

THOMAS K. DeLILLO

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I. Education and Employment

Education:

New York University, PhD, 1985.

New York University, MS, 1978.

Upsala College, BA, 1973.

PhD Thesis: *A comparison of some numerical conformal mapping methods*

Thesis Advisor: Olof B. Widlund

Professional Employment:

Professor, Wichita State University, 2005 to present.

Associate Professor, Wichita State University, 1994 to 2005.

Visitor, Courant Institute of Mathematical Science, New York University, Spring, 1997.

Assistant Professor, Wichita State University, 1988 to 1994.

Visiting Assistant Professor, Duke University, 1987 to 1988.

Visiting Assistant Professor, UNC at Chapel Hill, 1986 to 1987.

Postdoctoral position, Exxon Research and Engineering Co., 1985 to 1986.

Independent contractor, Exxon Research and Engineering Co., 1984 to 1985.

Lecturer in Mathematics, New York University, 1982 to 1984.

Memberships in Professional Societies:

American Mathematical Society

Society for Industrial and Applied Mathematics

American Physical Society

II. Teaching Information

Courses taught at WSU:

Calculus I, II, III
Business Calculus
Discrete Mathematics
Computational Mathematics using MATLAB
Mathematics for Elementary School Teachers
Ordinary Differential Equations
Mathematical Models
Numerical Methods
Optimization Theory
Engineering Mathematics I and II
Applied Mathematics and Mathematical Physics (Math/Physics)
Numerical Linear Algebra
Numerical Analysis of Differential Equations
Calculus of Variations
Tensor Analysis with Applications
Continuum Mechanics (Aerospace Engineering)
Advanced Mechanics (Physics)
Elementary Particles (Physics)
The Geometry of Physics (Math/Physics)
Functional Analysis I and II
Quantum Field Theory (Physics)
Individual Readings, Special Topics, PhD Dissertation

MS and PhD students:

Mark A. Horn, *Iterative methods applied to some problems in conformal mapping and potential theory*, PhD thesis (1997).

Lianju Wang, *Computational methods for two problems in potential theory*, PhD thesis (2000).

Noureddine Benchama, *A simplified Fornberg-like method for the conformal mapping of multiply connected regions*, PhD thesis (2003).

T. Mark Harder, *Some remarks on constructive Yukawa theory in four dimensions*, PhD thesis (2008)

Everett H. Kropf, *A Fornberg-like method for the numerical conformal mapping of bounded multiply connected domains*, MS thesis (2009) (won WSU Graduate School Outstanding Thesis Award for Spring 2009), *Numerical computation of Schwarz-Christoffel transformations and slit maps for multiply connected domains*, PhD thesis, Spring, 2012.

Richard Traverzo, *Derivation and regularization of corrections to propagators and vertices for cubically interacting scalar field theories*, MS thesis, Spring, 2013.

III. Funded Research Grants

Total external funding \$2,002,790 (approximate), including \$680,361 as Principal Investigator (estimated through 2010).

An analysis of commuter-aircraft seat-type structures in a crash environment, IAR 89.21 with Steve Hooper, PI, of WSU Aerospace Engineering Department and Institute for Aviation Research, funded by FAA, 1990 to 1992, \$171,114.

Wichita State University College of Liberal Arts and Sciences 1990 Summer Research Fellowship for *A Proposal for Experiments and Applications Using Numerical Conformal Mapping Methods*, \$3,500.

Numerical conformal mapping: methods, applications, and theory, U. S. Department of Energy grant DE-FG02-92ER25124, T. DeLillo, PI, funded for 6/1/92 to 5/31/94, \$35,646.

Mathematical modeling in fluid mechanics, with A. R. Elcrat, PI, and K. G. Miller, coPI, National Science Foundation grant OSR-9255223 under the NSF-EPSCoR program, funded for 1992 to 1995, \$189,000 (approximate).

Applications of numerical conformal mapping and computational complex analysis to Two-Dimensional Elasticity Problems, National Research Council COBASE Project Development Grant for 2 week visit to Muskhelishvili Institute, Tbilisi, Georgia, fSU, \$2,200 awarded. Visited Tbilisi 7/23 to 8/7/97.

