

Curriculum Vitæ

Paul Alphonse

December 14, 2022

1 Personal information

First name: Paul

Born on April 21, 1992

Last name: ALPHONSE

French citizen

Professional address:

ENS de Lyon site Monod

UMPA UMR 5669 CNRS

46, allée d'Italie

69364 Lyon Cedex 07, France

Office: MGN1.419.

Email: paul.alphonse at ens-lyon.fr.

Phone number: 04.72.72.81.88.

Personal webpage: <https://sites.google.com/view/paulalphonse/accueil>.

2 Career

Professional situations

Since 2020: “Agrégé préparateur” in mathematics at Ecole Normale Supérieure de Lyon.

2017 - 2020: PhD student in mathematics at the Université de Rennes 1 and teaching assistant at Ecole Normale Supérieure de Rennes.

Education and diplomas

2017 - 2020: PhD student in Mathematics at the Université de Rennes 1 under the directorship of Prof. Karel PRAVDA-STAROV. Thesis entitled *Regularity of solutions and controllability of evolution equations associated with non-selfadjoint operators* and defended on June 05, 2020.

Referees: Mouez DIMASSI et Jérôme LE ROUSSEAU.

PhD defense committee: Karine BEAUCHARD, Mouez DIMASSI, Frédéric HÉRAU, Jérôme LE ROUSSEAU, Nicolas LERNER, Francis NIER, Karel PRAVDA-STAROV, Didier ROBERT.

2013 - 2017: Student at Ecole Normale Supérieure de Rennes.

2017 Master 2 in Mathematics, Université de Rennes 1, with highest honors.

2016 Nationally ranked 41th at the Agrégation de Mathématiques (national teaching competitive exam).

2015 Master 1 in Mathematics, Université de Rennes 1, with highest honors.

Bachelor's degree in Computer Science, Université de Rennes 1, with honors.

2014 Bachelor's degree in Mathematics, Université de Rennes 1, with highest honors.

2010 - 2013: Student in Preparatory Classes (first 2 years after high school), MPSI and MP*, Lycée Camille Guérin, Poitiers (France).

2010: Baccalauréat Scientifique (end of high school degree), Lycée Camille Guérin, Poitiers (France), with honors.

Other skills

Languages spoken:

- . French - Mother tongue.
- . English - Fluent - TOEIC: 890/990 in 2015.
- . Spanish - Basics.

Computing:

- . Programming language: OCaml.
- . Numerical-analysis softwares: Maple, Mathematica, Scilab, Sage.

3 Research activities

Research interests

- . Microlocal study of the smoothness, the localization and the integrability of solutions of linear evolution equations.
- . Exponential stabilization and null-controllability of degenerate parabolic equations of hypoelliptic type.
- . Spectral estimates for selfadjoint operators.
- . Subelliptic and hypoelliptic estimates for non-selfadjoint operators.

Keywords

Partial differential equations; Microlocal analysis; Smoothing and localizing phenomena; Exponential stabilization; Null-controllability; Subellipticity; Hypoellipticity; Non-selfadjoint operators.

Articles published or accepted for publication

1. P. ALPHONSE & J. MARTIN, *Approximate null-controllability with uniform cost for the hypoelliptic Ornstein-Uhlenbeck equations*, accepted for publication at SIAM Journal on Control and Optimization (2022).
[arXiv:2201.01516](https://arxiv.org/abs/2201.01516).

2. P. ALPHONSE, *Description of the smoothing effects of semigroups generated by fractional Ornstein-Uhlenbeck operators and subelliptic estimates*, Journal of Evolution Equations 22 (2022), no. 28, 25 pp.
[arXiv:2007.04593](#) ; [doi:10.1007/s00028-022-00798-3](#).
3. P. ALPHONSE & J. MARTIN, *Stabilization and approximate null-controllability for a large class of diffusive equations from thick control supports*, ESAIM: Control, Optimization and Calculus of Variations 28 (2022), no.16, 30 pp.
[arXiv:2101.03772](#) ; [doi:10.1051/cocv/2022009](#).
4. P. ALPHONSE & J. BERNIER, *Polar decomposition of semigroups generated by non-selfadjoint quadratic differential operators and regularizing effects*, to appear in Annales scientifiques de l'École normale supérieure (2021).
[arXiv:1909.03662](#).
5. P. ALPHONSE, *Quadratic differential equations: partial Gelfand-Shilov smoothing effect and null-controllability*, Journal of the Institute of Mathematics of Jussieu 20 (2021), no. 6, pp. 1749-1801.
[arXiv:1902.04459](#) ; [doi:10.1017/S1474748019000628](#).
6. P. ALPHONSE & J. BERNIER, *Smoothing properties of fractional Ornstein-Uhlenbeck semigroups and null-controllability*, Bulletin des Sciences Mathématiques 165 (2020), 102914, 52 pp.
[arXiv:1810.02629](#) ; [doi:10.1016/j.bulsci.2020.102914](#).

Preprints submitted for publication

1. P. ALPHONSE, *Null-controllability of evolution equations associated with fractional Shubin operators through quantitative Agmon estimates*, in revision at Annales de l'Institut Fourier (2022).
[arXiv:2012.04374](#).
2. P. ALPHONSE, J. BERNIER, *Gains of integrability and local smoothing effects for quadratic evolution equations*, preprint (2021).
[arXiv:2111.11254](#).
3. P. ALPHONSE, *Hypoelliptic estimates for linear transport operators*, preprint (2020).
[arXiv:2007.07581](#).

