



Elizabeth Hadly

Paul S. and Billie Achilles Professor in Environmental Biology, Senior Fellow at the Woods Institute for the Environment and Professor, by courtesy, of Geological Sciences

Bio

ACADEMIC APPOINTMENTS

- Professor, Biology
- Senior Fellow, Stanford Woods Institute for the Environment
- Professor (By courtesy), Geological Sciences
- Member, Bio-X
- Senior Fellow, Stanford Woods Institute for the Environment

ADMINISTRATIVE APPOINTMENTS

- Senior Associate Vice Provost of Undergraduate Education, VPUE, (2013- present)

PROFESSIONAL EDUCATION

- Ph.D., Univ. California, Berkeley , Integrative Biology (1995)
- M.S., Northern Arizona University , Quaternary Studies (1990)
- B.A., Univ. Colorado, Boulder , Anthropology (1981)

LINKS

- Hadly Lab: <http://www.stanford.edu/group/hadlylab/index.html>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

ELIZABETH A. HADLY

PROFESSOR, DEPARTMENT OF BIOLOGY AND DEPARTMENT OF GEOLOGICAL SCIENCES, BY COURTESY

Professor Hadly uses a combined field and laboratory approach to examine how ecological perturbations link or decouple levels of biological organization, because understanding the links among ecosystems, species, populations and genes is central to understanding how organisms exist, evolve and become extinct. She addresses problems in organismal biology from both evolutionary and ecological perspectives, primarily using extant mammals. One of the unique aspects of her overall approach is the focus on the decadal to millennial time scale, a scale that is little studied, although it is a scale that is integral to understanding links between ecology and evolution.

PROJECTS

- Living on the roof of the world: mechanisms underlying hypo tolerance in pikas - Stanford University (2012 - present)

- Tracing zoonotic disease risks and immunological adaptations in bats, humans and human commensals across the Central American countryside - Stanford University (1/1/2015 - present)
- Evolution, Extinction, and Conservation of Caribbean Mammals - Stanford University (2013 - present)
- Ecological and evolutionary aspects of the bat-infection relationship - Stanford University (February 2012 - present)
- Gene Expression, not local adaptation, sufficient for pikas to occupy vast Himalayan elevational gradient - Stanford University
- Low-coverage Genome Sequencing of Black Rhinoceros to Inform Conservation Management - Stanford University (January 1, 2015 - present)

Teaching

COURSES

2017-18

- Conservation and Population Genomics: BIO 386 (Spr)

2016-17

- I, Biologist: Diversity Improves the Science of Biology: BIO 52 (Spr)
- Tipping Point for Planet Earth: How Close Are We to the Edge?: BIO 5N (Aut)

2014-15

- Geographic Impacts of Global Change: Mapping the Stories: BIO 128 (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Elora Lopez

Postdoctoral Faculty Sponsor

Kevin Leempoel, Katherine Solari

Doctoral Dissertation Advisor (AC)

Sergio Redondo

Undergraduate Major Advisor

Jamieson O'Marr

Doctoral (Program)

Sergio Redondo

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biology (School of Humanities and Sciences) (Phd Program)

Publications

PUBLICATIONS

- **Merging paleobiology with conservation biology to guide the future of terrestrial ecosystems** *SCIENCE*
Barnosky, A. D., Hadly, E. A., Gonzalez, P., Head, J., Polly, P. D., Lawing, A. M., Eronen, J. T., Ackerly, D. D., Alex, K., Biber, E., Blois, J., Brashares, J., Ceballos, et al
2017; 355 (6325): 594-?
- **Genetics, morphology and ecology reveal a cryptic pika lineage in the Sikkim Himalaya.** *Molecular phylogenetics and evolution*
Dahal, N., Lissovsky, A. A., Lin, Z., Solari, K., Hadly, E. A., Zhan, X., Ramakrishnan, U.
2017; 106: 55-60

