

Joseph Hua Tien

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EDUCATION

Cornell University, Ithaca, NY

2007 Ph.D. Applied Mathematics
 Advisor: John Guckenheimer

2005 M.S. Applied Mathematics

Princeton University, Princeton, NJ

1998 B.A. Ecology and Evolutionary Biology
 Highest Honors

CITIZENSHIP: United States of America

RESEARCH INTERESTS: Mathematical biology, particularly epidemiology and neuroscience. Parameter estimation for differential equations.

EMPLOYMENT

2009- **Ohio State University**
 Assistant Professor, Department of Mathematics

2007-2009 **McMaster University**
 Postdoctoral Research Fellow

2006-2007 **Fred Hutchinson Cancer Research Center**
 Postdoctoral Research Fellow

2004-2006 **Cornell University**
 Research Assistant, Center for Applied Mathematics

2002 (Summer) **Fred Hutchinson Cancer Research Center**
 Visiting Scientist, Biostatistics Modeling and Methods group. Seattle, Washington

2001-2004 **Cornell University**
 NSF Graduate Research Fellow, NSF IGERT Fellow

1998-1999 **NASA Glenn Research Center**
 Research Associate, Combustion branch. Cleveland, Ohio

1998-1999 **North Coast Tutoring Services**
 Tutor, high school math and science. Chagrin Falls, Ohio

PUBLICATIONS

Peer-reviewed

19. Devault AM, Golding GB, Wagglechner N, Enk JM, Kuch M, Tien JH, Shi M, Fisman DN, Dhody AN, Forrest S, Bos KI, Earn DJD, Holmes EC, Poinar HN. 2014. Second-pandemic strain of *Vibrio cholerae* from the Philadelphia cholera outbreak of 1849. *New England Journal of Medicine*. doi: 10.1056/NEJMoa1308663.
18. Eisenberg MC, Kujbida G, Tuite AR, Fisman DN, Tien JH. 2013. Examining rainfall and cholera dynamics in Haiti using statistical and dynamic modeling approaches. *Epidemics*. 5: 197-207.
17. Robertson SL, Eisenberg MC, Tien JH. 2013. Heterogeneity in multiple transmission pathways: modeling the spread of cholera and other waterborne disease in networks with a common water source. *Journal of Biological Dynamics*. 7(1): 254-275.
16. Eisenberg MC, Shuai Z, Tien JH, van den Driessche P. 2013. A cholera model in a patchy environment with water and human movement. *Mathematical Biosciences*. 246(1): 105-112.
15. Eisenberg MC, Robertson SL, Tien JH. 2013. Identifiability and estimation of multiple transmission pathways in cholera and waterborne disease. *Journal of Theoretical Biology*. 324: 84-102.
14. Shuai Z., Tien JH, van den Driessche P. 2012. Cholera models with hyperinfectivity and temporary immunity. *Bulletin of Mathematical Biology*. 74(10): 2423-2445. doi: 10.1007/s11538-012-9759-4
13. Holte S., Randolph T, Ding J, Tien JH, McClelland R, Baeten J, Overbaugh J. 2012. Efficient use of longitudinal CD4 counts and viral load measures in survival analysis. *Statistics in Medicine*. 31(19): 2086-2097. doi: 10.1002/sim.5318.
12. Tuite A.R., Tien J.H., Eisenberg M.C., Earn D.J.D., Ma J., Fisman D.N. 2011. Cholera epidemic in Haiti, 2010 – using a transmission model to explain spatial spread of disease and identify optimal control interventions. *Annals of Internal Medicine* 154(9): 593-601. doi: 10.1059/0003-4819-154.
11. Tien J.H., Poinar H.N., Fisman D.N., Earn D.J.D. 2011. Herald waves of cholera in 19th century London. *Journal of the Royal Society Interface* 8(58): 756-760. doi: 10.1098/rsif.2010.0494.
10. Lyles D., Tien J.H., McCobb D.P., Zeeman M.L. 2010. Pituitary network connectivity as a mechanism for the LH surge. *Journal of Neuroendocrinology*. 22(12): 1267-1278.
9. Tien J.H., Earn D.J.D. 2010. Multiple transmission pathways and disease dynamics in a waterborne pathogen model. *Bulletin of Mathematical Biology* 72(6): 1506-1533.
8. Tien J.H., Guckenheimer J. 2008. Parameter estimation for bursting neural models. *Journal of Computational Neuroscience* 24(3): 358-373.
7. Guckenheimer J., Tien J.H. 2007. Commentary on “Parameter estimation for differential equations: a generalized smoothing approach” by J.O. Ramsay, G. Hooker, D. Campbell, and J. Cao. *Journal of the Royal Statistical Society B* 69(5):741-770.
6. Tien J.H., Hazelton W.D., Sparks R., Ulrich C.M. 2005. A Michaelis-Menten- style model for the autocatalytic enzyme prostaglandin H synthase. *Bulletin of Mathematical Biology* 67: 683-700.
5. Tien J.H., Lyles D., Zeeman M.L. 2005. A potential role of modulating inositol 1,4,5-trisphosphate receptor desensitization and recovery rates in regulating ovulation. *Journal of Theoretical Biology* 232(1): 105-117.
4. Hazelton W.D., Tien J.H., Donato V.W., Sparks R., Ulrich C.M. 2004. Prostaglandin H synthases: members of a class of quasi-linear threshold switches. *Biochemical Pharmacology* 68(3): 423-432.
3. Tien J.H., Levin S.A., Rubenstein D.I. 2004. Dynamics of fish shoals: identifying key decision rules. *Evolutionary Ecology Research* 6: 555-565.

