PATRICIA BAUMAN

EDUCATION

B. of Math. with high distinction	University of Minnesota	1975
Ph.D. in Mathematics	University of Minnesota	1982

PROFESSIONAL EXPERIENCE

National Science Foundation Postdoctoral Research Fellow and Visiting Member	Courant Institute of Mathematics	1982-83
C.L.E. Moore Instructor	M.I.T.	1983-84
Assistant Professor (On leave during 1983-84)	Purdue University	1983-88
Associate Professor	Purdue University	1988-94
Visiting Associate Professor (on Sabbatical leave) and Visiting Member	I.M.A./University of Minnesota	1990-91
AMS Centennial Research Fellowship (on leave from Purdue University)	Carnegie Mellon University, Courant Institute, Oxford University, Purdue University, and U. C. Berkeley	1994-95
Visiting Member	I.M.A.	September 1995
Shapiro Visiting Professor (on Sabbatical Leave)	Penn State University	Oct.-Nov. 1998
Visiting Member	I.M.A.	Oct., Nov., Feb., Apr. 2004-05
Visiting Member	M.S.R.I.	August 2005
Visiting Research Fellow (on (Sabbatical from Purdue)	Isaac Newton Institute, University of Cambridge	Jan. - July 2013
AMS Fellow (Inaugural Class)		2013-
Professor	Purdue University	1994-2020
Professor Emeritus	Purdue University	July 2020-

PROFESSIONAL SOCIETIES

American Mathematical Society Member
Association for Women in Mathematics Member
Society for Industrial and Applied Mathematics Member

RESEARCH INTERESTS

Partial Differential Equations, Calculus of Variations, Applied Mathematics

PUBLICATIONS

1. "Positive Solutions of Elliptic Equations and their Adjoints," <u>Analysis Seminar</u>, McGill University, Montreal, Canada, October 1982.
2. Bauman P, Positive Solutions of Elliptic Equations in Nondivergence Form and Their Adjoints. *Arkiv. Math.* 22(2); 153-173, 1984.
3. Bauman P, A Weiner Test for Nondivergence Structure, Second Order Elliptic Equations. *Indiana Univ. Math J.* 34(2); 825-844, 1985.
4. Bauman P and Phillips D, Large-time Behavior of Solutions to Certain Quasilinear Parabolic Equations in Several Space Dimensions. *Proceedings of the A.M.S.* 96(2); 237-240, 1986.
5. Bauman P and Phillips D, Large-time Behavior of Solutions to a Scalar Conservation Law in Several Space Dimensions. *Transactions of the A.M.S.* 298(1); 401-419, 1986.
6. Bauman P, Large-time Behavior of Solutions to a Scalar Conservation Law in Several Space Dimensions. *Contemporary Mathematics (64), The Legacy of Sonya Kovalevskaya,* L. Keen, editor; 209-218, 1987.
7. Bauman P and Phillips D, A Nonconvex Variational Problem Related to Change of Phase. *Applied Mathematics and Optimization* 21; 113-138, 1990.
8. Bauman P, Owen N, and Phillips D, A Priori Estimates for a Class of Problems from Nonlinear Elasticity. *Ann.Inst. Henri Poincaré-Analyse Nonlinéaire* 8(2); 119-157, 1991.
9. Bauman P, Owen N, and Phillips D, Maximal Smoothness of Solutions to Certain Euler-Lagrange Equations from Nonlinear Elasticity, *Proc. Roy. Soc. Edinburgh 119A*; 241-263, 1991.
10. Bauman P, Owen N, and Phillips D, Maximum Principles and A Priori Estimates for an Incompressible Material in Nonlinear Elasticity. *Comm. in P.D.E.* 17, Nos. 7 and 8; 1185-1212, 1992.
11. Bauman P, Qualitative Behavior of Solutions to a System of Partial Differential Equations from Nonlinear Elasticity. *Geometric Analysis and Nonlinear Partial Differential Equations*, I.J. Bakelman, editor; 53-67, 1993.
12. Bauman P, Carlson N, and Phillips D, On the Zeroes of Solutions to Ginzburg-Landau Type Systems. *SIAM Journal on Mathematical Analysis* 24, No. 5; 1283-1293, 1993.
13. Bauman P and Phillips D, Univalent Minimizers of Polyconvex Functionals in Two Dimensions, Systems. *Arch. Rational Mech. Analysis* 126; No. 5; 161-181, 1994.
14. Bauman P, Chen C N, Phillips D and Sternberg P, Vortex Annihilation in Nonlinear Heat Flow for Ginzburg-Landau Systems. *European Journal of Applied Mathematics*, 6; 115-126, 1995.
15. Bauman P, Phillips D, and Tang Q, Stable Nucleation for the Ginzburg-Landau System in an Applied Magnetic Field. I.M.A. Preprint Series #1416, pp. 1-51, July 1996. *Arch. Rational Mech. Anal*. 142; 1-43, 1998.
16. Bauman P, Friesen M, and Phillips D, On the Periodic Behavior of Solutions to a Diffusion Problem describing Currents in a High-Temperature Superconductor. *Physica D*., 137; 172-191, 2000.
17. Bauman P, Marini A, and Nesi V, Univalent Solutions of an Elliptic System of Partial Differential Equations Arising in Homogenization. *Indiana University Mathematics Journal*, 50; 747-757, 2001.
18. Bauman P, Calderer M C, Liu C, and Phillips D, The Phase Transition between Nematic and Smectic A* Liquid Crystals. *Arch. Rational Mech. Anal*, 165 (2002), 2; 161-186.
19. Bauman, P, Phillips D, and Shen Q, Homogenization in Polymer-Stabilized Liquid Crystals. *Proceedings of The Royal Society of Edinburgh*, A 133 (2003), 1; 11-34.

