

Matthew D. Petrie

CONTACT INFORMATION

Department of Biology
University of New Mexico
MSC03 2020
1 University of New Mexico
Albuquerque, NM 87131-0001 USA

Mobile: +1-505-453-4706
Fax: +1-505-277-0304
E-mail:
matt@sevilleta.unm.edu

RESEARCH INTERESTS

The climate, ecology and hydrology of water and temperature-driven ecological systems vegetation ecology, ecohydrology, climatology, precipitation variability, surface hydrology, biophysical modeling, spatial and temporal scales, soil science, biogeography and landscape ecology, extreme events, drought, remote sensing, carbon and water cycling, energy exchange, vegetation optimality, eddy covariance, nutrient-use efficiency, pulse dynamics, nonlinear interactions, state transitions, rangelands, grasslands, woodlands

ACADEMIC APPOINTMENTS

Postdoctoral Scholar

Beginning January 2015

Department of Botany, University of Wyoming
Southwest Biological Science Center, United States Geological Survey

- Advisor: Professor William Lauenroth
- Advisor: Dr. John Bradford
- Affiliations:
 - Northern Arizona University

EDUCATION

University of New Mexico, Albuquerque, NM

Ph.D., Biology, September 2014

- Dissertation Topic: *Community ecology, climate change and ecohydrology in desert grassland and shrubland.*
- Major Advisor: Professor Scott L. Collins
- Affiliations:
 - Sevilleta Long Term Ecological Research Network
 - Sevilleta National Wildlife Refuge
 - Extreme Drought in Grasslands Experiment

University of Kansas, Lawrence, KS

M.A., Geography, May 2010, Honors

- Thesis Topic: *Climate change and the ecohydrology of grassland ecosystems.*
- Major Advisor: Professor Nathaniel A. Brunsell

B.S., Environmental Studies, May 2008, Honors & Distinction

- Land use emphasis
- Advisor: Professor Shannon O'Lear

SUBMITTED JOURNAL PUBLICATIONS

- [1] Petrie MD, Pockman WT, Pangle RE, Limousin JM, Plaut JA and McDowell NG. Winter climate change promotes altered spring growing season in Piñon-juniper woodlands, in review.
- [2] Petrie MD, Collins SL, and Litvak ML. The ecological role of small rainfall events in desert grassland, in review.
- [3] Ladwig LM, Ratajczak Z, Hafich K, Ocheltree T, Churchill AC, Fuss CB, Kazanski CE, Munoz JD, Petrie MD and Smith JG. Beyond arctic and alpine: the influence of winter climate on temperate ecosystems, in review.

REFEREED
JOURNAL
PUBLICATIONS

- [4] Petrie MD, Collins SL, Litvak ML, Swann AM and Ford PL. 2014. Grassland to shrubland state transitions enhance carbon sequestration in the northern Chihuahuan Desert. *Global Change Biology*, doi:10.1111/gcb.12743
- [5] Petrie MD, Collins SL, Gutzler DS and Moore DM. 2014. Regional trends and local variability in monsoon precipitation in the northern Chihuahuan Desert, USA. *Journal of Arid Environments*, 103: 63-70, doi:10.1016/j.jaridenv.2014.01.005
- [6] Petrie MD, Brunsell NA and Nippert JB. 2012. Climate change alters growing season flux dynamics of tallgrass prairie. *Theoretical and Applied Climatology*, 107: 427-440, doi:10.1007/s00704-011-0484-y
- [7] Petrie MD and Brunsell NA. 2012. Precipitation variability and the ecohydrology of grasslands. *Ecohydrology*, 5: 337-345, doi:10.1002/eco.224

PAPERS IN
PREPARATION

- [8] Petrie MD, Brunsell NA, Vargas R, Collins SL et al. Grassland sensitivity to precipitation and temperature in the Great Plains of North America.
- [9] Collins SL, Jones SK, Ladwig LM, Petrie MD and Pockman WT. Interactive effects of global change drivers on desert grassland structure and function.
- [10] Petrie MD, Pockman WT, Pangle RE, Limousin JM, Plaut JA and McDowell NG. Acclimation of piñon and juniper trees to water limitation decreases sensitivity to global-change-type drought events.

ORAL
PRESENTATIONS

- [11] Petrie MD and Collins, SL. 2014. *Ecological Society of America*. The ecological significance of seemingly insignificant small rainfall events in desert grassland.
- [12] Petrie MD. 2013. *University of New Mexico Department of Biology*. Climate change and the ecology and hydrology of grasslands and shrublands during dry years.
- [13] Petrie MD, Collins SL and Litvak ME. 2013. *Ecological Society of America*. Water-limited ecohydrology and carbon sink-source dynamics of desert grasslands and shrublands during dry years, Chihuahuan Desert, USA.
- [14] Ladwig L, Petrie MD and Hudson PJ. 2012. *University of New Mexico Department of Biology*. Grassland Fires, Hydrology, and Tree Mortality: A Sampling of Graduate Student Research Associated with the Sevilleta Long Term Ecological Research (LTER) Program.
- [15] Petrie MD, Collins SL and Gutzler DS. 2011. *Ecological Society of America*. Heterogeneity in monsoon precipitation across space and time: An analysis of the northern Chihuahuan Desert, USA.

