Alan Clive Newell

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PERSONAL DATA

Birthdate:	November 5, 1941
Place of Birth:	Dublin, Ireland
Citizenship:	Dual: Irish and US.
Family:	Wife: Tish. Children: Jamie (48), Shane (47), Matt (43), Pippa (37) Grandchildren: Luke (8), Tony (6), Georgina (5), Jack (4), Alan (2).

EDUCATION

BA(Mod.) Mathematics & BA(Mod.) Physics	1958-62, Trinity College,Dublin (Gold Medal in Mathematics)
MSc,PhD Applied Mathematics	1962-66, Massachusetts Institute of Technology

CURRENT EMPLOYMENT

Regents' Professor, University of Arizona.

LEADERSHIP

Over a period of thirty years (1971-2000), I successfully led, with much help from generous and talented colleagues, the Department of Mathematics and Computer Science at Clarkson University (1971-79), the Applied Mathematics Programme at the University of Arizona (1981-85), the Department of Mathematics at the University of Arizona (1985-1996), the Department of Mathematics at the University of Warwick (1996- 2000). I did this while at the same time maintaining active teaching (from large lecture undergraduate courses to graduate level courses) and research profiles (publications, external funding, invited lectures) and a record of all round scholarship. Since 2001, I have returned to the infantry ranks and have enjoyed the non-administrative challenges of scholarship, research, learning and teaching.

AWARDS AND HONOURS

1961	Foundation Scholar; Trinity College, Dublin.
1962	Gold Medal in Mathematics; Trinity College, Dublin.
1976-77	John Simon Guggenheim Fellow.
1988-89	U. S. Senior Scientist Humboldt Fellow.
1970	Kac Memorial Lectures. CNLS, Los Alamos.
2004	SIAM John von Neumann Lecture Prize.
2004	Regents' Professor, University of Arizona
2009	Elected Fellow SIAM as part of the first cohort.
2012	SIAG Martin D. Kruskal Lecture Prize.

PAST EMPLOYMENT

1966-67	Assistant Research Geophysicist, University of California, Los Angeles.
1967-70	Assistant Professor of Mathematics and Planetary and Space Science. University of California, Los Angeles.
1970-79	Chairman of Department and Professor of Mathematics and Computer Science. Clarkson University.
1981 – present	Professor of Mathematics; Research Professor of Arizona Research Laboratories.
1981-85	Chairman, Program in Applied Mathematics, University of Arizona.
1985-1996	Head of Department and Professor of Mathematics; Research Professor in Arizona Research Laboratories, University of Arizona.
1986 - 1996	Director, Arizona Centre for Mathematical Sciences.
1996- 2000	Professor of Mathematics and Chairman, Department of Mathematics, University of Warwick,UK.
1996 – present .	Professor of Mathematics, University of Arizona; Honorary Professor of Mathematics, University of Warwick
2004 – present	Regents' Professor of Mathematics, University of Arizona.

PROFESSIONAL AFFILIATIONS

Member:	Fellow, Institute of Mathematics and its Applications, UK. American Mathematical Society, Fellow of Society for Industrial and Applied Mathematics.

