

Vita (April 25, 2023)

**Larry L. Schumaker**

## **I. Biographical Data**

### *A. Education*

1. B.S. Mathematics, S.D. School of Mines, June, 1961
2. M.S. Mathematics, Stanford University, June, 1962
3. PhD Mathematics, Stanford University, January, 1966

### *B. Present Position*

1. Stevenson Professor of Mathematics, Vanderbilt University, 1988 –

### *C. Previous Teaching and Research Positions*

1. Staff Mathematician, Hughes Aircraft Co., Summers, 1961 – 1963
2. Research Assistant, Mathematics and Computer Science, Stanford University, 1964 – 1965
3. Instructor, Computer Science Dept., Stanford University, 1966
4. Visiting Research Member, Mathematics Research Center, University of Wisconsin, 1966 – 1968
5. Assistant Professor of Mathematics, University of Texas, 1968 – 1969
6. Associate Professor of Mathematics, University of Texas, 1969 – 1974
7. Professor of Mathematics, University of Texas, 1974 – 1979
8. Professor of Mathematics, Texas A&M University, 1981 – 1988
9. Director, Center for Approximation Theory, Texas A&M University, 1981 – 1988

### *D. Visiting Teaching and Research Positions*

1. Visiting Research Member, Mathematics Research Center, University of Wisconsin, 1973 – 1974
2. Visiting Professor, University of Munich, Germany, 1974 – 1975
3. Visiting Professor, Free University of Berlin, Germany, 1978 – 1979
4. Visiting Researcher, Hahn-Meitner Atomic Energy Laboratories, Berlin, Germany, 1978 – 1979
5. Visiting Professor of Mathematics, Texas A&M University, 1980 – 1981
6. Visiting Professor, University of Sao Paulo, Brazil, 5/1981 – 8/1981
7. Visiting Professor, University of Würzburg, W. Germany, 5/1984 – 8/1984
8. Visiting Professor, University of Würzburg, W. Germany, 5/1987 – 8/1987
9. Visiting Professor, University of Munich, W. Germany, 1988 – 1989.

### *E. Other Experience*

1. Candidate for the United States Senate in South Dakota, 1980

### *F. Honors*

1. Hughes Aircraft Masters Fellow
2. National Science Foundation Graduate Fellow
3. Humboldt Fellow, German Federal Republic, 1978 – 1979
4. Student Council Teaching Excellence Award, Texas A&M University, 1981
5. Centennial Outstanding Graduate Award, S.D. School of Mines & Technology, 1985
6. Humboldt Prize, Humboldt Foundation, Federal Republic of Germany, 1989.
7. John Gregory Award in Geometric Modelling, DFKI, Germany, 1999.
8. Birthday issue of Journal of Computational and Applied Mathematics, **119** (2000), 21 contributed papers, 412 pp.
9. Norwegian Academy of Sciences and Letters, 2006.
10. Fellow of the Society for Industrial and Applied Mathematics, 2013.
11. Fellow of the American Mathematical Society, 2017.
12. Distinguished Alumni Award, S. D. School of Mines & Technology, 2019.

### *G. Biographical Listings*

1. American Men of Science
2. American Men and Women of Science
3. Dictionary of International Biography
4. Men of Achievement
5. Who's Who Among American Teachers & Educators
6. Who's Who in American Education
7. Who's Who in American Universities and Colleges
8. Who's Who in the Southeast
9. Who's Who in the South and Southwest
10. Who's Who in Science and Engineering
11. Who's Who in Sciences Higher Education
12. Who's Who in Technology Today
13. Who's Who in the World
14. Who's Who

### *H. Professional Societies*

1. Society for Industrial and Applied Mathematics
2. American Mathematical Society
3. The Mathematical Association of America
4. Humboldt Association of the U. S.

## II. Professional Activity

### A. Member Editorial Board of Journals

1. *Computer Aided Geometric Design*, North Holland, 1984 – .
2. *Constructive Approximation*, Springer-Verlag, 1985 – .
3. *Advances in Computational Mathematics*, J. Balzer AG, 1992 – .
4. *Mathematics of Computation*, American Math. Society, 1989 – 1992.
5. *Revista de Matemáticas Aplicadas*, Univ. of Chile, 1991 – 1995.

### B. Referee

1. A.C.M. Trans. on Graphics
2. Advances in Computational Mathematics
3. Army Research Office (Durham)
4. Air Force Office of Scientific Research
5. Binational Science Foundation
6. Canadian Mathematics Bulletin
7. Canadian Research Foundation
8. Communications in Pure and Applied Analysis
9. Computers and Mathematics
10. Computing
11. Computational and Applied Mathematics
12. Computational Geometry and Applications
13. Computer–Aided Design
14. Computer–Aided Geometric Design
15. Computer Methods in Applied Mechanics and Engineering
16. Constructive Approximation
17. Dept. of Energy
18. Experimental Mathematics
19. GACR (Grant Agency, Czech Republic)
20. I.E.E.E. Computer Graphics and Applications
21. I.E.E.E. Trans. Circuits and Systems
22. I.E.E.E. Trans. Decision and Control
23. Indiana Journal of Mathematics
24. Int. J. Numerical Methods in Engineering
25. Journal of American Statistical Association
26. Journal of Approximation Theory
27. Journal d’Analyse
28. Journal of Applicable Analysis
29. Journal of Edinburgh Mathematics Society
30. Journal of Royal Statistical Society
31. Journal of Optimization Theory and Applications
32. Mathematics of Computation
33. Math. Geology

34. National Science Foundation, Conf. Board of Mathematics
35. Numerical Methods for Partial Differential Equations
36. Numerische Mathematik
37. Oxford University Press
38. Pacific Journal
39. Proceedings of the American Math. Society
40. Research Council, City Univ. Hong Kong
41. Rocky Mt. Journal
42. SIAM J. Control
43. SIAM J. Math. Analysis
44. SIAM J. Numerical Analysis
45. SIAM Publications
46. Technometrics
47. Transactions of the American Math. Society

*C. Reviewer*

1. Mathematical Reviews
2. Zentralblatt
3. Computer Reviews
4. Applied Mechanics Reviews

*D. Graduate Courses Taught*

1. Real and Abstract Analysis, Univ. of Texas, 1969
2. Advanced Numerical Analysis, Univ. of Texas, 1969
3. Approximation Theory, Univ. of Texas, 1970
4. Positive Linear Operators, Univ. of Texas, 1973
5. Spline Functions, Univ. of Munich, 1974
6. Approximation Theory, Univ. of Texas, 1976
7. Spline Functions, Free Univ. of Berlin, 1978
8. Spline Approximation, Univ. of Sao Paulo, Brazil, 1981
9. Data Fitting, Texas A&M Univ., 1981–1982
10. Numerical Analysis, Texas A&M Univ., 1982
11. Spline Functions, Texas A&M Univ., 1983–1984
12. Multivariate Spline Functions, Texas A&M Univ., 1984–1986
13. Multivariate Spline Functions, Univ. Würzburg, 1987
14. Spline Functions, Texas A&M University, 1987
15. Spline Functions, Vanderbilt University, 1989
16. Approximation Theory, Vanderbilt University, 1991
17. Spline Functions, Vanderbilt University, 1991
18. Multivariate Spline Functions, Vanderbilt University, 1992
19. Computer–Aided Geometric Design, Vanderbilt University, 1992
20. Topics in Splines, Vanderbilt University, 1993
21. Multivariate Splines, Vanderbilt University, 1995

