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# Jared Wunsch

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## Education

- 1998 **Ph.D., Mathematics**, *Harvard University*, Cambridge, MA.
- 1993 **A.B., summa cum laude**, *Princeton University*, Princeton, NJ.

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## Appointments

- 2009–present **Professor**, *Northwestern University*, Evanston, IL.  
Department Chair, 2012–2015.
- 2005–2009 **Associate Professor**, *Northwestern University*, Evanston, IL.
- 2002–2005 **Assistant Professor**, *Northwestern University*, Evanston, IL.
- 2000–2002 **Assistant Professor**, *SUNY at Stony Brook*, Stony Brook, NY.
- 1999–2000 **VIGRE Assistant Professor**, *Columbia University*, New York, NY.
- 1998–1999 **NSF Postdoctoral Fellow**, *Columbia University*, New York, NY.
- Spring 1995 **Teaching Fellow**, *Harvard University*, Cambridge, MA.
- Summer 1993 **Visiting Research Fellow**, *Center for Communications Research*, La Jolla, CA.
- Summer 1992 **Visiting Research Fellow**, *Center for Communications Research*, Princeton, NJ.

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## Visiting Appointments

- February 2016 **“Research in Paris,” joint with D. Baskin**, *Institut Henri Poincaré*, Paris, France.
- January 2016 **Professeur Invité**, *Université de Paris 11*, Orsay, France.
- October 2015 **Professeur Invité**, *Université de Paris 6*, Paris, France.
- Fall 2015 **Member**, *Institut Henri Poincaré*, Paris, France.
- July 2013 **Professeur Invité**, *Université de Nantes*, Nantes, France.
- July 2009 **Visitor**, *Institut Henri Poincaré*, Paris, France.
- 2008–9 **Research Professor**, *Mathematical Sciences Research Institute*, Berkeley, CA.
- May–June, 2007 **Professeur Invité**, *Université de Paris Nord*, Paris, France.
- Feb.–March 2005 **Visiting Fellow**, *Mathematical Sciences Institute*, Australian National University, Australia.

May 2004 **Maître de Conférence Invité**, *Université de Paris 11*, Orsay, France.

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### Awards and Honors

- 2013 **Fellow**, *American Mathematical Society*.
- 2011 **Distinguished Teaching Award**, WCAS, Northwestern University.
- 2008 **ASG Honor Roll**, *Northwestern University*.
- 1993 **Phi Beta Kappa**, *Princeton University*.
- 1993 **Sigma Xi**, *Princeton University*.
- 1993 **George B. Covington Prize**, *Senior Prize in Mathematics*, Princeton University.
- 1992 **Andrew H. Brown Prize**, *Junior Prize in Mathematics*, Princeton University.
- 1990–1992 **Goldwater Scholarship**, *Princeton University*.

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### Grant Support

- 1993–98 **Fannie and John Hertz Fellowship**, *Harvard University*.
- 1993 **NSF Graduate Fellowship**, (*declined*).
- 1993 **DoD Graduate Fellowship**, (*declined*).
- 1998–99 **NSF Postdoctoral Fellowship**, *Columbia University*.
- 2001–03 **NSF grant DMS-0100501**, *Linear Partial Differential Equations on Singular Spaces*.
- 2002–05 **NSF grant DMS-0323021**, *Linear Partial Differential Equations on Singular Spaces*.
- 2004–07 **NSF grant DMS-0401323**, *Linear Partial Differential Equations on Singular Spaces*.
- 2007–11 **NSF grant DMS-0700318**, *Linear Partial Differential Equations on Singular Spaces*.
- 2009 **Co-PI, NSF grant DMS-0935967**, *Conferences/Workshops on Partial Differential Equations and Related Analysis and Applications*.
- 2010–13 **NSF grant DMS-1001463**, *Linear Partial Differential Equations on Singular Spaces*.
- 2013–17 **NSF grant DMS-1265568**, *Linear Partial Differential Equations on Singular Spaces*.
- 2014 **NSF grant DMS-1420160**, *73rd Midwest PDE Seminar*.
- 2015– **Co-PI, NSF grant DMS-1502632**, *RTG: Analysis on Manifolds*.
- 2016 **NSF grant DMS-1600014**, *Conference: Evolution Equations on Singular Spaces*.
- 2016– **NSF grant DMS-1600023**, *Linear Partial Differential Equations on Singular Spaces*.
- 2019–20 **NSF grant DMS-1830112**, *Conference on Microlocal Analysis and Applications*.

