

Curriculum Vitae (August 2016)

Jesse E. Taylor

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Education

- 2003 Ph.D. (Ecology and Evolutionary Biology), University of Arizona.
Advisor: Bruce Walsh
- 1998 M.S. (Applied Mathematics), University of Arizona.
- 1992 B.A. (Mathematics; Chemistry), Western Maryland College.

Professional Positions

- 2016-present: Associate Professor, School of Life Sciences, Arizona State University.
- 2016-present: Core Faculty Member, Center for Evolution & Medicine, Arizona State University.
- 2015-present: Associate Professor, School of Mathematical and Statistical Sciences, Arizona State University.
- 2012-present: Member, Graduate Program in Evolutionary Biology, Arizona State University.
- 2010-present: Key faculty member, Human and Comparative Genomics Laboratory, Biodesign Institute, Arizona State University.
- 2009-2015: Assistant Professor, School of Mathematical and Statistical Sciences, Arizona State University.
- 2005-2009: Postdoctoral Research Fellow, Department of Statistics, Oxford University.
- 2003-2005: Postdoctoral Research Fellow, Institute of Cell, Animal and Population Biology, Edinburgh University.
- 2000-2002: Graduate Research Assistant, Theoretical Biology and Biophysics Group, Los Alamos National Laboratory.
- 1995-1996: Research Assistant, Frederick Cancer Research and Development Center (NCI).
- 1995: Lecturer, Department of Mathematics, University of Sarajevo, Sarajevo, Bosnia and Hercegovina.
- 1994: Field Assistant, World Health Organization (WHO) Food Security Monitoring Team, Sarajevo, Bosnia and Hercegovina.
- 1994-1995: Volunteer, Project Bosnia and Bosnian Institute for Public Health (Zavod za zdravstvenu zaštitu), Sarajevo, Bosnia and Hercegovina.

Research Interests: Population genetics and evolution in fluctuating environments; coalescent theory; malaria genetics and epidemiology.

Professional Societies: Genetics Society of America (GSA), Society for the Study of Evolution (SSE).

Funding

- National Institutes of Health (NIH R56AI109416): “Landscape Molecular Epidemiology for Malaria Elimination”, 8/1/2015 -7/31/2016, total award \$276,289. Co-PI with Doug Fuller (U. Miami) and Ananias Escalante (PI).
- National Institutes of Health (NIH/NIGMS R01GM084320): “A Global Comparative Study of the Evolution of Antimalarial Drug Resistance”, 6/1/2008-4/31/2013, total award \$1,434,067. Co-investigator with Ananias Escalante (PI).
- National Institutes of Health (NIH/NIGMS R01GM080586): “Evolution of *Plasmodium vivax* and Asian Macaque Malaria”, 9/1/2008-8/31/2013, total award \$1,242,898. Co-investigator with Ananias Escalante (PI).
- Engineering and Physical Sciences Research Council (EPSRC EP/E010989/1): “Modeling Adaptation and Evolution in Persistent Parasites”, 2007-2009, PDRA with Gloria Rudenko (co-investigator) and Alison Etheridge (PI).