22. Finite Elements, Vanderbilt University, 1996
23. Multivariate Approximation Theory, Vanderbilt University, 1996
24. CAGD, Vanderbilt University, 1997
25. Multivariate Splines, Vanderbilt University, 1998
26. Numerical Methods for PDE, Vanderbilt University, 2001
27. Approximation Theory, Vanderbilt University, 2002
28. Professional Development for Mathematicians, Vanderbilt University,
29. Seminar in Computational Analysis, Computer-Aided Geometric Design, Vanderbilt University, 2003
30. Professional Development for Mathematicians, Vanderbilt University, Fall, 2004
31. Seminar in Computational Analysis, Radial Basis Functions, Spring 2004
32. Numerical Methods for Partial Differential Equations, Fall, 2005
33. Finite Difference Methods for Partial Differential Equations, Fall, 2006
34. Finite Element Methods for Partial Differential Equations, Spring, 2007
35. Computational Math Seminar on Splines and Applications, Fall, 2007
36. Mesh-Free Methods in Approximation, Fall, 2008
37. Finite Difference Methods for Partial Differential Equations, Spring, 2009
38. Seminar in Computational Analysis: Computations with Splines, Spring 2010
39. Finite Difference Methods for Partial Differential Equations, Spring, 2011
40. Seminar in Computational Mathematics: Computation with Splines, Spring, 2013
41. Math 286 Finite Difference Methods for Partial Differential Equations, Spring, 2014
42. Math 305 Approximation Theory, Math 305, Fall 2014
43. Math 9600 Computation with Splines, Fall 2015
44. Math 6600 Finite Difference Methods for PDE's, Spring 2016
45. Math 9601 Computing with splines, Spring 2017
46. Math 6600 Finite Difference Methods for PDE's, Spring 2018
47. Math 5620 – Numerical Analysis, Spring 2019
48. Math 7899 – Spline Functions, Fall 2019
49. Math 5620 – Numerical Analysis, Spring 2020
50. Math 5620 – Numerical Analysis, Fall 2020
51. Math 7899 – Spline Functions, Spring 2021
52. Math 7899 – Spline Functions, Spring 2022
53. Math 8997 – Independent study, Fall 2022
54. Math 7899 – Computing with Splines, Spring 2023

### *E. Graduate Students*

1. Randolph Brasch, M.A., 1969, Univ. of Texas, Computation of  $Lg$ -splines
2. Robert Pratt, M.A., 1971, Univ. of Texas, A comparison of certain algorithms for the numerical computation of interpolating natural spline functions
3. Thomas Anderson, M.S., 1971, Univ. of Texas, On best spline approximation
4. Patricia Copley, PhD, 1974, Univ. of Texas Structure and characterization of  $pLg$ -splines
5. Tom Lyche, PhD, 1975, Univ. of Texas, Discrete polynomial splines and applications
6. M.S. Hsiang, M.A., 1977, Univ. of Texas, A comparison of methods for fitting surfaces to scattered data
7. Kin-Chy Woo, M.A., 1978, Univ. of Texas, The effectiveness of interpolating programs
8. Chui Li Hu, M.S., 1985, Texas A&M Univ.
9. Mohammad Hasan, M. S., 1988, Texas A&M Univ.
10. Dwight Diener, PhD, 1988, Texas A&M Univ., Dimension of spaces of piecewise polynomials
11. Adel Kh. Ibrahim, PhD, 1989, Suez Canal University, On the dimension of multivariate spline spaces
12. Lu Han, MS, 1993, Vanderbilt Univ.
13. Ethan Rutter, MS, 1994, Vanderbilt Univ.
14. Greg Fasshauer, PhD, 1995, Vanderbilt Univ. (Prof., Colorado School of Mines)
15. Sonya Stanley, PhD, 1996, Vanderbilt Univ. (Assoc. Prof., Samford Univ.)
16. X. L. Liu, completed qualification, Vanderbilt Univ.
17. David Assaf, PhD, May, 1997, Vanderbilt Univ., Bentley Systems
18. Tanya Morten, PhD, May, 2000, Vanderbilt Univ., Mathworks
19. Vera Rayevskaya, PhD, Dec. 2003, Vanderbilt Univ.
20. Tatyana Sorokina, PhD, May, 2004, Vanderbilt Univ. (Prof., Towson Univ.)
21. Yuliya Babenko, PhD, May, 2006, Vanderbilt Univ. (Assoc. Prof., Kennessaw State Univ.)
22. Lujun Wang, PhD, Aug, 2012, Vanderbilt Univ., Intergraph Corp.
23. Wenjia Zhang, M.S., June, 2016, Vanderbilt Univ.
24. Shiyong Li, PhD, Aug. 2019, Vanderbilt Univ. (Univ. of N.C.)

## *F. Committee Work*

1. Chairman, Colloquium Committee, Math., Univ. Texas, 1969
2. Chairman, Colloquium Committee, Math., Univ. Texas, 1970
3. Co-chairman, Colloquium Committee, Center for Numerical Analysis, Univ. Texas, 1971
4. Chairman, Policy and Development Committee, Math. Univ. Texas, 1972
5. Chairman, Colloquium Committee, Center for Numerical Analysis, Univ. Texas, 1972
6. Committee to select a chairman, Math., Univ. Texas, 1973
7. Chairman, Colloquium Committee, Center for Numerical Analysis, Univ. Texas, 1976
8. Administrative Subcommittee of the Graduate Studies Committee, Dept. of Math., Univ. Texas, 1975
9. Chairman, Tenure Committee, Univ. Texas, 1977
10. Math. Teaching Evaluation Committee, Texas A&M Univ., 1981
11. Math. Tenure and Promotion Guideline Committee, Texas A&M Univ., 1981
12. Math. Executive Committee, Texas A&M Univ., 1983 – 1985
13. College of Science Long Range Planning Committee, Texas A&M Univ., 1983
14. College of Science Research Committee, Texas A&M Univ., 1983 –
15. College of Science Tenure Review Committee, Texas A&M Univ., 1983 – 1985
16. Dean Search Committee, College and Arts & Sciences, Vanderbilt Univ., 1993.
17. Proposal Evaluation Subcommittee, Univ. Research Council, Vanderbilt Univ., 1994.
18. Computer Committee, Math. Dept., Vanderbilt Univ., 1988 –.
19. Long Range Planning Committee, Mathematics, Vanderbilt Univ., 1994
20. Biomathematics Center Committee, Mathematics, Vanderbilt Univ., 1995 –
21. Co-Chairman, Computational Sciences Committee, College of Arts and Sciences, Vanderbilt Univ., 1995–1996.
22. Computational Sciences Committee, College of Arts and Sciences, Vanderbilt Univ., 1996–1997.
23. Search Committee for Computational Mathematics, Dept. of Mathematics, Chair, 1996–1997.
24. Computational Science and Biomathematics Committee, Dept. of Mathematics, Chair, 1997–1998.
25. Search Committee for Computational Mathematics, Dept. of Mathematics, Chair, 1997–1998.
26. Promotions and Reappointments Advisory Committee, Dept. of Mathematics, 1997–1998.
27. Search Committee for Computational Mathematics, Dept. of Mathematics, Chair, 1998–1999.
28. Teaching Committee, Dept. Mathematics, 1999-2000.
29. Search Committee for Computational Mathematics, Dept. of Mathematics, Chair, 1999–2000.
30. Search Committee for Director of Vanderbilt University Press, 1999-2000.
31. Chair, NSF-VIGRE proposal committee, Dept. Mathematics, 2001.
32. Search Committee for Analysis, Dept. of Mathematics, 2001–2002.

