ROBIN CARL YOUNG

Department of Mathematics and Statistics

22 Rocky Hill Road

University of Massachusetts

Hadley, MA 01035

Amherst, MA 01003

(413) 545 1726

(413) 584 5883

e-mail: young@math.umass.edu

fax: (413) 545 1801

EDUCATION

<u>Ph.D.</u>, Mathematics June 1991
University of California, Davis
Advisor: Professor J. Blake Temple

<u>B.Sc. Honours</u>, Mathematics April 1985
University of the Witwatersrand, Johannesburg, South Africa

<u>B.Sc.</u>, Mathematics and Computer Science March 1984
University of the Witwatersrand, Johannesburg, South Africa

RESEARCH INTERESTS

Hyperbolic Conservation Laws and Continuum Mechanics.

Nonlinear Waves and their Interactions.

Numerical Methods for Nonlinear Partial Differential Equations.

ACADEMIC EXPERIENCE

<u>Professor</u> Mathematics and Statistics, University of Massachusetts, Amherst, 2009–present.

<u>Visiting Professor</u> Mathematics, University of California, Davis, January–June, 2010.

<u>Associate Professor</u> Mathematics and Statistics, University of Massachusetts, Amherst, 2002–2009.

<u>Assistant Professor</u> Mathematics and Statistics, University of Massachusetts, Amherst, 1996–2002.

<u>Visiting Professor</u> Institut Mathématique de Rennes, Université de Rennes I, France, April 1996.

Post-doctoral Associate   Applied Mathematics and Statistics, University at Stony Brook, 1994–1996.

Associate Research Scientist   Courant Institute of Mathematical Sciences, New York University, 1991–1994.

Lecturer and Teaching Assistant   Mathematics, UC Davis, 1985–1991.

GRANTS & AWARDS

"Periodic and Large Amplitude Solutions for the compressible Euler equations", National Science Foundation, Applied Mathematics, 2009–2013. Awarded $125,000.

"Fluid Dynamics With Large BV Data", National Science Foundation, Applied Mathematics, 2005–2008. Awarded $75,000.

"Wave Interactions in Continuum Mechanics", National Science Foundation, Applied Mathematics, 2001–2005. Awarded $85,000. Research Experiences for Undergraduates supplements of $6,000 in Summer 2002 and $10,000 in Summer 2004.

Faculty Research Travel Grant. University of Massachusetts, 1999. $800.

Richard C. DiPrima Prize, Society for Industrial and Applied Mathematics, 1992.

Allen G. Marr Award for the best thesis in the Physical Sciences, Mathematics and Engineering, UC Davis, 1991.

Regent's Fellowship, UC Davis, 1986–87. Reawarded 1987–88 and 1988–89.

University Scholarship, University of the Witwatersrand, 1985.

CSIR Bursary Scholarship, University of the Witwatersrand, 1984.

AEB Bursary Scholarship, University of the Witwatersrand, 1980–1983.

SELECTED PRESENTATIONS

National Central University, Taiwan, 2012 (3 lectures).

"BlakeFest", Conference on Nonlinear PDE's in Honor of Blake Temple, Ann Arbor, 2010.

IMA Summer Conference on Conservation Laws, Minnesota, 2009.

Free Boundary Problems (FBP08), Stockholm, Sweden, 2008.

SIAM Conference on PDEs (PD06), Boston, 2006.

Shock Waves and Relativity, Conference in Honor of Joel Smoller, Stanford, 2006.

Nonlinear PDEs and Applications, Bangalore, India, 2005 (4 lectures).

Tenth International Conference on Hyperbolic Problems, Osaka, Japan, 2004.

Hyperbolic PDE and Multiphase Flow, Conference in Honor of James Glimm, Stony Brook, 2004.

Joint AMS-HKMS International Meeting, Hong Kong, 2000.

Eighth International Conference on Hyperbolic Problems, Magdeburg, Germany, 2000.

STUDENTS AND POST-DOCTORAL ADVISEES

Post-doctoral advisees Thaddeus Edens (2004–06), Mikhail Perepelitsa (2005-06), Alexey Miroshnikov (2012–15).

Ph.D. student, Geng Chen, Ph.D., U Mass, 2011.

REU Supervision, W. Szeliga(2002), P. Dragon(2004), R. P. Chase(2004), S. Sarasin(2008).

Major Advisor, L. Puthanveetil, M.S. (2000), S. Iyer, B.S. (2001), R. P. Chase, B.S.(Hons) (2006).

Thesis Committee, Jie Xu (Ph.D., E.C.E.), I. Rodriguez, M. Gummalla (Ph.D., Chem.Eng.); Z.Chen, E. Ezster (Ph.D., Math); M. Ramanathpure (M.S., Mech.Eng.); S.Tael, B.Boston (Ph.D., Appl Math, Stony Brook).