- **Opportunity for some, extinction for others: the fate of tetrapods in the Anthropocene** *EVOLUTIONARY ECOLOGY RESEARCH*
Solari, K. A., Frank, H. K., Frishkoff, L. O., Hsu, J. L., Kemp, M. E., Mychajliw, A. M., Hadly, E. A.
2016; 17 (6): 787-813
- **Getting a head in hard soils: Convergent skull evolution and divergent allometric patterns explain shape variation in a highly diverse genus of pocket gophers (Thomomys)** *BMC EVOLUTIONARY BIOLOGY*
Marcy, A. E., Hadly, E. A., Sherratt, E., Garland, K., Weisbecker, V.
2016; 16
- **Climate change and habitat conversion favour the same species** *ECOLOGY LETTERS*
Frishkoff, L. O., Karp, D. S., Flanders, J. R., Zook, J., Hadly, E. A., Daily, G. C., M'Gonigle, L. K.
2016; 19 (9): 1081-1090
- **Rocking Earth's biodiversity cradle: challenges, advances, and prospects for conservation paleontology in the tropics** *JOURNAL OF VERTEBRATE PALEONTOLOGY*
Kemp, M. E., Hadly, E. A.
2016; 36 (5)
- **Anthropogenic impacts on Costa Rican bat parasitism are sex specific** *ECOLOGY AND EVOLUTION*
Frank, H. K., Mendenhall, C. D., Judson, S. D., Daily, G. C., Hadly, E. A.
2016; 6 (14): 4898-4909
- **Post-invasion demography of prehistoric humans in South America.** *Nature*
Goldberg, A., Mychajliw, A. M., Hadly, E. A.
2016; 532 (7598): 232-235
- **Early Holocene turnover, followed by stability, in a Caribbean lizard assemblage** *QUATERNARY RESEARCH*
Kemp, M. E., Hadly, E. A.
2016; 85 (2): 255-261
- **Variable impact of late-Quaternary megafaunal extinction in causing ecological state shifts in North and South America** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Barnosky, A. D., Lindsey, E. L., Villavicencio, N. A., Bostelmann, E., Hadly, E. A., Wanket, J., Marshall, C. R.
2016; 113 (4): 856-861
- **Bartonellae are Prevalent and Diverse in Costa Rican Bats and Bat Flies** *ZOOZOSES AND PUBLIC HEALTH*
Judson, S. D., FRANK, H. K., Hadly, E. A.
2015; 62 (8): 609-617
- **Extinction biases in Quaternary Caribbean lizards** *GLOBAL ECOLOGY AND BIOGEOGRAPHY*
Kemp, M. E., Hadly, E. A.
2015; 24 (11): 1281-1289
- **Thermal niche predicts tolerance to habitat conversion in tropical amphibians and reptiles** *GLOBAL CHANGE BIOLOGY*
Frishkoff, L. O., Hadly, E. A., Daily, G. C.
2015; 21 (11): 3901-3916
- **Loss of avian phylogenetic diversity in neotropical agricultural systems** *SCIENCE*
Frishkoff, L. O., Karp, D. S., M'Gonigle, L. K., Mendenhall, C. D., Zook, J., Kremen, C., Hadly, E. A., Daily, G. C.
2014; 345 (6202): 1343-1346
- **Predicting biodiversity change and averting collapse in agricultural landscapes.** *Nature*
Mendenhall, C. D., Karp, D. S., Meyer, C. F., Hadly, E. A., Daily, G. C.
2014; 509 (7499): 213-217
- **Predicting biodiversity change and averting collapse in agricultural landscapes** *NATURE*
Mendenhall, C. D., Karp, D. S., Meyer, C. F., Hadly, E. A., Daily, G. C.
2014; 509 (7499): 213-?
- **A call for tiger management using "reserves" of genetic diversity.** *journal of heredity*