*NSF EPSCoR K*Star Instrumentation Proposal for Acquisition of a High Performance Computer for Wichita State University*, D. Alexander, PI, R. Agarwal, P. Kuchment, S. Chou, E. Behrman, T. DeLillo, V. Madhavan, C. Yang, coPIs, \$437,144, 4/9/99, funded (FY 2001, \$223,256.)

Mathematical methods for nearfield acoustical holography with V. Isakov, PI, National Science Foundation DMS GOALI, University-Industry Cooperative Research Program, DMS-9803816 funded for 6/1/98 to 5/31/01, \$70,763.

AD95-5 Quiet Fuselage Program, with V. Isakov, coPI, funded by Cessna Aircraft Co., funded for 6/1/98 to 5/31/00, \$25,000.

*NSF EPSCoR K*Star New faculty start-up proposal for a joint position in scientific computing in WSU Math Department and WSU National Institute for Aviation Research*, T. DeLillo, PI, R. Agarwal and A. Elcrat, co-PIs, NSF no. 9874732, funded for 2/1/99 to 8/01, \$108,733.

NSF ITR/ACS Collaborative Research: Advanced Algorithms for Visualizing Sources of Noise and Vibrations of Complex Structures, T. DeLillo, PI, V. Isakov, T. Hrycak, and S.

F. Wu (Wayne State), coPIs, NSF no. 0081270, funded for 9/1/00 to 8/31/03, \$498,782.

NSF Research Experience for Undergraduates (REU) Supplement to NSF ITR Grant No. 0081270, funded for Summer 2002, \$10,000.

Support for Sabbatical Travel, WSU URCA, funded 2003-2004, \$4000. Funds were used to support travel to various meetings and living expenses, and visits to various universities: NYU, Princeton, Institute for Advanced Study, Rutgers, University of Delaware, and University of North Carolina at Chapel Hill.

LAS 2007 Summer Support Fellowship for Research on Conformal Mapping and Problems in Theoretical Physics, awarded \$4,000.

Innovative Methods for Gravimetric and Electromagnetic Prospecting, National Geospatial Intelligence Agency, \$449,908, V. Isakov, PI, A. Boukhgueim, T. DeLillo, A. Elcrat, and J. Qian, coPIs, funded 2008-2011.

Support for Sabbatical Travel, WSU URCA, funded 2010-2011, \$4500.

FRG: Collaborative Research: Modern Applications of Geometric Structure, Analytic Functions and Singularities: Modeling, Theory and Computation, Stefan G. Llewellyn-Smith, USCD, PI, CoPIs and other senior personnel: Linda J. Cummings, NJIT, Paul A. Martin, Colorado School of Mines, Thomas K. DeLillo and Alan Elcrat, WSU, and others, submitted to NSF DMS FRG Applied Math Program, submitted 9/21/12, \$256,840 (WSU), not funded.

IV. Publications

A. Articles Published in Refereed Journals

- [1] T. K. DeLillo, *On some relations among numerical conformal mapping methods*, Journal of Computational and Applied Mathematics, 19 (1987), pp. 363–377.
- [2] T. K. DeLillo, *A note on Rengel's inequality and the crowding phenomenon in conformal mapping*, Applied Mathematics Letters, 3, 2, (1990), pp. 25–27.
- [3] T. K. DeLillo, A. R. Elcrat, and K. G. Miller, *Constant vorticity Riabouchinsky flows from a variational principle*, Journal of Applied Mathematics and Physics (ZAMP), 41 (1990), pp. 755–765.
- [4] T. K. DeLillo and A. R. Elcrat, *A comparison of some numerical conformal mapping methods for exterior regions*, Society for Industrial and Applied Mathematics (SIAM) Journal on Scientific and Statistical Computing, 12, 2 (1991), pp. 399–422.
- [5] T. K. DeLillo and A. R. Elcrat, *A Fornberg-like conformal mapping method for slender regions*, Journal of Computational and Applied Mathematics, 46, 1–2 (1993), pp. 49–64.
- [6] T. K. DeLillo and J. A. Pfaltzgraff, *Extremal distance, harmonic measure, and nu-*

