

# RICHARD DEAN NEIDINGER

## ADDRESS

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## EDUCATION

The University of Texas at Austin, 1980-84, Ph.D. August 1984  
The University of Texas at Austin, 1978-80, M.A. August 1980  
Purdue University, 1977-78  
Trinity University, San Antonio, 1973-77, B.A. summa cum laude, May 1977

### Major Field: Functional Analysis

Ph.D. Dissertation: Properties of Tauberian Operators on Banach Spaces  
Supervising Professor: Haskell P. Rosenthal

### Minor Field: Applied Mathematics

Including many graduate and undergraduate courses in Modern Applied Mathematics, Computer Science and Operations Research; undergraduate major in Physics; research consultant and T.A. in Finance

## HONORS

Fulbright Specialist Roster, 2016 – 2021, Math Education, Technology in Mathematics  
The George Pólya Award, from the MAA, 1990,  
for expository article “Automatic Differentiation and APL”  
MAA Panel of Visiting Lecturers, 1990 – 1993  
Manugistics Educational Software Grant, 1992, 1993  
Phi Beta Kappa and several other undergraduate honors and scholarships

## EXPERIENCE

Davidson College

Professor of Mathematics, 1997-2020  
Chair of the Department of Mathematics 2003-2008  
Associate Professor of Mathematics, 1990-1997  
Assistant Professor of Mathematics, 1984-1990

### Courses taught:

Programming and Problem Solving (w/ Pascal and w/ Mathematica<sup>†</sup> and w/ Python),  
Exploring Mathematical Ideas\*,  
Calculus I,  
Calculus II (traditional and Multivariable<sup>†</sup>), and  
Calculus III,  
Calculus I and Modeling,  
Multivariable Calculus and Modeling,  
Linear Algebra with Applications,

Differential Equations (traditional), Differential Equations and Infinite Series<sup>†</sup>,  
 Vector Calculus and PDE's<sup>†</sup>,  
 Introduction to Proof, Analysis & Topology<sup>†</sup> (earlier Abstract Mathematics version),  
 Numerical Analysis,  
 Real Analysis I,  
 Real Analysis II (functional analysis)\*,  
 Complex Analysis,  
 Fractals & Chaos (later Dynamical Systems)\*,  
 Independent Studies\* (artificial neural networks, functional analysis, fractals &  
 chaos, real analysis II, dynamical systems, honors theses)  
 \* course designed  
 † course syllabus (description) designed or significantly revised

**Technology initiatives:** Developed interactive materials in many courses using *Mathematica*, *MATLAB*, graphing and symbolic calculators, *Excel*, and *True Basic*. Use of *Blackboard* and *Moodle* web-based course management, and online course supplements. Use of programming in *Mathematica*, Python, *True Basic*, *MATLAB*, Java, Pascal, and APL. Use of tools available online, such as DField & PPlane, and WolframAlpha.

The University of Texas at Austin  
 Assistant Instructor, Research Assistant, 1980-83  
 Teaching Assistant, 1978-80  
 Purdue University  
 Teaching Assistant, 1977-78

## PUBLICATIONS

- “Supplement for MAT 140: Supplementary material to accompany *Calculus for the Life Sciences*, by Greenwell, Ritchey & Lial,” Davidson College course booklet (12 sections, 51 pages), July 4, 2019.
- “Multivariate Polynomial Interpolation in Newton Forms,” *SIAM Review*, Vol. 61, No. 2, June 2019, pp. 361-381.
- with Ben Altman, “Comparing High-Order Multivariate AD Methods,” *Optimization Methods and Software*, Vol. 33, No. 4-6 (special issue: Advances in Algorithmic Differentiation), 2018, pp. 995-1009.
- “Avoiding Plagiarism in Mathematics,” *Math Horizons*, Vol. 23, No. 4, April 2016, pp. 16-17.
- “A Fair-Bold Gambling Function is Simply Singular,” *Amer. Math. Monthly*, Vol. 123, No. 1, January 2016, pp. 3-18.
- “A Classroom Note: Newton’s Method Doubles Digit Improvement,” *Mathematics and Computer Education*, Vol. 48, No. 1, Winter 2014, pp. 19-22.
- “Efficient Recurrence Relations for Univariate and Multivariate Taylor Series Coefficients,” *Dynamical Systems and Differential Equations, DCDS Supplement*

