

## Zak Ratajczak, Curriculum Vitae (updated December 2016)

Office 434 Birge Hall

430 Lincoln Drive

Madison, WI 53706

Email: Ratajczak@virginia.edu

Website: <http://zaratajczak.wix.com/zak-ratajczak>

### Appointments

---

- 2016, Fall** Visiting Post-Doctoral Scholar  
Grantham Research Institute on Climate Change and the Environment  
London School of Economics
- 2014-2017** NSF Post-Doctoral Fellow in Math and Biology  
Department of Environmental Sciences, University of Virginia  
Grantham Research Institute on Climate Change and the Environ., London School of Economics  
Department of Zoology, University of Wisconsin  
advised by Paolo D'Odorico, Alessandro Tavoni, and Monica Turner (respectively)

### Education

---

- 2010-2014** Kansas State University, PhD in Biology  
Advisor: Jesse B. Nippert  
"Ecological Thresholds and Abrupt Transitions of Tallgrass Prairie to Shrublands and Woodlands"
- 2006-2010** Vassar College, Bachelor of Arts in Earth Science (w/honors) and Biology (w/honors)  
Advisors: David P. Gillikin (Earth Science) & A. Marshall Pregall (Biology)  
"Dendrochronology and dendrochemistry ( $\delta^{13}\text{C}$ ) of coastal Loblolly Pine (*Pinus taeda*) in relation to climate, hurricanes, and soil salinity"

### Research Interests

---

Ecosystem Resilience and Stability, Biodiversity, Climate Change, Grasslands/Rangelands/Woodlands, Theoretical Ecology, Nonequilibrium Dynamics

### Fellowships

---

- 2014-2016** NSF Post-Doc in Biology and Mathematics
- 2010-2014** Graduates Addressing Areas of National Need (GAANN) Fellowship, U.S. Department of Education and Kansas State University Division of Biology
- 2009** NSF-REU Fellowship, Konza Prairie LTER

### Grants

---

- 2014** **NSF Post-Doc in Biology: Combining Math and Biology**, \$236K "Does economic connectedness undermine environmental stability?" (PI-Zak Ratajczak)
- 2013** **Cross-site Synthesis Grant**, Long Term Ecological Research Network, \$20K "Sensitivity of ecosystem properties to winter climate anomalies" (PI-Laura Ladwig)

- Green Action Fund**, Kansas State University, \$9K “The Meadow: Informal Learning through Experiences of Landscape and Art” (PI- Katie Kingery Page)
- 2012** **Cross-site Synthesis Grant**, Long Term Ecological Research Network, \$12K “Bi-stability in grasslands and shrublands” (PI-Zak Ratajczak)
- 2011** **Weaver Competitive Grant**, Nature Conservancy Nebraska Chapter, \$1K
- 2009** **Collins Student Research Grant**, Environmental Research Institute, \$1K

## Awards

---

- 2014**
- Michael Scott Watkins Award for Excellent Graduate Student Teaching**  
Kansas State University, Division of Biology
- H. Henley Haymaker Award for outstanding presentation by a Graduate Student**  
Kansas State University, Division of Biology
- Chris Edler Award for Outstanding Research on Konza Prairie**  
Kansas State University, Division of Biology
- 2013**
- Best Short Talk**  
Kansas State University, Division of Biology
- 2012**
- John C. Frazer Award for Excellence in Graduate Research in Plant Biology**  
Kansas State University, Division of Biology
- 2010**
- Virginia Swinburne Brownell Prize for excellence in Biology**  
Outstanding Thesis in Biology, Vassar College
- Erminie Smith Prize for excellence in Geology**  
Earth Science Thesis Award, Vassar College
- Sigma XI, Honorary Vassar Chapter Membership**  
Vassar College
- Young Botanist Award**  
Botanical Society of America
- 2008**
- Harriet Van Gurnee Allen Award**  
Outstanding Sophomore Biology student, Vassar College

## Publications

**\*=graduate first author; \*\*=undergraduate first author**

---

### (Submitted/In review)

\*Ning C., Yu K., Ratajczak Z. (*In Review*) Dryland revegetation in northern China: success or failure? alternative stable states or alternative transients? *Journal of Applied Ecology*.

