

Stephen Schecter
Professor Emeritus of Mathematics
North Carolina State University

Education

B.A. (Philosophy), Antioch College, 1970.

M.A. (Mathematics), University of California at Berkeley, 1973.

Ph.D. (Mathematics), University of California at Berkeley, 1975.

- Advisor: Stephen Smale
- Thesis: “Smooth Pareto Economic Systems with Natural Boundary Conditions”

Professional Experience

University of California at Berkeley

- Teaching Assistant, 1972–1975

North Carolina State University

- Visiting Instructor, 1975–1976
- Assistant Professor, 1976–1982
- Associate Professor, 1982–1992
- Professor, 1992–2017
- Mathematics Department Director of Graduate Studies, 1995–1997.
- Professor Emeritus, 2017–present

Research Interests

Traveling waves and other distinguished solutions of partial differential equations and their stability; geometric singular perturbation theory.

Invited Lectures (since 1982)

- (1) November 1982, University of North Carolina at Charlotte. “Vector fields in the plane with polynomial models” (colloquium).
- (2) August 1983, Special Session on Dynamical Systems at AMS summer meeting, Albany, NY. “Vector fields in the plane with polynomial models.”
- (3) February 1984, Montana State University. “Nonlinear programming with parameters” and “A singular perturbation problem in the plane.”
- (4) May 1985, 7th Symposium on Mathematical Programming with Data Perturbations, Washington, DC. “Structure of the Kuhn-Tucker sets in nonlinear programs with parameters.”
- (5) August 1985, Special Session on Dynamical Systems at AMS summer meeting, Laramie, WY. “Melnikov’s method at a saddle-node and the dynamics of the Josephson junction.”
- (6) October 1985, International Conference on Parametric Optimization, Plaue, East Germany. “Structure of the Kuhn-Tucker sets in nonlinear programs with parameters.”
- (7) February 1986, Michigan State University. “Melnikov’s method at a saddle-node and the dynamics of the Josephson junction.”

- (8) July 1986, Canadian Mathematical Society International Conference on Differential Equations, Toronto. “Stable manifolds in the method of averaging.”
- (9) March 1987, University of Miami. “Melnikov’s method at a saddle-node and the dynamics of the Josephson junction.”
- (10) August 1987, Conference on Generic Families of Vector Fields, University of Montreal. “Codimension three bifurcations occurring in the study of traveling wave solutions of a nonstrictly hyperbolic equation.”
- (11) March 1988, Piedmont Dynamical Systems Conference, University of North Carolina at Charlotte. “Interaction of equilibrium and heteroclinic bifurcation for planar vector fields.”
- (12) July 1988, International Conference on Bifurcation Theory and its Numerical Analysis, Xian, China. “Interaction of equilibrium and heteroclinic bifurcation for planar vector fields.”
- (13) December 1988, Duke University. “Shocks, traveling waves, and heteroclinic bifurcation.”
- (14) June 1989, Conference on the Qualitative Theory of Vector Fields, University of Montreal. “Shocks, traveling waves, and heteroclinic bifurcation.”
- (15) May 1990, SIAM Conference on Dynamical Systems, Orlando. “Simultaneous equilibrium and heteroclinic bifurcation.”
- (16) July 1991, Second Workshop on Partial Differential Equations, IMPA, Rio de Janeiro. “Heteroclinic bifurcation theory and shock waves.”
- (17) June 1992, European Bifurcation Theory Group Conference on Bifurcations in Differentiable Dynamics, Diepenbeek, Belgium. “Rate of convergence of numerical approximations to homoclinic and heteroclinic bifurcation points.”
- (18) November 1992, University of Houston. “Shock waves and heteroclinic bifurcations” and “Numerical computation of homoclinic orbits.”
- (19) February 1993, Georgia Institute of Technology. “Shock waves and heteroclinic bifurcations” and “Numerical computation of homoclinic orbits.”
- (20) May 1993, Duke University. “Numerical computation of homoclinic and heteroclinic solutions.”
- (21) July 1993, Third Workshop on Partial Differential Equations, IMPA, Rio de Janeiro. “Riemann problems that are stable to perturbation.”
- (22) August 1993, Equadiff 8, Bratislava, Slovakia. “Riemann problems that are stable to perturbation.”
- (23) September 1993, European Bifurcation Theory Group Conference on Dynamics, Bifurcations, and Symmetries, Cargèse, Corsica. “Riemann problems that are stable to perturbation.”
- (24) July 1995, Conference on Problems and Methods in Singular Perturbations, CIRM, Marseilles. “Riemann problems of codimension 0 and 1.”
- (25) November 1995, University of North Carolina at Wilmington. “Structurally stable Riemann problem solutions.”
- (26) March 1996, Special Session on Current Issues in Nonlinear Conservation Laws, AMS Sectional Meeting, Iowa City. “Riemann problem solutions of codimensions 0 and 1.”
- (27) March 1996, Iowa State University. “Riemann problem solutions of codimensions 0 and 1.”