- 2013, *Proceedings of the 9th AIMS International Conference (Orlando, USA)*, Nov. 2013, pp. 587-596.
- “Introduction to Automatic Differentiation and MATLAB OOP,” *SIAM Review*, Vol. 52, No. 3, pp. 545-563, Sept. 2010.
- “Letter to the Editor: Archimedes, Taylor, and Richardson,” *Mathematics Magazine*, Vol. 82, No. 1, February 2009, p. 41.
- with Donna K. Molinek, *Infinite Series Supplement (for a Differential Equations Course)*, Davidson College course booklet (13 sections, 52 pages), June 4, 2008.
- “Problem 200,” *Math Horizons*, Vol. 13, Feb. 2006, p. 33; solution Vol. 14, Sept. 2006, p. 41-42.
- “Directions for Computing Truncated Multivariate Taylor Series,” *Mathematics of Computation*, Vol. 74, No. 249, Jan. 2005, pp. 321-340.
- “Series as a Computational Differentiation Tool,” *Mathematica in Education and Research*, Vol. 9, No. 2, 2000, pp. 5-14.
- with Walter G. Spunde, “Sample Calculus,” *Mathematics Magazine*, Vol. 72, No. 3, June 1999, pp. 171-182.
- “Mathematica Notebooks for ATLAST,”  
<http://www.umassd.edu/SpecialPrograms/Atlast/welcome.html>, ATLAST (NSF) Project home page, May 1998.
- with Todd G. Will and John R. Swallow, *Programming Paradigms via Mathematica* (a first course in programming), <http://www.wolfram.com/mathsource/>, Wolfram Research, Jan. 1997.
- with R. John Annen, “The Road to Chaos is Filled with Polynomial Curves,” *Amer. Math. Monthly*, Vol. 103, No. 8, October 1996, pp. 640-653.
- “Recursive Algorithms for Iterated Function Systems,” *Mathematics and Computer Education*, Vol. 30, No. 1, Winter 1996, pp. 83-100.
- “Computing Multivariable Taylor Series to Arbitrary Order,” APL95 Conference Proceedings, *APL Quote Quad*, Vol. 25, No. 4, June 1995, pp. 134-144
- with Kenneth M. Lane, “Neural networks from idea to implementation,” *APL Quote Quad*, Vol. 25, No. 3, March 1995, pages 27-37.
- “Array-Oriented Programming in Education,” *APL Quote Quad*, Vol. 24, No. 2, December 1993, pages 17-18.
- “Differential Equations are Recurrence Relations in APL,” APL92 Conference Proceedings, *APL Quote Quad*, Vol. 23, No. 1, July 1992, pp. 165-174.
- “An Efficient Method for the Numerical Evaluation of Partial Derivatives of Arbitrary Order,” *ACM Transactions on Mathematical Software*, Vol. 18, No. 2, June 1992, pp. 159-173.
- “An APL Approach to Differential Calculus Yields a Powerful Tool,” APL89 Conference Proceedings, *APL Quote Quad*, Vol. 19, No. 4, August 1989, pp. 285-288.
- “Automatic Differentiation and APL,” *College Mathematics Journal*, Vol. 20, No. 3, May 1989, pp. 238-251.
- “Survey on Preparation for Graduate School,” *FOCUS*, newsletter of the MAA, Vol. 8, No. 4, September, 1988.

