# Louis-Hadrien Robert

*Curriculum Vitae*

## Academic Career

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| 2020–Now | **Postdoc**, *University of Luxembourg*, with S. Merkulov. |
| 2020 | **Job offer**, *Assistant professor*, HSE, Moscow, On hold because of Covid-19 pandemic. |
| 2017–2020 | **SwissMAP Postdoc**, *University of Geneva*, with R. Kashaev. |
| 2014–2017 | **Postdoc and Juniorprofessor (replacement)**, *Hamburg University*, with C. Schweigert. |
| 2014 | **Guest researcher**, *Max Planck Institute*, Bonn. |
| 2013–2014 | **Postdoc**, *Strasbourg University*, with F. Costantino. |
| 2009–2013 | **PhD Student**, *University Paris 7 – Denis Diderot*, supervised by C. Blanchet. |

## Education

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| 2008–2009 | **Research Internships**, Århus with J. Andersen and Zurich with A. Beliakova. |
| 2007–2008 | **Master 2**, *Pure Mathematics*, University Paris 7 – Denis Diderot, supervised by C. Blanchet. |
| 2006–2007 | **Agrégation of mathematics**, *13th*, (The highest French national competitive exam for teaching). |
| 2005–2006 | **Bachelor and Master 1**, *Mathematics and Computer Sciences*, École Normale Supérieure. |
| 2005–2009 | **Mathematical studies**, École Normale Supérieure, Paris, France. |

## Teaching Experience

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| since 2022 | **As assistant professor**. | |
| | ○ Tutorials for **Mathématics 2nd semester, Real Analysis** | *in French* |
| | ○ Tutorials for **Python for mathematicians** | *in French* |
| | ○ Integrated Lectures **Preparation to scientific studies** | *in French* |
| | ○ Cours **Introduction to Research** in Master 2 | *in French* |
| | ○ Interventions for **Preparation to *agrégation interne*** | *in French* |
| 2014–now | **As a Postdoc**. | |
| | ○ Tutorials **Analysis I**, **Statistics and R for biologists**, **Measure and integration**, **Mathematics for computer scientists**, **Geometry II**, **Introduction to logic and set theory**, **Algebra and Geometry III**, **Analysis II**, **General Mathematics** | *in French* |
| | ○ Tutorials **Hopf Algebra** | *in English* |
| | ○ Tutorials **Topology**, **Mathematics for Physicists**, **Analysis I** | *in German* |
| | ○ Seminar **Representation of Finite Groups** | *in German* |
| | ○ Seminar **Quantum invariants** | *in English* |
| | ○ Mini-lecture **Introduction to Categories** for PhD students in physics | *in English* |
| 2014 | **Examiner**, *Mathematics*, Competitive exam for Polythechnique and ÉNS, section PSI. | |
| 2013 | **Oral examiner**, *Preparation of the Agregation*, ENS Cachan. | |
| 2009–2013 | **As a PhD student**. | |
| | ○ Integrated Lecture **Algebra and Analysis 2** | *in French* |
| | ○ Tutorials **Algebra and Analysis 1** | *in French* |
| | ○ Supervision of Professional Projects | *in French* |

2005–2008  **In Preparatory Classes**.
- **Oral Examiner**, 1st year, *Lycée Henri IV*.                                    *in French*
- **Maple tutorial** 1st year, *Lycée Henri IV*, 2nd year *Lycée Lavoisier*.         *in French*

# Scientific Production

## Preprints

[21] **Symmetries of equivariant Khovanov–Rozansky homology**, *avec Y. Qi, J. Sussan et E. Wagner*, `arXiv:2306.10729`.

[20] **A categorification of the colored Jones polynomial at a root of unity**, *avec Y. Qi, J. Sussan et E. Wagner*, `arXiv:2111.13195`.

## Publications

[17] **Algebraic versus geometric categorification of the Alexander polynomial: a spectral sequence**, *with A. Beliakova, K. Putyra et E. Wagner*, `arXiv:2210.00878`, accepted in Journal of the European Mathematical Society.

[16] **A topological theory of unoriented SL(4) foams**, *with M. Khovanov, J. Przytycki and M. Silvero*, `arXiv:2307.00674`, published in Mediterranean Journal of Mathematics.

[15] **Symmetries of gl(N)-foams**, *with Y. Qi, J. Sussan et E. Wagner*, `arXiv:2212.10106`, published in Quantum Topology.

[14] **Conical SL(3) foams**, *with M. Khovanov*, `arXiv:2011.11077`, published in Journal of Combinatorial Algebra.

[13] **Link homology and Frobenius Extension II**, *with M. Khovanov*, `arXiv:2005.08048`, to appear in Fundamenta Mathematicae.

[12] **A quantum categorification of the Alexander polynomial**, *with E. Wagner*, `arXiv:1902.05648`, to appear in Geometry & Topology.

[11] **State sums for some super quantum link invariants**, *with E. Wagner*, `arXiv:1909.02305`, to appear in Topology and Geometry: A Collection of Papers Dedicated to Vladimir G. Turaev, ed. A. Papadopoulos (2021).

[10] **Foam evaluation and Kronheimer–Mrowka theories**, *with M. Khovanov*, `arXiv:1808.09662`, published in Advances in Mathematics 376 (2021).

[9] **Characterizations of box-totally dual integral polyhedra**, *with P. Chervet and R. Grappe*, `arXiv:1804.08977`, published in Mathematical Programming Series A (2021).

