# Vita for Robert C. McOwen

**Birth:** January 12, 1951 in Long Beach, California

**Education:**

B.S. in Mathematics: Harvey Mudd College, 1973
M.A. in Mathematics: University of California, Berkeley, 1975
Ph.D. in Mathematics: University of California, Berkeley, 1978

**Employment:**

Research Fellow Courant Institute, NYU, 1978-79
Assistant Professor of Mathematics, Northeastern University, 1979-85
Associate Professor of Mathematics, Northeastern University, 1985-2000
Professor of Mathematics, Northeastern University, 2000-present
Chairman of Math Department, Northeastern University, 2001-2007
Interim Chair of Math Department, Northeastern University, 2008-2009

**National Grants/Awards:**

AMS/NSF Postdoctoral Research Fellow 1978-9.
Co-PI for NSF grant for ACE Implementation, 1996-8.

**Affiliations:**

Member of American Mathematical Society

**Invited International Talks:**

Oberwohlfach, Germany, May 1987
Montreal, Canada, September 1994
Basilia, Brazil, June 1997
Shanghai, China, June 1998
Berlin, Germany, August 2001
Rome, Italy, June 2008
Novosibirsk, Russia, October 2008

**Publications (Books/Textbooks):**

1. *Partial Differential Equations: Methods & Applications*, Prentice Hall, 1996.
2. *Computer Labs for Differential Equations*, Prentice Hall, 1997.
3. *Partial Differential Equations: Methods & Applications*, Second Edition, Prentice Hall, 2003.
4. *Differential Equations with Linear Algebra*, Center of Math, 2012.

**Publications (Articles):**

1. The C*-algebra of a singular elliptic problem on a noncompact Riemannian manifold (with H.O. Cordes), *Math. Zeit.* 153 (1977), 101-116.
2. Remarks on singular elliptic theory for complete Riemannian manifolds (with H.O. Cordes), *Pacific J.* 70 (1977), 133-141.
3. The behavior of the Laplacian on weighted Sobolev spaces, *Comm. Pure Appl. Math.* 32 (1979), 783-795.

4. Fredholm theory of partial differential equations on complete Riemannian manifolds, *Pacific J.* 87 (1980), 169-185.

5. On elliptic operators in $R^n$, *Comm. Part. Diff. Eq.* 5 (1980), 913-933.

6. Boundary value problems for the Laplacian in an exterior domain, *Comm. Part. Diff. Eq.* 6 (1981), 783-798.

7. Pseudo-differential operators depending on a complex parameter, *Global Analysis* (ed. T.M. Rassias), Teubner-Texte, Leipzig, 1983.

8. On elliptic systems in Rn (with R. Lockhart), *Acta Math.* 150 (1983), 125-135.

9. On the equation $\Delta u + Ke^{2u} = f$ and prescribed negative curvature on $R^2$, *J. Math. Anal. and Appl.* 103 (1984), 365-370.

10. Elliptic differential operators on noncompact manifolds (with R. Lockhart), *Ann. Scuola Norm. Sup. Pisa, Ser. IV* 12 (1985), 409-447.

11. Conformal metrics in $R^2$ with prescribed Gaussian curvature and positive total curvature, *Indiana Univ. Math. J.* 34 (1985), 97-104.

12. Conformal deformations of complete manifolds with negative curvature (with Patricio Aviles), *J. Diff. Geom.* 12 (1985), 269-281.

13. Negative curvature and conformal deformations of complete manifolds, *Nonlinear Problems in Geometry (Contemporary Mathematics, Vol. 51)*, ed. D. Deturck, AMS, 1986.

14. Conformal deformation to constant negative scalar curvature on noncompact Riemannian manifolds (with P. Aviles), *J. Diff. Geom.* 27 (1988), 225-239.

15. Point singularities and conformal metrics on Riemann surfaces, *Proc. of the Amer. Math. Soc.* 103 (1988), 222-224.

16. Complete conformal metrics with negative scalar curvature in compact Riemannian manifolds (with P. Aviles), *Duke Math. J.* 56 (1988), 395-398.

17. The Laplacian on complete manifolds with warped cylindrical ends (with Xiaoyun Ma), *Comm. in Part. Diff. Eq.* 16 (1991), 1583-1614.

18. Complete conformal metrics with zero scalar curvature in compact Riemannan manifolds (with X. Ma), *Proc. of the Amer. Math. Soc.* 115 (1992), 69-77.

19. Prescribed curvature and singularites of conformal metrics on Riemann surfaces, *J. Math. Anal. & Appl.* 177 (1993), 287-298.

