

Semyon Dyatlov

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Research interests

Quantum chaos, microlocal analysis, dynamical systems, scattering theory, and general relativity.

Employment

- 2019– Associate Professor With Tenure, Massachusetts Institute of Technology
- 2018–2020 Assistant Professor, University of California, Berkeley
- 2018–2019 Associate Professor Without Tenure, Massachusetts Institute of Technology
- 2015–2018 Assistant Professor, Massachusetts Institute of Technology
- 2013–2018 Research Fellow, Clay Mathematics Institute
- Fall 2013 Postdoctoral Fellow in Mathematical General Relativity, MSRI
- 2009–2013 Graduate Student Researcher/Instructor, University of California, Berkeley

Education

- 2008–2013 Ph.D. Mathematics, University of California, Berkeley
Dissertation title: *Resonances in general relativity*
Dissertation advisor: Maciej Zworski
- 2003–2008 B.S. Mathematics, Novosibirsk State University (Russia)

Research papers

- [38] *Semiclassical measures for higher dimensional quantum cat maps*, with Malo Jézéquel; [arXiv:2108.10463](https://arxiv.org/abs/2108.10463)
- [37] *Pollicott–Ruelle resolvent and Sobolev regularity*; [arXiv:2108.06611](https://arxiv.org/abs/2108.06611).
- [36] *Ruelle zeta function at zero for nearly hyperbolic 3-manifolds*, with Mihajlo Cekić, Benjamin Küster, and Gabriel Paternain; [arXiv:2009.08558](https://arxiv.org/abs/2009.08558).
- [35] *Control of eigenfunctions on surfaces of variable curvature*, with Long Jin and Stéphane Nonnenmacher, Journal of the American Mathematical Society, published online; [arXiv:1906.08923](https://arxiv.org/abs/1906.08923).
- [34] *Microlocal analysis of forced waves*, with Maciej Zworski, Pure and Applied Analysis **1**(2019), 359–384; [arXiv:1806.00809](https://arxiv.org/abs/1806.00809).
- [33] *Fractal uncertainty for transfer operators*, with Maciej Zworski, International Mathematics Research Notices, 2020, 781–812; [arXiv:1710.05430](https://arxiv.org/abs/1710.05430).
- [32] *Semiclassical measures on hyperbolic surfaces have full support*, with Long Jin, Acta Mathematica **220**(2018), 297–339; [arXiv:1705.05019](https://arxiv.org/abs/1705.05019).
- [31] *Fourier dimension and spectral gaps for hyperbolic surfaces*, with Jean Bourgain, Geometric and Functional Analysis **27**(2017), 744–771; [arXiv:1704.02909](https://arxiv.org/abs/1704.02909).
- [30] *Fractal Weyl laws and wave decay for general trapping*, with Jeffrey Galkowski, Nonlinearity **30**(2017), 4301–4343; [arXiv:1703.06515](https://arxiv.org/abs/1703.06515).

