

CURRICULUM VITAE

CATHLEEN SYNGE MORAWETZ

New York University
Courant Institute of Mathematical Sciences
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- BORN: May 5, 1923
Toronto, Canada
- EDUCATION: University of Toronto; B.A. (1945)
Massachusetts Institute of Technology; M.S. (1946)
New York University; Ph.D (1951)
- POSITIONS: Inspection Board of the United Kingdom and Canada
Technical Assistant; (1943-44)
- Courant Institute of Mathematical Sciences, New York University
Research Assistant; (1946-50)
- Massachusetts Institute of Technology
Research Associate; (1950-51)
- Courant Institute of Mathematical Sciences, New York University
Research Associate; (1951-57)
Assistant Professor; (1957-60)
Associate Professor; (1960-65)
Professor; (1965-1993)
Professor Emerita; (1993-present)
Chairman, Department of Mathematics; (1981-84)
Associate Director; (1978-81)
Deputy Director; (1981-84)
Director; (1984-88)
- HONORS
AND AWARDS: Guggenheim Fellow, 1966-67, 1978-79
Lester R. Ford Award, Mathematical
Association of America, August 1980
Gibbs Lecture of the American Mathematical
Society, January 1981
Fellow of the American Association for

the Advancement of Science,	January 1982
Invited Address, Society of Industrial and Applied Mathematics 30th Anniversary,	July 1982
Emmy Noether Lecture, Association for Women in Mathematics,	January 7, 1983
Fellow, American Academy of Arts and Sciences,	May 1984
Jeffrey-Williams Lecture, Canadian Mathematics Society,	June 22, 1984
Invited Address, Mathematical Association of America, 75th Anniversary,	January 1990
Member, National Academy of Sciences,	1990
Fellow, Royal Society of Canada	1996-
Krieger-Nelson Lecture, Canadian Mathematics Society	June 1997
Emmy Noether Lecture, Association for Women in Mathematics, at ICM Berlin,	August 1998
National Medal of Science	1998
Fellow, Royal Irish Academy	2000
Honorary Member, London Mathematical Society	2001
AWM Speaker, SIAM 50th Anniversary	2002

HONORARY
DOCTORAL
DEGREES:

Eastern Michigan University	December 1980
Smith College	May 1982
Brown University	June 1982
Princeton University	June 1986
Duke University	May 1988
New Jersey Institute for Technology	May, 1988
University of Waterloo	October, 1993
University of Dublin, T.C.D.	July, 1996
University of Toronto	November, 1996

PROFESSIONAL
SOCIETIES:

American Mathematical Society
The Mathematical Association of America
Society for Industrial and Applied Mathematics
American Association for Advancement of Science

OFFICIAL
POSITIONS:

Member, Advisory Committee for the National Science Foundation for the Mathematical Sciences	1972-76
Trustee, Princeton University	1973-78

Trustee, American Mathematical Society	1975-85
Trustee, Alfred P. Sloan Foundation	1980-Present
Member, Mathematical Advisory Committee to the National Bureau of Standards	1979-82
Director, NCR Corporation	1978-1991
Director, JSTOR	1995-1998
Mayor's Commission on Science and Technology	1984-
Member, Board on Mathematical Sciences, National Research Council	1984-1987
President Elect, American Mathematical Society	1994-1995
Chairman, Board of School of Theoretical Physics, DIAS, Ireland	1995-2000
President, American Mathematical Society	1995-1997
Past President, American Mathematical Society	1997-1998

FORMER EDITOR:

Journal of Mathematical Analysis and Applications
Communications in Partial Differential Equations
Advances in Applied Mathematics
Communication in Pure and Applied Mathematics

PUBLICATIONS:

1. "The eigenvalues of some stability problems involving viscosity", J. of Rational Mechanics and Analysis, Vol. 1, Oct. 1952.
2. "Perturbations about strong spherical shock waves", NYU Report, CIMS.
3. "Perturbation theory for implosions", AFSWP-715-IMM-NYU- 224, CIMS.
4. "Cylindrical implosion in shallow water theory", AFSWP- 998, CIMS.
5. "On the non-existence of limiting lines in transonic flows", (with I. Kolodner), Comm. Pure Appl. Math., Vol. VI, February 1953, 97-102.
6. "A uniqueness theorem for Frankl's problem", Comm. Pure Appl. Math., Vol. VII, , November 1954, 697-704.
7. "Asymptotic solutions of the stability equations of a compressible fluid", J. of Mathematics and Physics, Vol. 33, April 1954, 1-26.
8. "On the non-existence of continuous transonic flows past profiles I,II,II", Comm. Pure Appl. Math., Vol. IX, February 1956, 45-68, Vol. X, 1, February 1957, 107-32, Vol. XI, 1, February 1958, 129-144.
9. "Note on a maximum principle and a uniqueness theorem for an elliptic-hyperbolic equation", Proc. of the Royal Society, Vol. 236, 1956, 141-144.

10. "Uniqueness for the analogue of the Neumann problem for mixed equations", Michigan Math. J., Vol. 4, 1957, 5-14.
11. "On the non-existence of continuous transonic flows past profiles II" Comm. Pure Appl. Math., Vol. X, February 1957, 107-132.
12. "Contracting spherical shocks treated by a perturbation method", (abridgement of a dissertation, partial fulfillment of the requirements for the degree of Doctor of Philosophy conferred in February, 1951).
13. "On the non-existence of continuous transonic flows past profiles III", Comm. Pure Appl. Math., Vol. XI, February 1958, 129-144.
14. "Hydromagnetic shock waves in high temperature plasmas", Proc. First United Nations Intl. Conf. on the peaceful Uses of Atomic Energy, 16, Nuclear Data and Reactor Theory, September 1958.
15. "A weak solution for a system of equations of elliptic-hyperbolic type", Comm. Pure Appl. Math., Vol. XI, August 1958, 315-322.
16. "Magneto-hydrodynamic shock structure using friction", January 1959, NYU Report 8677, AEC Computing and Appl. Math. Center.
17. "Magneto-hydrodynamic shock structure without collisions, IMS, IMF-1, NYU-2885, AEC Research and Development Report, 1960, Phys. of Fluids 4, 8, 1961, 986-1006.
18. "The decay of solutions of exterior initial-boundary value problem for the wave equation", Comm. Pure Appl. Math., Vol. XIV, August 1961, 561-568.
19. "The exponential decay of solutions of the wave equation in the exterior of a star-shaped obstacle", (with P.D. Lax and R.S. Phillips), Bull. of the Amer. Math. Soc., Vol. 68, November 1962, Comm. Pure and Appl. Math., Vol. XVI, 1963, 477-486.
20. "Modification for magneto-hydrodynamic shock structure without collisions". Phys. of Fluids, Vol. 5, 1962, 1447-1450.
21. "The limiting amplitude principle", Comm. Pure Appl. Math., Vol. XV, August 1962, 349-362.
22. "A uniqueness theorem for the relativistic wave equation", Comm. Pure Appl. Math., Vol. XVI, August 1963, 353-362.
23. "Non-existence of transonic flow past a profile", Comm. Pure Appl. Math., Vol. XVII, August 1964.
24. "Collisionless shocks and solitary waves", Proc. of the 11th Intl. Congress of Appl. Mechanics, 1964, 980-983; and Springer 1966, NYO Report No. 1480-1512, MF-44.