33. Committee for B. Jónsson Award, Mathematics, Vanderbilt Univ., 1995 - .
34. Hardin promotion committee, Dept. of Mathematics, 2004.
35. Computer committee, Dept. of Mathematics, 2005.
36. Computer committee, Dept. of Mathematics, 2006.
37. Neamtu promotion committee, Dept. of Mathematics, 2006.
38. Colloquium and Graduate Committees, 2007.
39. Colloquium and Graduate Committees, 2008.
40. Colloquium and Jonsson Award Committees, 2009.
41. Colloquium and Jonsson Award Committees, 2010.
42. Chair, SIAM Best Paper Prize Committee, 2010.
43. Postdoc selection committee, 2011.
44. Analysis prelim exam committee, 2011.
45. Jonsson Award Committee, 2012.
46. Analysis prelim exam committee, 2012.
47. Jonsson Award Committee, 2013.
48. Analysis prelim exam committee, 2013.
49. Jonsson Award Committee, 2014.
50. Colloquium Committe, 2014.
51. Jonsson Award Committee, 2015
52. Colloquium Committe, 2015.
53. Chair Advisor Committee, 016 - 2017
54. Jonsson Award Committee, 2017
55. Reappointment Committee (Dowdall), 2016 - 2017
56. Chair Advisor Committee, 2017 - 2018
57. Jonsson Award Committee, 2018
58. Reappointment Committee (Disconzi), 2018
59. Chair Advisor Committee, 2018 - 2019
60. Jonsson Award Committee, 2019
61. Postdoc Recruitment Committee, 2019
62. Jonsson Award Committee, 2021
63. Grad Admissions Committee, 2022
64. Aldroubi Prize Committee, 2022



### *G. Conference Organization*

1. International Symposium on Approximation, with G. G. Lorentz, E.W. Cheney, and H. Berens, Austin, Texas, Jan. 1973
2. International Symposium on Approximation, with G. G. Lorentz, E.W. Cheney, and C. K. Chui, Austin, Texas, Jan. 1976
3. International Symposium on Approximation, with C. K. Chui and J. Ward, Texas A&M Univ., College Station, Texas, Jan. 1983
4. NASA workshop on multivariate splines, Texas A&M Univ., College Station, Texas, Jan. 1983
5. Joint USA/China conference on Approximation Theory, with C. K. Chui, Hangzhou, China, May 1985
6. International Symposium on Approximation Theory, with C. K. Chui and J. Ward, Texas A&M Univ., College Station, Texas, Jan. 1986
7. International workshop on multivariate approximation, with C. K. Chui and F. Utreras, Santiago, Chile, Dec. 1986
8. International conference on Mathematical Methods in Computer-aided Design, with T. Lyche, Oslo, June 1988.
9. Sixth International Symposium on Approximation Theory, with C. K. Chui and J. Ward, Texas A&M Univ., College Station, Texas, Jan. 1989.
10. NATO Advanced Study Institute on Computational Curves and Surfaces, Puerto de la Cruz, Canary Islands, with W. Dahmen, M. Gasca, and C. Micchelli, July, 1989.
11. International Conference on Curves and Surfaces, Chamonix, France, with A. Le Méhauté and P. J. Laurent, June, 1990.
12. Second International Conference on Curves, Surfaces, CAGD, and Image Processing, with Tom Lyche, Biri, Norway, June, 1991.
13. International Conference Numerical Approximation Theory, with D. Braess, Oberwolfach, Germany, November, 1991.
14. 7th Texas International Symposium on Approximation Theory, with C. Chui and E. W. Cheney, Austin, Texas, Jan., 1992.
15. Symposium on Wavelets, Vanderbilt, with G. Webb, May, 1992.
16. 2nd International Conference on Curves and Surfaces, Chamonix, France, with A. Le Méhauté and P. J. Laurent, June, 1993.
17. 3rd International Conference on Mathematical Methods in Computer-Aided Design, with M. Daehlen and T. Lyche, Ulvick, Norway, June, 1994.
18. 7th Southeast Approximation Conference, with M. Neamtu, Nashville, TN, Nov., 1994.
19. 8th Texas International Symposium on Approximation Theory, with C. Chui, College Station, Texas, Jan., 1995.
20. International Conference on Scattered Data Fitting, with A. Le Méhauté and L. Traversoni, Cancun, Mexico, March, 1995.
21. Fourth SIAM Conference on Geometric Design, with R. Chang, Nashville, TN, Nov., 1995.

22. Third International Conference on Curves and Surfaces, Chamonix, France, with A. Le Méhauté and C. Rabut, June, 1996.
23. Numerische Methoden der Approximationstheorie, with D. Braess, Oberwolfach, Germany, May, 1997.
24. Fourth International Conference on Mathematical Methods in Computer Aided Geometric Design, with M. Daehlen and T. Lyche, Lillehammer, Norway, July, 1997.
25. Fourth SIAM Conference on Geometric Design, with Tony DeRose, Nashville, TN, Nov., 1997.
26. 9th International Symposium on Approximation Theory, with C. Chui, Nashville, TN, Jan., 1998.
27. CAGD and Wavelet Methods for Reconstructing Functions, with M. Bozzini (Milano), Montecatini, Italy, June 15–17, 1998.
28. Scattered Data Fitting, with A. LeMéhauté and L. Traversoni, Puerto Vallarta, Mexico, April, 1999.
29. Curves and Surfaces IV, with A. Cohen, and P. Laurent, and P. Sablonnière, St. Malo, France, July 1–7, 1999.
30. Mathematical Methods for Curves and Surfaces, Oslo, with Tom Lyche, Oslo, Norway, June, 2000.
31. 10th International Symposium on Approximation Theory, with C. Chui and J. Stoeckler, St. Louis, March, 2001.
32. Institute for Mathematics and Its Applications, Conference on Geometric Design, with Rosemary Chang, Univ. Minn., April 23–27, 2001.
33. Curves and Surfaces V, with A. Cohen, Tom Lyche, M.-L. Mazure, and J.-L. Merrien, St. Malo, France, June 27 – July 3, 2002.
34. Eleventh International Conference on Approximation Theory, with C. K. Chui and M. Neamtu, Gatlinburg, TN, May 18–22, 2004.
35. Mathematical Methods for Curves and Surfaces, with Morten Daehlen, Knut Morken, and M. L. Mazure, Tromso, Norway, July 1–6, 2004.
36. CAGD Workshop, Bergen-Kirkenes, Norway, June 24–30, 2004.
37. Curves and Surfaces, with Tom Lyche, J. L. Merrien, and A. Cohen, Avignon, France, June 29–July 5, 2006.
38. Approximation Theory XII, with M. Neamtu, San Antonio Texas, March 5–8, 2007.
39. Seventh International Conference on Mathematical Methods for Curves and Surfaces, Tonsberg, Norway, June 26–July 1, 2008.
40. Approximation Theory XIII, with M. Neamtu, San Antonio Texas, March 6–10, 2010.
41. Seventh International Conference on Curves and Surfaces, with J-D. Boissonnat, P. Chenin, A. Cohen, C. Gout, T. Lyche, and M-L. Mazure, Avignon, France, June 24–June 30, 2010.
42. Mathematical Methods for Curves and Surfaces, Oslo, with Tom Lyche et. al., Oslo, Norway, June, 2012.
43. Approximation Theory XVI, with G. Fasshauer, San Antonio Texas, April 7–10, 2013.
44. Eighth International Conference on Curves and Surfaces, with Marie-Laurence Mazure et al, Paris, France, June 12–18, 2014.

45. Workshop on Multivariate Splines and Algebraic Geometry, with H. Schenk and T. Sorokina, Oberwolfach, Germany, April 19 – 25, 2015.
46. Approximation Theory XV, with G. Fasshauer, San Antonio Texas, May 22 – 25, 2016.
47. Mathematical Methods for Curves and Surfaces, Oslo, with Michael Floater et. al., Oslo, Norway, June 23 – 28, 2016.
48. Ninth International Conference on Curves and Surfaces, with Albert Cohen et al, Arachon, France, June 28–July 4, 2018.
49. Approximation Theory XVI, with G. Fasshauer and M. Neamtu, Nashville, TN, May 19 – 22, 2019.

