

# Louis loos

## Curriculum Vitae

School of Mathematical Sciences, Schreiber 001  
Tel Aviv University, Ramat Aviv 69978  
☎ +972585004147  
✉ [louisioos@mail.tau.ac.il](mailto:louisioos@mail.tau.ac.il)  
📄 [louisioos.github.io](https://louisioos.github.io)

### Research area

#### Fields of expertise.

Differential geometry, complex geometry and symplectic geometry.

#### Themes.

Global analysis, geometric quantization, local index theory.

#### Objects studied.

Bergman kernel, automorphic forms, symplectic diffeomorphisms.

### Academic position

Since oct. 2018 **Post-doctoral fellow**, *School of Mathematical Sciences – Tel-Aviv University*,  
Tel-Aviv, 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 €.

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## 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.

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## Courses

- 02-06 sept. 2019 **NTHU, Taïwan**, *Geoquant 2019*, summer school.
- 13-17 jun. 2016 **Université Paul Sabatier, Toulouse**, *Complex geometry and beyond*, Recent advances in differential complex geometry.
- 27-29 jan. 2016 **Université Pierre et Marie Curie, Paris**, *GRACK*, Résolution variationnelle de la conjecture de Tian-Yau-Donaldson.

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## Organisation of scientific events

- 2016–2017 **Workshop : Riemann surfaces and algebraic curves**, *Université Pierre et Marie Curie*, with Léo Bénard and Adrien Boulanger.
- 2015–2016 **Séminaire des lapins**, *Université Pierre et Marie Curie*, with Miguel Acosta and Adrien Sauvaget.
- 2015–2016 **Workshop : FGA**, *Université Pierre et Marie Curie*, with Nicolina Istrati.
- 2014–2015 **Workshop : GAGA**, *Université Pierre et Marie Curie*, with Léo Bénard and Nicolina Istrati.

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## Languages

- French **mother tongue**.
- English **fluent**.
- German **basic knowledge**.

## Talks

### A. Talks in seminars.

- 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 Marie 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, Taiwan**, *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.

**A. Publications.**

1. **On the composition of Berezin-Toeplitz operators on symplectic manifolds**, *L. loos*, Math. Z. 290 (2018), no. 1-2, 539–559.
2. **Berezin-Toeplitz quantization for eigenstates of the Bochner-Laplacian on symplectic manifolds**, *L. loos*, *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. loos*, Lett. Math. Phys. 110 (2020), 1585–1621.
4. **Spectral aspects of the Berezin transform**, *L. loos*, *V. Kaminker*, *L. Polterovich*, *D. Shmoish*, Ann. Henri Lebesgue 3 (2020), 1343–1387.
5. **Berezin-Toeplitz quantization and the least unsharpness principle**, *L. loos*, *D. Kazhdan*, *L. Polterovich*, to appear in Int. Math. Res. Not. IMRN, 34 pp, <https://doi.org/10.1093/imrn/rnaa187>.
6. **Quantization and isotropic submanifolds**, *L. loos*, to appear in Michigan Math. J., 40 pp, <https://doi.org/10.1307/mmj/20195787>.

**B. Preprints.**

7. **Geometric quantization of symplectic maps and Witten's asymptotic conjecture**, *L. loos*, submitted for publication (2018), 49 pp, [arxiv.org/abs/1810.03589](https://arxiv.org/abs/1810.03589).
8. **Almost representations of algebras and quantization**, *L. loos*, *D. Kazhdan*, *L. Polterovich*, submitted for publication (2020), 36 pp, [arxiv.org/abs/2005.11693](https://arxiv.org/abs/2005.11693).
9. **Anticanonically balanced metrics on Fano manifolds**, *L. loos*, submitted for publication (2020), 38 pp, [arxiv.org/abs/2005.11693](https://arxiv.org/abs/2005.11693).
10. **Balanced metrics for Kähler-Ricci solitons and quantized Futaki invariants**, *L. loos*, submitted for publication (2021), 46 pp, [arxiv.org/abs/2101.10974](https://arxiv.org/abs/2101.10974).