PROFESSIONAL SERVICE

Member, Organizing Committee, "BlakeFest", Conference on Nonlinear PDE's, in conjunction with Blake Temple's 60th birthday, Ann Arbor, June 2011.

Grant Panelist: NSF Division Math. Sci., CAREER panel, October 2007.

Ad Hoc Reviewer: Arch. Rat. Mech. Anal., Comm. PDE, Proc. AMS, J. Math. Anal. & Appl., SIAM J. Num. Anal., Trans. AMS, Methods & Appls. Anal., J. Comp. Phys., SIAM J. Math. Anal., Addison-Wesley-Longman, IIT Bombay IRCC Research Awards Committee.

Chair, Local Organizing Committee, Fifth International Workshop on the Physics of Compressible Turbulent Mixing, Stony Brook, July 1995.

Chief Editor, Proceedings for the Fifth International Conference on Hyperbolic Problems, Stony Brook, July 1994.

SELECTED DEPARTMENTAL SERVICE

Chair, Analysis Faculty Search Committee, 2013–14, 2015–16.

Associate Department Head for Undergraduate Affairs, 2014–15.

Chair, Department Personnel Committee, 2011–12, 2012–13.

Chief Undergraduate Advisor, 2008–present.

Member, Undergraduate Education Council of Faculty Senate, 2004–2007.

Member, Department Personnel Committee, 2005–2007.

Undergraduate Program Director, 2003–2006.

Chair, Undergraduate Affairs Committee, 2003–2006, 2015–present.

Member, Faculty Search Committee, 1999–2001.

Chair, Undergraduate Major Review Committee ("Young Committee"), 1998–2000.

PUBLICATIONS

[1] R.C. Young. *An Extension of Glimm's Method to Third Order in Wave Interactions.* PhD thesis, U.C. Davis, 1991.

[2] Robin Young. Sup-norm stability for Glimm's scheme. *Comm. Pure Appl. Math.*, 46:903–948, 1993.

[3] Robin Young. On elementary interactions for hyperbolic conservation laws. Unpublished note, 29 pages, available at `http://www.math.umass.edu/~young/Research/misc/elem.pdf`, 1993.

[4] B. Temple and R. Young. The large time stability of sound waves. *Comm. Math. Phys.*, 179:417–466, 1996.

[5] B. Temple and R. Young. The large time existence of periodic solutions for the compressible Euler equations. *Matemática Contemporânea*, 11:171–190, 1996.

[6] B. Temple and R. Young. Solutions to the Euler equations with large data. In *Hyperbolic Problems: Theory, Numerics, Applications*. World Scientific, 1996.

[7] J. Glimm, J. Grove, X-L. Li, R. Young, Y. Zeng, and Q. Zhang. *Front Tracking: A Parallelized Approach for Internal Boundaries and Interfaces*, volume 1041 of *Lecture Notes in Computer Science*, pages 257–266. 1996.

[8] Robin Young, James Glimm, and Brian Boston. *Proceedings of the Fifth International Workshop on the Physics of Compressible Turbulent Mixing*. World Scientific Press, 1996.

[9] Robin Young. Exact solutions to degenerate conservation laws. *SIAM J. Math. Anal.*, 30:537–558, 1999.

[10] Robin Young. Periodic solutions for conservation laws. *Contemp. Math.*, 255:239–256, 2000.

[11] Robin Young. Sustained solutions for conservation laws. *Comm. PDE*, 26:1–32, 2001.

[12] Robin Young. The p-system I: The Riemann problem. *Contemp. Math.*, 301:219–234, 2002.

[13] Robin Young. The p-system II: The vacuum. In R. Picard, M. Reissig, and W. Zajaczkowski, editors, *Evolution Equations*, pages 237–252, Warsaw, 2001. Banach Center.

[14] Robin Young. Wave interactions in nonlinear strings, I. In E.F. Toro, editor, *Godunov Methods, Theory and Applications*, pages 1065–1071. Kluwer Academic, 2001.

[15] Robin Young. Wave interactions in nonlinear strings, II. In Heinrich Freistühler and Gerald Warneke, editors, *Eighth Int'l Conference on Hyperbolic Problems: Theory, Numerics, Applications*, pages 931–939. Birkhäuser, 2001.

[16] Robin Young. Wave interactions in nonlinear elastic strings. *Arch. Rat. Mech. Anal.*, 161:65–92, 2002.

[17] Robin Young. Nonstrictly hyperbolic waves in elasticity. *J. Diff. Eq.*, 188:80–109, 2003.

[18] Robin Young. Isentropic gas dynamics with large data. In Thomas Hou and Eitan Tadmor, editors, *Hyperbolic Problems: Theory, Numerics, Applications*, pages 929–939. Springer, 2003.

