

# GIGLIOLA STAFFILANI

## WORK ADDRESS

MIT, room E17-330  
77 Massachusetts Avenue  
Cambridge, MA 02139  
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## PERMANENT ADDRESS

37 Dana Street  
Cambridge, MA 02138  
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## EDUCATION

University of Chicago  
Ph.D in Mathematics (*Advisor: Carlos Kenig*), June 1995  
University of Chicago  
S.M. in Mathematics, August 1991  
Università di Bologna  
Laurea in Matematica, summa cum laude, September 1989

## ACADEMIC APPOINTMENTS

|  |                      |                      |
|--|----------------------|----------------------|
| <b>Eisenbud Professor</b>                                    | MSRI                 | August-December 2015 |
| <b>Abby Rockefeller Mauze Professor</b>                      | MIT                  | 2006-2018            |
| <b>E. S. and R. M. Cashin Fellow</b>                         | Radcliffe IAS        | 2009-2010            |
| <b>Professor</b>   | MIT                  | 2006-Present         |
| <b>Associate Professor</b>                                   | MIT                  | 2006-Present         |
| <b>Member of the IAS</b>                                     | IAS                  | 2003-2004            |
| <b>Visiting Associate Professor</b>                          | Harvard University   | January-May 2002     |
| <b>Associate Professor</b>                                   | Brown University     | 2001-2002            |
| <b>Associate Professor on leave</b>                          | Stanford University  | 2001-2002            |
| <b>Assistant Professor</b>                                   | Stanford University  | 1999-2001            |
| <b>Assistant Professor</b>                                   | Princeton University | 1998-1999            |
| <b>Szegö Assistant Professor</b>                             | Stanford University  | 1996-1998            |
| <b>Member of the IAS</b><br>( <i>Mentor: Jean Bourgain</i> ) | IAS                  | 1995-1996            |

## HONORS AND AWARDS

NSF Grants 1998-Present  
Member of the American Academy of Arts and Sciences, 2014  
AMS Fellow, 2013  
Member of the Massachusetts Academy of Sciences, 2013  
Ambasciatore d'Abruzzo nel Mondo, 2012  
Alfred P. Sloan Research Fellowship 2000-2002  
Terman Award, Stanford University, 1998-2001  
The Harold M. Bacon Memorial Teaching Award, Stanford University, 1997  
The Lawrence and Josephine Graves Memorial Lectureship Award, University of Chicago, 1994  
The Physical Sciences Teaching Prize, University of Chicago, 1994.

## PROFESSIONAL EXPERIENCES

Chair of the Organizing Committee for the conference *Analysis and Beyond: Celebrating Jean Bourgain's work and its impact*,  
IAS May 21 – 24, 2016.

Lead organizer of a semester at MSRI on *Deterministic and probabilistic challenges in nonlinear dispersive equations*,  
Berkeley, Autumn 2015.

Co-organizer of the conference *Harmonic Analysis and Partial Differential Equations: Recent Developments and Future Directions*,  
University of Chicago, September 19 – 21, 2014.

Co-organizer of the *Fifteenth International Conference on Hyperbolic Problems*  
Rio de Janeiro, Brazil, July 28 – August , 2014.

Co-organizer of the Clay Mathematics Institute 2008 Summer School on *Evolution Equations*  
Eidgenössische Technische Hochschule, Zürich, Switzerland, June 23 – July 18, 2008.

Co-organizer of the *MIT Women in Mathematics Conference: A Celebration*  
MIT, Cambridge, April 12 –13, 2008.

Visiting Professor with MIT–France Program  
Université Pierre and Marie Curie I, France, January 29 – February 3, 2007.

Co-organizer of a semester at MSRI, on *Dispersive Equations*  
Berkeley, Autumn 2005.

Visiting Researcher  
Centro di Ricerca Matematica Ennio De Giorgi, Pisa, Italy, June 9 – July 9, 2004.

Visiting Professor  
Université de Cergy-Pontoise, Cergy-Pontoise, France, May 15 – June 30, 2001.

Visiting Researcher  
University of Chicago, Chicago, January-March, 2001.

