

CURRICULUM VITAE

Blake Temple

EDUCATION

Ph.D. University of Michigan	June, 1980	Mathematics
M.S. University of Michigan	June, 1976	Mathematics/Education
B.A. University of Michigan	June, 1973	Philosophy

APPOINTMENTS

• Distinguished Professor, Mathematics	July 2012-Present
• Professor	1990-2012
• Associate Professor	1988-1990
• Assistant Professor	1986-1988
• Chair, Graduate Group in Appl. Math. <i>University of California, Davis</i>	2004-2007/1988-1990
• Van Vleck Assistant Professor <i>University of Wisconsin</i>	1984-1986
• Research Fellowship <i>MRC, University of Wisconsin</i>	1983-1986
• Visiting Member <i>Courant Institute</i>	1982-1983
• N.S.F. Postdoctoral Fellow <i>Rockefeller University</i>	1980-1982

TALKS/HONORS

- *Colloquium*, AMS Special Session-Machine Learning, Boston 2023
- *Colloquium*, UC-Davis, Feb 2023 (Robin Young)
- *Colloquium*, University of Arizona, Oct. 2022
- *Colloquium*, UC-Berkeley, Nov. 2021
- *Visitor*, Instituto Superior Tecnico, U-Mass, U-Mich, Fields Inst, 2017-2021
- *Colloquium*, ETH/UC-Berkeley/UC-Davis/UMass, 2014-17
- *Invited Talk*, Harvard, 2016
- *Plenary Address*, IMPA, July 2015
- *Five Year NSF Award*, 2007
- *Distinguished Visiting Professor*, Taiwan and Hong Kong, 2009

- *Gehring Professor of Mathematics*, U-Mich, 2008
- *Public Lecture to the National Academy of Sciences*, IISC, India, 2006
- *Visiting Scholar*, Newton Institute, Cambridge, England, 2003
- *Visiting Scholar*, IHES, Paris, France, 2002
- *Guggenheim Fellow*, 1994-95

RESEARCH AREAS:

- Shock Waves
- General Relativity
- Partial Differential Equations
- Numerical Analysis
- Applied Mathematics

PUBLICATIONS: <https://www.math.ucdavis.edu/~temple/!!!PubsForWeb/>

RESEARCH:

- *The existence of time-periodic solutions of the compressible Euler equations*, with R. Young, (in preparation)
- *A closed and stable family of solutions in an unstable manifold of the standard model of cosmology*, with C. Alexander and Z. Vogler, (in preparation)
- *Optimal regularity and Uhlenbeck compactness for general relativity and Yang-Mills theory*, with M. Reintjes, RSPA, March 1, 2023 (<https://doi.org/10.1098/rspa.2022.0444>)
- *On the optimal regularity implied by the assumptions of geometry I: The case of affine connections*, with M. Reintjes, (expected MAA)
- *On the optimal regularity implied by the assumptions of geometry II: The case of vector bundles*, with M. Reintjes, (under review.)
- *Optimal metric regularity in General Relativity follows from the RT-equations by elliptic regularity theory in L_p -spaces*, with M. Reintjes, (arXiv:1808.06455)
- *The Regularity Transformation Equations: An elliptic mechanism for smoothing gravitational metrics in General Relativity*, with M. Reintjes, (arXiv:1805.01004)

- *Shock Wave Interactions in General Relativity: The Geometry behind Metric Smoothing and the Existence of Locally Inertial Frames*, with M. Reintjes (arXiv:1610.0239)
- *Inversion of a Non-uniform Difference Operator*, with R. Young, (arXiv:1810.05718) (published in MAA)
- *Causal dissipation in the relativistic dynamics of barotropic fluids*, Jour of Math Phys 59(6):063101, DOI: 10.1063/1.5007831
- *An instability in the Standard Model creates the anomalous acceleration without Dark Energy*, with J. Smoller and Z. Vogler, Proc. R. Soc. A 473: 20160887, <http://dx.doi.org/10.1098/rspa.2016.0887>.
- *Causal dissipation for the relativistic dynamics of ideal gases*, with H. Freistuehler, Proc. R. Soc. A 473: 20160729. <http://dx.doi.org/10.1098/rspa.2016.0729>
- *Regularity Singularities and the scattering of gravity waves in approximate locally inertial frames*, with M. Reintjes, Meth Appl Anal, Vol. 23, No. 2, pp. 233-258, September 2016
- *An alternative proposal for the anomalous acceleration*, with J. Smoller, Surveys in Differential Geometry, Vol. 20 (2015): One Hundred Years of General Relativity, eds S.T. Yau and L. Bieri.
- *Numerical analysis of a canonical shock wave interaction problem in general relativity*, Bulletin of the Institute of Mathematics, Academia Sinica, Taiwan, April 2015, (Special issue in honor of Tai-Ping Liu's seventieth birthday).
- *No regularity singularities exist at points of general relativistic shock wave interaction between shocks from different characteristic families*, with M. Reintjes, Proc. R. Soc. A 471: 20140834. <http://dx.doi.org/10.1098/rspa.2014.0834>
- *Causal dissipation and shock profiles in the relativistic fluid dynamics of pure radiation*, with H. Freistuehler, Proceedings of the Royal Society A, March 20, 2014.
- *A Nash-Moser framework for finding periodic solutions of the compressible Euler equations*, with R. Young Jour of Sci Comp, April 2, 2014.
- *Simulation of general relativistic shock waves by a locally inertial Godunov method featuring dynamic time dilation*, with Z. Vogler, Proc. R. Soc. A 2012 468 1865-1883; DOI: 10.1098/rspa.2011.0355.