- (28) April 1996, Duke University. “Riemann problem solutions of codimensions 0 and 1.”
- (29) October 1997, Special Session on Nonlinear Dynamics and Applications, AMS Sectional Meeting, Atlanta. “Riemann problem solutions of codimensions 0 and 1.”
- (30) November 1997, Conference in Honor of Olga Oleinik, Iowa State University. “Traveling-wave solutions of convection-diffusion equations by center manifold reduction.”
- (31) September 1998, Third Americas Conference on Differential Equations and Nonlinear Analysis, Atlanta. “Traveling-wave solutions of convection-diffusion equations by center manifold reduction.”
- (32) March 1999, Technical University of Vienna. “Traveling-wave solutions of convection-diffusion equations by center manifold reduction.”
- (33) April 1999, University of Missouri. “Loss of normal hyperbolicity in geometric singular perturbation theory.”
- (34) August 2000, SIAM Pacific Rim Dynamical Systems Conference, Maui, HI. “Undercompressive shock waves and the Dafermos regularization.”
- (35) February 2001, University of Massachusetts at Amherst. “Undercompressive shock waves, the Dafermos regularization, and numerical computation of Riemann solutions.”
- (36) July 2001, VII Workshop on Partial Differential Equations: Theory, Computation and Applications, IMPA, Rio de Janeiro. “Transitional shock waves, the Dafermos regularization, and numerical computation of Riemann solutions” (45-minute talk).
- (37) April 2002, University of Kansas. “Numerical computation and stability of Riemann solutions via the Dafermos regularization” (colloquium).
- (38) May 2002, Fourth International Conference on Dynamical Systems and Differential Equations, University of North Carolina at Wilmington. “Computation and stability of Riemann solutions via the Dafermos regularization.”
- (39) July 2002, Special Session on Hyperbolic Systems of Conservation Laws, SIAM Annual Meeting, Philadelphia. “Numerical computation and stability of Riemann solutions via the Dafermos regularization.”
- (40) October 2002, Duke University. “The Dafermos regularization of a system of conservation laws” (seminar talk).
- (41) July 2003, Equadiff, Diepenbeek, Belgium. “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws.”
- (42) October 2003, AMS sectional meeting, special session on nonlinear waves, Chapel Hill, NC. “Dafermos profiles for singular shocks.”
- (43) May 2004, Kyoto University dynamical systems seminar. “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws.”
- (44) May 2004, International Workshop on Bifurcation Theory and Applications, Shanghai Jiao Tong University. “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws.”
- (45) May 2004, Fudan University (Shanghai) partial differential equations seminar. “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws.”
- (46) June 2004, Fifth International Conference on Dynamical Systems and Differential Equations, Pomona, California. “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws.”