#### *H. Special Session Organizer*

1. AMS Sectional Meeting, Chattanooga, TN, Sphere-based mathematics, with Ed Saff, Oct. 5–6, 2001.
2. SIAM 50th Anniversary Meeting, Philadelphia, Minisymposium on Applications of Splines, July 8–12, 2002.
3. Foundations of Computational Mathematics, Univ. of Minn., Workshop on Geometric Modelling and Animation, with Malcom Sabin and Wim Sweldens, August 5–14, 2002.
4. Foundations of Computational Mathematics Workshop on Geometric Design, with Tom Lyche, Santander, Spain, June 30 – July 3, 2005.

#### *I. Other Conference Committees*

1. Computer Graphics International '98, Hannover, Germany, June 22-26, 1998.
2. Conference on Mathematics of Surfaces, Cambridge, England, Sept. 3–6, 2000.

#### *J. Public Service*

1. Special Committee of South Dakota Board of Regents to develop EPSCOR funding for the state of S.D.

### *K. Lectures at Conferences*

1. ONR Workshop on Numerical Analysis, Cornell, 1968, Spline Functions and Applications
2. Conference on Approximation, Mathematics Research Center, Univ. of Wisconsin, 1968, a) Approximation by splines, b) Computation by splines
3. Symposium on Approximation, Mathematics Research Center, Univ. of Wisconsin, 1969, Splines via optimal control
4. International conference on constructive function theory, Varna, Bulgaria, 1970, A rational approximation problem in filter design
5. Symposium on Numerical Mathematics, Oberwolfach, Germany 1970, Local support bases for g-splines
6. NSF Regional conference on Approximation, Northwestern Univ., 1971, Some multi-dimensional spline approximation methods
7. Conference on approximation, Michigan State Univ., 1972, Direct and inverse theorems for multidimensional spline approximation
8. Symposium on Approximation, Univ. of Alberta, Edmonton, 1972, Convergence of cubic interpolating splines
9. International symposium on approximation theory, Univ. of Texas, 1973, Constructive aspects of discrete polynomial spline functions
10. Short course at Georgia Tech., 1973, 7 hours of lectures on spline functions and applications
11. Symposium on Numerical Methods in Approximation Theory, Oberwolfach, Germany, 1973, Spline solution of initial- and boundary-value problems for linear ordinary differential equations
12. Special year in Analysis, Northwestern Univ., 1973, The constructive approach to spline functions
13. Symposium on linear operators and approximation, Oberwolfach, Germany, 1974, Local spline approximation methods
14. Short course at Georgia Tech., 1974, 12 hours of lectures on spline functions and applications
15. Joint Hungarian-USA conference on approximation theory, Univ. of Wisconsin, 1974,  $N$ -widths and optimal spline approximation
16. International conference on spline approximation, Univ. of Karlsruhe, Germany, 1975, On the constructive approach to generalized splines
17. Symposium on numerical methods in approximation theory, Oberwolfach, Germany, 1975, Integration of B-splines
18. Symposium on approximation theory, Univ. of Texas, 1976, Fitting surfaces to scattered data
19. Semester on approximation theory, Stefan Banach Mathematical Center, Polish Academy of Sciences, Warsaw, 1975, a) Direct approximation methods, b) spline fitting data
20. Conference on approximation theory, Univ. of Brussels, 1976, Fitting surfaces to scattered data

21. Conference on approximation, Univ. of Bonn, Germany, 1976, Two stage methods for fitting surfaces
22. Special Session of Approximation Theory, American Mathematical Society summer meeting, Seattle, 1977, On the Budan–Fourier theorem for splines
23. Workshop on very large data bases, Tokyo, Japan, 1977, Computer–aided design of 3–D objects using spline functions
24. Symposium on approximation theory, Univ. of Siegen, Germany, 1979, Best  $L^2$ –approximation by splines
25. Conference on constructive function theory in several variables, Oberwolfach, Germany, 1979, On spaces of multi–dimensional piecewise polynomials
26. MAA Texas Section, San Antonio, 1981, Fitting surfaces to scattered data
27. Latin American Conference on Ordinary Differential Equations, Univ. of Sao Paulo, Brazil, 1981, Optimal spline solutions of systems of ordinary differential equations
28. Conference on Approximation theory, Oberwolfach, Germany, 1981, On hyperbolic splines
29. Conference on Multivariate Function Theory, Oberwolfach, 1982, On the dimension of spaces of piecewise polynomials
30. Second Edmonton Conference on Approximation theory, 1982, On spaces of piecewise polynomials with boundary conditions
31. SIAM Meeting, Stanford, Special session on surfaces, 1982, Spaces of piecewise polynomials
32. International Conference on Surface Fitting, Lake Garda, Italy, 1983, Five hours of lectures on multivariate splines
33. Conference on Numerical Analysis, Univ. of Dundee, Scotland, 1983, Computing the zeros of splines
34. SIAM Conference on Computer–Aided Design, RPI, Troy, N.Y., 1983 Methods of scattered data fitting
35. NATO Advanced Study Institute Conference on Approximation Theory, Memorial Univ., St. John’s Newfoundland, 1983, Spaces of bivariate splines
36. SIAM Section meeting, Texas A&M Univ., 1984, Spline Functions and Applications
37. Conference on Delay Equations and Approximation, Univ. Mannheim, Germany, 1984, Tensor–product natural spline interpolation
38. Conference on Computer–Aided Design, Oberwolfach, Germany, 1984, Rates of convergence of control polygons
39. Joint USA/China Conference on Approximation Theory, Hangzhou, China, 1985, Dimension of piecewise cubic and quartics on arbitrary partitions
40. IMSA Conference on Fitting of Data, Royal Military College, Shrivvenham, England, 1985, Use of triangle–based methods in multi–stage schemes for fitting scattered data
41. Haar Memorial Conference on Approximation Theory, Hungarian Academy of Sciences, Budapest, 1985, Tensor product schemes of abstract smoothing splines
42. International Workshop on Multivariate Approximation, Santiago, Chile, 1986, Triangulation algorithms
43. Southeastern Conference on Approximation Theory, Columbia, S. C., 1987, Generalized Cross–validation for tensor splines

44. Mathematics of Finite Elements Conference, Brunel University, 1987, Multivariate splines and finite elements
45. Special Session on Total Positivity, AMS Annual Meeting, Atlanta, 1988, Best approximation by generalized splines
46. Conference on Multivariate Approximation Theory, Oberwolfach, Germany, 1988, Penalized least squares
47. Joint U.S. Israel Conference on Approximation Theory, Jerusalem, Israel, 1988, Recent results on multivariate splines
48. Conference on Computer-aided Geometric Design, Jerusalem, Israel, 1988, Multivariate splines and CAGD
49. Conference on Numerical Methods for Data Fitting, Shrivenham, England, 1988, Data fitting using penalized least squares methods
50. Conference on Numerical Linear Algebra and Approximation Theory, Kent State University, 1989, On multivariate splines
51. Conference on Computer-aided Geometric Design, Oberwolfach, Germany, 1989, Data dependent  $C^1$  piecewise cubic surface fitting
52. NATO Workshop on Curves and Surfaces, Teneriffe, 1989, Reconstruction of 3D objects from cross sections
53. SPIE Conference, Santa Clara, Ca., Feb. 1990, Short course on splines and algorithms
54. SPIE Conference, Santa Clara, Ca., Feb. 1990, Applications of splines in surface reconstruction
55. International Conference on Mathematics of Finite Elements, Brunel University, Brunel, England, April, 1990, Recent results on multivariate splines
56. Conference on Curves and Surfaces, Chamonix, France, June, 1990, Data Dependent Triangulation Methods
57. Conference on Algebraic Methods in Spline Theory, Oberwolfach, Germany, October, 1990. Dimensions of multivariate spline spaces.
58. NSF/CBMS Regional Conference on Curves and Surfaces, Kent State, December, 1990. Applications of Simulated Annealing Methods for Computing Best Triangulations
59. Gedenkkolloquium für Lothar Collatz, University of Hamburg, Germany, July, 1991. Splines, wavelets, and their applications.
60. SPIE Conference, Boston, November, 1991. Wavelets and their applications in signal processing and image compression.
61. Conference on Computer Aided Geometric Design, Oberwolfach, Germany, June, 1992. Use of simulated annealing to compute optimal triangulations.
62. Workshop on Computational Geometry, University of Torino, Italy, June, 1992. Applications of triangulations in computational geometry.
63. Conference on Curves, Surfaces and Massive Computation, Oberwolfach, Germany, Feb., 1993. Data dependent triangulations in surface fitting.
64. Conference on Constrained Approximation, Stowe, Vt., May, 1993. Fitting monotone surfaces to scattered data.
65. Workshop on Computer-Aided Design, Wolfenbuettel, Germany, June, 1993. A Sibson element for shape controlled surface fitting.