20.   Andre N, Bauman P, and Phillips D, Vortex Pinning with Bounded Fields for the Ginzburg-Landau Equation. *Annales de l'Institut Henri Poincare-Analyse Nonlinéaire,* 20 (2003), 4; 705-729.

21.   Bauman P, Jadallah H, and Phillips D, Classical Solutions to the Time-dependent Ginzburg-Landau Equations for a Bounded Superconducting Body in a Vacuum. *Journal of Math. Physics*, 46 (2005); 5104-5128.

22.   Bauman P and Ko Y, Analysis of Solutions to the Lawrence-Doniach System for Layered Superconductors in an Applied Magnetic Field. *SIAM Journal on Math Analysis*, 37 (2006), no. 3, 914-940.

23.   Bauman P, Park J, and Phillips D, Existence results for liquid crystal energies. *Proceedings of the Ryukoku Workshop, 2008*, Y. Morita and H. Ninomiya, eds., 1-10, 2009

24.   Bauman P and Phillips D, A free boundary problem for bent-core liquid crystal fibers. *Proceedings of the Ryukoku Workshop, 2008*, Y. Morita and H. Ninomiya, eds., 11-23, 2009.

25.   Bauman P and Phillips D, Stability of B_7 fibers. *Molecular Crystals and Liquid Crystals Journal*, 510 (2009), 1135-1145.

26.   Bauman P and Phillips D, Analysis and Stability of Bent-Core Liquid Crystal Fibers. *Discrete and Continuous Dynamical Systems-B*, 17 (2012) 6; 1707-1728.

27.   Bauman P, Park J, and Phillips D, Analysis of Nematic Liquid Crystals with Disclination Lines. *Arch. Rational Mech. Anal.,* 205 (2012), 3; 795-826.

28.   Bauman P, Colbert-Kelly S, Park J, and Phillips D, Liquid Crystal Films with Defects. *Ferroelectrics*, 431 (2012), 1; 108-120.

29.   Bauman P, Phillips D, and Park J, Existence of Solutions to Boundary Value Problems for Smectic C Liquid Crystals. *Discrete and Continuous Dynamical Systems-S*, Special Issue on the Mathematical Study on Liquid Crystals and Related Topics: Statics and Dynamics, 8 (2015), 2; 243-257.

30.   Bauman P, and Rubiano, A., Energy Minimizers for Incompressible Liquid Crystal Elastomers. *Discrete and Continuous Dynamical Systems-S*, Special Issue on the Mathematical Study on Liquid Crystals and Related Topics: Statics and Dynamics, 8 (2015), 2; 259-281.

31.   Bauman P, and Phillips D, Regularity and the Behavior of Eigenvalues for Minimizers of a Constrained Q-Tensor Energy for Liquid Crystals. *Calculus of Variations and Partial Differential Equations*, 55 (2016), 4; 55-81.

32.   Bauman P, Phillips D, and Wang C., Higher-dimensional Ginzburg-Landau Equations under Weak Anchoring Boundary Conditions. *J, Functional Analysis*, 276 (2019), 2; 447-495.

33.   Bauman P, and Peng G, Analysis of Minimizers of the Lawrence-Doniach Energy for Superconductors in Applied Fields. *Discrete and Continuous Dynamical Systems-B.* Ser. B24 (2019), 11; 5903-5926

34.   Bauman P, and Phillips D, Regularity of Minimizers for a General Class of Constrained Energies in Two Dimensions. In preparation.

35.   Bauman P, and Phillips D, Landau-de Gennes Energy Minimizers with Defects of Degrees One-Half and One. In Preparation.

