Professor Frederic Y. M. Wan

See:

Positions:
Professor, Mathematics, School of Physical Sciences
Professor, Mechanical & Aerospace Engineering, The Henry Samueli School of Engineering

Degrees:
S.B., Massachusetts Institute of Technology, 1959, Mathematics
S.M. and Ph.D. Mathematics, June, 1993 and September, 1965, MIT

Honors and Awards:

**Arthur Beaumont Distinguished Service Award, Canadian Applied Mathematics Society, 1991
**Foreign Member, Russian Academy of Natural Sciences, 1999 -
**Fellow: American Academy of Mechanics (AAM), 1981, American Society of Mechanical Engineers (ASME), 1987; American Association for the Advancement of Science (AAAS), 1995.

Appointments:
**University of British Columbia: Director, Institute of Applied Mathematics and Statistics (1974-83)
**University of Washington: Chair, Department of Applied Mathematics (1983-88); Divsional Dean of Natural and Mathematical Sciences, College of Arts & Sciences (1988-92)
**Natural Science and Engineering Council of Canada: Member (1980-83) and Chairman (1982-83), Committee of Pure and Applied Mathematics
**National Science Foundation: Program Officer, Appl. Math. Program, DMS (1986-87); Division Director, DMS (January, 1993 - December, 1994)
**MIT: MIT Educational Council (1974-79) MIT Visiting Committee for Mathematics (1991-93)
**University of California, Irvine: Vice Chancellor for Research and Dean of Graduate Studies (1995-2000)

Editorial Board Membership: 1) Studies in Appl. Math. 84- ; 2) Canadian Appl. Math. Quarterly, 93- ; 3) International J. Solids & Strucutres 96- ; 4) World Sci. Publ. 95- .

Professional Societies: Canadian Applied Mathematics Society (CAMS/SCMA): Council Member 1980-82, President 1983-85, Past President 1985-87. American Mathematical Society (AMS): Committee of Committees (1995-97), Science Policy Committee (1995-97). Society for Industrial and Applied Mathematics (SIAM): Educational Committee (1983-87), Representative on the U.S. National Committee on Theoretical and Applied Mechanics (1991-93, 2001-), Science Policy Committee (1990-92,1995-) Mathematical Association of America (MAA)

Research Interests: Applied Mathematics, Solid Mechanics, Resource Economics, Biomathematics

Research Abstract:
**Copyrights on Books: 1) Mathematical Models and Their Analysis, Harper and Row, February, 1989. 2) Introduction to the Calculus of Variations and Its Applications, Chapman & Hall, January, 1995.
**Recent Presentations: 2004-05 - SIAM Conferences on the Life Sciences (7/11-16/04, Portland, OR), AIM's 5th Int'l Conf. on Dyn. Syst. & Diff. Eq'ns (6/16-19/04, Pomona, CA); 2003-04 - Int'l Conf. Math. & Its Applications (5/28-31/04, City Univ. of Hong Kong), Math. Seminar (5/21/04, Peking Univ.), Mechanics Seminar (5/14/04, Peking Univ.), Comp. Math. Seminar (4/23/04, Xian Jaotong Univ.), Mechanics Seminar (4/9/04, Tsinghua Univ.), 5th ICIAM (7/7-11/03, Sydney, Australia); 2002-03 - W.M. Keck Seminars in Comp. Biology (5/21/03, UCLA), 3rd So.Calif. Appl. Math. Symp. (5/3/2003, UC Irvine), Annual SIAM Meeting (7/8-12/2002, Philadelphia, PA).

Professional Societies:
    American Academy of Mechanics
    American Society for Mechanical Engineers (ASME)
    Canadian Applied Mathematical Society (CAMS/SCMA)
    Society for Industrial and Applied Mathematics (SIAM)
    American Mathematical Society (AMS)
    Mathematical Association of America (MAA)

Some Early Publications:

E. Reissner and F.Y.M. Wan, "Rotating shallow elastic shells of revolution", J. Soc. Ind. Appl. Math., Vol. 13, 1965, pp. 333-352

E. Reissner and F.Y.M. Wan, "A note on the stress strain relations of the linear theory of shells", ZAMP, Vol. 17, 1966, pp. 676-681

E. Reissner and F.Y.M. Wan, "On stress strain relations and strain displacement relations of the linear theory of shells", Recent Progress in Applied Mechanics (The Folk Odqvist Volume), Almqvist & Wiksell, Stockholm, 1967, pp. 487-500

E. Reissner and F.Y.M. Wan, "Rotationally symmetric stress and strain in shells of revolution", Studies in Appl. Math., Vol. 48, 1969, pp. 1-17

F.Y.M. Wan, "Two variational theorems for thin shells", J. Math. & Phys., Vol. 47, 1968, pp. 429-431

F.Y.M. Wan, "On the displacement boundary value problem of shallow spherical shells", Int. J. Solids & Structures, Vol. 4, 1968, pp. 661-666

F.Y.M. Wan, "The side force problem for shallow helicoidal shells", J. Appl. Mech., Vol. 36, 1969, pp. 292-295

F.Y.M. Wan, "Exact reductions of the equations of linear theory of shells of revolution, Studies in Appl. Math., Vol. 48, 1969, pp. 361-375

F.Y.M. Wan, "Rotationally symmetric shearing and bending of helicoidal shells", Studies in Appl. Math., Vol. 49, 1970, pp. 351-369

F.Y.M. Wan, "Circumferentially sinusoidal stress and strain in shells of revolution", Int. J. Solids & Structures, Vol. 4, 1970, pp. 959-973