66. SIAM Conference on Simulated Annealing, San Francisco, Aust., 1993. Use of simulated annealing to compute optimal triangulations.
67. AMS Anniversary Meeting for Mathematics of Computation, Vancouver, Aug., 1993. Applications of multivariate splines.
68. International Symposium on Wavelets, Taormina, Italy, October, 1993. Tchebycheffian spline wavelets.
69. SIAM conference on CAGD, Tempe, Arizona, November, 1993. a) Recent advances in dimension theory, b) data-dependent triangulations
70. Southeast Approximation Conference, Vanderbilt, November, 1994. Splines on the sphere.
71. Workshop on Proximity Graphs, Mississippi State Univ., Dec. 1994. Quadrangulations and applications.
72. International Conference on Scattered Data Fitting, Cancun, Mexico, March, 1995. Hybrid Bezier patches on sphere-like surfaces.
73. International Conference on Free Form Curves and Surfaces, Oberwolfach, Germany, June, 1995. Splines on the sphere.
74. Third International Conference on Curves and Surfaces, Chamonix, France, July, 1996. Wavelets on the sphere.
75. AMS, Memphis, March, 1997. Shape properties of CBB Curves.
76. SE Approximation Conference, Athens, Ga, April, 1997. Design of cams using trigonometric splines.
77. CAGD, Crete, Greece, June, 1997. Design of cams using trigonometric splines.
78. CAGD, Lillehammer, Norway, June, 1997. Scattered data fitting on the sphere.
79. Multiresolution methods in computer graphics, Dagstuhl, Germany, June, 1998. Local bases for bivariate spline spaces.
80. Wavelets and CAGD, Montecatini, Italy, June, 1998. Local bases for bivariate spline spaces.
81. Surface Approximation and Visualisation, Canterbury, New Zealand, Feb., 1999. Recent advances in macro-element methods for fitting scattered data.
82. Analysis, Matrix Theory, and Scientific Computation, Kent, Ohio, March, 1999. Recent advances in macro-element methods for fitting scattered data.
83. Mathematical Methods in Geodesy, Oberwolfach Germany, March, 1999. Splines on spherical triangulations.
84. Scattered Data Fitting, Puerto Vallarta, Mexico, April, 1999. Macro elements.
85. Geometric Modeling, Dagstuhl, Germany, May, 1999. Macro element methods.
86. Curves and Surfaces, St. Malo, France, July, 1999. Approximation power of spherical splines.
87. Workshop on Approximation Theory, Foundations of Computational Mathematics, Oxford, England, July, 1999. Stable bases via macro elements.
88. SIAM Conference on Computer-Aided Geometric Design, Nov. 1999. Invited Plenary Lecture. Recent advances in macro element methods.
89. International Conference on Approximation and Computation, Charleston, SC, May 12-17, 2001. Stable bases for spline spaces.

90. Algorithms for Approximation IV, Huddersfield, England, July, 2001. Recent advances in macro elements.
91. Multivariate Approximation and Interpolation with Applications in CAGD, Almunécar, Spain, Sept. 10–14, 2001. Stable bases for splines spaces.
92. Tenth Southeast Approximation Conference, Athens, Georgia, March 23–24, 2002. Surface compression using bivariate splines.
93. Geometric Modelling, Dagstuhl Germany, May 12 – 17, 2002. Trivariate spline interpolation.
94. SIAM 50th Anniversary Meeting, Philadelphia, Invited semi-plenary lecture, July 8–12, 2002. The impact of splines on Applied Mathematics,
95. Foundations of Computational Math, Workshop on Approximation Theory, Univ. of Minnesota Institute for Mathematics and its Applications, August 8 – 10, 2002.  $C^1$  quintic splines on type-4 tetrahedral partitions.
96. Geometric Data Processing, Oberwolfach, Germany, October 19–25, 2002.
97. Constructive Mathematics, Dagstuhl, Germany, May 26–30, 2003.
98. Workshop on Geodesy, Ohio State University, June 18–19, 2003. Modelling the earth's gravitational field with splines.
99. Geometric Modeling and Differential Geometry, Sept. 29 – Oct. 3, 2003, Erbach, Germany
100. Multivariate Approximation and Interpolation, Oct. 13 – 17, 2004, Hohenheim, Germany
101. Wavelets and Splines, May 16 – 19, 2005, Athens, Georgia
102. Geometric Modelling, May 29 – June 3, 2005, Dagstuhl, Germany
103. Foundations of Computational Mathematics, June 30 – July 7, 2005, Santander, Spain
104. Multivariate Approximation, Sept. 25 – 30, 2005, Bommerholz, Germany
105. Mathematics Association of America, MAA Distinguished Lecture Series, Carriage House Conference Center, Washington, DC, Jan. 25, 2007
106. Multivariate Approximation: Theory and Applications, Cancun, Mexico, April 26 – May 1, 2007.
107. 10th SIAM Conference on Geometric Design and Computing, San Antonio, Nov. 4 – 8, 2007.
108. Workshop on Algebraic Geometry and Approximation Theory, Towson Univ., April 11 – 13, 2008
109. Geometric Modelling, Dagstuhl, Germany, May 25 – 30, 2008.
110. Multivariate Approximation, Bommerholz, Germany, Sept. 21 – 26, 2008.
111. A. R. Mitchell Lecture: Computing bivariate splines in data fitting and the FEM method, 23rd Biennial Conference on Numerical Analysis, Glasgow, Scotland, June 23 – 26, 2009.
112. Multivariate approximation and interpolation with applications, Edinburgh, Scotland, Sept. 6–10, 2010.
113. Applied Math and Scientific Computing, Invited plenary lecture. Trogir, Croatia, June 13–17, 2011.
114. International Conference on Multivariate Approximation, Hagen, Germany, Sept. 24–27, 2011.



115. New Trends in Approximation Theory, Invited lecture, Ein Gedi, Israel, Jan. 4 – 7, 2012.
116. Jaen conference on Approximation Theory, Invited lecture, Ubeda, Spain, July 15 – 20, 2012.
117. Approximation Theory in the Caribbean, Invited plenary lecture, Puebla, Mexico, Oct. 13 – 18, 2013.
118. International Conference on Multivariate Approximation, Schloss Rauischholzhausen, Germany. Invited lecture, March 31 – April 5, 2016
119. VII Jaen Conference on Approximation Theory, invited lecture, July 3–8, 2016.
120. Integrating Design and Analysis, Austin, Tx, Invited lecture, Oct. 10–12, 2018.
121. Structure Preserving Discretizations: Finite Elements, Splines, and IGA, Univ. of Pittsburgh, Invited Lecture, May 31 – June 1, 2019.
122. Multivariate Approximation and Interpolation, Vienna, Austria, Invited lecture, Aug. 26 – 30, 2019.
123. Interpolation, Approximation, and Algebra, Oberwolfach, Germany, Feb. 14–18, 2022, invited lecture.

