

CURRICULUM VITAE

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Joseph W. Jerome

Professional Address:

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Home Address:

Wilmette, Illinois

Education:

1961 B.S. St. Joseph's College (Philadelphia)
1963 M.S. Purdue University
1966 Ph.D. Purdue University

Employment:

1966–68 Assistant Professor, Mathematics Research Center, University of Wisconsin
1968–70 Assistant Professor, Case-Western Reserve University
1970–72 Assistant Professor, Northwestern University
1972–76 Associate Professor, Northwestern University
1976– Professor, Northwestern University

Visiting Positions

1974–75 Visiting Fellow, Oxford
1978–79 Visiting Professor, University of Texas at Austin
1982–83 Visiting Scientist, Bell Laboratories, Murray Hill
1985 Visiting Scholar, University of Chicago (Spring)
1994–97 Adjunct Visiting Professor, Rush Medical College

Academic Honors/Awards/Recognition

1961–65 National Science Foundation Graduate Fellow

- 1974–75 British Science Council Senior Fellow
1996 Purdue University School of Science Distinguished Alumnus Award

Professional Activities

- 2001– Associate editor, Journal of Computational Electronics
2002– Associate editor, Journal of Nonlinear Analysis
1968– Reviewer, Mathematical Reviews (271 signed reviews)
1966– Member, American Mathematical Society
1982– Member, Society for Industrial and Applied Mathematics
1981–1987 Consultant, Bell Laboratories
1985–1987 Consultant, National Research Council Advisory Panels

Books:

1. (with S.D. Fisher) Minimum Norm Extremals in Function Spaces, Lecture Notes in Mathematics 479, Springer-Verlag, Berlin, 1975.
2. Approximation of Nonlinear Evolution Systems, Academic Press, New York, 1983.
3. Analysis of Charge Transport: Mathematical Theory of Semiconductor Devices, Springer-Verlag, Heidelberg, 1996.
4. (editor) Modelling and Computation for Applications in Mathematics, Science, and Engineering, Oxford University Press, 1998.
5. (editor, with G.-Q. Chen and G. Gasper) Nonlinear Partial Differential Equations and Related Analysis, Contemporary Mathematics Series, vol. 371, American Math. Soc., Providence, 2005.

Publications:

1. On the L_2 n -width of certain classes of functions of several variables, Journal of Mathematical Analysis and Applications 20 (1967), 110–123.
2. Asymptotic estimates of the L_2 n -width, Journal of Mathematical Analysis and Applications 22 (1968), 449–464.
3. (with L.L. Schumaker) A note on obtaining natural spline functions by the abstract approach of Atteia and Laurent, Society for Industrial and Applied Mathematics Journal of Numerical Analysis 5 (1968), 657–663.
4. (with L.L. Schumaker) On Lg -splines, Journal of Approximation Theory 2 (1969), 29–49.

5. (with L.L. Schumaker) Applications of ε -entropy to the computation of n -widths, *Proceedings of the American Mathematical Society* 22 (1969), 719–722.
6. (with R.S. Varga) Generalizations of spline functions and applications to nonlinear boundary value and eigenvalue problems, in *Theory and Applications of Spline Functions* (T.N.E. Greville, editor), Academic Press, New York (1969), 103–155.
7. (with L.L. Schumaker) Characterizations of functions with higher order derivatives in L_p , *Transactions of the American Mathematical Society* 143 (1969), 363–371.
8. On n -widths in Sobolev spaces and applications to elliptic boundary value problems, *Journal of Mathematical Analysis and Applications* 29 (1970), 201–215.
9. Linear, self-adjoint, multipoint boundary value problems and related approximation schemes, *Numerische Mathematik* 15 (1970), 433–449.
10. (with Michael Golomb) Linear ordinary differential equations with boundary conditions on arbitrary point sets, *Transactions of the American Mathematical Society* 153 (1971), 235–264.
11. (with L.L. Schumaker) Local bases and computation of g -splines, *Methoden und Verfahren der Mathematischen Physik* 5 (1971), 171–199.
12. (with J.G. Pierce) On spline functions determined by singular self-adjoint differential operators, *Journal of Approximation Theory* 5 (1972), 15–40.
13. Singular, self-adjoint, multipoint boundary value problems: solutions and approximations, in *Linear Operators and Approximation* (P.L. Butzer, J.P. Kahane and B. Sz-Nagy, editors), Birkhäuser-Verlag, Basel (1972), 470–486.
14. Asymptotic estimates of the n -widths in Hilbert space, *Proceedings of the American Mathematical Society* 33 (1972), 367–372.
15. On uniform approximation by certain generalized spline functions, *Journal of Approximation Theory* 7 (1973), 143–154.
16. Non-linear, singular, multipoint boundary value problems, *Zeitschrift für Angewandte Mathematik und Mechanik* 53 (1973), 31–38.
17. Linearization in certain non-convex minimization problems and generalized spline projections, in *Spline Functions and Approximation Theory* (A. Meir and A. Sharma, editors), Birkhäuser-Verlag, Basel (1973), 119–167.
18. (with L.L. Schumaker) Characterizations of absolute continuity and essential boundedness for higher order derivatives, *Journal of Mathematical Analysis and Applications* 42 (1973), 452–465.
19. Minimization problems and linear and nonlinear spline functions I: Existence, *Society for Industrial and Applied Mathematics Journal of Numerical Analysis* 10 (1973), 808–819.
20. Minimization problems and linear and nonlinear spline functions II: Convergence, *Ibid.* 10 (1973), 820–830.
21. Topics in multivariate approximation theory, in *Approximation Theory* (G.G. Lorentz, editor), Academic Press, New York (1973), 151–198.