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## Publications

- [1] *The Shields-Harary number for wheel and broken wheel graphs*, Discrete Applied Mathematics **59** (1995), 193–199.
- [2] *Propagation of singularities and growth for Schrödinger operators*, Duke Math. J., **98** (1999), 137–186.
- [3] *The trace of the generalized harmonic oscillator*, Ann. Inst. Fourier, **49** (1999), 351–373.
- [4] *Distribution of resonances for asymptotically euclidean manifolds* (with Maciej Zworski), J. Diff. Geom., **55** (2000), 43–82.
- [5] *The FBI transform on compact  $C^\infty$  manifolds* (with Maciej Zworski), Trans. AMS, **353** (2001), 1151–1167.
- [6] *Singularities and the wave equation on conic spaces* (with Richard Melrose), Proceedings of the Centre for Mathematics and its Applications, Australian National University, **39** (2001).
- [7] *Propagation of singularities for the wave equation on conic manifolds* (with Richard Melrose), Inventiones Mathematicae, **156** (2004), 235–299.
- [8] *A Poisson relation for conic manifolds*, Math. Res. Lett., **9** (2002), 813–828.
- [9] *The Schrödinger propagator for scattering metrics* (with Andrew Hassell), Annals of Mathematics, **162** (2005), 487–523.
- [10] *On the structure of the Schrödinger propagator* (with Andrew Hassell), *Partial Differential Equations and Inverse Problems*, Contemp. Math. 362, Amer. Math. Soc., Providence RI, 2004.
- [11] *The radiation field is a Fourier integral operator* (with Antônio Sá Barreto), Ann. Inst. Fourier, **55** (2005) 213–227.
- [12] *A Strichartz inequality for the Schrödinger equation on non-trapping asymptotically conic manifolds* (with Andrew Hassell and Terence Tao), Comm. PDE., **30** (2005), 157–205.
- [13] *Sharp Strichartz estimates on non-trapping asymptotically conic manifolds* (with Andrew Hassell and Terence Tao), Amer. J. Math. **128** (2006), 963–1024.
- [14] *Absence of super-exponentially decaying eigenfunctions on Riemannian manifolds with pinched negative curvature* (with András Vasy), Math. Res. Lett. **12** (2005), 673–684.
- [15] *Spreading of quasimodes in the Bunimovich stadium* (with Nicolas Burq and Andrew Hassell), Proc. AMS **135** (2007), 1029–1037.
- [16] *Spreading of Lagrangian regularity on rational invariant tori*, Comm. Math. Phys. **279** (2008), 487–496.

