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EDUCATION:
1988-1994: Ph.D. in Applied Mathematics, Department of Mathematics,
University of Maryland at College Park, College Park, Maryland.
1976-1982 : M.S., B.S. in Physical Chemistry and Metallurgy,
Moscow Institute of Steel and Alloys, Moscow, Russia.

EXPERIENCE:

2006-PRESENT - Associate Professor, Department of Mathematics, University of St. Thomas, St. Paul, Minnesota.
2000-2006 - Assistant Professor, Department of Mathematics, University of St. Thomas, St. Paul, Minnesota.
1998-2000 - Visiting Professor, Department of Mathematics, University of St. Thomas, St. Paul, Minnesota.
1996-1998 - Visiting Professor, Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, Pennsylvania.
1996-1998 - Visiting Professor, Department of Mechanical Engineering, University of Pittsburgh, Pittsburgh, Pennsylvania.
1994-1996 - Postdoctoral Associate, Department of Mathematics, Carnegie Mellon University, Pittsburgh, Pennsylvania.
1988-1994 - Graduate (Research and Teaching) Assistant, Department of Mathematics, University of Maryland at College Park, College Park, Maryland.
1982-1987 - Junior Scientist, Piro-Metallurgy Laboratory, Center for Non-Ferrous Metals, Moscow, Russia.

PUBLICATIONS:

[1985] with M.A. Grinfeld, Stress-strain state in an elastic medium containing an inclusion of a new phase, Computational Seismology, v. 18, p. 91-96.
[1986] with R.I. Shabalina and V.A. Kukoev, Mechanism of zinc transfer in molten slag, Russian Metallurgy-USSR, vol. 2, p. 8-13.
[1994] Phase Boundaries in Anisotropic Elastic Materials, Doctoral Dissertation, University of Maryland, College Park.
[1995] with S.S. Antman, The shrink-fit problem for aeolotropic nonlinearly elastic bodies, J. of Elasticity, 37, p. 157-166.
[1995] with S.S. Antman, Coexistent phases in nonlinear thermoelasticity: radially symmetric equilibrium states of aeolotropic bodies, J. of Elasticity, 41, 107-136.
[1997] with M.E. Gurtin, Configurational forces and the dynamics of planar cracks in three-dimensional bodies, J. of Elasticity, 48, 167--191.

[1998] with P. Cermelli and M.E. Gurtin, A note on the thermomechanics of curvature flow in R^3 and on surfaces in R^3, Meccanica 33 (1998), no. 6, 587--599.
[1999] with I. Fonseca and J. Schaeffer, Oscillations in one-dimensional elasticity with surface energy, Quart. Appl. Math. 57 (1999), no. 3, 475--499.
[1999] with I. Fonseca and Jack Schaeffer, Creation and propagation of oscillations in one-dimensional elasticity with surface energy. (English) Li, Ta-Tsien (ed.) et al., Nonlinear evolution equations and their applications. Proceedings of the Luso-Chinese symposium, Singapore: World Scientific. 72-80.
[2002] with C. Shakiban, M. Hennessey, Characterizing Slop in Mechanical Assemblies via Differential Geometry, Transactions of the ASME: Journal of Computing and Information Science in Engineering, 2(3), 2002, pp. 150-159.
[2004] with P.W.A. Dayananda and J. Kemper, A stochastic model for prostate-specific antigen levels. Math. Biosci. 190 (2004), no. 2, 113--126.
[2006] with Dokken, D.P, Time averaging, hierarchy of the governing equations, and the balance of turbulent kinetic energy. In J. Cannon & B.K. Shivamoggi (Eds.), *Mathematical and Physical Theory of Turbulence* (pp. 155-164). Taylor & Francis Group, LLC (Catalog # DK3004).
[2006] with P. Bělík, P.W.Dayananda and J. Kemper, A stochastic model for PSA levels: behavior of solutions and population statistics, Journal of mathematical Biology, 53, 437 – 463
[2009] with P. Bělík, "Modeling the behavior of heat-shrinkable thin films", J. of Elasticity, 95, 57—77
[2014] with P. Bělík, D.P. Dokken and K. Scholz, Fractal powers in Serrin's vortex solutions, Asymptotic analysis (Amsterdam : IOS-Press), Vol. 90, No. 1, p. 53-82.
[2017] with P. Bělík, D.P. Dokken and K. Scholz, Applications of a Vortex Gas Models to Tornadogenesis and Maintenance, OJFD, Vol. 7, No. 4, p. 596-622.
[2018] with P. Bělík, D. P. Dokken, K. Scholz, C. Potvin, Possible Implications of Self-Similarity for Tornadogenesis and Maintenance AIMS Mathematics, Vol. 3, No.3, 365-390.
[2020] with P. Bělík, X. Su, D. P. Dokken, K. Scholz, On the Axisymmetric Steady Incompressible Beltrami Flows, OJFD, Vol. 10, No. 3, p. 208-238.
[2022] with P. Bělík, D. P. Dokken, C. K. Potvin, K. Scholz, Vortex Gas Models for Tornadogenesis and Maintenance, New Trends in Physical Science Research, BP International, Vol. 2, Chapter 12, pages 137-157, Editor: Shi-Hai Dong, ISBN 978-93-5547-638-8, DOI: 10.9734/bpi/ntpsr/v2/2138B.
[2023] with P. Bělík, E. Bibelnieks, R. Laskowski, A. Lukanen, D. P. Dokken, Equilibrium Energy and Entropy of Vortex Filaments in the Context of Tornadogenesis and Tornadic Flows, to appear, OJFD, Vol. 13, No. 2, June 2023.

