

# Andrew T. Tredennick

POSTDOCTORAL FELLOW · QUANTITATIVE ECOLOGIST

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## Education

### Colorado State University

PH.D. IN ECOLOGY

Fort Collins, CO

2014

### Texas Tech University

B.S. IN BIOLOGY

Lubbock, TX

2006

## Professional Appointments

### Dept. of Wildland Resources, Utah State University

POSTDOCTORAL FELLOW III ('17-'18) & NSF POSTDOCTORAL FELLOW ('15-'17)

Logan, UT

Aug. 2014 - PRESENT

### Natural Resource Ecology Lab, Colorado State University

NASA GRADUATE FELLOW ('11-'14), GRADUATE RESEARCH ASSISTANT ('09-'11), & GRADUATE TEACHING ASSISTANT ('08-'09)

Fort Collins, CO

Aug. 2008 - May 2014

### U.S. Forest Service Rocky Mountain Research Station

RESEARCH ASSISTANT

Fort Collins, CO

Jan. 2009 - Aug. 2009

## Publications

**Tredennick, A.T.\***, A.R. Kleinhesselink\*, J.B. Taylor, & P.B. Adler. (2018). Ecosystem functional response across precipitation extremes in a sagebrush steppe. *PeerJ* 6:e4485.

\*Authors contributed equally.

Dietze, M.C., A. Fox, L. Beck-Johnson, J.L. Betancourt, M.B. Hooten, C.S. Jarnevich, T. Keitt, M.A. Kenney, C.M. Laney, L.G. Larsen, H.W. Loesch, C.K. Lunch, B. Pijanowski, J.T. Randerson, E.K. Read, **A.T. Tredennick**, R. Vargas, K.C. Weathers, & E.P. White. (2018). Iterative near-term ecological forecasting: Needs, opportunities, and challenges. *Proceedings of the National Academy of Sciences* 115(7):1424-1432.

Wilcox\*, K.R., **A.T. Tredennick\***, S. Koerner, E. Grman, L. Hallett, M. Avolio, K. La Pierre, G. Houseman, F. Isbell, D. Johnson, J. Alatalo, A. Baldwin, E. Bork, E. Boughton, W. Bowman, A. Britton, J. Cahill, S. Collins, G-Z. Du, A. Eskelinen, L. Gough, A. Jentsch, C. Kern, K. Klanderud, A. Knapp, J. Kreyling, Y. Luo, J. McLaren, P. Megonigal, V. Onipchenko, J. Prevéy, J. Price, C. Robinson, O. Sala, M. Smith, N. Soudzilovskaia, L. Souza, D. Tilman, S. White, Z. Xu, L. Yahdjian, Q. Yu, P. Zhang, Y. Zhang. (2017). Asynchrony among local communities stabilizes ecosystem function of metacommunities. *Ecology Letters* 20(12):1534-1545.

\*Authors contributed equally.

**Tredennick, A.T.**, P.B. Adler, & F.R. Adler. (2017). The relationship between species richness and ecosystem variability is shaped by the mechanism of coexistence. *Ecology Letters* 20(8):958-968.

**Tredennick, A.T.**, M.B. Hooten, & P.B. Adler. (2017). Do we need demographic data to forecast plant population dynamics? *Methods in Ecology & Evolution* 8(5):541-551.

**Tredennick, A.T.**, C. de Mazancourt, M. Loreau, & P.B. Adler. (2017). Environmental responses, not species interactions, determine synchrony of dominant species in semiarid grasslands. *Ecology* 98(4):971-981.

Kulmatiski, A., P.B. Adler, J.M. Stark, & **A.T. Tredennick**. (2017). Water and nitrogen uptake are better associated with resource availability than root biomass. *Ecosphere* 8(3):e01738.

**Tredennick, A.T.**, M.B. Hooten, C.L. Aldridge, C. Homer, A.R. Kleinhesselink, & P.B. Adler. (2016). Forecasting climate change impacts on plant populations over large spatial extents. *Ecosphere* 7(10):e01525.

**Tredennick, A.T.**, P.B. Adler, J.B. Grace, W.S. Harpole, E.T. Borer, E.W. Seabloom, & 36 co-authors. (2016). Comment on "Worldwide evidence of a unimodal relationship between productivity and plant species richness." *Science* 35(6272):457a-457c.

**Tredennick, A.T.**, M. Karembé, F. Dembélé, J. Dohn, & N.P. Hanan. (2015). No effects of fire, large herbivores, and their interaction on regrowth of harvested trees in two West African savannas. *African Journal of Ecology* 53(4):487-495.

