

Curriculum Vitae - December 31, 2018

1. **Walter A. Strauss**

L. Herbert Ballou University Professor
Department of Mathematics and Division of Applied Mathematics

2. Home Address: 1550 Centre Street, Newton, MA 02461-1233

3. Education

A.B., Columbia University, June 1958, Mathematics
M.S., University of Chicago, June 1959, Mathematics
Ph.D., M. I. T., Feb. 1962, Mathematics

4. Professional Appointments

Visiting Assistant Professor, Stanford University, 1963-66
Associate Professor, Brown University, 1966-71
Professor, Brown University, 1971-present

5a. Publications: listed at the end of this CV

5b. Invited Lectures (recent years)

Analysis Seminar, UC Berkeley, Jan. 15, 2007
Appl Math /Analysis Colloquium, UCLA, Jan. 18, 2007
Avron Douglis Memorial Lecture, U. of Maryland, March 30, 2007
IMACS Conf. on NL Evol. Eqs. & Waves, U. of Georgia, two lectures, April, 2007
Symp. Kinetic Eqs. and Methods, U. of Victoria, April 28, 2007
6 lectures in China at IAPCM Beijing, AMSS Beijing, ECNU Shanghai,
Fudan U. Shanghai, Yantai U., May 18-30, 2007
PDE Seminar, U. of Kyoto, June 8, 2007
PDE Seminar, U. of Tokyo, June 13, 2007
PDE Seminar, Georgia Inst. Tech., Oct. 16, 2007
Physical Oceanography Seminar, U. of Rhode Island, Oct. 31, 2007
Analysis Seminar, Trinity College Dublin, Nov. 15, 2007
CIRM Conf. on Geometric Mechanics, Luminy, France, Nov. 19, 2007
SIAM Conf. on PDE, Spec. Sess. on Oceanography, Mesa AZ, Dec. 10, 2007
Conf. in honor of J. Cooper and J. Osborn, U. of Maryland, April 4, 2008
AIMS Intl. Conf. on Dyn. Sys. & Diff. Eqns., Arlington TX,
Plenary Lecture May 18 & Spec. Sess., May 21, 2008
World Cong. Nonlin. Anal., Keynote Lecture, Orlando FL, July 8, 2008
BIRS Wkshp. on Asympt. & Sings. in Dispersive Eqns., Banff, Aug. 25, 2008
Fields Inst. Conf. in honor of C. S. Morawetz, Toronto, Sep. 18, 2008
Harold J. Gay Lecturer, WPI, Worcester MA, Nov. 20, 2008
Oberwolfach Workshop on Nonlinear Waves, Feb. 20, 2009

