



Biosketch for Jean Ijeh Tsao

Department of Fisheries & Wildlife, College of Agriculture & Natural Resources
Department of Large Animal Clinical Sciences, College of Veterinary Medicine
Michigan State University

EDUCATION

Swarthmore College, PA.	Biology	BA, 1994
University of Chicago, IL	Ecology & Evolution	MS, 1997, PhD, 2000
Yale University, CT	Epidemiology & Public Health	Post-doctoral fellow, 2001-2003

ACADEMIC POSITIONS

2004 -present Michigan State University. Associate Professor

- Program in Wildlife Disease Ecology & Conservation Medicine
- Program in Ecology, Evolutionary Biology & Behavior

2003 Michigan State University. Visiting Assistant Professor

PUBLICATIONS & PRESENTATIONS

5 Related publications

Ogden, N.H. and **J.I. Tsao**. The dilution effect revisited - assumptions and likely generality in the Lyme disease system. In press: *Epidemics* (on-line publication available June 2009, doi:10.1016/j.epidem.2009.06.002)

Tsao, J.I. Reviewing molecular adaptations of Lyme borreliosis spirochetes in the context of reproductive fitness in natural transmission cycles. 2009. *Vet. Res.* 40:36.

Kurtenbach, K., K. Hanincova, **J. I. Tsao**, G. Margos, D. Fish, N. H. Ogden. 2006. Fundamental processes in the evolutionary ecology of Lyme borreliosis. *Nat. Rev. Microbiol.* 4(9): 660-9.

Diuk-Wasser, M. A., A. G. Gatewood, M. R. Cortinas, S. Yaremych-Hamer, **J. Tsao**, U. Kitron, G. Hickling, J. S. Brownstein, E. Walker, J. Piesman, D. Fish. 2006. Spatiotemporal patterns of host-seeking *Ixodes scapularis* nymphs (Acari: Ixodidae) in the United States. *J. Med. Entomol.* 43(2): 166 - 176.

Madhav, N.K., J. Brownstein, **J. I. Tsao**, D. Fish. 2004. A dispersal model for the range expansion of the blacklegged tick, *Ixodes scapularis* (Acari: Ixodidae). *J. Med. Entomol.*, 41(5): 842-852.

5 Other significant publications

Gatewood, G.A., K.A. Liebman, G. Vourc'h, J. Bunikis, S.A. Hamer*, F. Melton, **J.I. Tsao**, A.G. Barbour, D. Fish, and M.A. Diuk-Wasser. 2009. Climate and tick seasonality predict *Borrelia burgdorferi* genotype distribution. *Appl. Environ. Microbiol.* 75(8):2476-2483.

Hamer, S. A., G. J. Hickling, P. L. Roy, E. D. Walker, E. S. Foster, C. C. Barber, **J. I. Tsao**. 2007. Endemic and recently-invaded *Ixodes scapularis* of Michigan are infected with *Borrelia burgdorferi*, *Anaplasma phagocytophilum*, and *Babesia odocoilei*. *Emerg. Inf. Dis.* 13(7): 1131-1133.

Tsao, J. I., J. T. Wootton, J. Bunikis, M. G. Luna, D. Fish, A. G. Barbour. 2004. An ecological approach to preventing human infection: vaccinating wild mouse reservoirs intervenes in the Lyme disease cycle. *Proc. Natl. Acad. Sci.*, 101(52): 18159-18164.

Bunikis, J., U. Garpmo, **J. I. Tsao**, J. Berglund, D. Fish, A. G. Barbour. 2004. Sequence typing reveals extensive strain diversity of the Lyme borreliosis agents *Borrelia burgdorferi* in North America and *Borrelia afzelii*. *Microbiol.* 150: 1741-1755.

Bunikis, J., **J. I. Tsao**, G. Luna, D. Fish, A. G. Barbour. 2004. A longitudinal study of infection with *Borrelia burgdorferi* in white-footed mice (*Peromyscus leucopus*) in an area endemic for Lyme disease. *J. Infect. Dis.*, 189(8):1515-1523.

SYNERGISTIC ACTIVITIES

Fish & Wildlife Disease Ecology & Conservation Medicine Graduate Specialization. I played a key role in developing this graduate program at MSU, where graduate and professional (e.g., veterinary) students can obtain a certificate in disease ecology and conservation medicine.

Wildlife Disease Ecology & Management Veterinary Clerkship. This is an annual short intensive summer course with didactic, field, and laboratory components for veterinary students that I developed and teach with Graham Hickling. Students develop research plans to test hypotheses regarding the environmental risk of Lyme disease in uncharacterized areas of Michigan; they carry out the necessary field samplings; laboratory diagnostics; and data analyses. They summarize their results and recommendations in a written completion report submitted to the Michigan Department of Community Health, with which I synergize both research and teaching activities.

MSU Invasive Species Initiative. Besides participating in this initiative, I co-taught a graduate seminar course on invasive species with three faculty from different disciplines within the biological and social sciences.

2005 Conference for Veterinary & Medical Professionals on Emerging Lyme Disease in Michigan.

My graduate student Sarah Hamer and I co-organized a conference for veterinary and public health professionals. We discussed the on-going invasion of Lyme disease in southwestern Michigan, based on our current research and potential implications for disease prevention and control.

Modeling *Renibacterium salmoninarum* dynamics in Lake Michigan (2005). My doctoral student Eli Fenichel and I co-organized 2 workshops that brought together disease modelers, fish pathologists and managers to produce a theoretical framework to study the dynamics of bacterial kidney disease in free-swimming fish populations in Lake Michigan. Funded by the Great Lakes Fishery Trust.

Assessing fish translocation risks using Real Options analysis: lamprey pathogen screening as a case study. For the Great Lakes Fishery Commission, Eli Fenichel, Michael Jones, Graham Hickling, and I developed a bioeconomic framework for evaluating the risk of pathogen introduction as a consequence of sea lamprey translocation. This case is an example of the broader issue of potential species introductions due to fish translocations.

COLLABORATORS & OTHER AFFILIATIONS

Collaborators

Lorenza Beati, Georgia Southern University
Russell Burke, Hofstra University
Maria Diuk-Wasser, Yale University
Howard Ginsberg, University of Rhode Island
Graham Hickling, University of Tennessee, Knoxville
Michael Jones, Michigan State University
Roger LeBrun, University of Rhode Island
Nicholas Ogden, Public Health Agency, Canada
Edward Walker, Michigan State University

Advisors

J. Timothy Wootton, University of Chicago (Thesis Advisor)
Durland Fish, Yale University (Post-doctoral Advisor)
Alan G. Barbour, University of California, Irvine (Post-doctoral Advisor)

Advisees (3 Ph.D., 1 M.S., all at Michigan State University)

Eli Fenichel (Ph.D. 2007): now Assistant Professor, Arizona State University
Andrew Flies (Ph.D. candidate, anticipated 2012)
Sarah (Yaremych) Hamer (Ph.D. candidate, anticipated 2010; co-advised with G. Hickling)
Isis Kuczaj (M.S. candidate, anticipated 2012)
Pamela Roy (M.S. student, 2008)