- “Concepts in the real interpolation of Banach spaces,” *Functional Analysis*, Lecture Notes in Mathematics, 1332, Springer-Verlag, New York, 1988, pp. 43-53.
- “Factoring operators through hereditarily- $\ell^p$  spaces,” *Banach Spaces*, Lecture Notes in Mathematics, 1166, Springer-Verlag, New York, 1985, 116-128.
- with H. P. Rosenthal, “Norm-attainment of linear functionals and characterizations of Tauberian operators,” *Pacific Journal of Mathematics*, Vol. 118, 1985, pp. 215-228.
- “Schachermayer's result concerning RNP and KMP equivalence,” *Longhorn Notes*, 1983-84, pp. 111-123.
- with H. P. Rosenthal, “Characterizing Tauberian operators by closed images,” *Longhorn Notes*, 1982-83, pp. 211-221.

### PRESENTATIONS (by topic -- titles and versions vary)

- “Visualizing Periods of Components in the Mandelbrot Set”  
Davidson College Math Coffee, Sept. 11, 2018.
- “An arbitrary-order Taylor series method DE solver in MATLAB”  
MAA SE section meeting, Clemson University, March 23, 2018.  
Carolina Dynamics Symposium, held at UNC Charlotte, April 23, 2017.
- “Comparing High-Order Multivariate AD Methods”  
AD2016 (7<sup>th</sup> Int’l Conference), Christ Church, Oxford, England, Sept. 15, 2016.  
Twelfth European Workshop on Automatic Differentiation, invited as the opening speaker (preliminary research), Humboldt-U., Berlin, Germany, Dec. 8, 2011.
- “A Fair-Bold Gambling Function is Simply Singular”  
James Madison U., Math & Stat Colloquium, October 3, 2016.  
MathFest, Columbus, OH, Aug. 5, 2016.  
Carolina Dynamics Symposium, held at Davidson College, April 26, 2014.  
Davidson College Math Coffee, Sept. 25, 2013.
- “Efficient Recurrence Relations for Univariate and Multivariate Taylor Series Coefficients,” 9th AIMS International Conference Dynamical Systems, Differential Equations, and Applications, Orlando, July 4, 2012.
- “Automatic Differentiation using MATLAB, from Fundamentals to Research”  
invited to lead off as the first speaker in a minisymposium on Automatic Differentiation Software at ICIAM, Vancouver, Canada, July 19, 2011.
- “Algorithms for Multivariable Polynomial Interpolation”  
Joint Mathematics (AMS & MAA) meetings, Washington, DC, Jan. 6, 2009.
- “A Divided-Difference Algorithm for Multivariable Interpolation”  
MathFest, San Jose, CA, Aug. 5, 2007.
- “Automatic Differentiation, MATLAB, and OOP”  
invited presentation at the “Kickoff Workshop for Project MOSAIC” (NSF and IMA) at the University of Minnesota, June 30 – July 2, 2010.  
MAA SE section meeting, Belmont U., Nashville, TN, March 14, 2009.  
MathFest, Knoxville, TN, Aug. 12, 2006.  
Davidson College Math Coffee, Sept. 15, 2005.
- “Counting on Infinity”  
Keynote for regional high-school mathematics Super Competition, March 5, 2007.  
North Meck High School Math Club, Dec. 16 2003
- “DPGraph -- 3D Graphing Software”  
Davidson College Math Coffee, Oct. 17, 2002.

