

TIMOTHY H. KEITT
SECTION OF INTEGRATIVE BIOLOGY
UNIVERSITY OF TEXAS AT AUSTIN
1 UNIVERSITY STATION C0930
AUSTIN, TEXAS 78712
<http://www.keittlab.org/>

EDUCATION

1985-1987 *University of Florida*: B.A., Zoology
1988-1990 *University of Florida*: M.S., Environmental Engineering Sciences
1991-1995 *University of New Mexico*: Ph.D., Ecology and Evolutionary Biology

ACADEMIC POSITIONS

2000-2002 Assistant Professor, State University of New York at Stony Brook
2002-2009 Assistant Professor, University of Texas at Austin
2009- Associate Professor, University of Texas at Austin

UT affiliations:

Graduate program in Ecology, Evolution and Behavior
Graduate program in Computation and Applied Mathematics
Division of Statistics and Scientific Computation
Environmental Sciences Institute
Center for Computational Biology and Bioinformatics

HONORS, AWARDS & FELLOWSHIPS

1998 Fulbright Senior Scholar, Pontificia Universidad Católica de Chile
1995-1997 Postdoctoral Fellow, The Santa Fe Institute
1998-2000 Postdoctoral Fellow, National Center for Ecological Analysis and Synthesis
1998-2000 Member, “The ecology and evolutionary dynamics of species' borders”
working group, NCEAS, Santa Barbara
1999-2000 Member, “Integrating the statistical modeling of data in ecology” working
group, NCEAS, Santa Barbara
1995 Honor Society of Phi Kappa Phi, University of New Mexico
2003 University of Texas Summer Research Assignment, Austin
2006 Reeder Fellowship, University of Texas at Austin
2005-2007 Member, “Restoring an ecosystem service to degraded landscapes: native bees
and crop pollination” working group, NCEAS, Santa Barbara
2005 Faculty of 1000 recommended reading: Scale Specific Inference Using
Wavelets (Keitt & Urban, *Ecology*, 2005)
2007-2009 Member, “Mechanistic distributions models: energetics, fitness, and population
dynamics,” joint NCEAS/NESCent working group
2008 Faculty of 1000 “must read”: Species' borders: a unifying theme in ecology
(Holt & Keitt, *OIKOS*, 2005)
2008 Faculty of 1000 recommended reading: Species diversity in metacommunities:
a network approach (Economio & Keitt, *Ecology Letters*, 2008)

- 2008 Faculty of 1000 recommended reading: Coherent ecological dynamics induced by large scale disturbance (Keitt, *Nature*, 2008)
- 2010-2011 Mathematical Biosciences Institute External Advisory Committee for the Emphasis Year on “Evolution, Synchronization, and Environmental Interactions: Insights from Plants and Insects”

LITERATURE CITATIONS

As of November, 2008, ISI reports a total of 1,022 citations since 1996 or roughly 80 per year. Twenty of these papers have received 20 or more citations ($H = 20$). The six most highly cited are *Conservation Ecology* 1997 (130), *American Naturalist* 2001 (100), *Ecography* 2002 (99), *Ecology* 2001 (88), *American Naturalist* 2000 (85), and *Nature* 1998 (74).

PUBLICATIONS

In Review

- Economu, E. and **T. H. Keitt**. Network isolation and local diversity in neutral metacommunities. *The American Naturalist*.
- Lasky J. R., W. Jetz and **T. H. Keitt**. The biogeography of the U.S.-Mexico border: conservation implications of a border fence. *Proceeding of the National Academy (USA)*.
- Lasky J. R. and **T. H. Keitt**. Spatial variation in the abundances of dry forest bird species and functional groups along environmental gradients. *Journal of Tropical Ecology*.

In Press

- Keitt, T. H.** Habitat conversion, extinction thresholds and pollination services in agroecosystems. *Ecological Applications*.
- Brooks, C. P., C. Holmes, and **T. H. Keitt**. Blending theory and empirical data to explain past and future deforestation risk near Ranomafana National Park, Madagascar. *PLoS ONE*.

2009

- Pinto N., **T. H. Keitt**. 2009. Beyond the least cost path: evaluating corridor robustness using a graph-theoretic approach. *Landscape Ecology* 24:253-266.