Colloquium, U. of Wisconsin, March 6, 2009
 Conf. on Evolution Eq. & Dyn. Sys., Hammamet, Tunisia, March 27, 2009
 Conf. on Nonlinear Evolution Eq., Inst. H. Poincaré, Paris, March 30, 2009
 Sem. de Maths. Appliquées, Collège de France, April 3, 2009
 Colloquium April 23 & Anal. Seminar April 22, U. North Carolina
 AMS Conf. at WPI, Spec. Sess. on Scaling and Irregularities, April 25, 2009
 CBMS Conf. on Water Waves, U. Texas Pan Am, May 18, 2010
 Workshop on Kinetic Theory, Stanford U., June 23, 2010
 Workshop on Fluids, Analysis and Numerics, Duke U., June 28, 2010
 Program in Kinetic Theory, Isaac Newton Institute, Cambridge, UK, Oct. 19, 2010
 Seminar in Relativity Theory, U. of Vienna Physics Dept., Oct. 28, 2010
 Appl. Math Colloquium, U. of Colorado (Boulder), Jan. 21, 2011
 U. de Nice, France, Conf. on Appl. Math from Waves to Fluids, Feb. 21, 2011
 U. of Georgia, IMACS Conf. on NL Evolution Eq. & Wave Phenomena, April 5, 2011
 ESI (E. Schrödinger Inst.), Vienna, Semester Program on NL Waves, May 31, 2011
 Postech, Pohang, Korea, Conf. on Kinetic Theory, June 23, 2011
 ICERM, Brown U., Program on Kinetic Theory & Computation, Sept. 9, 2011
 SIAM Conf. on Analysis of PDE, San Diego, Nov. 11, 2011
 AMS Spec. Sess. on Nonlinear PDEs, Boston, Jan. 6, 2012
 SIAM Minisymposium on Fluid Dynamics and Turbulence, Boston, Jan. 7, 2012
 Boeing Dist'd Appl. Math Colloquium, U. of Washington, Seattle, Jan. 19, 2012
 Math Colloquium, U. of Penn., Feb. 15, 2012
 Appl. Math Colloquium, Drexel U., Feb. 16, 2012
 Workshop on Stability of Structures & Patterns, 4 lectures, Seattle, June 11-12, 2012
 SIAM Conf. NL Waves & Coherent Struct., Plenary Lecture, Seattle, June 13, 2012
 UK-Japan Winter School on Nonlinear Analysis, London, Jan. 11, 2013
 Math Colloquium, U. of Reading, England, Jan. 15, 2013
 Math Colloquium, Carnegie-Mellon U., Nov. 1, 2013
 Diff. Eq. Seminar, U. of Michigan, Feb. 13, 2014
 Minicourse, 3 lectures on Stability Theory, IMPA, Rio de Janeiro, March 24-28, 2014
 Int'l Conf., "From Mechanics to Geometry", Seoul Nat. U., May 28, 2014
 Int'l Conf., "Boltzmann and Vlasov", Cartagena, Colombia, June 28, 2014
 Appl. Math Colloquium, UC Riverside, Oct. 15, 2014.
 Séminaire du Lab. J.-L. Lions, Paris VI, Nov. 7, 2014.
 Int'l Conf. on Kinetic Equations, CIRM, Luminy, France, Nov. 10, 2014.
 Analysis & PDE Seminar, UC Berkeley, March 30, 2015.
 Int'l Conf., "The Cauchy Pb. in Kinetic Theory (in honor of the work of Strauss, Glassey & Schaeffer), Imperial College London, Sept. 8, 2015.
 Math. Colloquium, U. of Pittsburgh, October 2, 2015.
 Dynamics and PDE Seminar, Boston U., Nov. 17, 2015.
 SIAM Conf. on PDE, Spec. Sess. on Water Waves, Scottsdale, AZ, Dec. 9, 2015.
 JMM, AMS Sess. on Water Waves, Seattle, Jan. 8, 2016.
 Midwest PDE Conf., Cincinnati, May 7, 2016.
 Physics Colloquium, U. Mass. Boston, Oct. 27, 2016.
 ICERM Conf. on Math'l Fluid Dynamics, Providence, Jan. 25, 2017.

U. C. Davis Wkshp. on Analysis of Water Waves, Bodega Bay, June 5, 2017.
 U. of Washington, Conf. on Nonlinear Waves, Seattle, July 31, 2017.
 Newton Inst., Conf. on Nonlinear Water Waves, Cambridge UK, Aug. 10, 2017.
 Courant Inst. NYU, Analysis Seminar, Nov. 16, 2017.
 Courant Inst. NYU, Celebration in Honor of Cathleen Morawetz, Nov. 17, 2017.
 Hebrew U., PDE and Analysis Seminar, Jerusalem, Dec. 18, 2017.
 Weizmann Inst., Distinguished Colloquium, Rehovot, Israel, Dec. 26, 2017.
 Israeli Wkshp. on Appl. and Comp. Math., Karmiel, Israel, Dec. 28, 2017.
 Tel Aviv U., Applied Math Seminar, Jan. 2, 2018.
 Georgia Tech, Conf. on Nonlinear Waves, Stability and Turbulence, May 7, 2018.
 Lund U., Wkshp. on Fluid Dynamics and Dispersive Eqns., June 25, 2018.
 Brown U., ICERM Wkshp. on Advances in PDE & CFD, Aug. 21, 2018.
 MIT, PDE/Analysis Seminar, March 12, 2019.