Co-organizer of the Workshop on *Nonlinear Dispersive Equations*  
Stanford University, Stanford, February 12 – 13, 2000.

Member of the Mathematical Sciences Research Institute  
Berkeley, September 1 – 30, 1997.

Visiting Professor  
Université de Cergy-Pontoise, Cergy-Pontoise, France, June 1 – 30, 1997.

## INVITED LECTURES

Plenary Speaker at the *AMS-EMS-SPM Joint International Meeting*,  
June 10-13, 2015, Porto.

*Geometric non-linear analysis: conference on the occasion of Michael Struwe's 60th Birthday*, June 8-12, 2015, ETH, Zurich.

*NSF-CBMS Regional Research Conference in the Mathematical Sciences*  
June 17–21, 2013, Manhattan KS.

*Conference on “Probability and PDEs”*  
May 20-24, 2013, Pisa.

*32rd Southeastern-Atlantic Regional Conference on Differential Equations*, October 19-20, Wake Forest.

*International PDE Conference*  
September 10–13, 2012, Oxford.

*XIV International Conference on Hyperbolic Problems: Theory, Numerics, Applications* June 25–29, 2012, Padova.

*Current Events Bulletin Lectures*  
January 6, 2012, Boston.

*2010 SIAM Annual Meeting*  
July 12–16, 2010, Pittsburgh.

*British Mathematics Colloquium and British Applied Mathematical Colloquium*  
April 6–9, 2010, Edinburgh.

*Conference on “Ondes Non-linéaire et Dispersion”*  
June 22–26, 2009, IHP, France.

*Conference on “Non-linear Phenomena in Mathematical Physics: A dedication to Cathleen Synge Morawetz on her 85th birthday”* September 18–20, 2008, Fields Institute, Toronto, Ontario, Canada.

*Conference on “Nonlinear wave”*  
May 8 –11, 2008, Brown University, Rhode Island.

*Fifth IMAC International Conference on Nonlinear Evolution Equations and Wave Phenomena*  
April 16–19, 2007, Athens Georgia.

*Conference in “Nonlinear dispersive equations”*  
March 14–18, 2007, Baltimore, Maryland.

*CMS Meeting*  
December 9–11, 2006, Toronto, Ontario, Canada.

*Satellite Conference on Analysis “Harmonic and Geometrical Analysis with Applications to PDE”*  
August 14–18, 2006, Seville, Spain.

*2 Olga’s Workshop*  
May 18–20 2006, MSRI, Berkeley.

*Schrödinger Evolution Equations*  
April 22–27, 2006, BIRS, Banff, Alberta, Canada.

*Colloque du Groupement de Recherche “Analyse des Equations aux Dérivés Partielles”*  
June 6–10, 2005, Forges-les-Eaux, France

*SIAM Applications of Dynamics Systems Meeting*  
May 22–26, 2005, Snowbird, Utah.

*International Conference on Harmonic Analysis and Partial Differential Equations*  
September 17–19, 2004, University of Chicago, Illinois.

*Harmonic Analysis*

June 9–July 9, 2004, Centro di Ricerca Matematica Ennio De Giorgi, Pisa, Italy.

*The 2nd Symposium on Analysis and PDEs*

June 7–10, 2004, Purdue University, West Lafayette, Indiana.

*Program for Women in Mathematics*

May 15–28, 2004, Institute for Advanced Study and Princeton University, Princeton.

*The Third Duke Mathematical Journal Conference*

April 23–25, 2004, Duke University, North Carolina.

*Park City Mathematics Institute*

June 13–July 31, 2003, Park City, Utah.

*AMS-UMI meeting, special session on Microlocal Analysis*

June 12–16, 2002, Pisa, Italy.

*Harmonic Analysis and PDE*

May 8–11, 2002, Columbia, Missouri.

*Curvature and Dispersion Effects in Nonlinear Partial Differential Equations*

April 21–27, 2002, Oberwolfach, Germany.

*Arkansas Spring Lecture series*

April 11–13, 2002, University of Arkansas, Fayetteville.