22. (with S.D. Fisher) Existence, characterization and essential uniqueness of solutions of L^∞ minimization problems, *Transactions of the American Mathematical Society* 187 (1974), 391–404.
23. (with S.D. Fisher) Elliptic variational problems in L^2 and L^∞ , *Indiana Journal of Mathematics* 23 (1974), 685–698.
24. (with James Kaplan) A unified approach to certain nonlinear initial value and boundary value problems, *Journal of Mathematical Analysis and Applications* 48 (1974), 31–42.
25. (with S.D. Fisher) Perfect spline solutions to L^∞ extremal problems, *Journal of Approximation Theory* 12 (1974), 78–90.
26. (with L.L. Schumaker) On the distance to a class of generalized splines, in *Linear Operators and Approximation II*, International Series in Numerical Mathematics 25, Birkhäuser-Verlag, Basel (1974), 503–517.
27. (with S.D. Fisher) Spline solutions to L^1 extremal problems in one and several variables, *Journal of Approximation Theory* 13 (1975), 73–83.
28. Smooth interpolating curves of prescribed length and minimum curvature, *Proceedings of the American Mathematical Society* 51 (1975), 62–66.
29. (with S.D. Fisher) Stable and unstable elastica equilibrium and the problem of minimum curvature, *Journal of Mathematical Analysis and Applications* 53 (1976), 367–376.
30. (with L.L. Schumaker) Local bases for a class of spline functions, *Journal of Approximation Theory* 16 (1976), 16–27.
31. On spline functions derivable from singular differential operators with compact resolvents, *Journal of Mathematical Analysis and Applications* 53 (1976), 567–577.
32. Existence and approximation of weak solutions of the Stefan problem with nonmonotone nonlinearities, in *Numerical Analysis*, Lecture Notes in Mathematics 506, Springer-Verlag, Berlin (1976), 148–156.
33. Galerkin methods for the existence and approximation of weak solutions of nonlinear Dirichlet problems with discontinuities, in *Approximation Theory*, Lecture Notes in Mathematics 556, Springer-Verlag, Berlin (1976), 274–290.
34. Generalized boundary value problems and the evolution equation, *Proceedings of the London Mathematical Society* 34 (1977), 145–154.
35. (with S.D. Fisher) Uniqueness of optimal controls in L^∞ , *Journal of Optimization Theory and Applications* 21 (1977), 469–476.
36. Nonlinear equations of evolution and a generalized Stefan problem, *Journal of Differential Equations* 26 (1977), 240–261.
37. Existence and approximation of weak solutions of nonlinear Dirichlet problems with discontinuous coefficients, *Society for Industrial & Applied Mathematics Journal of Mathematical Analysis* 9 (1978), 730–742.
38. The method of lines and the nonlinear Klein-Gordon equation, *Journal of Differential Equations* 30 (1978), 20–30.

