Tsung-Hsuan TSAI

Ph.D. in Mathematics

Email: tsai71517@gmail.com
Website: https://tsung-hsuan-tsai.github.io/

I was born on 13th April 1996 in New Taipei City, Taiwan, where I received my early education until I graduated from high school. Afterwards, I pursued my higher education in France until I received my Ph.D. degree.

I am currently doing my military service in Taiwan scheduled for late 2022 - early 2023.

RESEARCH INTERESTS

- Geometric group theory   • Random groups   • Hyperbolic groups

RESEARCH EXPERIENCES

2019 - 2022   **Institut de Recherche Mathématique Avancée, Strasbourg, France**
Ph.D. in Mathematics, supervised by Thomas Delzant

Thesis: *Phase transitions in random group: free subgroups and van Kampen 2-complexes*

2019.05 - 06   **Institut de Recherche Mathématique Avancée, Strasbourg, France**
Research internship M2, supervised by Thomas Delzant

Master thesis: *Random groups: the binomial triangular model*

2018.06 - 07   **Università di Padova, Padova, Italy**
Research internship M1, supervised by Remke Kloosterman

Subject: *Fundamental groups of complements of singular algebraic curves*

2017.05 - 06   **Laboratoire de Mathématiques Jean-Leray, Nantes, France**
Research internship L3, supervised by François Laudenbach

Subject: *Algebraic topology and applications: Schreier Theorem and Poincaré paving*

EDUCATION

2019 - 2022   **Université de Strasbourg, France**
Ph.D. in Mathematics, supervised by Thomas Delzant

2016 - 2019   **École normale supérieure de Rennes, France**
Normalien à titre étranger

M.Sc. in Mathematics at Université de Rennes 1, 2019

B.Sc. in Informatics at Université de Rennes 1, 2018

B.Sc. in Mathematics at Université de Rennes 1, 2017

2014 - 2016 **Lycée Janson de Sailly, Paris, France**
Classe préparatoire aux grandes écoles, MPSI and MP

TEACHING

2019 - 2022 **Université de Strasbourg, France**
Teaching assistant

2019,2020,2021 autumn: TD Algèbre S5 (exercise sessions of the course Introduction to group theory for 3rd year).

2020,2021,2022 spring: CI Math pour les sciences 2 (lecturer of the course Basic linear algebra for 1st year).

PUBLICATIONS AND PREPRINTS

2021 (2022) T.-H. Tsai, *Density of random subsets and the intersection formula.*
In **Journal of Combinatorial Algebra**, volume 6, number 3/4 (2022).
DOI: 10.4171/JCA/63. ArXiv: 2104.09192.

2021 (2023) T.-H. Tsai, *Freiheitssatz and phase transitions for the density model of random groups.*
In **Mathematische Zeitschrift** 303: 65 (2023).
DOI: 10.1007/s00209-022-03186-2. Arxiv: 2111.08958.

2022 T.-H. Tsai, *Phase transitions in random groups: free subgroups and van Kampen 2-complexes.*
PhD Thesis. University of Strasbourg, defended July 2022.
HAL: tel-03693833.

2022 T.-H. Tsai, *Phase transition for the existence of van Kampen 2-complexes in random groups.*
Submitted November 2022.
Arxiv: 2210.08234.

TALKS

2021.12.17 **Topology seminar, Institut Fourier, Grenoble, France.**
Freiheitssatz for the density model of random groups.

2021.12.14 **ENS Group theory seminar, Paris, France (Online).**
Freiheitssatz for the density model of random groups.

2021.12.06 **Ergodic theory seminar, IRMAR, Rennes, France.**
Freiheitssatz for the density model of random groups.

2021.09 **Séminaire Doctorant, IRMA, Strasbourg, France.**

Groupes à petite simplification et un théorème de non-torsion.

2020.10 **Séminaire Doctorant, IRMA, Strasbourg, France.**
La plupart des groupes sont hyperboliques.

2020.02 **Séminaire Doctorant, IRMA, Strasbourg, France.**
Ensembles aléatoires : définitions et applications à théorie des groupes.

LANGUAGES

• English   • French   • Chinese (Mandarin and Taiwanese)