- [17] *The semiclassical resolvent and the propagator for nontrapping scattering metrics* (with Andrew Hassell), *Adv. Math.* **217** (2008), 586–682.
- [18] *Propagation of singularities for the wave equation on edge manifolds* (with Richard Melrose and András Vasy), *Duke Math. J.* **144** (2008), 109–193.
- [19] *Semiclassical second microlocal propagation of regularity and integrable systems* (with András Vasy), *J. Anal. Math.* **108** (2009), 119–157.
- [20] *Microlocal analysis and evolution equations*, in “Evolution Equations,” Ellwood, David, et al., eds. Vol. 17. American Mathematical Soc., 2013.
- [21] *Evolution Equations (Clay Mathematics Proceedings Vol. 17)*, edited volume with D. Ellwood, I Rodnianski, G. Staffilani, American Mathematical Soc., 2013.
- [22] *Diffraction of singularities for the wave equation on manifolds with corners* (with Richard Melrose and András Vasy), *Astérisque* No. 351 (2013).
- [23] *Positive commutators at the bottom of the spectrum* (with András Vasy), *J. Func. Anal.* **259** 2, (2010), 503–523.
- [24] *Resolvent estimates for normally hyperbolic trapped sets* (with Maciej Zworski), *Ann. Henri Poincaré*, **12** (2011), 1349–1385.
- [25] *Non-concentration of quasimodes for integrable systems*, *Comm. PDE*, **37** (2012), no. 8, 1430–1444.
- [26] *Morawetz estimates for the wave equation at low frequency* (with András Vasy), *Math. Ann.*, **355** (2013), 1221–1254.
- [27] *Local smoothing for the Schrödinger equation with a prescribed loss* (with Hans Christianson), *Amer. J. Math.*, **135** (2013), 1601–1632.
- [28] *Erratum to Semiclassical second microlocal propagation of regularity and integrable systems* (with András Vasy), *J. Anal. Math.* **115** (2011), 389–391.
- [29] *From resolvent estimates to damped waves*, (with Hans Christianson, Emmanuel Schenck, and András Vasy), *J. Anal. Math.* **122** (2014), 143–162.
- [30] *Resolvent estimates with mild trapping*, *Journées “Équations aux Dérivées Partielles,”* 2012.
- [31] *Resolvent estimates and local decay of waves on conic manifolds* (with Dean Baskin), *J. Diff. Geom.* **95** (2013), 183–214.
- [32] *Strichartz estimates on exterior polygonal domains* (with Dean Baskin and Jeremy Marzuola), *Contemp. Math.*, 630, Amer. Math. Soc., Providence, RI, 2014.
- [33] *Asymptotics of radiation fields in asymptotically Minkowski space* (with Dean Baskin and András Vasy), *Amer. J. Math.* **137** (2015) 1293–1364.

- [34] *The diffractive wave trace on manifolds with conic singularities* (with G. Austin Ford), *Adv. Math.* **304** (2017) 1330–1385.
- [35] *Sharp high-frequency estimates for the Helmholtz equation and applications to boundary integral equations* (with Dean Baskin and Euan Spence), *SIAM J. Math. Anal.* **48** (2016) 229–267.
- [36] *Periodic damping gives polynomial energy decay*, *Math. Res. Lett.* **24** (2017) 519–528.
- [37] *Asymptotics of scalar waves on long-range asymptotically Minkowski spaces* (with Dean Baskin and András Vasy), *Adv. Math.* **328** (2018) 160–216.
- [38] *Diffractive propagation on conic manifolds*, Séminaire Laurent Schwartz, 2016.
- [39] *On resonances generated by conic diffraction* (with Luc Hillairet), preprint (2017).
- [40] *Refined Weyl law for homogeneous perturbations of the harmonic oscillator* (with Moritz Doll and Oran Gannot), *Commun. Math. Phys.* **362** (2018), 269–294.
- [41] *Semiclassical diffraction by conormal potential singularities* (with Oran Gannot), preprint (2018).
- [42] *On non-diffractive cones* (with Jeffrey Galkowski), preprint (2018).
- [43] *Resonance-free regions for diffractive trapping by conormal potentials* (with Oran Gannot), preprint (2018).
- [44] *Optimal constants in non-trapping resolvent estimates and applications in numerical analysis* (with Jeffrey Galkowski and Euan Spence), preprint (2018).
- [45] *For most frequencies, strong trapping has a weak effect in frequency-domain scattering* (with David Lafontaine and Euan Spence), preprint (2019).

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## Book Reviews

- [1] Review of *Stalking the Riemann Hypothesis* by Daniel Rockmore, *Booklist*, Feb. 15, 2005, p.1045.
- [2] *Magic square and circles* (rev. of “Benjamin Franklin’s Numbers” by Paul Pasles) *Nature*, vol 450, 20/27 Dec. 2007, p.1162.

