

Camilo E. Khatchikian, PhD

Ecology of Vector-Borne Diseases Laboratory

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RESEARCH INTERESTS

My research is centered in the **evolutionary ecology of vector-borne diseases**, focusing in processes of range expansion and demographic change through the study of geographical adaptation, population genetics, and phylogeography.

EDUCATION

2010: **PhD in Biology**. *Clark University, Worcester, MA*.
Dissertation advisor: Dr. Todd Livdahl.

2000: **Licentiate in Biological Sciences (MSc equivalent)**.
Universidad Nacional de Mar del Plata, Argentina. Thesis
Advisor: Dr. Aldo Vassallo. **Graduated with honours**.

RESEARCH EXPERIENCE

Assistant Professor 2016-Present

*Department of Biological Sciences
University of Texas at El Paso, TX*
Head of the Ecology of Vector-Borne Diseases Laboratory

Research associate 2015-2016

Department of Biology, University of Pennsylvania, PA.
Evolution and Ecology of Disease Systems Laboratory
Laboratory head: Dr. Dustin Brisson.

Postdoctoral researcher 2010-2015

Department of Biology, University of Pennsylvania, PA.
Evolution and Ecology of Disease Systems Laboratory.
Laboratory head: Dr. Dustin Brisson.

Research as doctoral student 2003-2009

Department of Biology, Clark University, MA.
Vector Ecology Laboratory.
Laboratory head: Dr. Todd Livdahl.

Research fellow 2000-2002

Universidad Nacional de Mar del Plata, Argentina.
Vertebrate Ecology Laboratory.
Laboratory head: Dr. Marcos Favero.

Research as licentiate student 1998-2000

Universidad Nacional de Mar del Plata, Argentina.
Vertebrate Ecology Laboratory.
Laboratory head: Dr. Aldo Vassallo.

PUBLICATIONS

Underline identifies mentored student, see “Mentoring” section for details.

16. Rieux, A and **CE Khatchikian**. 2016. TipDatingBeast: an R package to assist the implementation of phylogenetic tip-dating tests using BEAST. *Molecular Ecology Resources*, doi: 10.1111/1755-0998.12603.
15. **Khatchikian, CE**, RB Nadelman, J Nowakowski, I Schwartz, GP Wormser, D Brisson. 2015. Public health impact of strain specific immunity to *Borrelia burgdorferi*. *BMC Infectious Diseases* 15(1): 472.
14. **Khatchikian, CE**, M Prusinski, M Stone, PB Backenson, I-N Wang, EA Foley, SN Seifert, MZ Levy, D Brisson. 2015. Recent and rapid population growth and range expansion of blacklegged ticks in North America. *Evolution* 69(7): 1678-1689. **Featured in Wiley’s news round-up, August 2015.**
13. Seifert, SN, **CE Khatchikian**, W Zhou, D Brisson. 2015. Evolution and population genomics of the Lyme pathogen, *Borrelia burgdorferi*. *Trends in Genetics* 31(4): 201-207. **Featured in journal cover, April 2015.**
12. **Khatchikian, CE**, EA Foley, C Barbu, J Hwang, J Ancca-Juárez, K Borrini-Mayori, VR Quispe-Machaca, D Brisson, MZ Levy. 2015. Effect of the urban environment on the population structure of the Chagas disease vector, *Triatoma infestans*. *Plos Neglected Tropical Diseases* 9(2): e0003425.
11. **Khatchikian, CE**, RB Nadelman, J Nowakowski, I Schwartz, GP Wormser, D Brisson. 2014. Evidence for strain-specific immunity in human Lyme disease patients. *Infection and Immunity* 82(4): 1408-1413. **Highlighted in journal’s Spotlight as an article of significant interest selected by the editors, April 2014.**
10. Foley EA, **CE Khatchikian**, J Hwang, J Ancca-Juárez, K Borrini-Mayori, VR Quispe-Machaca, MZ Levy, D Brisson. 2013. Population structure of the Chagas disease vector, *Triatoma infestans*, at the urban-rural interface. *Molecular Ecology* 22(20): 5162-5171.
9. **Khatchikian CE**, M Prusinski, M Stone, PB Backenson, IN Wang, MZ Levy, D Brisson. 2012. Geographical and environmental factors driving the increase in the Lyme disease vector *Ixodes scapularis*. *Ecosphere* 3(10): art85.
8. **Khatchikian CE**, F Sangermano, D Kendell, and TP Livdahl. 2011. Evaluation of species distribution models (SDMs) algorithms for fine-scale container breeding mosquito risk prediction. *Medical and Veterinary Entomology* 25(3): 268-275.
7. Kaplan L, D Kendell, D Robertson, TP Livdahl, and **CE Khatchikian**. 2010. *Aedes aegypti* and *Aedes albopictus* in Bermuda: extinction, invasion, invasion and extinction. *Biological Invasions* 12(9): 3277-3288.
6. **Khatchikian CE**, JJ Dennehy, CJ Vitek, and TP Livdahl. 2010. Environmental effects and bet hedging on *Aedes* mosquito egg hatch. *Evolutionary Ecology* 24(5): 1159-1169.