6. Research in progress

Work on water waves, stability and instability, kinetic theory of plasmas, scattering theory and nonlinear dispersive waves, rotating stars, bifurcation.

7. Service within Brown (recent years)

Mentor of Joy Yueh Ko, NSF Postdoctoral Fellow & Tamarkin A. P., 2004-09
 Co-organizer of Conference on Fluids and PDEs, Brown, April 2006
 Analysis Senior Search Comm., Math. Dept., 2006-08
 Tamarkin Search Comm., Math. Dept., Dec. 2007
 Graduate Admissions Comm., Math. Dept., Jan. 2004, 2006 and 2008
 Host for several long-term visitors (Akahori, Perla, Shkoller, Kikuchi), 2008
 Co-organizer of Conference on Nonlinear Waves, Brown, May 8-11, 2008
 Mentor of Benoît Pausader, Tamarkin Asst. Prof, 2008-2011
 Tamarkin Search Comm. Chair, Math. Dept., Dec. 2009
 Tenure Comm. Chair - Justin Holmer, Math. Dept., fall 2010
 Senior Search Comm., Math. Dept., fall 2010
 Co-organizer, Federer Memorial Conf. on Geom. Meas. Th. at Brown, April 16, 2011
 Co-organizer, Dafermos Conf. on Cont. Mechanics at Brown, May 12-14, 2011
 Co-organizer, first ICERM Program at Brown (Kinetic Th. & Comp.), fall sem. 2011
 Mentor of two postdocs at ICERM, Andong He and Emre Esenturk, 2011-2012
 Tamarkin Search Comm., Math. Dept., Dec. 2011
 Mentor of Toan Nguyen, Prager Asst. Prof., 2010-2012
 Mentor of Xuwen Chen, Tamarkin Asst. Prof., 2012-2015
 Talk at Recruitment Day for grad students in Appl. Math., Nov. 22, 2013
 Senior Search Committee, Math. Dept., fall 2013
 ICERM Advisory Editorial Board, Sept. 2014
 Math. Dept. Nomination Committee, 2015-present
 Advisor of 1st and 2nd year undergrads, almost every year. (In 2016, 6+6 students)
 Member of TPAC, 2013-2016
 Mentor of Yilun (Allen) Wu, Tamarkin Asst. Prof., 2015-2018
 Faculty Mentor of Asst. Prof. Vasileios Kemerlis, C. S. Dept., 2015-present

Committee for the promotion of Justin Holmer to full professor, 2016
Committee to recommend Yan Guo as an AMS Fellow, 2016
Math. Dept. Tamarkin Committee, fall 2016
Primary Organizer of semester program “Singularities and Waves in Incompressible Fluids” at ICERM, spring semester 2017
Committee for the promotion of Daniel Katz as Senior Lecturer, 2017
Committee for Asst. Prof. Melody Chan, 2018
Tamarkin Search Committee, 2018
Co-Mentor of Huy Nguyen, Tamarkin Asst. Prof.

Service outside of Brown (recent years)

Frequent refereeing of research papers and reviewing of grants
Frequent references for promotions and honors
Editor-in-Chief, SIAM Journal of Mathematical Analysis, 2000-07
Member of Editorial Boards of:
 SIAM Journal of Mathematical Analysis
 Journal of Differential Equations, Handling Editor
 Applied and Computational Mathematics
 Dynamics and Differential Equations
 Discrete and Continuous Dynamical Systems
 Comm. on Applied Nonlinear Analysis
 Monographs & Surveys in Pure & Appl. Math. (CRC)
Organizing Committee for SIAM’s 50th Anniversary Meeting in 2002
Provost’s Tenure Review Committee at Columbia U., Oct.-Dec. 2003
Chair of SIAM Outstanding Paper Prize Committee, 2003-04
Organizer of new SIAM Activity Group in Analysis of PDE
NSF Applied PDE Review Panel, Jan. 2005
Co-organizer of Mittag-Leffler Program on Wave Motion, Sep.-Dec. 2005
Chair of SIAM APDE Prize Committee, 2005-06
SIAM Committee On Editorial Models, 2006
Co-organizer of Program in CIRM Luminy, Nov. 2007
NSF Analysis & PDE Review Panel, Jan. 2009
Co-organizer of Workshop on Water Waves, Oberwolfach, Feb. 2009
Scientific Comm. for Water Wave Program at Schrödinger Inst., Vienna, spring 2011
Organizing Committee for SIAM-APDE Conference in San Diego, Nov. 9-12, 2011;
 also co-organizer of the panel on Future Directions
Simons Foundation Review Panel, July 2012
Co-organizer of SIAM mini symposium, Orlando, Dec. 8, 2013
Nominating Comm. for SIAM-APDE, 2014-15
Simons Fdn. Comm. to Review Collaboration Grants, spring 2015
SIAM Fellows Selection Comm., 2015-17
Chair of SIAM Fellows Selection Comm., 2016-17