\*Jing G., W. Li, Yu K., **Ratajczak Z.**, Kallenbach R.L. and Cheng J. (*In Review*) Responses of restored grasslands to fertilization, burning, and grazing on the Loess Plateau of China. *Applied Vegetation Science*.

\*Miller J.E.D., Damschen E.I., **Ratajczak Z.** and Özdoğan M. (*In Review*) Holding the line: prescribed fire halts but does not reverse 75 years of woody encroachment. *Landscape Ecology*.

**Ratajczak Z.**, D'Odorico P., Suweis S. and Tavoni A. (*In Review*) "Habitat destruction and regime shift debts: results from ecological models with spatial connectivity and large-scale feedbacks". *Landscape Ecology*.

Brunsell N., Van Vleck E.S., Nosschi M., **Ratajczak Z.**, Nippert J.B. (*In Review*) Fire frequency is more important than rainfall for woody encroachment in grasslands. *Geophysical Research Letters*.

#### (Published or In Press)

Seakell D. Carr J., Dell'Angelo J., Gephart J., Kummu M., Magliocca N., Porkka M., Prell P., Puma M.J., **Ratajczak Z.**, Rulli M.C., Seekell D.A., Suweis S., Tavoni A., D'Odorico P. (*In Press*) Conceptualizing and quantifying resilience in the global food system. *Environmental Research Letters*.

**Ratajczak Z.**, D'Odorico P., Collins S.L., Bestelmeyer B., Isbell F. and Nippert J.B. (*In Press*) The interactive effects of press/pulse intensity and duration on regime shifts at multiple scales. *Ecological Monographs*.

**Ratajczak Z.**, D'Odorico P. and Yu K. (*In Press*) The enemy of my enemy: why coexisting with grasses might be an adaptive strategy for savanna trees. *Ecosystems*.

**Ratajczak Z.**, D'Odorico P.D., Nippert J.B., Collins S.L., Brunsell N. and Ravi S. (*In Press*) Changes in spatial variance during a grassland to shrubland state transition. *Journal Ecology*.

\*\*Klodd A.E, Nippert J.B., **Ratajczak Z.**, Waring H. and Phoenix G. (2016) Tight coupling of leaf area index to canopy nitrogen and phosphorus indicate co-limitation across heterogeneous tallgrass prairie communities. *Oecologia* 182: 889-898.

Marchand P., Carr J., Dell'Angelo J., Gephart J., Kummu M., Magliocca N., Porkka M., Prell P., Puma M.J., **Ratajczak Z.**, Rulli M.C., Seekell D.A., Suweis S., Tavoni A., D'Odorico P. (2016) Reserves and trade jointly determine exposure to food supply shocks. *Environmental Research Letters* 11: 095009.

\*Honglin L., Kailiang Y.\*, **Ratajczak Z.**, Nippert J.B. and Guozhen D. (2016) When variability outperforms the mean: trait plasticity predicts plant performance in an alpine wetland. *Plant and Soil* 407: 401-415.

Fader, M., Rulli M.C., Carr J., Dell'Angelo J., D'Odorico P., Gephart J., Kummu M., Magliocca N., Porkka M., Prell P., Puma M.J., **Ratajczak Z.**, Seekell D.A., Suweis S., Tavoni A. (2016) Past and present biophysical redundancy of countries as a buffer to changes in food supply. *Environmental Research Letters* 11: 055008.

