

# Curriculum Vitae

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**YIPING MA**

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## EDUCATION AND EMPLOYMENT

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11/2016- Dept. of Mathematics, Physics and Electrical Engineering, Northumbria University

- Vice Chancellor's Research Fellow in Extreme Environments

08/2013-07/2016 Department of Applied Mathematics, University of Colorado at Boulder

- Research Associate/Instructor

11/2012-07/2013 Dept. of Engineering Sciences and Applied Mathematics, Northwestern University

10/2011-10/2012 Dept. of Geophysical Sciences, University of Chicago

- Ed Lorenz Postdoctoral Fellow in the Mathematics and Climate Research Network (MCRN)

09/2006-08/2011 Department of Physics, University of California at Berkeley

- PhD (December 2011) in Physics; Advisor: Edgar Knobloch
  - Dissertation Title: Localized Structures in Forced Oscillatory Systems

02/2003-05/2006 Hong Kong University of Science and Technology (HKUST)

- BSc in Physics and Mathematics; Minor: Information Technology ( $\approx$  Computer Science)
  - Exchange studies (Spring 2005) at Université Joseph Fourier, Grenoble, France

09/2002-12/2002 Admission to and studies at Nanjing University, China

## RESEARCH INTERESTS

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Mathematical:

- Nonlinear waves (waves in higher spatial dimensions, e.g. lattice NLS and KP equations in 2D; ...)
- Pattern formation (spatially localized states in dissipative systems, e.g. forced CGL equation; ...)
- Applied dynamical systems (bifurcation theory; numerical continuation; chaotic mixing; ...)

Applications:

- Nonlinear optics (nonlinear topological photonics; Hamiltonian and dissipative optical solitons; ...)
- Climate dynamics (minimal models of climate components, e.g. sea ice, land ice, and water vapor; ...)
- Fluid mechanics (reduced models of convection, viscous buckling, and self-similar flows; ...)

## PUBLICATIONS

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Note: Co-authors may be ordered either by contribution or alphabetically.

Preprints/Submitted:

- M. J. Ablowitz, Y.-P. Ma, I. Rumanov. A universal asymptotic regime in the hyperbolic nonlinear Schrödinger equation. Preprint arXiv:1606.02782 (2016).
- Y.-P. Ma, I. Sudakov, and K. M. Golden. Ising model for melt ponds on Arctic sea ice. Preprint arXiv:1408.2487 (2014).

Published/Accepted:

## Curriculum Vitae

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- P. Weidman and Y.-P. Ma. The competing effects of wall transpiration and stretching on Homann stagnation-point flow. *Eur. J. Mech. B-Fluid* 60, 237-241 (2016).
- Y.-P. Ma and E. Knobloch. Two-dimensional localized structures in harmonically forced oscillatory systems. *Physica D* 337, 1-17 (2016).
- M. J. Ablowitz, A. Demirci, and Y.-P. Ma. Dispersive shock waves in the Kadomtsev-Petviashvili and two-dimensional Benjamin-Ono equations. *Physica D* 333, 84-98 (2016).
- C. Chong, P. G. Kevrekidis, M. J. Ablowitz, and Y.-P. Ma. Conical wave propagation and diffraction in two-dimensional hexagonally packed granular lattices. *Phys. Rev. E* 93, 012909 (2016).
- M. J. Ablowitz and Y.-P. Ma. Strong transmission and reflection of edge modes in bounded photonic graphene. *Optics Letters* 40 (20), 4635-4638 (2015).
- M. J. Ablowitz, C. W. Curtis, and Y.-P. Ma. Adiabatic dynamics of edge waves in photonic graphene. *2D Materials* 2, 024003 (2015).
- M. J. Ablowitz, C. W. Curtis, and Y.-P. Ma. Linear and nonlinear traveling edge waves in optical honeycomb lattices. *Phys. Rev. A* 90, 023813 (2014).
- J. C. Tzou, Y.-P. Ma, A. Bayliss, B. J. Matkowsky, and V. A. Volpert. Homoclinic snaking near a codimension-two Turing-Hopf bifurcation point in the Brusselator model. *Phys. Rev. E* 87, 022908 (2013).
- A. R. Champneys, E. Knobloch, Y.-P. Ma and T. Wagenknecht. Homoclinic snakes bounded by a saddle-center periodic orbit. *SIAM J. Appl. Dyn. Syst.* 11(4), 1583–1613 (2012).
- Y.-P. Ma and E. Knobloch. Depinning, front motion and phase slips. *Chaos* 22, 033101 (2012).
- Y.-P. Ma and E. A. Spiegel. A diagrammatic derivation of (convective) pattern equations. *Physica D* 240, 150-165 (2011).
- Y.-P. Ma, J. Burke and E. Knobloch. Defect-mediated snaking: A new growth mechanism for localized structures. *Physica D* 239, 1867-1883 (2010).
- Y.-P. Ma, S. Gonçalves, S. Mignot, J.-P. Nadal and M. B. Gordon. Cycles of cooperation and free-riding in social systems. *Eur. Phys. J. B* 71, 597-610 (2009).
- C.-H. Yeung, Y.-P. Ma, K. Y. M. Wong. Epoch lifetimes in the dynamics of a competing population. *Int. J. Mod. Phys. B* 21, 4048-4053 (2007).
- C.-H. Yeung, Y.-P. Ma and K. Y. M. Wong. Stable aggregates in the dynamics of a competing population. *J. Korean Phys. Soc.* 50, 196-200 (2007).

