

Matthieu Ménard | Curriculum vitae

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Since September I have a postdoctoral position in Université Libre de Bruxelles (under the supervision of Mitia Duerinckx).

Studies

Institut Fourier, Université Grenoble Alpes, Grenoble, France 2020-2023

PhD in mathematics

Supervised by Christophe Lacave and Evelyne Miot, entitled "Mean-field limits in kinetic theory and fluid mechanics".
Defended on December 12th, 2023.

École Normale Supérieure, Lyon, France 2016 - 2020

Master's degree in mathematics 2019-2020

Analysis of partial differential equations.

Master Feadep (Mathematical education) 2018-2019

Agrégation de mathématiques (french national teaching diploma) ranked 28/303.

Bachelor's degree in mathematics - 2017.

Lycee Chateaubriand, Rennes, France 2014-2016

*CPGE MPSI-MP**

Research internships

Institut Fourier, Grenoble, France 2020

Euler equation with point vortices, supervised by Christophe Lacave.

Université Libre de Bruxelles, Bruxelles, Belgium 2018

Gromov's non-squeezing theorem, supervised by Mélanie Bertelson.

Institut Fourier, Grenoble, France 2017

Bessel functions, supervised by Catriona McLean.

Articles

Publications

Mean-Field Limit Derivation of a Monokinetic Spray Model with Gyroscopic Effects April 2022

We show the local strong well-posedness and the mean-field limit derivation of a two dimensional spray model with gyroscopic effects (coupled system between the Euler equation and a monokinetic Vlasov-like equation).
Published in SIAM Journal on Mathematical Analysis - SIMA. Link : <https://epubs.siam.org/doi/full/10.1137/22M1495937>.

Preprints

Mean-Field Limit of Point Vortices for the Lake Equations September 2023

We show the mean-field limit derivation of a system of point vortices for the lake equations using a modulated energy method. Arxiv : <https://arxiv.org/abs/2309.10453>.

Bloch-Floquet band gaps for water waves over a periodic bottom - with C. Lacave and C. Sulem March 2024

We study the spectrum of the Dirichlet-Neumann operator which characterizes the water wave system linearized near equilibrium. We find that in a domain with a small variable periodic bottom, and under some conditions on the bottom variations, the spectrum is composed of bands separated by gaps, with explicit formulas for their sizes and locations. Arxiv : <https://arxiv.org/abs/2403.00114>.

Teaching

- Matrices and functions of several variables (second year physics bachelor's) 2022
- Introduction to numerical analysis (second year mathematics bachelor's) 2022
- Applied linear algebra (first year physics bachelor's) 2021
- Introduction to mathematical modeling and to population dynamics (first year biology bachelor's) 2021
- Mathematical methods for physicists (first year physics bachelor's) 2020
- Colles in CPGE-MPSI (oral tests for first year students) 2018-2019

Conferences

Talks given.....

- ANEDP Seminar - Lille** February 2024
Spectral gaps for linearized water waves above a small periodic bottom.
- Order and Randomness in PDEs program - Mittag-Leffler Institute, Djursholm** November 2023
Spectral gaps for linearized water waves above a small periodic bottom.
- Mathematical physics seminar - Grenoble - Institut Fourier** December 2022
Mean-field limit of point vortices for the lake equations.
- Horizons in non-linear PDEs summer school - Ulm, Germany** September 2022
Mean-field limit derivation of a gyrokinetic spray model.
- "Singflows" conference - Bordeaux** April 2022
Mean-field limit derivation of a gyrokinetic spray model.
- PHD days - Institut Fourier - Grenoble** October 2021
Interactions of vortex and particles in a two-dimensional fluid.

Conferences attended.....

- Advanced Summer School on Mathematical Fluids Dynamics** 2023
Water waves, IESC, Cargèse
- New trends in mathematical fluid dynamics** 2023
Fluid mechanics, Institut Fourier, Grenoble
- Mathflows conference** 2022
Fluid mechanics, Cirm, Marseille
- When kinetic theory meets fluid mechanics** 2022
Summer school in ETH Zurich
- Journées EDP** 2022
Partial differential equations, Obernai.
- Journées "Jeunes Edpistes"** 2022
Partial differential equations, Lyon.
- Journées EDP Auvergne Rhône-Alpes** 2021
Partial differential equations, Saint-Etienne.
- Advanced Summer School On Mathematical Fluids Dynamics** Août 2021
Geophysical Fluid Dynamics and Wave turbulence, IESC, Cargèse.
- Journées EDP** 2021
Partial differential equations, Obernai.
- MathsInFluid** 2020-2023
Workshop-Seminar in fluid mechanics, Lyon
- Journées Louis Antoine** 2019
Numerical Analysis, Rennes.
- Introductory workshop : Microlocal analysis** 2019
Summer school in MSRI, Berkeley.

Invitations

- University of Toronto** 2023
Invited by Catherine Sulem for two months.
- Mittag-Leffler Institute, Djursholm** 2023
Invited by Catherine Sulem for a week for the "Order and Randomness in PDEs" program.

Responsibilities

- Member of the Institut Fourier research council (UMR 5582, non-permanents). 2022-2023

Languages

- French (Native)
English (Professional, C1 certification from *Cambridge English Advanced* exam)

Popularisation

- MathaLyon exhibition** 2018
Mathematical exhibition for middle school students, Lyon.
- Jury for TFJM²** 2018
Member of jury for the french tournament for young mathematicians, Lyon.