POSTER
PRESENTATIONS

- [16] Petrie MD, Brunsell NA, Vargas R and Collins SL. 2013. *American Geophysical Union*. A collaborative characterization of North American grasslands and rangelands: climate, ecohydrology and carbon sink-source dynamics.
- [17] Ladwig LM, Ratajczak Z, Hafich K, Ocheltree T, Churchill AC, Fuss CB, Kazanski CE, Munoz JD, Petrie MD and Smith JG. 2013. *Ecological Society of America*. The surprising sensitivity of ecosystem structure and function to winter climate anomalies.
- [18] Petrie MD and Collins SL. 2012. *Ecological Society of America*. Seasonality in biomass production and sensitivity to precipitation history in Chihuahuan Desert grassland and shrubland plant communities in New Mexico, USA.
- [19] Petrie MD and Brunsell NA. 2009. *American Geophysical Union*. Nonlinear ecosystem responses to variable precipitation timing and magnitude using a low-dimensional modeling framework.

INVITED PRESENTATIONS [20] Petrie MD. 2014. *US Geological Survey Southwest Biological Science Center, Northern Arizona University*. The water-driven ecohydrology of southwestern US grassland and woodland ecosystems.

GRANTS, FELLOWSHIPS AND SCHOLARSHIPS Graduate Student, Ecological Society of America, Rangeland Ecology Section, Excellence in Rangeland Ecology Research Award. ESA Rangeland Ecology Section \$400, 2013

Graduate Student, University of New Mexico Department of Biology, Excellence in Research Grants & Scholarships. UNM Biology Grants and Scholarships \$3,000, 2013, 2014

Graduate Student, University of New Mexico Department of Biology, Graduate Research Allocations Committee (GRAC). UNM GRAC \$950, spring 2012, fall 2012, fall 2013

Graduate Student, Sevilleta Long Term Ecological Research Network, Graduate Student Summer Fellowship. Sevilleta LTER GSSF \$7,000, 2011, 2012

Undergraduate and Graduate Student, University of Kansas, \$14,000, 2004-2010

TEACHING EXPERIENCE **University of New Mexico**, Albuquerque, NM

Teaching Assistant **September 2012 to December 2012**
(student evaluations available upon request)

- BIOL 142: Plant & Animal Form & Function
 - Fall 2012 (2)

University of Kansas, Lawrence, KS

Teaching Assistant **August 2008 to May 2010**
(student evaluations available upon request)

- EVRN 320: Environmental Policy Analysis
 - Spring 2010
- EVRN 332: Environmental Law
 - Fall 2009
- EVRN 460: Field Ecology
 - Fall 2009
- EVRN 148: Principles of Environmental Studies
 - Fall 2008 (5), Spring 2009 (4)

ADDITIONAL EXPERIENCE Museum Collections Assistant **January 2011 to December 2011**
Herbarium, Museum of Southwestern Biology, University of New Mexico

Senior Energy Monitor **January 2007 to July 2008**
Chevron Power and Energy Management Company

SERVICE **Referee Service**

- *Journal of Arid Environments*
- *Global Change Biology*
- *Sustainability*
- *Bentham Science Publishers*

PROFESSIONAL MEMBERSHIPS **American Geophysical Union** **January 2008 to present**
Ecological Society of America **January 2011 to present**

SOFTWARE SKILLS The R Project for Statistical Computing:
• Statistics, data management & analysis, GIS (kriging, mapping, etc.), biophysical modeling, Monte Carlo simulations, Poisson distributions, cluster modeling, extreme value statistics
• S4 Object-oriented programming
Productivity Applications:
• \TeX (\LaTeX , \BibTeX), common office packages (Windows and Linux family)
• Python programming language

EXPERTISE Ecological sciences:
• Vegetation community ecology, mass and energy exchanges, soil moisture, climate drivers, disturbance and degradation, ecological state transitions, microbial ecology and extracellular enzymes, nutrient cycling, pulse dynamics
Earth and environmental sciences:
• Climatology, hydrology, biophysics, soil science, microclimatology, issues of spatial and temporal scale, mass and energy exchanges
Techniques:
• Low-dimensional modeling (climate, ecology, hydrology), Poisson and stochastic processes, Monte Carlo simulations, extreme values statistics, GIS, field manipulations and experiments, remote sensing, eddy covariance, cluster modeling, long-term data, sensor networks

REFERENCES AVAILABLE TO CONTACT **Dr. Scott L. Collins**
(e-mail: scollins@sevilleta.unm.edu; ph: +1-505-277-6303; fax: +1-505-277-0304)
• Regents' Professor, Department of Biology, University of New Mexico
• Director, Sevilleta Long Term Ecological Research Network
◇ Department of Biology, 167 Castetter Hall, MSC03 2020,
1 University of New Mexico, Albuquerque, NM 87131-0001

Dr. Nathaniel A. Brunsell
(e-mail: brunsell@ku.edu; ph: +1-785-864-2021; fax: +1-785-864-5378)
• Associate Professor, Department of Geography and Atmospheric Sciences Program, University of Kansas
◇ Dept. of Geography and Atmospheric Sciences Program, 214B Lindley Hall, University of Kansas, Lawrence, KS 66045-7316

Dr. David S. Gutzler
(e-mail: gutzler@unm.edu; ph: +1-505-277-3328; fax: +1-505-277-8843)
• Professor, Department of Earth & Planetary Sciences, University of New Mexico
◇ Department of Earth & Planetary Sciences, Northrop Hall, MSC03-2040,
1 University of New Mexico, Albuquerque, NM 87131-0001

Dr. William T. Pockman
(e-mail: pockman@unm.edu; ph: +1-505-277-2724; fax: +1-505-277-0304)
• Professor, Department of Biology, University of New Mexico

◇ Department of Biology, 167 Castetter Hall, MSC03 2020,
1 University of New Mexico, Albuquerque, NM 87131-0001