

CURRICULUM VITAE

MICHAEL J. WARD

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PERSONAL DATA

- Birthdate: Dec. 8, 1960.
- Citizenship: Canadian citizen.

EDUCATION

- Ph.D. Applied Mathematics, Caltech 6/88.
 - Thesis: *'Asymptotic Methods in Semiconductor Device Modeling'*.
 - Advisor: Prof. Donald S. Cohen.
- B.Sc. Mathematics, U.B.C. (Canada) 6/83. First Class Honors.

ACADEMIC AND INDUSTRIAL POSITIONS

- Full Professor (with tenure), Dept. of Mathematics, U.B.C. 7/98 – date.
- Associate Professor (with tenure), Dept. of Mathematics, U.B.C. 7/95 – date.
- Assistant Professor, Dept. of Mathematics, U.B.C. (Canada), 7/92 – 6/95.
- Visiting Member, Courant Institute, New York University, 9/91 – 6/93: Research position in applied mathematics supported under a Dept. of Energy grant. Supervisor: Prof. Peter Lax.
- Szegő Assistant Professor, Stanford University, 9/88 – 9/91: Research and teaching position. Supervisor: Prof. Joseph B. Keller.
- Research Scientist, I.B.M. Thomas Watson Research Lab, Yorktown Heights, New York, summers of 1985-1993: Supervisor: Dr. Farouk Odeh (deceased) and Dr. Luis Reyna.

HONORS AND FELLOWSHIPS

- CAIMS Research Prize, CAIMS, 2011.
- Killam Teaching Award, Faculty of Science, UBC, 2004.
- Christensen Fellow at St. Catherines College, Oxford, Trinity term 1998.
- Steacie Fellowship for 1998-1999 awarded by NSERC.
- Coxeter-James Prize awarded by the Canadian Mathematical Society in 1998.
- Co-winner of the 1995 Andre Aisenstadt prize for research in mathematics, awarded by the Centre de Recherches Mathematique (Canada).
- Invited plenary speaker ICIAM, Hamburg, July 1995.
- Awarded a 1995 UBC Killam Research Prize (\$10,000).
- William Carey Prize for best doctoral dissertation in applied mathematics (Caltech), 6/88.
- I.B.M. Pre-doctoral Fellowship, 8/86 – 6/88.
- NSERC Postgraduate Scholarship (Canada), 8/83 – 8/87.
- Lorraine Schwartz prize in Statistics U.B.C., 5/83. 7/79 – 6/83.

EDITORIAL BOARDS

- Co-Editor in Chief (with S. Howison of OCIAM and A. Lacey of Heriot-Watt University) of the journal *'European Journal of Applied Mathematics'* (effective 9/00). Formerly, associate editor of this journal since 6/96.
- Editor: *Discrete and Continuous Dynamical Systems Series B* (effective November 2007).

- Co-Managing Editor (with M. Li and B. Moodie): Canadian Quarterly of Applied Mathematics (effective Sept. 2007).
- Editorial Board Member: Canadian Mathematical Bulletin (effective Jan. 2011).

RESEARCH INTERESTS

Applied analysis, reaction-diffusion systems, scientific computing, singular perturbation methods, mathematical modeling, diffusion in perforated domains, biophysical applications.