- merical conformal mapping*, Journal of Computational and Applied Mathematics, 46, 1–2 (1993), pp. 103–113. This paper gives the first general estimate of the crowding based on my initial insight in [2].
- [7] T. K. DeLillo and A. R. Elcrat, *Numerical conformal mapping methods for exterior regions with corners*, Journal of Computational Physics, 108 (1993), pp. 199–208.
- [8] T. K. DeLillo, *The accuracy of numerical conformal mapping methods: a survey of examples and results*, SIAM Journal on Numerical Analysis, 31 (1994), pp. 788–812.
- [9] R. H. Chan, T. K. DeLillo, and M. A. Horn, *The numerical solution of the biharmonic equation by conformal mapping*, SIAM Journal on Scientific Computing, 18 (1997), pp. 1571–1582.
- [10] T. K. DeLillo, A. R. Elcrat, and J. A. Pfaltzgraff, *Numerical conformal mapping methods based on Faber series*, Journal of Computational and Applied Mathematics, 83 (1997), pp. 205–236.
- [11] R. H. Chan, T. K. DeLillo, and M. A. Horn, *Superlinear convergence estimates for a conjugate gradient method for the biharmonic equation*, SIAM Journal on Scientific Computing Special Issue on Iterative Methods, 19 (1998), pp. 139–147.
- [12] T. K. DeLillo and J. A. Pfaltzgraff, *Numerical conformal mapping methods for simply and doubly connected regions*, SIAM Journal on Scientific Computing Special Issue on Iterative Methods, 19 (1998), pp. 155–171.
- [13] T. K. DeLillo, M. A. Horn, and J. A. Pfaltzgraff, *Numerical conformal mapping of multiply connected regions by Fornberg-like methods*, Numerische Mathematik, 83, 2 (1999), pp. 205–232.
- [14] T. DeLillo, V. Isakov, N. Valdivia, and L. Wang, *The detection of the source of acoustical noise in two dimensions*, SIAM Journal on Applied Mathematics, 61 (2001), pp. 2104–2121.
- [15] T. K. DeLillo, A. R. Elcrat, and J. A. Pfaltzgraff, *Schwarz-Christoffel mapping of the annulus*, SIAM Review, 43 (2001), pp. 469–477.
- [16] T. DeLillo, V. Isakov, N. Valdivia, and L. Wang, *The detection of surface vibrations from interior acoustical pressure*, Inverse Problems, 19 (2003), pp. 507–524.
- [17] N. Benchama and T. K. DeLillo, *A brief overview of Fornberg-like methods for conformal mapping of simply and multiply connected regions*, Bulletin of the Malaysian Mathematical Sciences Society (Second Series) 26 (2003), pp. 1–10.
- [18] T. K. DeLillo, A. R. Elcrat, and J. A. Pfaltzgraff, *Schwarz-Christoffel mapping of multiply connected domains*, Journal d’Analyse Mathématique, 94 (2004), pp. 17–47. This is a mainly theoretical paper to which I made very substantial contributions. An NSF proposal review panel called the results in this paper “a striking new development in classical one complex variable theory”.
- [19] T. K. DeLillo, A. Elcrat, and C. Hu, *Computation of the Helmholtz-Kirchhoff and reentrant jet flows using Fourier series*, Applied Mathematics and Computation, 163 (2005), pp. 397–422.
- [20] T. DeLillo, T. Hyrcak, and V. Isakov, *Theory and boundary element methods for nearfield acoustic holography*, Journal of Computational Acoustics, 13, 1 (2005), pp. 163–185. I wrote some of the numerical sections, including examples of actual NRL experimental data on a Cessna fuselage test section.

