

NGUYEN VIET DANG

Curriculum Vitae

Institut Mathématique de Jussieu,
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Birthdate: 21/05/1987
Nationality: French
Married, 1 daughter plus 1 expected september
2021
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Actual position.

September 2021	Sorbonne University Professor at Institut Mathématique de Jussieu
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Past experience.

2015–2021	Université de Lyon, Université Claude Bernard–Lyon 1 Assistant Professor (tenure) at l' <i>Institut Camille Jordan – UMR CNRS 5208</i>
2014–2015	Postdoc CEMPI at Université de Lille 1, with Stéphane de Bièvre
2013–2014	Postdoc at Penn State University, with Ping Xu

Degrees.

19 Fév. 2021	Habilitation thesis at Université Paris Saclay. Advised by Stéphane NONNEN-MACHER.
Déc. 2013	Phd in Maths Université de Paris, passed with highest honors. Advised by Frédéric HÉLEIN.
2010–2013	Phd student at Université de Paris
2008–2009	Graduate at Paris VII, obtained with highest honors
2007–2011	Student at ENS Cachan

Research topics.

Quantum field theory on curved space–times, microlocal analysis, renormalization, global analysis, harmonic analysis, Ruelle resonances, Morse theory, torsion.

Habilitation à diriger des recherches en mathématiques, Université Paris (XI)

Titre: Microlocal analysis from quantum fields to hyperbolic dynamics.

Jury:

- Nalini Anantharaman,
- Sébastien Gouëzel,
- Colin Guillarmou,
- Christian Gérard (rapporteur),
- Stéphane Nonnenmacher (président),
- Gabriel Paternain (rapporteur),
- Maciej Zworski (rapporteur).

Organization

Here is a list of scientific events I coorganized. In 2020-2021, events were cancelled because of **Covid**.

27–29 Mai 2019	coorganized Mathematical physics days in Lyon 2019 summer school named <i>Random tensors and SYK models</i> , financial support of Labex Milyon
20–22 Juin 2018	coorganized Mathematical physics days in Lyon 2018 summer school named <i>Quantum chaos</i> , financial support of Labex Milyon
7–9 Juin 2017	coorganized Mathematical physics days in Lyon 2017 summer school named <i>Quantum field theory in curved space times</i> , financial support of Labex Milyon

Since september 2019, I organized **the seminar of the mathematical physics team** in Lyon 1 which takes place every two Fridays at 14:00 at Institut Camille Jordan which is **online right now**.

Supervision.

I had the opportunity to supervise Yann Chaubet during one year, he is a student of the ENS Ulm doing his phd with C. Guillarmou (senior researcher University Paris Saclay), this resulted in the preprint: *Dynamical torsion of Anosov flows*, arxiv 1911.09931.

Financial support and grants.

2021–2025	Membre de l'ANR "Quantum fields interacting with geometry", acronyme QFG (PIs: C. Gérard et D. Häfner)
2019–2022	Membre du projet Idex "ToRe: Topological revolution, from Quantum technologies to climate change" (PI: David Carpentier ENS Lyon)
2016–2019	Membre de l'ANR JCJC, <i>Scattering and propagation phenomena near space time horizons</i> , acronyme <i>Horizons</i> responsable Michal Wrochna
2009–2020	GDR CNRS 3274 "Quantum Dynamics" acronyme DYNQUA, membre correspondant pour Lyon 1
2018–2021	Membre du GDR "Renormalisation: Nouvelles Structures et Applications" acronyme RENORM

Personal grants.

2018 – 2021	Ministère de l'Enseignement Supérieur et de la Recherche "Prime d'encadrement doctorale et de recherche – PEDR".
2015	Bourse d'installation BQR, 9000 euros
2007–2011	Elève fonctionnaire stagiaire ENS Cachan

Publications and preprints.