Refereed Papers

1. Chenet SM, Taylor JE, Blair S, Zuluaga L, Escalante AA. (2015) Longitudinal analysis of *Plasmodium falciparum* genetic variation in Turbo, Colombia: implications for malaria control and elimination. *Malaria Journal* **14**: 363.
2. Muehlenbein MP, Pachecho MA, Taylor JE, Prall SP, Ambu L, Nathan S, Alsisto S, Ramirez D, Escalante AA. (2014) Accelerated diversification of non-human primate malaria in Southeast Asia: adaptive radiation or geographic speciation? *Molecular Biology and Evolution* **32**: 422-439.
3. Taylor JE, Pacheco MA, Bacon DJ, Beg MA, Dantas Machado RL, Fairhurst RM, Herrera S, Kim J-Y, Menard D, Pova MM, Villegas L, Mulyanto M, Snounou G, Cui L, Zeyrek FY, Escalante AA (2013) The Evolutionary History of *Plasmodium vivax* as Inferred from Mitochondrial Genomes: Parasite Genetic Diversity in the Americas. *Molecular Biology and Evolution* **30**: 2050-2064.
4. Taylor JE. (2013) The effect of fluctuating selection on the genealogy at a linked site. *Theoretical Population Biology* **87**: 34-50.
5. Stanne TM, Kushwaha M, Wand M, Taylor JE, Rudenko G. (2011) TbISWI regulates multiple Pol I transcribed loci and is present at Pol II transcription boundaries in *Trypanosoma brucei*. *Eukaryotic Cell* **10**: 964-976.
6. Tang W, Taylor JE, Mahalov A. (2010) Lagrangian dynamics in stochastic inertia-gravity waves. *Physics of Fluids* **22**: 126601.
7. Hutzenthaler M and Taylor JE. (2010) Time Reversal of Some Stationary Jump Diffusion Processes from Population Genetics. *Advances in Applied Probability* **42**: 1-25.
8. Etheridge AM, Griffiths RC, Taylor JE. (2010) A coalescent dual process in a Moran model with genic selection, and the lambda coalescent limit. *Theoretical Population Biology* **78**: 77-92.
9. Taylor JE. (2009) The Genealogical Consequences of Fecundity Variance Polymorphism. *Genetics* **182**: 813-837.
10. Taylor JE and Véber A. (2009) Coalescent Processes in Subdivided Populations Subject to Recurrent Mass Extinctions. *Electronic Journal of Probability* **14**: 242-288.
11. Hertz-Fowler C, Figueiredo LM, Quail MA, Becker M, Jackson A, Bason N, Brooks K, Churcher C, Fahkro S, Goodhead I, Heath P, Kartvelishvili M, Mungall K, Harris, D, Hauser H, Sanders M, Saunders D, Seeger K, Sharp S, Taylor JE, Walker D, White B, Young R, Cross GAM, Rudenko G, Barry JD, Louis EJ, Berriman M. (2008) Telomeric Expression Sites Are Highly Conserved in *Trypanosoma brucei*. *PLOS One* **3**:e3527.
12. Didelot X, Taylor JE and Watkins JC. (2008) A duality identity between a model of bacterial recombination and the Wright-Fisher diffusion. *Markov Processes and Related*

- Topics: A Festschrift for Thomas G. Kurtz 4*: 315-324.
13. Taylor JE. (2008) Environmental variation, fluctuating selection and genetic drift in subdivided populations. *Theoretical Population Biology* **74**: 233-250.
 14. Young R, Taylor JE, Kurioka A, Becker M, Louis EJ, Rudenko G. (2008) Isolation and analysis of the genetic diversity of repertoires of VSG expression site containing telomeres from *Trypanosoma brucei gambiense*, *T. b. brucei* and *T. equiperdum*. *BMC Genomics* **9**: 385.
 15. Salazar C, Jiggins CD, Taylor JE, Kronforst MJ, Linares M. (2008) Hybrid speciation and the genealogical history of *Heliconius heurippa*. *BMC Evolutionary Biology* **8**: 132.
 16. Rong R, Gnanakaran S, Decker JM, Bibollet-Ruche F, Taylor J, Sfakianos JN, Mokili JL, Muldoon M, Mulenga J, Allen S, Hahn BH, Shaw GM, Blackwell JL, Korber BT, Hunter E, Derdeyn CA. (2007) Unique mutational patterns in the envelope alpha 2 amphipathic helix and acquisition of length in gp120 hypervariable domains are associated with resistance to autologous neutralization of subtype C human immunodeficiency virus type 1. *Journal of Virology* **81**: 5658-5668.
 17. Taylor JE. (2007) The Common Ancestor Process for a Wright-Fisher Diffusion. *Electronic Journal of Probability* **12**:808-847.
 18. Taylor JE and Rudenko G. (2006) Switching trypanosome coats: What's in the wardrobe? *Trends in Genetics* **22**: 614-620.
 19. Ramanathan MP, Chambers JA, Taylor JE, Korber BT, Lee MD, Nalca A, Dang KS, Pankhong P, Attatippaholkum W, Weiner DB. (2005) Expression and evolutionary analysis of West Nile virus (Merion Strain). *Journal of Neurovirology* **11**: 544-556.
 20. Taylor JE and Korber B. (2005) HIV-1 intra-subtype superinfection rates: estimates using a structured coalescent with recombination. *Infection, Genetics and Evolution* **5**:85-95.
 21. Gao F, Bhattacharya T, Gaschen B, Taylor J, Moore JP, Novitsky V, Yusim K, Lang D, Foley B, Beddows S, Alam M, Haynes B, Hahn B, Korber B. (2004) Consensus and ancestral state HIV vaccines - Response. *Science* **299**: 1517-1518.
 22. Taylor JE and Jaenike J. (2003) Sperm competition and the dynamics of X chromosome drive in finite and structured populations. *Annales Zoologici Fennici* **40**: 195-206.
 23. Gaschen B, Taylor J, Yusim K, Gao F, Lang D, Novitsky B, Haynes B, Hahn BH, Bhattacharya T, Korber B. (2002) AIDS-Diversity considerations in HIV-1 vaccine selection. *Science* **296**:2354-2360.
 24. Taylor JE and Jaenike J. (2002) Sperm competition and the dynamics of X chromosome drive: Stability and Extinction. *Genetics* **160**: 1721-1731.
 25. Smith RH, Wladkowski BD, Taylor JE, Thompson EJ, Pruski B, Klose JR, Andrews AW, Michedja CJ. (1993) Acid-Catalyzed Decomposition of Alkyltriazolines - A Mechanistic Study. *Journal of Organic Chemistry* **58**: 2097-2103.
 26. Smith RH, Wladkowski BD, Herling JA, Pfaltzgraff TD, Taylor JE, Thompson EJ, Pruski B, Klose JR, Michedja CJ. (1992) Novel Triazenes and Triazolones from the Base-Catalyzed Hydrolysis of 1,3-Dialkyl-3-Acyltriazenes. *Journal of Organic Chemistry* **57**: 6448-6454.