[8] **Symmetric Khovanov–Rozansky link homologies**, *with E. Wagner*, `arXiv:1801.02244`, published in Journal de l'École Polytechnique 7 (2020).

[7] **A closed formula for the evaluation of $\mathfrak{sl}_N$-foams**, *with E. Wagner*, `arXiv:1702.04140`, published in Quantum Topology 11 (2020).

[6] **Signature invariants for knotted webs**, *with C. Gille*, `arXiv:1803.08025`, published in Algebraic and Geometric Topology 18:6 (2018).

[5] **Categorification of the colored $\mathfrak{sl}_3$-invariant**, `arXiv:1503.08451`, published in Journal of Knot Theory and its Ramifications 25, 7 (2016).

[4] **A characterization of indecomposable web-modules over Khovanov–Kuperberg algebras**, `arXiv:1309.2793`, published in Algebraic and Geometric Topology 15 (2015).

[3] **Grothendieck groups of the Khovanov–Kuperberg algebras**, `arXiv:1312.1122`, published in Journal of Knot Theory and its Ramifications 24, 14 (2015).

[2] **A large family of indecomposable projective modules for the Khovanov–Kuperberg algebras of $\mathfrak{sl}_3$-webs**, `arXiv:1207.6287`, published in Journal of Knot Theory and its Ramifications 22, 11 (2013).

[1] **Algebras for $\mathfrak{sl}_3$-homology**, Proceedings of 12th forum des jeunes mathématicien-ne-s, 2012.

## University Theses

2013 **PhD Thesis**, *Sur l'homologie $\mathfrak{sl}_3$ des enchevêtrements; algèbres de Khovanov–Kuperberg*, supervised by C. Blanchet.

2008 **Magister Thesis**, *Fonction potentielle de Conway et homologie de Heegaard–Floer*, supervised by C. Blanchet.

2008 **Master Thesis**, *Une construction géométrique de la fonction potentielle de Conway*, supervised by C. Blanchet.

2006 **M1 Thesis**, *Groupes de tresses et algorithme de réduction des poignées*, with N. Curien supervised by P. Dehornoy.

## Selected Talks

2021 **Foam evaluation, link homology and Soergel bimodules**, *Conference Perspectives on Knot Homology*, Banff (Online).

2020 **Symmetric Khovanov–Rozansky homology**, *Conference QUACKS*, Eugene, Oregon (Online).

2018 **Foam evaluation and Kronheimer–Mrowka theory**, *Conference Interactions of low-dimensional topology and "higher" representation theory*, Zurich.

2018 **Foams and Categorification**, *Workshop Categorification in mathematical physics*, Stony Brook.

2017 **Categorification of MOY calculi II**, *Workshop categorification, representation theory and symplectic geometry*, HIM, Bonn.

2017 **An evaluation of $\mathfrak{sl}_N$-foams**, *Winter Braids 7*, Caen.

2015 **The colored $\mathfrak{sl}_3$-homology**, *AMS–EMS–SPM Joint Meeting*, Porto.

2014 **Grothendieck groups of the Khovanov–Kuperberg algebras**, *Winter Braids 4*, Dijon.

2013 **Categorification of the colored $\mathfrak{sl}_3$ invariant**, *Conference Quantum Topology*, Cheliabinsk.

**Seminars** in Århus, Cambridge, Dijon, Geneva, Grenoble, Hamburg, Lille, Lisbon, Montpellier, New York, Orsay, Paris, Strasbourg, Stuttgart, Toulouse . . .

Complete List: `lrobert.perso.math.cnrs.fr/talks.html`

## Languages

French **Mother Tongue.**

English **Fluent.**

German **Fluent.**

## Community Contributions

2022 **Organizer**, *Conference*, Recent developments in link homology, Les Diablerets, Switzerland.

2021 **Organizer**, *Hot Topic Workshop*, Foam evaluation, ICERM, Providence, USA.

2021 **Organizer**, *Workshop*, Homological and quantum invriants, CIRM, France.

2020–now **Organizer**, *Online seminar*, `[K-OS]`, Knot Online Seminar.

2019 **Organizer**, *Conference*, Low dimensional topology: a Colloquium in honor of Christian Blanchet, University Paris 7 – Denis Diderot, France.

2017–2020 **Organizer**, *Seminar*, Geometry and Topology, University of Geneva, Switzerland.

2011–2013 **Spokesperson of PhD sudents**, *Scientific council of the Department of Mathematics*, University Paris 7 – Denis Diderot, France.

2010–2013 **Member of the "Bureau des Doctorants"**, University Paris 7 – Denis Diderot, France.

2011–2012 **Organizer**, *Casual Seminar*, Bourbakettes, University Paris 7 – Denis Diderot, France.

2009–2010 **Organizer**, *Workgroup*, Group cohomology, University Paris 7 – Denis Diderot, France.

## Miscellaneous

**Programming**, *C++, Caml, LaTeX, Maple, R, Python*.

2001–2003  **Volunteering**, *Renovation of a school in Magba (Cameron) with 2 years preparation (fundraising, logistic)*.

2017–2020  **Co-organizer**, *KinoKlub*, a weekly cinema club in Geneva.

2019–now  **Co-founding member**, *Robert Turner Collective*, artistic collaboration with Paul Turner.