Hanan, N.P., **A.T. Tredennick**, L. Prihodko, G. Bucini, & J. Dohn. (2015). Analysis of stable states in global savannas – a response to Staver and Hansen. *Global Ecology and Biogeography* 24(8):988-989.

**Tredennick, A.T.** & N.P. Hanan. (2015). Effects of tree harvest on the stable-state dynamics of savanna and forest. *The American Naturalist* 185(5):E153-E165.

Hanan, N.P., **A.T. Tredennick**, L. Prihodko, G. Bucini, & J. Dohn. (2014). Analysis of stable states in global savannas: Is the CART pulling the horse? *Global Ecology and Biogeography* 23(3):259-263.

**Tredennick, A.T.**, L.P. Bentley, & N.P. Hanan. (2013). Allometric convergence in savanna trees and implications for the use of plant scaling models in variable ecosystems. *PLoS One* 8(3):e58241.

Rice, J., **A.T. Tredennick**, & L. Joyce. (2011). The climate of the Shoshone National Forest: A synthesis of past changes, future projections, and ecosystem implications. USFS General Technical Report No. 264.

Sutton, A.E., J. Dohn, K. Loyd, **A.T. Tredennick**, G. Bucini, A. Solrzano, L. Prihodko, & N.P. Hanan. (2010). Letter: Does warming increase the risk of civil war in Africa? *Proceedings of the National Academy of Sciences* 107(25):E102.

## Manuscripts in review

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Adler, P.B., D. Smull, K.H. Beard, R.T. Choi, T. Furniss, A. Kulmatiski, **A.T. Tredennick**, & K.E. Veblen. (In revision). Competition and coexistence in plant communities: intraspecific competition is stronger than interspecific competition. *Ecology Letters* (Previous decision: Major Revisions).

## Manuscripts in preparation

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*Available upon request*

**A.T. Tredennick**, B.J. Teller, P.B. Adler, G. Hooker, & S.P. Ellner. (In preparation). Size by environment interactions: a neglected dimension of species' responses to environmental variation.

**A.T. Tredennick**, P.B. Adler, G. Hooker, & S.P. Ellner. (In preparation). A practical guide to selecting models for exploration, understanding, and prediction in ecology.

Bucini, G., N.P. Hanan, **A.T. Tredennick**, S. Saatchi, M.A. Lefsky, E. Mitchard, & L-J Theron. (In preparation). Woody cover mapping in Africa: combining optical and radar remote sensing for improved prediction in open savannas.

**Tredennick, A.T.**, N.P. Hanan, G. Bucini, & L. Prihodko. (In preparation). No evidence that savanna and forest are alternative stable states at large spatial scales in sub-Saharan Africa.

## Funding

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TOTAL EXTERNAL: \$297,000 · TOTAL INTERNAL: \$17,500

- 2015 **NSF Postdoctoral Fellowship in Biology and Mathematics**, \$207,000
- 2013 **Natural Resource Ecology Lab Development Grant for EcoPress** (<https://nrelscience.org/>), \$6,000
- 2011 **NASA Earth and Space Science Graduate Fellowship**, \$90,000
- 2010 **Natural Resource Ecology Lab James E. Ellis Scholarship**, \$1,500
- 2010 **Warner College of Natural Resources Grant (Collaborative proposal of Hanan Lab)**, \$10,000

## Honors & Awards

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- 2015 **Travel Award**, NEON and Powell Center Workshop on 'Ecological Forecasting'
- 2013 **First Place Oral Presentation**, Front Range Student Ecology Symposium
- 2012 **Travel Award**, NSF FORECAST Research Coordination Network Meeting
- 2012 **Sustainability Leadership Fellow**, School of Global Environmental Sustainability, Colorado State University
- 2009 **NSF Graduate K-12 Fellowship**, Natural Resource Ecology Lab, Colorado State University

# Teaching

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## Weekly R help sessions for graduate students

CO-ORGANIZER WITH TOM EDWARDS

- Introduced graduate students to data management and analysis in R.

Utah State University

2015-PRESENT

## Community Ecology (graduate)

GUEST LECTURE

- Led unit (lecture and lab) on the diversity-stability relationship.

Utah State University

2016 & 2017

## Data Visualization in R

CO-ORGANIZER AND CO-INSTRUCTOR

- Introduce diverse group of ecologists to ggplot2 for data viz in R.

ESA Meeting Workshop

2013-2017

## Plant Ecology (undergraduate)

GUEST LECTURE

- Guest lecture on tree-grass coexistence in savannas.

Colorado State University

2013

## Ecosystem Processes in a Changing World (undergraduate)

CO-INSTRUCTOR

- Taught course for half of semester and co-developed lectures, labs, and exams.