8. Academic Honors and Visiting Positions

NSF Postdoctoral Fellowship, Université de Paris, 1962-63

Fulbright Lecturer, IMPA, Rio de Janeiro, June-Aug.1967
 Visiting Professor at CUNY, New York, Jan.-June 1968
 John Simon Guggenheim Fellow, 1971
 Fellow of the JSPS, University of Tokyo, Japan, Sept.-Dec.1972
 Professeur Invité l'Université de Paris, May-June 1975
 Visiting Scholar at M. I. T., Jan.-June 1978
 Visiting Professor at University of Maryland, Jan.-June 1981
 Visiting Professor at Yunnan University, Kunming, China, May-June 1986
 Visiting Professor at Courant Institute, N.Y.U., 1987-88
 Professeur Invité à l'Ecole Normale Supérieure, Paris, May-June 1988
 Principal Lecturer, CBMS, Nonlinear Wave Equations, George Mason U., Jan.1989
 Professeur Invité à l'Université de Paris-Sud, June 1993
 Harrison S. Kravis University Professorship, Brown U., 1993-94
 Visiting Professor, University of Houston, 1994-95
 Visiting Scientist, Consiglio Nazionale de Ricerche, Italy, May-June 1995
 L. Herbert Ballou University Professorship, Brown U., 1995-present
 Institut Henri Poincaré Prize for best paper of 1997 in Analyse Non Linéaire
 Chercheur Associé, C.N.R.S., Institut Henri Poincaré, Paris, Sept.-Dec. 2001
 Visiting Professor, Duke University, Jan.-May 2002
 Member, Royal Physiographic Society of Lund, Sweden, elected April 2004
 Thomson-ISI New Hot Paper in Mathematics for March 2005 (2004 paper)
 Participant, Mittag-Leffler Program on Wave Motion, Sep.-Dec. 2005
 SIAM Fellow (selected in the first group of fellows), 2009
 AMS Fellow (selected in the first group of fellows), 2012
 Elected member of Amer. Acad. of Arts and Sciences, 2013

9. Teaching (recent years)

2001-02: On leave in Paris and Duke U.
 At Duke, I taught a graduate topics course, Stability of Nonlinear Waves.
 2002-03: Mathematics 19, Intermediate Calculus (CAP course).
 Mathematics 113, Real Analysis I.
 Mathematics 238, Partial Differential Equations.
 2003-04: Mathematics 20, Several Variable Calculus for Engin. and Phys. Sci..
 Mathematics 271, Mathematical Theory of Fluids, 5 students plus 5 auditors.
 Mathematics 114, Real Analysis II, 14 students.
 2004-05: Supervised UTRA student, Tracy Nance, summer 2004.
 Mathematics 238, Partial Differential Equations, spring 2005.
 2005-06: Mathematics 222, Real Analysis, spring 2006.
 Co-supervised indep. study of Josh Bronson.
 2006-07: Mathematics 238, Partial Differential Equations (grad), spring 2007.
 2007-08: Mathematics 112, Partial Differential Equations (undergrad), spring 2008.
 2008-09: Mathematics 113, Functions of Several Variables, fall 2008.
 Co-supervised independent study of Matthew Ball (fall and spring).
 Supervised informal independent study of William Shore (spring).
 2009-10: Mathematics 126, Complex Analysis, fall 2009.

