Thais Gomes Ribeiro

PhD Student · School of Mathematics · University of Birmingham

tgrib.github.io · txg306@student.bham.ac.uk

Research Interests

Computational Number Theory and Algebraic Geometry:

- Counting rational points on algebraic varieties over finite fields;
- Hypergeometric and A–hypergeometric functions over finite fields;
- Zeta and L–functions;
- Picard–Fuchs equations, periods and A–hypergeometric systems;
- K3 surfaces;
- Taylor varieties.

Education

PhD student in Pure Mathematics, University of Birmingham, UK. 09/2023 – present
Supervisor: Professor Tyler L. Kelly.

Visiting Student, IMPA, Brazil. 03/2023 – 06/2023

Master's Degree in Pure Mathematics, IMPA, Brazil. 01/2021 – 02/2023
Supervisor: Professor Carolina Bhering de Araujo.

Bachelor's Degree in Mathematics, UNIFEI, Brazil. 03/2018 – 12/2020
Supervisor: Professor Rick Antonio Rischter.
Dissertation: Secant Defectivity of Grassmannian Varieties via Osculating Projections.

Papers

"A geometric realisation of the Appell function F_3". In preparation.

"Some Taylor varieties with null Hessian" with Elena Guardo, Manuela Muzika Dizdarević, Maryam Nowroozi, Pierpaola Santarsiero, Paola Supino. 2026. arXiv:2605.03923. Submitted to Proceedings of Women in Numbers Europe 5.

"Hypergeometric decomposition of Delsarte K3 pencils" with Rachel Davis, Jessamyn Dukes, Eli Orvis, Adriana Salerno, Leah Sturman, Ursula Whitcher. Research in the Mathematical Sciences, Volume 13, article number 50, 61 pages, 2026. doi.org/10.1007/s40687-026-00634-x.

Research visits

Visiting Research Student, University of Sydney, Feb 1 – Mar 6, 2026. Visiting Professor John Voight and the Computational Algebra Group. Funded by the University of Sydney and by the Turing Scheme Cost of Living and SEND Grant from the University of Birmingham.

Arithmetic data for Delsarte K3 surfaces - Collaborate@ICERM, Providence, Jul 7 – 11, 2025.

Research presentations

Invited talks

"Geometric realisation of an Appell hypergeometric function", Algebraic Geometry Seminar at Bogotá (online). **Upcoming.**

"Hypergeometric structures of invertible pencils of prime chains", KCL/UCL Junior Geometry Seminar, Jun 9, 2025.

"Hypergeometric structures of a family of K3 surfaces", PG Forum, Lancaster University, Jun 4, 2025.

Short and contributed talks

"A geometric model for the Appell hypergeometric function F_3", Y–RANTVIII, Sep 3, 2026.

"A geometric model for the Appell hypergeometric function F_2", Building Bridges, Aug 17, 2026.

"A special family of K3 surfaces with hypergeometric properties", BECMC 2026, Jun 24, 2026.

"Appell hypergeometric functions", WINGs, Apr 14, 2026.

"A hypergeometric family of quartics in $\mathbb{P}^3$, periods, point counts and L-function", CAGE, Sep 17, 2025.

"Taylor Varieties", Women in Numbers Europe 5, A 15-minute presentation of the group's results, Aug 22, 2025.

"A hypergeometric correspondence for a family of K3 surfaces", WINGs, Apr 2, 2025.

Posters

"A geometric realisation for the Appell hypergeometric function F_3". Mirror Symmetry, Calabi–Yau Threefolds & Connections to Physics, Sep 29, 2026.

"Geometric models for Appell hypergeometric functions". GAeLXXXIII, Jun 29, 2026.

"Geometric models for Appell hypergeometric functions". BECMC 2026, Jun 24, 2026.

Teaching

Worked as a Postgraduate Teaching Assistant at the University of Birmingham since Fall 2023. Find below a list of the undergraduate modules assisted and a short description of the duties.

Year 1 modules

- **Algebra – 1AC**[1]
  - **Fall 2025**
    - Conducted eight Guided Study Sessions (ca. 80 students) for the Algebra part of the module: solved exercises on the board and answered questions from the students. Worked together with other two teaching assistants.
    - Marked two assignments of ca. 60 students each.
- **Sequences & Series – 1SAS**
  - **Fall 2025**
    - Conducted two Guided Study Sessions (ca. 80 students): solved exercises on the board and answered questions from the students. Worked together with other two teaching assistants.
    - Marked two assignments of ca. 29 students each.
  - **Fall 2024**
    - Conducted Guided Study Sessions[2]: walked around the room answering individual questions and providing hints on selected exercises. Worked together with other teaching assistants.
  - **Fall 2023**
    - Marked two assignments of ca. 30 students each.
- **Vectors, Geometry and Linear Algebra – J1VGLA**
  - **Spring 2025**
    - Marked one assignment of ca. 38 students enrolled at Jinan – Birmingham Joint Institute.
- **LaTeX Workshops – 1WorA**
  - **Fall 2023**
    - Assisted the module lead in a Computer Lab (ca. 100 students): answered questions from the students and helped solving bugs on their LaTeX codes. Worked together with other seven teaching assistants.
    - Marked two assignments of ca. 25 students each.

