

# T. TREVOR CAUGHLIN

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## Professional Appointments

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**Assistant Professor** (2016-present) Department of Biological Sciences, Boise State University.

**NSF Postdoctoral Fellow** (2014-2017) *Science, Engineering and Education for Sustainability (SEES) program.*  
Stephanie Bohlman, School of Forest Resources & Conservation, University of Florida.

**Postdoctoral Research Associate** (2013-2014) *Scaling up tropical forest dynamics using mathematical models and remote sensing data.*  
Jeremy Lichstein, Department of Biology, University of Florida.

**Lecturer** (2013-2014) *Taught Integrated Principles of Biology II and General Ecology courses. Developed course materials, supervised Teaching Assistants, and gave lectures.*  
Department of Biology, University of Florida.

**Research Associate** (2008-2013) *Mentored Thai graduate students, provided statistical training, and advised on quantitative techniques in ecology.*  
King Mongkut's University of Technology-Thonburi, Thailand.

**NSF IGERT Fellow** (2009-2013) *Quantitative Spatial Ecology, Evolution and the Environment.* Departments of Biology, Mathematics, Wildlife Ecology & Conservation.  
University of Florida.

## Education

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**Ph.D. in Biology** (2013) *Seeds move but trees stand still: spatial population dynamics of tropical trees*  
Douglas Levey, Department of Biology, University of Florida.

**Bachelor of Arts in Environmental Studies and Biology** (2007) *Birds and bats as agents for reforestation in an anthropogenic landscape of South India*  
Margaret Lowman, Environmental Studies, New College of Florida.

## Research and Teaching Interests

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Forest landscape restoration, Spatial ecology, Seed dispersal, Landscape ecology, Remote sensing, Statistical methods in ecology, Tropical forests, Human ecology, Transdisciplinary research

## Publications

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1. Estrada-Villegas, S., M. Bailón, J. S. Hall, S. A. Schnitzer, B. L. Turner, **T.T. Caughlin**, and M. van Breugel (*In Press*). Edaphic factors and initial conditions influence successional trajectories of early regenerating tropical dry forests. *Journal of Ecology*.
2. **Caughlin, T. T.**, E. I. Damschen, N. M. Haddad, D. J. Levey, C. Warneke, and L. A. Brudvig (2019). Landscape heterogeneity is key to forecasting outcomes of plant reintroduction. *Ecological Applications* 29:e01850.
3. **Caughlin, T. T.**, M. de la Peña-Domene, and C. Martínez-Garza (2019). Demographic costs and benefits of natural regeneration during tropical forest restoration. *Ecology Letters* 22:34–44.
4. Hunte, N., A. Roopsind, A. A. Ansari, and **T.T. Caughlin** (2019). Colonial history impacts urban tree species distribution in a tropical city. *Urban Forestry & Urban Greening* 41:313–322.
5. Requena-Mullor, J. M., K. C. Maguire, D. J. Shinneman, and **T. T. Caughlin** (2019). Integrating anthropogenic factors into regional-scale species distribution models—A novel application in the imperiled sagebrush biome. *Global Change Biology* 00:15.
7. Forbey, J. S., R. Liu, **T. T. Caughlin**, M. D. Matocq, J. A. Vucetich, K. D. Kohl, M. D. Dearing, and A. M. Felton (2018). Review: Using physiologically based models to predict population responses to phytochemicals by wild vertebrate herbivores. *animal* 12:s383–s398.
8. Graves, S. J., **T. T. Caughlin**, G. P. Asner, and S. A. Bohlman (2018b). A tree-based approach to biomass estimation from remote sensing data in a tropical agricultural landscape. *Remote Sensing of Environment* 218:32–43.
9. Roopsind, A., **T. T. Caughlin**, P. van der Hout, E. Arets, and F. E. Putz (2018). Trade-offs between carbon stocks and timber recovery in tropical forests are mediated by logging intensity. *Global Change Biology* 24:2862–2874.
10. Tarbox, B. C., C. Fiestas, and **T. T. Caughlin** (2018). Divergent rates of change between tree cover types in a tropical pastoral region. *Landscape Ecology* 33:2153–2167.
11. Roopsind A.R., **T.T Caughlin**, H. Sambhu, J. Fragoso, F.E. Putz (2017). Logging and indigenous hunting impacts on the persistence of large neotropical animals. *Biotropica* 49: 565-575.
12. Wilson, C.C., **T.T. Caughlin**, S.W. Rifai, E.H. Boughton, M.C. Mack, L.S. Flory (2017). Long time series of remotely sensed vegetation improves prediction of soil carbon stock in a subtropical grassland. *Ecological Applications* 27: 1646-1656.
13. Brudvig L.A., R.S. Barak, J.T. Bauer, **T.T. Caughlin**, et al (2017). Interpreting variation to advance predictive restoration science. *Journal of Applied Ecology* 54: 1018:1027.
14. **Caughlin T.T.**, S.W. Rifai, S.J. Graves, G.P. Asner, S.A. Bohlman (2016). Landsat-LiDAR integration reveals widespread forest regrowth in a tropical agricultural landscape. *Remote Sensing in Ecology and Conservation* 2:190-203.
15. **Caughlin T.T.**, S.J. Graves, G.P. Asner, M. van Breugel, J.S. Hal, R.E. Martin, M.S.