Co-supervised UTRAs (summer 2010) and independent studies (fall 2010) of
Wenhao Fang and Sorakrit Atcharanuwat.

Mathematics 238, Partial Differential Equations, spring 2011

Mathematics 222, Real Analysis, spring 2012

Mathematics 237, Partial Differential Equations, fall 2012

Mathematics 221, Real Analysis, fall 2013

Mathematics 238, Partial Differential Equations, spring 2015

Mathematics 101, Analysis: Functions of One Variable, spring 2016

Mathematics 237, Partial Differential Equations, fall 2016

Math DUG talk on Water Waves, Nov. 3, 2016

Supervisor of undergraduate research of Seung Wook So, 2016-17

Mathematics 112, undergraduate Partial Differential Equations, spring 2018

Mathematics 238, graduate Partial Differential Equations, spring 2019

Graduate Advising:

I often organize or co-organize seminars. At various times graduate students take reading courses with me. Five of my former PhD students subsequently became A. P. Sloan Research Fellows, two of them Presidential Young Investigators, one of them got an NSF CAREER award, three of them were NSF Postdoctoral Fellows, and two of them were invited to give a lecture at an International Congress of Mathematicians. (I've lost track: these numbers are lower bounds.)

Ph.D. theses supervised: Harvey (Stanford U.) 1965, Johnson (Stanford U.) 1966, Glassey (Appl. Math.) 1972, Costa (Math.) 1973, Perla (Math.) 1974, Lin (Math.) 1976, Keller (Math.) 1981, Shatah (Appl. Math.) 1983, Wei (Appl. Math.) 1986, Grillakis (Appl. Math.) 1986, Loe (Math.) 1989, Guo (Math.) 1993, Liu (Math.) 1994, Levandosky (Math.) 1997, Benson (Math.) 1999, Lin (Math., now at Georgia Tech) 2003, Karageorgis (Math., now at Trinity College Dublin) 2004, Hur (Math., now at U. of Illinois Urbana) 2006, Chen (Math., now at U. of Pittsburgh) 2007, Walsh (Appl. Math., now at U. of Missouri) 2010, Ben-Artzi (Math., now at Cardiff U., UK) 2011, Wheeler (Math., now at U. of Vienna) 2014, Zhang (current grad student).

PUBLICATIONS - WALTER A. STRAUSS

- [1963a] Scattering for hyperbolic equations, *Trans. A.M.S.* 108, 13-37.
- [1963b] Scattering for nonlinear wave equations, *Pac. J. Math.* 13, 23-43 (with F. Browder).
- [1963c] La décroissance asymptotique des solutions des équations d'onde non linéaires, *C.R. Acad. Sci.* 256, 2749-2750.
- [1963d] Les opérateurs d'onde pour des équations d'onde non linéaires indépendantes du temps, *C.R. Acad. Sci.* 256, 5045-5046.
- [1963e] Sur certains problèmes hyperboliques non linéaires, *C.R. Acad. Sci.*, 257, 3267-3270 (with J.L. Lions).
- [1965] Some nonlinear evolution equations, *Bull. Soc. Math. France* 93, 43-96 (with J.L. Lions).
- [1966a] Evolution equations nonlinear in the time derivative, *J. Math. Mech.* 15, 49-82.
- [1966b] On continuity of functions with values in various Banach spaces, *Pac. J. Math.* 19, 543-551.
- [1967a] On the solutions of abstract nonlinear equations, *Proc. A.M.S.* 18, 116-119.
- [1967b] The initial-value problem for certain nonlinear evolution equations, *Amer. J. Math.* 89, 249-259.
- [1968] Decay and asymptotics for dalembertian $u = F(u)$, *J. Funct. Anal.* 2, 409-457.
- [1969] The Energy Method in Nonlinear Partial Differential Equations, lecture notes, I.M.P.A., *Notas de Matemática*, Rio de Janeiro.
- [1970a] Further applications of monotone operators to partial differential equations, *Proc. Symp. Pure Math.* 18(1), 282-288.
- [1970b] Local exponential decay of a group of conservative nonlinear operators, *J. Funct. Anal.* 6, 152-156.
- [1970c] On weak solutions of semi-linear hyperbolic equations, *Anais da Acad. Brasil. de Ciências* 42, 645-651.
- [1971a] Decay of solutions of hyperbolic equations with localized nonlinear terms, *Symposia Matemática VII*, *Ist. Naz. Alta Mat.*, Academic Press, 339-355.
- [1971b] Asymptotics of a nonlinear relativistic wave equation, *Bull. A.M.S.* 77, 797-798 (with C.S. Morawetz).
- [1972] Decay and scattering of solutions of a nonlinear relativistic wave equation, *Comm. Pure Appl. Math.* 25, 1-31 (with C.S. Morawetz).
- [1973a] Asymptotics of a nonlinear relativistic wave equation, *Proc. Symp. Pure Math.* 23, 365-368 (with C.S. Morawetz).
- [1973b] On a nonlinear scattering operator, *Comm. Pure Appl. Math* 25, 47-54 (with C.S. Morawetz).
- [1973c] Semi-linear second-order elliptic equations in L^1 , *J. Math. Soc. Japan* 25, 585-590 (with H. Brezis).
- [1974a] Nonlinear scattering theory, in *Scattering Theory in Mathematical Physics*, edited by LaVita and Marchand, *Reidel Publ. Co.*, 53-78.
- [1974b] Dispersion of low-energy waves for two conservative equations, *Arch. Rat. Mech. Anal.* 55, 86-92.

