Louis Ioos

Curriculum Vitae

Max Planck Institute for Mathematics
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Research area

Fields of expertise.

Differential, complex and symplectic geometry, global analysis on manifolds.

Themes.

Geometric quantization, local index theory, spectral theory.

Objects studied.

Bergman kernel, Toeplitz operators, semiclassical invariants.

Academic positions

Since oct. 2021 **Post-doctoral fellow**, *Max Planck Institute for Mathematics*, Bonn, Germany.

2018–2021 **Post-doctoral fellow**, *Tel-Aviv University*, Tel-Aviv, Israel.
Advisors : Lev Buhovsky, Leonid Polterovich

Studies

31/05/2018 **PhD defense**, *Université Paris Diderot*.
Jury foreman : M. Jean-Michel Bismut,
Jury members : M. Gilles Carron (referee),
M. Eric Leitchnam,
M. Xiaonan Ma (advisor),
M. George Marinescu,
M. Martin Schlichenmaier (referee).

2014–2018 **PhD in Mathematics**, *IMJ-PRG*, Paris, Advisor : Xiaonan Ma.

2013–2014 **Master 2 in Fundamental Mathematics**, *UPMC*, Paris, Honors.

2012–2013 **Master 2 in Mathematical Logic**, *Université Paris Diderot*, Paris, Honors.

2009–2012 **Work abroad**, *Australia, Asia, America*.

2008–2009 **Master 1 in Mathematics**, *Université de Versailles Saint-Quentin*, Versailles, Honors.

2007–2008 **Maîtrise in Mathematics**, *Université de Montréal*, Montréal, scholar.

2007 **Licence in Mathematics**, *Université de Versailles Saint-Quentin*, Versailles.

Research funds raised

2014–2017 **Research Grant DIM RDM-IdF**, 5000 €.

Teaching

2nd semester 2018–2019 **Master 2 : Advanced topics in differential geometry**, *Assistant of L. Polterovich*, Tel Aviv University, 6 Lectures and Course preparation.

1st semester 2017-2018 **Licence 2 : Suites, séries et intégrales**, *Assistant of A.Iordan*, Université Pierre et Marie Curie, 12 Exercise sessions.

1st semester 2017-2018 **Licence 2 : Arithmétique pour informaticiens**, *Assistant of L. Koelblen*, Université Pierre et Marie Curie, 12 Exercise sessions.

1st semester 2016-2017 **Licence 1 : Analyse et algèbre pour les sciences**, *Assistant of E. Falbel*, Université Pierre et Marie Curie, 12 Exercise sessions.

1st semester 2016–2017 **Licence 2 : Fonctions de plusieurs variables et intégrales multiples**, *Assistant of P. Polo*, Université Pierre et Marie Curie, 12 Exercise sessions.

2nd semester 2015–2016 **Licence 3 : Analyse fonctionnelle**, *Assistant of D. Cordero-Erausquin*, Université Pierre et Marie Curie, 12 Exercise sessions.

1st semester 2015–2016 **Licence 3 : Probabilités élémentaires**, *Assistant of A. Lambert*, Université Pierre et Marie Curie, 12 Exercise sessions.

2nd semester 2014–2015 **Licence 2 : Intégrales multiples**, *Lecturer*, Université Pierre et Marie Curie, 12 Lectures, 12 Exercise sessions and Course preparation.

1st semester 2014-2015 **Licence 3 : Topologie et calcul différentiel**, *Assistant of P. Cherrier*, Université Pierre et Marie Curie, 12 Exercise sessions.

Organisation of scientific events

Depuis nov. 2021 **Alternative Geometry seminar**, *Max Planck Institute of Bonn*, with Okke van Garderen.

15-19 nov. 2021 **Workshop on the semiclassical trace formula**, *Auffargis*, with Léo Bénard and Adrien Boulanger.

2016–2017 **Workshop : Riemann surfaces and algebraic curves**, *Université Pierre et Marie Curie*, with Léo Bénard and Adrien Boulanger.

2015–2016 **Workshop : Hilbert schemes**, *Université Pierre et Marie Curie*, with Nicolina Istrati.

2014–2015 **Workshop : GAGA**, *Université Pierre et Marie Curie*, with Léo Bénard and Nicolina Istrati.

Languages

French **mother tongue**.

English **fluent**.

German **basic knowledge**.

Talks

A. Talks in seminar.

06/12/2021 **WWU Münster**, *Oberseminar*, Quantum measurement theory over projective manifolds.

08/12/2021 **Tel Aviv University, online**, *Geometry and Dynamics seminar*, Quantization in stages and canonical metrics.

27/04/2021 **Philipps-Universität Marburg**, *Differentialgeometrie und Analysis*, Survey on the semiclassical expansion of the Bergman kernel II.

20/04/2021 **Philipps-Universität Marburg**, *Differentialgeometrie und Analysis*, Survey on the semiclassical expansion of the Bergman kernel I.

01/04/2021 **University de Toulouse**, *Complex geometry seminar*, Quantization of Kähler-Ricci solitons.

22/03/2021 **Université Paris Sud, online**, *Harmonic Analysis seminar*, Donaldson's program for Kähler-Ricci solitons.

