

Sobhan Seyfaddini

Curriculum Vitae

Sorbonne Université
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Positions

- **CNRS & Sorbonne Université** Oct. 2016–Present
Chargé de Recherche 1ère Classe (CR1), then Classe Normale (CRCN)
- **Massachusetts Institute of Technology** Sep. 2014–Aug. 2016
C.L.E. Moore Instructor & NSF Postdoctoral Fellow
- **École Normale Supérieure-Paris & Université Paris-Dauphine** Oct. 2013–Aug. 2014
ERC Postdoctoral Fellow
- **École Normale Supérieure-Paris** Oct. 2012–Sep. 2013
FSMP Postdoctoral Fellow

Visiting Positions

- **MSRI** Nov.–Dec. 2018
Research Member
- **Institute for Advanced Study** Sep. 2016–Jun. 2017
Member

Education

- **Sorbonne Université** Paris, Fr
HDR Mathématiques Jan. 2021
– *Dissertation*: Géométrie symplectique C^0
- **University of California-Berkeley** Berkeley, CA
PhD Mathematics Aug. 2007–Aug. 2012
– *Dissertation*: C^0 -rigidity in Hofer geometry and Floer theory
– *Advisor*: Alan Weinstein
- **University of Toronto** Toronto, ON
MA Mathematics Sep. 2006–May 2007
- **University of Waterloo** Waterloo, ON
BMATH Pure Mathematics-Finance Option Sep. 2001–May 2006

Research Interests

C^0 -symplectic geometry, symplectic and contact dynamics, Floer homology, area-preserving homeomorphisms.

Publications

1. *Quantitative Heegaard Floer cohomology and the Calabi invariant*, with D. Cristofaro-Gardiner, V. Humilière, C.Y. Mak and I. Smith), arXiv 2105.11026.
2. *Proof of the simplicity conjecture*, with D. Cristofaro-Gardiner, V. Humilière, arXiv:2001.01792.
3. *PFH spectral invariants on the two-sphere and the large scale geometry of Hofer's metric*, with D. Cristofaro-Gardiner, V. Humilière, to appear in **J. Eur. Math. Soc. (JEMS)**, arXiv:2102.04404.
4. *The Anosov-Katok method and pseudo-rotations in symplectic dynamics*, with F. Le Roux, to appear in **Journal of Fixed Point Theory and Applications**, special issue in honour of Claude Viterbo, arXiv:2010.06237.
5. *An Arnold-type principle for non-smooth objects*, with L. Buhovsky, V. Humilière, to appear in **Journal of Fixed Point Theory and Applications**, special issue in honour of Claude Viterbo, arXiv:1909.07081.
6. *Barcodes and area-preserving homeomorphisms*, with Le Roux, C. Viterbo, **Geometry & Topology**, 25 (2021) 2713–2825.
7. *The action spectrum and C^0 symplectic topology*, with L. Buhovsky, V. Humilière, **Mathematische Annalen**, 380(1), 293–316. 2021.
8. *A C^0 counterexample to the Arnold conjecture*, with L. Buhovsky, V. Humilière, **Invent. Math.**, 213(2):759–809, 2018.
9. *Towards a dynamical interpretation of spectral invariants on surfaces*, with V. Humilière, F. Le Roux, **Geometry & Topology**, 20 (2016), 2253–2334.
10. *Reduction of symplectic homeomorphisms*, with V. Humilière, R. Leclercq, **Ann. Sci. Éc. Norm. Supér.**, Issue 3 (2016), 633–668.
11. *Spectral Killers and Poisson bracket invariants*, **J. Mod. Dyn.** 9 (2015), 51–66.
12. *Coisotropic rigidity and C^0 symplectic geometry*, with V. Humilière, R. Leclercq, **Duke Math. J.** 164 (2015), no. 4, 767–799.
13. *New energy-capacity-type inequalities and uniqueness of continuous Hamiltonians*, with V. Humilière, R. Leclercq, **Comment. Math. Helv.** 90 (2015), no. 1, 1–21.
14. *Unboundedness of the Lagrangian Hofer distance in the Euclidean ball*, **Electron. Res. Announc. Math. Sci.** 21 (2014), 1–7.
15. *The displaced disks problem via symplectic topology*, **C. R. Math. Acad. Sci. Paris** 351 (2013), no. 21–22, 841–843.
16. *C^0 limits of Hamiltonian paths and the Oh-Schwarz spectral invariants*, **Int. Math. Res. Not. IMRN** 2013, no. 21, 4920–4960.
17. *A note on C^0 rigidity of Hamiltonian isotopies*, **Journal of Symplectic Geometry**, Volume 11, Number 3, 1–8, 2013.
18. *Uniqueness of generating Hamiltonians for continuous Hamiltonian flows*, with L. Buhovsky, **Journal of Symplectic Geometry**, Volume 11, Number 1, 37–52, 2013.
19. S. Seyfaddini, *Descent and C^0 rigidity of spectral invariants on monotone symplectic manifolds*, **Journal of Topology & Analysis**, Volume 4, Number 4, 481–498, 2012.
20. *L^2 -singular dichotomy for orbital measures of classical simple Lie algebras*, with S. K. Gupta, K. E. Hare, **Mathematische Zeitschrift**, Volume 262, Number 1, pp. 91–124, 2009.