GRANTS

NSF Postdoctoral Research Fellowship, 1982-1983
12 NSF Grants during 1987-2018, including one NSF-FRG Grant in Mathematical Sciences for Collaborative Research with M.C. Calderer, E. Gartland, A. Jakli, O. Lavrentovich, D. Phillips, and J. Shen, 2005-2008.
AMS Centennial Research Fellowship, 1994-1995
D.O.E.-Midwest Superconductivity Consortium (MISCON) Grant, 1996-1998

EDITORIAL POSITIONS

   Editorial Board, SIAM Journal on Mathematical Analysis   1998-2006
   Editorial Board, Transactions of the AMS   2002-2005
   Editorial Board, Discrete and Continuous Dynamical Systems-Series B   2011-2020

INVITED ADDRESSES

1. "Positive Solutions of Elliptic Equations and their Adjoints," <u>Analysis Seminar</u>, McGill University, Montreal, Canada, October 1982.
2. "Positive Solutions of Elliptic Equations and their Adjoints, <u>P.D.E. Seminar</u>, University of Maryland, College Park, Maryland, November 1982.
3. "Positive Solutions of Elliptic Equations and Their Adjoints," <u>Special Session of A.M.S. Meeting, Harmonic Analysis and Its Applications to P.D.E.,</u> Northwestern University, Evanston, IL, November 1983.
4. "A Wiener Test for Nondivergence Structure Second Order Elliptic Equations," <u>P.D.E. Seminar,</u> University of Minnesota, October 1984.
5. "Large-Time Behavior of Solutions to Conservation Laws in Several Space Dimensions," Symposium supported by A.W.M., The Mary Ingraham Bunting Institute of Radcliffe College, and N.S.F., <u>The Legacy of Sonya Kovalevsky</u>, Radcliffe College, Cambridge, MA, October 1985.
6. "Large-Time Behavior of Solutions to Conservation Laws in Several Space Dimensions," <u>Colloquium</u>, Penn State, College Park, Penn., December 1985.
7. "The Perturbed Riemann Problem for a Conservation Law in Several Space Dimensions," <u>Nineteenth Midwest P.D.E. Seminar</u>, University of Wisconsin, Madison, Wisconsin, April 1986.
8. "A Nonconvex Variational Problem Related to Change of Phase," <u>P.D.E. Seminar</u>, University of Minnesota, February 1987.
9. "A Nonconvex Variational Problem Related to Change of Phase," <u>Twenty-first Midwest P.D.E. Seminar</u>, University of Chicago, Chicago, Illinois, April 1987.
10. "A Nonconvex Variational Problem Related to Change of Phase," <u>P.D.E. Seminar</u>, University of Kentucky, Lexington, Kentucky, October 1987.
11. "Change of Phase in Anti-plane Shear," <u>Viscoelasticity Seminar</u>, Virginia Polytechnic and State University, Blacksburg, Virginia, October 1987.
12. "Stable solutions of mixed-type p.d.e's from nonlinear elasticity," <u>Colloquium</u>, Univ. of Illinois, Urbana, IL, March 1988.
13. "Stable solutions of a mixed-type problem in multi- dimensional elasticity," <u>A.M.S.</u> Meeting, <u>Special Session entitled "Qualitative Theory of Nonlinear Partial Differential Equations,"</u> Univ. of Maryland, College Park, MD, April 1988.
14. "Anti-plane Shear of an Elastic Tube with Nonconvex Stored Energy," <u>Applied Mechanics and Engineering Sciences Conference, Symposium on Material Instabilities and Phase Transitions,</u> University of California, Berkeley, CA, June 1988.
15. "A Nonconvex Variational Problem Related to Change of Phase," <u>1988 SIAM Annual Meeting, Minisymposium entitled "Theory and Computation of Defects in Continuous Media,"</u> Minneapolis, MN, July 1988.
16. "A Priori Estimates of Solutions to an Elliptic System from Nonlinear Elasticity," <u>P.D.E. Seminar</u>, Indiana University, Bloomington, IN, November 1989.
17. "Qualitative Behavior of Solutions to a System of Partial Differential Equations from Nonlinear Elasticity," <u>A.M.S. Meeting, Special Session entitled "Geometric Inequalities and Convex Bodies,"</u> University of North Texas, Denton, TX, November 1990.

18.   "Maximal Smoothness of Solutions to Multidimensional Elliptic Systems from Nonlinear Elasticity," Phase Transitions Seminar, I.M.A., Minneapolis, MN, December 1990.

19.   "Maximal Smoothness of Solutions to Multidimensional Elliptic Systems from Nonlinear Elasticity," P.D.E. Seminar, M.S.R.I., Berkeley, CA, February 1991.

20.   "Maximal Smoothness of Solutions to Elliptic Systems from Nonlinear Elasticity," P.D.E. Seminar, Northwestern University, Evanston, Illinois, January 1992.

21.   "On the Zeroes of Solutions to Ginzburg-Landau Type Systems," Applied Math Seminar, McMaster University, Hamilton, Ontario, April 1993.

22.   "Univalent Minimizers of Polyconvex Variational Problems from Nonlinear Elasticity," Conference on Variational Problems in Differential Geometry and Partial Differential Equations, International Centre for Theoretical Physics, Trieste, Italy, August 1993.

23.   "Univalent Minimizers of Polyconvex Functionals from Nonlinear Elasticity," P.D.E. Seminar, Institute for Advanced Study, Princeton, NJ, October 1993.

24.   "Vortex Annihilation in Time-Dependent Ginzburg-Landau Systems," Workshop and Conference on Nonlinear Partial Differential Equations entitled "Pattern Formation, Singularities, and Related Topics, Japan - U.S. Mathematics Institute, The Johns Hopkins University, April 1994.