Ongoing works

1. P. ALPHONSE & A. KOENIG, *Null-controllability of the low-diffusing fractional heat equation*.
2. P. ALPHONSE & A. SEELMANN, *Quantitative spectral inequalities for the anisotropic Shubin operators and the Grushin operator*.

4 List of talks

Talks in conferences / workshops

2023. Workshop “Quadratic days” organized at Université de Nantes.

- 2022. Conference “Normal forms and splitting methods” organized at Pornichet. *Smoothing and localizing properties for quadratic evolution equations through the polar decomposition.*
- . Conference “One-Parameter Semigroups of Operators (OPSO) 2022” organized on ZOOM. *Smoothing properties and null-controllability for quadratic evolution equations through the polar decomposition.*
- 2021. “Journées EDP Auvergne Rhône Alpes (JEARA) 2021” organized at Université de Saint-Etienne. *Smoothing and localizing properties for quadratic evolution equations.*
- . Conference “Multi-scale problems in mathematical physics” organized at Université d’Angers as part of the thematic semester “Mathematical physics and geometry” of the centre Henri Lebesgue. *Smoothing and localizing properties for two classes of linear evolution equations.*
- . “Journées Jeunes EDPistes 2021” as part of the GDR EDP, organized online by the Laboratoire de mathématiques de Besançon.
- 2020. Workshop as part of the ANR project QuAMProcs, organized at Université de Nantes. *Effets régularisants des semi-groupes engendrés par les opérateurs d’Ornstein-Uhlenbeck fractionnaires.*
- . “Pseudo-differential conference” organised on ZOOM by the Ghent Analysis & PDE Center. *Smoothing properties of semigroups generated by accretive quadratic operators.*

Talks in laboratories seminars

- 2023. PDEs and Applications seminar at Université de Lorraine.
- . Analysis seminar of IMB, Université de Bordeaux.
- 2022. Seminar at the Fakultät für Mathematik - Technische Universität Dortmund. *Smoothing properties and null-controllability for quadratic evolution equations through the polar decomposition.*
- . PDE - Mathematical physics seminar of IMB, Université de Bordeaux. *Propriétés de régularisation et de contrôlabilité à zéro des équations d’évolution quadratiques grâce à la décomposition polaire.*
- . Mathematical physics seminar of Institut Fourier, Université de Grenoble. *Propriétés de régularisation et de contrôlabilité à zéro des équations d’évolution quadratiques grâce à la décomposition polaire.*
- 2020. MACS seminar, common between ICJ and UMPA, Université Claude Bernard Lyon 1. *Phénomènes de régularisation et contrôlabilité pour deux classes d’équations d’évolution linéaires.*
- 2019. Analysis seminar of LMJL, Université de Nantes. *Effets régularisants des semi-groupes engendrés par les opérateurs quadratiques accréatifs.*
- 2014. Probability and Statistics seminar, Université de Poitiers. *Lois des grands nombres pour des fermés aléatoires.*

Talks in PhD students seminars and meetings

- 2019. Day of PhD students in analysis of IRMAR, Université de Rennes 1. *Effets régularisants des semi-groupes engendrés par les opérateurs quadratiques.*
- 2018. Lambda seminar of PhD students of IMB, Université de Bordeaux. *Contrôlabilité à zéro des équations d’Ornstein-Uhlenbeck fractionnaires.*

- . Lebesgue PhD meeting 2018, Pôle Numérique de Brest. *Effets régularisants des semi-groupes d'Ornstein-Uhlenbeck*.
- . Landau seminar of PhD students in analysis of IRMAR, Université de Rennes 1. *Some properties of fractional Ornstein-Uhlenbeck operators*.
- . Landau seminar of PhD students in analysis of IRMAR, Université de Rennes 1. *Regularizing effects of quadratic semigroups and null-controllability of quadratic differential equations*.

5 Teachings

“Agrégé préparateur” at Ecole Normale Supérieure de Lyon Since 2020
 Exercices sessions for the course *Topology and differential calculus* (Bachelor degree), Exercices sessions for the course *Partial differential equations* (Master degree), Exercices sessions for the course *Advanced analysis* (Master degree, given in English), Complementary courses in analysis and oral trainings for students preparing the Agrégation de Mathématiques (Master degree).

Teaching assistant at Ecole Normale Supérieure de Rennes 2017 - 2020
 Exercices sessions for the course *Normed vector spaces and differential calculus* (Bachelor degree), Exercices sessions for the course *Lebesgue integration* at ENSAI (service exchange, Bachelor degree), Complementary courses in analysis and oral trainings for students preparing the Agrégation de Mathématiques (Master degree).

Teaching at INSA Rennes 2016 - 2017
 Exercices sessions for the course *Riemann integration, Ordinary differential equations and linear recurrence relations* (Bachelor degree).

6 Administrative responsibilities

- . Member of the recruitment committee of two “Agrégé préparateur” positions at ENS de Lyon in November/December 2022.
- . Member of the organizing committee of the conference “Workshop on control problems” organized on Zoom in October 2022.
- . Member of the laboratory council of UMPA since September 2022.
- . Member of the evaluation committee for applications for admission to the ENS de Lyon in September 2022.
- . Member of the organizing committee of the 2019 session of the Lebesgue PhD meeting (supported by the Centre Henri Lebesgue), which took place from 28/10/2019 to 30/10/2019 at the Université de Nantes.
- . Member of the organizing committee of the Landau seminar of PhD students in analysis of IRMAR at the Université de Rennes 1 since September 2018.
- . Member of the organizing committee of the regional phase of the Tournoi Français des Jeunes Mathématiciennes et Mathématiciens (TFJM²), a french championship for young mathematicians, which took place in ENS Rennes from 14/04/2018 to 15/04/2018.