PROFESSIONAL SERVICES

Co-Founder:	Physica D, Nonlinear Phenomena. One of four Founding Editors and longest serving Editor.
Co-Organizer:	
(Partial list)	Joint AMS-SIAM 7th Summer Seminar in Applied Mathematics, held at Clarkson University, Potsdam, NY, July 1972; Summer Workshop on Nonlinear Waves, held at Clarkson University, Potsdam, NY, August 1979; Programme on "Integrable models in Physics," NSF Institute for Theoretical Physics, University of California, Santa Barbara, August 1984-July 1985; Programme on "Nonlinear Waves." Institute for Mathematics and its Applications (IMA), University of Minnesota, Fall 1988; BMC-BAMC first joint annual meeting, Warwick, 2001; Conference on " Rogue Waves" (with N. Akhmediev and E. Pelinovsky), Dresden, Fall 2011.
Chairman:	AMS-SIAM Committee on Applied Mathematics, 1981-84.
Member:	SIAM Board of Trustees, 1981-84.
Member:	Research Briefing Panel on Nonlinear Science, 1987.
Chairman:	NSF-Advisory Committee, Division of Mathematical Sciences, 1987-88.
Member:	NSF-Advisory Committee, Division of Mathematical Sciences, 1986-87, 1988-89.
Member:	NRC Board of Mathematical Sciences, 1987-90.
Co-Director:	International Institute for Nonlinear Science, an organisation with strong support in the USA, USSR and Europe, whose aim is to promote international collaboration in nonlinear science, 1990 - present.
Member:	AMS Task Force on Excellence in Mathematics Departments at Research I Universities,1994 - 2000.
Member:	Isaac Newton Institute, Scientific Steering Committee, 1997-2000.

PhD STUDENTS

Name	Date of Ph.D	University	Current Position
P. Aucoin	1970	University of California, Los Angeles	Private industry
M.V. Gopalakrishna	1976	Clarkson University	College Lecturer
C. Knickerbocker	1981	Clarkson University	Professor, Sr. Lawrence Univ. (former Dean), now retired.
H. Adachihara	1989	University of Arizona	Industrial Scientist
A. Aceves	1990	University of Arizona	Professor , Southern Methodist University
P. Jakobsen	1992	University of Arizona	Professor, Univ. of Tromsø, Norway
J. Powell	1994	University of Arizona	Professor of Mathematics and Biology, Utah State University.
S. Varatharajah	1997	University of Arizona	Industrial Scientist
C. Bowman	1997	University of Arizona	Canadian Research Council. Adjunt Professor, Univ. of Manitoba.
Y. L'vov	1997	University of Arizona	Assoc. Professor, Rennselaer Polytechnic Inst.
N. Komarova	1998	University of Arizona	Professor (Sloan Fellow), Univ. of Calif. Irvine
L. Biven	2002	University of Warwick	Science and Technology advisor, Department of Energy.
C. Connaughton	2002	University of Warwick	Associate Professor, University of Warwick
M. Kuecken	2003	University of Arizona	Max Planck Institute, Dresden
P. Shipman	2003	University of Arizona	Assistant Professor, Colorado State University
Sun Zhiying	2009	University of Arizona	Postdoctoral Fellow, University of California, Irvine
M. Pennybacker	Current	University of Arizona	

PAST AND CURRENT RESEARCH INTERESTS

• Pattern Formation

Developed, with colleagues Whitehead, Cross, Passot, Ercolani, envelope and modulation equations describing the behaviors of pattern order parameters. Current interests include: (a) The investigation of weak solutions of the regularized phase diffusion equation in two and three dimensions and a categorization of the canonical point and line defects. (b) A demonstration of how, beginning only with translational and rotational symmetries, pattern forming systems can, under external stresses, undergo phase translations which produce objects analogous to quarks and leptons which share many of the fractional charge and main characteristics of the objects arising in the Standard Model. (c) A series of articles on plant patterns which show how many phylllotactic features can result from mechanistic models involving biochemical agents such as auxin and mechanical forces producing patterns which closely resemble observations and provide an intriguing contract to the algorithmic approaches of Douady and Couder. As D'Arcy Thompson remarked, teleology and mechanism, like warp and woof, are interwoven. Indeed one fascinating outcome is that pattern forming systems can give rise to optimal packing algorithms.

Significant publications.

III, 8, 9, 18, 19, 27, 57, 62, 96, 100, 117, 124, 134, 138, 142, 143, 145, 146, 151, 152, 169, 170, 172, 173, 174, 176, 178, 183, 184, 185, 188, 191, 194.