- [21] T. K. DeLillo, *Schwarz-Christoffel mapping of bounded, multiply connected domains*, Computational Methods and Function Theory Journal, 6, No. 2 (2006), pp. 275–300.
- [22] T. K. DeLillo, T. A. Driscoll, A. R. Elcrat, and J. A. Pfaltzgraff, *Computation of multiply connected Schwarz-Christoffel maps for exterior domains*, Computational Methods and Function Theory Journal, 6, No. 2 (2006), pp. 301–315.
- [23] T. DeLillo and T. Hrycak, *A stopping rule for the conjugate gradient regularization method applied to inverse problems in acoustics*, Journal of Computational Acoustics, 14, No. 4 (2006), pp. 397–414.
- [24] N. Benchama, T. DeLillo, T. Hrycak, and L. Wang, *A simplified Fornberg-like method for the conformal mapping of multiply connected regions - Comparisons and crowding*, Journal of Computational and Applied Mathematics, 209 (2007), pp. 1–21.
- [25] T. K. DeLillo, T. A. Driscoll, A. R. Elcrat, and J. A. Pfaltzgraff, *Radial and circular slit maps of unbounded multiply circle connected domains*, Proceedings of the Royal Society A, 464 (2008), pp. 1719–1737.
- [26] T. K. DeLillo and E. H. Kropf, *Slit maps and Schwarz-Christoffel maps for multiply connected domains*, Electronic Transactions on Numerical Analysis, 36 (2010), pp. 195–223.
- [27] T. K. DeLillo and E. H. Kropf, *Numerical computation of the Schwarz-Christoffel transformation for multiply connected domains*, SIAM J. Sci. Comput., 33, 3 (2011), pp. 1369–1394.
- [28] T. K. DeLillo, A. R. Elcrat, and E. H. Kropf, *Calculation of resistances for multiply connected domains using the Schwarz-Christoffel transformations*, Comput. Methods Function Theory, 11 (2) (2011), pp. 725–745.
- [29] T. K. DeLillo, A. R. Elcrat, E. H. Kropf, and J. A. Pfaltzgraff, *Efficient calculation of Schwarz-Christoffel transformations for multiply connected domains using Laurent series*, Comput. Methods Funct. Theory, 13 (2013), pp. 307–336, DOI 10.1007/s40315-013-0023-1.

B. Articles Submitted for Publication in Refereed Journals

- [30] T. K. DeLillo and E. H. Kropf, *A Fornberg-like method for the numerical conformal mapping of bounded multiply connected domains*, submitted to ETNA, 3/25/13.

C. Articles Published in Conference Proceedings

- [31] T. K. DeLillo and K. E. Jordan, *Some experiments with a dynamic grid technique for fluid flow codes*, in R. Vichnevetsky and R. S. Stepleman, Eds., *Advances in Computer Methods for Partial Differential Equations-VI*, Sixth IMACS Symposium Proceedings, Lehigh University (1987) 495–500, not refereed.
- [32] T. K. DeLillo, *On the use of numerical conformal mapping methods in solving boundary value problems for the Laplace equation*, in R. Vichnevetsky, D. Knight, and G. Richter, Eds., *Advances in Computer Methods for Partial Differential Equations-VII*, Seventh IMACS Symposium Proceedings, Rutgers University (1992) 190–194, not refereed.

- [33] T. K. DeLillo, *Comparisons of some numerical conformal mapping methods*, in W. F. Ames, Ed., *Proceedings of the 14th IMACS World Congress on Computation and Applied Mathematics, Vol. 1*, (1994) Georgia Institute of Technology, Atlanta, Georgia 115–118, not refereed.
- [34] T. K. DeLillo and J. A. Pfaltzgraff, *Numerical conformal mapping methods for exterior and doubly connected regions*, Proceedings of the Copper Mountain Conference on Iterative Methods, Vol 1, 4/9 to 4/13/96, Copper Mountain, CO.
- [35] T. DeLillo, V. Isakov, N. Valdivia, and L. Wang, *Computational methods for the detection of the source of acoustical noise*, Proceedings of the ASME Noise Control and Acoustics Division - 2000, NCA - Vol. 27, “Use of Sound and Vibration for System Characterization”, S. F. Wu and R. F. Keltie, eds., 2000 ASME International Mechanical Engineering Congress and Exposition, pp. 359–366, invited paper.
- [36] T. DeLillo, T. Hrycak, and N. Valdivia, *Iterative regularization methods for inverse problems in acoustics*, Proceedings of 2002 ASME International Mechanical Engineering Congress and Exposition, paper number IMECE2002/NCA-32730.

D. Book Reviews

- [37] T. DeLillo, Review of *Moving-Grid Methods for Time-Dependent Partial Differential equations*, by P. A. Zegeling, in SIAM Review, 37, 1 (1995) 120–121.