39. Convergence of successive iterative semidiscretizations for FitzHugh-Nagumo reaction diffusion systems, Society for Industrial and Applied Mathematics Journal of Numerical Analysis 17 (1980), 192–206.
40. Horizontal line analysis of the multidimensional porous medium equation, Springer Lecture Notes in Mathematics 773 (G. Watson, editor), Springer-Verlag, Berlin (1980), 64–82.
41. Uniform convergence of the horizontal line method for solutions and free boundaries in Stefan evolution inequalities, Mathematical Methods in the Applied Sciences 2 (1980), 149–167.
42. (with M. Golomb) Linearized elastica and classical cubic spline interpolation, in *Approximation Theory III* (E.W. Cheney, editor), Academic Press, New York (1980), 435–442.
43. Convergence for operators of hyperbolic type, in *Approximation Theory and Applications* (Z. Ziegler, editor), Academic Press, New York (1981), 147–158.
44. (with M. Golomb) Equilibria of the curvature functional and manifolds of nonlinear interpolating spline curves, Society for Industrial and Applied Mathematics Journal of Mathematical Analysis 13 (1982), 421–458.
45. Convergent approximations in parabolic variational inequalities II: Hamilton-Jacobi inequalities, Applied Mathematics and Optimization 8 (1982), 265–274.
46. (with M. Rose) Error estimates for the multidimensional two-phase Stefan problem, Mathematics of Computation 39 (1982), 377–414.
47. (with R.E. Bank and D.J. Rose) Analytical and numerical aspects of semi-conductor device modeling, *Computing Methods in Applied Sciences and Engineering V* (R. Glowinski and J. Lions, editors), North Holland Publishing, Amsterdam (1982), 593–597.
48. Quasi-linear parabolic and hyperbolic systems: contractive semidiscretizations and convergence of the discrete viscosity method, Journal of Mathematical Analysis and Applications 90 (1982), 185–206.
49. Analysis of nonlinear elliptic systems arising in reaction/diffusion modeling, in *Elliptic Problem Solvers II* (G. Birkhoff and A. Schoenstadt, editors), Academic Press, New York (1984), 507–520.
50. Fixed point and implicit function theorems and their applications, Anniversary Volume on *Approximation Theory and Functional Analysis* (P. Butzer, R. Stens, B. Sz-Nagy, editors), Birkhäuser-Verlag, Basel (1984), 495–509.
51. Fully discrete stability and invariant rectangular regions for reaction-diffusion systems, Society for Industrial and Applied Mathematics Journal of Numerical Analysis 21 (1984), 1054–1065.
52. Consistency in semiconductor modeling: An existence/stability analysis for the stationary Van Roosbroeck system, Society for Industrial and Applied Mathematics Journal of Applied Mathematics 45 (1985), 565–590.
53. Approximate Newton methods and homotopy for stationary operator equations, Constructive Approximation 1 (1985), 271–285.
54. The role of semiconductor device diameter and energy band bending in the convergence of Picard iteration for Gummel’s map, Institute for Electrical and Electronic Engineers Transactions on Electron Devices 32 (1985), 2045–2051.

55. An adaptive Newton algorithm based on numerical inversion: regularization as postconditioner, *Numerische Mathematik* 47 (1985), 123–138.
56. Isolated solution structure and Newton/continuation methods for stationary operator equations, *Journal of Approximation Theory* 48 (1986), 294–302.
57. Evolution systems in semiconductor device modeling: a cyclic uncoupled line analysis for the Gummel map, *Mathematical Methods in the Applied Sciences* 9 (1987), 455–492.
58. Convection-dominated nonlinear systems: Analysis of the Douglas-Russell transport-diffusion algorithm based on approximate characteristics and invariant regions, *Society for Industrial and Applied Mathematics Journal of Numerical Analysis* 25 (1988), 815–836.
59. (with C.L. Gardner and D.J. Rose) Numerical methods for the hydrodynamic device model: Subsonic flow, *Institute for Electrical and Electronic Engineers Transactions on Computer Aided Design of Integrated Circuits and Systems* 8 (1989), 501–507.
60. Newton’s method for gradient equations based upon the fixed point map: Convergence and complexity study, *Numerische Mathematik* 55 (1989), 619–632.
61. (with W.M. Coughran) Modular algorithms for transient semiconductor device simulation, Part I: Analysis of the outer iteration, *Lectures in Applied Mathematics* 25 (R. E. Bank, editor), American Mathematical Society, Providence (1990), 107–149.
62. Algorithmic aspects of the hydrodynamic and drift-diffusion models, in *Mathematical Modelling and Simulation of Electrical Circuits and Semiconductor Devices* (R.E. Bank, R. Bulirsch and K. Merten, editors), Birkhäuser-Verlag, Basel (1990), 217–236.
63. (with T. Kerkhoven) L_∞ stability of finite element approximations to elliptic gradient equations, *Numerische Mathematik* 57 (1990), 561–575.
64. An operator Newton method for the two-phase Stefan problem based on smoothing, *Journal of Approximation Theory* 62 (1990), 282–296.
65. (with E. Fatemi and S. Osher) Solution of the hydrodynamic device model using high-order, non-oscillatory shock capturing algorithms, *Institute for Electrical and Electronic Engineers Transactions on Computer Aided Design of Integrated Circuits and Systems* 10 (1991), 232–242.
66. (with T. Kerkhoven) A finite element approximation theory for the drift-diffusion semiconductor model, *Society for Industrial and Applied Mathematics Journal of Numerical Analysis* 28 (1991) 403–422.
67. Drift-diffusion systems: Variational principles and fixed point maps for steady state semiconductor models in *Computational Electronics* (K. Hess, J. P. Leburton and U. Ravaioli, editors), Kluwer Publishing, Boston (1991), 15–20.
68. (with E. Fatemi, C.L. Gardner, S. Osher and D.J. Rose) Simulation of a steady-state electron shock wave in a submicron semiconductor device using high-order upwind methods, in *Computational Electronics* (K. Hess, J. P. Leburton and U. Ravaioli, editors), Kluwer Publishing, Boston (1991), 27–32.
69. Numerical approximation of PDE system fixed point maps via Newton’s method, *Journal of Applied and Computational Mathematics* 38 (1991), 211–230.
70. Energy models for device simulation, *Proceedings, International Semiconductor Device Research Symposium*, University of Virginia, Charlottesville, (1991), 439–440.