- [1975] Dispersal of waves vanishing on the boundary of an exterior domain, *Comm. Pure Appl. Math.* 28, 265-278.
- [1976] Energy boundedness and decay of waves reflecting off a moving obstacle, *Indiana U. Math. J.* 25, 671-690 (with J. Cooper).
- [1977a] Decay of solutions of the wave equations outside nontrapping obstacles, *Comm. Pure Appl. Math.* 30, 447- 508 (with C.S. Morawetz and J.V. Ralston).
- [1977b] Existence of solitary waves in higher dimensions, *Comm. Math. Phys.* 55, 149-162.
- [1977c] Conformal invariance and energy estimates, *Memórias de Matemática No.* 85, Rio de Janeiro.
- [1978a] Nonlinear invariant wave equations, in: *Invariant Wave Equations* (Erice 1977), eds. Velo and Wightman, *Lecture Notes in Physics No.* 78, Springer, p. 197-249.
- [1978b] Decay and scattering of solutions of a nonlinear Schrödinger equation, *J. Funct. Anal.* 30, 245-263 (with J.E. Lin).
- [1978c] The nonlinear Schrödinger equation, in: *Contemporary Developments in Continuum Mech. and P.D.E.*, eds. Penha and Medeiros, North-Holland, p. 452-465.
- [1978d] Numerical solution of a nonlinear Klein-Gordon equation, *J. Comput. Phys.* 28, 271-8 (with L. Vazquez).
- [1978e] Everywhere defined wave operators, in: *Nonlinear Evolution Equations*, ed. M.G. Crandall, Academic Press, p. 85-102.
- [1979a] The existence of the scattering operator for moving obstacles, *J. Funct. Anal.* 31, 255-262.
- [1979b] Representations of the scattering operator for moving obstacles, *Indiana J. Math.* 28, 643-671 (with J. Cooper).
- [1979c] Analyticity properties of the scattering operator in nonlinear relativistic classical and prequantized field theories, *Reports on Math. Phys.* 16, 317-327 (with R. Raczka).
- [1979d] Conservation laws for the classical Maxwell-Dirac and Klein-Gordon-Dirac equations, *J. Math. Phys.* 20, 454-8 (with R. Glassey).
- [1979e] Decay of classical Yang-Mills fields, *Comm. Math. Phys.* 65, 1-13 (with R. Glassey).
- [1979f] Decay of coupled Yang-Mills and scalar fields, *Comm. Math. Phys.* 67, 51-67 (with R. Glassey).
- [1979g] Mathematical aspects of classical nonlinear field equations, in: *Nonlinear Problems in Theoretical Physics*, ed. A.F. Rañada, *Lecture Notes in Physics No.* 98, Springer, p.123-149.
- [1979h] Estimates from L^p to its dual for the Klein-Gordon equation, in: *Harmonic Analysis in Euclidean Spaces*, *Proc. Symp. Pure Math* 35(2), p. 175-7. Also in: *Fourier Analysis*, eds. Guzman & Peral, *Asoc. Mat. Española*, Madrid (with B. Marshall and S. Wainger).
- [1980a] L^p - L^q estimates for the Klein-Gordon equation, *J. de Math. Pures et Appl.* 59, 417-440 (with B. Marshall and S. Wainger).
- [1980b] Propagation of the energy of Yang-Mills fields, in: *Bifurcation Phenomena in Math. Phys.*, eds. C. Bardos and D. Bessis, *Reidel Publ.*, p. 231-241 (with R. Glassey).
- [1980c] Holomorphic extension of the scattering amplitude for moving obstacles, *Indiana J. Math.* 29, 597-607 (with J. Cooper).