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## Professional Service

1998–present **Reviewer for mathematics journals and book series.**

Including *Trans. AMS*, *J. Func. Anal.*, *Duke Math J.*, *Comm. PDE*, *Comm. Math Phys.*, *Adv. Geom.* *JAMS*, *Proc. Edinburgh Math. Soc.*, *Amer. J. Math.*, *Indiana Math. J.*, *J. Math. Anal. Applic.*, *Math. Res. Lett.*, *Ann. Sci. ENS*, *Ann. Math.*, *GAFA*, *Anal. PDE*, *SIAM J. Math. Anal.*, *Journal d’An. Math.*, *IMRN*, *Adv. Math.*, *Ann. Inst. Fourier.*, *AMS Grad. Studies.*, *Ann. Henri Poincaré*, *Ann. Henri Lebesgue*

2009–10 **Representative to MSRI Sponsors Committee.**

- 2011–12 **AMS Central Section Program Committee.**
- 2010, 2012, 2017 **Service on National Science Foundation Panels, Washington, D.C..**
- 2012 **Proposal Reviewing, Institut Universitaire de France, France.**
- 2013 **Proposal Reviewing, EPSRC, UK.**
- 2015 **Proposal Reviewing, NSERC, Canada.**
- 2017 **Promotion Committee, University of Cyprus, Cyprus.**

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## Conference Organization

- October 2004 **Geometric Partial Differential Equations, AMS Sectional Meeting, Evanston, IL.**
- May 2005 **Scattering Theory and Singular Spaces, Northwestern University, Evanston, IL.**
- April 2006 **Schrödinger Evolution Equations, Banff International Research Station, Banff, Canada.**
- June–July 2008 **Clay Mathematics Institute Summer School on Evolution Equations, ETH Zürich, Zürich, Switzerland.**  
Organizer and lecturer in 150 student summer school.
- Fall 2008 **Analysis on Singular Spaces, MSRI, Berkeley, CA.**  
Co-lead organizer of semester-long program with \$350,000 budget, 65 participants.
- October 2009 **Complex geometry: a conference in honor of Simon Donaldson, Northwestern University, Evanston, IL.**
- March 2010 **International Conference on Nonlinear PDE and Related Analysis/Applications, Northwestern University, Evanston, IL.**
- June 2010 **Local and Global Properties of Eigenfunctions, Northwestern University, Evanston, IL.**
- 2009–10 **Emphasis Year in PDE, Northwestern University, Evanston, IL.**
- October 2011 **Workshop on Microlocal Methods in Spectral and Scattering Theory, Northwestern University, Evanston, IL.**
- October 2011 **Workshop on Mathematics in the Geosciences, Northwestern University, Evanston, IL.**
- May 2012 **Workshop on Evolution Equations (in honor of Terence Tao), Northwestern University, Evanston, IL.**
- 2011–12 **Emphasis Year in Microlocal Analysis, Northwestern University, Evanston, IL.**
- May 2014 **73rd Midwest PDE Seminar, Northwestern University, Evanston, IL.**
- May 2015 **May Midwestern Microlocal Meeting, Northwestern University, Evanston, IL.**
- April 2016 **Evolution Equations on Singular Spaces, CIRM Luminy, France.**
- May 2017 **May Midwestern Microlocal Meeting, Purdue University, West Lafayette, IN.**

- July–Aug. 2017 **Summer Northwestern Analysis Program**, *Northwestern University*, Evanston, IL.
- March 2019 **March Midwestern Microlocal Meeting (in honor of Plamen Stefanov)**, *Purdue University*, West Lafayette, IN.
- May 2019 **Microlocal Methods in Analysis and Geometry**, *CIRM Luminy*, France.
- June 2019 **Fudan Conference on Microlocal Analysis**, *Fudan University*, Shanghai, China.
- Aug. 2019 **Summer Northwestern Analysis Program**, *Northwestern University*, Evanston, IL.

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### Curriculum Development

- 2004–5 **Development of new undergraduate courses in analysis**, *Northwestern University*.  
Now Math 321-1,2,3.
- 2010 **Development of new undergraduate course *Mechanics for Mathematicians***, *Northwestern University*.  
Now Math 327.

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### Undergraduate Theses Supervised

- 2006 **David Miller**, *Northwestern University*.
- 2007 **Sam Blinstein**, *Northwestern University*.
- 2007 **Matthew Gill**, *Northwestern University*.
- 2010 **Amy Danks**, *Northwestern University*.
- 2010 **Tae Eun Kim**, *Northwestern University*.
- 2015 **Erik Johnson**, *Northwestern University*.