**Ratajczak Z.**, Briggs J.M., Goodin D.G., Luo L., Mohler R.L., Nippert J.B. and Obermeyer B. (2016) Assessing the potential for transitions from tallgrass prairie to woodlands: are we operating beyond critical fire thresholds. *Journal of Rangeland Ecology and Management* 69: 280-287.

Ladwig L.M., **Ratajczak Z.**, Ocheltree T.W., Hafich K., Churchill A.C., Frey S.J.K., Fuss C.B., Kazanski C.E., Muñoz J.D., Petrie M., Reinmann A.B. and Smith J.G. (2016) Beyond arctic and alpine: the influence of winter climate on temperate ecosystems. *Ecology* 92: 372-382.

**Ratajczak Z.**, Blair J.B., Nippert J.B. and Briggs J.M. (2014) Fire dynamics distinguish grasslands, shrublands, and woodlands as alternative attractors in the Central Plains. *Journal of Ecology* 102: 1374-1385.

**Ratajczak Z.**, Nippert J.B. and Ocheltree T.W. (2014) Abrupt shift of mesic grassland to shrubland: multiple lines of evidence for thresholds, alternative attractors, and regime shifts. *Ecology* 95: 2633-2645.

Nippert J.B., Ocheltree T.W., Orozco G., **Ratajczak Z.**, Ling B., and Skibbe A. (2013) Evidence of physiological decoupling from grassland ecosystem drivers by an encroaching woody shrub. *PLoS ONE* 8: e81630.

**Ratajczak Z.** and Nippert J.B. (2012) Technical Comment 'Global Resilience of Tropical Forest and Savanna to Critical Transitions'. *Science* 336: 541-c.

**Ratajczak Z.**, Nippert J.B., and Collins S.L. (2012) Woody encroachment decreases diversity across North American grasslands and savannas. *Ecology* 93: 697-703.  
*Featured Article in Ecology*

**Ratajczak Z.**, Nippert J.B., Hartman J.C. and Ocheltree T.W. (2011) Positive feedbacks amplify rates of woody encroachment in tallgrass prairie. *Ecosphere* 2: art121.  
*Covered in an ESA blog and podcast*

## Presentations (first authored only)

\*= invited

---

2016

**Ecological Society of America Annual Meeting**

*"Spatial properties and ecological resilience to extreme driver pulses"*

**Konza Prairie LTER Annual Meeting**

*Relationships between grassland resilience, diversity, and heterogeneity*

2015

**\*Global Forum on Urban and Regional Resilience**

*"Can we learn to recognize when ecosystem are in the middle of a slow motion collapse?"*

**Americas Grasslands, World Wildlife Foundation and others**

*Mapping the potential for fire induced transitions of tallgrass prairie to shrubland and woodland: are we near a tipping point?*

**Ecological Society of America Annual Meeting**

*"The temporal dimension of regime shifts: How long can ecosystems operate beyond critical thresholds before transitions become irreversible?"*

2014

**\*Jones Research Center**

*"Fire Frequency Tipping Points in Grasslands, Shrublands, and Woodlands: a long term, large-scale assessment"; Ignite Talk*

**Ecological Society of America Annual Meeting**

*"Quantifying strength and scale of feedback mechanisms to prevent terrestrial regime shifts"*

2013

**\*University of Kansas**

*"Catastrophic shift of grasslands to shrublands: ecological and social resilience of the Central Great Plains"*

**\*University of Missouri**

*"Catastrophic shift of grassland to shrubland: merging ecological theory and conservation"*

**\*Ecological Society of America Annual Meeting (organized oral session)**

*"Bi-stability, compromised resilience, and state-shift indicators: abrupt shift of tallgrass prairie to degraded shrubland"*

**Ecological Society of America Annual Meeting**

*“Leading—and misleading—indicators of grassland-shrubland transitions”*

**Annual Savanna Science Networking Meetings, South Africa National Parks**

*“Abrupt shifts from grasslands to woodlands: understanding their causes and developing warning signs”*