- (47) January 2005, Sixth Americas Conference on Differential Equations and Nonlinear Analysis, Santiago, Chile. “Combustion fronts in porous media with two layers.”
- (48) April 2005, Workshop on Structured Dynamical Systems, Lefschetz Center for Dynamical Systems, Brown University. “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws.”
- (49) May 2005, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah. “Combustion fronts in porous media with two layers.”
- (50) May 2006, Dynamical Systems Weekend on the Occasion of Carmen Chicone’s 60th Birthday, University of Missouri. “Exchange lemmas.”
- (51) July 2006, SIAM Conference on Analysis of Partial Differential Equations. “Exchange Lemma for Nontrivial Slow Flows.”
- (52) November 2006, Boston University dynamical systems seminar. “Stability of patterns.”
- (53) January 2007, MSRI seminar, Berkeley. “Stability of patterns for viscous conservation laws.”
- (54) April 2007, Conference on Dynamics in Perturbations, University of Hasselt, Belgium. “Traveling waves in a thin liquid film with surfactant.”
- (55) May 2007, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah. “Stability of fronts in gasless combustion.”
- (56) August 2007, X Workshop on Partial Differential Equations, IMPA, Rio de Janeiro. “Stability of patterns in viscous conservation laws.” (Plenary talk)
- (57) August 2007, Universidade de Sao Paulo differential equations seminar. “Stability of fronts in gasless combustion.”
- (58) September 2007, University of North Carolina at Chapel Hill applied mathematics seminar. “Stability of fronts in gasless combustion.”
- (59) April 2008, University of Wyoming colloquium. “Stability of fronts in gasless combustion.”
- (60) May 2008, University of Missouri differential equations seminar. “Stability of fronts in gasless combustion.”
- (61) September 2008, International Conference on Infinite Dimensional Dynamical Systems, York University, Toronto. “Stability of fronts in gasless combustion.”
- (62) October 2008, AMS Fall Southeastern Meeting, Huntsville, AL. “Heteroclinic solutions of a singularly perturbed Hamiltonian system representing anisotropic crystalline phase interfaces in alloys.”
- (63) May 2009, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah. “A general exchange lemma.”
- (64) May 2010, 8th AIMS International Conference on Dynamical Systems, Differential Equations, and Applications, Dresden. “Heteroclinic solutions of a singularly perturbed Hamiltonian system.”
- (65) June 2010, Conference on Emerging Topics in Dynamical Systems and Partial Differential Equations, Barcelona. “Stability of traveling waves for a class of reaction-diffusion systems that arise in chemical reaction models.”
- (66) September 2010, Duke University Applied Mathematics Seminar. “Stability of traveling waves for a class of reaction-diffusion systems that arise in chemical reaction models.”

- (67) November 2010, Ohio State University PDE Seminar. “Stability of traveling waves for a class of reaction-diffusion systems that arise in chemical reaction models.”
- (68) March 2011, Miami University (Ohio) Colloquium. “Stability of traveling waves for a class of reaction-diffusion systems that arise in chemical reaction models.”
- (69) May 2011, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah. “Stability of traveling waves for parabolic and partially parabolic combustion problems.”
- (70) June 2011, IMA New Directions Short Course on Invariant Objects in Dynamical Systems and their Applications. Two lectures on “Loss of normal hyperbolicity in geometric singular perturbation theory.”
- (71) September 2011, Seminar on Mathematical Sciences and Applications, Virginia State University, Fredericksburg. “How the Talmud divides an estate among creditors.”
- (72) February 2012, Drexel University Applied Mathematics Seminar. “Concatenated traveling waves.”
- (73) March 2012, AMS Spring Midwestern Sectional Meeting, Lawrence, KS. “Concatenated traveling waves.”
- (74) June 2012, SIAM Conference on Nonlinear Waves and Coherent Structures, Seattle. “Concatenated traveling waves.”
- (75) March 2013, International Conference on Dynamics of Differential Equations, Atlanta. “Morse theory, Lagrange multipliers, and geometric singular perturbation theory.”
- (76) August 2013, Coloquio Brasileiro de Matemática, Rio de Janeiro. “Combustion in a porous medium under air injection.”
- (77) May 2014, Miami University (Ohio) Colloquium. “Concatenated traveling waves.”
- (78) July 2014, Université de Paris-Sud (Orsay) Séminaire d’analyse numérique et E.D.P. “Ondes progressives concaténées.”
- (79) July 2014, 10th AIMS International Conference on Dynamical Systems, Differential Equations, and Applications, Madrid. “Concatenated traveling waves.”
- (80) August 2014, SIAM Conference on Nonlinear Waves and Coherent Structures, Cambridge, England. “Concatenated traveling waves.”
- (81) May, 2015, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah. “The entry-exit function and geometric singular perturbation theory.”
- (82) July, 2015, Equadiff 2015, Lyon, France. “Concatenated traveling waves.”
- (83) May, 2016, National Center for Theoretical Sciences International Workshop on Mathematical Biology, Hsinchu, Taiwan. “The entry-exit function and geometric singular perturbation theory.”
- (84) May, 2016, National Center for Theoretical Sciences Applied Mathematics Seminar, Hsinchu, Taiwan. “Concatenated traveling waves.”
- (85) August, 2016, SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia. “The entry-exit function and geometric singular perturbation theory.”
- (86) September, 2016, 44th Annual Mathematics Conference: Differential Equations and Dynamical Systems, Miami University (Ohio). “The entry-exit function and geometric singular perturbation theory.” (Featured talk.)
- (87) September, 2016, 43rd Annual Pi Mu Epsilon Student Conference, Miami University (Ohio). “How the Talmud divides an estate among creditors.” (Featured talk.)