I emphasize **in bold** what I consider to be my best work

1. C. Brouder, N.V. Dang and F. Hélein, *A smooth introduction to the wavefront set*, J. Phys. A: Math. Theor. 47 (2014)
2. C. Brouder, N.V. Dang and F. Hélein, *Boundedness and continuity of the fundamental operations on distributions having a specified wave front set*, Studia Mathematica 232 (2016), 201-226
3. N.V. Dang, *The Euler characteristic of a surface from its Fourier analysis in one direction*, Math. Research Letters, Volume 23, (2016) pp. 1263-1279
4. N.V. Dang, E. Herscovich *Renormalization of Quantum Field Theory on Riemannian manifolds*, Rev. Math. Phys. 31 (2019), no. 06, 1950017, 30 pp.
5. **N.V. Dang, *Extension of distributions on manifolds, a microlocal approach*, Annales Henri Poincaré. Vol. 17. No. 4. Springer International Publishing, 2016**
6. N.V. Dang, *The wave front set of complex powers of analytic functions and meromorphic regularization in QFT*, arXiv:1503.00995
7. **N.V. Dang and G. Rivière, *Equidistribution of the conormal cycle of random nodal sets*, Journal of Eur. Math. Soc. Volume 20, Issue 12, 2018, pp. 3017–3071**
8. **N.V. Dang and G. Rivière, *Spectral analysis of Morse-Smale gradient flows*, Annales de l'ENS 2019 Tome 52 fascicule 6 p. 1403-1458**
9. N.V. Dang and G. Rivière, *Spectral analysis of Morse-Smale flows I: construction of the anisotropic spaces*, J. Inst. Math. Jussieu, Vol. 19 (2020), 1409-1465.
10. **N.V. Dang and G. Rivière, *Spectral analysis of Morse-smale flows II: resonances and resonant states*, American J. Math., Vol. 142 (2020), 547-593**
11. **N.V. Dang and G. Rivière, *Topology of Pollicott-Ruelle resonant states*, Annali della Scuola normale di Pisa, DOI:10.2422/2036-2145.201804_010.**
12. C. Brouder, N.V. Dang, C. Laurent-Gengoux et K. Rejzner, *Properties of field functionals and characterization of local functionals*, Journal of Mathematical Physics, 2018, vol. 59, no 2, p. 023508
13. **N.V. Dang and G. Rivière *Pollicott-Ruelle spectrum and Witten Laplacians*, 61p, to appear in Journal of Eur. Math. Soc.**
14. **N.V. Dang and B. Zhang *Renormalization of Feynman amplitudes on manifolds by spectral zeta regularization and blow-ups*, Journal of the European Mathematical Society, 2020, vol. 23, no 2, p. 503-556.**
15. **N.V. Dang, C. Guillarmou, G. Rivière et S. Shen *Fried conjecture in small dimensions*, Invent. Math. (2020). Volume 220 issue 2**

16. N.V. Dang, *Renormalization of determinant lines in Quantum Field Theory*, 61p, to appear in *Analysis and PDE*, arxiv: 1901.10542
17. N.V. Dang, *Wick squares of the Gaussian Free Field and Riemannian rigidity*, arxiv:1902.07315, submitted (2019)
18. Chaubet, Yann, and N.V. Dang. *Dynamical torsion for contact Anosov flows*. 67p, arXiv preprint arXiv:1911.09931 (2019), submitted
19. N.V. Dang and G. Rivière. *Poincaré series and linking of Legendrian knots*. 78p, arXiv:2005.13235 (2020) , submitted
20. Wrochna, Michał, and Nguyen Viet Dang. *Complex powers of the wave operator and the spectral action on Lorentzian scattering spaces*. 88p, arXiv preprint arXiv:2012.00712 (2020)., submitted
21. Nguyen Viet Dang. *Le principe d’incertitude fractal (d’après Dyatlov–Zahl, Bourgain–Dyatlov, Dyatlov–Jin, Dyatlov–Jin–Nonnenmacher)*, Seminar Bourbaki (2021)

Proceedings, papiers de survol.

- C. Brouder, N.V. Dang et A. Frabetti *Noncommutative version of Borchers’ approach to quantum field theory*, <http://arxiv.org/abs/1502.00147>
- P. Clavier et N.V. Dang *Batalin-Vilkovisky formalism as a theory of integration for polyvectors*, proceeding accepté
- N.V. Dang et G. Rivière *Correlation spectrum of Morse-Smale gradient flows*, Actes des 44èmes Journées EDP, Roscoff 2017

Recent talks.