V. Selected Service Information

A. Committee Service at WSU

1. Service in Math Department

Organizer of weekly Lecture Series in the Mathematical Sciences, 1994 to 2003.

Member of Departmental Library Committee, 1990 to present.

Member of various textbook committees, 1988 to present.

Member of Dept. Faculty Search Committees, 1990, 1992, 1993, 1999 (chair), 2004, 2007-2008.

Organizer of Math Department Activities for WSU Open House, 4/13/96.

Written Qualifying Exam Committee, 1991, 1992, 1994, 1995, 1996, 1997, 2001, 2004, 2005, 2006, 2007(2), 2008(Chair).

Member of Oral Exam/Thesis Committees for MS: 1990(2), 1993(1), 1994(2), 1995(1), 1996(2), 2001(3), 2005(3), 2006(1), 2007(1), 2009, 2010, 2013 (1 as chair).

Member of PhD Committees: 1994(2), 1995(2), 1996(1), 1997(4), 1998(1), 2000(2), 2001 (1), 2002(1), 2003(2), 2007 (chair) 2008(2), 2009, 2010 (3, one as chair), 2011, 2012 (chair), 2013 (1).

Nominated for Board of Trustees Excellence in Teaching Award 1996, 2000.

Nominated for WSU Academy for Effective Teaching Award 2005.

Member of Math Dept Executive Advisory Committee, Spring 2005-2008 (Chair 2007-2008).

Member of Math Dept Physics group, 2012 to present.

Interim Director of Physics group, 2013 to present.

2. WSU Service Outside Math Department

Outside reader for 7 MFA theses in Creative Writing, 1989 to 1992.

Outside reader for 12+ MS theses in Engineering, 1989 to 2010.

Outside committee member for 28 PhD candidates in Engineering, 1992, 1993, 1994, 1995, 1996, 1998, 1999, 2000, 2001, 2002, 2004, 2005, 2006, 2011, 2012.

Member of Faculty Grievance Committee, Spring, 1994.

Energy Conservation Committee, 1998.

Member of Academic Affairs Administrative Review Committee, January–April, 1998.

Member of Faculty Senate, 1997 to 2003.

Faculty Senate Budget Committee, 8/98 - 2003.

Ad Hoc Centers Review Committee, Fall 2001.

Nominated for Kansas Board of Regents Outstanding Faculty of the Year Award 2003.

WSU President's Distinguished Service Award, 2004.

University Faculty Support Committee member, Fall 2005-2008, chair (2007-2008).

Nominated for WSU Research Award, 2009.

Sabbatical years, 1996-1997, 2003-2004, 2010-2011.

Reviewer for WSU GRASP symposium, 2011.

Advisor to McNair Scholar, Fall 2011.

LAS College Tenure and Promotion Committee, 2011 to present, Chair, 2012.

University Tenure and Promotion Committee, LAS representative, 2012.

University Doctoral Subcouncil, member since 11/21/11.

University Research Council, 2013 to present.

B. Recent Selected Talks and Meetings

International Conference on Computational Methods and Function Theory, Penang, Malaysia, 1994, contributed talk.

Conference on Scientific Computation, Hong Kong, 1994, contributed talk.

14th IMACS World Congress on Computation and Applied Mathematics, Georgia Institute of Technology, Atlanta, Georgia, 1994, co-organized Special Session on Conformal Mapping and Grid Generation.

University of Freiberg, Freiberg, Germany, 1995, invited talk.

Konstruktive Verfahren in der komplexen Analysis, Mathematisches Forschungsinstitut, Oberwolfach, Germany, 1995, invited talk.

Math Colloquium, Univ. of North Florida, 1995, invited talk.

SIAM Annual Meeting, Kansas City, Mo., 1996, invited talk in minisymposium on Grid Generation and Applications.

ISAAC meeting, Univ. of Delaware, 1997, organized Special Session on Numerical Conformal Mapping.

SIAM Annual Meeting, Stanford U., CA, 1997, invited talk for minisymposium on Fast Toeplitz Solvers

International Conference on Computational Methods and Function Theory, Nicosia, Cyprus, 1997, gave contributed talk.

Conference on Domain Decomposition and Numerical Analysis in honor of Olof B. Widlund on his 60th birthday, Courant Institute of Math. Sci., NYU, 1998, session chair.