*AMS meeting, Invited Address*

November 10–11, 2001, Irvine, California.

*AMS meeting, special session on PDE*

October 21–22, 2001, San Francisco, California.

*AMS–IMS–SIAM Summer Research Conference in Harmonic Analysis*

June 24–July 5, 2001, Mt. Holyoke College, Massachusetts.

*Nonlinear Waves*

May 20–26, 2001, Oberwolfach, Germany.

*Workshop on PDE*

April 16–21, 2001, Fields Institute, Toronto, Canada.

*Nonlinear Analysis 2000*

May 28–June 2, 2000, Courant Institute, NYU.

*Riviere–Fabes Symposium on Analysis and PDE*

April 28–30, 2000, School of Mathematics, Minneapolis, Minnesota.

*Memphis Lectures on Mathematics year 2000*

March 15–18, 2000, University of Memphis, Memphis.

*Conference on Oscillatory Integrals and their Applications to Partial Differential Equations*

October 23–24, 1997, Mathematical Science Research Institute, Berkeley, California.

*Conference on Nonlinear Waves*

June 30–July 5, 1997, Oberwolfach, Germany.

## EDITORIAL BOARDS

Communications on Pure and Applied Analysis; Illinois Journal of Mathematics; Selecta Mathematica; AMS Graduate Studies in Mathematics.

## SEMINARS PRESENTED IN THE LAST FIVE YEARS

UCB, 2015; University of Maryland, 2015; Brown University, 2014; UPenn, 2013; UIUC, 2012; Northwestern University, 2012; MIT, 2012; Princeton University, 2011; Radcliffe Institute, 2010.

## PUBLICATIONS AND WORK IN PROGRESS

*Probabilistic preservation of regularity for periodic nonlinear Schrödinger equations.* Preprint, arXiv:1507.07320. (With A. Nahmod)

*A Semi-linear Shifted Wave Equation on the Hyperbolic Spaces with Application on a Quintic Wave Equation on  $\mathbb{R}^2$ .* Preprint, arXiv:1402.3879, to appear in Transaction AMS, (2015). (With R. Shen)

*Almost sure well-posedness for the periodic 3D quintic nonlinear Schrödinger equation below the energy space.* J. Eur. Math. Soc. (JEMS) 17 (2015), no. 7, 1687–1759. (With A. Nahmod)

*Randomization and the Gross-Pitaevskii hierarchy.* Arch. Ration. Mech. Anal. 218 (2015), no. 1, 417–485. (With V. Sohinger)

*On the uniqueness of solutions to the periodic 3D Gross-Pitaevskii hierarchy.* J. Funct. Anal. 266 (2014), no. 7, 4705–4764. (With P. Gressman and V. Sohinger)

*Almost sure existence of global weak solutions for super-critical Navier-Stokes equations.* SIAM J. Math. Anal. 45 (2013), no. 6, 3431–3452. (With A. Nahmod and N. Pavlović)

*On the continuum limit for discrete NLS with long-range lattice interactions.* Comm. Math. Phys. 317 (2013), no. 3, 563–591. (With K. Kirkpatrick and E. Lenzmann)

*Absolute continuity of Brownian bridges under certain gauge transformations.* Math. Res. Lett. 18 (2011), no. 5, 875–887. (With A. Nahmod, L. Rey-Bellet, Luc and S. Sheffield)

*On the global well-posedness of energy-critical Schrödinger equations in curved spaces.* Anal. PDE 5 (2012), no. 4, 705–746. (With A. Ionescu and B. Pausader)

*Invariant weighted Wiener measures and almost sure global well-posedness for the periodic derivative NLS.* J. Eur. Math. Soc. (JEMS), 14, no. 4, 1275–1330, (2012). (With A. Nahmod, T. Oh and L. Rey-Bellet)

*Derivation of the two-dimensional nonlinear Schrödinger equation from many body quantum dynamics.* Amer. J. Math. 133, no. 1, 91–130, (2011). (With K. Kirkpatrick and B. Schlein)

*Transfer of energy to high frequencies in the cubic defocusing nonlinear Schrödinger equation.* Invent. Math. 18, no. 1, 39–11, (2010). (With J. Colliander, M. Keel, H. Takaoka and T. Tao)

*The Cauchy problem for Schrödinger flows into Kähler manifolds.* Discrete Contin. Dyn. Syst. 27 (2010), no. 2, 389–439. (With C. Kenig, Carlos, T. Lamm, D. Pollack, and T. Toro)

*Strichartz estimates for the water-wave problem with surface tension.* Comm. Partial Differential Equations 35 (2010), no. 12, 2195–2252. (With H. Christianson and V. Hur).