Professional Service

- Organizing committee for Workshop on Viscous Profiles and Numerical Methods for Shock Waves, N.C. State University, May 1990.
- Co-organizer, Southeast Dynamical Systems Conference, N.C. State University, April 1992.
- Organizer, minisymposium on “Bifurcation theory and systems of nonlinear conservation laws,” SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 1997.
- Co-organizer, minisymposium on “Conservation laws: Traveling waves and other self-similar solutions,” SIAM Pacific Rim Dynamical Systems Conference, Lahaina, Hawaii, August 2000.
- Co-organizer, special session on “Traveling waves and shock waves” (16 speakers), Fourth International Conference on Dynamical Systems and Differential Equations, University of North Carolina at Wilmington, May 2002.
- Co-editor, special issue on traveling waves and shock waves, *Discrete and Continuous Dynamical Systems*, June 2004.
- Co-organizer, minisymposium on “Existence and stability of traveling waves,” SIAM Conference on Analysis of Partial Differential Equations, Boston, July 2006.
- Co-organizer, minisymposium on “Existence, uniqueness and stability of combustion wavefronts,” SIAM Conference on Applications of Dynamical Systems, Snowbird, May 2007.
- Served on three NSF panels 2004–2008.
- Member, editorial board of *Dynamical Systems Magazine*, the on-line magazine of the SIAM Dynamical Systems Activity Group, since Fall 2007.
- Co-organizer, minisymposium on “Stability of combustion waves,” SIAM Conference on Nonlinear Waves and Coherent Structures, Rome, July 2008.
- Minicourse on “Game theory and climate change” (3 hours), with Mary-Lou Zeeman (Bowdoin College), SACNAS (Society for the Advancement of Chicanos and Native Americans in the Sciences) National Conference, Salt Lake City, October 2008.
- Co-organizer, minisymposium on “Stability of traveling waves,” Joint SIAM/RSME-SCM-SEMA Meeting on Emerging Topics in Dynamical Systems and Partial Differential Equations, Barcelona, May 2010.
- Organizer, minisymposium on “Traveling waves in partially parabolic systems,” SIAM Conference on Applications of Dynamical Systems, Snowbird, May 2011.
- Organizer, minisymposium on “Game theory in the mathematics curriculum,” SIAM Conference on Applied Mathematics Education, Philadelphia, September 2016.

Grants

- N. C. State University Engineering Foundation Grant, Summer 1976.
- N.S.F. Grant MCS-7902524, “Vector fields in the plane,” 1979–1981 (with Michael Singer).
- N.S.F. Grant DMS-9002803, “Theory and applications of homoclinic and heteroclinic bifurcation,” 1990–1992 (with Xiao-Biao Lin).
- N.S.F. Grant DMS-9205535, “Theory and applications of homoclinic and heteroclinic bifurcation,” 1992–1995 (with Xiao-Biao Lin).
- N.S.F. Grant DMS-9501255, “Singular perturbation and Riemann problems,” 1995–1999 (with Xiao-Biao Lin).