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- Bay, R. A., Ramakrishnan, U., Hadly, E. A.
2014; 105 (3): 295-302
- **Molecular diagnosis of bird-mediated pest consumption in tropical farmland.** *SpringerPlus*
Karp, D. S., Judson, S., Daily, G. C., Hadly, E. A.
2014; 3: 630-?
 - **Molecular diagnosis of bird-mediated pest consumption in tropical farmland.** *SpringerPlus*
Karp, D. S., Judson, S., Daily, G. C., Hadly, E. A.
2014; 3: 630-?
 - **Forest bolsters bird abundance, pest control and coffee yield** *ECOLOGY LETTERS*
Karp, D. S., Mendenhall, C. D., Sandi, R. F., Chaumont, N., Ehrlich, P. R., Hadly, E. A., Daily, G. C.
2013; 16 (11): 1339-1347
 - **Asymmetrical Competition between *Microtus montanus* and *Microtus longicaudus* in the Greater Yellowstone Ecosystem** *AMERICAN MIDLAND NATURALIST*
Anich, P. S., Hadly, E. A.
2013; 170 (2): 274-286
 - **Morphological Adaptations for Digging and Climate-Impacted Soil Properties Define Pocket Gopher (*Thomomys* spp.) Distributions.** *PloS one*
Marcy, A. E., Fendorf, S., Patton, J. L., Hadly, E. A.
2013; 8 (5)
 - **Genetic diversity within vertebrate species is greater at lower latitudes** *EVOLUTIONARY ECOLOGY*
Adams, R. I., Hadly, E. A.
2013; 27 (1): 133-143
 - **Approaching a state shift in Earth's biosphere** *NATURE*
Barnosky, A. D., Hadly, E. A., Bascompte, J., Berlow, E. L., Brown, J. H., Fortelius, M., Getz, W. M., Harte, J., Hastings, A., Marquet, P. A., Martinez, N. D., Mooers, A., Roopnarine, et al
2012; 486 (7401): 52-58
 - **Ancient DNA Assessment of Tiger Salamander Population in Yellowstone National Park** *PLOS ONE*
McMenamin, S. K., Hadly, E. A.
2012; 7 (3)
 - **Genetic variation over 10 000 years in *Ctenomys*: comparative phylogenetics provides a temporal perspective on rarity, environmental change and demography** *MOLECULAR ECOLOGY*
Chan, Y. L., Hadly, E. A.
2011; 20 (22): 4592-4605
 - **Predicting small-mammal responses to climatic warming: autecology, geographic range, and the Holocene fossil record** *GLOBAL CHANGE BIOLOGY*
Terry, R. C., Li, C. (., Hadly, E. A.
2011; 17 (10): 3019-3034
 - **HIGH LEVELS OF GENE FLOW IN THE CALIFORNIA VOLE (*MICROTUS CALIFORNICUS*) ARE CONSISTENT ACROSS SPATIAL SCALES** *WESTERN NORTH AMERICAN NATURALIST*
Adams, R. I., Hadly, E. A.
2010; 70 (3): 296-311
 - **Small mammal diversity loss in response to late-Pleistocene climatic change** *NATURE*
Blois, J. L., McGuire, J. L., Hadly, E. A.
2010; 465 (7299): 771-U5
 - **Dispersal provided resilience to range collapse in a marine mammal: insights from the past to inform conservation biology** *MOLECULAR ECOLOGY*
Pinsky, M. L., Newsome, S. D., Dickerson, B. R., Fang, Y., Van Tuinen, M., Kennett, D. J., Ream, R. R., Hadly, E. A.
2010; 19 (12): 2418-2429
 - **Isotopes reveal limited effects of middle Pleistocene climate change on the ecology of mid-sized mammals** *QUATERNARY INTERNATIONAL*
Feranec, R. S., Hadly, E. A., Paytan, A.