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### Graduate Students

- 2006 **Drew Youngren**, *Ph.D.*, *Northwestern University*.
- 2009 **Randy Qian**, *Ph.D.*, *Northwestern University*.
- 2012 **Austin Ford**, *Ph.D.*, *Northwestern University*.
- 2015 **Rohan Kadakia**, *Ph.D.*, *Northwestern University*.
- current **Peter Kleinhenz**, *Northwestern University*.
- current **Mengxuan Yang**, *Northwestern University*.
- current **Ruoyu Wang**, *Northwestern University*.

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### Postdoctoral Fellows

- 2010–11 **Emmanuel Schenck**, *Boas Assistant Professor*, *Northwestern University*.
- 2010–14 **Dean Baskin**, *NSF Postdoctoral Fellow*, *Boas Assistant Professor*, *Northwestern University*.
- 2016–present **Oran Gannot**, *RTG Postdoctoral Fellow*, *Northwestern University*.

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## Departmental and University Service

- 2000–2002 **Organizer of Partial Differential Equations Seminar**, *SUNY at Stony Brook*.
- 2002–present **Co-organizer of Analysis Seminar**, *Northwestern University*.
- 2004–present **Advisor for Mathematics Graduate School Applicants**, *Northwestern University*.
- 2004–7 **Gates Cambridge Committee**, *Northwestern University*.
- 2005 **Provost’s Domain Dinner Presentation**, *Northwestern University*.
- 2006–8 **Rhodes/Marshall Committee**, *Northwestern University*.
- 2005–12 **Phi Beta Kappa Board of Advisors**, *Northwestern University*.
- 2007, 2008, **Mathematics Department Budget Committee**, *Northwestern University*.  
2010, 2011, Also served Ex Officio 2013–15.  
2017
- 2007–8 **Chair, Boas Hiring Committee**, *Northwestern University*.
- 2009–12 **President, Phi Beta Kappa Alpha Chapter of Illinois**, *Northwestern University*.  
Chapter Chartered in 1890
- 2007–8 **Integrated Science Program Honors Committee**, *Northwestern University*.
- 2008 **WCAS Lecturer Promotion Committee**, *Northwestern University*.
- 2009–12 **Chair, Mathematics Department Personnel Committee**, *Northwestern University*.
- 2009–10, **Chair, Yamabe Lectures Committee**, *Northwestern University*.  
2016–17
- 2009–10, **Chair, Pinsky Lectures Committee**, *Northwestern University*.  
2016–17
- 2010–2014 **Hertz Fellowships Committee**, *Northwestern University*.
- 2009–11 **Chair, Mathematics Department Space Committee**, *Northwestern University*.
- 2011–12 **Co-Chair, Mathematics Department Emphasis Year Committee**, *Northwestern University*.
- 2011 **Completed Kellogg School of Management minicourse *Management Skills for Innovative University Leaders***, *Northwestern University*.
- 2012–15 **Chair, Northwestern University Department of Mathematics**, *Northwestern University, Evanston, IL*.
- 2012–13 **Committee for the Reform of the Ad Hoc Committee Process**, *WCAS, Northwestern University*.
- 2013–14 **WCAS Strategic Plan Committee**, *Northwestern University*.
- 2016–17 **Chair, Bellow Lectures Committee**, *Northwestern University*.
- 2018 **Nemmers Prize Committee**, *Northwestern University*.



- 2017–19 **Faculty Appeals Panel**, *Northwestern University*.  
2018–20 **Executive Committee of Faculty Appeals Panel**, *Northwestern University*.

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### Panel Appearances

- 2008 **Postdoctoral Jobs for Math. Graduate Students**, *Northwestern University*.  
2009 **Panel for Graduate Students on Job Applications**, *Northwestern University*.  
2014 **Panel for Undergraduates on Math. Graduate Study**, *NUMS*, Northwestern University.  
2014 **Third Annual Introduction to Graduate Study at Northwestern University**, *TGS*, Northwestern University.  
2017 **Panel for Graduate Students on Job Applications**, *Northwestern University*.  
2018 **Academic Job Forum/Panel Discussion**, *Northwestern University*.