- “Directions for Computing Multivariate Taylor Series Coefficients”  
 AD 2004 (4<sup>th</sup> Int’l Conference), Chicago, July 22, 2004.  
 SIAM Conference on Optimization, Toronto, May 21, 2002.  
 AMS-MAA Joint Annual Meetings, San Diego, Jan. 7, 2002.  
 Automatic Diff. Symposia, U of Hertfordshire, Hatfield, UK, Nov. 14, 2001.  
 Cranfield Univ./Royal Military College of Science, Shrivenham, UK, Nov. 8, 2001.  
 Davidson College Math Coffee, Oct. 2001.
- “Multivariable Polynomial Interpolation Using Partitioned Matrices”  
 MAA-AMS joint SE Section meeting, Atlanta, March 9, 2002.
- “The Romance of Interpolating Polynomials”  
 Davidson College Math Coffee, Feb. 14, 2002.
- “Sample Calculus on the TI-89”  
 Southeastern Section Meeting of the MAA, Montgomery, March 31, 2001.
- “ATLAST Mathematica Projects”  
 MAA Annual Meeting, Baltimore, Jan. 1998  
 Southeastern Section of the MAA, Charleston, March 1998
- “Mathematical Programming Languages”  
 invited speaker at J User’s Conference, Toronto, June 1996
- “Mathematica Series as a Computational Differentiation Tool”  
 2<sup>nd</sup> Int’l Workshop on Computational Differentiation, Santa Fe, Feb. 1996.
- “Recursive Algorithms for Iterated Function Systems”  
 Southeastern Section of the MAA, UNC at Asheville, April 1, 1995
- “Numerically Based Calculus”  
 Davidson College, APL95
- “The Road to Chaos is Filled with Polynomial Curves”  
 Univ. of South Carolina, Pi Mu Epsilon faculty/student talk, March 1999  
 MAA Annual Meeting, San Francisco, January 6, 1995  
 invited to NSF Sponsored Faculty Development Seminar, Baltimore, Feb. 25, 1995  
 Rhodes College, Math and CS Colloquium, April 21, 1994  
 Univ of Southern Queensland, Australia, Math and CS Colloquium, Oct. 20, 1994
- “The Computational Power of Power Series”  
 invited Hendrix-Rhodes-Sewanee Undergraduate Math Symposium, April 22, 1994
- “Differential Equations are Recurrence Relations in APL”  
 APL92 (ACM/SIGAPL), St. Petersburg, Russia, July 9, 1992
- “Multivariable Calculus II, a “Five into Four” Experience”  
 MAA Annual Meeting, Baltimore, January 8, 1992
- “Computing multivariable Taylor series coefficients to arbitrary order”  
 Univ. of Southern Queensland, Australia, Math and CS Colloquium, Nov. 3, 1994  
 ICIAM (Int’l Conf. on Industrial and Applied Math), Washington, D.C., July 8, 1991  
 SIAM Workshop, Breckenridge, CO, January 7, 1991
- “Automatic differentiation and APL”  
 APL89, Annual Meeting of ACM/SIGAPL, New York City, August 9, 1989  
 Southeastern Section of the MAA, Furman University, April 1988  
 Davidson College, Math Colloquium 1987, Faculty Research Group 1988
- “Functional iteration leads to chaos and fractals”  
 Western Carolina University, March 23, 1994  
 U.N.C. Asheville, Math Colloquium, December 2, 1993  
 Virginia State University, Math Colloquium, March 5, 1993

- Trinity University, Math Colloquium, April 22, 1991  
 Wake Forest University, Math and CS Colloquium, March 21, 1991  
 Francis Marion College, Math and CS Colloquium, April 13, 1989  
 The Citadel, Math and CS Colloquium, March 15, 1989  
 Davidson College Math Colloquium, March 2, 1989  
 Senior Scholars, Charlotte, November 8, 1988  
 Several area high schools, through 2006.
- “Concepts in the real interpolation of Banach spaces”  
 AMS, 833rd Meeting Special Session speaker, Kent, Ohio, April 1987  
 University of Texas Functional Analysis Seminar, June 1986
- “Operators preserving properties of bounded sets in Banach spaces”  
 UNCC Mathematics Faculty Colloquium, February 1986
- “Between compact and strictly singular operators”  
 Georgia Tech University, August 1985
- “Introduction to Banach spaces”  
 Trinity University, distinguished alumni speaker, Spring 1984  
 Davidson College Math Coffee, October 1984
- “Factoring operators through hereditarily- $\ell^p$  spaces”  
 NSF-CBMS Regional Conference, University of Missouri, June 1984
- “Characterizations of Tauberian operators and norm-attainment of linear functionals on subspaces”  
 AMS, 90th Annual Meeting, Louisville, Kentucky, January 1984