2012

**LTERR All Scientists Meeting, Dormant Season Ecology Working Group**

*“The Critical Climate Period Approach”*

**Konza Prairie LTER Annual Meeting**

*“Grasslands and shrublands as alternative stable states: mechanisms and multi-scale evidence”*

**Kansas State University BioForum**

*“The effects of woody encroachment on global biodiversity: a meta-analysis”*

2011

**\*Sheffield University Plant Ecology and Arctic Research group**

*“Positive feedbacks, demographic bottlenecks and the transformation of tallgrass prairie to savanna/forest”*

**Posters (only those presented by ZR)**

---

2016

**After the extreme—what happens when thresholds are crossed? INTERFACE/CLIMANI Workshop, Florence Italy**

*“Tripping ecosystem thresholds: the role of extreme event duration versus magnitude”*

2015

**All Scientists Meeting, LTER Network Meeting**

*“Are critical ecosystem thresholds defined by the magnitude or duration of exogenous forcing?”*

2013

**America’s Grasslands Conference**

*“Indicators that tallgrass prairie is becoming susceptible to rapid expansion by native shrubs”*

**Annual Savanna Science Networking Meetings, South Africa National Parks**

*“The effect of woody encroachment on plant diversity in global grasslands and savannas: a meta-analysis”*

2012

**LTERR All Scientists Meeting**

*“Widespread abrupt shifts of grasslands to a wooded state: woody encroachment in a stable state and socio-economic framework”*

**Konza Prairie LTER Annual Meeting**

*“Woody encroachment decreases diversity across North American grasslands”*

2011

**Grasslands in a global context, Institute for Grassland Studies**

*“Woody encroachment decreases diversity across North American grasslands”*

**Konza Prairie LTER Site Review and Annual Meeting**

*“Biological feedbacks and the transformation of tallgrass prairie to savanna/forest”*

**Role of Stable isotopes in water cycle research**

*“Biological feedbacks and the transformation of tallgrass prairie to savanna/forest”*

2010

**Geological Society of America Northeast Chapter Meeting**

*“The direct and interactive effects of precipitation, salinity and hurricanes on tree-ring  $\delta^{13}\text{C}$  of coastal pine”*

**Travel Grants**

---

2013

ESA, Rangeland Ecology Chapter

- 2012 ESA, Long-Term Studies Research Chapter
- 2010 Academic Enrichment Fund, Vassar College  
GSA Student Travel Grant, Geological Society of America Northeast Chapter

## College Teaching Experience

---

- 2013 Plant Physiology, Kansas State University
- 2012 Two Sections Principles of Biology Studio, Kansas State University
- 2011 Two Sections Principles of Biology Studio, Kansas State University
- 2010 Principles of Biology Studio, Kansas State University