- [29] *Dolgopyat's method and the fractal uncertainty principle*, with Long Jin, *Analysis & PDE* **11**(2018), 1457–1485; [arXiv:1702.03619](#).
- [28] *Spectral gaps without the pressure condition*, with Jean Bourgain, *Annals of Mathematics(2)* **187**(2018), 825–867; [arXiv:1612.09040](#).
- [27] *Resonances for open quantum maps and a fractal uncertainty principle*, with Long Jin, *Communications in Mathematical Physics* **354**(2017), 269–316; [arXiv:1608.02238](#).
- [26] *Ruelle zeta function at zero for surfaces*, with Maciej Zworski, *Inventiones Mathematicae* **210**(2017), 211–229; [arXiv:1606.04560](#).
- [25] *Improved fractal Weyl bounds for hyperbolic manifolds*, with an appendix with David Borthwick and Tobias Weich, *Journal of the European Mathematical Society* **21**(2019), 1595–1639; [arXiv:1512.00836](#).
- [24] *Lower resolvent bounds and Lyapunov exponents*, with Alden Waters, *Applied Mathematics Research Express* 2016, 68–97; [arXiv:1508.04051](#).
- [23] *Spectral gaps, additive energy, and a fractal uncertainty principle*, with Joshua Zahl, *Geometric and Functional Analysis* **26**(2016), 1011–1094; [arXiv:1504.06589](#).
- [22] *Pollicott–Ruelle resonances for open systems*, with Colin Guillarmou, *Annales Henri Poincaré* **17**(2016), 3089–3146; [arXiv:1410.5516](#).
- [21] *Stochastic stability of Pollicott–Ruelle resonances*, with Maciej Zworski, *Nonlinearity* **28**(2015), 3511–3534; [arXiv:1407.8531](#).
- [20] *Spectral gaps for normally hyperbolic trapping*, *Annales de l'Institut Fourier* **66**(2016), 55–82; [arXiv:1403.6401](#).
- [19] *Power spectrum of the geodesic flow on hyperbolic manifolds*, with Frédéric Faure and Colin Guillarmou, *Analysis & PDE* **8**(2015), 923–1000; [arXiv:1403.0256](#).
- [18] *Resonances and lower resolvent bounds*, with Kiril Datchev and Maciej Zworski, *Journal of Spectral Theory* **5**(2015), 599–615; [arXiv:1402.0604](#).
- [17] *Dynamical zeta functions for Anosov flows via microlocal analysis*, with Maciej Zworski, *Annales de l'ENS* **49**(2016), 543–577; [arXiv:1306.4203](#).
- [16] *Trapping of waves and null geodesics for rotating black holes*, with Maciej Zworski, *Physical Review D* **88**(2013), 084037; [arXiv:1305.4603](#).
- [15] *Asymptotics of linear waves and resonances with applications to black holes*, *Communications in Mathematical Physics* **335**(2015), 1445–1485; [arXiv:1305.1723](#).
- [14] *Resonance projectors and asymptotics for r -normally hyperbolic trapped sets*, *Journal of the American Mathematical Society* **28**(2015), 311–381; [arXiv:1301.5633](#).
- [13] *Sharp polynomial bounds on the number of Pollicott–Ruelle resonances*, with Kiril Datchev and Maciej Zworski, *Ergodic Theory and Dynamical Systems* **34**(2014), 1168–1183; [arXiv:1208.4330](#).
- [12] *Fractal Weyl laws for asymptotically hyperbolic manifolds*, with Kiril Datchev, *Geometric and Functional Analysis* **23**(2013), 1145–1206; [arXiv:1206.2255](#).
- [11] *Scattering phase asymptotics with fractal remainders*, with Colin Guillarmou, *Communications in Mathematical Physics* **324**(2013), 425–444; [arXiv:1205.5955](#).
- [10] *Microlocal limits of plane waves and Eisenstein functions*, with Colin Guillarmou, *Annales de l'ENS* **47**(2014), 371–448; [arXiv:1204.1305](#).

- [9] *Quantum ergodicity for restrictions to hypersurfaces*, with Maciej Zworski, *Nonlinearity* **26**(2013), 35–52; [arXiv:1204.0284](#)
- [8] *Weighted eigenfunction estimates with applications to compressed sensing*, with Nicolas Burq, Rachel Ward, and Maciej Zworski, *SIAM Journal on Mathematical Analysis* **44**(2012), 3481–3501; [arXiv:1111.2383](#).
- [7] *Microlocal limits of Eisenstein functions away from the unitarity axis*, *Journal of Spectral Theory* **2**(2012), 181–202; [arXiv:1109.3338](#).
- [6] *Asymptotic distribution of quasi-normal modes for Kerr–de Sitter black holes*, *Annales Henri Poincaré* **13**(2012), 1101–1166; [arXiv:1101.1260](#).
- [5] Appendix to *Microlocal analysis of asymptotically hyperbolic and Kerr–de Sitter spaces*, by András Vasy, *Inventiones Mathematicae* **194**(2013), 381–513; [arXiv:1012.4391](#).
- [4] *Exponential energy decay for Kerr–de Sitter black holes beyond event horizons*, *Mathematical Research Letters* **18**(2011), 1023–1035; [arXiv:1010.5201](#).
- [3] *Quasi-normal modes and exponential energy decay for the Kerr–de Sitter black hole*, *Communications in Mathematical Physics* **306**(2011), 119–163; [arXiv:1003.6128](#).
- [2] *Symmetry of bound and antibound states in the semiclassical limit for a general class of potentials*, with Subhroshekhar Ghosh, *Proceedings of the AMS* **138**(2010), 3203–3210; [arXiv:0911.4282](#).
- [1] *The sectional curvature remains positive when taking quotients by certain nonfree actions*, *Siberian Advances in Mathematics* **18**(2008), 1–20; [arXiv:0710.3912](#).