2008

- Keitt, T. H.** 2008. Coherent ecological dynamics induced by large scale disturbance. *Nature* 454:331-334. (Faculty of 1000 recommended reading)
- Economu, E. and **T. H. Keitt**. 2008. Species diversity in neutral metacommunities: a network approach. *Ecology Letters* 11:52-62. (Faculty of 1000 recommended reading)
- McRae, B. H., B. G. Dickson, **T. H. Keitt** and V. B. Shah. 2008. Using circuit theory to model connectivity in ecology, evolution and conservation. *Ecology* 89:2712-2724
- Brooks, C. P., J. Antonovics and **T. H. Keitt**. 2008. Spatial and temporal heterogeneity explain disease dynamics in a spatially-explicit network model. *The American Naturalist* 172:149-159

- Downing, A. L., B. L. Brown, E. M. Perrin, **T. H. Keitt**, M. A. Leibold. 2008. Environmental fluctuations induce scale-dependent compensation and increase stability in plankton ecosystems. *Ecology* 89:3204-3214.
- Pinto N. and **T. H. Keitt**. 2008. Scale-specific responses to forest cover displayed by frugivore bats. *OIKOS* 117:1725-1731.
- Pinto N., J. Lasky, R. Bueno, **T. H. Keitt** and M. Galetti. 2008. "Primate Densities in the Brazilian Atlantic Forest: The Role of Habitat Quality and Anthropogenic Disturbance," in *South American Primates: Comparative Perspectives in the Study of Behavior, Ecology, and Conservation*, P. A. Garber, A. Estrada, J. C. Bicca-Marques, E. W. Heymann, K. B. Strier, eds. Springer.

2007

- Keitt, T. H.** 2007. "On the quantification of local variation in biodiversity scaling using wavelets," in *Scaling Biodiversity*, D. Storch, P. A. Marquet and J. H. Brown, eds. Cambridge University Press, Cambridge.
- Kremen, C., N. M. Williams, M. A. Aizen, B. Gemmill-Herren, G. LeBuhn, R. Minckley, L. Packer, S. G. Potts, T. Roulston, I. Steffan-Dewenter, D. P. Vazquez, R. Winfree, L. Adams, E. E. Crone, S. S. Greenleaf, **T. H. Keitt**, A. M. Klein, J. Regetz and T. H. Ricketts. 2007. Pollination and other ecosystem services produced by mobile organisms: a conceptual framework for the effects of land-use change. *Ecology Letters* 10:299-314.

2006

- Keitt, T. H.** and J. Fischer. 2006. Detection of scale-specific community dynamics using wavelets. *Ecology* 87:2895-2904.

2005

- Keitt, T. H.** and D. L. Urban. 2005. Scale-Specific Inference Using Wavelets. *Ecology* 86: 2497-2504. (Faculty of 1000 recommended reading)
- Holt, R. D. and **T. H. Keitt**. 2005. Species' borders: a unifying theme in ecology. *OIKOS* 108:3-6. (Faculty of 1000 "must read")
- Fortin, M.-J., **T. H. Keitt**, B. A. Mauer, M. L. Taper, D. M. Kauffman and T. M. Blackburn. 2005. Species' geographic ranges and distributional limits: pattern analysis and statistical issues. *OIKOS* 108: 7-17.
- Holt, R. D., **T. H. Keitt**, M. A. Lewis, B. A. Mauer and M. L. Taper. 2005. Theoretical models of species' borders: single species approaches. *OIKOS* 108:18-27.
- Case, T. J., R. D. Holt, M. A. McPeck and **T. H. Keitt**. 2005. The community context of species' borders: ecological and evolutionary perspectives. *OIKOS* 108:28-46.
- Johnson, S. E., P. C. Wright, **T. H. Keitt**, K. L. Kramer, F. J. Ratelolahy, G. Ravalison, C. M. Holmes, W. Gordon, J. P. Puyravaud. 2005. Predictors of local variation in lemur abundance at Ranomafana National Park, Madagascar. *American Journal of Physical Anthropology*. Suppl. abstracts.