## Synergistic Activities

---

- 2016 **Participated in “After the extreme—what happens when thresholds are crossed?”** (Hosted by INTERFACE/CLIMANI)
- 2015 **Participated in the “America’s Grasslands” Conference and Symposium** a meeting that brought together farmers, ranchers, policy advocates, industry, and scientists (Hosted by WWF, CSU and USDA-ARS).
- 2015 **Participated in the “Frequent Fire Conifer Ecosystems” Synthesis Workshop** involving private sector, government researchers, and academics, addressing evolving ecological and social issues in frequent fire forests (hosted by Jones Research Center and USFS).
- 2014-2015 **Participated in three syntheses workshops on the topic of “The effects of international trade and land grabbing on food security”** (hosted by SESYNC).
- 2013 to 2015 **Student Site Representative for Konza Prairie LTER Prairie Studies Institute Prairie Research Institute, Steering Committee and Founding Member**  
Trans-disciplinary graduate and faculty course in Art, Architecture, Performing Arts, Humanities, and Science. [Click here for website.](#)
- 2013 **Participated in the “America’s Grasslands” Conference and Symposium** a meeting that brought together farmers, ranchers, policy advocates, industry, and scientists (Hosted by WWF and KSU Biology).
- 2013 **Co-organized a 4-day synthesis workshop at the Sevilleta LTER** on the topic of “Sensitivity of ecosystem structure/function to winter climatic variation”.
- 2013 **Organized a 4-day synthesis workshop at the Konza LTER** on the topic of “Early warning signs for grassland to woodland transitions”.
- 2012 to 2013 **EPA Rainworks Challenge, Kansas State University, Department of Landscape Architecture and Urban Planning:** Volunteer teaching and acting as a ‘consultant,’ meeting with teams of undergraduate students that are developing grant proposals for the EPA Rainworks Grant, a competition to integrate rain gardens into college campuses. [One team received has a runner-up award.](#)
- 2012 **Participated in the South American Resilience and Sustainability (SARAS<sup>2</sup>) Workshop** on “Causes and Consequences of Grassland-Woodland Transitions”, a merging of the arts, humanities, and science to address abrupt transitions between grasslands and woodlands (hosted by SARAS).
- 2012 **Co-organized a graduate Student Working group for the LTER “All Scientists Meeting”** on the topic of “Dormant Season Ecology and Critical Climate Periods”.

- 2012**            **Organized a 4-day synthesis workshop at the Sevilleta LTER** on the topic of “Woody Encroachment and Bi-Stability”.
- 2011 to 2014**    **“Prairie Restoration on Campus,” Kansas State University, Beach Museum of Art and Department of Architecture and Urban Planning:** I helped design and install a restored prairie on campus as a teaching tool that merges art and science. I have been contributing to the restoration design, educational materials, grant writing, and starting undergraduate research projects on restoration and plant ecophysiology. [Click here for website.](#)

## Volunteer Work

---

- 2011-2013**        **Stillwater Elementary School, Stillwater NY** lead reoccurring lectures & activities in two 6th grade classrooms, helping them with ‘Model Unite Nations’ exercises. I also act as in a more in depth mentor for students working in Africa and Russia.
- 2010-2013**        **“Konza Prairie Educational Tour Guide” Konza Prairie Biological Station** give educational and interactive tours to college students, GK-12 teachers, and the public.
- 2012**            **Girls Researching Our World (GROW), Kansas State University:** engage female middle-school students in Scientific Research and Education activities at Konza Prairie Research Station.

## Journals Reviewed For

---

Agricultural and Forest Meteorology, Austral Ecology, Bioscience, Bulletin of Mathematical Biology, Carbon Balance and Management, Crop and Pasture Science, Ecological Applications, Ecosphere, Ecosystems, Fire Ecology, Global Change Biology, Journal of Applied Ecology, Journal of Arid Environments, Journal of Ecology, Journal of Vegetation Science, International Journal of Climatology, Oecologia, Oikos, Nature Climate Change, PLoS ONE, Remote Sensing

## Professional References

---

Dr. Jesse Nippert  
Associate Professor, Division of Biology  
Kansas State University  
Manhattan, KS, U.S.A.  
Phone: (785) 532-0114  
Email: [nippert@ksu.edu](mailto:nippert@ksu.edu)

Dr. Anthony Joern  
Distinguished Professor, Division of Biology  
Kansas State University  
Manhattan, KS  
Phone: (785) 532- 7073  
Email: [ajoern@ksu.edu](mailto:ajoern@ksu.edu)

Dr. Scott Collins  
Professor, Division of Biology  
University of New Mexico  
Albuquerque, NM, U.S.A.  
Phone: (502) 277-6306  
Email: [scollins@sevilleta.unm.edu](mailto:scollins@sevilleta.unm.edu)

Dr. Paolo D'Odorico  
Professor, Environmental Science  
University of Virginia  
Charlottesville, VA, U.S.A.  
Phone: (434) 924-7241  
Email: [paolo@virginia.edu](mailto:paolo@virginia.edu)