

Nathalie Ayi

Maître de conférences
(Associate Professor)

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Born on 02/25/1989 in Orléans
French
Pacsée, 1 child (born in 2018)

Current situation

2017–... **Maître de conférences (Associate Professor)**, Sorbonne University, Jacques Louis Lions Laboratory, Paris, France.

Education

- 2016–2017 **Post-Doctorat**, IPSO Team, INRIA Bretagne Atlantique, IRMAR Laboratory, Rennes, France.
- 2013–2016 **PhD in Mathematics**, University of Nice Sophia-Antipolis, Inria team : COFFEE, Nice, France.
Title of the thesis “*Influence of stochastic on change of scales problems*”, in Jean Alexandre Dieudonné Laboratory (LJAD) under the direction of Florent Berthelin and Laure Saint-Raymond, defended on 09/19/2016.
Jury :
- Florent Berthelin (advisor), University of Nice Sophia-Antipolis,
- Arnaud Debussche (reviewer), École normale supérieure de Rennes,
- François Delarue (examineur), University of Nice Sophia-Antipolis,
- Laurent Desvillettes (reviewer), Pierre et Marie Curie University, Paris Diderot University
- Isabelle Gallagher (president of the Jury), Pierre et Marie Curie University, Paris Diderot University,
- Thierry Goudon (examineur), University of Nice Sophia-Antipolis,
- Laure Saint-Raymond, (advisor), École normale supérieure de Paris.
- 2012–2013 **Master degree of Science, Mathematics (Option Research) with honors**, University of Nice Sophia-Antipolis, Nice.
- 2012 **"Agrégation de Mathématiques"**, National Competitive Exam, French "Éducation Nationale", France.
- 2012 **"École Normale Supérieure de Lyon" diploma**, ENS Lyon.
- 2011–2012 **Master degree of Science, Mathematics (Option "Agrégation de Mathématiques") with honors**, University of Nice Sophia-Antipolis, Nice.
- 2010–2011 **Master degree of Science, first year, Mathematics, with honors**, University of Nice Sophia-Antipolis, Nice.
Curriculum : PENSUNS ENS Lyon-Nice.
- 2009–2010 **Bachelor of Science, Mathematics with honors**, ENS Lyon, University Claude Bernard , Lyon.

Research themes

Stochastic and deterministic partial differential equations – Stochastic Calculus – Kinetic theory of gases – Scalar conservation laws – Change of scales problems – Hydrodynamical limit – Diffusion limit – Boltzmann-Grad limit – Boltzmann equation – Discrete velocity models – Particles in interaction systems.

Publications

Articles accepted or published in peer-reviewed journals

- 2017 **From Newton's law to the linear Boltzmann equation without cut-off**, N. Ayi.
Communications in Mathematical Physics, 350(3), 1219-1274.
- 2017 **Regularity of velocity averages for transport equations on random discrete velocity grids**, N. Ayi, T. Goudon.
Analysis & PDE, 10, 1201-1225.

Submitted articles in revision

- 2018 **Analysis of an asymptotic preserving scheme for stochastic linear kinetic equations in the diffusion limit**, N. Ayi, E. Faou.
- 2017 **High-Field Limit from a Stochastic BGK Model to a Scalar Conservation Law with Stochastic Forcing**, N. Ayi.

Proceedings, seminar acts

- 2018 **Eighth Montreal Industrial Problem Solving Workshop - Rio Tinto Report**, D. Jovmir, N. Ayi, A. Poterie, C. Budd, S. H. Jun, K. A. Alahassa, S. Amraoui, S. Ibrahim, T. Y. Lee, C.P. Liou, C. Poissant, V. Rochon Montplaisir, L. Sarrazin-Mc Cann, P. Duchesne, R. Arsenault, and M. Latraverse.
- 2017 **Derivation of the linear Boltzmann equation without cut-off starting from particles**, N. Ayi.
Journées Équations aux dérivées partielles, Cedram.
- 2017 **Stochastic discrete velocity averaging lemmas and Rosseland approximation**, N. Ayi.
Séminaire Laurent Schwartz - EDP et applications, Cedram.

Conferences, Workshops, Schools

Presentations at national or international conferences

- Dec. 2017 **Étude mathématique des fluides : aspects cinétiques et dynamiques**, Paris, France.
- Oct. 2017 **Dynamics in multi-component systems : mathematical and physical aspects**, Lille, France.
- June 2017 **Journées EDP 2017**, Roscoff, France.
- March 2017 **Journées Jeunes EDPistes**, Autrans, France.
- Dec. 2016 **Workshop Mean-field dynamics of many particle systems**, Vienne, Austria.
- May 2016 **Mathematical Topics in Kinetic Theory Conference**, Cambridge, Royaume-Uni.

