

RESUME

Name: RICHARD A. TOUPIN
Born: August 20, 1926
Miami, Florida

Education

BS: University of South Carolina 1946
MS: University of Hawaii 1949
Thesis: On the Motion of Singularities in the General
Theory of Relativity
PhD: Syracuse University 1961
Dissertation: A Dynamical Theory of Elastic Dielectrics

EXPERIENCE

- 1946: Commission, Ensign U. S. Navy
- 1946-47: Navigator, U.S.S Andromeda (AKA-15)
- 1949-50: Instructor of Physics and Mathematics,
University of Hawaii, Honolulu, Hawaii
- 1950-52 Research Staff Member, Applied Mathematics
Branch, U. S. Naval Research Laboratory,
Washington, D.C.
- 1952-54 Research Assistant, Graduate Student
Syracuse University, Syracuse, N. Y.
- 1954-56: Research Staff Member, Applied Mathematics Branch.
U. S. Naval Research Laboratory, Washington, DC
- 1956-62: Head, Theoretical Mechanics Section,
U. S. Naval Research Laboratory, Washington, DC
- 1962-66: Research Staff Member, Mathematical Sciences
Department, IBM Research Center, Yorktown
Heights, N. Y.
- 1966-68: Visiting Research Staff Member
IBM Research Laboratory, Zurich, Switzerland.
- 1968-74: Manager, Theoretical Mechanics, Mathematical
Sciences Department, IBM Research Center,
Yorktown Heights, N. Y.
- 1974-81: Director, Mathematical Sciences Department,
IBM Research Center, Yorktown Heights, N. Y.
- 1982-83: Consultant, Theoretical and Applied Mechanics,
IBM General Products Division Development
Laboratory, San Jose, CA.
- 1983-86: Manager, Scientific and Engineering Computation,
IBM Science Center, Heidelberg, FRG
- 1986- Visiting Scholar, Mathematics and Applied
Mechanics, Stanford University. Consultant in
Applied Mechanics, IBM Almaden Research Center.

HONORS

Recipient, Hulbert Award for 1961: U. S. Naval Research Laboratory Outstanding Scientist of the Year.

New York Academy of Sciences 1965: Annual Invited Evening Lecture on Mechanics: "St.-Venant and a Matter of Principle".

IBM Outstanding Contribution Award 1973 [with G. Fan] for work on magnetic ink jet printing.

Citations: Most cited paper decade 1972-1982 in a special field. (Bibliography: Elastic Materials with Couple Stresses)

ACADEMIC, GOVERNMENT, AND PROFESSIONAL SERVICE

Founding and Service Member of the Society for Natural Philosophy 1963-. Secretary of the Society 1965-67.

American Mathematical Society Member

Editorial Board, Archive for Rational Mechanics and Analysis 1966-86

Editorial Board, International Journal for Engineering Science 1964-66

National Science Foundation Peer Reviewer

American Physical Society Referee J. Math. Phys. & Physical Review.

International Journal of Solids and Structures Referee

Mathematical Reviews American Mathematical Society Contributor

Lehigh University: Member, Department of Mathematics Visiting Committee, 1980-85

Princeton University: Member, Visiting Committee Applied Mathematics Program, 1976

Columbia University: Examination Committee 3 Graduates in Civil and Mechanical Engineering 1970-80.

City University of New York: Examination Committee Graduate in Solid State Physics 1980.

Member-at-Large, U. S. National Committee on Theoretical and Applied Mechanics, National Research Council, 1977-79.

PUBLICATIONS

"A Variational Principle for the Mesh Analysis of a Mechanical System", *Journal of Applied Mechanics* (1952) pp. 151-52.

"Piezoelectric Relations and Radial Deformations of a Polarized Spherical Shell" *Journal of the American Acoustical Society* 31 (1959) pp. 315-18.

"The Elastic Dielectric", *J. Ratl. Mech. and Anal.* 5 (1956) pp. 849-916.

"Lattice of Partly Permanent Dipoles," *J. Chemical Physics* 27 (1957) pp. 458-464.

"Implications of Hadamard's Condition for Elastic Stability with Respect to Uniqueness Theorems", [with J. L. Ericksen] *Canadian Journal of Mathematics* 8 (1956) pp. 432-36.

"Some Relations between Waves, Stability, Uniqueness Criteria, and Restrictions on the Form of the Energy Function in Elasticity Theory", Lecture Notes Inaugural Meeting of British Society for Theoretical Mechanics, Newcastle (1960).