25.   "Univalent Minimizers of Polyconvex Functionals from Nonlinear Elasticity," Thirty-eighth Meeting of the Society for Natural Philosophy entitled "Topics in Nonlinear Elasticity," Cornell University, Ithaca, New York, September 1994.

26.   "Behavior of Solutions to the Ginzburg-Landau System in Two Dimensions," Thirty-third Midwest P.D.E. Seminar, University of Illinois, Chicago, Illinois, November 1994.

27.   "Qualitative Behavior of Solutions to the Ginzburg-Landau System in Two Space Dimensions," P.D.E. Seminar, University of Tennessee, Knoxville, Tennessee, January 1995.

28.   "Behavior of Solutions to the Ginzburg-Landau System in Two Space Dimensions," Conference entitled "Ginzburg-Landau Equations and Related Models," Center for Nonlinear Analysis, Carnegie Mellon University, Pittsburgh, Pennsylvania, February 1995.

29.   "Stable Solutions of the Ginzburg-Landau System in the Presence of a Large Applied Magnetic Field," Applied Math Seminar, Oxford Centre for Industrial and Applied Mathematics, Oxford University, Oxford, England, March 1995.

30.   "Stable Solutions of the Ginzburg-Landau System in the Presence of a Large Applied Magnetic Field," P.D.E. Seminar, University of Sussex, Sussex, England, March 1995.

31.   "Stable Solutions of the Ginzburg-Landau System in a Large Magnetic Field," MISCON (Midwest Superconductivity Consortium) Seminar, Purdue University, April 1995.

32.   "Stable Solutions of the Ginzburg-Landau System in a Large Magnetic Field," P.D.E. Seminar, University of California, Berkeley, April 1995.

33.   "Stable Solutions of the Ginzburg-Landau System in a Large Magnetic Field," P.D.E. Seminar, Indiana University, Bloomington, April 1995.

34.   "Stable Solutions of the Ginzburg-Landau System in an Applied Magnetic Field," A.M.S. Meeting, Special Session entitled "Nonlinear Partial Differential Equations," Univ. of Iowa, Iowa City, March 1996.

35.   "Stable Solutions of the Ginzburg-Landau System in an Applied Magnetic Field," Analysis Seminar, Courant Institute of Mathematical Science, NYU, April 1996.

36.   "Stable Solutions of the Ginzburg-Landau System in an Applied Magnetic Field," Analysis Seminar, Princeton University, April 1996.

37.   "Mathematical Problems Related to Superconductivity," One-hour Invited Address, AMS Meeting, University of Missouri, Columbia, November 1996.

38.   "Stable Solutions of the Ginzburg-Landau System," Midwest PDE Seminar and Conference in Celebration of Gene Fabes' 60th Birthday, University of Minnesota, Minneapolis, April 1997.

39. "Behavior of Solutions to the Ginzburg-Landau System in an Applied Field," Second SIAM Conference on Mathematical Aspects of Materials Science, Symposium on Superconductivity, Philadelphia, PA, May 1997.

40. "On Mathematical Models for High-Temperature Superconductors in a Magnetic Field," MISCON Seminar, Materials Engr., Purdue University, W. Lafayette, IN, June 1997.

41. "A Three-Dimensional Superconductor in a Strong Magnetic Field," International Conference on Nonlinear PDE and Applications, Northwestern University, Evanston, IL, March 1998.

42. "Layered Superconductors in an Applied Magnetic Field," Invited Address, The Second Riviere-Fabes Symposium on Analysis and PDE, University of Minnesota, Minneapolis, April 1998.

43. "Superconductors in Strong Magnetic Fields," Phase Transitions Conference, Oberwolfach, Germany, May 1998.

44. "Behavior of Solutions to the Ginzburg-Landau System in Three Space Dimensions," International Conference entitled "Fabes Lectures on Real Analysis and PDE's," Politecno di Milano, Milan, Italy, June 1998.

45. "Effects of ac Magnetic Fields on Superconducting ac Currents," MISCON (Midwest Superconductivity Consortium) Group Meeting, Columbia, MO, July 1998.

46. "On the Behavior of Solutions to a Diffusion Problem Describing Currents in a High-Temperature Superconductor," Recent Trends and Advances in PDEs and Numerical PDEs; A Conference in Honor of Olga Ladyzhenskaya, Iowa State University, Ames, August 1998.

47. "A Three-Dimensional Superconductor in a Strong Magnetic Field," A.M.S. Meeting, Special Session on Modeling of Phase Transitions of Partially-Ordered Physical Systems, Penn. State University, University Park, PA, October 1998.

48. "Analysis of Solutions to the Ginzburg-Landau System," Applied Math Seminar, Penn. State University, October 1998.

49. "A Three-Dimensional Superconductor in a Strong Magnetic Field," ICIAM, Minisymposium on Superconducting, Edinburgh, Scotland, July 1999.

50. "The Phase Transition between Nematic and Smectic A* Liquid Crystals," SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 2000.