INVITED LECTURES AND CONFERENCE ORGANIZATION

- CAIMS Research Prize lecture at ICIAM 2011, Vancouver, July 2011; Title: “Localized Pattern Formation in Reaction-Diffusion Systems”.
- Minisymposium lecture at ICIAM, Vancouver, July 2011 in the session “Mathematical Modeling in Cellular Biology”. Title: Asymptotics and Scaling Laws for Narrow Escape and Splitting Probabilities.
- Co-organizer of BIRS workshop on “Localized Multi-Dimensional Patterns in Dissipative Systems: Theory, Modeling, and Experiments”, held at BIRS, Banff, July 24-29, 2011.
- One of three principal invited lecturers for the International Conference “Recent Advances in Nonlinear Partial Differential Equations”, sponsored by the Croucher Foundation Advanced Study Institute, Chinese U. of Hong Kong, held Feb. 28th–March 4th, 2011 (organizers J. Wei and X. Zin). Gave three 75 minute lectures at this meeting.
- Invited speaker for the International Conference “Far-From Equilibrium Dynamics”, in honor of Prof. Nishiura; held at Kyoto Research Center (RIMS), Kyoto, Japan, Jan. 2011.
- One of four Principal Lecturers for the Fourth Winter School on Applied Mathematics, City U. of Hong Kong, Dec. 2010. Five two-hour lectures on “Singular Perturbations and Localization Behavior for Partial Differential Equation Models of Pattern Formation”.
- CAIMS Plenary Lecture; St. John’s, Newfoundland, July 2010; Title: “Traps, Patches, Spots, and Stripes: Localized Solutions to Diffusive and Reaction-Diffusion Systems”.
- Minisymposium lecture at CAIMS; St. John’s, Newfoundland, July 2010; Title: “Asymptotic Analysis of Biharmonic Nonlinear Eigenvalue Problems of MEMS”.
- One of six Principal Lecturers at the International Centre for Mechanical Sciences (CISM) in Udine, Italy, Sept. 2009, for the workshop “Asymptotic Methods in Fluid Mechanics: Survey and Results” (organizers: R. Klein, H. Steinruck). Gave four one-hour talks at this workshop. Title: “Asymptotic Methods for PDE Problems in Fluid Mechanics and Related Systems with Strong Localized Perturbations in Two-Dimensional Domains”.
- One of two Principal Lecturers at the BIRS workshop “Multiscale Analysis of Self-Organization in Biology” (organizers: B. Perthame, T. Hillen), July 2009. Gave three 45 minute lectures at this workshop (videotaped by BIRS and available on their website). Title: “Traps, Patches, Spots, and Stripes: Localized Solutions to Diffusive and Reaction-Diffusion Systems”.
- Minisymposium lecture at the CMS meeting at Memorial University in the session “Reaction-Diffusion Systems and their Applications”, St. John’s, Newfoundland, June 2009.
- Minisymposium lecture and organization of the two-part Minisymposia “Contemporary Applications of Perturbation Methods”, at the SIAM Annual Meeting, Denver, Colorado, July 2009.
- Invited lecture (45 minutes) for the International Conference “Asymptotic Analysis and Infinite Dimensional Dynamical Systems”, held at the City University of Hong Kong, Hong Kong, June 2009.
- Minisymposium lecture at the SIAM Snowbird Dynamical Systems Conference in the session “Molecular Diffusion and Transport in Cells”, in Snowbird, Utah, May 2009.

- Invited plenary lecture for the International Conference “Mathematical Methods and Modeling of Biophysical Phenomena”, sponsored by IMPA(Brazil) at Rio de Janeiro, Brazil (organizers J. Zubelli, B. Perthame) in March 2009: Title: “Asymptotic Analysis of Diffusion on Surfaces with Localized Traps”
- Minisymposium lecture in the session “Self-Replication in Homogeneous Media” for the SIAM 2008 Conference on Nonlinear Waves and Coherent Structures, at Rome, Italy, in July 2008. Title: “Self-Replicating Patterns for Reaction-Diffusion Systems in Two-Space Dimensions”
- Co-organizer (with G. Bluman (UBC), J. King (Nottingham), P. Broadridge (Canberra)) of the PIMS sponsored international workshop “Similarity”, held at UBC in August 2008, with 40 international participants.
- Co-organizer of the Minisymposium “Localized Behavior of Elliptic Equations and Systems” for the 7th AIMS International Conference on Dynamical Systems, Differential Equations, and Applications, at Arlington, Texas, in May 2008. Gave a talk in this session with title: “The Dynamics and Self-Replication of Spots for the Schnakenburg Model”.
- Minisymposium lecture for the session “Asymptotic Analysis of Localized Patterns in PDE” for the International CMS-CAIMS-France 2008 Conference at Montreal, Quebec, in May 2008: Title: “Self-Replicating Spots for Reaction-Diffusion Systems in Two-Space Dimensions”.
- Invited lecture for the Chile-Japan workshop “Nonlinear Elliptic and Parabolic PDE”, at Santiago, Chile, in October 2007. Title: “Self-Replication for Reaction-Diffusion Equations in Two-Dimensional Domains”.
- Invited lecture for BIRS workshop “Reaction-Diffusion and Free Boundary Value Problems” at Banff, Alberta, in March 2006. Title: “Eigenvalue Optimization, Spikes, and the Neumann Green’s Function”.
- Invited lecture for the International Conference “The Dynamics of Patterns” (organizer: A. Doelman) at the University of Groningen, Holland, in April 2006. Title: “The Stability and Dynamics of 1-D Localized Pulses for Reaction-Diffusion Systems”.
- Invited lecture for the International Conference “Limit Problems in Analysis” (organizers; J. F. Williams, V. Van de Bouwe), at Leiden University in May 2006. Title: “Spike Dynamics in 2-D and the Neumann Green’s Function”.
- Minisymposium lecture in the session “Patterns on Growing Domains” for the SIAM 2006 Conference on Nonlinear Waves and Coherent Structures, at Seattle, Washington, in Sept. 2006. Title: “The Dynamics of Pulses for the Gray-Scott Model”.
- Invited Lecture for the International Conference “Pattern Formation” (organizers: J. Wei, Y. Nishiura), at the Chinese U. of Hong Kong in Dec. 2006. Title: “A Two-Dimensional Metastable Flame-Front and a Degenerate Spike Layer Problem”..
- Co-organizer of the Minisymposium “Localization in PDE” at the first CMS-SMM Conference at Guanajuato, Mexico, in Sept. 2006 (with A. Minzoni). Also gave a lecture in this session with title: “Eigenvalue Optimization, Spikes, and the Neumann Green’s Function”.
- Invited 45-minute lecture at the joint Japan-France International Conference on “Pattern Formation in Biology” (organizers, Ken-Ichi Nakamura, M. Henry, M.Mimura) at the University of Tokyo, Oct. 2005. Title: “The Stability of Stripes for Reaction-Diffusion Systems”.
- Minisymposium lecture in the session “Nonlinear Analysis” at the CMS Winter Meeting in Victoria, Dec. 2005. Title: “Eigenvalue Optimization, Spikes, and the Neumann Green’s Function”.
- Minisymposium lecture in the session “Localized Patterns in PDE” for the International Conference “Free Boundaries 2005”, at Coimbra, Portugal, in June 2005. Title: “Asymptotic Analysis of Localized Patterns for the One-Dimensional Gray-Scott Model”.

