GIGLIOLA STAFFILANI

Biographical Sketch

Education

1990–1995 University of Chicago
Ph.D. in Mathematics, June 1995
S.M. Mathematics, August 1991.
1985–1989 Universitá di Bologna
Laurea in Matematica, summa cum laude

Academic Appointments

2009-2010 Radcliffe Institute for Advanced Study
Elizabeth S. and Richard M. Cashin Fellow
2007-2012 Massachusetts Institute of Technology
Abby Rockefeller Mauze Professor
2006-Present Massachusetts Institute of Technology
Professor
2002-2006 Massachusetts Institute of Technology
Associate Professor
2003-2004 Princeton
Member of the Institute for Advanced Study
January-May, 2002 Harvard University
Visiting Associate Professor
2001-2002 Brown University
Associate Professor
2001-2002 Stanford University
Associate Professor on leave
1999-2001 Stanford University
Assistant Professor
1998-1999 Princeton University
Assistant Professor
1996-1998 Stanford University
Szegö Assistant Professor
1995-1996 Princeton
Member of the Institute for Advanced Study

Fellowships and Teaching Awards

NSF Grant 2006-2010
NSF Grant 2000-2003
Alfred P. Sloan Research Fellowship 2000-2002
NSF Grant 1998-2001
Terman Award 1998-2001
Borsa di Studio C.N.R. per l'estero, 1993-1995
University of Chicago fellowship, 1990-1995
Borsa di Studio INdAM 1989-1990
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 Experience

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.
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.
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

"2010 SIAM Annual Meeting"
July 12th-16th, 2010, Pittsburgh.
"British Mathematics Colloquium and British Applied Mathematical Colloquium"
April 6th-9th, 2010, Edinburgh.
Conference on "Ondes Non-linéaire et Dispersion"
June 22nd - 26th, 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, Oberfolfach, 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, Oberfolfach, Germany.

Editorial Experience

- Communications on Pure and Applied Analysis
- Selecta Mathematica
- AMS Graduate Studies in Mathematics

Seminars Presented In The Last Five Years

Radcliffe Institute, 2010; Brown University, 2010; Boston University, 2010; University of Wisconsin, 2009; UNC, 2008; University of Kyoto, 2008; MIT, 2008; Stanford University 2007; University of Toronto, 2006; Brown University, 2006.

Publications and Work in Progress

Recent papers can also be found following the link:
$http://arxiv.org/find/grp_math/1/au:+staffilani/0/1/0/all/0/1$

- *Derivation of the cubic non-linear Schrödinger equation from quantum dynamics of many-body systems: the periodic case.* To appear in American Journal of Mathematics. (With B. Schlein and K. Kirkpatrick.)
- *Weakly turbulent solutions for the cubic defocusing nonlinear Schrödinger equation.* To appear in Inventiones Math. (with J. Colliander, M. Keel, H. Takaoka and T. Tao)
- *Semilinear Schrödinger Flows on Hyperbolic Spaces: Scattering in H^1.* Math. Ann. 345 (2009), no. 1, 133–158. . (With A. Ionescu)
- *On the global well-posedness of the one-dimensional Schrödinger map flow.* Anal. PDE 2 (2009), no. 2, 187–209. (With I. Rodnianski and Y.A. Rubinstein).
- *Strichartz estimates for the water-wave problem with surface tension.* To appear in Comm. PDE, 2010. (With H. Christianson and V. Hur).
- *Scattering theory for radial nonlinear Schrödinger equations on hyperbolic space.* Geom. Funct. Anal. 18 (2008), no. 2, 367–399. (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 (2008), no. 3, 767–865. (With J. Colliander, M. Keel, H. Takaoka and T. Tao).
- *Resonant decompositions and the I-method for cubic nonlinear Schrodinger 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 rnm087, 35 pp. 76D03. (With P. Germain and N. Pavlović).
- *The energy-critical nonlinear Schrdinger 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; MR2006556]. 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

- *Notes on symplectic non-squeezing of the KdV flow.* Journés "Èquations aux Dèrivès Partielles", Exp. No. XIV, 15 pp., Ècole Polytech., Palaiseau, 2005.
- *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.* To appear in *IAS/Park City Mathematics Series*, 2003.

Advising and Mentoring Activity

- **Vedran Sohinger**
  Current graduate student at MIT
- **Hans Christianson**
  Current postdoc at MIT
- **Daniela De Silva, Vera Hur, Kay Kirkpatrick, Enno Lenzmann, Natasa Pavlovic, Sarah Raynor, Nikos Tzirakis**
  Postdocs or assistant professors elsewhere.

Service

MSRI Scientific Advisory Committee (SAC).
2010-2014.
Co-chair of Graduate Studies at MIT
September 2007-present.
Member of Gender Equity Committee at MIT
September 2008-present.
Member of the Faculty Search Oversight Committee at MIT
September 2007-present.
Member of the Search Committee for Dean of School of Science
Fall 2007.
Member of the Pure Math Committee at MIT
September 2004-present.