Book chapters / Thesis

2. Tien J.H. 2007. Optimization for bursting neural models. Ph.D. Thesis, Cornell University.
1. Guckenheimer J., Tien J.H., Willms A.R. 2005. Bifurcations in the fast dynamics of neurons: implications for bursting. In: *Bursting: the genesis of rhythm in the nervous system*. (Eds.) Coombes S., Bressloff P.C., World Scientific Press, pp. 91-124.

INVITED TALKS

Disease invasion of community networks with environmental pathogen movement. Current topics workshop: From within host dynamics to the epidemiology of infectious disease. Mathematical Biosciences Institute, Columbus, OH. April 2014.

Disease invasion of community networks with environmental pathogen movement. American Mathematical Society Southeastern Spring Sectional Meeting, University of Tennessee, Knoxville. March 2014.

Disease invasion of community networks with environmental pathogen movement. American Mathematical Society Central Sectional Meeting, Washington University, St. Louis. October 2013.

Disease invasibility of community networks. Applied Mathematics Seminar, University of Illinois, Urbana-Champaign. April 2013.

Disease invasibility of community networks. GISciences Workshop: Challenges in Modeling the Spatial and Temporal Dimensions of the Ecology of Infectious Diseases. September 2012.

Modeling cholera dynamics in Haiti. Complex Biological Systems Group Theme Days, University of Pittsburgh. May 2012.

Modeling cholera dynamics. Mathematics Department Colloquium, University of Tennessee, Knoxville. March 2012.

Modeling an autocatalytic enzyme. Mathematics Department Jr. Colloquium, University of Tennessee, Knoxville. March 2012.

Parameter estimation for bursting neural models. Current topics workshop: Recent advances in statistical inference. Mathematical Biosciences Institute, Columbus, OH. February 2012.

Cholera past and present. Current topics workshop: Spatio-temporal dynamics in disease ecology and epidemiology. Mathematical Biosciences Institute, Columbus, OH. October 2011.

Modeling the cholera epidemic in Haiti. AMS Sectional Meeting, Wake Forest. September 2011.

Cholera: insights from Haiti. Modelling and analysis of options for controlling persistent infectious diseases. Banff International Research Station. March 2011.

Modeling waterborne disease dynamics. Applied Mathematics Seminar, Northwestern University. Evanston, IL. January 2011.

Modeling cholera in Haiti. Modeling for Public Health Action: from Epidemiology to Operations. Atlanta, GA. December 2010.

Modeling waterborne diseases. Ohio State University, MBI post-doc seminar. May 2010.

Mathematical models and cholera epidemics. Ohio State University, RUMBA seminar. October 2009.

Waterborne pathogen models and cholera outbreaks. The Hospital for Sick Children, Toronto. Biostatistics seminar. March 2009.

Waterborne pathogen models and cholera outbreaks. McMaster University. Ecology and Evolutionary Biology seminar. February 2009.

Waterborne pathogen models and cholera outbreaks. Ohio State University. Mathematics Department seminar. February 2009.

Waterborne pathogen models and cholera outbreaks. McMaster University. Mathematical Biology Research Seminar. January 2009.

Parameter estimation for bursting neural models. SIAM Life Sciences 2008. Montreal, Canada. August 2008.