- Ashton, S.A. Bohlman (2016). A single hyperspectral aerial image can accurately predict growth rates of tropical tree species in single-species stands. *Ecological Applications* 26:2367-2373.
16. **Caughlin T.T.**, S. Elliott, J.W. Lichstein (2016). When does seed limitation matter for scaling up reforestation from patches to landscapes? *Ecological Applications* 26:2437-2448.
  17. Levey D.J., **T.T. Caughlin**, L.A. Brudvig, N.M. Haddad, E.I. Damschen, J.J. Tewksbury, D.M. Evans (2016). Disentangling fragmentation effects on herbivory in understory plants of longleaf pine savanna. *Ecology* 97:2248-2258.
  18. Ruktanonchai, N. W., P. DeLeenheer, A. J. Tatem, V. A. Alegana, **T. T. Caughlin**, et al. (2016). Identifying malaria transmission foci for elimination using human mobility data. *PLOS Computational Biology* 12:e1004846.
  19. **Caughlin T.T.**, J.M. Ferguson, J.W. Lichstein, P.A. Zuidema, S. Bunyavejchewin, D.J. Levey (2015). Loss of animal seed dispersal increases extinction risk in a tropical tree species due to pervasive negative density dependence across life stages. *Proceedings of the Royal Society B: Biological Sciences* 282:20142095.
  20. Acevedo, M. A., O. Prosper, K. Lopiano, N. Ruktanonchai, **T.T. Caughlin**, M. Martcheva, C. W. Osenberg, D. L. Smith (2015). Spatial heterogeneity, host movement and mosquito-borne disease transmission. *PloS one* 10:e0127552.
  21. Wilson, C. H., **T.T. Caughlin**, D.J. Civitello, S.L. Flory (2015). Combining mesocosm and field experiments to predict invasive plant performance: a hierarchical Bayesian approach. *Ecology* 96:1084–1092.
  22. **Caughlin T.T.**, J.M. Ferguson, J.W. Lichstein, S. Bunyavejchewin, D.J. Levey (2014). The importance of long distance seed dispersal for the demography and distribution of a canopy tree species. *Ecology* 95: 952-962.
  23. **Caughlin T.T.**, N. Ruktanonchai, M.A. Acevedo, K. Lopiano, O. Prosper, N. Eagle, A.J. Tatem (2013). Geographic context predicts community membership in a mobile phone communication network. *PloS one* 8(2): e56057.
  24. Chanthorn W., **T.T. Caughlin**, S. Dechkla (2013). Seedling survival of a dominant tropical tree depends on fungal infection, not negative density dependence or environmental heterogeneity. *Biotropica* 45:587-593.
  25. **Caughlin T.T.**, J.H. Wheeler, J.J. Jankowski, J.W. Lichstein (2012). Urbanized landscapes increase invasive but not native strangler fig abundance. *Ecology* 93:1571-1580.  
\*Best Graduate Student Paper Award, University of Florida, Biology Department
  26. **Caughlin T.T.**, T. Ganesh, M.D. Lowman (2012). Sacred fig trees promote frugivore visitation and tree seedling abundance in South India. *Current Science* 102:1-6.
  27. Callis, K. L., L.R. Christ, J. Resasco, D.W. Armitage, J.D. Ash, **T. T. Caughlin**, et al. (2009). Improving Wikipedia: educational opportunity and professional responsibility. *Trends in Ecology & Evolution* 24:177–179.