51. "Solutions to PDEs Exhibiting Phase Transitions in Liquid Crystals," Invited Address, Fabes Lectures on Real Analysis and PDEs (International Conference), Florence, Italy June 2000.

52. "Vortex Pinning with Bounded Fields for the Ginzburg-Landau System," PDE Seminar, University of Illinois, Urbana, IL, April 2001.

53. "Vortex Pinning with Bounded Fields for the Ginzburg-Landau System," Applied Math Seminar, University of California, Irvine, April 2001.

54. "Mathematical Analysis of Solutions to the Ginzburg-Landau System describing Superconductivity," Colloquium, Ohio State University, Columbus, OH, May 2001.

55. "Vortex Pinning with Bounded Fields for the Ginzburg-Landau System," Invited Address, Concentration Phenomena and Vortex Dynamics Workshop, Pacific Institute for the Math. Sciences, University of British Columbia, Vancouver, Canada, July 2001.

56. "Vortex Pinning with Bounded Fields for the Ginzburg-Landau System," Special Session on Superconductivity, SIAM Meeting, Berlin, Germany, September 2001.

57. "A Ginzburg-Landau System with Pinning," PDE Seminar, U. of Wisconsin, Madison, WI, April 2002.

58. "Mathematical Analysis of Phase Transitions between Nematic-Smectic Liquid Crystals," AMS Meeting, Special Session entitled "Mathematical Problems in Soft Matter Modeling," Pisa, Italy, June 2002.

59. "Mathematical Analysis of a Ginzburg-Landau Model including Pinning," 22nd Southeastern-Atlantic Regional Conference on Differential Equations, University of Tennessee, Knoxville, October 2002.

60. "Singular integrals and Layered Superconductors in Three Dimensions," <u>AMS Meeting</u>, Special Session entitled "Singular Integrals and Applications to PDE," Orlando, FL, November 2003.

61. "Variational Methods for Analyzing Phase Transitions in Chiral Liquid Crystals," <u>Conference on the Calculus of Variations</u>, Fields Institute, Toronto, Canada, August 2003.

62. "A Variational Approach to Solving the Time-Dependent Ginzburg-Landau Equations in Three Space Dimensions," <u>AMS Meeting</u>, Special Session entitled "Nonlinear PDE's and Calculus of Variations," Phoenix, AZ, January 2004.

63. "Existence of Solutions to a Mixed-Type Elliptic-Parabolic System for Three-dimensional Superconductors in an Applied Magnetic Field," <u>SIAM Conference on Mathematical Aspects of Materials Science</u>, Special Session entitled "Multiscale Modeling and Computation of Complex Fluids," Los Angeles, CA, May 2004.

64. "Analysis of Solutions to the Lawrence-Doniach System for Layered Superconductors," <u>IMA / University of Minnesota</u>, Minneapolis, MN, October 2004.

65. "Analysis of Ginzburg-Landau Models with Applications to Materials," <u>Minicourse Presentation (Three Invited Lectures)</u> supported by NSF, New Mexico Analysis Seminar, Albuquerque, NM, October 2004.

66. "Nonlinear PDE Methods for Analysis of Phase Transitions in Superconducting and Liquid Crystals," <u>Workshop in Nonlinear Elliptic Equations and its Applications</u>, M.S.R.I., Berkeley, CA, August 2005.

67. "Existence of Solutions for Time-Dependent-Ginzburg-Landau System in Three Space Dimensions," <u>Midwest PDE Seminar</u>, Notre Dame University, December 2005.

68. "Analysis of Change of Phase in Layered Superconductors in Nontangential Magnetic Fields," <u>SIAM Conference on Analysis of PDEs</u>, Special Session entitled "Superconductivity, Ginzburg-Landau Theory, and Related Topics," Boston, July 2006.

69. "Analysis of Change of Phase in Layered Superconductors in Nontangential Magnetic Fields," <u>Analysis Seminar</u>, University of Rome 1, September 2006.

70. "Analysis of Change of Phase in the Lawrence-Doniach System in Nontangential Applied Magnetic Fields," <u>AMS Meeting</u>, Special Session entitled "Calculus of Variations and Nonlinear PDEs: Theory and Applications, New Orleans, January 2007.

71. "Mathematical Analysis of Physical Models Describing Superconductors and Liquid Crystals," <u>Second Virginia L. Chatelain Memorial Lecture</u>, Kansas State University, Manhattan, KS, March 2007.

72. "Analysis of a Variational Model for Bent-Core Liquid Crystals," <u>Invited Address</u>, <u>International Conference on Mathematical Theory of Superconductivity and Liquid Crystals</u>, East China Normal University, Shanghai, China, May 2007.

73. "Analysis of a Variational Model for Bent-Core Liquid Crystals," <u>Invited Address</u>, <u>The Third Symposium on Analysis and PDE</u>, Purdue University, West Lafayette, IN, May 2007.