- [1981a] Existence of localized solutions for certain model field theories, *J. Math. Phys.* 22, 1005-9 (with L. Vazquez).
- [1981b] Energy splitting, *Quart. Appl. Math.*, 351-361 (with D. Costa).
- [1981c] Some global solutions of the Yang-Mills equations in Minkowski space, *Comm. Math. Phys.* 81, 171-181 (with R. Glassey).
- [1981d] Nonlinear scattering theory at low energy, *J. Func. Anal.* 41, 110-133 and 43, 281-293.
- [1982a] On a wave equation with a cubic convolution, *J. Diff. Eqns.* 43, 93-105 (with G. Perla-Menzala).
- [1982b] Scattering of waves by periodically moving bodies, *J. Funct. Anal.* 47, 180-229.
- [1983a] Stable and unstable states of nonlinear wave equations, *AMS Conf. on Non-linear Partial Differential Equations, Contemp. Math.* 17, 429-441.
- [1983b] The scattering of certain Yang-Mills fields, *Comm. Math. Phys.* 89, 465-482 (with R. Glassey).
- [1983c] An application of L_p estimates to scattering theory, in: *Harmonic Analysis, Lecture Notes in Math.* 992, 91-100 (with S. Wainger).
- [1984a] The leading singularity of a wave reflected by a moving boundary, *J. Diff. Eqns.* 52, 175-203 (with J. Cooper).
- [1984b] Remarks on collisionless plasmas, *AMS Conf. on Fluids and Plasmas, Contemp. Math.* 28, 269-279 (with R. Glassey).
- [1985a] Abstract scattering theory for time-periodic systems with applications to electromagnetism, *Indiana Math. J.* 84, 33- 83 (with J. Cooper).
- [1985b] The initial boundary problem for the Maxwell equations in the presence of a moving body, *SIAM J. Math. Anal.* 16, 1165-1179 (with J. Cooper).
- [1985c] Instability of nonlinear bound states, *Comm. Math. Phys.* 100, 173-190 (with J. Shatah).
- [1985d] Book review, *Bull. A.M.S.* 12, 172-175.
- [1986a] Singularity formation in a collisionless plasma could occur only at high velocities, *Arch. Rat. Mech. Anal.* 92, 59-90 (with R. Glassey).
- [1986b] Time-periodic scattering of symmetric hyperbolic systems *J. Math. Anal. Applies.* 122, 444-452 (with J. Cooper).
- [1986c] On the scattering frequencies of time-dependent potentials *Math. Meth. in Appl. Sci.* 8, 576-584 (with J. Cooper and G. Perla-Menzala).
- [1986d] Instability with constraints, in: *Semigroups, Theory and Applications, Res. Notes in Math.*, Pitman Publ., 1986, p. 227-234 (with J. Shatah).
- [1986e] On the stability under dilations of nonlinear spinor fields, *Phys. Rev. D* 34, 641-643 (with L. Vazquez).
- [1987a] On the dynamics of a collisionless plasma, in: *Dynamical Problems in Continuum Physics, I.M.A. Volume 4*, Springer Verlag, 1986, p. 186-192 (with R. Glassey).
- [1987b] Imaginary poles of radial potentials, *Mat. Aplicada Comput.* 7, 17-24
- [1987c] High velocity particles in a collisionless plasma, *Math. Meth. in Appl. Sci.* 9, 46-52 (with R. Glassey).
- [1987d] Stability theory of solitary waves in the presence of symmetry I, *J. Funct. Anal.* 74, 160-197 (with M. Grillakis and J. Shatah)