Awards and Grants

- ERC Starting Grant 851701, 2020-2025, €1,340,471.
 - Grant title: *HSD - Homeomorphisms in symplectic topology and dynamics.*
- Member of ANR Project COSY, 2021-2026 (Coordinator: Frédéric Bourgeois).
- CNRS Prime d'encadrement doctoral et de la recherche, 2016-2020, €14,000.
- NSF Postdoctoral Fellowship, 2014, \$150,000
 - Grant No. *DMS-1401569.*
- Banting Postdoctoral Fellowship, 2013.
 - *Declined (Tenable in Canada only)*
 - *Ranked one. Awarded by the Natural Sciences and Engineering Research Council of Canada.*
- NSERC Postdoctoral Fellowship, 2013.
 - *Declined (Tenable in Canada only)*

Student/Postdoctoral Advising

- Graduate Students:
 - PhD, Yusuke Kawamoto, ENS-Paris (co-supervision with Claude Viterbo, expected completion in 2021).
 - * Subsequent position: Université de Montréal, ETH Zürich.
 - Master's (M2), Yusuke Kawamoto, "Symplectic topology and persistence modules," ENS-Paris (co-supervision with Claude Viterbo, 2018).
 - Master's (M1), Ella Blair, "Foliations on 3-manifolds: The Thurston-Wood theorem," Sorbonne Université, 2018.
- Postdoctoral Fellows:
 - Dusan Joksimovic, Jan. 2021 – Dec. 2022.
 - Erman Çinelli, Sep. 2021 – Aug. 2023.
 - Vukasin Stojisavljevic, Apr. 2022 – Apr. 2023.
- Mentorship :
 - Étienne André, Sorbonne Université, 2021-2022.
 - Marguerite Bin, Sorbonne Université, 2021-2022.
 - Cynthia Chedrawi, Sorbonne Université, 2021-2022.
 - Paul Martin, Sorbonne Université, 2021-2022.
 - Jazel Tutunjian, Sorbonne Université, 2021-2022.
 - Yassine Ozaim, Sorbonne Université, 2021-2022.
 - Sudarshan Shinde, Sorbonne Université, 2019-2020.
 - Jeremy Wohlwend, MIT, 2015-2016.

Academic Activities

- Associate Editor of Virtual Series on Symplectic Geometry.
- Member of the organizing committee of the thematic trimester program "*Symplectic Topology, Contact Topology, and Interactions*" Institut Henri Poincaré, Spring 2021.
- Conference Organization:
 - *Giroux 60 – Convexity in contact and symplectic topology*, Institut Henri Poincaré, July 2022.
 - *Advances in Symplectic Topology*, Institut Henri Poincaré, May 2021.
- Seminar Organization:
 - Symplectix seminar, Institut Henri Poincaré, Fall 2018–Present.
 - Geometry & Topology Seminar, Sorbonne Université, Spring 2020–Present.
 - Symplectic Reading Group, Sorbonne Université, Fall 2021–Present.
 - Learning seminar on generating functions & symplectic geometry, MIT, Fall 2015.
 - The joint Harvard-MIT Geometry, Topology, and gauge theory seminar, Sep. 2015- Spring 2016.
 - Geometry & Topology Seminar, MIT, Fall 2014- Spring 2016.
 - Learning seminar on transverse foliations and dynamical systems of surfaces, Inst. Math. de Jussieu, May-Jul. 2014.
 - Symplectic Topology Graduate Student Seminar, UC Berkeley, 2010-2012.
 - Symplectic Geometry Seminar, UC Berkeley, Spring 2010.
 - Floer Theory Reading Group, UC Berkeley, Fall 2009.
- Thesis Committees:
 - HDR Committee: Jean Gutt, Institut de Mathématiques de Toulouse. , June 2021.
 - Thesis Committee: Jaime Bustillo, ENS-Paris, July 2018.
- Institutional Responsibilities:
 - Member of the International Selection committee, ENS-Paris, 2022 – 2025.
 - Member of Comité de Prospective et Recruitment, Sorbonne Université et Université Paris Diderot, Fall 2018–Present.
 - HDR Committee: Jean Gutt, Institut de Mathématiques de Toulouse. , June 2021.
 - Thesis Committee: Jaime Bustillo, ENS-Paris, July 2018.
- Outreach Activities
 - Ambassador of the Paris Graduate School of Mathematics, Fondation Science Mathématiques de Paris, Fall 2017-Present: Responsible for public relations aspects of the Paris Graduate School of Mathematics program in Canada & United States.
 - Fête de la science, Sorbonne Université , 2017 & 2018: Participation in public relations event aimed at promoting mathematics among high school students.
 - Organizer of Mathematical Conversations, Institute for Advanced Study, 2016–2017: A broad seminar series aimed at introducing IAS members to the research domains of visiting scholars.