- **Invitation ESI Vienna**, November 2021, declined
- **Invitation Porquerolles**. September 2021, declined
- **BOURBAKI SEMINAR**. On the **fractal uncertainty principle** after Dyatlov–Zahl, Bourgain–Dyatlov, Dyatlov–Jin, Dyatlov–Jin–Nonnenmacher 24 Avril 2021
- *Poincaré series and linking of Legendrian knots* Seminar ”Géométrie, Groupes et dynamiques” UMPA, ENS Lyon 2021
- *Poincaré series and linking of Legendrian knots* Seminar ”Théorie de Lie, Géométrie et Analyse” Metz 2021
- *Meromorphic continuation of Poincaré series* Conference *Ruelle-Pollicott Resonances in dynamics and semiclassical analysis* initialement prévue à l’EPFL (Lausanne), on line 2021
- *The spectral action on Lorentz scattering spaces* Seminar Analysis and PDE Stanford, on line 2021
- *The spectral action on Lorentz scattering spaces* Seminar Harmonic Analysis Paris Saclay 2021, on line
- *The spectral action on Lorentz scattering spaces* Higher Structures Emerging from Renormalisation, ESI 2020, on line
- *Dynamical zeta function and topology* Higher structures and Field theory, ESI 2020, on line
- *Renormalization of determinant lines in Quantum Field Theory* Leeds analysis seminar 2020, on line
- *Renormalization of determinant lines in Quantum Field Theory* Scattering, microlocal analysis and renormalization at Institut Mittag-Leffler, 2020
- *Renormalization of determinant lines in Quantum Field Theory* Seminar of the analysis group of Potsdam, 2020

- *Rationality of Poincaré series at zero for surfaces* Colloquium Potsdam, 2020
- *Rationality of Poincaré series at zero for surfaces* Colloquium Göttingen, 2020
- *Rationalité des séries de Poincaré en zéro sur les surfaces* Seminar Géométrie Nantes, 2020
- *Rationalité des séries de Poincaré en zéro sur les surfaces* Seminar Géométrie et Topologie IMJ Paris, 2020
- *Fonction zêta dynamique et torsion* Seminar Géométries ICJ Lyon, 2020
- *Recent progress on the Fried conjecture* "Differential geometry and topology" seminar Cambridge, 2020
- *Recent progress on the Fried conjecture for smooth Anosov flows*
MSRI Recent developments in microlocal analysis, October 14, 2019 - October 18, 2019
- *Renormalization and a conjecture of Quillen on determinant lines*
University of York July 1, 2019 to July 5, 2019, *Mathematics of interacting QFT models*
- *Renormalization of QFT on Riemannian manifolds*
Ecole de physique des Houches workshop *Quantum fields, scattering and spacetime horizons: mathematical challenges* 2018
- *Renormalisation en théorie des champs sur les variétés Riemanniennes.*
Seminar EDP Irmar Rennes 2018
- *Renormalization of quantum field theory on Riemannian manifolds*
Seminar Dublin City University 2018
- *Renormalization of quantum field theory on Riemannian manifolds*
Analysis seminar Potsdam 2018
- *Ruelle resonances for Morse-Smale flows.*
Orsay Mini workshop organized by C. Guillarmou 2018
- *Pollicott-Ruelle resonances and the asymptotic spectrum of Witten Laplacians.*
Workshop in microlocal analysis Murramarang 2018
- *Ruelle resonances and asymptotic spectrum of Witten Laplacians*
Aussois "Spectral geometry, graphs and semiclassical analysis" 2017
- *From Ruelle resonances of Morse-Smale flows to the Smale complex*
Cargèse "Analysis and geometry in Cargèse" 2017
- *Spectral analysis of Morse-Smale flows*
York conference "Modern mathematics of Quantum Theory" 2017
- *Régularisation zeta à plusieurs variables et renormalisation en théorie quantique des champs Euclidiennes*
Seminar de géométrie et physique mathématique Jussieu 2017
- *Spectral analysis of Morse-Smale flows* Leeds Conference "Mathematical Methods in Inverse Scattering and Spectral Theory" 2017
- *Resonances of Morse gradient flows and the Witten complex*
CIRM conference "Resonances: geometric scattering and dynamics" 2017
- *Spectrum of Morse gradient flows*
39th LQP workshop "Foundations and constructive aspects of QFT", Münster
- *Résonances de Ruelle des flots de gradients et complexe de Thom-Smale-Witten*
Avignon Seminar de systèmes dynamiques, Analyse et géométrie 2016
- *Résonances de Ruelle des flots de gradients et complexe de Thom-Smale-Witten.*
Strasbourg Seminar Analyse 2016
- *Résonances de Ruelle des flots de gradients et complexe de Thom-Smale-Witten.*
Clermont-Ferrand Seminar et groupe de travail GAAO
- *Renormalisation en théorie des champs sur les variétés Riemannienne.*
Grenoble Seminar *General relativity and QFT*
- *Equidistribution du cycle conormal des ensembles nodaux aléatoires.*
Seminar problèmes spectraux IHP 2016.