71. (with Chi-Wang Shu) Essentially non-oscillatory methods for two-dimensional hydrodynamic models, in *Proceedings, International Workshop on Computational Electronics*, Beckman Institute, Urbana (1992), 83–86.
72. (with Carl Gardner and Chi-Wang Shu) The ENO Method for the hydrodynamic model for semiconductor devices, in *High Performance Computing: Grand Challenges in Computer Simulation* (A. Tentner, editor), The Society for Computer Simulation, San Diego (1993), 96–101.
73. (with Z. Chen, B. Cockburn and C.-W. Shu) Finite element computation of the hydrodynamic model of semiconductor devices, in *Proceedings, Sixth SIAM Conference on Parallel Processing for Scientific Computing* (F. Sincovec *et al.*, editors), SIAM, Philadelphia (1993), 228–236.
74. (with Chi-Wang Shu) Energy Models for one-carrier transport in semiconductor devices, in *Semiconductors, Part II*, IMA Volumes in Mathematics and its Applications, v. 59 (W. Coughran, J. Cole, P. Lloyd and J. White, editors), Springer-Verlag, New York (1994), 185–207.
75. The mathematical study and approximation of semiconductor models, in *Advances in Numerical Analysis: Large Scale Matrix Problems and the Numerical Solution of Partial Differential Equations* (J. Gilbert and D. Kershaw, editors), Oxford University Press (1994), 157–204.
76. (with Chi-Wang Shu) Transport effect, hyperbolicity, and shock capturing algorithms for device simulations, in *Proceedings, Third International Workshop on Computational Electronics*, Portland, Oregon, May, 1994, 252–255.
77. (with Z. Chen, B. Cockburn and C.L. Gardner) Quantum hydrodynamic simulation of hysteresis in the resonant tunneling diode, *Journal of Computational Physics* 117 (1995), 274–280.
78. An asymptotically linear fixed point extension of the inf-sup theory of Galerkin approximation, *Numerical Functional Analysis and Optimization* 16 (1995), 345–361.
79. (with Chi-Wang Shu) Transport effects and characteristic modes in the modeling and simulation of submicron devices, *Institute for Electrical and Electronic Engineers Transactions on Computer Aided Design of Integrated Circuits and Systems* 14 (1995), 917–923.
80. (with Z. Chen, B. Cockburn and C.-W. Shu) Mixed-RKDG finite element methods for the 2-D hydrodynamic model for semiconductor device simulation, *VLSI DESIGN* 3 (1995), 145–158.
81. (with Chi-Wang Shu) The response of the hydrodynamic model to heat conduction, mobility, and relaxation expressions, *VLSI DESIGN* 3 (1995), 131–143.
82. (with D.P. Chen, R.S. Eisenberg, and C.-W. Shu) Hydrodynamic model of temperature change in open ionic channels, *Biophysical Journal* 69 (1995), 2304–2322
83. The approximation problem for drift-diffusion systems, *Society for Industrial and Applied Mathematics Review* 37 (1995), 552–572.
84. (with Bo Zhang) On a steady-state quantum hydrodynamic model for semiconductors, *Nonlinear Analysis* 26 (1996), 845–856.
85. (with Chi-Wang Shu) Energy transport systems for semiconductors: Analysis and simulation, *Proceedings of the First World Congress of Nonlinear Analysts* (V. Lakshmikantham, editor), Walter de Gruyter Publishing, Berlin (1996), 3835–3846.

