

## Min Chen

### Contact Information:

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**Current Position Held:** Professor, Chair of the undergraduate committee

### Editorial Board of :

- "European Journal of Pure and Applied Mathematics"
- "Nonlinear Analysis: Theory, Methods & Applications"

**Research Fields:** nonlinear waves, numerical analysis, scientific computing, partial differential equations, finite- and infinite-dimensional dynamical systems.

### Education:

- August 1991: **Ph.D** in Applied Mathematics, **Indiana University**, IN.  
Adviser: Professor Roger Temam.
- January 1988: **M.S.** in Engineering, **Princeton University**, NJ.
- May 1985: **M.S.** in Applied Mathematics, **Beijing University**, China.
- May 1982: **B.S.** in Mathematics, **Beijing University**, China.

### Purdue University Service (last 2 years)

- Chair of the undergraduate study committee, 2008-present;
- UEPCC, Member, Fall 2008-present;
- Member of Computer Science Strategic planning committee;
- Promotion Committee, Member, Fall 2008;
- Graduate Committee, Member, Fall 2008;
- Calculus Committee, Member, 2008-present;

### Conference Organization:

- Member of Scientific committee for the FOURTH, FIFTH, SIXTH and SEVENTH international IMACS Conference on *Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory*, in the years of 2005, 2007, 2009 and 2011, Athens, Georgia.
- Organizer of special sessions for the THIRD, FOURTH, FIFTH, SIXTH and SEVENTH International IMACS Conference on *Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory*, in the years of 2003, 2005, 2007, 2009, and 2011, Athens, Georgia.
- Organizer of special session for International conference: Nonlinear Waves: Theory and Applications, Beijing, China, June, 2008
- Member of Scientific committee for the SIAM conference on *nonlinear waves and*

*coherent structures*, Oct. 2004, Orlando, FL.

- Organizer of special sessions for *AIM's fifth international conference on dynamical systems and differential equations* June, 2004, Ponomo, CA.
- Organizer of a special session for the *Fifth International Conference on Mathematical and Numerical Aspects of Wave Propagation*, July 10-14, 2000, Santiago de Compostela, Spain.
- Organizer of three mini-symposiums for *ICIAM 99* (The Fourth International Congress on Industrial and Applied Mathematics), July 5-9, 1999, Edinburgh, Scotland.
- Organizer of three mini-symposiums for *Fourth International Conference on Mathematical and Numerical Aspects of Wave Propagation*, June 1-5, 1998, Golden, Colorado.
- Member of the organizing committee for the *7th International Conference on Domain Decomposition Methods in Scientific and Engineering Computing*, Oct. 27-30, 1993, Penn State.
- Member of the scientific committee for 7th Applied Mathematics Workshop for Materials Studies and Industrial Applications, Penn State, Oct. 24-26, 1996.

## PUBLICATIONS OF MIN CHEN

### Publications in Refereed Journals:

- [1] Decay of solutions to viscous asymptotical models for waterwaves: Kakutani-Matsuuchi model, with S. Dumont and O. Goubet, Submitted.
- [2] Existence of Traveling-wave Solutions to Boussinesq Systems, with Nghiem V. Nguyen and Shu-Ming Sun, Submitted.
- [3] Spectral stability of stationary solutions of a Boussinesq system describing long waves in dispersive media, with Chris Curtis, Bernard Deconinck, Crystal Lee and Nghiem V. Nguyen, To appear in *SIAM Journal on Applied Dynamical Systems*, (2010).
- [4] Oblique Interaction of Solitary Waves, to appear in the proceedings of the NSF-CBMS conference, (2010)
- [5] Decay of solutions to a water wave model with nonlocal viscous dispersive term, with S. Dumont, L. Dupaigne and O. Goubet, to appear in *Discrete and Continuous Dynamical Systems*, (2010)
- [6] Solitary-Wave Solutions to Boussinesq Systems with Large Surface Tension, with Nghiem V. Nguyen and Shu-Ming Sun, *Discrete and Continuous Dynamical Systems Series S*, vol. 26, no. 4, pp 1153-1184 (2010).
- [7] Existence of traveling wave solutions of a high-order nonlinear acoustic wave equation, with Monica Torres and Timothy Walsh, *Physics Letters A*, 373, pp. 1037-1043 (2009).
- [8] Long-Time Asymptotics of 2D Dissipative Boussinesq Systems, with O. Goubet,