*Local smoothing effects for the water-wave problem with surface tension.* C. R. Math. Acad. Sci. Paris 347 (2009), no. 3-4, 159–162. (With H. Christianson and V. Hur)

*Semilinear Schrödinger Flows on Hyperbolic Spaces: Scattering in  $H^1$ .* Math. Ann. 345, no. 1, 133–158, (2009). (With A. Ionescu)

*Global well-posedness and polynomial bounds for the defocusing  $L^2$ -critical nonlinear Schrödinger equation in  $\mathbb{R}$ .* Comm. Partial Differential Equations 33 (2008), no. 7-9, 1395–1429. (With D. de Silva, N. Pavlovic and N. Tzirakis)

*On the global well-posedness of the one-dimensional Schrödinger map flow.* Anal. PDE 2, no. 2, 187–209, (2009). (With I. Rodnianski and Y.A. Rubinstein).

*Scattering theory for radial nonlinear Schrödinger equations on hyperbolic space.* Geom. Funct. Anal. 18 (2008), no. 2, 367–399, (2008). (With V. Banica and R. Carles).

*Global well-posedness and scattering in the energy space for the critical nonlinear Schrödinger equation in  $\mathbb{R}^3$ .* Ann. of Math. (2) 167, no. 3, 767–865, (2008). (With J. Colliander, M. Keel, H. Takaoka and T. Tao).

*Resonant decompositions and the I-method for cubic nonlinear Schrödinger on  $\mathbb{R}^2$ .* DCDS-A, 21 (2008), no. 3, 665–686. (With J. Colliander, M. Keel, H. Takaoka and T. Tao).

*Weighted low-regularity solutions of the KP-I initial-value problem.* Discrete Contin. Dyn. Syst. 20 (2008), no. 2, 219–258. (With J. Colliander, A. Ionescu, and C. Kenig).

*Regularity of solutions to the Navier-Stokes equations evolving from small data in  $BMO^{-1}$ .* Int. Math. Res. Not. IMRN 2007, no. 21, Art. ID rmm087, 35 pp. 76D03. (With P. Germain and N. Pavlović).

*The energy-critical nonlinear Schrödinger equation in  $\mathbb{R}^3$ .* Recent developments in nonlinear partial differential equations, 69–80, Contemp. Math., 439, Amer. Math. Soc., Providence, RI, 2007. (With J. Colliander, M. Keel, H. Takaoka and T. Tao).

*Errata to: Low regularity solutions for the Kadomtsev-Petviashvili I equation.* [Geom. Funct. Anal. 13 (2003), no. 4, 737–794;]. Geom. Funct. Anal. 17 (2007), no. 3, 999–1000. (With J. Colliander and C. Kenig).

*Global well-posedness for the  $L^2$  critical nonlinear Schrödinger equation in higher dimensions.* Commun. Pure Appl. Anal. 6 (2007), no. 4, 1023–1041. (With D. De Silva, N. Pavlović and N. Tzirakis).

*Global well-posedness for a periodic nonlinear Schrödinger equation in 1D and 2.* Discrete Contin. Dyn. Syst. 19 (2007), no. 1, 37–65. (With D. De Silva, N. Pavlović and N. Tzirakis).

*Symplectic nonsqueezing of the Korteweg-de Vries flow.* Acta Math. 195 (2005), 197–252. (With J. Colliander, M. Keel, Markus and H. Takaoka).