### Thesis & Proceedings:

- Y.-P. Ma. Localized structures in forced oscillatory systems. PhD thesis, University of California at Berkeley (2011).
- Y.-P. Ma. The derivation and application of convective pattern equations. Proceedings of the Summer Study Program in G.F.D., Woods Hole Oceanographic Institution, 308-329 (2009).

### TEACHING

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#### As Instructor at CU Boulder:

- Spring 2016: Applied Mathematics 2350 (lower division multivariate calculus)
- Fall 2013, Fall 2014, Spring 2015, Fall 2015: Applied Mathematics 2360 (lower division differential equations and linear algebra)

# Curriculum Vitae

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As Graduate Student Instructor (GSI) at UC Berkeley:

- Fall 2007, Spring 2008, Fall 2008, Fall 2009: Physics 8B (lower division electromagnetism/optics)
- Fall 2006, Spring 2007: Physics 8A (lower division mechanics/thermodynamics)
- Fall 2006: Reader for Physics 221A (graduate quantum mechanics)

## PROFESSIONAL ACTIVITIES

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Journals refereed

- Physica D
- SIAM Journal on Applied Dynamical Systems
- Chaos
- Nonlinearity

Events organized

- Mini-symposium "Spatially localized structures in dissipative systems: computation and analysis". The Fourth International Conference: Nonlinear Waves – Theory and Applications, Beijing, Jun 2016. Co-organized with Alan R. Champneys (Bristol) and Jonathan H. P. Dawes (Bath).
- Mini-symposium "Graphene Lattices: Phenomena and Analysis". The Ninth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA, Apr 2015. Co-organized with Christopher W. Curtis (SDSU) and Yi Zhu (Tsinghua).
- Webinar "Mathematics of Climate Tipping Points". Mathematics and Climate Research Network (MCRN), Apr 2012 - Dec 2012. Co-organized with Mary Silber (Northwestern) et al.

## AWARDS

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- Phase Transitions in Arctic Melt Ponds. MCRN mini-grant, Mar - Sep 2013, \$2,500. Co-PIs: Kenneth M. Golden and Ivan A. Sudakov (University of Utah).
- Student Travel Award, The Seventh IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, 2011
- SIAM Student Travel Award, SIAM Conference on Nonlinear Waves and Coherent Structures, 2010
- GFD Fellow, Woods Hole Oceanographic Institution, Class of 2009
- Winner of the "Maxwell and His Equations" T-Shirt Contest, UC Berkeley, Fall 2006 (for the top student in Physics 209, graduate electrodynamics)
- Academic Achievement Medal, HKUST, 2006 (awarded annually to top 1% graduates)
- Dean's List, HKUST, 2003 - 2006 (each semester in HKUST)
- Drs. Richard Charles and Esther Yewpick Lee Charitable Foundation Scholarship for Undergraduate Students from the Mainland, HKUST, Spring 2003
- UGC Publicly-Funded Scholarship Scheme for Mainland Students, HKUST, Fall 2003 - Spring 2006

## CONFERENCE PRESENTATIONS

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From localized Turing patterns to localized phase-winding states: New localized structures in forced oscillatory systems (presented by E. Knobloch)

- Mini-symposium talk at the Fourth International Conference: Nonlinear Waves – Theory and Applications, Beijing, Jun 2016

## Curriculum Vitae

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Ising models for Arctic melt ponds: from evolution of complexity to ice-albedo feedback

- Invited substitute talk at Joint Mathematics Meetings, Seattle, Jan 2016

Ising model for melt ponds on Arctic sea ice (presented by I. Sudakov)

- Poster at PIMS Conference on the Mathematics of Sea Ice, Vancouver, Sep 2015

The evolution of complexity in Arctic melt ponds: a statistical physics perspective

- Invited mini-symposium talk at SIAM Conference on Applications of Dynamical Systems, Snowbird, May 2015