- Discrete and Continuous Dynamical Systems, Series S., Vol. 2, No. 1, pp. 37-53 (2009).
- [9] From Boussinesq systems to KP-type equations, Canadian Applied Mathematics Quarterly, Vol. 15, No. 4, winter 2007 (appeared in 2009).
  - [10] Numerical investigation of a two-dimensional Boussinesq system, Discrete and Continuous Dynamical Systems, Vol. 28, No. 4, pp. 1169-1190 (2009).
  - [11] Asymmetrical Periodic Traveling Wave Patterns of Two-Dimensional Boussinesq Systems, with G. Iooss, Physica D, Vol. 237, pp. 1539-1552 (2008)
  - [12] Cnoidal Wave Solutions to Boussinesq Systems, with H. Chen, N.V.Nguyen, Nonlinearity, Vol. 20, pp. 1443-1461 (2007).
  - [13] Long-Time Asymptotic Behavior of Dissipative Boussinesq System, with O. Goubet, Discrete and Continuous Dynamical Systems - Series A, Vol 17, No. 3, pp. 61-80 (2007)
  - [14] Periodic Wave Patterns of two-dimensional Boussinesq systems, with G. Iooss, European Journal of Mechanics B/Fluids, vol 25, pp. 393-405 (2006)
  - [15] Comparisons between the BBM equation and a Boussinesq system, with A.A.Alazman, J.P. Albert, J. L. Bona and J. Wu, Advances in Differential Equations, Vol. 11, no. 2, pp. 121-166 (2006).
  - [16] *Standing waves for a two-way model system for water waves* with G. Iooss, European Journal of Mechanics B/Fluids, Vol 24, No 1, pp. 113-124 (2005).
  - [17] *Three-wave solitons and continuous waves in media with competing quadratic and cubic nonlinearities*, with D.J. Kaup and Boris A. Malomed, Physical Review E, Vol 69, No. 5 (056605) (2004). It is selected for the June 2004 issue of Virtual Journal of Ultrafast Sciences.
  - [18] *Boussinesq equations and other systems for small-amplitude long waves in nonlinear dispersive media. Part II: the nonlinear theory*, with J. L. Bona and J-C. Saut, Nonlinearity, Vol 17, No. 3, pp. 925 - 952 (2004).
  - [19] *Equations for bi-directional waves over an uneven bottom* , Mathematics and Computers in Simulation, Vol. 62, pp. 3-9 (2003).
  - [20] *Boussinesq equations and other systems for small-amplitude long waves in nonlinear dispersive media. Part I: derivation and the linear theory*, with J.L.Bona and J-C. Saut, Journal of Nonlinear Science, Vol. 12, No. 4, pp. 283-318, (2002);
  - [21] *Solitary-wave and multi-pulsed traveling-wave solutions of Boussinesq systems*, Applicable Analysis, Vol. 75(1-2), pp. 213-240, (2000);
  - [22] *Bifurcations of finite difference schemes and their approximate inertial forms*. with R. Bronstering, Mathematical Modeling and Numerical Analysis, Vol. 32, no. 4, pp. 1-14, (1998);
  - [23] *Exact solutions of various Boussinesq systems*, Appl. Math. Lett., Vol. 11, No. 5,