## **Other publications**

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### *Book chapter*

28. **Caughlin, T. T.**, S. J. Graves, G. P. Asner, B. C. Tarbox, and S. A. Bohlman. 2019. High-Resolution Remote Sensing Data as a Boundary Object to Facilitate Interdisciplinary Collaboration. Pages 295–326, *Collaboration Across Boundaries for Social-Ecological Systems Science*. Springer.

## **In Review**

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Zaiats, A., B.E. Lazarus, M.J. Germino, M.D. Serpe, B.A. Richardson, S. Buerki, and **T.T. Caughlin**. Intraspecific variation in surface water uptake in a perennial desert shrub. In Review, *Functional Ecology*.

**Caughlin, T.T.** C.A.B. Barber, G.P. Asner, N.F. Glenn, S.A. Bohlman, and C.H. Wilson. Monitoring tropical forest succession at landscape scales despite uncertainty in the Landsat satellite record. In Revision, *Ecological Applications*.

## **Teaching Experience**

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### *Instructor (courses)*

**Hierarchical Models in Ecology** (2017, 2018) Graduate-level. *Built course to teach generalized linear mixed models and Bayesian methodology to ecology, geoscience, and anthropology graduate students*. 14-18 students. 3 credits. Boise State University

**Ecological Theory** (2018, 2019) Mixed graduate and undergraduate-level. *Analysis and derivation of classic models in population and community ecology*. 8-12 students. 3 credits. Boise State University.

**Gaming for Ecology, Economics and Complex Systems** (2016) Graduate-level. *Developed and led seminar on games as a tool to involve stakeholders in research across a wide range of fields, including natural resource management, behavioral economics, and complex systems modeling*. 14 students. 1 credit. University of Florida.

**General Ecology** (2014) Upper-level undergraduate course. *Community and population ecology module*. 60 students. 4 credits. University of Florida.

**Integrated Principles of Biology II** (2013) Undergraduate-level. *Introductory course for Biology majors; ecology module*. 700 students. 3 credits. University of Florida.

### *Instructor (workshops)*

**Forest Landscape Restoration** (2019) Graduate-level. *Principles of restoration ecology for audience of environmental policymakers*. 15 participants. 1 week. University of Guyana.

**Quantitative thinking in ecology** (2016) Graduate-level. *Primer on linking models to ecological data*. 25 students. 1 week. University of Puerto Rico.

**Introduction to multivariate regression** (2013) Graduate-level. *Practical skills for analyzing ecological data using R programming language*. 25 students. 2 weeks. King Mongkut's University of Technology-Thonburi, Thailand.

**Generalized linear models in ecology** (2011) Graduate-level. *Course focused on applying statistical models to analyze wildlife data*. 25 students. 2 weeks. King Mongkut's University of Technology-Thonburi, Thailand (with Mollie Brooks, Jake Ferguson and Rosana Zenil).

**Matrix population models** (2010) Graduate-level. *Introduction to structured population models for wildlife students*. 10 students. 1 week. King Mongkut's University of Technology-Thonburi, Thailand (with Mollie Brooks).

**Mathematical models in ecology** (2010) Graduate-level. *Theoretical models for population and community ecology*. 15 students. 1 week. Kasetsart University, Thailand.

## Grants and Fellowships

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*Proposals with Caughlin as PI*

**Bureau of Land Management: Cooperative Agreement** (\$40,186; #L19AC00130). Determining Rates of Spread for Native Forb and Shrub Species During Ecosystem Restoration, 2019-2010.

