

Antoine DE SAINT GERMAIN

PERSONAL DETAILS

DoB: 5 March 1996
ADDRESS: Department of Mathematics, Room 408, Run Run Shaw Building,
The University of Hong Kong, Pokfulam, Hong Kong
PHONE: +852 5933 2145
EMAIL: adsg96@hku.hk

EDUCATION

| | | |
|-----------|---|-----------|
| 2018-2023 | University of Hong Kong PhD in Mathematics Supervisor: Prof. Jiang-Hua LU Thesis: Friezes with coefficients for acyclic cluster algebras | HONG KONG |
| 2014-2018 | University College London MSc in Mathematics with Mathematical Physics | LONDON |

PAPERS

Published

1. *When frieze patterns meet Y-systems: Y-frieze patterns*, **Math Intelligencer**, 2024.
2. (with J. Cheah, formalised in Lean4) *On upper bounds of frieze patterns*, **Fibonacci Quart.**, 2025.

Preprints

1. (with P. Cao and J.-H. Lu) *Tropical friezes and cluster-additive functions via Fock-Goncharov duality and a conjecture of Ringel*, arXiv: 2311.17712.
2. *Y-frieze patterns*, arXiv:2311.03073.
3. (with M. Huang and J.-H. Lu) *Friezes of cluster algebras of geometric type*, arXiv:2309.00906.

In preparation

1. (with Z. Liu and J.-H. Lu) *Fixed points of DT transformations, cluster-exponents and degrees of Weyl groups*.
2. (with J.-H. Lu) *Cluster tori for finite type and Bott-Samelson varieties*.

SCHOLARSHIPS AND CERTIFICATES

| | | |
|-----------|---|-------------------------|
| 2018-2022 | Doris Chen Postgraduate Scholarship | UNIVERSITY OF HONG KONG |
| 2018-2022 | Excellent Teaching Award (x4) | UNIVERSITY OF HONG KONG |
| 2018 | Certificate in Teaching and Learning | UNIVERSITY OF HONG KONG |

SEMINAR TALKS

- 2025 *Fixed points of DT transformations, cluster exponents and degrees of Weyl groups*,
Conference on Poisson geometry and cluster algebras, Nankai University.
- 2024 *Fixed points of DT transformations and cluster exponents*,
AIMS conference, Abu Dhabi.
Digitalising mathematics through Lean,
The Open University, UK.
Digitalising mathematics through Lean,
Geometry seminar, HKU.
Y-frieze patterns,
Continued fractions and SL_2 -tilings, Durham University.
- 2023 *Frieze patterns and total positivity*,
LMR Seminar, Université de Reims.
Patterns from the duality pairing,
Cluster algebras, Representation theory and Algebraic Geometry (HKU).
Cluster-additive functions and acyclic cluster algebras,
Paris Algebra Seminar.
Cluster-additive functions and frieze patterns with coefficients,
Tokyo-Nagoya Algebra Seminar.
- 2022 *Integral points, total positivity and frieze points*,
Chengdu University.

CONFERENCES ATTENDED

- 2025 *Poisson geometry and cluster algebras*, Nankai University.
- 2024 *AIMS conference*, NYU in Abu Dhabi.
Continued fractions and SL_2 -tilings, Durham University.
- 2023 *Cluster algebras Arbeitsgemeinschaft*, MFO, Oberwolfach.
Cluster algebras, Representation theory and Algebraic Geometry, HKU.
Higher Structures in Geometry and Mathematical Physics, IHP Paris.
- 2022 *New Trends in Representation theory, AMSI-MSRI Winter School*,
The University of Hawaii.
- 2021 *Global Young Scientist Summit*, Singapore (virtual).
- 2019 *Toric Varieties, MSRI Summer Graduate School*, NCTS Taipei.
International Congress of Chinese Mathematicians, Tsinghua University.

TEACHING EXPERIENCE

The University of Hong Kong

- University Mathematics II (2019, 2020).
- Multivariable Calculus and Linear Algebra (2019, 2020, 2021).
- Linear algebra I (2021).
- Algebra II (2022).
- Introduction to total positivity in reductive groups, *Geometry seminar* (2023).

- Mathematical seminar (2025)

MISCELLANEOUS

Languages

- French: native speaker
- English: native speaker
- Spanish: level B1
- Cantonese: elementary proficiency (reading/writing and speaking/listening)

Online certificates

2019 *Deep learning specialisation*, Stanford University (via Coursera)

Bloomberg Market Concepts, Bloomberg

2018 *Machine learning*, Stanford University (via Coursera)

Personal activities

2023 - CURRENT Long distance trail running.

2020 - CURRENT Co-founder of namethatmineral.com, online tool for mineral identification.