Pending/Unrefereed/Unpublished Articles

1. Patterson-Lomba O, Safan M, Towers S, Taylor JE. (2016) Modeling the Role of Healthcare Access Inequalities on Epidemic Outcomes. *Mathematical Biosciences and Engineering* (Accepted, pending revision).
2. Hernandez-Ceron N, Mubayi A, Taylor JE. (2012) The Effects of Epidemic Dynamics on MHC Diversity. Mathematical And Theoretical Biology Institute Technical Report MTBI-09-07M.

3. Maruki T, Taylor JE, Greenwood PE. (2011) The Stochastic Dynamics of a Hitchhiking Allele. *Unpublished manuscript*.

Book Reviews

1. Taylor JE and Walsh B. (2001). Book review of *The Mathematical Theory of Selection, Recombination, and Mutation* by R. Burger. Society of Industrial and Applied Mathematics (SIAM) Review 43: 740-743.

Talks/Presentations/Workshops

1. "Molecular Epidemiology", three day workshop presented to participants in the Amazonia ICEMR at Cayetano Heredia University, Lima, Peru, August 23-25, 2014 (with Ananias Escalante).
2. "Fluctuating Selection in Subdivided Populations", invited talk at the University of Arizona, Tucson, October 2013.
3. "Fecundity Variance and Genealogies in Fluctuating Environments", invited talk at the University of California, Santa Barbara, November 2012.
4. "Genealogies, Epidemiology and Evolution", presentation to MAT 191 class, ASU, October 2012.
5. "Fecundity Variance and Genealogies in Fluctuating Environments", invited talk for the MTBI summer program, ASU, July 2012.
6. "Coalescent Theory and Genealogies", MTBI advanced student lecture, ASU, July 2012.
7. "Genetics and Natural Selection", presentation to MAT 191 class, ASU, November 2011.
8. "Environmental Variation and Genetic Drift in Subdivided Populations", talk for MTBI summer program, ASU, June 2011.
9. "Diffusions, Genealogies, and Substitution Processes in Molecular Evolution", invited colloquium for the Program in Applied Mathematics, University of Arizona, April 2011.
10. "Diffusions, Genealogies, and Substitution Processes at Selected Loci", invited colloquium at the Department of Mathematics and Statistics, Georgetown University, October 2010.
11. "Genealogical Consequences of Fecundity Variance Polymorphism", invited talk at the Banff International Research Station Workshop: New Mathematical Challenges from Molecular Biology and Genetics, Banff, Canada, September 2009.
12. "Diffusions and Structured Coalescents", two day workshop presented at the Evolutionsbiologiskt Centrum, Uppsala University, Sweden, March 2009 (with J. Wakeley).
13. "The Genealogical Consequences of Fecundity Variance Polymorphism and Fluctuating Selection", invited talk at the University of Arizona, Tucson, AZ, March 2009.
14. "Common Ancestor Processes", plenary talk at the meeting of the Bilateral Research Group "Random Spatial Models in Physics and Biology", Bielefeld University, Bielefeld, Germany, April 2007.
15. "Common Ancestor Processes For Diffusions and Jump-Diffusion", invited talk at the Gemeinsame Jahrestagung der Deutschen Mathematiker-Vereinigung, Humboldt University, Berlin, Germany, March 2007.

