

Nicolas Tholozan

Junior Researcher

Studies and carrier

- 2017–Present **Chargé de Recherche**, *CNRS – École Normale Supérieure*.
Département de Mathématiques et Applications – équipe Algèbre et Géométrie
- 2014–2016 **Research assistant**, *University of Luxembourg*.
research team of Jean-Marc Schlenker
- 2010–2014 **PhD Student**, *University of Nice Sophia Antipolis*.
under the supervision of Sorin Dumitrescu
- 2007–2012 **Student**, *École Normale Supérieure de Paris and University Paris-Sud (Orsay)*.
Bachelor (2008), Master (2010)

Degrees

- 2014 **Habilitation à diriger les recherches**, *Ecole Normale Supérieure*.
Memoir : *Compact quotients of reductive homogeneous spaces and surface group representations*
- 2014 **PhD**, *University of Nice Sophia Antipolis*.
Thesis : *Uniformisation des variétés pseudo-Riemanniennes localement homogènes*, supervised by Sorin Dumitrescu.
- June 2010 **Master**, *University Paris-Sud (Orsay)*.
Memoir : *Semi-complétude du flot géodésique des métriques riemanniennes-holomorphes invariantes à gauche sur les groupes de Lie complexes*, supervised by Sorin Dumitrescu.
- Juillet 2009 **Agrégation**.
- Juillet 2008 **Bachelor**, *University Paris-Sud (Orsay)*.

Publications and pre-publications

- Equidistribution of Hodge loci II, with Salim Tayou. 2021. [arXiv:2103.15717](https://arxiv.org/abs/2103.15717)
- Phénomènes de type Ratner dans les variétés hyperboliques de volume infini [d'après McMullen, Mohammadi, Oh, Benoist, ...]. *Actes du Séminaire Bourbaki*. Janvier 2020. www.bourbaki.fr/TEXTES/Exp1173-Tholozan.pdf
- Teichmüller geometry in the highest Teichmüller space (Notes d'un mini-cours donné à l'Université du Michigan). 2019. [~tholozan/Annexes/CocyclesReparametrizations2.pdf](https://tholozan.github.io/Annexes/CocyclesReparametrizations2.pdf)
- Hausdorff dimension of limit sets for projective Anosov representations, with Olivier Glorieux and Daniel Monclair. 2019. Submitted. [arXiv:1902.01844](https://arxiv.org/abs/1902.01844)
- Compact connected components in relative character varieties of punctured spheres, with Jérémy Toulisse. 2018. To appear in *l'Épjournal de Géométrie Algébrique*. [arXiv:1811.01603](https://arxiv.org/abs/1811.01603)
- The Geometry of maximal representations of surface groups into $SO(2, n)$, with Brian

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- Collier and Jérémy Toulisse. *Duke Mathematical Journal*, **168**(15), 2019, p. 2873-2949. [arXiv:1702.08799](#)
- Supra-maximal representations from fundamental groups of punctured spheres into $\mathrm{PSL}(2, \mathbb{R})$, with Bertrand Deroin. 2016. *Annales scientifiques de l'École Normale Supérieure*, **52**(5), 2019, p. 1305-1329. [arXiv:1604.00330](#)
 - Volume and non-existence of compact Clifford-Klein forms. 2015. [arXiv:1511.09448](#)
 - The Volume of complete anti-de Sitter 3 manifolds. *Journal of Lie theory* **28**(3), 2018, p. 619-642. [arXiv:1509.04178](#)
 - Entropy of Hilbert geometries and length spectrum of Hitchin representations in $\mathrm{PSL}(3, \mathbb{R})$. *Duke Mathematical Journal* **166**(7), 2017, p. 1377-1403. [arXiv:1506.04640](#)
 - Dominating surface group representations and deforming closed anti-de Sitter 3-manifolds. *Geometry & Topology* **21**, 2017, p. 193-214. [arXiv:1403.7479](#)
 - Dominating surface group representations by Fuchsian ones, with Bertrand Deroin. *International Mathematics Research Notices* **2016**(13), 2016, p. 4145-4166. [arXiv:1311.2919](#)
 - Sur la complétude de certaines variétés pseudo-riemanniennes localement symétriques. *Annales de l'Institut Fourier* **65**(5), 2015, p. 1921-1952. [arXiv:1307.3315](#)

Conferences et Seminars

Since 2012, I have had many occasion to present my research in various conferences and seminars. Here is a non-exhaustive list.

