

Sarah Ivory

Postdoctoral Scholar
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Research Interests

I will be starting as an Assistant Professor in the Department of Geosciences at Pennsylvania State University as of July 2018.

I use paleoecological records from fossil pollen along with models and data analysis to better understand changes in vegetation related to climate and ecological dynamics.

Education

- 2013 PhD, Geosciences
University of Arizona
Dissertation Title: *Vegetation and Climate of the African Tropics for the last 500,000 years*
Committee: Andrew Cohen, Joellen Russell, Anne-Marie Lézine, Owen Davis, Steve Jackson, Jonathan Overpeck
- 2006 BS, Biology (Botany focus), French, Summa cum laude
University of Wisconsin – Eau Claire

Professional Appointments

- 2014-2016 Voss Postdoctoral Fellow, Institute at Brown for the Study of Environment and Society, Brown University, Mentors: James Russell and Dov Sax
- 2013-2014 Postdoctoral Researcher, University of Arizona
- 2012-2013 Teaching Assistantship, University of Arizona
Courses: *Life on Earth* and *Geological Perspective*
- 2009-2012 National Science Foundation - Graduate Research Fellow
University of Arizona
- 2007-2008 Research Technician, Laboratoire des Sciences du Climat et de l'Environnement (LSCE) – CNRS, Paris, France

Publications (published or in review)

1. Ivory, S., Early, R., Russell, J.M., Sax, D., Large-scale future range collapse of African montane forests, in review at *Ecology Letters*.
(Role - conceptual framework, data analysis, manuscript production)
2. Nolan, C., Jackson, S., Overpeck, J., Allen, J., Anderson, P..... Ivory, S., et al. Past and future global transformation of terrestrial ecosystems under climate change, in revision at *Science*.
(Role – data acquisition and analysis)

3. **Ivory, S.**, Russell, J. Lowland forest collapse at the end of the African Humid Period at Lake Edward, Equatorial East Africa, *Quaternary Research*, 2017.
(Role – conceptual framework, data analysis, manuscript production)
4. **Ivory, S.**, McGlue, M.M., Ellis, G.S., Boehlke, A., Cohen, A.S., Scholz, C.A., Vegetation controls on weathering intensity in Southeast Africa, *Geology*, 2017.
(Role – conceptual framework, data analysis, manuscript production)
5. Lézine, A.-M., **Ivory, S.**, Braconnot, P., Marti, O., Timing of the southward retreat of the ITCZ at the end of the Holocene Humid Period in Southern Arabia: data-model comparison, *Quaternary Science Reviews*, 2017.
(Role – data analysis, manuscript production)
6. McGlue, M., Palacios-Fest, M., Cusminksy, G., Camacho, M., **Ivory, S.**, Kowler, A., Chakraborty, S., Ostracode biofacies and shell chemistry reveal Quaternary aquatic transitions in the Pozuelos Basin (Argentina), *PALAIOS*, 2017.
(Role – data analysis, manuscript production)
7. **Ivory, S.**, Blome, M., King, J., McGlue, M., Cole, J., Cohen, A. Environmental change explains cichlid adaptive radiation at Lake Malawi over the past 1.2 million years, *Proceedings of the National Academy of Science*, 2016.
(Role – conceptual framework, data analysis and age model construction, manuscript production)
8. **Ivory, S.**, and Russell, J.M. Climate and disturbance controls on tropical African forest for the last 60ka, *Quaternary Science Reviews*, 2016.
(Role – conceptual framework, data analysis, manuscript production)
9. Russell, J., Bijaksana, S., Vogel, H., Melles, M., ... , **Ivory, S.**, et al. The Towuti Drilling Project: Paleoenvironments, Biological Evolution, and Geomicrobiology of a Tropical Pacific Lake, *Scientific Drilling*, 2016.
(Role – field and laboratory work, manuscript production)
10. **Ivory, S.**, Early, R., Sax, D., Russell, J.M., Niche expansion and temperature sensitivity of tropical African montane forests, *Global Ecology and Biogeography*, 2016.
(Role – conceptual framework, data analysis, manuscript production)
11. Cohen, A., Campisano, C., Arrowsmith, R., **Ivory, S.** et al., The Hominin Sites and Paleolakes Drilling Project: Inferring the Environmental Context of Human Evolution from Eastern African Rift Lake Deposits, *Scientific Drilling*, 2016.
(Role – data analysis, field work, manuscript editing)
12. Lyons, R., Scholz, C., Cohen, A., King, J., Brown, E., **Ivory, S.**, et al., A continuous 1.3 million year record of East African hydroclimate, and its implications for patterns of evolution and biodiversity, *Proceedings of the National Academy of Science*, 2015.
(Role – data analysis and age model construction)