24/11/2020 **Philipps-Universität Marburg, online**, *Differentialgeometrie und Analysis*, Bergman kernels in the Yau-Tian-Donaldson program.

01/07/2020 **Université Paris Sud / UPMC, online**, *Analysis and Geometry seminar / Workshop on Dirac operators*, Applications of Berezin-Toeplitz quantization to Donaldson's program in Kähler geometry.

13/05/2020 **Tel Aviv University, online**, *Geometry and Dynamics seminar*, Almost-representations of the Lie algebra of SU(2) and quantization of the sphere.

08/01/2020 **Tel Aviv University**, *Geometry and Dynamics seminar*, Donaldson's iterations towards canonical Kähler metrics.

23/05/2019 **University of Geneva**, *Topology and Geometry seminar*, La Conjecture Asymptotique de Witten pour les représentations quantiques du Mapping Class Group.

06/03/2019 **Tel Aviv University**, *Geometry and Dynamics seminar*, Canonical Kähler metrics and quantization.

09/01/2019 **Aarhus University**, *QGM seminar*, Geometric quantization of symplectic maps and Witten's asymptotic conjecture.

31/10/2018 **Tel Aviv University**, *Geometry and Dynamics seminar*, Geometric quantization of Hamiltonian flows.

15/05/2018 **Université Paris sud, Orsay**, *Harmonic analysis seminar*, Asymptotique des états isotropes en quantification holomorphe.

20/03/2018 **University of Luxembourg**, *Working Group in Algebra, Geometry and Quantization*, Asymptotics of isotropic states in holomorphic quantization.

09/01/2018 **Institut de Mathématiques de Marseille**, *Complex geometry seminar*, Asymptotique des états isotropes en quantification holomorphe.

05/12/2017 **Universität zu Köln**, *Semi-classical analysis seminar*, Asymptotic expansion of isotropic states in holomorphic quantization.

24/04/2015 **Université Pierre et Mare Curie, Paris**, *Workshop on Higgs bundles*, Théorie de Chern-Simons.

04/03/2015 **Université Paris sud, Orsay**, *Workshop on Dirac operators*, Connexion de Hitchin et quantification géométrique.

B. Talks in conferences.

15-19 dec. 2019 **Academia Sinica, Taipei**, *2019 Taipei conference in complex geometry*, Canonical Kähler metrics and the spectral gap of the Berezin transform.

09-13 sept. 2019 **NTHU, Taïwan**, *Geoquant 2019*, Geometric quantization of symplectic maps and semi-classical trace formulas.

15-19 july 2019 **Universität zu Köln**, *Quantization in symplectic geometry*, An operational point of view on Berezin-Toeplitz quantization.

08-12 oct. 2018 **CIRM, Luminy**, *International Workshop on Geometric Quantization and Applications*, Geometric quantization of symplectic maps and Witten's asymptotic conjecture.

27-31 march 2017 **La Llagone, Matemale**, *Workshop on L^2-invariants*, Théorie de Hodge-de Rham, noyau de la chaleur.

Research

A. Publications.

1. **On the composition of Berezin-Toeplitz operators on symplectic manifolds**, *L. Ioos*, Math. Z. 290 (2018), no. 1-2, 539–559.
2. **Berezin-Toeplitz quantization for eigenstates of the Bochner-Laplacian on symplectic manifolds**, *L. Ioos, W. Lu, X. Ma, G. Marinescu*, J. Geom. Anal. 30 (2020), no. 3, 2615–2646.
3. **Geometric quantization of Hamiltonian flows and the Gutzwiller trace formula**, *L. Ioos*, Lett. Math. Phys. 110 (2020), 1585–1621.
4. **Spectral aspects of the Berezin transform**, *L. Ioos, V. Kaminker, L. Polterovich, D. Shmoish*, Ann. Henri Lebesgue 3 (2020), 1343-1387.
5. **Berezin-Toeplitz quantization and the least unsharpness principle**, *L. Ioos, D. Kazhdan, L. Polterovich*, Int. Math. Res. Not. IMRN 6 (2021), 4625–4656.
6. **Quantization and isotropic submanifolds**, *L. Ioos*, to appear in Michigan Math. J. (2021), 40 pp, doi.org/10.1307/mmj/20195787.
7. **Geometric quantization of symplectic maps and Witten's asymptotic conjecture**, *L. Ioos*, accepted in Adv. Math. (2021), 49 pp, arxiv.org/abs/1810.03589.
8. **Balanced metrics for Kähler-Ricci solitons and quantized Futaki invariants**, *L. Ioos*, J. Funct. Anal. 282 (2022), no. 8, 109400, 58 pages.
9. **Anticanonically balanced metrics on Fano manifolds**, *L. Ioos*, accepted for publication in Ann. Global Anal. Geom. (2022), 38 pp.

B. Preprints.

8. **Almost representations of algebras and quantization**, *L. Ioos, D. Kazhdan, L. Polterovich*, submitted for publication (2020), 36 pp, arxiv.org/abs/2005.11693.
11. **Quantization of symplectic fibrations and canonical metrics**, *L. Ioos, L. Polterovich*, submitted for publicationn (2021), 51 pp, arxiv.org/abs/2112.00419.