- *Spectral analysis of Morse gradient flows* Chengdu, 2016
- *Multiplication of distributions and renormalization*. Mini-cours conference "Paths to, from and in renormalisation" Potsdam 2016
- *Equidistribution du cycle conormal des ensembles nodaux aléatoires*. Seminars "Physique-Mathématique" Lyon 2015 et "Physique-Mathématique" Grenoble 2015.
- *Equidistribution of the conormal cycle of random nodal sets*. Workshop "Hyperbolic Equations on Space-times" ESI Vienne 2015.
- *Opérateurs intégraux de Fourier*. Mini-cours "Summer school on FIO" Ouagadougou 2015
- *Renormalization of QFT on manifolds and extension of distributions on configuration spaces*. Conférence "Spectral and Scattering theories in QFT, III" Porquerolles 2015.
- *Renormalization of QFT on manifolds and extension of distributions on configuration spaces*. Seminar "Analyse algébrique" Paris 6, 9 Février 2015.
- *Puissance complexes de fonctions analytiques et régularisation méromorphe en théorie quantique des champs*. Seminar de physique mathématique, Lyon 1, 6 Février 2015.
- *Renormalisation en Théorie quantique des champs sur une variété*, Seminar de physique mathématique, Université de Lorraine, 30 Janvier 2015
- *Prolongement de distributions et renormalisation en TQC sur des variétés*, Seminar Problèmes Spectraux en Physique Mathématique, IHP, 12 janvier 2015.
- *Renormalisation en Théorie quantique des champs sur une variété*, Groupe de travail Analyse spectrale et physique mathématique d'Orsay, 10 décembre 2014.
- *Renormalisation en Théorie quantique des champs sur un espace-temps courbe*, Seminar de physique mathématique Lille, 18 novembre 2014.
- *La caractéristique d'Euler d'une surface par l'analyse de Fourier dans une seule direction*, Seminar de physique mathématique Lens, 3 novembre 2014.
- *Renormalisation, prolongement de courants et formules de résidus*. Université Lille 1, 20 octobre 2014.
- *The extension of distributions on manifolds and renormalization of QFT on curved space times*, RTG colloquium Göttingen University, 8 mai 2014.
- *Quantum field theory on curved Lorentzian space times*, GAP seminar, Penn State University, 4 Février 2014.

Service.

On average I do referee work for at least 4 papers every year for the following journals: **Communications in Mathematical physics**, **Annales Henri Poincaré**, **Journal of Geometric Analysis**, **Astérisque**, **Journal of Spectral Theory**, **Journal of Differential Geometry**, **Advances in Maths**, **Annals of Probability**, **Journal de l'Ecole Polytechnique**.

Teaching duties

Here I summarize the different teaching duties I accomplished since my hiring at Institut Camille Jordan. In general, I am aboe to teach all subjects from the first to fourth in practically all math subjects.

Cours	Niveau	Année	nbre heures
Algèbre linéaire pour informaticiens	Licence 2	2021	36h
Probabilités en filière Maths éco	Licence 3	2020,2021	36h
Probabilités filière Maths	Licence 3	2021	36h
Analyse avancée Introduction analyse fonctionnelle	Master 1	2017, 2018	52h
Calcul différentiel et analyse complexe	Licence 3	2017,2018,2019	54h
Géométrie différentielle Courbes et surfaces	Master 1	2020	52h
Géométrie	Licence 2	2016	36h
Mathématiques 4, cours d'analyse en ingénierie et mécanique	Licence 2	2016,2019,2021	36h
Analyse 3 parcours Maths analyse deuxième année	Licence 2	2016, 2019	36h
Techniques Mathématiques de base Cours et TD intégrés pour 1ère année de méca		2015,2017	39h
Fondamentaux des Maths 2 analyse algèbre de première année	Licence 1	2016	64h

I was also **Instructor** in the United States where I taught Calculus 3 at Penn State during 1 semester.

Langues parlées.

English:	fluent
French:	Mother tongue
German:	basic knowledge
Vietnamese:	Mother tongue.