86. (with J. Park) Qualitative properties of solutions of steady-state Poisson-Nernst-Planck systems: Mathematical study, Society for Industrial and Applied Mathematics Journal of Applied Mathematics 57 (1997), 609–630.
87. (with V. Barcion, D.P. Chen, and R.S. Eisenberg) Qualitative properties of solutions of steady-state Poisson-Nernst-Planck systems: Perturbation and simulation study, Society for Industrial and Applied Mathematics Journal of Applied Mathematics 57 (1997), 631–648.
88. (with Gui-Qiang Chen and Bo Zhang) Particle hydrodynamic moment models in biology and microelectronics: singular relaxation limits, Nonlinear Analysis 30 (1997), 233–244.
89. (with Gui-Qiang Chen and Chi-Wang Shu) Analysis and simulation of extended hydrodynamic models: The multi-valley Gunn oscillator and MESFET symmetries, VLSI DESIGN 6 (1998), 277–282.
90. (with Gui-Qiang Chen, Chi-Wang Shu, and Dehua Wang) Two carrier semiconductor device models with geometric structure, in *Modelling and Computation for Applications in Mathematics, Science, and Engineering*, Oxford University Press (1998), 103–140.
91. (with Gui-Qiang Chen and Bo Zhang) Existence and the singular relaxation limit for the inviscid hydrodynamic energy model, in *Modelling and Computation for Applications in Mathematics, Science, and Engineering*, Oxford University Press (1998), 189–215.
92. (with Carlo Cercignani, Irene Gamba and Chi-Wang Shu) Applicability of the high field model: An analytical study via asymptotic parameters defining domain decomposition, VLSI DESIGN 8 (1998), 135–141.
93. (with Carlo Cercignani, Irene Gamba and Chi-Wang Shu) Applicability of the high field model: A preliminary numerical study, VLSI DESIGN 8 (1998), 275–282.
94. (with Carlo Cercignani, Irene Gamba and Chi-Wang Shu) A domain decomposition method: A simulation study, in *Proceedings of the 1998 Sixth International Workshop on Computational Electronics*, Osaka University Press, 1998, pp. 174–177.
95. (with Gregory Fasshauer) Multistep approximation algorithms: Improved convergence rates through postconditioning with smoothing kernels, Advances in Computational Mathematics 10 (1999), 1–27.
96. (with Carlo Cercignani, Irene Gamba and Chi-Wang Shu) Device benchmark comparisons based on kinetic, hydrodynamic and high field models, Computer Methods in Applied Mechanics and Engineering 181 (2000), 381–392.
97. (with Bernardo Cockburn and Chi-Wang Shu) The utility of modeling and simulation in determining transport performance properties of semiconductors, in *Discontinuous Galerkin Methods: Theory, Computation, and Applications* (B. Cockburn, G. Karniadakis, and C.-W. Shu, editors), Lecture Notes in Computational Science and Engineering, vol. 11, Springer-Verlag, Heidelberg (2000), pages 147–156.
98. (with Gui-Qiang Chen and Dehua Wang) Compressible Euler-Maxwell equations, Transport Theory and Statistical Physics 29 (2000), 311–331.
99. (with Carlo Cercignani, Irene Gamba and Chi-Wang Shu) A domain decomposition method for Silicon devices, Transport Theory and Statistical Physics 29 (2000), 525–536.
100. (with Gregory Fasshauer and Eugene Gartland) Algorithms defined by Nash iteration: Some implementations via multilevel collocation and smoothing, Journal of Computational and Applied Mathematics 119 (2000), 161–183.

101. Analytical and computational advances for hydrodynamic models of classical and quantum charge transport, *VLSI DESIGN* 10 (2000), 453–466.
102. (with Carl Gardner and Robert Eisenberg) Electrodiffusion model of rectangular current pulses in ionic channels of cell membranes, *Society for Industrial and Applied Mathematics Journal of Applied Mathematics* 61 (2000), 792–802.
103. (with Gregory Fasshauer and Eugene Gartland) Newton iteration for partial differential equations and the approximation of the identity, *Numerical Algorithms* 25 (2000), 181–195.
104. A trapping principle for discontinuous elliptic systems of mixed monotone type, *Journal of Mathematical Analysis and Applications* 262 (2001), 700–721.
105. (with K. Banoo, M. Lundstrom, J.-H. Rhew, and C.-W. Shu) Simulating quasi-ballistic transport in Si nanotransistors. *VLSI DESIGN* 13 (2001), 5–13.
106. (with Siegfried Carl) Trapping region for discontinuous quasilinear elliptic systems of mixed monotone type, *Nonlinear Analysis* 51 (2002), 843–863.
107. (with Siegfried Carl) Trapping regions for elliptic systems with discontinuous coupling vector fields, in *Nonsmooth/Nonconvex Mechanics, with Applications in Engineering* (C.C. Banagiotopoulos, editor), Ziti, Thessaloniki, 2002, pp. 15–22.
108. Analytical approaches to charge transport in a moving medium, *Transport Theory and Statistical Physics* 31 (2002), 333–366.
109. (with Carl Gardner and Robert Eisenberg) Electrodiffusion model simulation of rectangular current pulses in a biological channel, *Journal of Computational Electronics* 1 (2002) 347–351.
110. (with Carl Gardner and Robert Eisenberg) Electrodiffusion model simulation of rectangular current pulses in a voltage-based biological channel, *Journal of Theoretical Biology* 219 (2002) 291–299.
111. An analytical study of smooth solutions of the Blotekjaer hydrodynamic model of electron transport, *VLSI DESIGN* 15 (2002), 729–742.
112. (with Siegfried Carl) Trapping regions for discontinuously coupled dynamic systems, in *Proceedings of the International Conference on Acoustics Mechanics and the Related Topics of Mathematical Analysis, Frejus, France*, World Scientific, New Jersey, 2002, pp. 71–77.
113. (with Siegfried Carl and Seppo Heikkilä) Trapping regions for discontinuously coupled systems of evolution variational inequalities and application, *Journal of Mathematical Analysis and Applications* 282 (2003), 424–438.
114. The Cauchy problem for compressible hydrodynamic-Maxwell systems: A local theory for smooth solutions, *Differential and Integral Equations* 16 (2003), 1345–1368.
115. (with Nikolay Stoykov, Allen Taflove, and Lauren Pierce), Computational modeling evidence of a non-thermal electromagnetic interaction mechanism with living cells: microwave nonlinearity in the cellular sodium ion channel, *Institute for Electrical and Electronic Engineers Transactions on Microwave Theory and Techniques*, special issue on Medical Applications and Biological Effects of RF/Microwaves, 52 (2004), 2040–2045.
116. (with Siegfried Carl) Drift-diffusion in electrochemistry: thresholds for boundary flux and discontinuous optical generation, *Applicable Analysis* 83 (2004), 915–931.