2010; 217 (1-2): 43-52

- **Developmental dynamics of *Ambystoma tigrinum* in a changing landscape.** *BMC ecology*
McMenamin, S. K., Hadly, E. A.
2010; 10: 10-?
- **Source-sink dynamics structure a common montane mammal** *MOLECULAR ECOLOGY*
O'Keefe, K., Ramakrishnan, U., van Tuinen, M., Hadly, E. A.
2009; 18 (23): 4775-4789
- **Niche conservatism above the species level** *Arthur M Sackler Colloquium of the National-Academy-of-Sciences on Biogeography, Changing Climates and Niche Evolution*
Hadly, E. A., Spaeth, P. A., Li, C.
NATL ACAD SCIENCES.2009: 19707-19714
- **Biogeography, changing climates, and niche evolution** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Wake, D. B., Hadly, E. A., Ackerly, D. D.
2009; 106: 19631-19636
- **Do complex population histories drive higher estimates of substitution rate in phylogenetic reconstructions?** *MOLECULAR ECOLOGY*
Ramakrishnan, U., Hadly, E. A.
2009; 18 (21): 4341-4343
- **PHYLOGEOGRAPHY OF *MICROTUS LONGICAUDUS* IN THE TECTONICALLY AND GLACIALLY DYNAMIC CENTRAL ROCKY MOUNTAINS** *JOURNAL OF MAMMALOGY*
Spaeth, P. A., Van Tuinen, M., CHAN, Y. L., Terca, D., Hadly, E. A.
2009; 90 (3): 571-584
- **Using phylochronology to reveal cryptic population histories: review and synthesis of 29 ancient DNA studies** *MOLECULAR ECOLOGY*
Ramakrishnan, U., Hadly, E. A.
2009; 18 (7): 1310-1330
- **Mammalian Response to Cenozoic Climatic Change** *ANNUAL REVIEW OF EARTH AND PLANETARY SCIENCES*
Blois, J. L., Hadly, E. A.
2009; 37: 181-208
- **Stable isotopes reveal seasonal competition for resources between late Pleistocene bison (*Bison*) and horse (*Equus*) from Rancho La Brea, southern California** *PALAEO GEOGRAPHY PALAEOCLIMATOLOGY PALAEOECOLOGY*
Feranec, R. S., Hadly, E. A., Paytan, A.
2009; 271 (1-2): 153-160
- **Climatic change and wetland desiccation cause amphibian decline in Yellowstone National Park** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
McMenamin, S. K., Hadly, E. A., Wright, C. K.
2008; 105 (44): 16988-16993
- **Fire and ice: genetic structure of the Uinta ground squirrel (*Spermophilus armatus*) across the Yellowstone hotspot** *MOLECULAR ECOLOGY*
van Tuinen, M., O'Keefe, K., Ramakrishnan, U., Hadly, E. A.
2008; 17 (7): 1776-1788
- **The role of molecular genetics in sculpting the future of integrative biogeography** *PROGRESS IN PHYSICAL GEOGRAPHY*
Riddle, B. R., Dawson, M. N., Hadly, E. A., Hafner, D. J., Hickerson, M. J., Mantooth, S. J., Yoder, A. D.
2008; 32 (2): 173-202
- **Environmental influences on spatial and temporal patterns of body-size variation in California ground squirrels (*Spermophilus beecheyi*)** *JOURNAL OF BIOGEOGRAPHY*
Blois, J. L., Feranec, R. S., Hadly, E. A.
2008; 35 (4): 602-613
- **Determining landscape use of Holocene mammals using strontium isotopes** *OECOLOGIA*

- Feranec, R. S., Hadly, E. A., Paytan, A.
2007; 153 (4): 943-950
- **The shifting baseline of northern fur seal ecology in the northeast Pacific Ocean** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Newsome, S. D., Etnier, M. A., Gifford-Gonzalez, D., Phillips, D. L., van Tuinen, M., Hadly, E. A., Costa, D. P., Kennett, D. J., Guilderson, T. P., Koch, P. L.
2007; 104 (23): 9709-9714
 - **Non-random patterns in the Yellowstone ecosystem: inferences from mammalian body size, order and biogeographical affinity** *GLOBAL ECOLOGY AND BIOGEOGRAPHY*
Bruzgul, J. E., Hadly, E. A.
2007; 16 (2): 139-148
 - **Radiocarbon dates from the pleistocene fossil deposits of Samwel Cave, Shasta County, California, USA** *RADIOCARBON*
Feranec, R. S., Hadly, E. A., Blois, J. L., Barnosky, A. D., Paytan, A.
2007; 49 (1): 117-121
 - **Bayesian estimation of the timing and severity of a population bottleneck from ancient DNA** *PLOS GENETICS*
Chan, Y. L., Anderson, C. N., Hadly, E. A.
2006; 2 (4): 451-460
 - **Ancient DNA reveals Holocene loss of genetic diversity in a South American rodent** *BIOLOGY LETTERS*
Chan, Y. L., Lacey, E. A., Pearson, O. P., Hadly, E. A.
2005; 1 (4): 423-426
 - **Community inertia of quaternary small mammal assemblages in North America** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
McGill, B. J., Hadly, E. A., Maurer, B. A.
2005; 102 (46): 16701-16706
 - **Detecting past population bottlenecks using temporal genetic data** *MOLECULAR ECOLOGY*
Ramakrishnan, U., Hadly, E. A., Mountain, J. L.
2005; 14 (10): 2915-2922
 - **Serial SimCoal: A population genetics model for data from multiple populations and points in time** *BIOINFORMATICS*
Anderson, C. N., Ramakrishnan, U., CHAN, Y. L., Hadly, E. A.
2005; 21 (8): 1733-1734
 - **Temporal response of the tiger salamander (*Ambystoma tigrinum*) to 3,000 years of climatic variation.** *BMC ecology*
Bruzgul, J. E., Long, W., Hadly, E. A.
2005; 5: 7-?
 - **Studying the effect of environmental change on biotic evolution: past genetic contributions, current work and future directions** *PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY A-MATHEMATICAL PHYSICAL AND ENGINEERING SCIENCES*
van Tuinen, M., Ramakrishnan, U., Hadley, E. A.
2004; 362 (1825): 2795-2820
 - **Genetic response to climatic change: Insights from ancient DNA and phylochronology** *PLOS BIOLOGY*
Hadly, E. A., Ramakrishnan, U., CHAN, Y. L., Van Tuinen, M., O'Keefe, K., Spaeth, P. A., Conroy, C. J.
2004; 2 (10): 1600-1609
 - **Similarities in body size distributions of small-bodied flying vertebrates** *EVOLUTIONARY ECOLOGY RESEARCH*
Maurer, B. A., Brown, J. H., Dayan, T., Enquist, B. J., Ernest, S. K., Hadly, E. A., Haskell, J. P., Jablonski, D., Jones, K. E., Kaufman, D. M., Lyons, S. K., Niklas, K. J., Porter, et al
2004; 6 (6): 783-797
 - **Error in estimation of rate and time inferred from the early amniote fossil record and avian molecular clocks** *JOURNAL OF MOLECULAR EVOLUTION*
van Tuinen, M., Hadly, E. A.
2004; 59 (2): 267-276
 - **Similarity of mammalian body size across the taxonomic hierarchy and across space and time** *AMERICAN NATURALIST*