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- **Nonlinear Waves and Solutions**

  Was one of the first (w/Benney) to derive the nonlinear Schrödinger equation as the universal equation for nonlinear dispersive wave envelopes. Made significant contributions with colleagues (Ablowitz, Kaup, Segur, Flaschka, Ratiu) to integrable and near integrable systems and isomonodromic deformations. More recent interests have concentrated on understanding the effect that the introduction of a random medium has on the propagation of nonlinear waves. Using the self-induced transparency of optical pulses in inhomogeneously broadened media as a paradigm, we have investigated the dependence of the Anderson localization distance on wave amplitude and shape.

  Significant Publications. I, II, 1,16, 17, 20, 21, 33, 39, 43, 46, 50, 53, 54, 60,150,177.

- **Optics**

  Developed with colleagues (Aceves, McLaughlin, Moloney, Lega, L'vov, Wright) useful results in connection with nonlinear Snell's Laws, optical bistability and feedback, pattern formation in wide aperture lasers, eye damage due to lasers, and semiconductor lasers. With L'vov, investigated the role of finite flux (rather than Fermi-Dirac) equilibria of the fermionic quantum kinetic equation in enhancing laser output. As part of the MURI AFOSR grant, developed with Glasner, Koselik and Moloney the canonical equation for ultra-short pulse population.

  Significant Publications. III,88,89,95,116,123,134,138,149,155, 180, 193.

- **Wave Turbulence**

  Developed (with Benney) consistent derivation of wave turbulence closure relying on minimal a priori statistical assumptions. With Dyachenko, Pushkarev and Zakharov, wrote a much cited paper on optical turbulence where we introduced the notion of cycle of intermittency. Developed (with Nazarenko, Biven, Connaughton) conditions on the wavenumber ranges of validity of the Kolmogorov-Zakharov (KZ) spectra in order for the wave turbulence closure to hold. With Galtier, wrote highly cited paper on weak magnetohydrodynamics turbulence and discovered the finite capacity anomaly, later addressed for three wave interactions in a paper with Connaughton, in which the spectral of turbulence systems are realized in a very curious manner. With Rumpf and Zakharov, solved the MMT conundrum in which an initially weakly nonlinear system relaxes not to a wave turbulence state dominated by a resonant waves but to one dominated by radiating, coherent structures. This led, in two review papers with Rumpf to several suggestions as to what a priori premises are required in order for the wave turbulence closure to be valid. With Zakharov, pointed out the central role which the generalized Phillips's spectrum may play in wave turbulence.

  Significant Publications 6, 10, 11, 67, 85, 104 111, 112, 133, 144, 149, 150, 153, 154, 157, 158, 159, 165, 166, 168, 175, 182, 186, 187, 189, 190,192

- **Plasmas and Fluids**

  Developed with colleagues (Nazarenko, Rubenchik, Zakharov) useful results in connection with the use of nonlinear plasma properties to enhance communication properties. Current interests include investigations of novel ways to improve drag reduction and flight characteristics of hypersonic vehicles.

  Significant Publications. 129,135,140,156.

- **Coherent Structures**

  With Benno Rumpf, have recently developed an explanation for the appearance of robust, large and coherent structures in nonintegrable systems with modulational (self focusing) instabilities and constrained by more than one conservation law. This result has widespread application. We also suggest an approach towards developing an H-theorem for nonisolated systems with a consequence that coherent structures play a vital role in order to enable highly nonlinear systems to reach a statistically steady state.

  Significant Publications: 27, 52, 161, 167.