5. Chmielewski MW, **CE Khatchikian**, and TP Livdahl. 2010. Estimating per capita rate of change: how well do life-history surrogates perform? *Annals of the Entomological Society of America* 103(5): 734-741.
4. **Khatchikian CE**, JJ Dennehy, CJ Vitek, and TP Livdahl. 2009. Climate and geographic trends in hatch delay of the tree hole mosquito, *Aedes triseriatus* Say (Diptera: Culicidae). *Journal of Vector Ecology* 34(1): 119-128.
3. **Khatchikian CE**. 2004. The development of holism in biology. *From Past to Future* 5(1): 66-76.
2. Favero M, **CE Khatchikian**, A Arias, MP Silva Rodriguez, G Cañete, and R Mariano-Jelichich. 2003. Estimates of seabird by-catch along the Patagonian Shelf by Argentine longline fishing vessels, 1999–2001. *Bird Conservation International* 13(4): 273-281.
1. **Khatchikian CE**, M Favero, and AI Vassallo. 2002. Kleptoparasitism by Brown hooded Gull and Grey hooded Gull on the American Oystercatcher. *Waterbirds* 25(2): 137-141.

MANUSCRIPTS IN ADVANCED PROGRESS

Khatchikian, CE, RB Nadelman, J Nowakowski, I Schwartz, GP Wormser, D Brisson. Spatial heterogeneity increases the potential effect of Lyme disease strain specific immunity. *Diagnostic Microbiology and Infectious Disease*, under review.

BOOK CHAPTERS

3. **Khatchikian CE**. 2008. A holistic perspective in Natural Sciences. In: *Striving for the whole. Creating theoretical syntheses*. Diriwächter, R, and J Valsiner Eds. Pp. 179-193. Transaction Publishers, New Brunswick, USA. ISSB: 978-1-4128-0738-8.
2. Favero M, S Bachmann, S Copello, R Mariano-Jelichich, MP Silva Rodriguez, M Ghys, **CE Khatchikian**, and L Mauco. 2001. Aves marinas del sudeste bonaerense. In: *Reserva de biósfera Mar Chiquita. Características físicas, biológicas y ecológicas*. Iribarne, O Ed. Pp. 251-267. Editorial Martin - UNESCO. Argentina. ISSB: 950-9635-92-8.
1. **Khatchikian CE**. 2001. El camino hacia el evolucionismo. In: *Introducción a la biología: Una propuesta de trabajos prácticos*. Denegri GM, S Demarco, and J Marcangelli Eds. Pp. 60-66. Editorial Martin - UNMdP. Argentina. ISSB: 987-543-33-X.

GRANTS

- 2011-2016**. Contributor in writing, designing, and leading the grant project; fully supported as postdoc by the grant. *Phylogeographic dynamics of a vector and pathogen in a natural environment*, D Brisson (PI), National Institutes of Health (NIH), \$1,934,522 awarded.
- 2005-2009**. Contributor for grant with project designing, preparation and processing of samples. *Ecology of large and small scale mosquito invasions*, T Livdahl (PI), National Institutes of Health (NIH), \$216,900 awarded.

FELLOWSHIPS

- 2003: **Doctorate fellowship** support for four years to conduct doctoral studies granted by the Comisión Nacional de Ciencia y Tecnología (CONICET), Argentina. Declined.
- 2001: **Independent research fellowship** support for two years under mentoring of Dr. M. Favero granted by Comisión de Investigaciones Científicas (CIC), Argentina.
- 2000: **Student research fellowship** support for one year to complete research thesis under mentoring of Dr. A. Vassallo granted by Universidad Nacional de Mar del Plata, Argentina.
- 2000: **Visiting student program** support to travel and assist for a term to Louisiana State University (LSU). Baton Rouge, LA. Program coordinator: Dr. Brent Craig.

AWARDS

- 2017: Faculty **Grant Writing Workshop**. Full support including travel and lodging to attend to the workshop organized by the University of Kentucky.
- 2013: **Trainee travel award** to attend and present work at the meeting granted by the International Conference on Lyme Borreliosis and other Tick-borne Diseases (ICLB) Program Committee.
- 2008: **Travel award** to attend and present work at the Evolution meeting held in Minneapolis, MN, granted by the Graduate Student Council (GSC), Clark University.
- Additional travel awards (2) to attend scientific meetings granted in *noncompetitive* bases.