- *General Relativistic Self-Similar Waves that induce an Anomalous Acceleration into the Standard Model of Cosmology*, with J. Smoller *Memoirs of the AMS*, November 3, 2011.
- *The “Big Wave” Theory for Dark Energy*, with J. Smoller, *Proceedings: Quantum Field Theory and Gravity*, Regensburg, Germany Sept. 28-August 1, 2010.
- *Expanding wave solutions of the Einstein equations that induce an anomalous acceleration into the Standard Model of Cosmology*, with J. Smoller, *PNAS*, Vol.106, no.34, 2009, pp. 14218-14218.
- *A Liapunov-Schmidt Reduction for Time-Periodic Solutions of the Compressible Euler Equations*, *Meth. Appl. Anal.*, Vol. 17, No. 3, pp. 225-262, September 2010.
- *Time periodic linearized solutions of the compressible Euler equations and a problem of small divisors*, with R. Young, *SIAM J. Math. Anal.*, Vol. 43, No. 1, 2011, pp. 1-49.
- *Periodic Solutions of the Euler Equations: A paradigm for time-periodic sound wave propagation in the compressible Euler equations*, with R. Young, *Meth. Appl. of Anal.* Vol. 16, No.3 pp. 341-364, September 2009.
- *Linear waves that express the simplest possible periodic structure of the compressible Euler equations*, with R. Young, *Acta Mathematica Scientia*, Vol. 29, Ser. B, no. 6, 2010, pp. 1749-1766.
- *A bound on the total variation of the conserved quantities for solutions of a general resonant nonlinear balance law*, with J. Hong, *SIAM J. Appl. Math.*, Vol. 64, No. 3, 2004, pp. 819-857.
- *Cosmology, Black Holes, and Shock Waves beyond the Hubble Length*, with J. Smoller *Meth. and Appl. of Anal.*, Vol. 11, No. 1, 2004, pp. 077-132.
- *Shock-wave solutions of the Einstein equations: Existence and consistency by a locally inertial Glimm Scheme*, with J. Groah, *Memoirs of the AMS*, Vol. 172, No. 813, November 2004.
- *Shock-wave cosmology inside a black hole*, with J. Smoller, *PNAS*, Vol. 100, no. 20, 2003, pp. 11216-11218.
- *Solving the Einstein equations by Lipschitz continuous metrics: Shock waves in General Relativity*, with J. Smoller, *Handbook of Mathematical Fluid Dynamics*, 2003, (series by Elsevier).

- *A shock-wave formulation of the Einstein equations*, with J. Groah, Methods and Applications of Analysis, Vol. 7, no. 4, 2000, pp. 793-812.
- *Cosmology with a Shock-Wave*, with J. Smoller, Comm. Math. Phys., Vol. 210, no. 2, 2000, pp. 275-308.
- *On the Oppenheimer-Volkov equations in general relativity*, with J. Smoller, Arch. Rat. Mech. Anal., Vol. 142, 1998, pp. 177-191.
- *Shock-wave solutions of the Einstein equations: The Oppenheimer-Snyder model of gravitational collapse extended to the case of non-zero pressure*, with J. Smoller, Arch. Rat. Mech. Anal., Vol. 128, 1994, pp. 249-297.
- *Global solutions of the relativistic Euler equations*, Comm. Math. Phys., Vol. 156, 1993, pp. 67-99.
- *Nonlinear resonance in systems of conservation laws*, with E. Isaacson, SIAM Jour. Appl. Math., Vol. 52, No. 5, 1992, pp. 1260-1278.
- *A characterization of the weakly continuous polynomials in the method of compensated compactness*, with J. Robbins and R. Rogers, Trans. Am. Math. Soc., Vol. 310, No. 1, 1988, pp. 405-417.
- *The Riemann problem near a hyperbolic singularity: the classification of solutions of quadratic Riemann problems*, with D. Marchesin, B. Plohr, and E. Isaacson, SIAM Jour. Appl. Math. Vol. 48, No. 5, 1988, pp. 1009-1032.
- *Stability of Godunov's method for a class of 2×2 systems of conservation laws*, with R. Leveque, Trans. AMS, Vol. 288, No. 1, 1985, pp. 115-123.
- *No L^1 contractive metrics for systems of conservation laws*, Trans. Amer. Math. Soc., Vol. 288, No. 2, 1985, pp. 471-480.
- *Systems of conservation laws with invariant submanifolds*, Trans. Amer. Math. Soc., Vol. 280, No. 2, 1983, pp. 781-795.
- *The existence of a global weak solution of the waterhammer problem*, with M. Luskin, Comm. Pure Appl. Math. Vol. 35, 1982, pp. 697-735.
- *Global solution of the Cauchy problem for a class of 2×2 non-strictly hyperbolic conservation laws*, Adv. Appl. Math. 3, 1982, pp. 335-375.