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GRANT SUPPORT

NATIONAL SCIENCE FOUNDATION: 45 years continuous support from Atmospheric Sciences (1969 - 73) and Mathematics (1971 - 2012) Divisions.
OFFICE OF NAVAL RESEARCH: A total of 19 years support from Mathematics (1976 - 1981), Physics (1984 - 1989, 1991 - 1995) and Engineering (1985 - 1989) Divisions.
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH: 20 years continuous support from Mathematics Division. From 1986 - 1992, I was Director of a Centre sponsored under the University Research Initiative (URI) Programme.
ARMY RESEARCH OFFICE: A total of 6 years support, 1980 - 1986, from the Mathematics Division.
ENGINEERING & PHYSICAL SCIENCES RESEARCH COUNCIL (EPSRC): A total of six years support.
EUROPEAN TMR NETWORK. Part of two Networks (1) Nonlinear Dynamics and Statistical Physics of Spatially Extended Systems (2) Intermittency in Turbulent Systems.

1990 - Present.

Title	Yr(s)	Agency	Duration	Total	Comments
Nonlinear Optics & Turbulence	3	AFOSR	12.89-9.93	1,481,902	University Research Initiative Programme
Electrohydrodynamic Conv.in Liquid Crystal (Tv1)	1	NSF	2.90-7.92	9,820	Travel grant.
Coherent & Chaotic Phenomena in PDE's	3	NSF	6.90-11.93	112,011	w/Flaschka, Ercolani
Safety Standard Development for Ultra-Short Laser Pulses	3	AFOSR	12.90-11.93	50,000	w/Zakharov
Celebration of A.Scott's 60th Birthday	1	Army	1.92-1.93	4,000	Travel grant.
Sea-Air Exchange of Energy and Mements under Well Developed Sea Conditions.	1,2,3	ONR	4.92-9.94	390,256	w/Zakharov, Moloney
AASERT: Patterns and Turbulence in Optics and Fluids	1,2,3	AFOSR	6.92-5.95	192,783	
Communications thru Plasma Sheaths: Alternative approaches.	1,2,3	AFOSR	1.93-12.95	427,349	w/Zakharov, Nazarenko
Exact Phys.Models & Methods for Stablization & Control of Reflection Induced Instabilities in Semiconductor Lasers.	6mos	AFOSR	5.93-12.93	49,999	w/Moloney
3D Collapse Phenomena in Dispersive Nonlinear Media	3	AFOSR	10.93-10.96	241,566	w/Moloney
Computational Nonlinear Optics	1	AFOSR	9.94-9.95	250,000	w/Moloney
Semiconductor Laser Dynamics	3	AFOSR	2.94-2.97	1,267,05	w/Moloney
Pattern Formation, Turbulence & Singularties in PDE's	3	NSF	6.94-6.98	65,000	w/Ercolani, Pomeau, Zakharov
NonlinearDynamics & Statistical Physics	3	TMR Network	10.96-9.99	305,000	w/Rand/ MacKay
Computational Nonlinear Mathematics	2	EPSRC	1.97-12.99	146,147	w/Rand, Barkley, Sherratt
New ideas to improve laser efficiently and the competition between nonlinearity and randomness	2	EPSRC	10.97-9.99	71,880	
Intermittency in Turbulent Systems	3	TMR	10.97-9.99	104,516	w/Tabeling,ENS,Paris
Mathematical Modelling and computation in medicine	3	New Initiatives	97-00	168,219	w/Rand, Barkley
Numerical Modelling of wind-tunnel experiments	1	EPSRC/	98-99	12,000	w/ Nazarenko
Filamentary structures and pattern formation in Bacillus	1	EPSRC	99-00	33,220	w/ Wellington
Wave Turbulence: Open Challenges and New Opportunities	3	NSF	2000-03	161,000	w/Zakharov
Global description of patterns far from onset	3	NSF	2002-05	123,000	
Communication with hypersonic vehicles via nonlinear plasma processes	3	AFOSR	2004-07	300,000	w/Zakharov
Wave turbulence: A wealth of applications and a rich paradigm for turbulent systems	3	NSF	2004-07	271,509	w/Zakharov
Patterns in nature and in the laboratory	3	NSF	2005-08	140,000	
Wave turbulence: computational and theoretical	3	NSF	2008-11	180,000	w/Zakharov
Patterns in notes and in the laboratory	3	NSF	2009-12	180,000	
Wave turbulence: A story far from over	3	NSF	Under review		
Ultra short pulse optics. Investigator on AFOSR MURI grant	5	NSF	2011-16	5million	PI. J.V. Moloney

*US grants in US dollars. European/UK grants in pounds sterling.