*Errata: “On solutions for the Kadomtsev–Petviashvili I equation”* [Mosc. Math. J. 1 (2001), no. 4, 491–520, 644; MR1901072]. Mosc. Math. J. 4 (2004), no. 2, 529–530. (With J. Colliander and C.E. Kenig).

*Multilinear estimates for periodic KdV equations, and applications.* J. Funct. Anal. 211 (2004), no. 1, 173–218. (With J. Colliander, M. Keel, H. Takaoka, H. and T. Tao).

*Global existence and scattering for rough solutions of a nonlinear Schrödinger equation on  $\mathbb{R}^3$ .* Comm. Pure Appl. Math. 57 (2004), no. 8, 987–1014. (With J. Colliander, M. Keel, H. Takaoka and T. Tao).

*Local well-posedness for dispersion-generalized Benjamin–Ono equations.* Differential Integral Equations 16 (2003), no. 12, 1441–1472. (With J. Colliander and C. Kenig).

*Low regularity solutions for the Kadomtsev–Petviashvili I equation.* Geom. Funct. Anal. 13 (2003), no. 4, 737–794. (With J. Colliander and C. Kenig).

*Low regularity stability of solitons for the KdV equation.* Commun. Pure Appl. Anal. 2 (2003), no. 3, 277–296. (With S. Raynor).

*Sharp global well-posedness for KdV and modified KdV on  $\mathbb{R}$  and  $\mathbb{T}$ .* J. Amer. Math. Soc. 16 (2003), no. 3, 705–749 (electronic). (With J. Colliander, M. Keel, H. Takaoka and T. Tao).

*Polynomial upper bounds for the instability of the nonlinear Schrödinger equation below the energy norm.* Commun. Pure Appl. Anal. 2 (2003), no. 1, 33–50. (With J. Colliander, M. Keel, M., H. Takaoka and T. Tao).

*Polynomial upper bounds for the orbital instability of the 1D cubic NLS below the energy norm.* Discrete Contin. Dyn. Syst. 9 (2003), no. 1, 31–54. (With J. Colliander, M. Keel, H. Takaoka and T. Tao).

*Existence globale et diffusion pour l'équation de Schrödinger nonlinéaire répulsive cubique sur  $\mathbb{R}^3$  en dessous l'espace d'énergie.* [Global existence and scattering for the cubic repulsive nonlinear Schrödinger equation in  $\mathbb{R}^3$  below the energy space.] Journées “Équations aux Dérivées Partielles” (Forges-les-Eaux, 2002), Exp. No. X, 14 pp., Univ. Nantes, Nantes, 2002. (With J. Colliander, M. Keel, H. Takaoka and T. Tao).

*A refined global well-posedness result for Schrödinger equations with derivative.* SIAM J. Math. Anal. 34 (2002), no. 1, 64–86 (electronic). (With J. Colliander, M. Keel, H. Takaoka and T. Tao).

*Almost conservation laws and global rough solutions to a nonlinear Schrödinger equation.* Math. Res. Lett. 9 (2002), no. 5-6, 659–682. (With J. Colliander, M. Keel, H. Takaoka and T. Tao).

*Regularity bounds on Zakharov system evolutions.* Electron. J. Differential Equations 2002, No. 75, 11 pp. (electronic). (With J. Colliander).

*Strichartz estimates for a Schrödinger operator with nonsmooth coefficients.* Comm. Partial Differential Equations 27 (2002), no. 7-8, 1337–1372. (With D. Tataru).

*A new approach to study the Vlasov–Maxwell system.* Commun. Pure Appl. Anal. 1 (2002), no. 1, 103–125. (With S. Klainerman).

*On solutions for the Kadomtsev–Petviashvili I equation. Dedicated to the memory of I.G. Petrovskii on the occasion of his 100th anniversary.* Mosc. Math. J. 1 (2001), no. 4, 491–520, 644. (With J. Colliander and C. Kenig).