- Co-organized (with J. Rademacher) the Minisymposium “Localized Pattern Formation” at the SIAM Snowbird Dynamical Systems Conference, at Snowbird, Utah, in May 2005. Gave a 30 minute lecture in this session. Title: “The Stability and Dynamics of Spike Solutions to the Gierer-Meinhardt and Gray-Scott Systems: Competition and Oscillatory Instabilities”.
- Invited 30 minute lecture in the International Conference for the 60th Birthday of Prof. Roderick Wong in Hong Kong, May 2004 . Title: “Singular Perturbations, Carrier’s Problem, and Metastable Flame-Front Dynamics”.
- Co-Organized (with J. Wei) the Minisymposium “Spike Dynamics” at the International Congress of Industrial and Applied Mathematics, ICIAM 2003, at Sydney, Australia in July 2003. Gave two 30 minute lectures titled: “Instabilities of Spikes for the Gray-Scott Model” and “The Dynamics of Pulses in Reaction-Diffusion Systems”.
- Plenary invited speaker for the International Conference Differential Equations and Asymptotic Theory in Mathematical Physics, at Wuhan University, China, in October 2003 (organizers; C. Hua and R. Wong). Gave five one-hour lectures titled “Singular Perturbations and Reaction-Diffusion Equations”.
- Invited one-hour lecture for the Field Institute workshop “Patterns in Nonlinear PDE” at Toronto, Ontario, in November 2003 (organizers: W. Craig, C. Sulem, N. Ercolani): Title: “Instabilities of Spike Solutions for the One-Dimensional Gray-Scott Model”.
- One lecture for the PIMS workshop “The Dynamics of Localized Structures” held at Banff from August 9-16, 2003 (organizers: Bernoff, Fife, Hillen, Ward, Wei): Title: “Dynamics and Instabilities of Spikes for the One-Dimensional Gray-Scott Model”.
- AMS Invited one-hour address for the Western Section Meeting at Salt Lake City, Utah, in Oct. 2002: Title: “The Dynamics of Localized Patterns in Reaction-Diffusion Systems”.
- Minisymposium lecture in the session “Industrial Mathematics” for the Canada-China 3 by 3 Conference in Mathematics, at Vancouver, in Sept. 2001. Title: “The Dynamics of Hot-Spots for Microwave Heating Models”.
- Invited keynote one-hour lecture for the International Meeting Differential Equations in Mathematical Biology at Wuhan University in May 2001, (organizers: H. Chua, B. Sleeman): Title: “Beyond Turing: The Stability and Dynamics of Localized Patterns”.
- Invited one-hour lecture for the workshop “Nonlinear Pattern Formation”, at the University of Leiden, Holland, in March 2001, (organizers: D. Hilhorst, H. Matano). Title: “The Existence and Stability of Symmetric and Asymmetric Spike Patterns for the Gierer-Meinhardt Model”.
- Minisymposium lecture for the SIAM 200 Dynamical Systems Conference at Maui, Hawaii, in August 2000. Title: “Metastable Spike Solutions to a Reaction-Diffusion System”.
- Advanced Systems Institute, UBC, Sept. 2000: One-hour lecture. Title: “Nonlinear Problems in Industrial Applied Mathematics”.
- Invited keynote one-hour speaker for the Mount Baldy Conference in Differential Equations at Claremont, California, in Sept. 2000. Title: “The Dynamics of Localized Patterns”.
- Invited lecture for the IMACS conference “Nonlinear Evolution Equations” at Athens, Georgia, in April 1999. (organizer: W. Craig, C. Sulem). Title: “Nonlinear Dynamics for the Gierer-Meinhardt Model”.
- Invited one-hour lecture for the International Conference “Nonlinear Pattern Formation”, at Crete, Greece, in June 1999, (organizer N. Alikakos). Title: “Nonlocal Reaction-Diffusion Problems and Metastability”.
- Plenary one-hour lecture for the International Conference “Nonlinear Evolution Equations” at the Chinese University of Hong Kong in Dec 1999, (organizer M. Mimura and J. Wei). Title: “The Dynamics of Spikes for Nonlocal Reaction-Diffusion Models”.