Book

Mathematical theory of scattering resonances, with Maciej Zworski, Graduate Studies in Mathematics **200**, American Mathematical Society, 2019.

Expository work

- [6] *Macroscopic limits of chaotic eigenfunctions*, submitted to Proceedings of ICM 2022; [arXiv:2109.09053](#).
- [5] *Around quantum ergodicity*, *Annales Mathématiques du Québec*, published online; [arXiv:2103.08093](#).
- [4] *An introduction to fractal uncertainty principle*, *Journal of Mathematical Physics* **60**(2019), 081505; [arXiv:1903.02599](#).
- [3] *Notes on hyperbolic dynamics*; [arXiv:1805.11660](#).
- [2] *Afterword: Dynamical zeta functions for Axiom A flows*, with Colin Guillarmou, *Bulletin of the American Mathematical Society* **55**(2018), 337–342; [arXiv:1801.00348](#).
- [1] *Control of eigenfunctions on hyperbolic surfaces: an application of fractal uncertainty principle*, Proceedings of Journées Équations aux Dérivées Partielles 2017; [arXiv:1710.08762](#).

Awards and honors

- Jul 2020 MIT Teaching with Digital Technology Award
- Dec 2018 ICCM Best Paper Award for the paper [32]
- Jul 2018 IAMP Early Career Award
- Jul 2018 NSF CAREER Award DMS-1749858
- Jul 2017 Sloan Research Fellowship
- Dec 2013 Birkhäuser prize for the most remarkable paper [6] in *Annales Henri Poincaré* in 2012
- May 2013 Herb Alexander Prize (outstanding dissertation in pure mathematics), UC Berkeley
- Apr 2005 13th place at International Collegiate Programming Contest world finals
- Aug 2003 Silver medal at the International Olympiad in Informatics

Editorial work

- 2019– Associate Editor, *Probability and Mathematical Physics*
- 2020– Associate Editor, *Communications in Mathematical Physics*

Teaching

- Fall 2021 18.155 (Differential Analysis I), MIT
- Fall 2020 18.02 (Multivariable Calculus), MIT
- Spring 2020 18.03 (Differential Equations), MIT
- Fall 2018 Math 279 (Topics in PDE/Semiclassical Analysis), UC Berkeley
- Spring 2018 Math 1B (Calculus), UC Berkeley
- Spring 2017 18.156 (Differential Analysis II/Scattering Theory), MIT
- Spring 2016 18.125 (Measure Theory), MIT
- Spring 2015 18.100A (Real Analysis), MIT
- Spring 2012 Math 113 (Introduction to Abstract Algebra), UC Berkeley, teaching assistant
- Summer 2010 Math 54 (Linear Algebra and Differential Equations), UC Berkeley, instructor
- Spring 2010 Math 54, UC Berkeley, teaching assistant
- Fall 2009 Math 1B (Calculus), UC Berkeley, teaching assistant

Conferences and seminars organized

- 2018–2019 Co-organized *Bay Area Microlocal Analysis Seminar*, UC Berkeley–Stanford
- Oct 2017 Co-organized an Emerging Topics workshop on *Quantum Chaos and Fractal Uncertainty Principle* at IAS, Princeton
- Apr 2017 Co-organized a special session on *Microlocal Analysis and Spectral Theory* at the AMS Spring Western Sectional Meeting, Pullman, WA
- 2011–2012 Co-organized *Student Harmonic Analysis and PDE seminar*, UC Berkeley

Minicourses

Fractal uncertainty principle

- Jun 2021 Séminaire de mathématiques supérieures “Microlocal Analysis: Theory and Applications”, CRM Montréal (online)
- Mar 2021 Spring School on Transfer Operators, Centre Bernoulli, Lausanne (online)
- Jun 2020 Workshop ‘Lattice Point Distribution and Homogeneous Dynamics’, ICERM (online)
- Oct 2017 Emerging Topics workshop, IAS, Princeton
- Jul 2017 Third Symposium on Scattering and Spectral Theory, Florianópolis, Brazil

Semiclassical analysis, joint with Kiril Datchev

- Jul–Aug 2019 Summer School in Semiclassical Analysis, Northwestern University

Microlocal methods in hyperbolic dynamics, joint with Maciej Zworski

- Jul 2017 Summer school “Analytical aspects of hyperbolic flows”, Nantes
- Jan 2017 Tokyo–Berkeley Mathematics Workshop, University of Tokyo