- N.S.F. Grant DMS-9973105, “Homoclinic and heteroclinic bifurcations, shock waves, and singular perturbations,” 1999–2003 (with Xiao-Biao Lin).
- N.S.F. Grant DMS-0406016, “The Dafermos regularization of a system of conservation laws,” 2004–2007 (with Xiao-Biao Lin).
- N.S.F. Grant DMS-0708386, “Stability of patterns,” 2007–2010 (with Xiao-Biao Lin).
- N.S.F. Grant DMS-1211707, “Concatenated traveling waves,” 2012–2016.

Students

- Ph.D. Students: John Shutt (1994), Monique Taylor (2010), Fatih Ozbag (2016).
- M.S. student: Rebecca Krakowski (1995), Ashley Daly (2010).

Publications in Refereed Journals

- (1) “Accessibility of optima in pure exchange economies,” *Journal of Mathematical Economics* **4** (1977), 197–216.
- (2) “Structure of the demand function and Pareto optimal set with natural boundary conditions,” *Journal of Mathematical Economics* **5** (1978), 1–21.
- (3) “On the structure of the equilibrium manifold,” *Journal of Mathematical Economics* **6** (1979), 1–5.
- (4) “Planar polynomial foliations” (with M. Singer), *Proceedings of the American Mathematical Society* **79** (1980), 649–656.
- (5) “Separatrices at singular points of planar vector fields” (with M. Singer), *Acta Mathematica* **145** (1980), 47–78; correction, *Acta Mathematica* **151** (1983), 297–298.
- (6) “Feuilletages de \mathbb{R}^3 définis par des équations de Pfaff polynomiales homogènes” (with C.F.B. Palmeira), *Annales de l’Institut Fourier* **32** (1982), 241–250.
- (7) “Applications of the blowing-up construction and algebraic geometry to bifurcation problems” (with M. Buchner and J. Marsden), *Journal of Differential Equations* **48** (1983), 404–433.
- (8) “Examples for the infinite dimensional Morse lemma” (with M. Buchner and J. Marsden), *SIAM Journal on Mathematical Analysis* **14** (1983), 1045–1055.
- (9) “A class of vectorfields on S^2 that are topologically equivalent to polynomial vectorfields” (with M. Singer), *Journal of Differential Equations* **57** (1985), 406–435.
- (10) “Persistent unstable equilibria and closed orbits of a singularly perturbed equation,” *Journal of Differential Equations* **60** (1985), 131–141.
- (11) “Structure of the first-order solution set for a class of nonlinear programs with parameters,” *Mathematical Programming* **34** (1986), 84–110.
- (12) “The saddle-node separatrix-loop bifurcation,” *SIAM Journal on Mathematical Analysis* **18** (1987), 1142–1156.
- (13) “Melnikov’s method at a saddle-node and the dynamics of the forced Josephson junction,” *SIAM Journal on Mathematical Analysis* **18** (1987), 1699–1715.
- (14) “Stable manifolds in the method of averaging,” *Transactions of the American Mathematical Society* **308** (1988), 159–176.
- (15) “Simultaneous equilibrium and heteroclinic bifurcation of planar vector fields via the Melnikov integral,” *Nonlinearity* **3** (1990), 79–99.
- (16) “Undercompressive shocks for nonstrictly hyperbolic conservation laws” (with M. Shearer), *Journal of Dynamics and Differential Equations* **3** (1991), 199–271.