117. Functional analytic methods for evolution systems, *Contemporary Mathematics*, vol. 371, American Mathematical Society, Providence, 2005, pp. 193–204.
118. The thermodynamic characterization of spontaneous electrochemical reactions, *Nonlinear Analysis* 63 (2005), 754–762.
119. (with S. Van Crielingen, R. Beauwens, and E.E. Lewis): Mixed-hybrid discretization methods for the linear Boltzmann transport equation, *Computational Methods in Applied Mechanics and Engineering* 195 (2006), 2719–2741.
120. (with B. Chini and R. Sacco): Multi-Physics modeling and finite element approximation of charge flow in ionic channels, in *Proceedings of EuroSimE 2006, Thermal, Mechanical and Multi-Physics Simulation and Experiments in Micro-Electronics and Micro-Systems*, (L.J. Ernst, G.Q. Zhang, P. Rodgers, M. Meuwissen, S. Marco, O. de Saint Leger, Eds.), IEEE Shaker Publishing, Maastricht (The Netherlands), 2006, pp. 153–160.
121. (with Anders Linner) A unique graph of minimal elastic energy, *Transactions of the American Mathematical Society* 359 (2007), 2021–2041.
122. (with Anders Linner) Efficient approximation of implicitly defined functions: General theorems and classical benchmark studies, *Journal of Approximation Theory* 145 (2007), 81–99.
123. (with P.R. Sievert, L.-H. Ye, I.-G. Kim, and A.J. Freeman) Convergence of density functional iterative procedures with a Newton-Raphson algorithm, *Journal of Computational Electronics* 6 (2007), 349–352.
124. (with Yoichiro Mori and Charles Peskin) Three-dimensional model of electrical activity in biological cells, *Bulletin of the Mathematical Institute, Academia Sinica (Taiwan)* 2 (2007), 367–390.
125. (with M. Longaretti, B. Chini, and R. Sacco) Electrochemical modeling and characterization of voltage operated channels in nano-bio-electronics. *Sensor Letters* 6 (2008), 49–56.
126. (with M. Longaretti, G. Marino, B. Chini, and R. Sacco) Computational models in nano-bio-electronics: simulation of ionic transport in voltage operated channels. *Journal of Nanoscience and Nanotechnology*, 8 (2008), 3686–3694.
127. A trapping principle and convergence result for finite element approximate solutions of steady reaction/diffusion systems, *Numerische Mathematik* 109 (2008), 121–142.
128. Local properties of an isothermal charged fluid: the initial-boundary value problem, in, *Nonlinear Analysis* 69 (2008), 866–873.
129. (with M. Longaretti, B. Chini, and R. Sacco) Computational modeling and simulation of complex systems in bio-electronics. *Journal of Computational Electronics* 7 (2008), 10–13.
130. (with C. de Falco and R. Sacco) Quantum corrected drift-diffusion models: Solution fixed point map and finite element approximation. *Journal of Computational Physics* 228 (2009), 1770–1789.
131. Mathematical advances and horizons for classical and quantum-perturbed drift-diffusion systems: solid state devices and beyond. *Journal of Computational Electronics* 8 (2009), 132–141.
132. Steady Euler-Poisson systems: A differential/integral equation formulation with general constitutive relations. *Nonlinear Analysis*, 71 (2009), 2188–2193.

133. (with Riccardo Sacco) Global weak solutions for an incompressible charged fluid with multi-scale couplings: Initial-boundary value problem. *Nonlinear Analysis* 71 (2009), 2487–2497.