13. **Ivory, S.**, McGlue, M.M., Ellis, G.S., Lézine, A.-M., Vincens, A., Cohen, A., Vegetation controls on weathering intensity during the last deglacial transition in southeast Africa, *PLOS ONE*, 2014.
(Role – conceptual framework, data analysis, manuscript production)
14. **Ivory, S.**, Russell, J., Cohen, A. – In the hot seat: Insolation, ENSO, and vegetation in the African tropics, *Journal of Geophysical Research –Biogeosciences*, 118, 1347–1358. 2013.
(Role – conceptual framework, data analysis, manuscript production)
15. **Ivory, S.**, Lézine, A.-M., Vincens, A., Cohen, A. - Effect of aridity and rainfall seasonality on vegetation in the southern tropics of East Africa during the Pleistocene/Holocene Transition, *Quaternary Research*, 77, 77-76, 2012.
(Role – conceptual framework, data analysis, manuscript production)
16. Beuning, K., Zimmerman, K., **Ivory, S.**, Cohen, A. Vegetation response to glacial-interglacial climate variability near Lake Malawi in the southern African tropics, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 303, 81-92, 2011.
(Role –data analysis, manuscript production)
17. **Ivory, S.**, Lézine A.-M. - Climate and Environmental change at the end of the Holocene Humid Period: a pollen record off Pakistan, *CR-Geosciences*, 340, 760-769, 2009.
(Role – conceptual framework, data analysis, manuscript production)
18. Cohen, A., Stone, J., Beuning, K., Park, L., Reinthal, P., Dettman, D., Scholz, C., Johnson, T., King, J., Talbot, M., Brown, E., and **Ivory, S.** Ecological consequences of Late Pleistocene Megadrought in Equatorial Africa. *Proceedings of the National Academy of Science* 104:16422-16427, 2007.
(Role –data analysis, manuscript production)

Publications (in preparation and to be submitted in <3 months)

Ivory, S., Lézine, A.-M., Vincens, A., Cohen, A., McGlue, M., Waxing and Waning of Forests: Late Quaternary Biogeography of Lake Malawi, Southeast Africa, in prep.

(Role – conceptual framework, data analysis, manuscript production)

McGlue, M.M., **Ivory, S.**, Ellis, G.S., Boehlke, A., Cohen, A.S., Lake Malawi drill core stratigraphy and implications for source rock formation, in prep.

(Role – conceptual framework and manuscript editing)

Grants and Awards

Successful

2017	NSF Integrated Earth Systems Title: Collaborative Research: Interactions Between Incipient Continental Rifting, Fluvial Systems, and Regional Climate in Southern Africa: The Okavango-Makgadikgadi Complex, Botswana (co-PI)	\$150,000
2016	NSF Coupled Human and Natural Systems Title: CNH-L: Pastoral Territoriality as a Dynamic Coupled System (Senior Personnel – co-written)	total \$1,700,000
2016	Brown University UTRA Research Grant	\$3500
2015	Brown University UTRA Research Grant	\$3000
2014	Brown University Voss Postdoctoral Fellowship Grant	\$10,000
2009-2012	NSF Graduate Research Fellowship Grant	\$100,000
2011	Galileo Circle Scholar Award	\$1000
2010	Institute of the Environment Travel Grant	\$1000
2010	Graduate Student Council Travel Grant	\$1000
2009	DOSECC Summer Internship Award	\$6000

*2016 The Nature Conservancy NatureNet Fellowship (Declined)

Recognition in Media

Environmental change drove diversity in Lake Malawi cichlids, Brown University Press Release, <https://news.brown.edu/articles/2016/09/malawi>
-Also covered in the *Environmental Monitor*:
<http://www.fondriest.com/news/sediment-cores-reveal-secrets-lake-malawi-cichlid-diversity.htm>