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### Distinguished Addresses

- September 22, 2008 **MSRI Evans Lecture**, *MSRI/Berkeley*, Berkeley, CA.  
November 5, 2010 **AMS 2010 Fall Central Section Meeting**, *Notre Dame*, South Bend, IN.  
June 7, 2012 **Journées EDP 2012**, Biarritz, France.  
January 26, 2016 **Séminaire Laurent Schwartz**, *IHES*, Bures sur Yvette, France.

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### Minicourses

- June–July 2008 **Clay Mathematics Institute Summer School on Evolution Equations**, *ETH Zürich*, Zürich, Switzerland.  
10 lectures.  
June–July 2014 **Chicago Summer School in Analysis**, *University of Chicago*, Chicago, IL.  
5 lectures.  
May 2016 **Oxford University Center for Doctoral Training in PDE**, *Oxford*, UK.  
3 lectures (4.5 hours).  
June 2017 **Microlocal Analysis and Applications**, *Cardiff*, UK.  
2 lectures.  
August 2017 **Summer Northwestern Analysis Program**, *Northwestern University*, Evanston, IL.  
4 lectures (6 hours).  
March 2018 **Graduate minicourse in Microlocal Analysis**, *Australian National University*, Canberra, Australia.  
2 hours

December 2018 **PDE/Analysis Mini-School *Trapping, diffraction, and decay of waves***, UNC, Chapel Hill, North Carolina.  
4 lectures (principal lecturer)

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### Invited Talks

Conference “Analysis of PDEs: unique continuation, stabilization, control and dispersive properties,” IHP Paris, 11/8/18.  
Banff International Research Station Workshop “Around Quantum Chaos,” 7/20/18  
MIT PDE/Analysis Seminar, 5/1/18  
UNC Analysis and PDE Seminar, 4/25/18  
AMSI-ANU Workshop on Microlocal Analysis and its Applications, Murrumarang Australia, 3/23/18  
“Spectral Geometry, Graphs and Semiclassical Analysis,” Aussois France, 12/14/17  
79/80th Midwest PDE Seminar, UIC, 9/14/17  
Third Symposium on Scattering and Spectral Theory, Florianópolis Brazil, 7/26/17  
Calderón-Zygmund Analysis Seminar, Univ. of Chicago, 5/22/17  
Operator Semigroups in Analysis: Modern Developments, Bedlewo Poland, 4/25/17  
Bay Area Microlocal Analysis Seminar, Stanford, 3/20/17  
University of Michigan Mathematics Colloquium, 2/7/17  
CMO Oaxaca “Geometric and Spectral Methods in Partial Differential Equations”, 12/15/16  
University of Cyprus, 11/16/16  
Purdue University Mathematics Colloquium, 10/18/16  
Oxford University Partial Differential Equations Seminar, 5/23/16  
Analysis and Differential Equations Seminar, University of Bath (UK), 4/14/16  
Séminaire Géométrie, EDP et Physique Mathématique, Université de Cergy-Pontoise, 4/4/16  
Séminaire Équipe MIP, Institut des Mathématiques de Toulouse, 3/8/16  
Séminaire de Physique Mathématique, Institut Fourier, Grenoble, 1/18/16  
PDE and Fluid Mechanics Seminar, ICMAT Madrid, 1/13/16  
Séminaire du MAPMO, Université d’Orléans, 12/10/15  
Groupe de Travail Problèmes Spectraux et Physique Mathématique, Université Paris-Sud, 12/7/15  
Oberseminar Analysis/Numerik, Carl von Ossietzky Universität, Oldenburg Germany, 12/3/15  
Relativity Seminar, Institut Henri Poincaré, Paris, 11/4/15  
London Analysis and Probability Seminar, University College London, 10/22/15  
Séminaire “Problèmes Spectraux en Physique Mathématique”, IHP Paris, 10/19/15  
Workshop on Analysis and PDE, Leibniz Universität Hannover, 9/29/15  
Berkeley/Bonn/Paris Nord/Zürich PDE Video Seminar, 9/24/15  
Erwin Schrödinger Institute for Mathematical Physics workshop “Semi-classical Analysis: Spectral Theory and Resonances,” 8/28/15  
University of Toronto Analysis and Applied Mathematics Seminar, 4/10/15  
Texas A&M Mathematical Physics and Harmonic Analysis Seminar, 3/27/15  
UNC Analysis/PDE Seminar, 3/18/15  
Duke/UNC Student Colloquium, 3/17/15  
Temple University Analysis Seminar, 2/23/15  
Stanford University Analysis and PDE Seminar, 11/17/14  
Thematic Program on Nonlinear PDEs in Geometry and Physics, Notre Dame, 6/17/14  
Montreal Analysis Seminar, McGill University, 5/23/14