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A CROSS-SECTION OF RECENT AND FUTURE LECTURES

Max Planck Institute, Göttingen

- Pattern quarks and leptons, July 2011
- A review of wave turbulence, July 2011

Les Houches

- Wave turbulence: a story far from over. March 2012

City University of Hong Kong, Plenary speaker, International Conference on Applied Mathematics, May 2012

SIAG Annual Conference, Seattle, June 2012

- Martin David Kruskal Lecture. No title yet.

University of California, Berkeley. January 2013

- Diperna Lecture. No title yet.

British Applied Mathematics Colloquium, July 2013, Plenary speaker

- Probable title: Understanding plant patterns and phyllotaxis.

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PUBLICATIONS

Books

I Editor Nonlinear Wave Motion. Lectures in Applied Mathematics, Vol.15, AMS Providence (1974).

II Solitons in Mathematics and Physics. CBMS Lectures, Vol.48, SIAM (1985).

III Nonlinear Optics (with J. V. Moloney). Advanced Topics in Interdisciplinary Mathematical Sciences, Addison-Wesley (1992). Second Edition appeared in paperback, 2003. Westbrook.

Articles

1. Propagation of Nonlinear Wave Envelopes, Journal of Mathematics and Physics, (currently Studies in Applied Mathematics) 46,133 - 139, (1967) (with D. J. Benney).

2. Statistical Properties of the Sea, Physics of Fluids Special Issue, Kyoto Meeting of International Union of Theoretical and Applied Mechanics, September 1966, 10, S281, (1967) (with D. J. Benney).

3. Sequential Time Closures of Interacting Random Waves, Journal of Mathematics and Physics, 46, 363, (1967) (with D.J. Benney).

4. The Closure Problem in a System of Random Gravity Waves, Reviews of Geophysics, 6, 1-31, (1968).

5. An Alternative Proof of the Poincaré -Bertrand Formula for Real Integrals and Its Generalization to N Dimensions, Journal of Mathematical Analysis and Applications, 24, 149-155, (1968).

6. Random Wave Closures, Studies in Applied Mathematics, 48 1, 29-53, (1969) (with D. J. Benney).

7. Rossby Wave Packet Interactions, J Fluid Mech., 35, 255-271, (1969).

8. Finite Bandwidth, Finite Amplitude Convection, J Fluid Mech., 38, 279-303,(1969)(with J. A. Whitehead).

9. Review of the Finite Bandwidth Concept, Proceedings International Union of Theoretical and Applied Mechanics, Symposium on Instability of Continuous systems, Harrenalb, 284-289, (1969), Ed. H. Leipholz, Springer-Verlag, Berlin, (1971) (with J. A. Whitehead).

10. Random Convection, J Fluid Mech., 40, 513-542, (1970) (with C. G. Lange and P.J. Aucoin).

11. Semidispersive Wave Systems,J. Fluid Mech., 49, 593-609, (1971) (with P.J Aucoin).

12. The Postbuckling Problem for Thin Elastic Shells, SIAM Journal of Applied Mathematics, 21, 605-629, (1971) (with C. G. Lange).

13. The Postbifurcation State of Baroclinic Instability, Journal of Atmospheric Science, 29, 64-76, (1972).

14. Semi-resonant Interactions and Frequency Dividers, Studies in Applied Mathematics, 52, 51-74, (1973) (with M. J. Ablowitz and B. Funk).

15. The Decay of the Continuous Spectrum for Solutions of the Korteweg-de Vries Equation, Journal of Mathematical Physics, 14, 1277-1284(1973) (with M. J. Ablowitz).