*L. Colloquium Lectures:*

**1966**

1. Univ. of Hamburg, Germany
2. Math. Research Institute, Trier, Germany

**1968**

3. Michigan State Univ.
4. Indiana Univ.
5. Oregon State Univ.
6. Carnegie Mellon Univ.
7. Case–Western Reserve Univ.

**1970**

8. Northwestern Univ.
9. Stanford Univ.
10. California Inst. of Tech.
11. Tech. Univ. of Hannover, Germany
12. Tech. Univ. of Aachen, Germany
13. Univ. of Tübingen, Germany
14. Univ. of Freiburg, Germany
15. Univ. of Bochum, Germany
16. Univ. of Bonn, Germany
17. Univ. of Munich, Germany
18. Univ. of Karlsruhe, Germany
19. Univ. of Stuttgart, Germany
20. Univ. of Göttingen, Germany

21. Technische Univ. Berlin, Germany
22. Univ. of Erlangen, Germany

### **1971**

23. Rice Univ.
24. Los Alamos Scientific Labs.
25. Sandia Scientific Labs.

### **1972**

26. Colorado College
27. Colorado State Univ.
28. Univ. of Maryland, College Park
29. Univ. of Maryland, Baltimore

### **1973**

30. Univ. of Minnesota
31. Arizona State Univ.
32. Univ. of California, La Jolla
33. Univ. of Southern California
34. Univ. of Utah
35. Penn. State Univ.
36. Kent State Univ.
37. Univ. of Bonn, Germany
38. Univ. of Grenoble, France
39. National Physical Labs., Teddington, England

### **1974**

40. Math. Research Center, Madison, Wis.
41. Vanderbilt Univ., Nashville
42. Univ. of Florida, Gainesville

### **1975**

43. Tech. Univ. of Aachen, Germany
44. Ruhr Univ., Bochum, Germany
45. Rhein–Westf. Univ., Münster, Germany
46. Hungarian Academy of Sciences, Budapest
47. Univ. of Stuttgart, Germany
48. Eidgenössische Tech. Univ., Zürich, Switzerland
49. Free Univ. of Berlin, Germany
50. Hahn-Meitner Atomic Labs., Berlin
51. Univ. of Hamburg, Germany
52. Univ. of Munich, Germany
53. Texas A&M Univ.

**1976**

54. Univ. of Duisburg, Germany
55. Oxford Univ., England
56. Univ. of Antwerp, Belgium
57. Univ. of Hamburg, Germany
58. Germany Military Academy, Hamburg, Germany
59. Univ. of Bonn, Germany
60. Air Force Inst. of Tech., Dayton
61. Inst. for Comp. Mechanics, Univ. of Texas

**1977**

62. FuJen Univ., Taipei, Taiwan
63. Science Univ. of Malaysia, Penang

**1978**

64. Univ. of Karlsruhe, Germany
65. Univ. of Erlangen, Germany
66. Univ. of Würzburg
67. Univ. of Osnabrück, Germany
68. Chalmers Inst. of Technology, Göteborg, Sweden
69. Univ. of Oslo, Norway
70. Tech. Univ. of Athens, Greece
71. Univ. of Kaiserslautern, Germany
72. Univ. of Hamburg, Germany

**1979**

73. Rice Univ.
74. S.D. School of Mines and Technology
75. Math. Research Center, Univ. of Wisconsin
76. Univ. of South Carolina
77. National Bureau of Standards, Washington
78. John Hopkins Univ.
79. IBM T.J. Watson Research Center, N.Y.
80. Univ. of Tel Aviv, Israel
81. Technion, Haifa, Israel
82. Univ. of Munich, Germany
83. Free Univ. of Berlin, Germany

## 1981

84. Texas A&M Univ.
85. Univ. of Sao Paulo, Brazil
86. Lab. de Computacao Cientifica, Rio de Janeiro
87. Univ. of South Carolina
88. Univ. of Munich, Germany
89. Univ. of Erlangen, Germany
90. Univ. of Tübingen, Germany

## 1982

91. Georgia Tech.
92. Univ. of Augsburg, Germany
93. Rice Univ.
94. Univ. of South Florida

## 1983

95. Univ. of Munich, Germany
96. Univ. of Augsburg, Germany
97. Free Univ. of Berlin, Germany
98. Hahn–Meitner Inst., Berlin
99. Univ. of Florence, Italy
100. Instituto di Calcolo, Rome, Italy
101. Cambridge Univ., England
102. Univ. of Bonn, Germany
103. Univ. of Bielefeld, Germany
104. Univ. of Erlangen, Germany
105. Katholische Univ. Eichstätt, Germany
106. Univ. of Duisburg, Germany
107. Univ. of Hamburg, Germany

## 1984

108. Colorado State Univ.
109. Univ. of Lancaster, England
110. National Physical Labs., London, England
111. Suez Canal Univ., Ismailia, Egypt
112. Univ. of Oslo, Norway
113. Univ. of Amsterdam, The Netherlands
114. Univ. of Twente, Enschede, The Netherlands
115. Univ. of Delft, The Netherlands
116. Univ. of Bonn, Germany
117. Univ. of Darmstadt, Germany

**1985**

- 118. Univ. of Utah
- 119. Normal Univ., Peking, China
- 120. Technical Univ., Hannover, Germany
- 121. Univ. of Göttingen, Germany
- 122. Hahn–Meitner Inst., Berlin, Germany
- 123. Technical Univ. of Berlin, Germany
- 124. Univ. of Siegen, Germany
- 125. Univ. of Mannheim, Germany
- 126. Univ. of Linz, Austria

**1986**

- 127. Mathematics Research Center, Univ. Wisconsin

**1987**

- 128. Arizona State Univ.
- 129. Naval Postgraduate School
- 130. Univ. of Utah
- 131. Univ. of Bielefeld, W. Germany
- 132. Catholic Univ. of Eichstätt, W. Germany

**1988**

- 133. Vanderbilt Univ.
- 134. Univ. of Utah
- 135. Free University of Berlin, W. Germany
- 136. University of Hamburg, W. Germany
- 137. Technical University Darmstadt, W. Germany
- 138. University of Erlangen, W. Germany
- 139. University of Munich, W. Germany
- 140. Purdue University
- 141. University of Wisconsin
- 142. General Motors Research Laboratories
- 143. University of Utah

**1989**

- 144. Memphis State University
- 145. University of Twente, Enschede, The Netherlands

**1990**

- 146. Catholic University Eichstaett, Germany
- 147. Ludwig Maximilians University, Munich, Germany
- 148. University of Bonn, Germany
- 149. University of Göttingen, Germany
- 150. University of Dortmund, Germany
- 151. University of Oldenbourg, Germany

**1991**

- 152. North Dakota State University
- 153. University of Utah
- 154. University of Göttingen, Germany
- 155. University of Oslo, Norway
- 156. Technical University of Dresden, Germany
- 157. Free University of Berlin, Germany
- 158. Technical University of Rostock, Germany
- 159. University of Stuttgart, Germany

**1992**

- 160. General Motors Research Labs

**1993**

- 161. General Motors Research Labs
- 162. Univ. of Waterloo, Canada
- 163. Univ. of Milan, Italy

**1994**

- 164. Univ. of Utah
- 165. Tech. Univ. Munich, Germany
- 166. Univ. Wurzburg, Germany
- 167. Center for Industrial Research, Oslo, Norway
- 168. Miss. State Univ.