**National Science Foundation: GEM3 EPSCoR seed funding** (\$117,434). Mapping and modeling to forecast ecosystem recovery after megafires in sagebrush steppe, 2019-2010.

**National Science Foundation: INTERN program** (\$38,946; supplemental funding to NSF grant #1415297). Support for graduate student to collaborate with USGS on mapping sagebrush restoration, 2019-2020.

**Joint Fire Science Program: Graduate Research Innovation (GRIN) program** (\$24,736), "Impact of unburned remnant sagebrush versus outplants on post-fire landscape rehabilitation," 2018-2020.

**National Science Foundation: Science, Engineering and Education for Sustainability (SEES) program** (\$350,000; NSF grant #1415297), "Landowner decision-making and landscape-level reforestation," 2014-2018.

**Fulbright Award, Thailand**, (\$30,000) “Survival prospects for Thailand's large-mammal dispersed trees,” 2007-2008.

*Proposals with Caughlin as Co-PI*

**Conservation International** (\$69,991; 2019-2020), “Initiation Grant for Restoring Ecosystem Functions to Degraded Forests after Mining in Guyana,” Co-Investigator (PI: Anand Roopsind, 2019-2020).

*Fellowships*

**National Science Foundation: Graduate Research Fellowship**, (\$120,000; NSF grant #DGE-0802270) “Will animal-dispersed rainforest trees persist without dispersal services?” 2007-2009.

**National Science Foundation: IGERT Fellowship, Quantitative Spatial Ecology**, 2009-2012.

## **Graduate Students Advised**

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**Sandra Velazco** (2019-Present) *Primary advisor of PhD student. Dissertation title: “Use of seeds dispersed by bats to restore degraded montane areas in Peru”* Boise State University

**Merry Davidson** (2019-Present) *Primary advisor of Master’s student. Thesis title: “Plant-animal interactions and ecosystem structure across a Guyanese forest/savanna ecotone”* Boise State University

**Cara Applestein** (2018-Present) *Co-advisor (with Dr. Matt Germino) of PhD student. Dissertation title: “Spatial dynamics of post-fire sagebrush recruitment.”* Boise State University

**Cristina Barber Alvarez-Buylla** (2017-Present) *Primary advisor of PhD student. Dissertation title: “Scaling up population dynamics of tropical forest trees in a reforesting landscape.”* Boise State University

**Andrii Zaiats** (2017-Present) *Primary advisor of Masters student. Thesis title: “Spatial pattern and process in sagebrush common gardens.”* Boise State University

## **Undergraduate Students Advised**

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**Ameet Patel** (2010-2012) Honor’s thesis: *Quantifying negative density dependence across the life stages of the bean beetle, Callosobruchus maculatus.* University of Florida.

**Jessica Wheeler** (2009) Honor’s thesis: *The impact of seed dispersal by mammals on seed fate in a dry evergreen forest, Huai Kha Khaeng Wildlife Sanctuary, Thailand* (co-supervised with Margaret Lowman) New College of Florida.

## **Professional Service**

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**President-elect**, (2019). Society for Ecological Restoration-Great Basin Chapter.

**Literature Coordinator**, (2015-2017). *Produced science outreach blogposts (available at <http://partners-rcn.org/>) on reforestation for NSF-funded Research Coordination Network.* PARTNERS (People and Reforestation in the Tropics) network.

**Symposium organizer**, (2013). *Organized symposium titled “Modeling Coupled Natural-Human Systems in the Tropics.”* Association for Tropical Biology and Conservation Annual Conference, San José, Costa Rica.

**Student representative**, (2009-2010). *Led student outreach and web development activities.* Graduate Student Advisory Council, “Innovation, Integration and Institutionalization” NSF-funded graduate training program, University of Florida.

### **Invited Seminars**

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**Forecasting Outcomes of Ecological Restoration at Landscape Scales** (2018). Caughlin, T.T. Weston Roundtable Talk, Center for Sustainability and the Global Environment (SAGE), University of Wisconsin-Madison, Madison, WI

**Integrating ecological field data and satellite remote sensing to inform landscape-scale forest restoration** (2017). Caughlin, T.T. Center for Modeling Complex Interactions, University of Idaho, Idaho.