- pp. 45–49, (1998);
- [24] *Exact traveling-wave solutions to bi-directional wave equations*, International Journal of Theoretical Physics, Vol 37, No. 5, 1547-1567 (1998);
  - [25] *A Boussinesq system for two-way propagation of nonlinear dispersive waves*, with J. Bona, Physica D., V. 116 1-2 pp. 191-224, (1998);
  - [26] *The incremental unknowns–multilevel scheme for the simulation of turbulent channel flows*, with H. Choi, T. Dubois, J. Shen and R. Temam, Proceedings of 1996 Summer Program, Center for Turbulence Research, NASA Ames/Stanford Univ. pp. 291-308, (1996);
  - [27] *Incremental Unknowns in finite differences in three space dimension*, with A. Miranville and R. Temam, Comp. Appl. Math., Vol. 14, no. 3, pp. 1-15, (1995);
  - [28] *Nonlinear Galerkin method with multilevel Incremental Unknowns*, with R. Temam, Contributions in Numerical Mathematics, WSSIAA, Vol. 2, pp. 151-164, (1993);
  - [29] *Incremental Unknowns for convection-diffusion equations*, with R. Temam, Applied Numerical Mathematics, Vol. 11, pp. 365-383, (1993);
  - [30] *Nonlinear Galerkin method in the finite difference case and wavelet-like Incremental Unknowns*, with R. Temam, Numer. Math., Vol. 64, no. 3, pp. 271-294, (1993);
  - [31] *Incremental Unknowns in finite differences: condition number of the matrix*, with R. Temam, SIAM J. Matrix Analysis and its Appl., Vol. 14, No. 2, pp. 432-455, (1993);
  - [32] *Incremental Unknowns for solving partial differential equations*, with R. Temam, Numer. Math., Vol 59, pp. 255-271, (1991);
  - [33] *Incremental Unknown method II*, with R. Temam, Appl. Math. Lett., Vol. 4, No. 3, pp. 77-80, (1991);
  - [34] *Incremental Unknown method I*, with R. Temam, Appl. Math. Lett., Vol. 4, No. 3, pp. 73-76, (1991).

#### **Publications in Conference Proceedings:**

- [35] *A plethora of multi-pulsed solutions for a Boussinesq system*, Proceedings of the Fifth International Conference on Mathematical and Numerical Aspects of Wave Propagation, Spain, pp. 274-279, (2000), (refereed);
- [36] *Preliminary results on simulation of a new kind traveling wave of permanent form*, Proceedings of the Fourth International Conference on Mathematical and Numerical Aspect of Wave Propagation, Colorado, June, pp. 209-213, (1998), (refereed);
- [37] *Higher-order Boussinesq systems for two-way propagations of water waves*, with J. Bona, Proceedings of the Conferences on Nonlinear Evolutional Equations and Infinite-Dimensional Dynamical System, pp. 5-12, (1997);

- [38] *Three types of incremental unknowns and nonlinear Galerkin method in the finite difference case*, with R. Temam, *Advances in computer methods for partial differential equations VII*, pp. 109-113, (1992), (refereed).

**Research Supports:**

- Purdue International Travel Grant, in the years of 2005 and 2010;
- Association for Women in Mathematics travel award, in the years of 2005 and 2008 ;
- NSF grant (DMS-9753216), *Study of model equations for water waves*, 1/1/98–12/31/99, sole principle investigator. Award amount: \$48,582;
- ONR grant (N00014-96-1-1190), *Analytical investigation of unsteady flows in turbomachinery systems*, 9/1/96–8/31/2001, sole principle investigator starting from 9/1/98. Award amount: \$424,262;
- NSF grant (DMS-9622858), *Study of model equations for water waves*, 7/15/96–12/31/98, sole principle investigator. Award amount: \$44,000;
- NSF grant (DMS-9410188), *Study of model equations for water waves*, 9/1/94–8/30/96, sole principle investigator. Award amount: \$18,000;
- NSF grant (DMS-9205300), *Numerical solution of differential equations in mechanics*, 9/1/92–2/29/96, Investigators: D. Arnold, Jie Shen and Min Chen. Award amount: \$255,000;