**EDITORIAL WORK: Articles refereed or books reviewed for**

- Journal of Computational Methods in Sciences and Engineering*  
*ACM Transactions on Mathematical Software*  
*MAA Reviews* (2 books)  
*Multidimensional Systems and Signal Processing*  
*Optimization Methods and Software* (3 articles)  
*SIAM Journal on Scientific Computing*  
*Mathematics of Computation (AMS)* (2 articles)  
*Mathematics Magazine* (10 articles)  
*American Mathematical Monthly* (3 articles)  
*AD 1991 and 2004 Proceedings* (3 articles published by SIAM and Springer, respectively)  
 CRC Press (book review for publisher)  
*International Journal for Numerical Methods in Engineering*  
*Quaestiones Mathematicae* (Journal of South African Mathematical Society)  
 Academic Press (book review for publisher)  
*Results in Mathematics*  
 Jones and Bartlett (2 book reviews for publisher)  
*The College Mathematics Journal*  
*International Journal of Mathematics and Mathematical Sciences*  
*Punjab University Journal of Mathematics*  
*SIAM Undergraduate Research Online*

## PROFESSIONAL SERVICE

Humboldt-Universität, Berlin, Germany, external reviewer for Ph.D. dissertation, Dec. 2011.

Berry College, GA, external reviewer for Mathematical Sciences Department, March 2000.

External review of colleagues for tenure committees, a few times.

Post-grant review of materials for the Australian Government, following joint work on an approach to using technology in Calculus, published as *Sample Calculus*, 1999.

## PROFESSIONAL MEMBERSHIPS

Mathematical Association of America (MAA)

American Mathematical Society (AMS)

Society for Industrial and Applied Mathematics (SIAM)

## COLLEGE AND DEPARTMENTAL SERVICE

Chair, Department of Mathematics, 2003 – 2008.

Pre-Medical Advisory Committee, 2002 – 2012, 2014 – 2016.

Curriculum Requirements Committee, 2014 – 2016.

Advisory Council on Finance, Personnel & Development, 1990 – 1993, Secretary 1991 – 1992, Chair 1992 – 1993; 2011 – 2014, Secretary 2012 – 2014.

Educational Policy Committee, 1998 – 2001, 2006 – 2008.

Pre-Ministerial Committee, 1998 – 2001, 2017 – 2020, Chair 2000 – 2001, 2017 – 2020.

Admissions and Financial Aid Committee, 1995 – 1998, Secretary 1996 – 1997.

Human Subjects/Institutional Review Board, 2018 – 2020.

Faculty Study and Research Committee, 1994 – 1997.

Academic Computing Committee, 1993 – 1996, Secretary, 1993 – 1994.

Physical Education Committee, 1988 – 1990.

Student Conduct Council, 1987 – 1990.

Pre-Management Committee, 1984 – 1987.

ROTC Advisory Committee, 1985 – 1986.

Phi Beta Kappa, Chapter President 2003 – 2004.

Academic Advisor for math majors and undeclared beginning students, throughout career.

Departmental webmaster and newsletter author for many years.

## COMMUNITY SERVICE

Founder and President 2003 – 2014, Director 2017 – present, President 2019 – present. of Friends of Accion, Inc., a non-profit that supports educational opportunities (operating two youth boarding facilities for access to middle, high, and college schools), homes, and churches for villagers in the Yucatan Peninsula of Mexico in cooperation with Acción, Mexico.

Math Fair Judge, K-12, occasionally for schools, county, and region.

MAA meetings, volunteer judge for undergraduate paper or poster sessions, occasionally.

Monthly volunteer in Loaves and Fishes food pantry, 2002 – present.

First Presbyterian Church Charlotte, Elder, teacher, volunteer in many service programs.