[Presentations at seminars or working groups](#)

- Dec. 2017 **Séminaire de Modélisation et Calcul Scientifique**, *Paris 13 University*.
- Oct. 2017 **Séminaire Jacques Louis Lions**, *Pierre et Marie Curie University*.
- Feb. 2017 **Séminaire Laurent Schwartz**, *École Polytechnique*.
- January 2017 **Séminaire Landau des jeunes chercheurs en Analyse**, *University of Rennes*.
- January 2017 **Séminaire d'Analyse, Probabilités et Modélisation**, *University of Orléans*.
- Oct. 2016 **Séminaire d'Analyse numérique et équations aux dérivées partielles**, *University of Lille*.
- April 2016 **Séminaire d'Analyse**, *University of Nantes*.
- April 2016 **Séminaire des doctorants**, *T.U. Wien, Vienne*.
- March 2016 **Séminaire Landau des jeunes chercheurs en Analyse**, *University of Rennes*.
- January 2016 **Working group “Applications des mathématiques”**, *ENS Rennes*.
- Sept. 2015 **ENS Paris Analysis Team return days**, *Paris*.
- June 2014 **PhDs seminar of the team “EDPs et Analyse Numérique”**, *Nice*.
- April 2014 **PhDs seminar of the team “Probabilités et Statistiques”**, *Nice*.

[Regular participation in a working group, with a presentation](#)

- 2017–2018 **Working group “Limits to the hyperbolic”**, *Sorbonne University*.
Presentation in February 2018.
- 2015–2016 **Working group “EDPs-Probas”**, *University of Nice Sophia-Antipolis*.
Presentation in September 2015 and October 2015.

[Participation in national or international conferences without presentations](#)

- Sept. 2017 **MAFRAN DAYS : Mathematical Frontiers in the Analysis of Many-particle Systems**, *Cambridge, Royaume-Uni*.
- August 2017 **Eighth Industrial Problem Solving Workshop in Montréal**, *University of Montréal, Canada*.
- July 2017 **Fluids, dispersion and blow-up**, *Institut Henri Poincaré (Paris), France*.
- May 2017 **Analysis of transport equations : Vlasov equation and related models**, *University of Rennes 1, France*.
- January 2017 **Nantes-Rennes days**, *University of Nantes, France*.
- March 2016 **Journées Jeunes EDPistes français**, *University of Bordeaux, France*.
- May 2015 **Workshop Mathematical problems in kinetic theory**, *University of Rennes 1, France*.
- May 2015 **Journées Nice-Toulon-Marseille**, *Porquerolles, France*.
- March 2015 **Journées Jeunes EDPistes français**, *Saint-Brévin, France*.
- Nov. 2014 **Kinetic equations**, *CIRM, Marseille, France*.
- June 2014 **Advances in nonlinear PDEs : analysis, numerics, stochastics, applications**, *University of Vienna, Austria*.
- April 2014 **Nonlinear PDEs with random conditions**, *University of Toulouse, France*.
- March 2014 **"Journées Numériques"**, *University of Nice Sophia-Antipolis, France*.

July 2013 **Mathematics for industry and society**, *French Embassy, Berlin, Germany.*

Regular participation in seminars (as an auditor)

- 2017–2018 **Seminar of the Jacques Louis Lions Laboratory**, *Jacques Louis Lions Laboratory, Sorbonne University.*
- 2016–2017 **Seminar of the Analysis team**, *Jean Leray Laboratory, University of Nantes.*
- 2016–2017 **Working group “Applications des mathématiques”**, *ENS Rennes.*
- 2013–2016 **Seminar of the team “EDP et Analyse Numérique”**, *J.A. Dieudonné Laboratory, University of Nice.*
- 2013–2016 **PhDs seminar of the team “EDPs et Analyse Numérique”**, *J.A. Dieudonné Laboratory, University of Nice.*
- 2013–2016 **PhDs seminar of the team “Probabilités et Statistiques”**, *J.A. Dieudonné Laboratory, University of Nice.*

Related research activities

Reviews for *Kinetic and Related Models*, *Archive for Rational Mechanics and Analysis* and *Journal of Computational Physics*.

Invitations, Scientific Stays

- Sept. 2017 **University of Cambridge, Cambridge.**
Ariane Trescases, Clément Mouhot.
- April 2016 **T.U. Wien, Vienna.**
Ansgar Juengel.
- June 2015 **University of Harvard, M.I.T., Boston.**
Laure Saint-Raymond.
- Février 2015 **University of Harvard, M.I.T., Boston.**
Laure Saint-Raymond.
- Juin 2014 **University of Vienna, T.U. Wien, Vienna.**
Christian Schmeiser, Ansgar Juengel.

Experience

Internships

- 2013 **Academic report for the Master degree**, *INRIA, University of Nice Sophia-Antipolis, Nice.*
Subject : Stochastic scalar conservation laws.
- 2011 **Academic report for the Master degree**, *University of Nice Sophia-Antipolis, Nice.*
Subject : Markov chains, invariant measure and ergodicity.

Teaching

- 2013–2016 **Instructor (192 hours)**, *Economics and Management Superior Institute, Nice.*
Statistics and Analysis, First year of Bachelor of Economics.
- 2012–2013 **Tutoring**, *Economics and Management Superior Institute, Nice.*
Statistics, First year of Bachelor of Economics

Popularization of Science

- March 2017 **Mathematics week**, Charles Péguy High School and Jean Zay High School, Orléans.
Talk : *Introduction to the world of research in Applied Mathematics.*
- March 2015 **Mathematics week**, René Goscinny High School, Drap.
Talk *Particles system and fluid mechanics.*
- October 2013 **Science celebration** , University of Nice Sophia-Antipolis.
Mathematics stand.

Skills

Languages

- French Mother tongue
English Fluent
Spanish Notions

Informatics

- Office Word, Open Office, L^AT_EX,
OS Windows, Linux, Mac OS
Prog. Scilab, Matlab, Notions of Python
Internet HTML notions (C2i2e certificate)