

Nguyen-Thi Dang

Neuenheimer Landstraße 5
69120 Heidelberg, Baden-Württemberg, Germany
☎ (+33) 6-51-91-14-45
✉ dangnguyenthi@free.fr, ndang@mathi.uni-heidelberg.de
Nationality : French

Keywords : group actions, semisimple Lie groups, topological dynamics, Weyl chamber flows, spectrum of a product of random square matrix, Benoist cone, product of loxodromic elements.

Positions

- 10/01/2022– **Post-Doc at LMO (Laboratoire de Mathématique d’Orsay)**, funded by the program *Cofund MathInGreaterParis* , Orsay , France.
- 10/01/2019– **Post-Doc at the University of Heidelberg**, Research team "Asymptotic invariants and limits of groups and spaces", Universität Heidelberg, Germany.
- 09/30/2022
- 09/23/2019 **PhD defense**, *Ergodic Theory Team, IRMAR*, University of Rennes, France.
- 2016–2019 **PhD under the supervision of François Maucourant and Barbara Schapira**, *Ergodic Theory Team, IRMAR*, University of Rennes, France.

Training

- 02/2016– **Master thesis under the supervision of Fanny Kassel**, *Proper affine actions in dimension 3*, Laboratoire Paul Painlevé, Lille, France.
- 07/2016
- 2013–2016 **Master’s degree in Mathematics**, *Université Paris-Diderot*, Paris, France, *with distinction*.
- 02/2012– **Licence thesis with F. Patou under the supervision of Laure Quivy**, *Traitement du vide dans l’écoulement des fluides*, Cmla, Cachan, France.
- 07/2012
- 2012–2013 **Licence degree in Mathematics**, *Université Paris-Diderot and ENS Cachan*, Paris and Cachan, joint diploma, *with distinction*.

Research papers

In preparation (on demand)

- 2021 **Regular immersion**, in preparation, joint with Johannes Horn, Andrew Sanders, Colin Davalo.

Current abstract : Let X be a (higher rank) symmetric space of non-compact type and S be a compact hyperbolic surface without boundary. We give a sufficient condition on regular immersions of the universal covering of S in X so that they are embedding. When this immersion is equivariant with respect to a representation of the fundamental group of S into $\text{Isom}_0(X)$, this condition implies that representation is Borel Anosov.

Preprint

- 2021 **Equidistribution and counting of maximal flats**, Submitted, Arxiv <https://arxiv.org/abs/2202.08323>, joint work with Jialun Li.

Abstract : Let G be a semisimple Lie group without compact factor and $\Gamma < G$ a torsion-free, cocompact, irreducible lattice. According to Selberg, periodic orbits of regular Weyl chamber flows live on maximal flat periodic tori of the space of Weyl chambers. We prove that these flat periodic tori equidistribute exponentially fast towards the quotient of the Haar measure. From the equidistribution

formula, we deduce a higher rank prime geodesic theorem. These counting and equidistribution results also hold in the non cocompact, finite covolume case for $G = \mathrm{SL}(d, \mathbb{R})$ and $\Gamma < \mathrm{SL}(d, \mathbb{Z})$ a finite index subgroup.

Accepted papers

2021 **Topological mixing of positive diagonal flows**, *Accepted for publication in Israel Journal of Math*, on arXiv 2011.12900 or on HAL hal-03010830, version 2.

Abstract: Let G be a semi-simple real Lie group without compact factors and $\Gamma < G$ a Zariski dense, discrete subgroup. We study the topological dynamics of positive diagonal flows on $\Gamma \backslash G$. We extend Hopf coordinates to Bruhat-Hopf coordinates of G , which gives the framework to estimate the elliptic part of products of large generic loxodromic elements. By rewriting results of Guivarc'h-Raugi into Bruhat-Hopf coordinates, we partition the preimage in $\Gamma \backslash G$ of the non-wandering set of mixing regular Weyl chamber flows, into finitely many dynamically conjugated subsets. We prove a necessary condition for topological mixing, and when the connected component of the identity of the centralizer of the Cartan subgroup is abelian, we prove it is sufficient.

2020 **Topological mixing of the Weyl chamber flow**, *Ergodic Theory and dynamical systems*, (preprint 2018), joint work with O. Glorieux.

Abstract: In this paper, we study topological properties of the right action by translation of the Weyl Chamber flow on the space of Weyl chambers. We obtain a necessary and sufficient condition for topological mixing.

PhD thesis

2019 **Dynamics of group action on homogeneous spaces of higher rank and infinite volume**, HAL Id:tel-02301728, version 1, under the supervision of Barbara Schapira and François Maucourant.