20. Conformal metrics with singularities and finite negative total curvature on Riemann surfaces, *Geometry and Nonlinear Partial Diff'l Equations (Contemporary Math, Vol. 127)*, ed. Oliker & Treibergs, AMS, 1992.

21. Singularites and the conformal scalar curvature equation, *Geometric Analysis and Nonlinear Partial Diff'l Equations*, ed. I. Bakelman, Dekker Inc., 1993.

22. Singularities and asymptotics for the equation $\Delta_g u - u^q = Su$ (with D. Finn), *Indiana University Mathematics Journal* 42 (1993), 1487-1523.

23. Results and open questions on the singular Yamabe problem, *Proceedings* of the Conference on Dynamical Systems and Differential Equations held at Springfield, Missouri, June 1996; appeared in *Dynamical Systems & Differential Equations* 1998.

24. The singular Yamabe problem & conical asymptotics, to appear in *Proceedings* of the International Conference on Dynamical Systems and Differential Equations, Shanghai, June 1998.

25. Singular Sturm-Liouville theory on manifolds (with R. Mazzeo), *Journal of Differential Equations*, 176 (2001), 387-444.
26. Asymptotics for solutions of elliptic equations in double divergence form (with V. Maz'ya), *Comm. in Part. Diff. Eq.*, 32 (2007), 1-17.
27. On the fundamental solution for an elliptic equation in nondivergence form (with V. Maz'ya), *AMS Translations: special volume dedicated to Nina Uraltseva* 229 (2010), 145-172.
28. On elliptic operators in nondivergence and double divergence form, *Operator Theory: Advances and Applications*, 193 (2009), 159-169.
29. Differentiablilty of solutions to second-order elliptic equations via dynamical systems (with V. Maz'ya), *J. Differential Equations*, 250 (2010), 1137-1168.
30. Second-order differentiability for solutions of elliptic equations in the plane (with V. Maz'ya), *J. Mathematical Sciences*, 191 (2013), 243-253.
31. Shallow water waves with asymptotics (with Peter Topalov), *Discrete & Continuous Dynamical Systems*, 35 (2015), 3103-3131.
32. Groups of asymptotic diffeomorphisms (with Peter Topalov), *Discrete & Continuous Dynamical Systems* 36, no. 11 (2016), 6331-6377.
33. Differentiability of solutions to the Neumann problem with low-regularity data via dynamical systems (with V. Maz'ya), *Operator Theory: Advances and Applications*, 261 (2017), 343-385.
34. Spatial asymptotic expansions in the incompressible Euler equation  (with Peter Topalov), *Geometric and Functional Analysis*, 27 (2017), 637-675.

**Conferences, Workshops, & Special Sessions Organized:**
1. Special Session on Partial Differential Equations in Geometry and Mathematical Physics (with C. King and M. Shubin), AMS Meeting #903, Northeastern University, October 5-7, 1995.
2. Special Session on Partial Differential Equations in Geometry (with T. Branson), AMS Meeting #914, Rider University, October 5-6, 1996.
3. Workshop in Industrial Mathematics (with A. Martsinkovsky), Northeastern University, April 3-6, 1998.

**Students who received a Ph.D. under my supervision (and their employment):**
1. Jeanne Trubek, June 1988. Thesis title: *Asymptotic Behavior of Solutions to $\Delta u + Ke^{2u} = 0$ and $\Delta u + Ku^{\sigma} = 0$ on Euclidean Spaces*
   - Simmons College, Boston, MA
   - Emmanuel College, Boston, MA
2. Xiaoyun Ma, June 1990. Thesis title: *The Laplacian on Complete Manifolds with Warped Cylindrical Ends and its Application.*
   - University of Wisconsin, La Crosse, WI
   - University of San Diego, San Diego, California
3. Junjie Tang, June 1992. Thesis title: *Prescribing Curvature on Manifolds with Singularities*
   - Information Resources, Inc., Waltham, MA
   - Scudder Mutual Funds, Boston, MA

4. David Finn, June 1995. Thesis title: *Positive Solutions to Nonlinear Elliptic Equations with Prescribed Singularities.*
   - Merrimack College, Andover, MA: 1995-8;
   - Goucher College, Maryland: 1998-9.
   - Rose-Human Institute of Technology: 1999-present.
5. Randall Rausch, September 1996. Thesis title: *The Kite Method for Accelerating Vortex Method Solutions of Euler's and Navier-Stokes' Equations.*
   - E-Systems, subsidiary of Raytheon, in Dallas, Texas.
   - University of Texas, Dallas
6. Bindu Veetel, April 2014. Thesis title: *On the regularity of solutions to the Beltrami equation in the Plane.*
   - Part-time Lecturer, Northeastern University: 2014-2019.

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