25. "The limiting amplitude principle for arbitrary finite bodies", *Comm. Pure Appl. Math.*, Vol. XVIII, 1/2, February/May 1965.
26. "Transonic flow and mixed equations", *Rendiconti del Seminario Matematico dell'Universita del Politecnico de Torino*, Vol. 25, April 1965/66, 73-74.
27. "Mixed equations and transonic flow", *Rendiconti di Matematica* [3-4], Vol. 25, 1966, 28 pages.
28. "Exponential decay of solutions of the wave equation", *Comm. Pure Appl. Math.*, Vol. XIX, 1966, 439-444.
29. "Energy identities for the wave equation:", NYU Report, IMM-346, 1966. Appendix in "Scattering Theory", (with P.D. Lax and R.S. Phillips), Academic Press, 1967.
30. "Time decay for the nonlinear Klein-Gordon equation", *Proc. Royal Society, A*, 306, 1968, 291-296.
31. "An inequality for the reduced wave operator and the justification of geometrical optics", (with D. Ludwig), *Comm. Pure Appl. Math.*, Vol. XXI, 1968, 187-203.
32. "The generalized Huyghens' principle for reflecting bodies", (with D. Ludwig), *Comm. Pure Appl. Math.*, Volume XXII, 1969, 189-205.
33. "Two *Lsubp* inequalities", *Bull. Amer. Math. Soc.*, November 1969, Vol. 75, 1299-1302.
34. "Energy flow: Wave motion and geometrical optics", *Bull. Amer. Math. Soc.*, July 1970, Vol. 76, , 661-674.
35. "The Dirichlet problem for the Tricomi equation", *Comm. Pure Appl. Math.*, Vol. XXIII, 1970, 587-601.
36. "Profile problems for transonic flows with shocks", *Rendiconti della Classe di Scienze Fisiche, Matematiche e Naturali, Roma, Serie VIII*, Vol. XLIX, December 1970.
37. Notes on charge-neutral self-consistent plasmas and fields, NYO-1480-139, MF-60, January 1970.
38. "Asymptotics of a nonlinear relativistic wave equation, (with Walter A. Strauss) *Bull. AMS*, Sept. 1971, Vol. 77, 5, 797-798.
39. "Decay and scattering of solutions of a nonlinear relativistic wave equation", (with W.A. Strauss), *Comm. Pure and Appl. Math.*, Vol. XXV, 1972, 1-31.
40. "Well-posed problems and transonic flow", *Fluid Dynamics Transactions*, Vol. 6, Part I, Polish Academy of Sciences, 1972, 325-333.

41. "On the modes of decay for the wave equations in the exterior of a reflecting body", Proc. Royal Irish Academy, Vol. 72, Section A, 9, 1972, 113-122.
42. "On a nonlinear scattering operator", (with W.A. Strauss), Comm. Pure Appl. Math., Vol. XXVI, 1973, 47-54.
43. "Estimates for a slowly-varying wave equation with a periodic potential", Comm. Pure Appl. Math., Vol. XXVI, 1973, 4/5.
44. "A decay theorem for Maxwell's equation", USPECHI Mat. Nauk No. 2, in honor of I.G. Petrovskii, 233-240.
45. "Notes on time decay and scattering for some hyperbolic problems", Regional Conference, Series in Applied Mathematics, 19, SIAM, Buffalo, June 3-7, 1973.
46. "Nouveaux Problemes Sur Les Equations Mixtes", Seminaire Goulaouic-Lions-Schwartz, Centre de Mathematiques, Paris, March 1975.
47. "Decay for solutions of the exterior problem for the wave equation", Comm. Pure Appl. Math., Vol. XXVIII, 1975, 229-264.
48. "Properties of shock waves, mathematical and numerical methods in fluid dynamics", International Atomic Energy Agency, Vienna, 1986.
49. "Time decay and relaxation schemes", Adv. in Mathematics, Vol. 24, 1, April 1977, 63-73.
50. "Geometrical Optics and the Singing of Whales", Summer meeting of the MAA, Toronto, August 1976.
51. "Decay of solutions of the wave equation outside nontrapping obstacles", (with J.V. Ralston and W.A. Struass), Comm. Pure Appl. Math., Vol. XXX, 1977, 447-508.
52. Correction to "Decay of solutions of the wave equation outside nontrapping obstacles", Comm. Pure Appl. Math., Vol. XXXI, 1978, 795.
53. "Numerical solutions of exterior problems with the reduced wave equation", (with G.A. Kriegsmann), Journ. Comp. Physics, Vol. 28, 181-197.
54. "A regularization for a simple model of transonic flow", Comm. in Partial Diff. Equations, 4, (1), 1979, 79-111.
55. "Nonlinear conservation equations", Amer. Math. Monthly, Vol. 86, 4, April 1979, 284-287.
56. "Numerical methods for solving the wave equation with variable index of refraction", (with G.A. Kriegsmann), Proc. BAIL I Conference, Trinity College, Dublin, 1980, J.J.H. Miller (ed), Boundary and Interior Layers - Computational and Asymptotic Methods, 118-125.