2003

- Keitt, T. H.** 2003. "Network theory: an evolving approach to landscape conservation," in *Ecological Modeling for Resource Management*, V. H. Dale, editor. Springer-Verlag, Berlin.

Keitt, T. H. 2003. "Spatial autocorrelation and the maintenance of source-sink populations," in *How Landscapes Change: Human Disturbance and Ecosystem Fragmentation in the Americas*, G. A. Bradshaw and P. A. Marquet, eds. Springer-Verlag, Berlin.

2002

Keitt, T. H., O. N. Bjornstad, P. Dixon and S. Citron-Pousty. 2002. Accounting for spatial pattern when modeling environment-abundance relationships. *Ecography* 25:616-625.

Keitt, T. H., L. A. N. Amaral, S. V. Buldyrev and H. E. Stanley. 2002. Scaling in the growth of geographically subdivided populations: invariant patterns from a continent-wide biological survey. *Philosophical Transactions of the Royal Society of London, Series B* 357:627-633.

2001

Keitt, T. H., M. A. Lewis and R. D. Holt. 2001. Allee dynamics, invasion pinning, and species' borders. *The American Naturalist* 157:203-216.

Urban D. L. and **T. H. Keitt**. 2001. Landscape connectedness: a graph theoretic perspective. *Ecology* 82:1205-1218.

2000

Keitt, T. H. 2000. Spectral representation of neutral landscapes. *Landscape Ecology* 15:479-494.

Bunn, A. G., D. L. Urban and **T. H. Keitt**. 2000. Landscape connectivity: a conservation application of graph theory. *Journal of Environmental Management* 59:265-278.

Stanley H. E., L. A. N. Amaral, P. Gopikrishnan, P. Ch. Ivanov, **T. H. Keitt** and V. Plerou. 2000. Scale invariance and universality: organizing principles in complex systems. *Physica A* 281:60-68.

Kendall, B. E., O. N. Bjornstad, J. Bascompte, **T. H. Keitt** and W. F. Fagan. 2000. Dispersal, environmental correlation, and spatial synchrony in population dynamics. *The American Naturalist* 155:628-636.

Holt, R. D. and **T. H. Keitt**. 2000. Alternative causes for range limits: a metapopulation perspective. *Ecology Letters* 3:41-47.

1999

Micheli, F., K. L. Cottingham, J. Bascompte, O. N. Bjornstad, G. L. Eckert, J. M. Fischer, **T. H. Keitt**, B. E. Kendall, J. L. Klug and J. A. Rusak. 1999. The dual nature of community variability. *OIKOS* 85:161-169.

1998

Keitt, T. H. and H. E. Stanley. 1998. Dynamics of North American breeding bird populations. *Nature* 393:257-260.

Stanley, H. E., L. A. N. Amaral, S. V. Buldyrev, S. Havlin, **T. H. Keitt**, H. A. Makse and G. Viswanathan, "Scale-Invariant Correlations in the Social Sciences," in *Econophysics: An Emerging Science* [Proc. 1997 Budapest Conference], J. Kertesz and I. Kondor, eds. (Kluwer, Dordrecht, 1998).

1997

- Keitt, T. H.**, D. L. Urban and B. T. Milne. 1997. Detecting critical scales in fragmented landscapes. *Conservation Ecology* [<http://www.consecol.org/>] 1:4.
- Keitt, T. H.** 1997. Stability and complexity on a lattice: coexistence of species in an individual-based food web model. *Ecological Modelling* 102:243-258.

1996

- Keitt, T. H.** and P. Marquet. 1996. The introduced Hawaiian avifauna reconsidered: evidence for self-organized criticality? *Journal of Theoretical Biology* 182:161-167.
- Milne, B. T., A. R. Johnson, **T. H. Keitt**, C. A. Hatfield, J. David and P. Hraber. 1996. Detection of critical densities associated with pinon-juniper woodland ecotones. *Ecology* 77:805-821.
- Keitt, T. H.**, A. Franklin and D. L. Urban. 1996. Landscape analysis and metapopulation structure. Chapter II.3 in USDI Fish and Wildlife Service, Recovery Plan for the Mexican Spotted Owl: Vol.I., Albuquerque, NM. 172pp.