Geometric approaches to parameter estimation for differential equations. University of British Columbia Mathematical Biology Seminar. Vancouver, Canada. May 2007.

Modeling an autocatalytic enzyme. University of Washington Undergraduate Math Sciences Seminar. Seattle, Washington. February 2007.

OTHER TALKS AND PRESENTATIONS

Disease invasion of community networks. EEID PI meeting. Athens, Georgia. March 2013.

Disease hot spots, network structure, and the basic reproduction number. EEID PI meeting. Berkeley, California. March 2012.

Waterborne diseases: can mathematics help? Gordon Research Conference, Environmental Sciences: Water. Holderness, New Hampshire. May 2010.

Parameter estimation for bursting neural models. Biomath Days 2008. Ottawa, Canada. March 2008.

Parameter estimation for bursting neural models. McMaster University Mathematical Biology Seminar. Hamilton, Canada. October 2007.

Estimating relative fitness by logistic regression. HIV Dynamics and Evolution. Segovia, Spain. April 2007.

A Michaelis-Menten-style model for the autocatalytic enzyme prostaglandin H synthase. Annual Meeting of the Society for Mathematical Biology. Ann Arbor, Michigan. July 2004.

A Michaelis-Menten-style model for the autocatalytic enzyme prostaglandin H synthase. Mathematical Sciences Seminar, Cornell University. Ithaca, New York. May 2004.

Regulating run-away reactions: insights from modeling the autocatalytic enzyme prostaglandin H synthase. RPI Applied Math Days. Troy, New York. November 2003.

Calcium dynamics and the human menstrual cycle. IGERT Workshop, Oak Brook, Illinois. October 2002.

Optimal reproduction strategies for plants capable of producing two seed types in a randomly varying environment. Joint meeting of the International Conference on Mathematics in Biology and the Society for Mathematical Biology. Salt Lake City, Utah. August 2000.

TEACHING**MBI-NimBIOS-CAMBAM Summer Graduate Program.**

Summer 2011.

Mathematical modeling for the life sciences.

Instructor, course organizer. Spring 2013, Ohio State University.

Ordinary and partial differential equations.

Instructor, course organizer. Spring 2011, Winter 2012, Ohio State University.

Topics in mathematical ecology.

Co-instructor with Ian Hamilton, Yuan Lou, Elizabeth Marschall. Fall 2010, Ohio State University.

MBI Summer Undergraduate Program.

Summer 2010.

Topics in differential equations.

Instructor, course organizer. Spring 2010, Ohio State University.

Introduction to real analysis.

Instructor, course organizer. Winter 2010, Ohio State University.

Introduction to mathematical modeling.

Instructor, course organizer. Fall 2008, McMaster University.

Calculus I.

Instructor. Spring 2014, Ohio State University.

Instructor, course organizer. Summer 2008, McMaster University.

Cornell's Summer Math Institute 2006.

Co-founder and instructor for the 2006 pilot program for Cornell's Summer Math Institute (SMI). Funds raised included \$33,000 from the Sloan Foundation, \$33,000 from Cornell's Provost Office, \$16,500 from the School of Engineering, and \$16,500 from the Department of Mathematics. Cornell has since received a 3 year continuation grant for SMI from the National Science Foundation. Lecturer and project supervisor for Dynamics and Neurobiology. Students presented their research at the Society for the Advancement of Chicanos and Native Americans in Science meeting in 2006, as a poster titled *Bifurcation Analysis of the Morris-Lecar System*.

Dynamic Models in Biology.

Teaching assistant, Spring 2006, Cornell University.

SUPERVISORSHIPS*Post-doctoral supervision*

Name	Dates	Last degree	Current position
Karly Jacobsen	2013-present	Ph.D. 2013, U. Florida	Postdoctoral Fellow, MBI, Ohio State U.
Marcio Mourao	2013-present	Ph.D. 2012, U. Michigan	Postdoctoral Fellow, MBI, Ohio State U.
Marisa Eisenberg	2009-2012	Ph.D. 2009, UCLA	Assistant Professor, Epidemiology, U. Michigan
Suzanne Robertson	2009-2012	Ph.D. 2009, U. Arizona	Assistant Professor, Department of Mathematics, Virginia Commonwealth University