Stanford University Analysis and PDE Seminar, 12/16/13  
CIRM “HANDDY” (Hamiltonian and Dispersive Equations) conference Luminy France, 6/28/13  
University of Illinois at Chicago Mathematics Colloquium, 2/15/13  
Stanford University Analysis and PDE Seminar, 11/15/12  
University of Michigan Differential Equations Seminar, 11/8/12  
Conference on Spectral Invariants on Non-compact and Singular Spaces, CRM, Montreal, 7/25/12  
A Conference on Partial Differential Equations Analytic and Geometric Aspects in honor of Michael Taylor’s 65th Birthday, 6/17/12  
University of Illinois at Urbana-Champaign Colloquium, 11/17/11  
Johns Hopkins Analysis Seminar, 11/7/11  
Banff International Research Station Workshop “Self Adjoint Extensions and Singularity Resolution in String Theory and Quantum Gravity,” 8/24/11  
University of Kentucky NSF-CBMS conference on “Global Harmonic Analysis,” 6/20/2011, 6/23/2011  
CIRM Meeting “Analyse Géométrique,” Luminy France, 1/21/2011  
UNC Analysis/PDE Seminar, 12/1/10  
MIT PDE/Analysis Seminar, 9/14/10  
Banff International Research Station Workshop “Geometric Scattering Theory and Applications,” 3/16/10  
Calderón-Zygmund Analysis Seminar, Univ. of Chicago, 3/1/10  
June Workshop, Institut Henri Poincaré Trimester: Nonlinear Waves and Dispersion, 6/23/09  
Institut Henri Poincaré Séminaire: Problèmes Spectraux en Physique Mathématique, 6/15/09  
MIT “Mini Micro Conference,” 4/3/09  
Southern California Analysis and PDE Meeting, UCLA, 2/7/09  
U.C. Davis Mathematics Colloquium, 11/17/08  
From Wave Propagation to K-theory: a Conference in Honour of the 60th Birthday of Richard Melrose, Stanford University, 10/25/08  
MIT Casual Geometric Analysis Seminar, 4/30/08  
University of Pennsylvania Analysis Seminar, 3/25/08  
University of Rochester Analysis Seminar, 3/21/08  
University of Kentucky PDE and Analysis Seminar, 3/10/08  
U.C. Berkeley PDE/Analysis Seminar, 1/28/08  
UCSD Real Analysis Seminar, 12/4/07  
AMS special session on Wave Propagation from Mathematical and Numerical Viewpoints, Chicago, 10/6/07  
MFO Oberwolfach Workshop “Analysis and Geometric Singularities,” 8/23/07  
Université de Paris Nord Seminar “Equations non linéaires,” 6/1/07, 6/15/07  
Princeton University Analysis Seminar, 4/9/07  
University of Southern California Mathematics Colloquium, 3/21/07  
AMS Special Session on Microlocal Analysis and Singular Spaces, New Orleans, 1/6/07  
Purdue University Spectral and Scattering Theory Seminar, 10/26/06  
Stanford University Mathematics Colloquium, 4/6/06  
Johns Hopkins Analysis Seminar, 3/13/06  
Osaka University PDE Seminar, 1/20/06  
“Spectral and scattering theory and related topics” workshop, RIMS, Kyoto, 1/18/06  
“Analysis of singularities of solutions to Schrödinger equation” workshop, University of Tokyo, 1/13/06, 1/14/06