1995

- Keitt, T. H.** and A. R. Johnson. 1995. Spatial heterogeneity and anomalous kinetics: emergent patterns in diffusion-limited predator-prey interactions. *Journal of Theoretical Biology* 172:127-139.

EXTRAMURAL SUPPORT

Current

- DOE National Institute for Climate Change Research, "Improved prediction of climate change impact on migratory pathways through machine learning, hydrological modeling and network theory." 2009-2011 (\$250,000)
- Marine Ecosystem-Based Tools Innovation Fund (David and Lucile Packard Foundation; Duke University) "NAMEM: Network Analyst for Marine Ecosystem-based Management," 2007-2009 (\$110,000)
- Texas Space Grant Consortium (NASA) New Investigator Award: "Mapping Pattern and Process Across Complex Landscapes Using Remote Sensing and GIS," 2006-2009 (\$20,000).

Past

- David and Lucile Packard Foundation, "Integrating Dynamics of Human Resource Use and Their Effects on Rainforests in Madagascar" Principle author and Co-PI with P. Wright, SUNY Stony Brook, 2002-2007 (\$1,000,220).
- Fulbright Foundation of Chile, "Geostatistical analysis of species-climate relationships across the Americas," 1998 (\$10,000).
- USDA Fish and Wildlife Service, Research involved modeling and GIS analysis of Mexican Spotted Owl habitat use at local and regional scales, 1994-1995 (\$35,000).

Pending / In Development

David and Lucile Packard Foundation, “International collaboration for the design and management of multiple-use coastal marine protected areas in northern Chile” (with Bernardo Broitman and Carlos Gaymer, Centro de Estudios Avanzados en Zonas Áridas).

NASA, “Forecasting terrestrial biodiversity: bringing remotely-sensed environments down to earth with bioenergetic models,” (with Mike Angilletta, Indiana State. Univ., Lauren Buckley, NCEAS and Josh Tewksbury, Univ. Washington).

SPEAKING INVITATIONS

- 2009 Invited Foreign Lecturer, II Jornadas Argentinas de Ecología de Paisajes, Córdoba City, Argentina
- 2008 Departmental seminar, “Disentangling hierarchical patterns in space and time: wavelets and landscape networks,” Rice University
Departmental seminar, “Wavelet analysis of biological diversity,” Biological Sciences, UC San Diego
Symposium presentation, “Scale-specific drivers of community turnover in a continent-wide biological survey,” US IALE, Madison
Symposium presentation, “Species diversity in structured metacommunities: A network approach,” US IALE, Madison
- 2007 Graduate lectures, “Concepts and methods of spatial graph theory” and “Network theory for spatial risk mapping,” *Networks in Ecology and Beyond* organized by the Program in Interdisciplinary Math, Ecology and Statistics at Colorado State University, Fort Collins
Symposium presentation, “Habitat Conversion, Extinction Thresholds and Pollinator Services in Agroecosystems,” US IALE, Tucson
Departmental seminar, “Modeling persistence of pollinators in agroecosystems,” Department of Ecology and Evolutionary Biology, UC Santa Cruz
- 2006 Departmental seminar, “Wavelets as a Paradigm for Pattern and Scale in Ecology,” Department of Biology, University of Puerto Rico
Symposium presentation, “Applications of network theory to landscape conservation,” U.S. IALE, San Diego
Symposium presentation (co-organizer), “Theory and application of ecological networks,” Ecological Society of America, Memphis
Graduate lecture, “Robustness, resistance and resiliency in landscape networks”, *Social and Ecological Networks: Theories and Applications* Ph.D. course organized by T. Elmqvist, Stockholm
- 2005 Workshop presentation (co-organizer), “Spatial network theory: applications and conceptual domain,” Santa Fe Institute, Santa Fe
- 2004 Workshop presentation, “On the quantification of local biodiversity scaling using wavelets,” *Scaling Biodiversity* organized by Santa Fe Institute, Prague