"The Classical Field Theories", [with C. Truesdell] *Handbuch der Physik* (Springer-Verlag, Berlin, 1960), Vol.III/1, 226-858.

"Dimensional Changes in Crystals Caused by Dislocations", [with R. S. Rivlin] *J. Math. Physics* 1 (1960) pp. 8-15.

"Some Properties of the Hessian Matrix of a Strictly Convex Function", [with B. Bernstein] *J. Reine Angew. Math.* 210 (1962) pp. 65-72.

"Stress Tensors in Elastic Dielectrics", *Arch. Rat. Mech. and Anal.* 5 (1960) pp. 440-452.

“Korn Inequalities for Sphere and Circle,” [with B. Bernstein] *Arch. Ratl. Mech. and Anal.* 6 (1960) pp. 51-64.

“Sound Waves in Deformed Perfectly Elastic Materials. Acoustoelastic Effect”, [with B. Bernstein] *J. Acoust. Soc. Amer.* 33 (1961) pp. 216-225.

“Electro-magneto-optical Effects”, [with R. S. Rivlin] *Arch. Ratl. Mech. and Anal.* 5 (1961) pp. 434-448.

“A Dynamical Theory of Elastic Dielectrics”, *Int. J. Engrg. Sci.* 1 (1963) pp. 101-126.

Bressanone Lectures on Continuum Mechanics and Electromagnetism: CIME Summer Course on Continuum Mechanics (1963).

“Elastic Materials with Couple-Stresses”, *Arch. Ratl. Mech. and Anal.* 11 (1962) pp. 385-414.

“Static Grounds for Inequalities in Finite Strain of Elastic Materials”, [with C. Truesdell] *Arch. Ratl. Mech. and Anal.* 12 (1961) pp. 1-33.

“The Elastic Tensor of Given Symmetry Nearest to an Anisotropic Elastic Tensor,” [with D. Gazis and I. Tadjbakhsh] RC-801, IBM Research Center, Yorktown Heights, NY (1962); also, *Acta Crystallographica* 16 (1963) pp. 917-922.

“Surface Effects and Initial Stress in Continuum and Lattice Models of Elastic Crystals”, [with D. Gazis] RC-1008, IBM Research Center, Yorktown Heights, NY (July 11, 1963); also, Proc. Intern’l Conf. on Lattice Dynamics, Copenhagen, Denmark, R. F. Wallis, ed. Pergamon Press, (1964), pp. 597-.

“A Numerical Analysis of a Magneto-Resistive Circuit Employed as a Voltage Regulator”, [with R. K. Brayton and W. L. Miranker] NC-295, IBM Research Center, Yorktown Heights, N.Y. (1963).

“On the Equations of Finite Elastic Deformations in Deformed Coordinates”, [with I. Tadjbakhsh] RC-1111, IBM Research Center, Yorktown Heights, NY (Jan. 1964).

“A Uniqueness Theorem for the Displacement Boundary-Value Problem of

Linear Elastodynamics”, [with M. E. Gurtin] *Q. of Appl. Math.* 23 (1965) pp. 79-81.

“Theories of Elasticity with Couple-Stress”, RC-1192, Research Center, Yorktown Heights, NY (May 1964); also, *Arch. Ratl. Mech. and Anal.* (1964) pp. 85-112.

“Saint-Venant’s Principle”, RC-1326, IBM Research Center, Yorktown Heights, NY (Nov. 1964); also, *Arch. for Ratl. Mech. and Anal.* 18 (1965) pp. 83-96.

“St.-Venant and a Matter of Principle”, *Trans. of the New York Academy of Sciences (Series II)* 28 (1965) pp. 221-232.

“On St.-Venant’s Principle”, Proceedings of the XI International Congress of Applied Mechanics, Munich (1964).

“Dislocated and Oriented Media”, RZ-245, IBM Research Center, Zurich, Switzerland (1967); also in *Continuum Theory of Inhomogeneities in Simple Bodies, A Reprint of Six Memoirs*, Springer-Verlag (1968); also in *Proc. IUTAM Symposium, Stuttgart (1967)*, (E. Kroner, ed.) Springer-Verlag, (1968) 126-140.

“Slow Sound Waves and Phase Transformations of Elastic Solids,” [with H. Thomas] RC-2663, IBM Research Center, Yorktown Heights, NY (1969).

“A Phenomenological Theory of Streaming Birefringence”, [with B. Coleman and E. H. Dill] *Arch. Ratl. Mech. and Anal.* 39 (1970).