- Participation in Prison Teaching Initiative, New Jersey, Spring 2017: Taught Introductory Algebra at the Garden State Prison in New Jersey. This program aims to reduce incarceration rates in New Jersey by increasing access to post-secondary education in state prisons.

Teaching Experience

- Instructor, Sorbonne Université, Paris, Spring 2019.
 - Introduction to Hamiltonian Floer theory.
- Instructor, Prison Teaching Initiative-Princeton, Garden State Prison, New Jersey, Spring 2017.
 - Matho20: Introductory Algebra.
- Instructor, MIT, Spring 2016.
 - MATH 18.100C: Real Analysis.
- Recitation Leader, MIT, Fall 2014.
 - MATH 18.02: Multivariable Calculus.
- Graduate Student Instructor, UC Berkeley, Fall 2009, Fall 2010, Spring 2012.
 - MATH 1A: Calculus, Math 53: Multivariable Calculus
- Teaching Assistant, University of Toronto, Fall 2006-Spring 2007.
 - MAT137Y1: Calculus
 - MAT223H1: Linear Algebra

Invited Talks

Conferences, Lecture Series, and Colloquia:

1. Hyperbolic and symplectic dynamics, Bochum, Sep. 2021. (virtual)
2. A topological theory of tangent distributions, Lorentz Center, Leiden, Aug. 2021. (virtual)
3. Dynamische Systeme, Oberwolfach Workshop, Jul. 2021. (virtual)
4. From Hamiltonian dynamics to symplectic topology, IHP, Paris, Apr. 2021.
5. Frontiers in Mathematical Sciences, IPM, Tehran, Apr. 2021. (virtual)
6. International Conference on symplectic topology, IMPA, Aug. 2019.
7. Dynamische Systeme, Oberwolfach Workshop, Jul. 2019.
8. Interactions of symplectic topology and dynamics, Cortona, June 2019.
9. Department Colloquium, University of Waterloo, Oct. 2018.
10. The 4th KTGU mathematics workshop for young researchers, Kyoto University, Sep. 2018.
11. Embedding Questions in Symplectic Topology, TSIMF, Sanya, China, Dec. 2017.
12. Hamiltonian and Reeb dynamics: new methods and applications, Lorentz Center, Leiden, Jul. 2017.

13. Dynamische Systeme, Oberwolfach Workshop, Jul. 2017.
14. A celebration of symplectic geometry: 15 years of JSG, Center of Mathematical Sciences and Applications, Harvard University, June 2017.
15. Surfaces in Luminy, Centre International de Rencontres Scientifiques, Luminy, Oct. 2016.
16. Conference in honor of Dusa McDuff's 70th birthday, Columbia University, Mar. 2016.
17. Department Colloquium, UC Santa-Cruz, Jan. 2016.
18. Department Colloquium, University of Toronto, Jan. 2016.
19. Lecture series on coisotropic rigidity and spectral invariants, Research Institute for Mathematical Sciences, Kyoto, Mar. 2015.
20. IX Workshop on Symplectic Geometry, Contact Geometry, and Interactions, École Normale Supérieure de Lyon, Jan. 2015.
21. SFT VII - Function theory on symplectic manifolds, WW Universität Münster, Aug. 2014.
22. Beyond Hamilton-Jacobi in Avignon, Université d'Avignon, Apr. 2014.
23. C^0 symplectic geometry and dynamical systems, IBS Center for Geometry and Physics, Jan. 2014.
24. Weinstein symposium, Institut Henri Poincaré, Jul. 2013.
25. Lecture series on spectral invariants and applications to area-preserving dynamical systems, Inst. Math. de Jussieu, Jul. 2013.
26. FNRS Contact Group in Differential Geometry, Université Libre de Bruxelles, Dec. 2012.
27. AMS Regional Meeting, Symplectic Geometry Session, Cornell University, Sep. 2011.