AWARDS, GRANTS, SCHOLARSHIPS AND ASSISTANSHIPS:

[1985] Second Prize in The Competition of Young Scientists, Center for Non-Ferrous Metals, Moscow, Russia.
[1988-1994] Graduate Assistant, Department of Mathematics, University of Maryland, College Park
[1994 -1996] Postdoctoral Fellowship, Carnegie-Mellon University, Pittsburgh, PA
[1998] Faculty Partnership, University of St. Thomas, St Paul, MN
[2000] Faculty Partnership, University of St. Thomas, St Paul, MN

[2001] Faculty Partnership, University of St. Thomas, St Paul, MN
[2002] Research Assistance Grant, University of St. Thomas, St Paul, MN
[2007] Bush Grant, University of St. Thomas, St Paul, MN
[2022] Diversity Curriculum Grant, University of St. Thomas, St Paul, MN

NSF PROPOSALS AND AWARDS:

[2002] Mathematical Transformations and Their Applications – A Summer Research Experience at UST (co-PI jointly with P. Van Fleet, L Johnson, R. Turcajova)
[2004] Inverse problem of finding the temperature field for deformation of a thin film into a prescribed shape (co-PI jointly with P. Bělík)
[2008] CSUMS: A Computational Training and Interdisciplinary Research Program for Undergraduates in the Mathematical Sciences (co-PI jointly with P. Van Fleet, J. Kemper, A. Shemyakin, M. Stolarska, D.P. Dokken, K. Scholz)
[2009] CSUMS Grant **Awarded**, National Science Foundation, Washington, DC CSUMS: A Computational Training and Interdisciplinary Research Program for Undergraduates in the Mathematical Sciences (co-PI jointly with P. Van Fleet, J. Kemper, A. Shemyakin, M. Stolarska, D.P. Dokken, K. Scholz)

LECTURES, TALKS AND PRESENTATIONS:

5/84 Young scientists conference (Center for NON- Ferrous Metals, Moscow, Russia).
4/92 Theory of Freezing Waves, University of Maryland at College Park, College, Park, MD.
9/94 Phase Boundaries in Anisotropic Materials, Carnegie Mellon University, Pittsburgh, PA.
3/96 Three dimensional theory of dynamical fracture, Materials Dynamics Branch, Aberdeen Proving Ground, MD.
10/96 One-dimensional model of phase transition in elasticity, National Security Agency, Baltimore MD.
3/97 Configurational forces in fracture mechanics, University of Pittsburgh, PA.
4/97 A series of 3 lectures on Fracture Mechanics, Carnegie Mellon University, Pittsburgh, PA.
11/98, Black-Scholes Model in Financial Calculus, University of St. Thomas, St. Paul, MN
2/99, Evolution Equations in Fracture Mechanics, University of St. Thomas, St. Paul, MN
5/99, Nonlinear Oscillations in Elasticity with Surface Energy, University of Minnesota, Minneapolis, MN
11/99, Calculus of Variations, Series of 3 talks, University of St. Thomas, St. Paul, MN
3/00, Nonlinear PDE with surface energy, University of St. Thomas, St. Paul, MN
3/00, ARPS Theoretical Background, Series of 4 talks, University of St. Thomas, St. Paul, MN
4/00, Breakdown in strong convergence for a nonlinear wave equation, Midwest AMS meeting, Notre-Dame, IN
4/00, Nonlinear PDEs with surface energy, Southern AMS meeting, Lafayette, LA
5/00, Configurational Forces in Mechanics, University of Minnesota, Minneapolis, MN
7/00, Elevated Vortices, Series of 2 talks, University of St. Thomas, St. Paul, MN
11/00, Theoretical Background of Dynamic Meteorology, Series of 4 talks, University of St. Thomas, St. Paul, MN
04/01, Navier-Stokes Equations with inertial terms, UST Seminar on Dynamic Meteorology, Series of 5 talks, University of St. Thomas, St. Paul, MN