Book and Career Reviews

1. of T.J. Rivlin, *An Introduction to the Approximation of Functions* (Blaisdell, 1969) *Statistics Journal* (1970).
2. of A. Sard and S. Weintraub, *A Book of Splines* (Wiley, 1971) in *Math. Comp.* 27 (1973), 205–208.
3. of I.J. Schoenberg, *Cardinal Spline Interpolation* (SIAM, Philadelphia, 1973) in *Computing Reviews* 15 (1974), 323–324.
4. of A. Bellini-Morante, *Applied Semigroups and Evolution Equations* (Clarendon Press, 1979) in *SIAM Review* 23 (1981), 408–409.
5. of L. Schumaker, *Spline Functions: Basic Theory* (Wiley, 1981) in *Bull. Amer. Math. Soc.* 5 (1982), 238–247.
6. (with C. de Boor) Professional Biography: Michael Golomb, *Society for Industrial and Applied Mathematics Journal on Mathematical Analysis* 13 (1983), V–XIV.
7. of P. Markowich, *The Stationary Semiconductor Device Equations* (Springer, 1986), for the Brazilian Mathematical Society (1986).
8. of I. Rubinstein, *Electro-Diffusion of Ions* (SIAM, 1990) in *SIAM Review* 33 (1991), 682–684.

Conferences Organized

1. NSF Regional Conference on Approximation Theory and Spline Functions, I. J. Schoenberg, principal lecturer, Northwestern University, June, 1971.
2. Emphasis Year Conference on Scientific, Statistical, and Symbolic Computing, Northwestern University, March, 1987 (George Gasper and Shelby Haberman, co-organizers).
3. SIAM Annual Meeting, 1988, member, Organizing Committee (Donald Saari, Chair).
4. Varga Conference on Approximation Theory and Numerical Linear Algebra, Kent State University, March, 1989, Chair, Organizing Committee.
5. Urbana Int. Workshop on Computational Electronics, May, 1990, member, Program Committee.
6. Urbana Int. Workshop on Computational Electronics, May, 1992, member, Program Committee.
7. Leeds Int. Workshop on Computational Electronics, July, 1993, member, Program Committee.
8. Portland Int. Workshop on Computational Electronics, May, 1994, member, Advisory Committee.
9. Tempe Int. Workshop on Computational Electronics, October, 1995, member, Program Committee.
10. Workshop on Application of Mathematical Computation to Science and Engineering, Northwestern University, May, 1996.

11. Notre Dame Int. Workshop on Computational Electronics, May, 1997, member, Advisory Committee.
12. Osaka Int. Workshop on Computational Electronics, October, 1998, member, Advisory Committee.
13. Glasgow Int. Workshop on Computational Electronics, May, 2000, member, Advisory Committee.
14. Urbana Int. Workshop on Computational Electronics, October, 2001, member, Program and Advisory Committees.
15. Midwest Conference on Partial Differential Equations (G.-Q. Chen and G. Gasper, co-organizers), October, 2002.
16. Rome Int. Workshop on Computational Electronics, May, 2003, member, Program Committee.
17. International Conference on Nonlinear Evolution Equations and Applications (G.-Q. Chen and G. Gasper, co-organizers), June, 2003.
18. Purdue Int. Workshop on Computational Electronics, October, 2004, member, Advisory Committee.
19. Vienna Int. Workshop on Computational Electronics, May, 2006, member, Advisory Committee.
20. Amherst Int. Workshop on Computational Electronics, October, 2007, member, Advisory Committee.

Lectures

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| 1980 | Golomb Conference, Purdue University, April, invited speaker
Haifa Workshop on Numerical Methods, Technion, Haifa, June, invited speaker
Seminar: Yale University, July |
| 1981 | Seminar: Bell Laboratories, Murray Hill, December |
| 1982 | Minisymposium, SIAM Anniversary Meeting, Stanford University, July
Seminar: Bell Laboratories, Murray Hill, June |
| 1983 | AMS Special Session, Denver, January
Elliptic Problem Solving Conference, Naval Postgraduate School, Monterey, January, invited speaker
Seminar: Brown University, February
Seminar: Univ. of Chicago, April
Conference on Functional Analysis and Approximation, Oberwolfach, August, invited speaker
Seminar: University of Delaware, November
Seminar: IBM T.J. Watson Research Center, Yorktown Heights, November |
| 1984 | Seminar: Kent State University, February
Seminar: Bell Laboratories, Murray Hill, March
Seminar: York University, Canada, March
Colloquium: Newton methods and numerical analysis, Texas A&M, April |