Research talks

Ruelle zeta at zero for nearly hyperbolic 3-manifolds

- Jul 2021 Workshop ‘Dynamical Systems’, Oberwolfach (online)
- May 2021 Conference ‘Analysis on Singular Spaces’, BIRS Oaxaca (online)
- Apr 2021 Midwest Dynamics and Group Actions seminar (online)
- Feb 2021 PDE/Analysis seminar, MIT (online)

Fourier decay and spectral gaps on hyperbolic surfaces

- Jun 2020 Seminar ‘analyse géométrique’ (online)
- Jan 2018 PDE/Analysis seminar, UC Berkeley
- Oct 2017 Dynamics seminar, University of Maryland

Control of eigenfunctions on negatively curved surfaces

- Jun 2021 Minisymposium ‘Spectral Theory and Integrable Systems’, European Congress of Mathematics (online)
- Apr 2021 Texas Analysis and Mathematical Physics Symposium (online)
- Feb 2021 Conference ‘Mathematics of Alexander Shnirelman’ (online)
- Jan 2021 Open PDE seminar (online)
- Nov 2020 Calderón–Zygmund analysis seminar, University of Chicago (online)
- Oct 2020 Analysis seminar, Princeton (online)
- Dec 2019 Working group seminar, UC Davis
- Nov 2019 Mathematics Department Colloquium, UC San Diego
- Nov 2019 SCAPDE conference, UC San Diego
- Oct 2019 Conference “Microlocal Analysis and Spectral Theory”, UC Berkeley
- Sep 2019 Conference “Dynamics, Equations, and Applications”, Kraków, Poland
- Aug 2019 QMath14 conference, Aarhus, Denmark
- Jun 2019 Conference “Microlocal Analysis and Applications”, SCMS, Fudan University
- Apr 2019 Conference “Probing the Earth and the Universe with Microlocal Analysis”, Banff
- Dec 2018 Geometry/Analysis seminar, Columbia University
- Oct 2018 Bay Area Microlocal Analysis Seminar, Stanford University
- Oct 2018 Mathematics Department Colloquium, MIT

Semiclassical measures for hyperbolic surfaces

- Jan 2019 Harmonic Analysis seminar, University of British Columbia
- Oct 2018 Special Session on Analysis and Geometry of Fractals,
Fall AMS Western Sectional Meeting, San Francisco State University
- Jul 2018 International Congress on Mathematical Physics, Montreal
- Jul 2018 Conference “Around quantum chaos”, Banff
- Mar 2018 Conference “New developments in open dynamical systems and their applications”, Banff
- Feb 2018 Western States Mathematical Physics meeting, UC Irvine
- Feb 2018 Geometry and Analysis seminar, UC Santa Cruz
- Jan 2018 Caltech/UCLA joint Analysis seminar, UCLA
- Jan 2018 Paris-Nord–Berkeley–Bonn–Zurich analysis videoseminar
- Dec 2017 Conference “Spectral geometry, graphs and semiclassical analysis”, Aussois, France
- Nov 2017 Mathematical Physics and Harmonic Analysis seminar, Texas A&M University
- Oct 2017 Geometry/Analysis seminar, Columbia University
- Jul 2017 Third Symposium on Scattering and Spectral Theory, Florianópolis, Brazil
- Jun 2017 PDE/Analysis seminar, University of Nice
- Jun 2017 Mathematical Physics seminar, University of Bristol
- Jun 2017 Conference “Complex and functional analysis and their interactions with harmonic analysis”,
Polish Mathematical Conference Center, Będlewo
- Jun 2017 Conference “Analyse des équations aux dérivées partielles”, Roscoff
- Jun 2017 Numerical Analysis and PDE seminar, Université Paris-Sud
- May 2017 Differential Geometry/PDE Seminar, University of Washington
- May 2017 May Midwestern Microlocal Meeting, Purdue University

What is quantum chaos?