4/01, Normally Hyperbolic Manifolds and Fluids, CAM Applied Math Seminar,
University of St. Thomas, St. Paul, MN
06-11/02, Vorticity and Turbulence, UST Seminar on Dynamic Meteorology,
Series of 10 lectures, University of St. Thomas, St. Paul, MN
02/26/03, Averaging Method in Computing the Turbulent Kinetic Energy.
CAM Applied Math Seminar, University of St. Thomas, St. Paul, MN
05/03, A Balance Equation for Turbulent Kinetic Energy in the Boundary Layer, Orlando, FL
03/04 Tornado Mechanism, Math Club, University of St. Thomas, St. Paul, MN
07/06 Tornados and Turbulent Kinetic Energy, Department of Mathematics, Aveiro University, Portugal.
11/06 Predictability of tornados, UST Statistics Seminar, UST, St. Paul, MN
03/07 Use of R language in Weather Modeling and Meteorological Statistics, UST Statistics Seminar, University of St. Thomas, St. Paul, MN
03/07 Predictability of Tornados - Modeling and Statistics, SIAM Conference on Geosciences in Santa Fe, NM
05/08 Delay in Spiking Neurons, Midwest Numerical Analysis Day in Minneapolis, MN
05/08 (with P. Bělík), Mathematical Modeling of Heat-Shrinkable Thin Films, SIAM Meeting, Philadelphia, PA
11/08 Talk to Math Club at UST "Why Mechanical Engineers have to major in Mathematics"
03/09 (with P. Bělík), Modeling the Behavior of Heat-Shrinkable Thin Films, SIAM Meeting, Miami, FL
02/10 Alternate powers in Serrin's Swirling Vortex Solutions
(joint with D. P. Dokken and K. Sholz), IMA Workshop, University of Minnesota
07/10 CSUMS presentation by students on Delay in axonal signal transmission, SIAM meeting, Pittsburgh, PA
09/10 Delay in Modeling Spiking Neurons,
Department of Mathematics Colloquium, Augsburg College, Minneapolis, MN
11/10 Phenomenological versus Statistical Thermodynamics, the argument that has never been settled. Applied Probability and Statistics Seminar, University of St. Thomas, St Paul, MN
04/12 Delay in Neuronal Spiking (joined with P. Bělík)
SIAM Conference on Uncertainty Quantification, Raleigh, NC
07/12 Investigations of Cai's Power Law for Strong Tornados (joint with P. Bělík, D. P. Dokken, K. Scholz), SIAM Annual Meeting, Minneapolis, MN
07/12 Alternate Powers in Serrin's Swirling Vortex Solutions (joint with P. Bělík, D. P. Dokken, K. Scholz), SIAM Annual Meeting, Minneapolis, MN
11/12 Slope of Vorticity Lines Derived from Numerical Models as a Tornado Predictor, Severe Local Storms Conference, Nashville, TN (joint with P. Bělík, D. P. Dokken, K. Scholz)
01/13 Fractal Powers in Serrin's Swirling Vortex Solutions (joint with P. Bělík, D. P. Dokken, K. Scholz), 2013 Joint Mathematics Meeting, San Diego, CA
01/13 CSUMS presentation by students on Modeling Turbulence with Delay Equations, 2013 Joint Mathematics Meeting, San Diego, CA
03/13 Slope of Vorticity Lines Derived from Numerical Models as a Tornado Predictor, (joint with P. Bělík, D. P. Dokken, K. Scholz), Stochastic Modeling of the Oceans and Atmosphere, Minneapolis, MN
04/14 Fractal powers in Serrin's vortex solutions (joint with P. Bělík, D. P. Dokken, K. Scholz), University of Washington, Seattle, WA

08/14 Fractal Powers in Serrin's Swirling Vortex Solutions (joint with P. Bělík, D. P. Dokken, K. Scholz), GSSI, L'Aquila, Italy
11/14 Axisymmetric Solutions in the Models of Tornadogenesis(joint with P. Bělík, D. P. Dokken, K. Scholz), 27th Conference on Severe Local Storms, Madison, WI
03/15 Fractal Powers in Swirling Vortex Solutions (joint with P. Bělík, D. P. Dokken, K. Scholz), Wayne State University, Detroit, MI
08/15 Modeling Delay in Axon Circuit (joint with P. Bělík), MAA Mathfest 100, Washington, DC
12/15 Thermodynamic Equations in Tornado Theory (joint with P. Bělík, D. P. Dokken, K. Scholz), 114 Statistical Mechanics Conference, Celebration of David Ruelle and Yakov Sinai, Rutgers University**,** Piscataway, NJ
10/16 Thermodynamic Balance in Tornado Layer (joint with P. Bělík, D. P. Dokken, K. Scholz), Meeting #1123 of the Fall Central Sectional Meeting of the American Mathematical Society, Minneapolis, MN
03/19 Power Laws and Self-Similarity in Tornadogenesis (joint with P. Bělík, D. P. Dokken, K. Scholz), 2019 SIAM Conference on Mathematical & Computational Issues in the Geosciences, Houston, TX