- Invited one-hour lecture for the workshop “Reaction Diffusion Equations” at the Universit de Paris-Sud, Orsay, France, in December 1999, (organizer D. Hilhorst). Title: “The Dynamics of Spikes for Nonlocal Reaction-Diffusion Models”.
- Two invited one-hour lectures for the International Conference “Singularities and Partial Differential Equations”, at Kyoto, Japan, in November 1998, (organizer: H. Matano). Title: “Dynamics of Localized Solutions of PDE’s”.
- Invited one-hour lecture for the International Conference “Exponential Asymptotics”, at Luminy, France, in June 1998 (organizer: Robert O’Malley, R. Diener): Title: “Metastability for the Gierer-Meinhardt Model”.
- The Coxeter-James Lecture given at the Canadian Math Society (CMS) Winter Meeting in Victoria, Canada Dec. 1997.
- Invited plenary lecture for the International Congress of Industrial and Applied Mathematics (ICIAM) at Hamburg, Germany July 1995. Title: “Hybrid Asymptotic-Numerical Methods for Singular Perturbation Problems”.
- Minisymposium lecture in the session “Pulsatile Solutions of Reaction-Diffusion Equations”, for the Pacific Rim Conference on Mathematics at Hong Kong in Jan 19-23, 1998 (organizer: M. Mimura). Title: “Metastability in the Gierer-Meihardt Model”.
- Invited lecture for the AMS short course series “Singular Perturbation Concepts of Differential Equations” at Baltimore, Maryland, in January 2008 (organizer: Robert O’Malley, J. Cronin). Title: “Asymptotic Analysis of Metastable Behavior in Differential Equations”.
- Invited plenary lecture for the IMA workshop “Multiple-Time Scale Dynamical Systems” at the IMA in Minneapolis, Minnesota, in Oct. 28, 1997, (organizers: C.K.R.T. Jones, S. Wiggins). Title: “Metastability in Differential Equations”.
- Three Invited lectures for the IMA workshop on “Multiple-Time Scale Dynamical Systems” Oct. 23-34, 1997: Titles: “Exponentially Ill-Conditioned Boundary Value Problems”, “Metastability for Reaction-Diffusion Equations”, “Pulse Dynamics”.
- Minisymposium lecture in the session “Dynamics and Singular Perturbations in Phase Transitions”, for the SIAM meeting on Mathematical Aspects of Material Science at Philadelphia, Pennsylvania, in May 1997. Title: “The Dynamics of Slow Phase Separation Problems”.
- Minisymposium lecture in the session “Singular Perturbation: Theory and Applications”, for an American Math Society Meeting at Corvallis, Oregon, in April 1997. Title: “Metastability for Propagating Flame-Fronts”.
- Invited lecture for the International Conference “Exponential Asymptotics” at Luminy, France, in June 1996. Title: “Exponential Asymptotics and Dynamic Metastability”.
- Invited plenary one hour lecture for the 16th annual conference of the Canadian Applied Mathematics Society, at Winnipeg, Canada, in May 1996. Title: “Exponential Asymptotics and Dynamic Metastability”.
- Minisymposium lecture in the session “Localization in PDE” for the joint AMS-Mexican Mathematical Society meeting at Guanajaoto, Mexico, in Dec. 1995. Title: “Slow Bubble Motion for a Phase Separation Model”.
- Two invited one-hour lectures for the summer school sponsored by the Centre de Recherches Mathematique (CRM) on “Boundaries, Interfaces and Transitions”, at Banff, Alberta, in June 1995. Title: “Dynamical Metastability and Singular Perturbations”.
- Minisymposium lecture for the International Symposium “Methods and Applications of Analysis” held at Hong Kong, in December 1994. Title: “Summing Infinite Logarithmic Expansions for Problems in Singularly Perturbed Geometries”.
- Invited lecture for Conference honoring Prof. Joseph Keller held at R.P.I., Troy, New York,

June 1993. Title: “On the Exponentially Slow Motion of a Viscous Shock”.

- Invited lecture for IMA. Conference on Semiconductors at Minnesota in July 1991. Title: “Asymptotic Methods in Semiconductor Device Modeling”.
- Invited lecture for the International NASECODE 6 Conference at Dublin, Ireland, in July 1989. Title: “Multiple Steady State Solutions in a Multi-Junction Semiconductor Device”.