F.Y.M. Wan, "On the equations of linear theory of elastic conical shells", Studies in Appl. Math., Vol. 49, 1970, pp. 69-83

F.Y.M. Wan, "Laterally loaded shells of revolution", Ing. Arch., Vol. 42, 1973, pp. 245-258

F.Y.M. Wan, "The dimpling of spherical caps", Mechanics Today, Vol. 5 (E. Reissner Anniversary Volume, edited by S. Nemat-Nasser), Pergamon Press, 1980, pp. 495-508

F.Y.M. Wan, "Polar dimpling of complete spherical shells", Theory of Shells (Proc. Third IUTAM Shell Symp., Tbilisi, 1978, edited by W.T. Koiter and G.K. Mikhailov), North Holland (1980), pp. 191-207

David F. Parker (1) and Frederic Y. M. Wan (2)

(1) Department of Theoretical Mechanics, The University of Nottingham, Nottingham, NG7 2RD, England
(2) Department of Mathematics and Institute of Applied Mathematics and Statistics, The University of British Columbia, Vancouver, V6T 1W5, Canada

"Finite polar dimpling of shallow caps under sub-buckling axisymmetric pressure distributions", SIAM J. Appl. Math., Vol. 44, No. 2, April 1984, Society for Industrial and Applied Mathematics

PARTIAL ABSTRACT: For shallow caps under an axisymmetric external pressure distribution which is inward in a neighborhood of the pole and outward away from the pole, it has been shown previously that a finite axisymmetric dimple state of deformation is possible if the inward pressure is at least of the order of the classical buckling pressure for a complete spherical shell and that, asymptotically, the corresponding dimple base is located by the condition of no resultant vertical force over the dimpled region. In the present paper we treat the more difficult load magnitude range…

F.Y.M. Wan, "Shallow caps with a localized axisymmetric load distribution", in Flexible Shells (Proc. EUROMECH Colloq. No. 165, edited by E.L. Axelrad and F.A. Emmerling), Springer-Verlag, 1984, pp. 124-145

F.Y.M. Wan, "Lecture notes on the linear theory of shells of revolution", Appl. Math. Tech. Report 84-89, University of British Columbia, 1984

F.Y.M Wan and H.J. Weinitschke, "Boundary layer solutions for some nonlinear elastic membrane problems", ZAMP, Vol. 38, 1987, pp. 79-91

Some Recent Publications:

Feedback regulation in multistage cell lineages, Math. Biosci. & Eng., 6(1), 2009, Pgs. 59-82. (W.-C. Lo, C.-S. Chou, K. Gokoffski, A.D. Lander, A.L. Calof and Q. Nie)

Compact integration factor methods in high spatial dimension, J. Comp. Phys., 227, 2008, Pgs. 5238-5525. (with Q. Nie, F.Y.M. Wan, Y.-T. Zhang and X.-F. Liu)

Selective pressures for and against genetic instability in cancer: a time-dependent problem, J. Royal Society, Interface, 2007, Online, June 19, 2007, doi: 10.1098/rsif.2007.1054. (with N. Komarova and A. Sadovsky)

Elastodynamics of embryonic epidermal wound closure, Studies in Appl. Math., 118, 2007, Pgs. 365-395. (with A. Sadovsky)

Wingless directly represses DPP morphogen expression via an Armadillo/TCF/Brinker complex, PLoS ONE, 2007, 1 (e142, doi:10.1371/journal.pone.0000142), Pgs. 1-10 [plus supplement, 1-14, and figures, S1-S6]. (with H. Theisen, A. Syed, B.T. Nguyen, T. Lukacsovich, J. Purcell, G.P. Srivastava, D. Iron, K. Gaudenz, Q. Nie,M.L. Waterman, and J. L. Marsh)

Time to first spike in Hodgkin-Huxley stochastic systems, Physica A - Stat. Mech. Applic., 351 (2-4), 2005, Pgs. 427-438. (with H.C. Tuckwell)

Effects of Sog on Dpp-receptor binding, SIAM J. Appl. Math., 65, 2005, Pgs. 1748 - 1771. (with Y. Lou and Q. Nie)

Formation of the BMP activity gradient in the Drosophila embryo, Dev. Cell, 8, 2005, Pgs. 519-5?? [plus supplement]. (with C.M. Mizutani, Q. Nie, Y.-T. Zhang, P. Vilmos, E. Bier, J.L. Marsh and A.D. Lander)

Spatially distributed morphogen synthesis and morphogen gradient formation, Math. Biosci. & Eng. (MBE), 2 , 2005, Pgs. 239 – 262. (with A.D. Lander and Q. Nie)

Stress boundary conditions for plate bending, Int. J. Solids Structure Vol. 40, 2003, 4107-4123. (A Special Issue in honour of Arthur. W. Leissa on his 70th Birthday)

Determination of Firing Times for the Stochastic Fitzhugh-Nagumo Neuronal Model, Neural Comp., vol. 15, 2003, 143-159. (with H.C. Tuckwell and Rodriguez)

Do morphogen gradients arise by diffusion? Dev. Cell, vol. 2, 2002, 785-796. (with A.D. Lander and Q. Nie)

Nature of equilibria and effects of drug treatments in some viral population dynamical models, IMA J. Math. Appl. Med. & Biol. vol. 17, 2000, Pgs. 311-327. (with H.C. Tuckwell)

Locational equilibrium models for publicly owned residential land, Natural Resource Modeling vol. 13(2), 2000, 219-246.

A thick hollow sphere compressed by equal and opposite concentrated axial loads, an asymptotic solution, SIAM J. Appl. Math., vol. 59, 1999, 1080-1097. (with R. D. Gregory & T. I. Milac)