Science, Highlight of recent paper on the future of Afromontane forests
<http://science.sciencemag.org/content/352/6292/1422.3>

A Human Climate, Earth Images Foundation, short video of environmental research to better understand the context of human evolution to be shown at international museums. <http://www.earthimage.org/Africa.html>

Drilling from Above, Ray Globe Productions, short video of scientific drilling operations on Lake Towuti, Indonesia,
<https://www.facebook.com/towutidrilling>

Professional and Field Experience

- 2017 Ancient Socio-ecological systems of OMan (ASOM)
-Collaborative fieldwork with archeologists in Oman, including the location and sampling of fossil hyrax middens for paleoecological analysis
- 2015 Lake Towuti Drilling Project
-Science principal investigator and data curation during core drilling field work in Sulawesi, Indonesia
- 2014 Hominin Sites and Paleolakes Drilling Project
-Postdoctoral researcher doing field logistics coordination, drilling data curation, and site supervision
- 2012 Laboratoire de l'Océanographie et du Climat (LOCEAN) –
CNRS/Université de Paris VI, Paris, France
-Research Assistantship in palynology on Lake Malawi drill cores
- 2008-2011 Laboratoire des Sciences du Climat et de l'Environnement (LSCE) –
CNRS, Paris, France
-Research Assistantship in palynology on Lake Malawi drill cores
- 2007-2008 Laboratoire des Sciences du Climat et de l'Environnement (LSCE) –
CNRS, Paris, France
-Research Technician in palynology of Arabia and Pakistan
- 2005-2007 University of Wisconsin – Eau Claire
- Laboratory Assistant responsible for sample processing and pollen identification
- 2005-2005 Eau Claire County – Wisconsin
- Taxonomic surveyor in «Guettinger Woods» responsible for identification of plant species and habitat types
- 2003-2004 University of Wisconsin – Eau Claire
- Laboratory Assistant responsible for extraction of DNA from North American *Prunus* species, collection and organization of data
- 2003-2006 University of Wisconsin – Eau Claire: University Herbarium
- Laboratory Assistant responsible for preparation and organization of mounted archival herbarium specimens

Invited Lectures (Selected)

- 2017 Invited seminar speaker at University of Kentucky, *Human and climatic dimensions of African forests*.
- 2017 Invited seminar speaker at Pennsylvania State University, *The past and future of African forests: inferences from muds and models*.
- 2017 Invited lecture at the Oman Botanic Garden, *Initial Location and Investigations for Hyrax middens for ancient vegetation reconstruction*

- 2016 Invited Lake Tanganyika paleoecology workshop speaker at University of Basel, *Paleoecology and source to sink dynamics in East Africa, application and planning for Lake Tanganyika drilling*
- 2016 Invited seminar speaker at Michigan Technological University, *Learning from the past: inferences from muds and models.*
- 2015 Invited STEPPE workshop speaker at AGU 2015, *Paleoecology and source to sink dynamics in East Africa, application and planning for Lake Tanganyika drilling*
- 2015 Invited Paleoclimate seminar speaker at Lamont Doherty Earth Observatory, *Paleoecology and continental drilling in the tropics*
- 2015 Invited speaker for fall meeting of Geological Society of America, session title: *Paleoecological Patterns, Ecological Processes, Modeled Scenarios: Crossing Temporal Scales to Understand an Uncertain Future*, talk title: *The past and future of Africa forests: inferences from muds and models.*
- 2015 Invited Paleoecology seminar speaker at Woods Hole Oceanographic Institute, *The past and future of Africa forests: inferences from muds and models.*
- 2014 Invited master's convocation speaker at King's College London, *Vegetation controls on weathering intensity in Southeast Africa.*
- 2014 Invited speaker at the Wisconsin Geological Survey and University of Wisconsin – Department of Geography seminar, *Vegetation controls on weathering intensity in Southeast Africa.*
- 2014 Guest lecturer at University of Kentucky for Paleolimnology course, lecture *African Great Lakes and their hinterlands.*
- 2013 Invited speaker for workshop on “Forests from central Africa: present and past biodiversity: What is at stake for the future?” Yaoundé, Cameroun
- 2012 Invited speaker for workshop on African climate-vegetation interactions, MARUM Center for Marine Environmental Sciences, University of Bremen, Germany
- 2011 Invited speaker for NSF African Great Lakes Drilling Workshop, Brown University, Providence, Rhode Island, *Tertiary/Quaternary vegetation dynamics in East Africa: Questions for a long core*
- 2008 Invited speaker at l'Académie des Sciences, Paris (French National Academy of Sciences), *Climate and Environmental change at the end of the Holocene Humid Period: a pollen record off Pakistan*