Colloque d'Equations aux Derivées Partielles, Hamammet, Tunisia, 9/9/05  
University of Bordeaux Applied Mathematics Seminar, 6/23/05  
AMS/DMV/ÖMG Special Session on Nonlinear Waves, Mainz, Germany, 6/16/05  
Calderón-Zygmund Analysis Seminar, Univ. of Chicago, 5/23/05  
The Australian National University Mathematics Colloquium, 3/3/05  
The Australian National University PDE/Analysis Seminar, 2/28/05  
Mathematics Colloquium, McMaster University, 10/8/04  
Conference on Phase Space Analysis and Related Topics, Grado Italy, 9/16/04  
Séminaire Equations aux Dérivées Partielles, University of Paris XI (Orsay), 5/25/04  
Purdue Scattering and Spectral Theory Seminar, 4/7/04  
Michigan State University PDE Seminar, 4/6/04  
Fields Institute Workshop on Nonlinear Wave Equations, 3/17/04  
MIT PDE/Analysis Seminar, 2/11/04  
Short programme on analysis and resolution of singularities, CRM, Montreal, 9/4/03  
Symposium on Scattering and Spectral Theory, Serrambi Brazil, 8/21/03  
Calderón-Zygmund Analysis Seminar, Univ. of Chicago, 4/28/03  
51st Midwest PDE Seminar, UIC, 4/13/03  
UCLA Analysis Seminar, 3/14/03  
The Australian National University PDE/Analysis Seminar, 3/3/03  
PASI on PDE, Inverse Problems, and Non-Linear Analysis, Santiago de Chile, 1/14/03  
CMS Special Session on Partial Differential Equations, Ottawa, 12/9/02  
Recent Advances in Calculus of Variations and PDE's, Pisa, 11/7/02  
MIT PDE/Analysis Seminar, 9/11/02  
Northwestern University Colloquium, 3/4/02  
CUNY Graduate Center Differential Geometry and Analysis Seminar, 2/27/02  
McGill University Analysis Seminar, 1/11/02  
Temple University Colloquium, 9/17/01  
University of Potsdam workshop "Ellipticity and Parabolicity in Analysis and Geometry," 8/24/01  
Erwin Schrödinger Institute for Mathematical Physics, Workshop in Scattering Theory, 5/21/01  
MSRI Spectral Invariants Workshop, 5/7/01  
AMS Special Session on Nonlinear Partial Differential Equations, New York, 11/4/00  
Hyperbolic Equations and Scattering: A Conference in Honor of Gerard Friedlander, MIT, 9/30/00  
University of New South Wales Pure Mathematics Colloquium, 7/14/00  
The Australian National University PDE/Analysis Seminar, 7/10/00  
The Australian National University, National Research Symposium on Geometric Analysis and Applications, 6/29/00  
University of Bologna, 6/12/00, 6/13/00, 6/14/00  
Princeton University Analysis Seminar, 2/28/00  
University of Toronto Analysis and Applied Mathematics Seminar, 12/6/99  
Columbia University Analysis and Geometry Seminar, 11/11/99  
U.C. Berkeley Analysis and PDE Seminar, 9/3/99  
CIRM Meeting "Théorie des résonances," Luminy France, 6/17/99  
University of Bologna, 6/8/99  
SUNY Stonybrook Colloquium, 2/25/99, 9/14/00  
University of Pennsylvania Analysis Seminar, 10/20/98  
U.C. Berkeley Analysis and PDE Seminar, 9/29/98

University of Bologna, 6/29/98  
Erwin Schrödinger Institute for Mathematical Physics, Workshop in Spectral Geometry and its Applications, 6/18/98  
The Ohio State University Analysis and Geometry Seminar, 3/13/98  
University of British Columbia, 2/26/98  
University of Washington Differential Geometry/PDE Seminar, 2/23/98  
Columbia University Analysis and Geometry Seminar, 2/12/98  
The Johns Hopkins University Partial Differential Equations/Geometric Analysis Seminar, 11/20/97  
Fields Institute Workshop on Microlocal Methods in Geometric Analysis and Mathematical Physics, 11/1/97  
Harvard University Differential Geometry Seminar, 10/7/97  
AMS Special Session on Geometric Analysis and Spectral Theory, Montreal, 9/27/97  
MIT PDE/Analysis seminar, 3/19/97, 9/11/02  
Universität Potsdam Arbeitsgruppe “Partielle Differentialgleichungen und Komplexe Analysis”  
Spring School, 2/26/97  
Brown University PDE seminar, 11/15/96