16. Method for Solving the Sine-Gordon Equation, Physical Review Letters, 30, 1262-1264, (1973) (with M.J.Ablowitz, D.J. Kaup and H.Segur).

17. Nonlinear Evolution Equations of Physical Significance, Physical Review Letters, 31, 125-127, (1973) (with M. J. Ablowitz, D. J. Kaup and H. Segur).

18. Envelope Equations, Lectures in Applied Mathematics, Vol.15, Nonlinear Wave Motion, American Mathematical Society, Providence, Rhode Island, 157-163, (1974).

19. A Stability Criterion for Envelope Equations, SIAM Journal of Applied Mathematics, 27, 441, (1974) (with C. G. Lange).

20. Coherent Pulse Propagation, a Dispersive, Irreversible Phenomenon, Journal of Mathematical Physics, 15, 1852-1858, (1974) (with M. J. Ablowitz and D. J. Kaup).

21. The Inverse Scattering Transform - Fourier Analysis for Nonlinear Problems, Studies in Applied Mathematics, 53, 294-315, (1974) (with M. J. Ablowitz, D. J. Kaup and H. Segur).

22. Integrable Systems of Nonlinear Evolution Equations, Proceedings Battelle Summer Institute on Dynamical Systems, July 1974, 355-441. Editor: J. Moser, Springer-Verlag (1975) (with H. Flaschka).

23. The Interrelation Between Bäcklund Transformations and the Inverse Scattering Transform: Proceedings of Conference on Bäcklund Transformations (1975). Lecture Notes in Mathematics, 115, 227, (1976).

24. Spherical Shells Like Hexagons, Cylinders Prefer Diamonds, Journal of Applied Mechanics, (June 1976), 575-581, (with C. G. Lange).

25. Synchronized Solitons, Journal of Mathematical Physics, 18, 922-926, (1977).

26. Breakdown of Zakharov-Shabat Theory and Soliton Creation, Physical Review Letters, 38, 377 - 380, (1977) (with L.G . Redekopp)

27. Finite Amplitude Instabilities of Partial Difference Equations, SIAM Journal of Applied Mathematics, 33, 133-160, (1977).

28. Near Integrable Systems, Nonlinear Tunnelling and Solitons in Slowly Changing Media. Proc. Conference on the Inverse Spectral Transform, Room, (June 1977). Research Notes in Mathematics, 26, 127-189. Publisher: Pitman, London. Editor: F. Calogero.

29. On the Coleman correspondence and the solution of the massive Thirring model, Lett. Nuovo Cimento, 20(1977), pp.325-331, (with D. J. Kaup).

30. The Goursat and Cauchy Problems for the Sine-Gordon Equation, SIAM Journal of Applied Mathematics, 34, 37-54, (1978) (with D. J. Kaup).

31. Long Waves, Short Waves; a Solvable Model, SIAM Journal of Applied Mathematics, 35,650-664, (1978).

32. The Inverse Scattering Transform, Nonlinear Waves, Singular Perturbations and Synchionized Solitons, Rocky Mountain Journal of Mathematics, 8, 25-52, (1978).

33. Solitons As Particles and Oscillators and in Slowly Changing Media: A Singular Perturbation Theory, Proc. Roy. Soc. London A., 361, 413446, (1978) (with D. J. Kaup).

34. An Exact Solution for a Derivative Nonlinear Schrödinger Equation, Journal of Mathematical Physics, 19, 798-801, (1978) (with D. J. Kaup).

35. Nonlinear Tunnelling, Journal of Mathematical Physics, 19, 1126-1133, (1978).

36. Theory of Nonlinear Oscillating Dipolar Excitations in One-Dimensional Condensates, Phys. Rev. B., 18, 5162-5167, (1978).

