lab Paris Saclay, France*.
Controllability of a magneto-elastic micro-swimmer

Teaching

- 2019-2020 **Tutor**, *Université Paris-Dauphine – PSL, Paris*.
« Analyse 3 » (undergrad level analysis)
64 hours
- 2017-2019 **Tutor**, *Université Nice-Sophia-Antipolis, Institut Supérieur d'Economie et de Management (ISEM), Nice*.
« Mathématiques 2 » (first year undergrad level analysis), Statistics (second year undergrad)
128 hours

Outreach activities

- 2021 Participation to JSPS Science Dialogue (lecture given to 40 high school students in Aichi Prefecture)
- 2018– writer for the press review section of the French website « Images des mathématiques »
- 2017-2019 Various contributions to Inria outreach activities (Science festival, presentations in schools)
- 2018 Participation to the « Ma thèse en 180 secondes » competition
- 2018 Short live presentation for « La méthode scientifique » program on national French radio

Academic responsibilities

- 2019-2020 Elected representative of the PhD students at the CEREMADE (Univ. Paris- Dauphine) lab council
- 2019-2020 Member of the CEREMADE's committee for gender equality

Languages

- French Mother tongue
- English Fluent
- German Occasional practice
- Japanese Basic