- [1987e] Stability and instability of solitary waves of KdV type, Proc. Royal Soc. London, A411, 395-412 (with J. Bona and P. Souganidis).
- [1987f] Absence of shocks in an initially dilute collisionless plasma, Comm. Math. Phys. 113, 191-208 (with R. Glassey).
- [1988] Numerical computation of the scattering frequencies for acoustic wave equations, J. Comput. Phys. 75, 345-358 (with M. Wei and G. Majda).
- [1989a] Computation of exponentials in transient data, IEEE Trans. on Antennas and Propagation 37,1284-90 (with M. Wei and G. Majda).
- [1989b] *Nonlinear Wave Equations*, NSF-CBMS Research Monograph, Amer. Math. Soc., Providence.
- [1989c] Large velocities in the relativistic Vlasov-Maxwell equations, J. Fac. Sci. U. of Tokyo, IA, 36, No. 3, 615-627 (with R. Glassey).
- [1990a] Stability of solitary waves, Contemp. Math. 107, 123-129.
- [1990b] Stability theory of solitary waves in the presence of symmetry II, J. Funct. Anal. 94, 308-348 (with M. Grillakis and J. Shatah)
- [1990c] Instability of a class of dispersive solitary waves, Proc. Royal Soc. Edinburgh, 114A, 195-212 (with P. Souganidis).
- [1991a] Infinite gain of regularity for dispersive evolution equations, in: Microlocal Analysis and Nonlinear Waves, IMA Vol. 30, Springer, 47-50 (with W. Craig and T. Kappeler).
- [1991b] On the derivatives of the collision map of relativistic particles, Transport Theory and Statistical Physics, 20, 55- 68 (with R. Glassey).
- [1991c] Time decay estimates for a perturbed wave equation, Journées Equations aux Dérivées Partielles, St. Jean de Monts, exp. no. XIII (with M. Beals).
- [1992a] Gain of regularity for equations of KdV type, Annales Inst. H. Poincaré (Anal. Nonl.) 9, 147-186 (with W. Craig and T. Kappeler).
- [1992b] *Partial Differential Equations: An Introduction*, Wiley and Sons, New York.
- [1992c] Infinite gain of regularity for dispersive wave equations, Nonlinear Variational Probs. and PDEs, Pitman Res. Notes (with W. Craig and T. Kappeler).
- [1993a] Asymptotic stability of the relativistic maxwellian, Publ. RIMS Kyoto 29, 301-347 (with R. Glassey).
- [1993b] Smoothing of dispersive waves, Journées Equations aux Dérivées Partielles, St. Jean de Monts, exp. no. XIV.
- [1993c] Book review of "Global Classical Solutions for Nonlinear Evolution Equations" by Li and Chen, Bull. A.M.S. 29, 265-9
- [1993d] L^p estimates for the wave equation with a potential, Comm. P.D.E. 18, 1365-1397 (with M. Beals).
- [1994a] The relativistic Boltzmann equation near equilibrium, in: Spectral and Scattering Theory, K. Yajima, ed., Kinokuniya, Tokyo, p. 105-111 (with R. Glassey).
- [1994b] Nonlinear bound states outside an insulated sphere, Comm. P.D.E., 19, 177-197 (with M. Esteban).
- [1995a] Nonlinear instability of double-humped equilibria, Ann. IHP (Anal. NL) 12, 339-352 (with Y. Guo).
- [1995b] Infinite gain of regularity for dispersive wave equations, in: Nonlinear Variational Probs. and PDEs, A. Marino & M. Murthy, eds., Pitman Res. Notes, Longman, p.

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