37. Soliton Perturbations and Nonlinear Focusing: Soliton Structure and Dynamics in Condensed Matter, Solid State Sciences, 8, 52-67, (1978). Eds. A. R. Bishop and T. Schneider, Springer-Verlag.

38. Evolution Equations, Singular Dispersion Relations and Moving Eigenvalues, Advances in Mathematics, 31, 67-100, (1979) (with D. J. Kaup).

39. The General Structure of Integrable Evolution Equations, Proc. Roy. Soc. London A, 365, 283-311, (1979).

40. Bifurcation and Nonlinear Focusing, Pattern Formation and Pattern Recognition,244-265. Series on Synergetics, Springer-Verlag (1979), Editor: H. Haken.

41. The Inverse Scattering Transform. Solitons. Topics in Current Physics, 17, 177-242. Eds. R. Bullough and P. Caudrey. Springer-Verlag (1980).

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42. Shelves and the Korteweg-de Vries Equation, J Fluid Mech., 98, Part 4, 803-818, (1980) (with C. Knickerbocker).

43. Monodromy and Spectrum Preserving Deformations, Comm. Math. Phys., 76, 65-116, (1980) (with H. Flaschka).

44. Internal Solitary Waves Near a Turning Point, Phys. Lett., 75-A, No.5., 326-330, (1980) (with C. Knickerbocker).

45. How Internal Waves Travelling on a Thermocline Change Polarity Near Critical Points. Developments in Theoretical and Applied Mech., 10, Proc. 10th SE Conf. on Theor. and Appi. Mechs., 581-603. Ed. J. Stoneking, University of Tennessee (1980) (with C. Knickerbocker).

46. Multiphase Similarity Solutions of Integrable Evolution Equations, Lecture Notes in Pure and Applied Math., 54, 373-395, (1980). Physica D 3, 203-222, (1981) (with H. Flaschka).

47. The Mechanism by Which Many Partial Difference Equations Destabilize, Proc. 1981 Conf. on Synergetics, Schloss Elmau. Chaos and Order in Nature, 269-274. Ed. H. Haken. Series on Synergetics, Springer-Verlag (1981) (with W. Briggs and T. Sarie).

48. Chaos in the Inhomogeneously Driven Sine-Gordon Equation, Phys. Lett., 87A, 14, (1981) (with P.S. Lomdahl, J. C. Eilbeck).

49. Propagation of surface and internal solitary waves in non uniform media, Applied Scientific Research 39:111-126, (1981) (with C. Knickerbocker).

50. The Inverse Monodromy Transform Is a Canonical Transformation, Math. Studies, 61, 65-91. Eds. A. Bishop, D. Campbell, B. Nickolaenko, Publ. North Holland (1982) (with H. Flaschka).

51. Two-Dimensional Convection Patterns in Large Aspect Ratio Systems, Lecture Notes in Num. Appl. Anal., 5, 205-231, (1982).

52. Focusing: A Mechanism For Instability of Nonlinear Finite Difference Equations, J Comp. Phys, 51, 83-106, (1983) (with W. L. Briggs and T. Sarie).

53. Kac-Moody Algebras and Soliton Equations: Lax Equations Associated With $A_1^{(1)}$,Physica D 9, 300-323, (1983) (with H. Flaschka and T. Ratiu).

54. Kac-Moody Lie Algebras and Soliton Equations: Stationary Equations Associated With $A^{(1)}$ Physica D 9, 324-332 , (1983), (with H. Flaschka and T. Ratiu).

55. Solitary Waves as Fixed Points of Infinite Dimensional Maps in an Optically Bistable Ring Cavity, Physical Review Letters, 51, 75-78, (1983) (with D. McLaughlin and J. Moloney).