Seminars:

1. Séminaire Géométrie Topologie Dynamique, Orsay, Nov 2021.
2. Oberseminar Differentialgeometrie, Augsburg Universität, Nov 2021.
3. Symplectic geometry seminar, IBS center for geometry and physics, Sep 2021.
4. Western hemisphere virtual symplectic seminar, Jul. 2021. (virtual)
5. Topology Seminar, University of Iowa, Apr. 2021. (virtual)
6. Symplectic Zoominar of CRM-Montréal, Princeton/IAS, Tel Aviv, and Paris, Mar. 2021. (virtual)
7. ETH Zürich, Symplectic Geometry Seminar, Nov. 2020. (virtual)
8. Heidelberg University and Karlsruhe Institute of Technology, Seminar on Asymptotic Invariants and Limits of Groups and Spaces, Jun. 2020. (virtual)
9. Ruhr-Universität, Bochum, Aachen University, Cologne University, Heidelberg University, Joint Seminar on Symplectic and Contact Topology, Jun. 2020. (virtual)
10. Stanford University, Symplectic Geometry Seminar, May 2020. (virtual)
11. Université de Nantes, Séminaire de topologie, géométrie et algèbre, Dec. 2019.

12. Université Libre de Bruxelles, Séminaire de Géométrie, Nov. 2019.
13. PUC-Rio, EDAI seminar, Aug. 2019.
14. Heidelberg University, Geometry Seminar, May 2019.
15. ETH Zürich, Symplectic Geometry Seminar, Apr. 2019.
16. Institute for Advanced Study, Joint IAS-Princeton Symplectic Geometry Seminar, Dec. 2018.
17. UC Berkeley & Stanford University, Northern California Symplectic Geometry Seminar, Dec. 2018.
18. MSRI, Hamiltonian Seminar, Nov. 2018.
19. Séminaire de géométrie hamiltonienne, Institut Math. de Jussieu–Paris Rive Gauche, Nov. 2017.
20. Séminaire géométries et topologie, Institut Math. de Jussieu–Paris Rive Gauche, Nov. 2017.
21. Séminaire de système dynamique, analyse et géométrie, Université d’Avignon, Oct. 2017.
22. Journée de rentrée, Institut Mathématiques de Jussieu–Paris Rive Gauche, Oct. 2017.
23. Geometry & Dynamics Seminar, Université Paris-Sud, Oct. 2017.
24. Institute for Advanced Study, Joint IAS-Princeton Symplectic Geometry Seminar, Nov. 2016.
25. Joint Cornell–PSU Symplectic Seminar, Penn State University, Oct. 2016.
26. Institut Mathématiques de Jussieu, Analyse Algébrique Colloquium, Oct. 2016.
27. Institute for Advanced Study, Postdoc Talks, Sep. 2016
28. Northeastern University, Geometry, Physics and Representation Theory Seminar, Sep. 2016.
29. École Normale Supérieure-Lyon, Geometry Seminar, Apr. 2016.
30. UC Berkeley, Symplectic Geometry Seminar, Jan. 2016.
31. Institute for Advanced Study, Joint IAS-Princeton Symplectic Geometry Seminar, Apr. 2015.
32. Columbia University, Symplectic Geometry, Gauge Theory, and Categorification Seminar, Apr. 2015.
33. University of Georgia-Athens, Geometry Seminar, Feb. 2015.
34. Harvard University, Gauge Theory, Topology, and Symplectic Geometry seminar, Oct. 2014.
35. Ruhr-Universität, Bochum, Dynamics Seminar, Dec. 2013.
36. École Normale Supérieure-Paris, Algebra & Geometry Colloquium, Sep. 2013.
37. Université Lyon 1, Séminaire géométrie, May 2013.
38. Université de Montréal, CRM-Montréal Symplectic Seminar, May 2013.
39. Université de Nantes, Séminaire géométrie symplectique, Apr. 2013.
40. Université d’Orsay, Séminaire géométrie topologie dynamique, Feb. 2013.
41. Université de Strasbourg, Séminaire géométrie symplectique et applications, Jan. 2013.
42. Institut Henri Poincaré, Séminaire Symplectix, Nov. 2012.

43. ETH Zürich, Symplectic Geometry Seminar, Nov. 2012.
44. Vrije Universiteit and University of Amsterdam, Dynamics & Analysis Seminar, Oct. 2012.
45. University of Chicago, Geometry & Topology Seminar, May 2012.
46. UC Berkeley & Stanford University, Northern California Symplectic Geometry Seminar, Mar. 2012.
47. University of Toronto, Symplectic Geometry Seminar, Nov. 2011.
48. McMaster University, Geometry & Topology Seminar, Nov. 2011.
49. University of Waterloo, Geometry & Topology Seminar, Nov. 2011.
50. Columbia University, Symplectic Geometry, Gauge Theory, and Categorification Seminar, Oct. 2011.
51. Institute for Advanced Study, Geometry Seminar, Oct. 2011.
52. Rutgers University, Geometry, Symmetry, and Physics Seminar, Oct. 2011.

Last updated: January 3, 2022