- Departmental seminar, "Spectral representation of pattern and scale in ecology,"
Institute for Ecosystem Studies, Millbrook
- 2002 Symposium presentation, "Network theory for landscapes: application to Chilean temperate rainforest fragments," Annual Meeting of the Biological Society of Chile, Termas de Puyehue
- Symposium presentation, "Allee effects and invasion pinning," Ecological Society of America, Tucson
- 2001 Symposium presentation, "Analysis of landscape flow networks," Annual Meeting of the Biological Society of Chile, Termas de Puyehue
- 1999 Symposium presentation, "Graph theoretical approaches to landscape connectivity," 5th IALE World Congress, Snowmass
- Symposium presentation, "Allee effects and species borders," 5th IALE World Congress, Snowmass
- 1998 Departmental seminar, "Application of landscape networks," Department of Biological Sciences, P. Univ. Católica de Chile, Santiago
- 1997 Symposium presentation, "Landscape modeling: the addition of spatial complexity," 4th Annual Meeting of the Wildlife Society, Snowmass
- Graduate lecture, "Scaling in ecology," Santa Fe Institute Summer School

SERVICE

Workshop & Symposium Organizer

- Symposium:* Ecological and evolutionary dynamics in complex networks (with Bill Fagan), 91st Meeting of the Ecological Society of America, Memphis (August 2006)
- Workshop:* Network Robustness to Evolving Agents (with Lauren Meyers), Santa Fe Institute (January 2005)
- Workshop:* Integrating Dynamics of Human Resource Use and Their Effects on Rainforests in Madagascar (with Patricia Wright), Ranomafana, Madagascar (December 2002)

University Service

- Graduate workshop on niche modeling methods, March 24, 2007
- Graduate selection committee, UT Ecology, Evolution and Behavior, 2006
- Environmental sciences faculty search committee, UT Environmental Sciences Institute and Section of Integrative Biology, 2003
- Ecosystem ecologist faculty search committee, SUNY Stony Brook, 2001
- Conservation biology faculty search committee, SUNY Stony Brook, 2002

Referee & Grant Reviewer

- National Science Foundation, Nature, Ecology, Ecological Monographs, OIKOS, Ecography, Journal of Biogeography, Ecosystems, Landscape Ecology, Complexity, Conservation Biology, Environmental Science & Technology, Journal of Theoretical Biology, Natural Sciences and Engineering Research Council of Canada, Philosophical Transactions of the Royal Society of London B, Journal of Animal Ecology,

Mathematical Biosciences, The American Naturalist, Ecological Modeling

Service To Professional Organizations

Secretary-treasurer, Theory Section of the Ecological Society of America, 1998-2000
Editorial board, Landscape Ecology, 2009-2012

Educational Outreach Activities

Instructor, “Kids do Ecology” program at the National Center for Ecological Analysis and Synthesis, UC Santa Barbara

Software Development

“Network Analyst for Marine Ecosystem-based Management” and “PostGraph” library;
network analysis software to be released in 2009.
Contributed 5 packages to R (<http://www.r-project.org/>)
rpgsql - one of first relational database access packages for R
Rdbi - generic framework for database access
Rdbi.PgSQL - Rdbi driver package for PostgreSQL
rgdal - geomatics in R
colorRamps - data visualization assistance

TEACHING AND ADVISING

Graduated Ph.D. Students

Naiara Sardinha-Pinto (2008)

Ph.D. Students Moved To Candidacy

Katherine Behrman (2008)
Evan Economo (2004)
Jesse Lasky (2008)
Tania Pena-Blanca (2008)
Betsy Reardon (2008)

M.S. Students

Courtney Abshire

Undergraduate Honors Students

Kevin Hannay, Mathematics and Physics (2006-2008)
Jeff Scott, Biology (2008)

Postdoctoral Associates

Wendy Gordon (2002-2003; Texas Commission on Environmental Quality)
Chris Brooks (2006-2007; faculty Mississippi State University)
Andrew Noble (2008-2009; postdoc, Univ. of Maryland)

Courses Taught

University of Texas

BIO 373 Ecology (approx. 60 students per section; 6 semesters in 6 years)

BIO 384K Mathematical Ecology (approx. 10 students; 4 semesters in 6 years)

BIO 384K Topics in Biogeography (approx. 10 students; 1 semester in 6 years)

SUNY Stony Brook

Non-majors Ecology

Graduate Core Ecology