- VLSI Modeling Conference, Boston, November, invited speaker
- 1985 Seminar: University of Chicago, May (two lectures)
Seminar: Cornell University, July
Seminar: University of Michigan, December
- 1986 Seminar: Argonne National Lab., February
Seminar: IBM T.J. Watson Research Center, Yorktown Heights, July
Minisymposium organizer and speaker, SIAM Annual Meeting, Boston, July
Seminar: University of Illinois, Urbana, December
- 1987 Seminar: Kent State University, March
Seminar: Brown University, March
Seminar: Purdue University, April
AMS-SIAM Summer Seminar on Computational Aspects of VLSI Design, University of Minnesota, May, invited speaker
Seminar: UCLA, August
- 1988 Rheinboldt Conference on Recent Trends in Nonlinear Computational Mathematics and Mechanics, University of Pittsburgh, March, invited speaker
Seminar: Bell Laboratories, June
Minisymposium, SIAM Annual Meeting, Minneapolis, July
Oberwolfach Conference on Device Modeling, November, invited speaker
- 1989 Meeting on Semiconductor Device Modeling, Washington, D.C., January, invited speaker
Varga Conference on Approximation Theory and Numerical Linear Algebra, March, invited speaker
Seminar: Minnesota Supercomputer Institute, October
Seminar: Kent State University, November
- 1990 Seminar: Brown University, March
Seminar: University of Notre Dame, March
Urbana Workshop on Computational Electronics, May, invited speaker
International Symposium on Computational Mathematics, Matsuyama, Japan, August, invited speaker
Seminar: Bell Laboratories, Murray Hill, November
Seminar: University of Virginia, December
- 1991 Seminar: Duke University, March
Seminar: University of Minnesota, May
Minisymposium, SIAM Annual Meeting, Washington, D.C., July
Conference on Numerical Optimization Methods in Differential Equations and Control, North Carolina State University, July, invited speaker

- IMA Summer Program on Semiconductors, July, invited speaker
 International Semiconductor Device Research Symposium, University of Virginia, December
- 1992 Seminar: Duke University, January
 Seminar: Kent State University, July
 Invited lecturer (five lectures), Summer School on Numerical Analysis, Lancaster, England, July
 Special Session, World Congress of Nonlinear Analysts, Tampa, August
- 1993 SCS Simulation Multiconference, Arlington, VA, March
 Minisymposium, SIAM Annual Meeting, Philadelphia, July
 Seminar: Purdue University, September (two lectures)
- 1994 Finite Element Mathematics Workshop, Pennsylvania State University, November
- 1995 Tempe Int. Workshop on Computational Electronics, Arizona State University, October
- 1996 Distinguished Alumnus Award Lecture, Purdue University, April
 Second World Congress of Nonlinear Analysts, Athens, July (Hour Speaker)
 Urbana Workshop on Future Topics in Computational Electronics, September
 Seminar: Brown University, December
- 1997 Seminar: New York University, January
 Seminar: University of Texas, December
- 1998 Seminar: University of California, Santa Barbara, February
 Maui Workshop on Mathematical Aspects of Plasma and Fluid Dynamics (mafpd-4), July, invited speaker
- 1999 Varga Seventieth Birthday Conference, Kent State University, March, invited speaker
 Conference on Discontinuous Galerkin Methods, Newport, RI, May, invited speaker
 International Congress on Industrial and Applied Mathematics, Edinburgh, July, invited minisymposium organizer and speaker
 O'Malley Sixtieth Birthday Conference, RPI, Troy, NY, October, invited speaker
- 2000 Seminar: Brown University, June
- 2001 Seminar: University of Pittsburgh, March
 Seminar: Boston University, March
 Seminar: North Carolina State University, March
 Finite Element Mathematics Workshop, University of Delaware, March
 Seminar: Illinois Institute of Technology, April
 Mafpd-5, Oberwolfach, April, invited speaker

- SIAM Minisymposium on Electrodifussion Model of Cell Membrane Ionic Channels, San Diego, July
- Urbana Int. Workshop on Computational Electronics (IWCE-8), University of Illinois, October, invited speaker
- 2002 Seminar: Northern Illinois University, February
- Colloquium: Florida Institute of Technology, March
- SIMAI (Italian) Biannual Conference, invited speaker, Sardenia, May
- Invited lecturer (three lectures), Short Course on Semiconductor Modeling, Scuola Normale, Pisa, Italy, June
- AMS-UMI Special Session on Transport Theory, Pisa, Italy, June
- Seminar: Arizona State University, October
- 2003 SIAM Minisymposium, San Diego, February
- 2004 Fourth World Congress of Nonlinear Analysis (Hour Speaker), Orlando, July
- Seminar: UCLA, September
- Mafpd-6 (with Y. Mori and C. Peskin), invited speaker, Kyoto, September
- Seminar: UIC, October
- 2005 Minisymposium, SIAM Annual Meeting, New Orleans, July
- 2006 Vienna Int. Workshop on Computational Electronics (IWCE-11), Technical University of Vienna, May, invited speaker
- 2007 Colloquium, DePaul University, April
- NSF-CBMS invited hour speaker, University of Iowa, May
- 2008 Fifth World Congress of Nonlinear Analysis (Hour Speaker), Orlando, July
- 2009 Seminar, Georgia Institute of Technology, April
- IMA Workshop on Conservation Laws and their Applications, Minneapolis, July, invited speaker