

Matthieu Faitg

Postdoc in mathematics

Curriculum Vitae

Age: 30 years old.

Citizenship: French.

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Past and current positions

- *01/10/2022 – present* : **Postdoc** at the Institut de Mathématiques de Toulouse, Université Toulouse III (France), under the supervision of Francesco Costantino. 2 years position.
- *01/10/2019 – 30/09/2022* : **Postdoc** at the mathematics department of the University of Hamburg (Germany), under the supervision of Christoph Schweigert. 3 years position.

Studies

- *2016 – 2019* : **PhD student** at the University of Montpellier.
Thesis: Mapping class groups, skein algebras and combinatorial quantization.
Under the supervision of Stéphane Baseilhac and Philippe Roche. Defended on 16/09/2019.
- *2014 – 2016* : **Master** in fundamental mathematics, University of Montpellier.
- *2011 – 2014* : **Licence** in mathematics, University of Perpignan.
- *2011* : **Baccalauréat** in science, option mathematics.

Research interests

I am interested in:

- **Quantum algebra and topology**, in particular quantum character varieties (moduli algebras), skein algebras, mapping class groups.
- **Deformation theory and homological algebra**, in particular deformation of monoidal structures in tensor categories (Davydov–Yetter cohomology).

Other relevant keywords for my research works are: quantum groups, Hopf algebras, tensor categories, representation theory, link invariants, relative Ext groups, non-commutative rings.

(Pre)-Publications

Preprints:

6. S. Baseilhac, M. Faitg, P. Roche, *Unrestricted quantum moduli algebras III : surfaces of arbitrary genus and skein algebras*, arXiv:2302.00396, 75 pages (2023).

Papers accepted for publication:

5. M. Faitg, *Holonomy and (stated) skein algebras in combinatorial quantization*, arXiv:2003.08992, 49 pages (2020). Accepted for publication in Quantum Topology

Published papers:

4. M. Faitg, A.M. Gainutdinov, C. Schweigert, *Relative homological algebra and Davydov–Yetter cohomology*, *Selecta Math. New Ser.* 30, article n°26 (2024). (arXiv:2202.12287)
3. M. Faitg, *Modular group representations in combinatorial quantization with non-semisimple Hopf algebras*, *SIGMA* 15 (2019), 077, 39 pages. (arXiv:1805.00924)
2. M. Faitg, *Projective representations of mapping class groups in combinatorial quantization*, *Comm. Math. Phys.* 377(1), 161–198 (2020). (arXiv:1812.00446)
1. M. Faitg, *A note on symmetric linear forms and traces on the restricted quantum group $\overline{U}_q(\mathfrak{sl}(2))$* , *Osaka J. Math.* 57, 575–595 (2020). (arXiv:1801.07524)

Talks at seminars and conferences

- *Moduli algebras and representations of mapping class groups*, Quantum workshop, 1h, Montpellier, 17/11/2023.
- *Structure of quantum moduli algebras and skein algebras*, presented at:
 - Quantum Topology day, 1h, IMJ-PRG, Paris, 18/03/2024. Invited.
 - Algebra and geometry seminar, 1h, University of Caen, 30/01/2024.
 - Algebra and topology seminar, 1h, University of Strasbourg, 09/01/2024.
 - Algebra and topology seminar, 1h30, University of Dijon, 25/05/2023.
 - One day on skein and moduli algebras, 45 min, University Toulouse III, 24/03/2023.
 - Algebra seminar, 1h, Institut Camille Jordan (Lyon), 16/03/2023.
- *Quid of quantum groups?*, Quid seminar (for young researchers), 1h, University Toulouse III, 15/02/2023.
- *Davydov–Yetter cohomology and relative homological algebra*, presented at:
 - Space seminar, 1h, University of Tours, 24/06/2023.
 - Mathematical physics seminar, 1h, University of Dijon (online), 15/03/2022.
 - Groups, representations and geometry seminar, 1h30, IMJ–PRG (Paris), 04/03/2022.
 - GAAO seminar, 1h, University Clermont Auvergne, 14/01/2022.
- *Deformations of tensor categories*, Algebra and mathematical physics seminar, 45 min, University of Hamburg (online), 19/11/2021.
- *Holonomy and (stated) skein algebras in combinatorial quantization*, Conference “Remote Rendez-vous for Quantum Topologists”, 1h, online, 13/08/2021. Invited.
- *Holonomy in combinatorial quantization*, Quantum Universe cluster quarterly meeting, 15 min, online, 23/06/2020.
- *Wilson loops and skein algebras in combinatorial quantization*, Algebra and mathematical physics seminar, 1h30, University of Hamburg, 28/01/2020.
- *Mapping class group representations in combinatorial quantization*, presented at:
 - Quantum Universe cluster quarterly meeting, 1h30, DESY, Hamburg, 21/01/2020.
 - Topology seminar, 1h15, University of Grenoble, 08/03/2019.
 - Geometry and topology seminar, 1h, University Toulouse III Paul Sabatier, 05/03/2019.

- PhD students seminar, 45 min, University of Montpellier, 21/02/2019.
- Algebra and mathematical physics seminar, 1h30, University of Hamburg, 04/12/2018.
- Conference “Rencontre du GdR de Topologie Algébrique”, 1h, Montpellier, 25/10/2018. Invited.
- *Combinatorial quantization and representations of mapping class groups: the case of the torus*, Topology seminar, 1h, University of Montpellier, 31/05/2018.
- *Some examples of quantum groups*, PhD students seminar, 1h, University of Montpellier, 03/05/2017.

Teaching

Total: 296 hours.

I teach at the University Toulouse III in addition to my postdoc:

- *Basic mathematics III* in 2022 and 2023, lecture and exercise classes, 48 hours total. 1st year course. Arithmetic in \mathbb{Z} , discrete probability theory.
- *Elementary groups and rings* in 2023 and 2024, exercise classes, 56 hours total. 2nd year course. Groups, rings, morphisms, classical examples, arithmetic in rings.

I taught at the University of Montpellier during my PhD thesis:

- *Analysis 4* from 2017 to 2019, exercise classes, 114 hours total. 2nd year course. Function sequences, function series, power series, Fourier series.
- *Analysis 2* in 2017 and 2018, exercise classes, 50 hours total. 1st year course. Real sequences, real functions, limits, derivatives, asymptotic expansions.
- *Linear algebra and analysis 2* in 2019, exercise classes, 28 hours. 1st year course. Polynomials, vector spaces, linear maps and matrices, integrals, asymptotic expansions, linear differential equations.

Other activities

I refereed papers for the journals *Communications in Mathematical Physics*, *Algebraic and Geometric Topology*, *SIGMA*.