- (17) “ C^p singularity theory and heteroclinic bifurcation with a distinguished parameter,” *Journal of Differential Equations* **99** (1992), 306-341.
- (18) “Heteroclinic bifurcation theory and Riemann problems,” *Matemática Contemporânea* **3** (1992), 165-189.
- (19) “Pitchfork bifurcation with a heteroclinic orbit: Normal form, recognition criteria, and universal unfolding,” *Journal of Differential Equations* **105** (1993), 63-93.
- (20) “Nonstrictly hyperbolic conservation laws with a parabolic line” (with D. Schaeffer and M. Shearer), *Journal of Differential Equations* **103** (1993), 94-126.
- (21) “Numerical computation of saddle-node homoclinic bifurcation points,” *SIAM Journal on Numerical Analysis* **30** (1993), 1155-1178.
- (22) “Riemann problem solutions that are stable to perturbation,” *Tatra Mountains Mathematical Publications* **4** (1994), 187-198.
- (23) “Rate of convergence of numerical approximations to homoclinic bifurcation points,” *IMA Journal of Numerical Analysis* **15** (1995), 23-60.
- (24) “Structurally stable Riemann solutions” (with D. Marchesin and B. J. Plohr), *Journal of Differential Equations* **126** (1996), 303-354.
- (25) “An organizing center for wave bifurcation in multiphase flow models” (with D. Marchesin and B. J. Plohr), *SIAM Journal on Applied Mathematics* **57** (1997), 1189-1215.
- (26) “Classification of codimension-one Riemann solutions” (with B. J. Plohr and D. Marchesin), *Journal of Dynamics and Differential Equations* **13** (2001), 523-588.
- (27) “Codimension-one Riemann solutions: classical missing rarefaction cases,” *Journal of Differential Equations* **157** (1999), 247-318.
- (28) “Codimension-one Riemann solutions: missing rarefactions in transitional wave groups,” *Advances in Differential Equations* **5** (2000), 929-975.
- (29) “Traveling-wave solutions of convection-diffusion systems by center manifold reduction,” *Nonlinear Analysis: Theory, Methods, and Applications* **49** (2002), 35-59.
- (30) “Codimension-one Riemann solutions: missing rarefactions adjacent to doubly sonic transitional waves,” *Journal of Dynamics and Differential Equations* **14** (2002), 295 - 348.
- (31) “Undercompressive shock waves and the Dafermos regularization,” *Nonlinearity* **15** (2002), 1361 - 1377.
- (32) “Geometric singular perturbation analysis of oxidation heat pulses for two-phase flow in porous media” (with D. Marchesin), *Bulletin of the Brazilian Mathematical Society* **32** (2002), 237-270.
- (33) “Oxidation heat pulses in two-phase expansive flow in porous media” (with D. Marchesin), to appear in *ZAMP* **54** (2003), 48-83.
- (34) “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws” (with X.-B. Lin), *SIAM J. Math. Anal.* **35** (2003), 884-921.
- (35) “Steam condensation waves in water-saturated porous rock” (with J. Bruining and D. Marchesin), *Qual. Theory Dyn. Syst.* **4** (2003), 205-231.
- (36) “Computation of Riemann solutions using the Dafermos regularization and continuation” (with B. Plohr and D. Marchesin), *Discrete and Continuous Dynamical Systems* **10** (2004), 965-986.
- (37) “Existence of Dafermos profiles for singular shocks,” *Journal of Differential Equations* **205** (2004), 185-210.

