

# Louis-Hadrien Robert

## Curriculum Vitae

### Academic Career

- 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

- 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

- 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 Polytechnique 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*

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## Scientific Production

### Preprints

- [16] **A new way to evaluate MOY graphs**, arXiv:1512.02370.
- [15] **On edge-colorings of planar bicubic graphs**, arXiv:1312.0361.

### Publications

- [14] **Conical  $SL(3)$  foams**, with *M. Khovanov*, arXiv:2011.11077, to appear 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.

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## 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](http://lrobert.perso.math.cnrs.fr/talks.html)

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## Languages

- French **Mother Tongue.**
- English **Fluent.**
- German **Fluent.**

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## 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 invariants, 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 students**, *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.

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## Miscellaneous

- Programming**, C++, Caml, L<sup>A</sup>T<sub>E</sub>X, Maple, R, Python.
- 2001–2003 **Volunteering**, *Renovation of a school in Magba (Cameron) with 2 years preparation (fund-raising, 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.