**1995**

- 169. Tech. Univ., Vienna, Austria
- 170. Univ. Georgia

**1996**

- 171. Univ. of Erlangen, Germany
- 172. Tech. Univ. Hannover, Germany

**1997**

- 173. Univ. of Nantes, France
- 174. Univ. of Rennes, France

**1998**

- 175. Univ. of Bonn, Germany
- 176. Univ. of Kaiserslautern, Germany
- 177. Univ. of Bologna, Italy
- 178. Univ. of Toulouse, France

**1999**

- 179. Australian National Univ., Canberra, Australia
- 180. Latrobe Univ., Bendigo, Australia
- 181. Univ. of Mannheim, Germany
- 182. Univ. of Giessen, Germany

**2002**

- 183. Illinois Institute of Technology
- 184. Univ. of Würzburg
- 185. Univ. of Mannheim
- 186. Signature Biosystems, San Francisco

**2003**

- 187. Univ. of Mannheim, Germany

**2004**

- 188. Univ. of Mannheim, Germany

**2005**

- 189. Univ. of Mannheim, Germany

**2006**

- 190. Univ. of Oslo, Norway
- 191. Univ. of Strathclyde, Glasgow, Scotland

**2007**

- 192. Boeing, Seattle

**2008**

- 193. Towson Univ., Md.
- 194. Institute for Biomathematics, Helmholtz Zentrum, Munich, Germany
- 195. Univ. of Würzburg, Würzburg, Germany

**2010**

- 196. Illinois Institute of Technology

**2011**

- 197. Institute for Biomathematics, Helmholtz Zentrum, Munich, Germany
- 198. Zuse Institut Berlin, Berlin, Germany

**2016**

- 199. Illinois Institute of Technology

### III. Book Reviews

1. Methods in Approximation: Techniques for Mathematical Modelling by R. Bellman and R. Roth, Mathematics of Computation, 1986.
2. Approximation of Functions by G. Lorentz, Mathematics of Computation **48** (1987), 845–846.
3. Computation Geometry – Curve and Surface Modelling by B. Su and G. Chang, Mathematics of Computation, 1990.
4. Multivariate Approximation Theory IV by C. Chui, W. Schempp, and K. Zeller, Mathematics of Computation, 1990.
5. Approximation by Spline Functions by G. Nürnberger, Mathematics Reviews, 1990.
6. Curve and Surface Fitting by P. Lancaster and K. Salkauskas, Mathematics Reviews, 1990.
7. Visual Reconstruction by A. Blake and A. Zisserman, Mathematics of Computation, 1990.
8. Spline Models for Observational Data by G. Wahba, SIAM Review **33** (1991), 502.
9. Spline Models for Observational Data by G. Wahba, Mathematics of Computation, 1991.
10. Approximation Theory and Functional Analysis by C. Chui, Mathematics of Computation, 1991.
11. NURBS for Curve and Surface Design by G. Farin, Mathematics of Computation, 1992.
12. Geometry Processing for Design and Manufacturing by R. E. Barnhill, Mathematics of Computation, 1992.
13. Exact Constants in Approximation Theory by N. Korneichuk, Mathematics of Computation, 1992.
14. Curves and Surface Fitting with Splines by P. Dierckx, Mathematics of Computation, 1993.
15. Constructive Approximation Vol. II, by G. G. Lorentz, M. von Golitschek, and Y. Makovoz, Math Reviews, 1996.
16. An Introduction to Computational Geometry for Curves and Surfaces by A. Davies and P. Samuels, Mathematics of Computation, 1997.
17. Methods of Shape Preserving Spline Approximation, Boris Kvasov, Math Reviews, 2001.
18. Variational Theory of Splines, A. Bezhaev and V. Vasilenko, Math Reviews, 2002.
19. Multivariate Spline Functions and Their Applications, R.-H. Wang, Math Reviews, 2002.
20. Multidimensional Minimizing Splines, R. Arcangeli, M. C. Lopez de Silanes, J. J. Torrens, Math Reviews, 2005.



#### IV. Published papers

1. Characterization of moment points in terms of Christoffel numbers, with S. Karlin, *J. d'Analyse* **20** (1967), 213–231.
2. The fundamental theorem of Algebra for Tchebycheffian monosplines, with S. Karlin, *J. d'Analyse* **20** (1967), 233–270.
3. Representation theorems for certain classes of generalized polynomials induced by Tchebycheff systems and applications to extremal problems, *J. d'Analyse* **21** (1968), 313–335.
4. Uniform approximation by Tchebycheffian spline functions, *J. Math. Mech.* **18** (1968), 369–377.
5. Uniform approximation by Tchebycheffian spline functions, II. Free knots, *SIAM J. Numer. Anal.* **5** (1968), 647–656.
6. A note on obtaining natural spline functions by the abstract approach of Atteia and Laurent, with J. Jerome, *SIAM J. Numer. Anal.* **5** (1968), 657–663.
7. Iterated deferred corrections for initial value problems, with J. Daniel and V. Pereyra, *Acta Cient. Venezolana* **19** (1968), 128–134.
8. A differential equation approach to interpolation at extremal points, with C. Fitzgerald, *J. d'Analyse* **22** (1969), 117–134.
9. On approximation by polynomials having restricted ranges, with G. D. Taylor, *SIAM J. Numer. Anal.* **6** (1969), 31–36.
10. On  $Lg$ -splines, with J. W. Jerome, *J. Approx. Theory* **2** (1969), 29–49.
11. Approximation by splines, in *Theory and Application of Spline Functions*, T. N. Greville (ed.), Academic Press, New York, 1969, 65–85.
12. Some algorithms for the computation of interpolating and approximating spline functions, in *Theory and Application of Spline Functions*, T. N. Greville (ed.), Academic Press, N.Y., 1969, 87–102.
13. Splines via optimal control, with O. L. Mangasarian, in *Approximation with Special Emphasis on Spline Functions*, I. J. Schoenberg (ed.), Academic Press, N.Y., 1969, 119–156.
14. On the smoothness of best spline approximation, *J. Approx. Theory* **2** (1969), 410–418.
15. Uniform generalized weight function polynomial approximation with interpolation, with H. L. Loeb, D. C. Morsund, and G. D. Taylor, *SIAM J. Numer. Anal.* **6** (1969), 284–293.
16. Characterization of functions with higher order derivatives in  $L^p$ , with J. W. Jerome, *Trans. Amer. Math. Soc.* **143** (1969), 363–371.
17. Application of  $\epsilon$ -entropy to the computation of  $n$ -widths, with J. W. Jerome, *Proc. Amer. Math. Soc.* **22** (1969), 719–722.
18. A constrained rational approximation problem in filter design, *Proc. of the International Conference on Constructive Function Theory*, Bulgarian Academy of Sciences, Sofia, 1970, 309–314.
19. Discrete splines via mathematical programming, with O. L. Mangasarian, *SIAM J. Control* **9** (1971), 174–183.