Abstract : Let G be a semisimple Lie group (of higher rank) and Γ a Zariski dense subgroup of G (of infinite covolume). In this thesis, we discuss two questions related to the *Benoist limit cone* of Γ : one concerns random walks, the other topological mixing of the directional Weyl chamber flow. In the introduction, we state the main results of this thesis in their context. In the second chapter, we recall some general facts about Lie groups and loxodromic elements. In the third chapter, we prove that every point of the interior of the limit cone is a Lyapunov vector. In the fourth chapter, we construct local coordinates of G and give key tools for the remaining parts. In the fifth chapter, we introduce the invariant subsets of G . In the last chapter of this thesis, we prove the topological mixing criterion of regular directional Weyl chamber flow obtained with O. Glorieux and we generalize this criterion to $\Gamma \backslash G$ for a class of Lie groups including $\mathrm{SL}(n, \mathbb{R})$, $\mathrm{SL}(n, \mathbb{C})$, $\mathrm{SO}_0(p, p + 2)$.

Oberwolfach report

2022 **MFO report: Mini-Workshop Anosov³**, *webpage of the report*, reporter of the mini-workshop.

I collected the abstracts of the talks (including mine) given during the Mini-Workshop 2149a Anosov³. It took place in Oberwolfach from the 5th to the 11th of December 2021 and was organised by Benjamin Delarue (formerly Küster), Colin Guillarmou, Maria Beatrice Pozzetti and Tobias Weich.

Future talks

07/18/2022– **Special session: Deformation of geometric structures**, *Joint AMS-SMF-EMS Congress in Grenoble*, Grenoble, France.
07/22/2022 Short contribution: TBA

- 04/08/2022 **Geometry Seminar**, *Laboratoire Paul Painlevé*, Lille, France.
Comptage et équidistribution de tores plats
- 03/14/2022 **Geometry Seminar**, *Institut Élie Cartan de Lorraine*, Nancy, France.
Comptage et équidistribution de tores plats
- 03/04/2022 **Geometry Seminar**, *IMB*, Bordeaux, France.
Comptage et équidistribution de tores plats
- 02/24/2022 **Topology and dynamical systems Seminar**, *LMO*, Orsay, France.
Comptage et équidistribution de tores plats

Past talks

- 02/03/2022 **Geometry, algebra, dynamics and topology seminar**, *IMB*, Dijon, France.
TBA
- 01/10/2022–
01/14/2022 **Workshop on theta positivity, IWH or hybrid**, Heidelberg, Germany.
TBA
- 12/5/2021–
12/11/2021 **Anosov 3**, *Mini-workshop*, Oberwolfach, Germany.
Topological mixing of positive diagonal flows
- 11/05/2021 **Geometry day in Creteil**, *LAMA*, Créteil, France.
Equidistribution and counting of maximal flats
- 09/14/2021 **Geometry and dynamics seminar**, *LAREMA*, Angers, France.
Équidistribution et comptages de plats maximaux
- 09/08/2021 **Hyperbolic dynamical systems and resonances**, *Conference organized by Colin Guillarmou*, Porquerolles, France.
Equidistribution and counting of maximal flats
- 04/15/2021 **Séminaire francophone de groupes et géométrie**, *online*, BBB, in french.
Mélange topologique des flots diagonaux positifs
- 10/29/2020 **Ergodic theory and dynamical systems Seminar**, *Bristol University*, Bristol, Great Britain.
Topological mixing of the Weyl chamber flow
- 06/15/2020 **HORUS seminar in Strasbourg**, *IRMA*, Strasbourg, France.
Mélange topologique des flots hyperboliques homogènes
- 02/14/2020–
02/15/2020 **Sophus Lie 2020**, *Universität Paderborn*, Paderborn, Germany.
Short talk : Topological dynamics of the Weyl chamber flow
- 11/25/2019–
11/27/2019 **Topological Mixing of the Weyl Chamber Flows**, *Paroles aux jeunes chercheuses et chercheurs en Géométrie et Dynamique*, University of Nancy, Nancy, France
- 11/11/2019 **Topological Mixing of the Weyl Chamber Flows**, *Ergodic Theory and Dynamical Systems Seminar*, University of Zuerich, Zuerich, Switzerland
- 11/6/2019 **Topological Mixing of the Weyl Chamber Flows**, *Ergodic Theory and Dynamical Systems Seminar*, LAGA, University Paris 13, Villetaneuse, France
- 10/14/2019–
10/19/2019 **The Top Lyapunov Exponent**, *Arbeitsgemeinschaft*, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany

- 10/08/2019 **Topological Mixing of the Weyl Chamber Flows**, *Spectral Theory Seminar*, University of Paderborn, Paderborn.
Germany
- 09/23/2019 **Dynamics of group action on homogeneous spaces of higher rank and infinite volume**, *PhD defense, IRMAR*, University of Rennes, Rennes.
France
- 06/13/2019 **Topological Mixing of the Weyl Chamber Flows**, *Joint meeting of the ergodic theory teams of Brest and Vannes*, University of Brest and Vannes, Quimper.
France
- 02/2019 - 06/2019 **Two talks on the Benoist limit cone**, *weekly meetings on Anosov Representations*, IRMAR, University of Rennes, Rennes.
France
- 05/3/2019 **Topological Mixing of the Weyl Chamber Flows**, *Geometry Seminar in Nantes*, University of Nantes, Nantes.
France
- 02/7/2019 **Topological Mixing of the Weyl Chamber Flows**, *Geometry Seminar in Heidelberg*, University of Heidelberg, Heidelberg.
Germany
- 02/6/2019 **Some problems of dynamics in higher rank**, *Junior Geometry Seminar in Heidelberg*, University of Heidelberg, Heidelberg.
Germany
- 12/12/2018 **Topological Mixing of the Weyl Chamber Flows**, *Meeting of the ERC project IPPFLOWS*, Université Paris 11, Orsay.
France
- 04/9/2018 **Special PhD student session: Quelques problèmes en dynamique en rang supérieur**, *Séminaire de l'équipe de théorie ergodique*, IRMAR, Rennes.
France
- 02/1/2018 **Perturbations singulières: l'analyse géométrique de Fenichel**, *Journées Louis Antoinnes*, IRMAR, Rennes.
France
- 05/31/2018 **Séminaire des doctorants**, *IRMA*, Strasbourg, France.
Exposé : Quelques problèmes en dynamique en rang supérieur
- 03/15/2018 **Surprise session: Comment jouer au ping-pong**, *Séminaire Pampers*, IRMAR, Rennes.
France
- 11/07/2017 **Marches aléatoires dans $SL(n, \mathbb{R})$ pour $n > 2$.**, *Séminaire des doctorants*, Laboratoire Jean Leray, Nantes.
France
- 10/26/2017 **Marches aléatoires dans $SL(n, \mathbb{R})$ pour $n > 2$.**, *Séminaire Pampers*, IRMAR, Rennes.
France

Participation to meetings and Workshops

Upcoming

- 01/10/2022– **Workshop on theta positivity, hybrid part**, Heidelberg, Germany.
01/14/2022 winter school
- 12/12/2021– **Aussois 2020-2021**, *Paul Langevin center*, Aussois, France.
12/17/2021 Winter school
- 12/5/2021– **Workshop Anosov³ 2149a**, *MFO*, Oberwolfach, Germany.
12/11/2021
- Past
- 06/21/2021– **Summer school in western Brittany in dynamical systems**, *GDR Platon*, Brest, France.
06/25/2021
- postponed **Dynamics, equidistribution and counting**, *Technion*, Haifa, Israël.
since May Amos Nevo fest.
2020
- 2/4/2021 **a hyperbolic day online**, *online*.
Online conference
- 01/11/2021– **Topics at the interface of low dimensional group actions and geometric structures**, *online*, Singapur University, Singapur.
01/15/2021 Online conference
- 12/7/2020– **Paroles aux jeunes chercheurs et chercheuses**, *online conference organised by IRMAR*, Rennes, France.
12/9/2020
GDR Platon
- 08/3/2020– **Dynamics on your screen**, *online conference*.
08/6/2020
- 07/8/2019– **Aspects of Geometric Group Theory**, *IHES*, Bures-sur-Yvette, France.
07/19/2019 Summer School
- 06/27/2019– **Dynamics of Parabolic Flows**, *University of Zuerich*, Zuerich, Switzerland.
07/5/2019
- 05/27/2019– **Dynamics of Group Actions**, Cetraro, Italie.
05/31/2019
- 12/10/2018– **Meeting of the ERC IPPFLOW**, *Université Paris 11*, Orsay, France.
12/12/2018 Meeting of the ERC IPPFLOW
- 12/5/2018– **Borel seminar**, Les Diablerets, Suisse.
12/07/2018 Topology and Dynamics in the Swiss Alps
- 06/11/2018– **Workshop**, *University of Luxembourg*, Esch-sur-Alzette, Luxembourg.
06/14/2018 Workshop on pseudo-Riemannian geometry and Anosov representations
- june 2017 **Lebesgue Semester in Geometry and Dynamics**, *IRMAR, UBL, Leray*, Rennes, Brest, Nantes, France.
all the semester

Experiences

- 18/06/2018– **Participation to MathC2+**, *Ens Rennes*, Rennes, France.
20/06/2018
- 5/10/2018– **Participation to Science Festival**, Rennes, France.
7/10/2018

2017–2018 **Organiser with C. Francini of the Junior Algebra and Geometry seminar (Pampers)**, IRMAR, Rennes, France.

Teaching

2018–2019 **64h of teaching in exercise sessions and computer sessions**, *University of Rennes*, Rennes, France.

2017–2018 **64h of teaching in exercise sessions and computer sessions**, *University of Rennes*, Rennes, France.

2016–2017 **64h of teaching in exercise sessions and computer sessions**, *University of Rennes*, Rennes, France.

Languages

French	native language	
Vietnamese	native language, missing math vocabulary	
English	proficient	<i>C1, C2</i>
German	practical notions	