MENTORING

- 2016-current. I supervised 2 undergraduate students in my laboratory: Priscilla Ruan, Mario Ochoa. Currently supervising Lourdes Perez Moreno and Xavier Rodriguez.
- 2010-2013. I supervised and trained PhD Erica A. Foley (2 publications, 1 in preparation and 1 conference presentation).
- 2008: I supervised and trained High School Teacher Brian Dempsey (Acton-Boxborough, MA) with molecular work in collaboration with the Marine Biological Lab in Woods Hole, MA.
- 2005-2010. I supervised and trained several undergraduate and graduate students: MSc Laran Kaplan (2005-2006, 1 publication and 1 conference presentation), MSc Matt Chmieliewski (2005-2008, 1 publication and 1 conference presentation), and Anne Meyer (2007-2008).

TEACHING TRAINING AND EXPERIENCE

2008: **Certification in College Teaching** offered by the Colleges of Worcester Consortium. The teaching certification requires five classes in a consortium member university and fulfilling the final teaching portfolio requirement. Program director: Dr. Judy Miller.

2016-current: **Professor**. University of Texas at El Paso. TX.

- **Introduction to Biology**. In charge of classes lectures and exams (around 120 students enrolled).
- **Ecology of Infectious Diseases**. Graduate level class.

2003-2009: **Teaching assistant**. Clark University, MA.

- **Ecology of Atlantic Shores**; in charge of lab and field activities in the coast of Maine (USA) and in the Bermuda islands (UK). Assisting students in the development and execution of research projects, 16 students per class. Frequent guest lectures and seminars. **4 times**.
- **Ecology**; in charge of designing, conducting and evaluating the lab section of the course, 2 sections per week, 32 students each. Occasional guest lectures. **2 times**.
- **Ecology of Disease Vectors**; in charge of lab and field activities. Assisting students in the development and execution of research projects, 16 students per year. Frequent guest lectures and seminars. **2 times**.
- **Comparative Vertebrate Anatomy**; in charge of 2 lab sections, 32 students each.
- **Genetics**; in charge of 2 lab sections, 16 students each.

2001: **Teaching assistant**. Universidad Nacional de Mar del Plata, Argentina.

- **Introduction to Biology**; teaching in 2 lab sections per week, 40 students each.

1999-2000: **Laboratory teaching assistant**. Universidad Nacional de Mar del Plata, Argentina.

- **Animal Biology**; assisting in 2 lab sections per week, 30 students each.
- **Introduction to Biology**; assisting in 2 lab sections per week, 40 students each.

OUTREACH AND RELATED ACTIVITIES

2015: **Invited lecturer** in the University of Nature, a symposium for the nature enthusiast organized yearly by the Schuylkill Center for Environmental Education. Philadelphia, PA.

2011-2012: **Science Day Leader**. Outreach program for inner city high school students from the Science Leadership Academy and Roxborough High School with the University of Pennsylvania.

2006-2009: **Currier** for the American Birding Association with conservation and research programs in Argentina.

1998-2002, 2006: Seabird **banding campaigns** in Punta Rasa, Samborombon Bay, Argentina, and Great Gull Island, NY, USA. Program leaders: Dr. Laura Mauco and Dr. Helen Hays.

2003-2005: **Representative** in the Graduate Student Council for the Biology Department, Clark University, serving in multiple committees in the university and internal roles in the organization.

1999-2002: Fishing Vessels Onboard Observers program in the Argentinean Sea and CCAMLR area. Analyses of databases. Project leader: Dr. Guillermo Cañete. Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP), Argentina.

1998-2002: **Field assistance**, Laboratory of Mastozoology, Museum of Natural History, Mar del Plata. Laboratory head: Dr. Damian Romero.

1995-1997: **Representative** in the Student Union, multiple roles, FCEyN. Universidad Nacional de Mar del Plata, Argentina.

1995-1996: **Community service**, mentoring of high school students in vulnerable environments. Universidad Nacional de Mar del Plata, Argentina.

EDITORIAL, REVIEWING AND JUDGING ACTIVITIES

Editorial board: *Frontiers in Ecology and Evolution. Evolutionary and Genomic Microbiology.*

Reviewer for journals: *American Journal of Tropical Medicine & Hygiene; Bulletin of the Veterinary Institute in Pulawy; Evolution; Genome Biology and Evolution; Infection, Genetics and Evolution; Plos One; Proceeding of the Royal Society B; Spatial and Spatio-temporal Epidemiology.*

Grant reviewer for agencies: Medical Research Council (MRC), Infections and Immunity Board, United Kingdom; BiodivERSA - *Fondation pour la Recherche sur la Biodiversité* Joint Calls. European Union.

Judge in awards competitions for: Ecological Society of America, including the Buell Award and the Braun Award; Entomological Society of America.

Reviewer for graduate student competitions and grants: Graduate Student Council (GSC), Clark University, MA.