56. The History of the Soliton. 50th Anniversary Volume, Journal of Applied Mechanics, 105, 1127-1138, (1983).

57. Convection Patterns in Large Aspect Ratio Systems, Physica D 10, 299-328, (1984) (with M. Cross).

58. Non-Predictable Behavior in Partial Differential Equations, Proc. of "Workshop on Instabilities in Continuous Media, " Interassociation Committee on Mathematical Geophysics, International Union Geodesy and Geophysics, sponsored by IUGG, National Science Foundation, (December 3-7), 1984, Venice (with D. McLaughlin and J. Moloney).

59. An Infinite Dimensional Map from Optical Bistability Whose Regular and Chaotic Attractors Contain Solitary Waves, in Chaos in Nonlinear Dynamical Systems, 94-119. Ed. J. Chandra, SIAM (1984) (with J. V. Moloney and D.W. McLaughlin).

60. Reflections from Solitary Waves in Channels of Decreasing Depth, J Fluid Mech., 153, 1-16, (1985) (with C. J. Knickerbocker).

61. A New Class of Instabilities in Passive Optical Cavities, Physical Review Letters, 54, 681, (1985) (with D. McLaughlin and J. Moloney).

62. The Shape of Stationary Dislocations, Phys. Lett A, 113, 5, 289-292, (1985) (with D. Meiron).

63. Chaos and Turbulence; Is There a Connection? Special Proc. of Conf. on Mathematics Applied to Fluid Mechanics and Stability Dedicated in Memory of Richard C. Diprima, published by SIAM, 157-189, (1986).

64. Chaos and Coherent Structures in Partial Differential Equations, Physica D 18, 85-112, (1986) (with A. Aceves, H. Adachihara, C. Jones, J. C. Lerman, D. McLaughlin, J. Moloney).

65. The Hirota Conditions, Journal of Mathematical Physics, 27, 2016-2021, (1986) (with Zeng Yunbo).

66. Soliton Mathematics, SMS A'ato Advanced Study Institute, Vol.103, Published by the University of Montreal, survey article pages 89-116, (1986) (with T. Ratiu, M. Tabor and Z. Yunbo).

67. Benjamin-Feir Turbulence in Convective Binary Mixtures, Physica D 23, 345-361, (1986) (with H. Brand, P. Lomdahl).

68. Chaos and Turbulence. Proc. Wood's Hole Summer Seminar in Geographical Fluid Dynamics on "Shear Flow Turbulence," WHOI-8645, 90-103, (1986).

69. Evolution of the Order Parameter in Situations with Broken Rotational Symmetry, Phys. Letters A, 118, 67-73, (1986) (with H. Brand and P. Lomdahl).

70. A Unified Approach to Painleve Expansions, Physica D 29, l-68, (1987), (with M. Tabor and Y. Zeng).

71. The Dynamics of Patterns: A survey, Springer Proc. in Physics, Proc. Conf. on "Propagation in Nonequilibrium Systems" at Les Houches 1987, Springer-Verlag Publisher, 122-155, (1987).

72. Wavenumber Selection of Convection Rolls in a Box, Phys. Fluids, 30 (12), 3840-3842, (1987) (with W. Arter and A. Bernoff).

73. Fixed Points and Chaotic Dynamics of an Infinite Dimensional Map. Chaos, Noise and Fractals, 137-186(with J V Moloney, H. Adachihara, D. W. McLaughlin).

74. A Calculus Curriculum for the Nineties. Proceedings NRC-MAA "Calculus Curriculum" (October 1987) (with D. Lovelock).

75. Turbulent transport and the random occurrence of coherent events. "Plasma Theory and Nonlinear and Turbulent Processes in Physics" Kiev, USSR, (13-25 April 1987) Vol.1, 471-487, Eds. V. G. Bar'yakhtar, V. M. Chernousenko, N. S. Erokhin, A. G. Sitenko, V. E. Zakharov, World Scientific.

76. Lax Pairs, Backlund Transformations and Special Solutions for Ordinary Differential Equations, Nonlinearity 1,1-10, (1988) (with J. D. Gibbon, M. Tabor and Y. B. Zeng).

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