74. "Analysis and Stability of Bent-Core Liquid Crystals," <u>Invited Address</u>, <u>Interdisciplinary Workshop and Summer School on Ferroelectric Phenomena in Liquid Crystals</u>, Liquid Crystal Institute, Kent State University, Kent, OH, June 2007.

75. "Stable Solutions of a Variational Model for Bent-Core Liquid Crystals," <u>SIAM Conference in Analysis and PDE</u>, Special Session entitled "Recent Trends in the Calculus of Variations," Mesa, AZ, December 2007.

76. "Analysis and Stability of Bent-Core Liquid Crystals," <u>Invited Address</u>, <u>American Institute of Mathematics Workshop on Ferroelectric Phenomena in Soft Matter Systems</u>, Palo Alto, CA, May 2008.

77. "Analysis and Stability of Bent-Core Liquid Crystals," <u>CAIMS Meeting</u>, Special Session on Singular Perturbations and the Ginzburg-Landau Model," Montreal, Canada, May 2008.

78.   "Analysis and Stability of Bent-Core Liquid Crystals," <u>Invited Address</u>, <u>Ryukoku Workshop on Pattern Formation and Dynamics in Mathematical Sciences</u>, Ryukoku University, Seto, Japan, June 2008.

79.   "Analysis and Stability of Bent-Core Liquid Crystals," <u>PDE Seminar</u>, Hokkaido University, Sapporo, Japan, June 2008.

80.   "Existence of Solutions to Boundary Value Problems for Smectic Liquid Crystals," <u>The 62nd Midwest PDE Seminar</u>, University of Wisconsin, Madison, WI, April 2009.

81.   "Existence of Solutions to Boundary Value Problems for Smectic Liquid Crystals," <u>PDE Seminar</u>, Ohio State University, Columbus, OH, April 2009.

82.   "Existence of Solutions to Boundary Value Problems for Smectic Liquid Crystals," <u>The Fourth Symposium on Analysis and PDE</u>, Purdue University, May 2009.

83.   "High-Temperature Versus Low-Temperature Superconductors: A Mathematical Description," <u>Colloquium</u>, National University of Singapore, August 2009.

84.   "Stable Solutions to the Lawrence-Doniach Equations in Tilted Magnetic Fields," <u>Invited Address</u>, Workshop on Mathematical Theory and Computational Methods in Materials, Institute for Mathematical Sciences, National University of Singapore, August 2009.

85.   "Anisotropic Behavior of Layered Superconductors in Tilted Magnetic Fields," <u>SIAM Conference on Analysis of PDE</u>, Special Session entitled "Singularities in PDEs," Miami, FL, December 2009.

86.   "Stable Solutions to the Lawrence Doniach Equations in Tilted Magnetic Fields," <u>AMS Meeting</u>, Special Session entitled "Mathematical Problems in Mechanics and Materials Science," Lexington, KY, March 2010.

87.   "Mathematical Differences and Similarities Between High-Temperature and Low-Temperature Superconductors," <u>SIAM Conference on Mathematical Aspects of Materials Science</u>, Special Session entitled "Ginzburg-Landau Theory and Related Topics," Philadelphia, PA, May 2010.

88.   "Energy Minimizers for a Class of Incompressible Liquid Crystal Elastomers," <u>SIAM Conference on Mathematical Aspects of Materials Science</u>, Special Session entitled "Modeling and Simulations of Liquid Crystal Elastomers," Philadelphia, PA, May 2010.

89.   "Existence of Solutions to Boundary-Value Problems for Smectic Liquid Crystals," <u>Emerging Topics in Dynamical Systems and Partial Differential Equations Conference</u>, Special Session entitled "Ferroelectric Liquid Crystals and Composites," Barcelona, Spain, June 2010.

90.   "Analysis of Nematic-Liquid Crystals with Half-Degree Defects," <u>ICIAM (International Congress of Pure and Applied Mathematics)</u>, Special Session entitled "Advances in Liquid Crystals," Vancouver, BC, Canada, July 2011.

91.   "Gamma Convergence of Lawrence-Doniach Energies," <u>SIAM Conference on Analysis of Partial Differential Equations</u>, Special Session entitled "Singular Solutions and Phase Transitions in PDE," San Diego, CA, November 2011.

92.   "Analysis of Nematic Liquid Crystals with Half-Degree Defects," <u>Invited Address</u>, Second Ohio River Analysis Meeting, University of Kentucky, Lexington, April 2012.

93.   "Analysis of Nematic Liquid Crystals with Half-Degree Defects," <u>Ninth AIMS Conference on Dynamical Systems, Differential Equations, and Applications</u>, Special Session entitled "PDEs and Dynamical Systems and their Applications", Orlando, FL, July 2012.

94.   "Analysis of Nematic Liquid Crystals with Half-Degree Defects," <u>2012 SIAM Annual Meeting</u>, Special Session entitled "Mathematics and Mechanics of Soft Matter," Minneapolis, MN, July 2012.

95.   "Analysis of Nematic Liquid Crystals with Half-Degree Defects," <u>AMS Southeastern Full Section Meeting</u>, Special Session entitled "Analysis of Pattern Formation in PDEs," Tulane University, New Orleans, LA, Oct. 2012.