20. Local bases and computation of  $g$ -splines, with J. W. Jerome, *Methoden und Verfahren der Math. Physik* **5** (1971), 171–199.
21. Saturation of positive operators, with G. G. Lorentz, *J. Approx. Theory* **5** (1972), 413–424.
22. Computation of smoothing and interpolating natural splines via local bases, with T. Lyche, *SIAM J. Numer. Anal.* **10** (1973), 1027–1038.
23. Best summation formulae and discrete splines, with O. L. Mangasarian, *SIAM J. Numer. Anal.* **10** (1973), 448–459.
24. On a method of Carasso and Laurent for constructing interpolating splines, with M. J. Munteanu, *Math. Comp.* **27** (1973), 317–325.
25. Direct and inverse theorems for multidimensional spline approximation, with M. J. Munteanu, *Indiana Math. J.* **23** (1973), 461–470.
26. Characterizations of absolute continuity and essential boundedness for higher derivatives, with J. W. Jerome, *J. Math. Anal. Appl.* **42** (1973), 452–465.
27. On the convergence of cubic interpolating splines, with T. Lyche, in *Spline Functions and Approximation Theory*, A. Meir and A. Sharma (eds.), Birkhäuser Verlag, Basel, 1973, 169–189.
28. Constructive aspects of discrete polynomial spline functions, in *Approximation Theory*, G. G. Lorentz (ed.), Academic Press, N.Y. 1973, 469–476.
29. Some multidimensional spline approximation methods, with M. J. Munteanu, *J. Approx. Th.* **10** (1974), 23–40.
30. Procedures for computing smoothing and interpolating natural splines, with T. Lyche, *Commun. ACM* **17** (1974), 463–467.
31. Computation of  $g$ -splines via a factorization method, with H. Eidson, *Commun. ACM* **17** (1974), 526–530.
32. On the distance to a class of generalized splines, with J. W. Jerome, in *Linear Operators and Approximation II*, P. Butzer and S. Nagy (eds.), Birkhäuser Verlag, Basel, 1974, 503–517.
33. On the closedness of the linear image of a set with applications to generalized spline functions, with J. W. Daniel, *J. Applicable Anal.* **4** (1974), 191–205.
34. Local spline approximation methods, with T. Lyche, *J. Approx. Theory* **15** (1975), 294–325.
35. Local support bases for a class of spline functions, with J. W. Jerome, *J. Approx. Theory* **16** (1976), 16–27.
36. Toward a constructive theory of generalized spline functions, in *Spline Functions, Karlsruhe 1975*, K. Boehmer, G. Meinardus, and W. Schempp (eds.), Lecture Notes 501, Springer-Verlag, Heidelberg, 1976, 265–329.
37. On a collocation method for singular two-point boundary value problems, with G. W. Reddien, *Numer. Math.* **25** (1976), 427–432.
38. Fitting surfaces to scattered data, in *Approximation Theory II*, C. K. Chui, G. G. Lorentz, and L. L. Schumaker (eds.), Academic Press, N.Y. 1976, 203–268.
39. Nonlinear classes of splines and variational problems, with J. W. Baumeister, *J. Approx. Theory* **18** (1976), 63–73.
40. Zeroes of spline functions and applications, *J. Approx. Theory* **18** (1976), 152–168.

41. On Tchebycheffian spline functions, *J. Approx. Theory* **18** (1976), 278–303.
42. On calculating with B-splines II, Integration, with C. deBoor and T. Lyche, in *Numerische Methoden der Approximations Theorie*, Vol. 3, L. Collatz, G. Meinardus, and H. Werner (eds.), Birkhäuser Verlag, Basel, 1976, 123–146.
43. Spline solution of linear initial- and boundary-value problems, with H. D. Eidson, in *ISNM 32*, Birkhäuser Verlag, Basel, 1976, 67–80.
44. Two-stage spline methods for fitting surfaces, in *Quantitative Approximation*, R. Schaback and K. Scherer (eds.), Lecture Notes 556, Springer-Verlag, Berlin, 1976, 378–389.
45. On  $pLg$ -splines, with P. Copley, *J. Approx. Theory* **23** (1978), 1–28.
46. Lower bounds for spline approximation, *Banach Center Publ.* **4** (1979), Z. Ciesielski (ed.), 213–223.
47. Error bounds for the approximation of Green's kernels by splines, with G. Hämmerlin, *Numer. Math.* **33** (1979), 17–22.
48.  $L_2$  approximation by splines with free knots, in *Approximation in Theorie und Praxis*, G. Meinardus (ed.), Biblio. Inst., Mannheim, 1979, 157–182.
49. On the dimension of spaces of piecewise polynomials in two variables, in *Multivariate Approximation Theory*, W. Schempp and K. Zeller (eds.), Birkhäuser Verlag, Basel, 1979, 396–412.
50. A dual basis for  $L$ -splines and applications, with K. Scherer, *J. Approx. Theory* **29** (1980), 151–169.
51. Procedures for kernel approximation and solution of Fredholm integral equations of the second kind, with G. Hämmerlin, *Numer. Math.* **34** (1980), 125–141.
52. The use of spline functions for the polar representation of 3-dimensional objects, in *Picture Processing*, K. S. Fu and T. L. Kunii (eds.), Springer, N. Y., 1982, 96–106.
53. On recursions for generalized splines, *J. Approx. Theory* **36** (1982), 16–31.
54. The set of continuous selections of a metric projection in  $C(X)$ , with J. Blatter, *J. Approx. Theory* **36** (1982), 141–155.
55. Optimal spline solutions of systems of ordinary differential equations, in *Differential Equations, Proc. Sao Paulo 1981*, Lect. Notes 957, Springer-Verlag, 1982.
56. On spaces of piecewise polynomials with boundary conditions. I. Rectangles, with C. K. Chui, in *Multivariate Approximation II*, W. Schempp and K. Zeller (eds.), Birkhäuser Verlag, Basel, 1982, 69–80.
57. FORTRAN subroutines for computing smoothing and interpolating natural splines, with T. Lyche and K. Sepehrnoori, *Adv. Eng. Software* **5** (1983), 2–5.
58. On hyperbolic splines, *J. Approx. Theory* **38** (1983), 144–166.
59. Continuous selections and maximal alternators for spline approximation, with J. Blatter, *J. Approx. Theory* **38** (1983), 71–80.
60. On shape preserving quadratic spline interpolation, *SIAM J. Numer. Anal.* **20** (1983), 854–864.
61. On spaces of piecewise polynomials with boundary conditions II. Type-1 triangulations, with C. K. Chui and R. H. Wang, *Canad. Math. Soc. Conf. Proceedings* **3** (1983), 51–66.

62. On spaces of piecewise polynomials with boundary conditions. III. Type-2 triangulations, with C. K. Chui and R. H. Wang, *Canad. Math. Soc. Conf. Proceedings* **3** (1983), 67–80.
63. Interpolation by generalized splines, with G. Nürnberger, M. Sommer, and H. Strauss, *Numer. Math.* **42** (1983), 195–212.
64. Generalized Chebychevian splines, with G. Nürnberger, M. Sommer, and H. Strauss, *SIAM J. Numer. Anal.* **15** (1984), 790–804.
65. Bounds on the dimension of spaces of multivariate piecewise polynomials, *Rocky Mountain J. Math.* **14** (1984), 251–264.
66. On spaces of piecewise polynomials in two variables, in *Approximation Theory and Spline Functions*, S. Singh, J. Burry, and B. Watson (eds.), Reidel, Dordrecht, 1984, 151–197.
67. Splines and computer-aided design, *Delft Progress Rpt.* **9** (1984), 292–304.
68. Approximation by generalized spline functions, with G. Nürnberger, M. Sommer, and H. Strauss, *J. Math. Anal. Appl.* **108** (1985), 466–494.
69. Bivariate natural spline smoothing, with C. L. Hu, in *Delay Equations, Approximation and Applications*, G. Meinardus, and G. Nürnberger (eds.), Birkhäuser Verlag, Basel, 1985, 165–179.
70. Rates of convergence of control polygons, with E. Cohen, *Comput. Aided Geom. Design* **2** (1985), 229–235. (See also *Comput. Aided Geom. Design* **3** (1986), 77).
71. Algorithms for degree-raising of splines, with E. Cohen and T. Lyche, *Trans. on Graphics* **4** (1985), 171–181.
72. Degree raising for splines, with E. Cohen and T. Lyche, *J. Approx. Theory* **46** (1986), 170–181.
73. Efficient evaluation of multivariate polynomials, with W. Volk, *Comput. Aided Geom. Design* **3** (1986), 149–154.
74. Multivariate lacunary interpolation, with T. Fawzy, in *Approximation Theory V*, C. K. Chui, J. D. Ward, and L. L. Schumaker (eds.), Academic Press, N. Y., 1986, 339–342.
75. Complete spline smoothing, with C. L. Hu, *Numer. Math.* **49** (1986), 1–10.
76. A piecewise polynomial lacunary interpolation method, with T. Fawzy, *J. Approx. Theory* **48** (1986), 407–426.
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