57. "Solving the Helmholtz equation for exterior problems with variable index of refraction: I", (with G. Kriegsmann), SIAM Journ. of Stat. and Sci. Computing, Vol. 1, 3, September 1980.
58. "Computations with the nonlinear Helmholtz equation", (with G.A. Kriegsmann), Journ. of the Optical Soc. of America, Vol. 71, No. 8, August 1981, 1015-1019.
59. "A formulation for higher dimensional inverse problems for the wave equation", Computers and Mathematics with Appl., Vol. 7, 1981, 319-331.
60. Lectures on nonlinear waves and shocks, TATA Institute of Fundamental Research, Bombay, 1981, p. 137.
61. "The mathematical approach to the sonic barrier", Bull. of the AMS, March 1982, pp. 127-145.
62. "Strange boundary layer effects on the edge of a nonlinear plasma", Proc. of BAIL II Conference, Trinity College, Dublin, June 1982, 3-12.
63. "The calculations of an inverse potential problem", (with G.A. Kriegsmann), SIAM Journal on Applied Mathematics, SIAM Journ. Appl. Math., Vol. 43, No. 4, August 1983, 844-854.
64. "The nonlinear interaction of a laser beam with a plasma pellet", (with A. Bayliss and G.A. Kriegsmann), Comm. Pure Appl. Math., Vol. 36, 1983, 399-414.
65. "Weak Solutions of Transonic Flow by Compensated Compactness", Dynamical Problems in Continuum Physics, IMA Volumes in Mathematics and its Applications, Springer-Verlag, Vol. 4, 1985.
66. "On a weak solution for a transonic flow problem", Comm. Pure Appl. Math., Vol. 38, 1985, 797-818.
67. "Mathematical Problems in Transonic Flow," Canadian Mathematical Bulletin, Vol. 29 (2), 1986.
68. "Scattering by a Potential by Hyperbolic Methods," (with Alvin Bayliss and Yanyan Li), Mathematics of Computation, Vol. 52, 1986, 321-338.
69. "An Alternative Proof of Di Perna's Theorem", Comm. Pure Appl. Math. Vol. 44, 1991, 1081-1090.
70. "A Numerical Experiment on a Second-Order Partial Differential Equation of Mixed Type" (with D.C. Stevens and H. Weitzner) Comm. Pure Appl. Math., Vol. 44, 1991, 1091-1106.

71. "Giants", an address given at the 75th anniversary of the founding of the MAA, Columbus, Ohio, The American Mathematical Monthly, November 1992, 819-828.
72. "Potential Theory for Regular and Mach Reflection of a Shock at a Wedge," Comm. Pure Appl. Math. Vol. 47, 1994, 593-624.
73. "On Steady Transonic Flow by Compensated Compactness," Methods and Applications of Analysis, Vol. 2, No. 3, 257-268.
74. "A Viscous Approximation for a 2-D Steady Semiconductor or Transonic Gas Dynamic Flow; Existence Theorem for Potential Flow" (with Irena Gamba), Comm. Pure and Appl. Math., Vol. 49, 1996, 999-1049.
75. "Mathematics to the Rescue (Retiring Presidential Address)" Notices of the American Mathematical Society, Vol. 46, No. 1, 1999, 9-16.
76. "Variations on Conservation Laws for the Wave Equation," Bull. Amer. Math. Soc., Vol. 37, No. 2, 2000, 141-154.