TEACHING/EDUCATIONAL SERVICE

Courses Taught

Arizona State University:

- STP 421/598: Probability Theory
- STP 425: Stochastic Processes
- MAT/ASM 394: Forensic DNA Analysis (new course developed in Spring 2012)
- MAT 499: Theoretical Population Genetics (reading course)
- MAT 499: Ergodic Theory (reading course)
- APM 504: Applied Probability and Stochastic Processes
- APM 530: Mathematical Cell Physiology
- APM 541: Stochastic Modeling in Biology
- EVO 590: Population Genetics (reading course)

Oxford University:

- MS2b: Stochastic Models in Mathematical Genetics

University of Arizona:

- ECOL 484/584: Ornithology (lab/field sections)

University of Sarajevo:

- Point-Set Topology

Student Advising

Advising: Ph.D. students

1. Romarie Morales, Ph.D. candidate, Applied Mathematics in the Life and Social Sciences, ASU, 2012-2014.
2. Takahiro Maruki, Ph.D. Biology, ASU, 2011. "The Effects of Natural Selection and Random Genetic Drift in Structured Populations." Co-advised by Y. Kim (Ewha Womans University).
3. Alisha Rossi, Ph.D. candidate, Computational Biosciences, ASU, left in 2010.

Advising: M.S. students

1. Lin Zhou, M.S. Computational Biosciences, ASU, 2011. "Effect of Recurrent Mutations on the Estimated Age of the Most Recent Common Ancestor."
2. Mingze Li, M.S. Statistics, ASU, 2010. "An Extended Ancestral Mixture Model for Phylogenetic Inference under the HKY DNA Substitution Model." Co-advised by G. Chen (ASU).
3. Amandine Véber, M.S. Statistics, Oxford University, 2007. "Structured Population Models as Measure-Valued Random Evolutions."

Advising: Undergraduate students

1. Jaye Espinas, B. S. candidate, Biological Sciences, ASU, 2015. Honors Thesis Project: "Evolution of AMA1 in Malaria Parasites."
2. Brennen Lee, Phoenix Country Day School, but taking classes at ASU. Undergraduate research project (Summer-Fall 2013): The effects of fluctuating selection on genealogies.
3. Sadik Shahidain, B.S. candidate, Mathematics/Physics, Harvard, 2016 (expected). MBI REU project (Summer 2013): Gene duplication in structured populations.
4. Annie Shan, B.S. candidate, Biostatistics, University of North Carolina, 2014 (expected). MBI REU project (Summer 2013): Selection-mutation balance in multi-level host-parasite models.

5. Anthony Sanchez, B.S. candidate, Mathematics, ASU, 2013 (expected). Undergraduate research project (Fall 2012): Within-host dynamics of trypanosome antigen repertoires.
6. Xiyuan Su, B.S. candidate, Mathematics, Iowa State University. MBI REU project (Summer 2012): Molecular evolution of VSG antigen repertoires.
7. Wenyu Zheng, B.S. candidate, Mathematics/Finance, ASU, 2012. Honors Thesis Project: “Bayesian Biogeographical Analyses with BEAST: Assessment using Simulated Data.”
8. Ann Napier, B.S. Statistics, Oxford University, 2009. “Composite Likelihood Estimation of Gene Conversion and Recombination.”
9. Emma Whitehouse, B.S. Statistics, Oxford University, 2009. “Selective Sweeps in Variable Environments.”
10. Philip Berman, B.S. Statistics, Oxford University, 2008. “A Diffusion Approximation for a Subdivided Population Subject to Fluctuating Selection, Extinction and Recolonization.”
11. Jie He, B.S. Statistics, Oxford University, 2008. “Gene Conversion and Diversification of Antigen Repertoires.”
12. Ayako Kurioka, B.S. Zoology, Oxford University, 2008. “Cloning and Comparative Analysis of Trypanosome *VSG* Expression Sites.” Co-supervised with G. Rudenko (Oxford).