Year 2 modules

- **Real and Complex Analysis – 2RCA**
  - **Spring 2024**
    - Assisted the module lead in Guided Study Sessions: walked around the room answering questions from the students. Worked together with other teaching assistants. Ca. 250 students enrolled in the module.
    - Marked assignments of ca. 35 students for the Real Analysis part of the module.

Year 3 modules

- **Metric Spaces and Topology – 3Top**
  - **Fall 2025 – Spring 2026**
    - Solved problems on the board in two Guided Study Sessions. The module lead and another teaching assistant were also present. Ca. 40 – 50 students enrolled in the module.
    - Marked two Metric Spaces assignments of 49 students each and one Topology assignment of 50 students.
  - **Fall 2024 – Spring 2025**
    - Assisted the module lead in Guided Study Sessions: walked around the classroom answering questions from the students. Ca. 50 students enrolled in the module.
    - Marked two Metric Spaces and two Topology assignments of ca. 50 students each.

[1] Algebra is the first part of the double module Algebra & Combinatorics – 1AC. I did not contribute to the Combinatorics part.
[2] In Fall 2024, the Guided Study Sessions occurred together for both modules 1AC and 1SAS.

Selected conferences attended

- **Mirror Symmetry, Calabi–Yau Threefolds & Connections to Physics**, ICERM, US, Sep 28 – Oct 2. 2026.
- **Y–RANTVIII**, University of Bristol, UK, Sep 2 – 4. 2026.
- **Building Bridges**, Będlewo Palace, Poland, Aug 10 – 21. 2026.
- **GAeLXXXIII**, Universiteit Leiden, the Netherlands, Jun 29 – Jul 3. 2026.
- **BECMC 2026**, University of Birmingham, UK, Jun 24 – 26. 2026.
- **WINGs**, DoubleTree by Hilton Cheltenham – Cotswolds Hotel, UK, Apr 13 – 16. 2026.
- **ICTP Winter School on Number Theory and Physics**, ICTP, Italy, Nov 17 – 28. 2025.
- **CRC Workshop on Zeta and L–functions**, University of Oxford, UK, Sep 30 – Oct 1. 2025.
- **CAGE**, Universiteit Leiden, Netherlands, Sep 17 – 19. 2025.
- **WINE5**, University of Split, Croatia, Aug 18 – 23. 2025.
- **WINGs**, Mercure Haydock Hotel, Saint Helens, UK, Mar 31 – Apr 3. 2025.
- **Instructional Workshop on Rational Points**, University of Groningen, the Netherlands, Nov 4 – 8. 2024.
- **School on Hodge Theory & Shimura Varieties**, Universität Duisburg-Essen, Germany, Sep 23 – 27. 2024.
- **TAGSS - Tropical Geometry and Related Topics**, ICTP, Italy, Sep 2 – 6. 2024.
- **SinG School in Geometry - IHS Manifolds**, University of Trento, Italy, Aug 26 – 30. 2024.
- **Mirrors in the Midlands**, University of Birmingham, UK, Aug 6 – 9. 2024.
- **WINGs**, Mercure Shrewsbury Albrighton Hall Hotel & Spa, UK, Apr 15 – 18. 2024.
- **UKAG Network Winter School**, University of Warwick, UK, Dec 12 – 15. 2023.
- **Rethinking Number Theory 4**, Virtual Workshop, Jun 12 – 23. 2023.
- **15th ALGA**, IMPA, Brazil, Feb 06 – 10. 2023.

Funding and scholarships

Turing Scheme Cost of Living and SEND Grant, University of Birmingham, 02/2026.
College Funded PhD Scholarship, University of Birmingham, 09/2023 – 03/2027.
Financial Assistance for Visiting Students, IMPA, 03/2023 – 07/2023.
Master's Scholarship, Academic Excellence Program – PROEX/CAPES, 04/2021 – 03/2023.
Summer Program Scholarship, IMPA, 01/2020 – 02/2020.
Undergraduate Research Scholarship, PIBIC/FAPEMIG, 03/2018 – 02/2019.

Other activities

Typesetter – K3 surfaces course, taught by Dr Ursula Whitcher. Winter School on Number Theory and Physics, ICTP.

Magma – Implemented *intrinsics* to compute multiplicative characters of finite fields and Gauss sums. Developed *intrinsics* to compute the gamma triple associated with a given hypergeometric datum and the hypergeometric datum associated with a gamma triple, according to work of Asem Abdelraouf. This was done under the guidance of John Voight and part of it was joint work with James Gass.

Languages

Portuguese (native) and English (fluent).