*Global well-posedness for Schrödinger equations with derivative.* SIAM J. Math. Anal. 33 (2001), no. 3, 649–669 (electronic). (With J. Colliander, M. Keel, H. Takaoka and T. Tao)

*Bilinear estimates and applications to 2D NLS.* Trans. Amer. Math. Soc. 353 (2001), no. 8, 3307–3325 (electronic). (With J.E. Colliander, J.-M. Delort and C.E. Kenig)

*Global well-posedness for KdV in Sobolev spaces of negative index.* Electron. J. Differential Equations 2001, No. 26, 7 pp. (electronic). (With J. Colliander, M. Keel, H. Takaoka and T. Tao)

*Global wellposedness for KdV below  $L^2$ .* Math. Res. Lett. 6 (1999), no. 5-6, 755–778. (With J. Colliander and H. Takaoka)

*On the generalized Korteweg–de Vries-type equations.* Differential Integral Equations 10 (1997), no. 4, 777–796.

*On solutions for periodic generalized KdV equations.* Internat. Math. Res. Notices 1997, no. 18, 899–917.

*Local well-posedness for higher order nonlinear dispersive systems.* J. Fourier Anal. Appl. 3 (1997), no. 4, 417–433. (With C.E. Kenig)

*On the growth of high Sobolev norms of solutions for KdV and Schrödinger equations.* Duke Math. J. 86 (1997), no. 1, 109–142.



*Quadratic forms for a 2-D semilinear Schrödinger equation.* Duke Math. J. 86 (1997), no. 1, 79–107.

## EXPOSITORY PAPERS

*Dispersive equations and their role beyond PDE.* Current Events Bulletin, AMS annual meeting, Boston, (2012).

*Periodic Schrödinger equations in Hamiltonian form.* HCDTE Lecture Notes. Part II., AIMS, (2013).

*Evolution Equations.* *Clay Mathematics Proceedings* 17, (2013). (With Ellwood D. (editor), Rodnianski I. (author and editor) and Wunsch J. (author and editor).)

*Notes on symplectic non-squeezing of the KdV flow.* Journées “Équations aux Dérivées Partielles”, Exp. No. XIV, 15 pp., École Polytech., Palaiseau, (2005). (With J. Colliander, M. Keel, H. Takaoka and T. Tao)

*KdV and almost conservation laws.* In *Harmonic Analysis at Mount Holyoke*, William Beckner, Alexander Nagel, Andreas Seeger, and Hart F. Smith, Editors, American Mathematical Society, 2003, *Contemporary Mathematics*, vol. 320.

*Review of the book “Global solutions of nonlinear Schrödinger equations” by J. Bourgain.* *Bull. Amer. Math. Soc.* 40 (2003), pp. 99-107.

*Well-posedness for dispersive equations and almost conservation laws.* *IAS/Park City Mathematics Series*, (2003).

## ADVISING AND MENTORING ACTIVITY

*Graduate Advisor:* Chenji Fan (PhD candidate M.I.T), Loris Domenicale (Master, Politecnico di Torino), Federico Fraternali (Master, Politecnico di Torino), Dana Mendelson (PhD, PD MSRI, Member IAS, Dickson Instructor at UofC), Ilaria Mondello (Master, Università di Milano-Bicocca) and Vedran Sohinger (PhD, Simons Postdoc at UPenn and Postdoc at ETH Zurich).

*Postdoctoral Sponsor:* H. Christianson, University of North Carolina, NC; K. Kirkpatrick, University of Illinois Urbana-Champaign, IL; V. Hur, University of Illinois Urbana-Champaign, IL; P. Isset, M.I.T.; E. Lenzmann, University of Basel, Switzerland; Jonathan Luk, M.I.T.; R. Shen, McMaster University, Canada.

## SERVICE

Associate Head, 2013-2015

Co-chair of MSRI Scientific Advisory Committee (SAC), 2013-2016.

Member of MSRI Scientific Advisory Committee (SAC), 2010-2013.

Co-chair of Graduate Studies, 2007-2013.

Member of Gender Equity Committee at MIT, 2008-2010.

Member of the Faculty Search Oversight Committee at MIT, 2007-present.

Member of the Search Committee for the Dean of School of Science, Fall 2007.

Member of the Pure Math Committee at MIT, 2004-2012 and 2013-present