

CURRICULUM VITAE

Justin C. Tzou

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Education

- Ph.D. Applied Mathematics, Northwestern University, Sept. 2012
 - thesis: Pattern formation in the weakly nonlinear and singularly perturbed regimes of the Brusselator model
 - advisors: Bernard J. Matkowsky, Vladimir A. Volpert, Alvin Bayliss
- B.A.Sc. Engineering Physics, May 2007, with distinction

Research interests

- Reaction-diffusion systems; pattern formation; homoclinic snaking; singular perturbations; localized solutions; matched asymptotic methods; first passage processes and narrow escape problems

Academic positions

- AARMS Postdoctoral Fellow (Sept. 2013 – date), Dept. of Mathematics and Statistics, Dalhousie University
 - supervisor: Theodore Kolokolnikov
- Postdoctoral Fellow (Dec. 2012 – July 2013), Dept. of Mathematics, Technion – Israel Institute of Technology
 - supervisor: Alexander Nepomnyashchy

Preprints and publications

- Y. Chen, T. Kolokolnikov, J. C. Tzou, C. Gai, *Patterned vegetation, tipping points, and the rate of climate change*, (2015), accepted, European J. of Appl. Math.
- A. E. Lindsay, T. Kolokolnikov, J. . Tzou, *Narrow escape problem with a mixed trap and the effect of orientation*, Phys. Rev. E **91** (3), 032111 (2015), 15 pages.
- J. C. Tzou, S. Xie, T. Kolokolnikov, *First passage times, mobile traps, and Hopf bifurcations*, Phys. Rev. E **90** (6), 062138 (2014), 10 pages.
- J. C. Tzou, B. R. Wetton, *Optimal covering points and related problems*, (2014), accepted, Canadian Applied Mathematics Quarterly, 13 pages.
- V. Kurella, J. C. Tzou, D. Coombs, M. J. Ward, *Asymptotic analysis of first passage time problems inspired by ecology*, (2014), B. Math. Biol **77** (1), (2015), pp. 83-125.

- J. C. Tzou, T. Kolokolnikov, *Mean first passage time for a small rotating trap inside a reflective disk*, SIAM Multiscale Model. Simul. **13** (1), (2015), pp. 231–255.
- J. C. Tzou, M. J. Ward, T. Kolokolnikov, *Slowly varying control parameters, delayed bifurcations, and the stability of spikes in reaction-diffusion systems*, Physica D **290**, (2015), pp. 24–43.
- J. C. Tzou, Y. -P. Ma, A. Bayliss, B. J. Matkowsky, V. A. Volpert, *Homoclinic snaking near a codimension two Turing-Hopf bifurcation point in the Brusselator model*, Phys. Rev. E **87** (2), 022908 (2013), 20 pages.
- J. C. Tzou, Y. Nec, M. J. Ward, *The stability of localized spikes for the 1-D Brusselator reaction-diffusion model*, European J. of Appl. Math., **24** (4), (2013), pp. 515–564.
- J. C. Tzou, A. Bayliss, B. J. Matkowsky, V. A. Volpert, *Stationary and slowly moving localized pulses in a singularly perturbed Brusselator model*, European J. of Appl. Math. **22** (5), (2011), pp. 423–453.
- J. C. Tzou, A. Bayliss, B. J. Matkowsky, V. A. Volpert, *Interaction of Turing and Hopf modes in the superdiffusive Brusselator model near a codimension two bifurcation point*, Math. Model. Nat. Phenom. **6** (1), (2011), pp. 87–118.
- J. C. Tzou, B. J. Matkowsky, V. A. Volpert, *Interaction of Turing and Hopf modes in the superdiffusive Brusselator model*, Appl. Math. Lett. **2**, (2009), pp. 1432–1437.

Conference activity

- *First passage times with mobile traps in one and two dimensions* (invited workshop speaker), Workshop on Pattern Formation, Dalhousie University, Halifax, Nova Scotia, Canada, July 18–19, 2015.
- Mini-symposium co-organizer, session title “First passage times in discrete and continuous systems,” SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, USA, May 2015.
- *Mean first passage time for a small rotating trap inside a reflective disk* (invited mini-symposium speaker), SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, USA, May 2015.
- *Homoclinic snaking near a codimension two Turing-Hopf bifurcation point* (invited mini-symposium speaker, *featured session*), SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, USA, May 2015.
- *Slowly varying control parameters, delayed bifurcations, and the stability of spikes in reaction-diffusion systems* (invited mini-symposium speaker), SIAM Conference on Nonlinear Waves & Coherent Structures, University of Cambridge, United Kingdom, August 2014.
- *Mean first passage time for a small rotating trap inside a reflective disk* (invited mini-symposium speaker), SIAM Conference on Nonlinear Waves & Coherent Structures, University of Cambridge, United Kingdom, August 2014.
- *Mean first passage time for a small rotating trap inside a reflective disk* (invited mini-symposium speaker), AIMS Conference on Dynamical Systems, Differential Equations and Applications, Madrid, Spain, July 2014.

- *Slowly varying control parameters, delayed bifurcations, and the stability of spikes in reaction-diffusion systems* (invited mini-symposium speaker), Canadian Applied and Industrial Mathematics Annual Meeting, Saskatoon, Canada, June 2014.
- *Slowly varying control parameters, delayed bifurcations, and the stability of spikes in reaction-diffusion systems*, Dalhousie University Mathematics Colloquium, March 2014.
- *Homoclinic snaking near a codimension two Turing-Hopf bifurcation point in the superdiffusive Brusselator model* (invited mini-symposium speaker), SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, USA, May 2013.
- *Homoclinic snaking near a codimension two Turing-Hopf bifurcation point in the Brusselator model* (invited mini-symposium speaker), AMS Fall Southeastern Sectional Meeting, New Orleans, USA, October 2012.
- *The stability of localized spikes for the 1-D Brusselator reaction-diffusion model* (invited mini-symposium speaker), Canadian Applied and Industrial Mathematics Annual Meeting, Toronto, Canada, June 2012.

Honours and awards

- Pacific Institute for the Mathematical Sciences (PIMS) Post-Doctoral Fellowship (CRG: Applied PDE's), Sept. 2015 – date
- Early-Career Travel Award – SIAM Conference on Nonlinear Waves & Coherent Structures, Aug. 2014
- Atlantic Association for Research in the Mathematical Sciences (AARMS) Post-Doctoral Fellowship, Sept. 2013 – Sept. 2015
- Northwestern University Cabell Terminal Year Fellowship 2011–2012
- Natural Sciences and Engineering Council of Canada (NSERC) Postgraduate Doctoral Fellowship, 2009–2011
- NSERC Alexander Graham Bell Canada Graduate Master's Fellowship, 2008–2009
- NSERC Alexander Graham Bell Canada Graduate Master's Fellowship, 2007–2008 (declined)
- Royal E. Cabell Fellowship, Northwestern University, 2007–2008
- Graduate College Fellowship, University of Arizona, 2007–2008 (declined)
- NSERC Undergraduate Student Research Award, 2007
- Edward G. Auld Prize in Engineering, University of British Columbia, 2007
- John Collison Memorial Scholarship, University of British Columbia, 2006
- MacKenzie Swan Memorial Scholarship, University of British Columbia, 2006
- Undergraduate Scholar Program, University of British Columbia, 2002–2007

Teaching

- Assistant professor, Math 2120 (Methods for Ordinary Differential Equations), Dalhousie University (Fall 2013 & Fall 2014)
- Teaching assistant, Math 234 (Vector and Multivariable Integration), Northwestern University (Winter 2012)