Conferences

- January 2021 **Topics at the interface of Low dimensional group actions and Geometric Structures**, *Singapour (en visioconférence)*.
- December 2019 **Discrete subgroups of Lie groups**, *Banff International Research Station*.
- December 2019 **Geometric Structures and Higher Teichmüller Spaces**, *University of Michigan*.
mini-cours : Teichmüller theory on moduli spaces of Anosov flows
- June 2019 **Géométrie et dynamique de A à Z (en l'honneur d'Abdelghani Zeghib)**, *Avignon*.
- June 2018 **pseudo-Riemannian geometry and Anosov representations**, *Luxembourg*.
mini-course : Minimal surfaces in Riemannian and pseudo-Riemannian symmetric spaces
- August 2017 **Third GEAR Retreat**, *Stanford*.
- March 2017 **Moduli Spaces and Applications in Geometry, Topology, Analysis and Mathematical Physics**, *Beijing*.
- April 2016 **Geometry of Groups**, *Montevideo*.
- January 2016 **Geometric Aspects of Modern Dynamics**, *Porto*.
- August 2015 **Geometry of Discrete Group Actions**, *ICTP (Trieste)*.
- July 2015 **Géométries en Action (en l'honneur d'Étienne Ghys)**, *Lyon*.

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Recent seminars

Heidelberg (visio, February 2021), Austin (visio, February 2021), Bordeaux (March 2020), Nice (February 2020), Séminaire Bourbaki (January 2020), Rennes (May 2019), Strasbourg (November 2018), ENS Lyon (October 2018), Grenoble (January 2018).

Teaching

École Normale Supérieure

- Advanced M2 course : *Fibrés de Higgs et représentations de groupes de surfaces* (Spring 2021)
- Advanced M2 course : *Propriétés d'hyperbolicité des groupes linéaires* (Spring 2020)
- Advanced M2 course : *Déformations des groupes discrets dans les groupes de Lie* (Spring 2019)

Université du Luxembourg

Various Bachelor courses.

Université Côte d'Azur

Exercise sessions in Bachelor and Master.

Supervision

- 2020–Present **PhD of Samuel Bronstein, ENS.**
- Spring 2021 **Master's thesis of Tianqi Want, ENS.**
- SPring 2020 **Master's thesis Samuel Bronstein, ENS.**
Structures conformément plates en dimension 3
- Spring 2019 **Bachelor thesis, ENS.**
Equidistribution des horocycles et hypothèse de Riemann d'après (Don Zagier et Sarnak)
- Spring 2019 **Internship of a student from Chennai Institute, ENS.**
Higgs bundles and harmonic maps (after Hitchin and Corlette)
- Spring 2019 **Internship of a student from Tsinghua University, China, ENS.**
Analytic proof of the Narasimhan–Seshadri correspondence (after Donaldson)
- Spring 2015 **Bachelor thesis, Luxembourg.**
Topologie des surfaces et théorie des graphes (d'après Bollobás)

Other research activities

Organizing conferences

Parole aux jeunes chercheur.es en géométrie et dynamique, Nancy, 25–27 november 2019.

Journées isomonodromiques : Convolution moyenne de Katz, IHP, 18–19 july 2019.

Workshop : Harmonic maps and rigidity, Sisteron, 6–14 april 2019.

Winter school on Geometric structures, Nice, 7–11 january 2019.

Workshop : Relative character varieties and parabolic Higgs bundles, California, 24 février–3 mars 2018.

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Conference : Three dimensional geometric structures, representations of Surface groups and related topics, Luxembourg, 13–15 july 2015.

Organizing research seminars and reading groups

- 2020 **Reading group : Équirépartition de mesures algébriques, ENS.**
- 2018–present **Seminar « Raconte-moi... », ENS.**
- 2015–2016 **Seminar *Géométrie et Topologie*, Luxembourg.**
- 2015–2016 **various reading groups, Luxembourg.**

Jurys

- June 2020 **PhD defense, Strasbourg.**
Alexander Thomas, *Higher complex structures*
- 2016–2019 **Jury of the International Selection competition, ENS.**

Other

- Member of the department board.
- Member of the parity committee.
- Member of the outreach committee.

Outreach

Analysis Situs project

With a group of 19 mathematicians, we created a website based on the famous *Analysis Situs* memoir of Henri Poincaré : <http://analysis-situs.math.cnrs.fr/>

The website proposes a modern course in algebraic topology (at the Masters level) including many videos, together with commentaries of the original text of Poincaré.

Other

- In October 2020, I coordinated the department's participation to the “Fête de la Science”
- In May 2017, I gave a presentation in the *Séminaire de la détente mathématique* at ENS Lyon, entitled « Le clavier bien tempéré et les sous-ensembles de $\mathbb{Z}/12\mathbb{Z}$ ».

A bit of musicology

From 2012 to 2014, in parallel with my PhD, I studied musicology at the Conservatoire de Paris. During those studies I wrote two memoirs :

- *Les Nègres de Michael Levinas : un opéra en Blanc et Noir ?* (à propos de l’opéra *Les Nègres* d’après la pièce de Jean Genêt).
- *Musique et pensée chrétienne pendant l’entre-deux guerres : l’exemple du « Traité de la musique selon l’esprit de Saint Augustin » d’Henri Marrou-Davenson.*

In a slightly different register, I wrote the pedagogical comments of a musical book for children : *Les plus grandes berceuses classiques*, éditions Didier Jeunesse, 2013.