PROFESSIONAL SOCIETY MEMBERSHIPS

Ecological Society of America
Entomological Society of America
Society for Molecular Biology and Evolution.

SEMINARS, TALKS, AND ORAL PRESENTATIONS

2017. Bioinformatics Colloquium, University of Texas at El Paso, TX, USA.

2016. Department of Biological Sciences, University of Texas at El Paso, TX, USA.

2016. Conference on Mathematical Modeling and Control of Communicable Diseases. Rio de Janeiro, Brazil.

2016. Annual Meeting of the Eastern Branch of the Entomological Society of America. Philadelphia, PA, USA.

2015. EcoHealth Alliance. New York, NY, USA.

2014. Department of Biological Sciences, State University of New York. Albany, NY, USA.

2012. Department of Biology, University of Pennsylvania. Philadelphia, PA, USA.
2010. Department of Biology, Clark University. Worcester, MA, USA.
2008. Evolution 2008. Minneapolis, MN, USA.
2008. Department of Biology, Clark University. Worcester, MA, USA.

PRESENTATIONS AT CIENTIFIC MEETINGS

Presentations during the last 10 years listed below.

20. **Khatchikian CE** and A Rieux. 2016. TipDatingBeast: an R package to assist the implementation of phylogenetic tip-dating tests using BEAST software – Bayesian Evolutionary Analysis Sampling Trees. 101st Annual Meeting of the Ecological Society of America, Fort Lauderdale, FL.
19. **Khatchikian CE**, RB Nadelman, J Nowakowski, I Schwartz, GP Wormser, D Brisson. 2016. Spatial heterogeneity increases the epidemiological impact of strain-specific immunity in patients treated for early Lyme disease. Conference on Mathematical Modeling and Control of Communicable Diseases. Rio de Janeiro, Brazil.
18. **Khatchikian CE**, M Prusinski, M Stone, LJ Meehan, PB Backenson, I-N Wang, MZ Levy, D Brisson. 2016. Using mitogenomes in phylodynamic studies of *Ixodes scapularis*. Annual Meeting of the Eastern Branch of the Entomological Society of America. Philadelphia, PA.
17. **Khatchikian CE**, M Prusinski, M Stone, LJ Meehan, PB Backenson, I-N Wang, MZ Levy, D Brisson. 2014. Predicting the Lyme disease vector range expansion: A modeling approach for New York State. 62nd Annual Meeting of the Entomological Society of America. Portland, OR.
16. **Khatchikian CE**, RB Nadelman, J Nowakowski, I Schwartz, GP Wormser, D Brisson. 2014. Lyme Disease Patients Develop Strain-Specific Immunity. Infection and Immunity Forum, American Society for Microbiology. Philadelphia, PA.
15. **Khatchikian CE**, D Brisson. 2013. Effects of vector density on Lyme disease risk in recently invaded areas. Adapting to global change. Seville, Spain.
14. **Khatchikian CE**, M Prusinski, M Stone, PB Backenson, I-N Wang, E Foley, SN Seifert, MZ Levy, D Brisson. 2013. Recent population growth and range expansion of blacklegged ticks in New York State. 13th International Conference on Lyme Borreliosis and other tick-borne diseases. Boston, MA. **Selected as with interest by the Conference Program Committee.**
13. Prusinski M, **CE Khatchikian**, M Stone, PB Backenson, I-N Wang, MZ Levy, D Brisson. 2013. Vector ecology of Lyme disease in New York State: a phylogeographic approach. 13th International Conference on Lyme Borreliosis and other tick-borne diseases. Boston, MA.
12. **Khatchikian CE**, and TP Livdahl. 2009. Genetic structure of *Aedes albopictus* populations in USA. International Symposium on the Asian Tiger Mosquito: Ecology, Evolution, Epidemiology, and Control. New Brunswick, NJ.

11. Kendell D, **CE Khatchikian**, L Kaplan, and TP Livdahl. 2009. *Aedes albopictus* in Bermuda: seasonality, spatial correlates and density dependence. International Symposium on the Asian Tiger Mosquito: Ecology, Evolution, Epidemiology, and Control. New Brunswick, NJ.
10. Chmielewski M, **CE Khatchikian**, and TP Livdahl. 2009. Testing the r' method of estimating per capita growth rate in *Aedes albopictus*. International Symposium on the Asian Tiger Mosquito: Ecology, Evolution, Epidemiology, and Control. New Brunswick, NJ.
9. **Khatchikian CE**. 2008. Phylogeography, genetic variability, and population structure of *Aedes albopictus* populations in the eastern US. 6th Annual Multidisciplinary Conference. Worcester, MA.
8. **Khatchikian CE**, and TP Livdahl. 2008. Phylogeography of *Aedes albopictus* in the northeastern US. Evolution 2008. Minneapolis, MN.