Advising: Graduate Student Research/Rotations

1. Nancy Hernandez-Ceron, Ph.D. candidate, Mathematics, Purdue. MTBI research project (Summer 2012): “The Effects of Epidemic Dynamics on MHC Diversity.”
2. Karl Dutson, Ph.D. candidate, BioDesign, ASU, Spring 2011. Project: “Stochastic Simulations of Antigenic Variation in African Trypanosomes.”

Graduate Student Committee Memberships: Odalys Colón-Rentas (SoMSS), Tom Holeva (SoMSS), Jon Young (SoMSS), Yuqin Zhou (SoMSS), Andreina Castillo-Siri (SoLS), Stella Chenet (SoLS), Ti Eriksson (SoLS), Chris Grivas (SHESC), Tara Furstenuau (SoLS), Jinhun Gwak (SoMSS), Lin Zhou (SoMSS), Bruce Pell (SoMSS), Diego Chowell-Puente (SHESC/BioDesign), Kathleen Paul (SHESC), Nick Waters (SoLS), Dan Magee (BMI).

Undergraduate Research Supervision: Mentor for the Mathematical Biosciences Institute Undergraduate Summer Research Program, 2012 and 2013.

Teaching Awards: The Charles Wexler Teaching Award, 2013 (SoMSS, ASU).

PROFESSIONAL SERVICE

Editorial Service

Review editor for *Frontiers in Bioinformatics and Computational Biology*.

Referee for: *American Naturalist*; *BMC Evolutionary Biology*; *Bulletin of Mathematical Biology*; *Electronic Journal of Probability*; *Epidemics*; *Evolution*; *Genetics*; *Infection, Genetics and Evolution*; *Journal of Biological Dynamics*; *Journal of Mathematical Biology*; *Journal of Raptor Research*; *Journal of Theoretical Biology*; *Mathematical Population Studies*; *Nature*; *Oecologia*; *PLoS Genetics*; *Proceedings of the Edinburgh Mathematical Society*; *Theoretical Population Biology*; *PLoS Pathogens*.

Professional Activities

Reviewer for National Science Foundation CAREER proposal.

Service at Arizona State University*School of Life Sciences*

Member, Steering Committee for the Graduate Program in Evolutionary Biology (Fall 2013 -)
Coordinated the Population Genetics reading group in SoLS/SHESC (Spring 2011)

School of Mathematical and Statistical Science

Member, Research Assistant Professor Hiring Committee (Fall 2013-Spring 2014)
Co-chair of the SoMSS Colloquium/DLS Committee (Fall 2010-Spring 2013)
Member, Undergraduate Mathematics Curriculum Committee (Spring 2011)
Member, Tenure-track Faculty Hiring Committee (March 2011: special probability position)
Member, Tenure-track Faculty Hiring Committee (2009/2010: probability and statistics position)
Member, Committee on Learning Mathematics (2009/2010)

Volunteer Work: Bird Conservation and Ecology

eBird contributor (2009-): I have contributed over 2000 checklists from 11 different countries to eBird.

Volunteer bird docent, Boyce Thompson Arboretum (2013-).

Participant in numerous National Audubon Society Christmas Bird Counts in AZ and Sonora, Mexico (1997-2002; 2010-2012).

Conducted breeding bird counts in Oxford (UK) for the British Trust for Ornithology's 2007-2011 Bird Atlas (Spring-Summer 2008).

Conducted Common Swift counts in Edinburgh (UK) for the Royal Society for the Protection of Birds' 2005 UK Common Swift Survey (Summer 2005).

Volunteer assistant in the University of Arizona Bird Collection (2001-2002).

Volunteer field assistant for an Arizona Game & Fish-supported study of the effects of grazing on wintering populations of grassland sparrows in southern AZ (Winter 1998-2000).

Volunteer field assistant at four MAPS bird banding stations in Organ Pipe National Monument (Growler Wash and Alamo Canyon), Tumacacori, and Florida Canyon Work Station (Summer 1997-1999).