96.   "Analysis of Ginzburg-Landau Models for Superconductors," <u>Bridge to Research Seminar</u>, Purdue University, Nov. 2012.

97.   "Problems Related to Defects in Nematic Liquid Crystals," <u>Invited Address</u>, Conference entitled "Symmetry, Bifurcation, and Order Parameters", Isaac Newton Institute, University of Cambridge, Cambridge, England, Jan. 2013.

98.   "Analysis of Liquid Crystals with Disclination Lines," <u>PDE Seminar</u>, University of Bath, Bath, England, March 2013.

99.   "Analysis Liquid Crystals with Disclination Lines," <u>Invited Address</u>, Conference entitled "Nonlinear Analysis of Continuum Theories: Statics and Dynamics," Oxford University, Oxford, England, April 2013.

100.   "Analysis of Liquid Crystals with Disclination Lines," PDE Seminar, University of Bristol, Bristol, England, May 2013.

101.   "Analysis of Minimizers of the Lawrence-Doniach Model in Applied Magnetic Fields," <u>SIAM Conference on Mathematical Aspects of Materials Science</u>, Minisymposium on "The Ginzburg-Landau Model and Related Topics," Philadelphia, PA, June 2013.

102.   "Analysis of Energy Minimizers for Nematic Liquid Crystals with Disclination-Line Defects," <u>Invited Address</u>, Workshop on "Quantized Vortices in Superfluidity and Superconductivity and Related Problems," Wolfgang Pauli Institut, Vienna, Austria, July 2013.

103.   "Analysis of Minimizers of the Lawrence-Doniach Model in Applied Magnetic Fields," <u>AMS Meeting</u>, Minisymposium on Mathematical Analysis of Complex Fluids and Flows," University of Louisville, Louisville, KY, October 2013.

104.   "Analysis of Defects in Nematic Liquid Crystals Described by Minimizers of de Gennes' Q-Tensor Energy," <u>Invited Address</u>, <u>SNP/IMA Conference: Mathematics and Mechanics in the Physical Sciences: A Tribute to James Serrin</u>, University of Minnesota, Minneapolis, MN, November 2013.

105.   "Energy-Minimizing Elastomers," <u>AMS Meeting</u>, Special Session on Partial Differential Equations in Materials Science, University of New Mexico, Albuquerque, NM, March 2014.

106.   "Analysis of Nematic Liquid Crystals with Defects," <u>Analysis and PDE Seminar</u>, University of Pittsburgh, Pittsburgh, PA, April 2014.

107.   "Energy-Minimizing Nematic Elastomers," <u>Invited Address</u>, <u>International Conference on Liquid Crystals and Related Topics</u>, NYU- Shanghai, Shanghai, China, June 2014.

108.   "Energy-Minimizing Elastomers," <u>AIMS Conference on Dynamical Systems, Differential Equations and Applications</u>, Minisymposium on "Recent Progress in Spintronics: Experiment, Theory and Simulation," Madrid, Spain, July 2014.

109.   "Energy-Minimizing Elastomers," <u>III Dynamics Days South America Conference</u>, Valparaiso, Chile, November 2014.

110.   "The Nature of Defects for Landau-de Gennes and Maier-Saupe Q-Tensor Energies for Liquid Crystals", <u>Invited Presentation</u>, <u>Symposium on Mathematical and Computational Aspects of Materials Science</u>, Materials Research Society Fall Meeting, Boston, MA, December 2014.

111.   "Energy-Minimizing Elastomers", <u>ICIAM 2015 Conference</u>, Special Session on "Mathematical Trends, Challenges, and Future Applications for Liquid Crystal Theories", Beijing, China, August 2015.

112.   "Analysis of Minimizers for the Lawrence-Doniach Energy in Perpendicular Magnetic Fields", <u>Invited Address</u>, Workshop on Ginzburg-Landau Theory and Related Topics, NIMS (National Institute of Mathematical Sciences), Daejon, South Korea, August 2015.

113.   "Regularity and Properties of Minimizers for Landau-de Gennes Energies defined by Probability Density Functionals", <u>AMS Meeting</u>, Special Session on "Nonlinear PDEs and Calculus of Variations", Loyola University, Chicago, IL, October 2015.