- (38) “Composite waves in the Dafermos regularization” (with P. Szmolyan), *Journal of Dynamics and Differential Equations* **16** (2004), 847–867.
- (39) “Eigenvalues of self-similar solutions of the Dafermos regularization of a system of conservation laws via geometric singular perturbation theory,” *Journal of Dynamics and Differential Equations* **18** (2006), 53 - 101.
- (40) “Combustion fronts in a porous medium with two layers” (with J. C. da Mota), *Journal of Dynamics and Differential Equations* **18** (2006), 615 - 665.
- (41) “Exchange lemmas 1: Deng’s lemma”, *Journal of Differential Equations* **245** (2008), 392–410.
- (42) “Exchange lemmas 2: General exchange lemma,” *Journal of Differential Equations* **245** (2008), 411–441.
- (43) “Persistence of rarefactions under Dafermos regularization: Blow-up and an exchange lemma for gain-of-stability turning points” (with Peter Szmolyan), *SIAM Journal on Applied Dynamical Systems* **8** (2009), 822–853.
- (44) “Traveling waves for a thin liquid film with surfactant on an inclined plane” (with Vahagn Manukian, *Nonlinearity* **22** (2009), 85–122.
- (45) “Stability of gasless combustion fronts in one-dimensional solids” (with Anna Ghazaryan, Yuri Latushkin, and Aparecido J. de Souza), *Arch. Ration. Mech. Anal.* **198** (2010), 981–1030.
- (46) “Heteroclinic orbits in slow-fast Hamiltonian systems with slow manifold bifurcations” (with Christos Sourdis), *J. Dynam. Differential Equations* **22** (2010), 629–655.
- (47) “Stability of traveling waves for degenerate systems of reaction diffusion equations” (with Anna Ghazaryan and Yuri Latushkin), *Indiana University Mathematic Journal* **60** (2011), 443–472.
- (48) “Stability of traveling waves for a class of reaction-diffusion systems that arise in chemical reaction models” (with Anna Ghazaryan and Yuri Latushkin), *SIAM J. Math. Anal.* **42** (2010), 2434–2472.
- (49) “Dafermos regularization of a diffusive-dispersive equation with cubic flux” (with Monique Richardson Taylor), *Discrete Contin. Dyn. Syst. A* **32** (2012), 4069–4110.
- (50) “How the Talmud divides an estate among creditors,” expository article in Bridging Mathematics, Statistics, Engineering and Technology: Contributions from the Seminar on Mathematical Sciences and Applications, Springer, 2012.
- (51) “Gasless combustion fronts with heat loss” (with Anna Ghazaryan and Peter L. Simon), *SIAM J. Appl. Math.* **73** (2013), 1303–1326.
- (52) “Stability of traveling waves in partly parabolic systems” (review article with Anna Ghazaryan and Yuri Latushkin), *Math. Model. Nat. Phenom.* **8** (2013), 31–47.
- (53) “Combustion waves and Riemann solutions in light porous foam” (with Grigori Chapiro and Dan Marchesin), *J. Hyperbolic Differ. Equ.* **11** (2014), 295–328.
- (54) “Morse theory for Lagrange multipliers and adiabatic limits” (with Guangbo Xu), *J. Differential Eqs.* **257** (2014), 4277–4318.
- (55) “Traveling waves in the Holling-Tanner model with weak diffusion” (with A. Ghazaryan and V. Manukian), *Proc. Roy. Soc. London Ser. A* **471**: 20150045 (2015).
- (56) “Stability of concatenated traveling waves: Alternate approaches” (with X.-B. Lin), *J. Differential Eqs.* **259** (2015), 3144–3177.
- (57) “Stability of concatenated traveling waves” (with X.-B. Lin), *J. Dynam. Differential Equations* **28** (2016), 867–896.

- (58) “The entry-exit function and geometric singular perturbation theory” (with P. De Maesschalck), *J. Differential Eqs.* **260** (2016), 6697–6715.
- (59) “Traveling waves in a simplified gas-solid combustion model in porous media” (with F. Ozbag and G. Chapiro), to appear in *Adv. Differential Equations*.

Articles in Conference Proceedings

- (1) “Singular points of planar vector fields” (with M. Singer), *Global Theory of Dynamical Systems: Proceedings, Northwestern, 1979*, Springer-Verlag, 1980.
- (2) “Riemann problems involving undercompressive shocks” (with M. Shearer), *PDE’s and Continuum Models of Phase Transitions: Proceedings, Univ. of Nice, 1988* (eds. M. Rascle, D. Serre, M. Slemrod), Springer Lecture Notes in Physics **344** (1989), 187–200.
- (3) “Undercompressive shocks in systems of conservation laws” (with M. Shearer), *Non-linear Evolution Equations that Change Type* (eds. B. L. Keyfitz and M. Shearer), IMA Volumes in Mathematics and its Applications **27**, Springer-Verlag, 1990.
- (4) “Transversality for undercompressive shocks in Riemann problems” (with M. Shearer), in *Viscous Profiles and Numerical Methods for Shock Waves* (M. Shearer, ed.), SIAM, 1991.

Books

- (1) *Game Theory in Action: An Introduction to Classical and Evolutionary Models* (with H. Gintis), Princeton University Press, 2016.

Chapters in Books

- (1) “Bifurcations with symmetry,” in J. Marsden and M. McCracken, *The Hopf Bifurcation*, Springer-Verlag, 1976.