- May 2019 Mathematics Department Colloquium, Dartmouth College
- May 2019 Mathematics Department Colloquium, Northwestern University
- Jan 2018 Colloque des sciences mathématiques du Québec, Montreal
- Nov 2017 Mathematics Department Colloquium, University of Arizona
- Nov 2017 Mathematics Department Colloquium, UC Berkeley

Spectral gaps without the pressure condition

- Oct 2018 Mathematical Picture Language Project Seminar, Harvard
- Sep 2017 Mathematics Department Colloquium, Tufts University
- Apr 2017 Mathematics Department Colloquium, Yale University
- Apr 2017 Pure Mathematics seminar, The University of Melbourne
- Mar 2017 Mathematics Department Colloquium, Australian National University
- Feb 2017 PDE/Analysis seminar, MIT
- Feb 2017 Conference “Harmonic analysis and geometry of fractal sets”, The Ohio State University
- Jan 2017 Analysis and PDE seminar, UC Berkeley
- Jan 2017 Analysis and PDE seminar, University of Kentucky

Harmonic analysis issues related to hyperbolic surfaces, on behalf of Jean Bourgain

- Sep 2017 Conference “Analysis and Applications” in honor of Elias Stein, Wrocław, Poland

Dynamical zeta functions and topology for negatively curved surfaces

- Jan 2017 Analysis and Geometry seminar, Northeastern University
- Nov 2016 PDE/Analysis seminar, Purdue University
- Nov 2016 Geometric Analysis seminar, MIT

Spectral densification for hyperbolic surfaces

- Dec 2016 Conference “Geometric and spectral methods in partial differential equations”, Oaxaca

Resonances for open quantum maps

- Nov 2016 PDE/Analysis seminar, Texas A&M University
- Sep 2016 PDE/Analysis seminar, MIT
- Sep 2016 Analysis and PDE seminar, UC Berkeley

Spectral gaps via additive combinatorics

- Nov 2016 Student Harmonic Analysis and PDE seminar, UC Berkeley
- Jun 2016 Workshop “Analytical methods in classical and quantum dynamical systems”, Pisa
- Apr 2016 Analysis seminar, IAS, Princeton
- Mar 2016 Program on dimension and dynamics, ICERM, Providence
- Sep 2015 International conference “Lavrentyev readings”, Novosibirsk, Russia
- Aug 2015 Workshop “Semiclassical analysis: spectral theory and resonances”, ESI, Vienna
- Jul 2015 International Congress on Mathematical Physics, Santiago, Chile
- Jun 2015 Conference “Geometric and computational spectral theory”, University of Montreal
- Jun 2015 Dynamics and PDE/Analysis seminar, University of Chicago
- Apr 2015 PDE/Analysis seminar, MIT
- Apr 2015 Bay Area Microlocal Analysis Seminar, Stanford University

Spectral gaps and resonance counting for hyperbolic manifolds

- Jul 2016 Analysis minicourse series, Yau Mathematical Sciences Center, Tsinghua University
- Jan 2016 Mathematics Department Colloquium, Rice University
- Dec 2015 Conference “Semiclassical analysis and nonselfadjoint operators”, CIRM, Marseille
- Nov 2015 HKUST IAS/Department of Mathematics Colloquium, Hong Kong, China

Ringdown and geometry of black holes

- Jan 2017 Colloquium, Black Hole Initiative, Harvard University
- Oct 2015 Workshop ‘Geometric hyperbolic PDE’, Imperial College London
- Sep 2015 Workshop ‘Recent advances in mathematical general relativity’, IHP, Paris
- Jun 2015 Workshop ‘Black hole stability’, Fields Institute, Toronto
- Apr 2014 PDE seminar, Brown University
- Mar 2014 Differential Equations seminar, University of Michigan

A microlocal toolbox for hyperbolic dynamics

- Jul 2019 Dynamics and PDE seminar, Yau Mathematical Sciences Center, Tsinghua University
- Mar 2015 Conference “Analysis and geometry of resonances”, CIRM, Marseille
- Jan 2015 Dynamics seminar, University of Maryland
- Jan 2015 Spectral and Scattering Theory Seminar, Purdue University
- Dec 2014 Mathematics Department Colloquium, UC Berkeley
- Nov 2014 Mathematics Department Colloquium, UCLA
- Nov 2014 Conference “Geometric scattering theory and applications”, Banff
- Oct 2014 Dynamical Systems seminar, Boston University

Spectral gaps for normally hyperbolic trapping

- Dec 2014 Student Harmonic Analysis and PDE seminar, UC Berkeley
- Nov 2014 Mathematical physics seminar, Caltech
- Oct 2014 Differential geometry seminar, Harvard University
- Jun 2014 Conference “Asymptotic Analysis in General Relativity”, Grenoble
- Jun 2014 Numerical Analysis and PDE seminar, Université Paris-Sud