Colorado State University

2011

## Wildland Ecosystems (undergraduate)

GUEST LECTURE

- Guest lecture and computer lab on ecosystem modeling.

Colorado State University

2009, 2010, 2012

## 4-5 Grade Science & Advanced Science Program

NSF GK-12 FELLOW

- Help teach elementary science and developed teaching materials.

Irish Elementary

2010-2011

## Wildland Ecosystems (undergraduate)

GRADUATE TEACHING ASSISTANT

- Gave several lectures, assisted with grading, and helped draft exams.

Colorado State University

2008

# Professional Service

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## EDITORSHIPS

Academic Editor at *PeerJ*

## REVIEWER (~12 PER YEAR)

*Agriculture, Ecosystems, and Environment; Ecological Applications; Ecology; Ecology Letters; Elementa; Environmental Management; Forest Ecology and Management; Journal of Applied Ecology; Journal of Ecology; Journal of Vegetation Science; Koedoe: African Protected Area Conservation and Science; Land Degradation & Development; Nature Climate Change; Oecologia; Oikos; Pest Management & Science; Proceedings of the National Academy of Sciences; Proceedings of the Royal Society B; PLoS One; Restoration Ecology; Scientific Reports; National Research Foundation (South Africa); National Science Foundation (ad hoc reviewer; 2/year)*

## PROFESSIONAL SOCIETY MEMBERSHIP

American Society of Naturalists

Ecological Society of America

*Rangeland Ecology Section member*

*Statistical Ecology Section member*

*Theoretical Ecology Section member*

## UNIVERSITY SERVICE AND PUBLIC OUTREACH

Director of Social Media, *NREL EcoPress*: <http://nrelscience.org> (2012-2013)

Student Review Committee, Ecology Faculty Search, CSU (2011)

Advertising and Outreach Committee, Front Range Student Ecology Symposium (2010)

Graduate Student Representative, Natural Resource Ecology Lab (2010-2011)

Organizing Committee, NASA Global Savanna Workshop, CSU (2009)

## INVITED WORKING GROUPS

- iDiv From Species Coexistence to Ecosystem Functioning: A Theoretical and Empirical Synthesis. *Lead PIs: Christiane Roscher, Yanhao Feng, Stan Harpole* (2018)
- NCEAS Community Responses to Resource Experiments: Communities to Ecosystems. *Lead PIs: Kimberly La Pierre, Meghan Avolio, Kevin Wilcox* (2016 & 2017)
- NEON Operationalizing Ecological Forecasts. *Lead PIs: Michael Dietze, Andy Fox* (2015)

## Recent Presentations & Seminars

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### Invited

- 2018 TBD. *American Statistical Association ENVR Workshop: Statistics for the Environment: Research, Practice and Policy*, Asheville, NC.
- 2018 Advancing ecological forecasting. *Center for the Ecology of Infectious Diseases*, University of Georgia.
- 2018 What determines ecosystem stability in theory and in nature? *Department of Botany*, University of Hawai'i at Mānoa.
- 2017 What determines ecosystem stability in theory and in nature? *Quinney College of Natural Resources*, Utah State University.
- 2013 Sustainability and Biome-Level Impacts of Fuelwood Harvesting in sub-Saharan Africa. *Geospatial Center of Excellence*, South Dakota State University.

### Contributed

- 2017 The relationship between species richness and ecosystem variability is shaped by the mechanism of coexistence. *ESA Annual Meeting*, Portland, OR.
- 2016 Disentangling the drivers of species synchrony in natural plant communities: Environmental forcing, demographic stochasticity, and interspecific interactions. *ESA Annual Meeting*, Fort Lauderdale, FL.
- 2015 Do we need detailed demographic data to forecast population responses to climate change? *ESA Annual Meeting*, Baltimore, MD.
- 2014 Africa's Fuelwood Footprint and the Biome-Level Impacts of Tree Harvest. *Center for Biodiversity Theory & Modeling, CNRS*, Moulis, France.
- 2014 Forecasting climate change impacts on plant population dynamics at large spatial extents: a test case with sagebrush (*Artemisia*) species. *ESA Annual Meeting*, Sacramento, CA.
- 2013 Pixel-based modeling of population dynamics at large spatial extents. *Climate-SageSteppe Working Group*, Park City, UT.
- 2013 Tree harvest, fire, and drought can drive state transitions in savanna. *ESA Annual Meeting*, Minneapolis, MN.

## Skills

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- Programming** R, Stan, JAGS, Python, LaTeX
- Scientific computing** Hierarchical Bayesian modeling, numerical simulations, Integral Projection Models, population modeling