[19] Robin Young. Review of "Nonlinear hyperbolic waves in multi-dimensions", by Phoolan Prasad. *SIAM Review*, 45:162–164, 2003.

[20] Robin Young. Blowup of solutions and boundary instabilities in nonlinear hyperbolic equations. *Comm. Math. Sci.*, 2:269–292, 2003.

[21] Robin Young. Blowup in hyperbolic conservation laws. *Contemp. Math.*, 327:379–387, 2003.

[22] H.K. Jenssen and R.C. Young. Gradient driven and singular flux blowup of smooth solutions to hyperbolic systems of conservation laws. *J. Hyp. Diff. Eq.*, 1:627–641, 2004.

[23] Robin Young and Walter Szeliga. Blowup with small BV data in hyperbolic conservation laws. *Arch. Rat. Mech. Anal.*, 179:31–54, 2006.

[24] W. Domański and R. Young. Interactions of plane waves in nonlinear elasticity. Preprint, 34 pages, available at
`http://www.math.umass.edu/~young/Research/misc/domanski.pdf`,
2011.

[25] W. Domański and R. Young. Interaction coefficients for 3-D conservation laws. In preparation.

[26] Robin Young. Global wave interactions in isentropic gas dynamics. Submitted, 47 pages, available at
`http://www.math.ntnu.no/conservation/2008/032.html`, 2011.

[27] Robin Young. Composite wave interactions and the collapse of vacuums in gas dynamics. *J. Diff. Eq.*, 252:5129–5154, 2012.

[28] Blake Temple and Robin Young. A paradigm for time-periodic sound wave propagation in the compressible Euler equations. *Methods and Appls of Analysis*, 16(3):341–364, 2009.

[29] Blake Temple and Robin Young. Time-periodic linearized solutions of the compressible Euler equations and a problem of small divisors. *SIAM Journal of Math Anal*, 43(1):1–49, 2011.

[30] Blake Temple and Robin Young. A Liapunov-Schmidt reduction for time-periodic solutions of the compressible Euler equations. *Methods and Appls of Analysis*, 17(3):225–262, 2010.

[31] Blake Temple and Robin Young. Linear waves that express the simplest possible periodic structure of the compressible Euler equations. *Acta Mathematica Scientia*, 29B(6):1749–1766, 2009.

[32] Blake Temple and Robin Young. A canonical small divisor problem for the Nash-Moser method. *Comm. Information and Systems*, 13(4):469–485, 2013.

[33] Blake Temple and Robin Young. A Nash-Moser framework for finding periodic solutions of the compressible Euler equations. *J. Sci. Comput.*, DOI: 10.1007/s10915-014-9851-z, 2014.

[34] Robin Young. Nonuniqueness of BV solutions of quasilinear hyperbolic systems. *J. Hyper. Diff. Eq.*, 9:555–570, 2012.

[35] Robin Young. Modified front tracking for isentropic gas dynamics. In preparation, 2013.

[36] Robin Young. Shock waves, and how to avoid them. Annual Newsletter, Mathematics and Statistics Department, University of Massachusetts, 2013.

[37] Geng Chen and Robin Young. Smooth solutions and singularity formation for the inhomogeneous nonlinear wave equation. *J. Diff. Eq.*, 252:2580–2595, 2012.

[38] Geng Chen and Robin Young. Shock formation and exact solutions for the compressible Euler equations. *Arch. Ration. Mech. Anal.*, to appear:1–31, 2014.

[39] Geng Chen and Robin Young. Global shock free solutions and shock formation for the Euler equations with monotonic entropy. In preparation, 2010.

[40] Geng Chen and Robin Young. Strong wave interactions in 3×3 gas dynamics. In preparation, 2010.

[41] Geng Chen and Robin Young. The vacuum in nonisentropic gas dynamics. *Acta Mathematica Scientia*, 32:339–351, 2012.

[42] Geng Chen, Robin Young, and Qingtian Zhang. Shock formation in the compressible Euler equations and related systems. *Jour. Hyp. Diff. Eq.*, 10:149–172, 2013.

[43] P.-E. Jabin, A. Miroshnikov, and R. Young. Cellulose biodegradation models; an example of cooperative interactions in structured populations. submitted, 2015.

[44] A. Miroshnikov and R. Young. Weak* solutions I: A new perspective on solutions to systems of conservation laws. submitted, 2015.

[45] A. Miroshnikov and R. Young. Weak* solutions II: The vacuum in Lagrangian gas dynamics. preprint, 2015.

[46] A. Miroshnikov and R. Young. Weak* solutions III: A general unified approach for balance laws. In preparation, 2016.

Last updated May 2016.