Pollicott–Ruelle resonances in constant curvature

- Jun 2014 Conference “Microlocal Analysis and Applications”
in honor of Gilles Lebeau, University of Nice
- May 2014 Midwest PDE seminar, Northwestern University
- Nov 2013 Student Harmonic Analysis and PDE seminar, UC Berkeley

Dynamical zeta functions for Anosov flows via microlocal analysis

- Jun 2014 STAMP workshop, ICMAT, Madrid
- May 2014 PDE/Analysis seminar, MIT
- Mar 2014 RTG Seminar on Geometry, Dynamics and Topology, University of Michigan
- Nov 2013 PDE/Analysis seminar, UC Berkeley

Resonances for r -normally hyperbolic trapped sets

- Nov 2013 Differential Equations seminar, University of Michigan
- Oct 2013 Mathematical General Relativity seminar, MSRI
- Sep 2013 Mathematics Department Colloquium, UC Santa Cruz
- Jun 2013 Conference ‘Spectral Theory and Partial Differential Equations’
in honor of James Ralston, UCLA
- May 2013 PDE/Analysis seminar, MIT
- Apr 2013 Analysis seminar, IAS, Princeton
- Apr 2013 Analysis seminar, Princeton University
- Mar 2013 Analysis seminar, University of North Carolina
- Feb 2013 Paris-Nord–Berkeley–Bonn–Zurich analysis videoseminar
- Jan 2013 Analysis seminar, UCLA
- Dec 2012 Inverse Problems seminar, University of Washington
- Nov 2012 Geometry seminar, Stanford University
- Nov 2012 Student Harmonic Analysis and PDE seminar, UC Berkeley
- Nov 2012 Analysis seminar, Johns Hopkins University
- Oct 2012 Seminar ‘Spectral methods in classical and quantum chaos’, École Normale Supérieure

Sharp polynomial bounds on the number of Pollicott–Ruelle resonances

- Nov 2012 PDE/Analysis seminar, UC Berkeley
- Oct 2012 Mathematical physics seminar, Institut Fourier, Grenoble
- Oct 2012 Real analysis seminar, Institut de Mathématiques de Toulouse
- Oct 2012 Mathematical physics seminar, University of Lille
- Sep 2012 Dynamics seminar, University of Chicago

Quantum ergodicity for restrictions to hypersurfaces

- Oct 2012 Séminaire d’analyse non-linéaire et EDP, Institut Henri Poincaré, Paris
- Apr 2012 PDE/Analysis seminar, UC Berkeley

Fractal Weyl laws for resonances on asymptotically hyperbolic manifolds

- Sep 2012 Workshop ‘Weyl Law at 100’, Fields Institute, Toronto

Microlocal limits of plane waves

- Oct 2012 Seminar ‘Spectral methods in classical and quantum chaos’, École Normale Supérieure
- Oct 2012 Analysis seminar, University of Nantes
- Jul 2012 St. Petersburg Conference in Spectral Theory, Euler Institute
- Apr 2012 Bay Area Microlocal Analysis Seminar, Stanford University
- Apr 2012 Analysis seminar, McGill University

Quantum ergodicity for Eisenstein functions at complex energies

- Oct 2011 Analysis seminar, Northwestern University
- Oct 2011 Mathematical Physics seminar, Institut Fourier, Grenoble

Quasi-normal modes for Kerr–de Sitter black holes

- May 2012 Conference ‘Evolution equations’ in honor of Terence Tao, Northwestern University
- Apr 2012 General Relativity seminar, UC Berkeley
- Nov 2011 PDE/Analysis seminar, MIT
- May 2011 Séminaire Géométrie, EDP et Physique Mathématique, Université Cergy-Pontoise
- May 2011 Geometric Analysis and PDE seminar, University of Cambridge
- Apr 2011 Mathematical Physics seminar, Institut de Mathématiques de Bordeaux
- Apr 2011 Conference ‘Ondes en limite semi-classique’, Université Paris 13
- Mar 2011 Conference ‘Resonances and scattering in general relativity’, IM Bourgogne

Scattering by (some) rotating black holes

- Oct 2010 Inverse Problems seminar, MSRI
- Sep 2010 PDE/Analysis seminar, UC Berkeley
- Jul 2010 International Conference on Spectral Geometry, Dartmouth College, poster presentation

Bound and antibound states

- Sep 2009 Student Harmonic Analysis and PDE seminar, UC Berkeley