Traveling edge waves in photonic graphene

- Invited session talk at the Ninth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA, Apr 2015

Localized states near supercritical Turing bifurcations in the 1:1 forced complex Ginzburg-Landau equation

- Invited talk at Joint US-Japan Workshop for Young Researchers on Interactions among Localized Patterns in Dissipative Systems, Minneapolis, Jun 2013

Front motion, pinning and depinning in one and two spatial dimensions

- Invited mini-symposium talk at SIAM Conference on Applications of Dynamical Systems, Snowbird, May 2013

Application of viscous buckling theory to supraglacial lakes on the George VI Ice Shelf

- Poster at MCRN Annual Meeting, Boulder, Oct 2012

Dimensionality, form, and process of supraglacial lakes on the George VI Ice Shelf (with S. Koppaka et al)

- Poster at AGU Fall Meeting, San Francisco, Dec 2011

Homoclinic snakes bounded by a saddle-centre periodic orbit

- Poster at Conference "Geometric Methods for Infinite-Dimensional Dynamical Systems" (to celebrate the 60th birthday of Christopher K.R.T. Jones), Providence, Nov 2011

Depinning of localized structures in a forced dissipative system

- Poster at MCRN Annual Meeting, Chapel Hill, Sep 2011
- Poster at Dynamics Days, Chapel Hill, Jan 2011

Defect-mediated snaking: spatial and temporal dynamics

- Invited mini-symposium talk at SIAM Conference on Applications of Dynamical Systems, Snowbird, May 2011

Dynamics of 2-D localized structures in a non-variational system

- Contributed talk at the Seventh IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA, Apr 2011

Defect-mediated snaking: A new growth mechanism for localized structures

- Invited mini-symposium talk at SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, Aug 2010
- Poster at the Second International Conference: Nonlinear Waves – Theory and Applications, Beijing, Jun 2010

# Curriculum Vitae

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## COLLOQUIUM TALKS

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Traveling edge waves in photonic graphene

- Department of Mathematics, Hangzhou Normal University, Aug 2016
- Department of Mathematics, Macquarie University, May 2016
- Nonlinear Waves Seminar, University of Colorado at Boulder, Sep 2015

Localized patterns in harmonically forced oscillatory systems: bifurcation, stability, and dynamics

- Department of Mathematics, Hangzhou Normal University, Aug 2016
- BU/Brown PDE seminar, Boston University, Feb 2015

Traveling edge waves in optical honeycomb lattices

- Nonlinear Waves Seminar, University of Colorado at Boulder, Mar 2014

Localized patterns in driven dissipative systems

- Nonlinear Waves Seminar, University of Colorado at Boulder, Oct 2013

Applications of pattern formation: supraglacial lakes and spatially localized states

- Department of Mathematics, University of Utah, Mar 2012

Localized states in one and two spatial dimensions

- Department of Engineering Sciences and Applied Mathematics, Northwestern University, Oct 2011
- Department of Physics, Georgia Institute of Technology, Apr 2011

Defect-mediated snaking: A new growth mechanism for localized structures

- Department of Mathematical Sciences, University of Bath, Jun 2010

The derivation and application of convective pattern equations

- The Summer Study Program in GFD, Woods Hole Oceanographic Institution, Aug 2009

## CONFERENCES ATTENDED

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- MCRN Junior Researcher Workshop, Chapel Hill, Sep 5 - 7, 2012
- MBI Workshop on Ocean Ecologies and Their Physical Habitats in a Changing Climate, Columbus, Jun 20 - Jul 1, 2011
- The Launch Conference of the World Year of Physics (Physics for Tomorrow), Paris, Jan 13 - 15, 2005

## ACADEMIC VISITS

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- Aug 2016: Department of Mathematics, Hangzhou Normal University. Hosted by Yancong Xu.
- Aug 2010: GFD program, Woods Hole Oceanographic Institution. Hosted by Edward A. Spiegel.
- Jun 2010: Department of Engineering Mathematics, University of Bristol and Department of Mathematical Sciences, University of Bath. Hosted by Alan R. Champneys and Jonathan H. P. Dawes.
- Dec 2008: Department of Applied Mathematics, University of Washington, Seattle. Hosted by J. Nathan Kutz.
- Jun - Aug 2005: Laboratoire Leibniz-IMAG, Grenoble, France. Hosted by Mirta B. Gordon.

## Curriculum Vitae

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### SKILLS

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- Programming/Software: experience in C++, MATLAB, Mathematica, AUTO-07p; knowledge of Lisp/Scheme, Python
- Languages: native Chinese (mandarin), proficient English, daily Cantonese, intermediate French, elementary Russian