Graduate student supervision

Name	Dates	Type of Supervision	Current position
Daniel Grollmus	2012-present	Ph.D. advisor	OSU graduate student
Kristen Deger	2013-present	Master's Thesis advisor	OSU graduate student
Chris Batty	2012-2013	Master's Thesis advisor	Medical Mutual
Leah Guinn-Durbak	2012-present	GRA Supervisor	MPH student, OSU
Noah Brostoff	2011-2012	Master's Thesis advisor	Model Engineer, Immunetrics
Jeff Dunworth	2010-2011	Master's Thesis advisor	PhD student, U. Pittsburgh, Dept. Mathematics
Suh Park	2010-2011	Master's Thesis co-advisor	Hyundai, Analyst

Undergraduate supervision

Name	Dates	Type of Supervision	Current position / first position after graduation
Boyu Liu	2013-present	Undergraduate Research Assistant	Epic, Software Developer
Patrick Schnell	2012-2013	RUMBA Research Fellow	PhD student, U. Minnesota, Biostatistics
Yibo Shao	2012-2013	RUMBA Research Fellow	Cerner Corporation
Mark Guseman	2011-2012	Undergraduate Research Assistant	Texas Instruments
Joshua Leirer	2010-2011	RUMBA Research Fellow	ORISE Research Participant at the Centers for Disease Control and Prevention
Yitian Wang	2010-2011	RUMBA Research Fellow	PhD student, U.C. Davis, Materials Science
Xiao Xiao Yu	2010-2011	RUMBA Research Fellow	PhD student, Carnegie Mellon, Chemical Engineering
Yi Zeng	2010 (Summer)	REU student	PhD student, MIT, Dept. Mathematics

High school supervision

Name	Dates	Type of Supervision	Current position
Felix Mak	2013	Metro High School intern	Metro High student

GRANTS AND AWARDS / PROFESSIONAL ACTIVITIES**Grants**

Institute for Population Research Seed Grant, Ohio State University, 2013. Co-Investigator. "Migration and household management practices: an interdisciplinary examination of cholera outbreaks in urban Cameroon." \$18,310.

Banff International Research Station – Research in Teams. Organizer. "Cholera dynamics on community networks." August 2013.

National Science Foundation – Ecology of Infectious Diseases. OCE-1115881, PI. "Modeling the effects of heterogeneity in water quality on cholera disease dynamics". 2011-2016. \$973,128.

Cornell Summer Math Institute Pilot Program, 2006. A graduate student initiated program, including \$99,000 combined raised from the Sloan Foundation and Cornell University (Provost Office, School of Engineering, and Department of Mathematics).

Fellowships / Scholarships / Awards

NSF Graduate Research Fellowship.

NSF IGERT Fellowship in Nonlinear Studies.

Distinguished Undergraduate Research Mentor Award – nominated. Ohio State University, 2011.

Outstanding Presentation. Co-winner, Ottawa Biomath Days 2008.

Senior Book Award. Department of Ecology and Evolutionary Biology, Princeton University.

National Merit Scholarship.

Professional Activities

Research for Undergraduates: adventures in Mathematical Biology and its Applications. Faculty member, Ohio State University, 2010-present. <http://rumba.biosci.ohio-state.edu/>.

Colloquium Committee. Mathematical Biosciences Institute, Ohio State University, 2010-2011.

Graduate Studies Committee. Department of Mathematics, Ohio State University, 2013-present.

Graduate Recruitment Committee. Department of Mathematics, Ohio State University, 2013-present.

Graduate Advising Committee. Department of Mathematics, Ohio State University, 2013-present.

Undergraduate Advisor – Mathematical Biology Track. Department of Mathematics, Ohio State University, 2010-present.

Undergraduate Recruitment Committee. Department of Mathematics, Ohio State University, 2012-present.

Communications Committee. Department of Mathematics, Ohio State University, 2010-2011.

Mathematical Biology Seminar. Organizer, McMaster University, 2008-9.

Reviewer. *Grants:* Ontario Ministry of Agriculture and Food and Ministry of Rural Affairs, Food Safety Research Program (peer review). *Journals:* American Journal of Tropical Medicine and Hygiene, BMC Infectious Diseases, Chaos, Solitons, and Fractals, Discrete and Continuous Dynamical Systems B, Epidemics, International Journal of Applied Mathematics and Computer Science, Journal of Biological Dynamics, Journal of Biological Systems, Journal of Computational and Applied Mathematics, Journal of the Royal Society Interface, Journal of Theoretical Biology, Mathematical Biosciences, PLoS Biology, SIAM Journal on Applied Mathematics.