**Spatial models to promote forest landscape restoration in Panama’s Azuero Peninsula** (2016). Caughlin, T.T. Smithsonian Tropical Research Institute, Tupper Talk. Panama City, Panama.

**Spatial models to scale up reforestation from patches to landscapes** (2016). Caughlin, T.T. University of Puerto Rico, Río Pedras Campus. San Juan, PR.

**Quantifying human movement for models of malaria transmission in Hispaniola** (2012). Caughlin, T.T., Ruktanonchai N., Acevedo, M.A., Lopiano K., Prosper, O., Eagle, N., Tatem, A.J. Assessing the Feasibility of Malaria Elimination in Hispaniola, St. Petersburg, FL.

**Seeds move but trees stand still: effects of seed dispersal on tree demography and distribution** (2012). Caughlin, T.T, Chiang Mai University, Thailand.

**Long and short distance seed dispersal in Huai Kha Khaeng Wildlife Sanctuary, Thailand** (2009). Caughlin, T.T. National University of Singapore, Singapore.

### **Contributed presentations** (only presentations on which I’m first author)

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**Spatial models to forecast restoration outcomes at landscape scales** (2018). Caughlin, T.T. Joint Pacific Northwest Regional Conference, Society for Ecological Restoration and Society of Wetland Scientists (Spokane, Washington).

**Hierarchical Bayesian models to quantify forest dynamics at the scale of individual trees from remote sensing data** (2016). Caughlin, T.T. International Statistical Ecology Conference (Seattle, Washington).

**Non-linear impacts of succession on survival and growth of naturally-recruited tree seedlings during tropical forest restoration** (2016). Caughlin, T.T. M. De la Peña-Domene. Ecological Society of America Annual Meeting (Ft. Lauderdale, FL).

**Using spatial models to link landowner decision-making with tropical forest dynamics and promote landscape-level reforestation** (2016). Caughlin, T.T. Yale International Society of Tropical Foresters conference on Tropical Forests for Sustainable Development (New Haven, CT).

**Seed dispersal and the transient dynamics of reforestation in heterogeneous landscapes** (2015). Caughlin, T.T., S. Elliott, J.W. Lichstein. Ecological Society of America Annual Meeting (Baltimore, Maryland).

**Sensitivity of population growth rates of a tropical tree species to conspecific neighborhood competition at multiple life stages** (2013). Caughlin, T.T., J.M. Ferguson., P.A. Zuidema, D.J. Levey, S. Bunyavejchewin, J.W. Lichstein. Association for Tropical Biology and Conservation Annual Conference (San Jose, Costa Rica).

**Inferring long distance seed dispersal from seedling count data: a hierarchical Bayesian approach** (2013). Caughlin, T.T., Ferguson J.M., Levey, D.J., Bunyavejchewin S., Lichstein J.W. Ecological Society of America Annual Meeting (Minneapolis, Minnesota).

**Geographic context and community membership in a Dominican social network.** (2012). Caughlin T.T., Ruktanonchai N., Acevedo M.A., Lopiano K., Prosper O., Eagle N., Tatem A.J. IGERT video & poster competition. Presentation available online at: <http://posterhall.org/igert2012/posters/294> (Washington, D.C.).

\*Received Judge's Choice Award

**Consequences of long distance seed dispersal for the seedling bank at the Huai Kha Khaeng Wildlife Sanctuary** (2012). Caughlin, T.T. Association for Tropical Biology and Conservation-Asia Chapter Annual Conference (Xishuangbanna, China).

\*Received Award for Best Student Oral Presentation

**Giant fruit bats and birds as agents for reforestation in South India.** Caughlin, T.T., Ganesh T., Lowman M.D (2007). Ecological Society of America Annual Conference (San Jose, CA).



## **Professional Reviewer**

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Ecology, Environmental Entomology, Biotropica, Ecological Modelling, Integrative Zoology, Journal of Applied Ecology, Biological Conservation, National Science Foundation, Nature Communications, Forest Ecology and Management