Conference Abstracts (selected)

- 2016 Poster presentation for American Geophysical Union (AGU) Fall Meeting, *Climate and disturbance controls on tropical African forests.*
- 2015 Poster presentation for American Geophysical Union (AGU) Fall Meeting, *Climate change and early human land-use in a biodiversity hotspot, the Afromontane region*
- 2015 Poster presentation for Geological Society of America (GSA) Fall Meeting (with student co-author Josephine Benson as primary presenter), *Vegetation and climate change in equatorial East Africa from a 6000 yr pollen record, Lake Edward, Uganda*
- 2014 Oral presentation for American Geophysical Union (AGU) Fall Meeting, *Waxing and Waning of Forests: Late Quaternary biogeography of Lake Malawi, southeast Africa.*
- 2013 Poster presentation for American Geophysical Union (AGU) Fall Meeting, *Vegetation controls on weathering intensity in Southeast Africa.*

- 2011 Oral presentation for the International Union for Quaternary Research (INQUA), *Tropical vegetation and high-amplitude climate variability: the Last Interglacial at Lake Malawi, southeast Africa*
- 2010 Oral presentation for American Geophysical Union (AGU) Fall Meeting, *In the hot seat : Insolation and ENSO controls on vegetation productivity in tropical Africa inferred from NDVI*
- 2009 Oral presentation for Geological Society of America (GSA) Fall Meeting, *Vegetation and climate of Lake Malawi, Southeast Africa during the Last Deglaciation*
- 2008 Poster for International Palynology Congress, Bonn, Germany, *Climate and Environmental change at the end of the Holocene Humid Period: a pollen record off Pakistan*

Student Mentorship

University of Arizona

Undergraduate research supervisor

Preston Smith (lacustrine sedimentology)

PhD student mentorship

Chimene Assi-Kaudjis (African palynology)

Postdoctoral mentorship

Marie Mathis (African palynology)

Brown University

Undergraduate Thesis Reader/Supervision

2016 – Aaron Rachels (Indonesia paleoclimate)

2016 – Birch Malotky (ecological modeling of species distributions)

2015 – Gene Robinson (remote sensing of tropical vegetation)

Undergraduate research supervisor

Elizabeth MacDougall (African palynology)

Maria Orbay-Cerrato (African palynology)

Josie Benson (African palynology)

Blake DeVaney (African palynology)

PhD student mentorship

Emily Hollenbeck (species distribution models)

Laura Garrison (statistics methods)

Ohio State University

Undergraduate research supervisor

Annalee Sekulic (hyrax midden macrofossil identification)

Teaching and Development

2016 ESWN - Thriving in Academia Workshop

2015 Workshop on course and syllabus design through Sheridan Center, Brown University

2013 Teaching Assistant at University of Arizona: Life on Earth

2012 Teaching Assistant at University of Arizona: A Geological Perspective

2009 Teaching Assistant at University of Arizona: Oceanography
2005 Teaching Assistant at University of Wisconsin-Eau Claire: Plants and Society

Outreach and Synergistic Activities

Siemens Competition in Math, Science & Technology – Science project judge

URI Watershed Watch – Volunteer

Brown University SPARK program – Volunteer

Professional Associations – Geological Society of America, American Geophysical Union

Participant and speaker at numerous International Continental Scientific Drilling Program (ICDP) community and planning workshops

Manuscript Reviewer – *PloS One*; *Journal of Biogeography*; *Journal of Geophysical Research – Biogeosciences*; *Quaternary International*; *Climates of the Past*; *Ecology Letters*; *Environment, Development, and Sustainability*

Languages

English (Native Speaker)

French (Fluent)

Arabic (Notions)

Technology

Matlab, R, Tilia, Adobe Illustrator and Photoshop, CorelDraw