Kansas Center for Advanced Scientific Computing, University of Kansas, invited talk, 1998.

University of Washington, Complex Variables Seminar, invited talk, 1998.

Naval Research Laboratory Physical Acoustics Group, invited talk, 1999.

Birzeit University Math Dept., West Bank, invited talk, 1999.

University of Cyprus Math Dept., invited talk, 1999.

Cessna Aircraft Co., Wichita, invited talk, 1999.

Ohio State University, Applied Math Seminar., invited talk, 1999.

Acoustical Society of America meeting, Columbus, OH, contributed talk, 1999.

University of North Carolina at Chapel Hill, Applied Math Seminar, invited talk, 2000.

American Society of Mechanical Engineers International Conference, Orlando, FLA, invited talk in Special Symposium, 2000.

Wayne State University, Mechanical Engineering Colloquium, invited talk, 2001.

Applied Inverse problems meeting, Montecatini, Italy, contributed talk, 2001.

International Conference on Computational Methods and Function Theory, Aveiro, Portugal, contributed talk, 2001.

SIAM Annual meeting, San Diego, CA, organized minisymposium on Computational Acoustics and Inverse Problems, 2001.

American Society of Mechanical Engineers International Conference, New Orleans, LA, invited talk in Special Symposium, 2002.

Acoustical Society of America meeting, Cancun, Mexico, invited talk, 2002.

Inverse Problems Workshop Series II, Institute for Pure and Applied Mathematics, UCLA 11/12/03 to 11/20/03, invited attendee.

CMFT 2005 meeting, Joensuu, Finland, contributed talk.

Strings 2005 meeting, Toronto, Canada, contributed poster session.

SIAM Annual meeting, Boston, MA, invited minisymposium talk, 2006.

Kansas State U Math Dept Analysis Seminar, invited talk, 11/8/06.

Gave talk at WSU Math Lecture Series, Feb. 2008.

SIAM Annual meeting, San Diego, CA, organized minisymposium, 2008.

Contributed poster session with MS student E. Kropf for 70th birthday meeting for Olof Widlund, Courant, NYU, Sept., 2008.

Contributed talk for 80th birthday meeting for Richard Varga, Kent State U., Oct., 2008.

Temple Univ. Math Dept. Colloquium, invited talk, 10/18/10.

Temple Univ. Math Dept. Applied Math and Scientific Computing, invited talk, 10/20/10.

Kent State Math Dept., invited talk, 4/20/11.

SUNY Stony Brook Math Dept, invited talk, 4/26/11.

SUNY Stony Brook Computer Sci., invited talk, 4/28/11.

CCAAT 2011 meeting in honor of Nick Papamichael, Protaras, Cyprus, contributed talk, 6/6/11.

ICIAM 2011 meeting Vancouver, BC, 7/18-7/22/11, invited talk in minisymposium and contributed poster session.

AMS meeting, University of Kansas, invited talk in special session, 3/31/12.

New Frontiers in Numerical Analysis and Scientific Computing—A conference on the occasion of Lothar Reichel's 60th birthday and on the 20th anniversary of ETNA, Kent State Univ., Kent, OH, 4/19–20/13, contributed talk.

First Central Region Conference on Numerical Analysis and Dynamical Systems, University of Kansas, Lawrence, KS, 5/3–5/13, invited talk.

Frontiers of Applied and Computational Mathematics meeting, NJIT, Newark, NJ, 5/31/13, attended.

Conformal Geometry in Mapping, Imaging, and Sensing Workshop, co-organizer with Darren Crowdy and Darryl Holm, Imperial College, London, 6/20-21/13, also gave invited talk. Jointly sponsored by London Math Society, the Engineering and Physical Sciences Research Council, and Proceedings of the Royal Society A.

C. Journal Refereeing, Reviewing, and Other Outside Service

Managing Editor of Journal Electronic Transactions in Numerical Analysis, Fall 2005 to present.

Referee for various journals including ETNA, JCP, SISC, JCAM, BIT, CMFT, Proc. R. Soc. A, JASA, J. Sound and Vibrations, etc.

Co-editor of Comput. Methods Function Theory Journal Special Issue, Vol. 11, No. 2 (2011).