“Acoustical and Optical Activity in Alpha Quartz”, [with R. D. Mindlin] RC-3207, IBM Research Center, Yorktown Heights, NY (1971); also, *Intern’l J. Solids and Structures* 7 (1971) pp. 1219-1227.

“Numerical Solution of Steady-State Problems for Nonlinear Magnets”, [with D. Quarles] RC-3871, IBM Research Report, Yorktown Heights, NY (1972).

“An Iterative Method for the Computation of Eigenvalues of a Matrix”, [with A. Ziv] RC 9491 IBM Research Report (1982).

“Solving Large Sparse Systems of Linear Equations with Guaranteed Ac-

curacy”, [with U. Schauer] Proceedings of IBM Symposium on Accurate Scientific Computation, Springer-Verlag Lecture Notes on Computer Science (1986); also, Co-editor with W. L. Miranker of the Proceedings of this Symposium.

LECTURES & PRESENTATIONS

“Large Elastic Deformations of Dielectrics”, Bell Telephone Laboratory Physics Colloquium (1960).

“Equivalence of the Principles of Conservation and Invariance in Non-simple Elastic Materials”, First Meeting of the Society for Natural Philosophy, Johns Hopkins University (1963)

“On St.-Venant’s Principle”, Society for Natural Philosophy U. of Minnesota Meeting (1965).

“On St.-Venant’s Principle”, Polish Academy of Science Meeting Zakopane (1967).

“Generalizations of Onsager’s Principle to Non-Linear Constitutive Relations”, Colloquium ETH (1967).

“On the Conservation Laws of Electric Charge and Magnetic Flux”, Society for Natural Philosophy ITT Chicago Meeting (1967)

“Thermodynamics of Continuous Systems and the Onsager Property”, IBM Research Center Physics Colloquium (1968).

“Sound Waves and Phase Transitions of Elastic Crystals”, Carnegie-Mellon (1969).

“An Analysis of the Magnetic Ink Jet Printer”, ITL Printing Conference, Lexington, KY (1973).

“The Magnetic Ink Jet Printer,” IBM Patent Symposium on Ink Jet Printing, Endicott, NY (1973).

“Ink Jet Printing: An Overview,” IBM Research Center, Yorktown Heights, Course in Printing Technology (1974).

“Electrodynamics of Magnetic Recording Heads: Theory and Experiments”, [with S. Hoo] IBM Yorktown Heights, San Jose, Sindelfingen (1982-83).

“A Geometry for Space-Time and Elementary Matter”, IBM Research Mathematical Sciences Department 25'th Anniversary Symposium (1985); Applied Mechanics Seminar Series, Stanford University 1986

PATENTS AND INVENTION DISCLOSURES

“Magnetohydrodynamic Velocity Modulation of a Jet”, [with Lynn West] (1972) (YO8710373)

“Electromagnetic Modulation of a Thin Magnetic Fluid Jet”, [with G. Fan] (Oct. 1971) (YO8710556). U.S.Patent No. 4,027,308 (issued May 31, 1977).

“Selective Deflection of a Stream of Magnetic Fluid Droplets [with G. Fan] (1971) (YO8710557) Patent No. 3,805,272, issued 4/16/74 “Recording System Utilizing Magnetic Deflection”.

“Asynchronous Magnetic Ink Jet System”, [with G. Fan] (1972) (YO8720263)

“Magnetic Ink Jet Printer”, [with G. Fan and F. H. Dill] (1973) (YO8730229)

“Drop Shutter for Ink Jet Printing”, [with G. Fan] (1972) (YO8720624)

“Fluid Jet Deflection by Modulation and Coanda Selection”, (1973) (YO8720671) U. S. Patent No. 3,893,623 issued July 8, 1975.

“Method and Apparatus for Asynchronously Forming Magnetic Liquid Droplets”, [with G. Fan] (YO972-111); U. S. Patent No. 3,916,419 issued October 28, 1975.

“Distributed Blowing Engine for Electronic Cooling”, [with P. Stuckert] (1976) (YO876-0174), published in IBM Tech. Discl. Bull. Vol.20, No.6, (Nov. 1977) 2445-2446.

“Method and Apparatus for Recording Information on a Recording Surface”, [with G. Fan and F. H. Dill] U. S. Patent No. 3,992,712, issued on November 16, 1976.

"Facsimile with Encrypted Hard Copy", [with R. Myers] (1977) (YO877-0662).