114.   "Regularity and Applications for a Constrained Q-Tensor Landau-de Gennes Energy for Liquid Crystals", Special Session on "PDE Methods for Problems in Materials Science", <u>SIAM Conference on Analysis of Partial Differential Equations</u>", Scottsdale, AZ, December 2015

115. "Regularity and Related Properties for Minimizers of Maier-Saupe Energies for Liquid Crystals", <u>Invited Address</u>, Workshop on Partial Order: Mathematics, Simulations, and Applications, IPAM (Institute for Pure and Applied Mathematics), UCLA, Los Angeles, CA, January 2016.
116. "Regularity and Behavior of Eigenvalues for Minimizers of Maier-Saupe Energies", <u>SIAM Conference on Aspects of Materials Science</u>, Minisymposium entitled "Mathematical Problems in Nematic Colloids and Chromonic Liquid Crystals", Philadelphia, PA, May 2016.
117. "Regularity and Behavior of Eigenvalues", <u>Invited Address</u>, Workshop at Centre de Recherches Mathematiques entitled "Partial Order in Materials: Analysis, Simulations, and Beyond", Montreal, Canada, June 2016.
118. "Regularity and Behavior of Eigenvalues for Minimizers of Maier-Saupe Energies for Liquid Crystals", <u>Invited Address</u>, 75th Birthday Conference for David Kinderleher entitled "Topics in Applied Nonlinear Analysis: Recent Advances and New Treands", Carnegie- Mellon University, Pittsburgh, PA, July 2016.
119. "Regularity and Behavior of Eigenvalues for Minimizers of Maier-Saupe Energies", <u>International Liquid Crystal Conference</u>, Minisymposium on the Mathematics of Liquid Crystals, Kent State University, Kent OH, August 2016.
120. "Regularity and Behavior of Eigenvalues for Minimizers of Maier-Saupe Energies for Liquid Crystals", <u>AMS Meeting</u>, Minisymposium entitled "Analysis of Variational Problems and Nonlinear Partial Differential Equations", Indiana University, Bloomington, IN, April 2017.
121. "Regularity and Behavior of Eigenvalues for Minimizers of a Constrained Q-Tensor Energy for Liquid Crystals", <u>Invited Address.</u> Conference entitled "Phase Transitions Models", Banff Research Station, Banff, Canada, May 2017.
122. Summer School on the Calculus of Variations and Nonlinear Partial Differential Equations, <u>Two Invited Lectures</u> on "Recent Variational Techniques and Applications to Liquid Crystals and Super Conductors", University of California, Berkley. May 22-26, 2017.
123. "Behavior of Minimizers for the Maier-Saupe Q-tensor energy for Liquid Crystals", <u>Invited Address</u>, Conference entitled "Calculus of Variations and Nonlinear Partial Differential Equations", University of California, Berkeley, May 29- June 2, 2017.
124. "Behavior of Eigenvalues for the Constrained Landau-DeGennes Energy with all Anisotropic Terms", Mini-symposium entitled "Variational Problems from Materials Science", SIAM Conference on Mathematical Aspects of Materials, Portland, OR, July 2018.
125. "Regularity of Minimizers for Constrained Energies in Two Space Dimensions with Applications to Liquid Crystals", <u>Invited Address</u>, Workshop on New Trends in Variational Models: From Superconductors to Liquid Crystals, Fields Institute for Research in Mathematical Sciences, Toronto, Ontario, Canada, June 2019.
126. "Physicality of Minimizers for the Anisotropic Landau-de Gennes/Maier-Saupe Constrained Q-tensor Energy for Liquid Crystals including all Elasticity Terms", Mini-symposium, <u>Conference on Industrial and Applied Mathematics (ICIAM)</u>, Valencia, Spain, July 2019.
127. "Nematic Liquid Crystal Defects for Landau-de Gennes Energy Minimizers in Three Dimensions", Mini-symposium entitled "Soft Materials: Liquid Crystals and Beyond," SIAM <u>Conference on Mathematical Aspects of Materials (Virtual Conference), May 2021.</u>
128. <u>"Analysis of Minimizers for the Landau-de Gennes Q-Tensor Energy and their defects," Special Session in Memory of David Adams, AWM Research Symposium, University of Minnesota, Minneapolis, MN, June 2022.</u>

GRADUATE STUDENTS

Mel Royer - Ph.D. 1998

Yangsuk Ko – Ph.D. 2000
Jianzhong Sun- Ph.D. 2004
Dmitry Glotov- Ph.D. 2004
Chunyan Yuan - Ph.D. 2008
Zhenqui Xie - Ph.D. 2009
Andrea Rubiano - Ph.D. 2010
Guanying Peng - Ph.D. 2014

SELECTED SERVICE TO THE PROFESSION

Organizer (with D. Phillips and M. Gunzburger), IMA Participating Institution Conference entitled "A Workshop on Superconductivity", Purdue University	1998
AMS Council Member (Elected), Three-year term	2000-2003
AMS Committee on the Profession	2000-2003
AMS Committee on Professional Ethics	2005-2008
Organizing Committee, Siam Conference on Analysis and PDE	2007
Vice Chair, SIAM Activity Group on Analysis and PDE (elected)	2007-2009
Chair, Nominating Committee, SIAM Activity Group on Analysis and PDE	2008
Nominating Committee, SIAM Activity Group on Analysis and PDE	2010
Nominating Committee, SIAM Activity Group on Mathematical Aspects of Materials Science	2010
Co-organizer, Sixth Annual Midwest Women in Math Conference	2017
Chair, SIAM Activity Group in Mathematical Aspects of Materials Science (Elected)	2017-19
Organizing Committee, Second Joint SIAM/CAIMS Annual Meeting, Toronto, Canada (Virtual Conference)	2021