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- Smith, F. A., Brown, J. H., Haskell, J. P., Lyons, S. K., Alroy, J., Charnov, E. L., Dayan, T., Enquist, B. J., Ernest, S. K., Hadly, E. A., Jones, K. E., Kaufman, D. M., Marquet, et al
2004; 163 (5): 672-691
- **Calibration and error in placental molecular clocks: A conservative approach using the cetartiodactyl fossil record** *JOURNAL OF HEREDITY*
van Tuinen, M., Hadly, E. A.
2004; 95 (3): 200-208
 - **Thermodynamic and metabolic effects on the scaling of production and population energy use** *ECOLOGY LETTERS*
Ernest, S. K., Enquist, B. J., Brown, J. H., Charnov, E. L., Gillooly, J. F., Savage, V., White, E. P., Smith, F. A., Hadly, E. A., Haskell, J. P., Lyons, S. K., Maurer, B. A., Niklas, et al
2003; 6 (11): 990-995
 - **The interface of paleontology and mammalogy: Past, present, and future** *JOURNAL OF MAMMALOGY*
Hadly, E. A.
2003; 84 (2): 347-353
 - **Ancient DNA evidence of prolonged population persistence with negligible genetic diversity in an endemic tuco-tuco (*Ctenomys sociabilis*)** *JOURNAL OF MAMMALOGY*
Hadly, E. A., Van Tuinen, M., Chan, Y., Heiman, K.
2003; 84 (2): 403-417
 - **Mammalian response to global warming on varied temporal scales** *JOURNAL OF MAMMALOGY*
Barnosky, A. D., Hadly, E. A., Bell, C. J.
2003; 84 (2): 354-368
 - **Mapping the origin of faunal assemblages using strontium isotopes** *PALEOBIOLOGY*
Porder, S., Paytan, A., Hadly, E. A.
2003; 29 (2): 197-204
 - **Temperate terrestrial vertebrate faunas in North and South America: Interplay of ecology, evolution, and geography with biodiversity** *CONSERVATION BIOLOGY*
Barnosky, A. D., Hadly, E. A., Maurer, B. A., Christie, M. I.
2001; 15 (3): 658-674
 - **Spatial and temporal patterns of species diversity in montane mammal communities of western North America** *EVOLUTIONARY ECOLOGY RESEARCH*
Hadly, E. A., Maurer, B. A.
2001; 3 (4): 477-486
 - **Fidelity of terrestrial vertebrate fossils to a modern ecosystem** *PALAEOGEOGRAPHY PALAEOCLIMATOLOGY PALAEOECOLOGY*
Hadly, E. A.
1999; 149 (1-4): 389-409
 - **A genetic record of population isolation in pocket gophers during Holocene climatic change** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Hadly, E. A., Kohn, M. H., Leonard, J. A., Wayne, R. K.
1998; 95 (12): 6893-6896