

# CURRICULUM VITÆ

## RACHEL L. LUPIEN

### Contact

address: Lamont-Doherty Earth Observatory, Geosciences 105F, Palisades, NY 10964

phone: +1 (443) 415-1084

email: rlupien@ldeo.columbia.edu

website: www.rachellupien.com

### Education

BROWN UNIVERSITY Providence, RI

**May 2019** Ph.D., Earth, Environmental, and Planetary Sciences

Advisor: James M. Russell

Dissertation: *The Plio-Pleistocene Climate History of East Africa and the Role of Environmental Change on Human Evolution: Studies of Leaf Wax Isotopes from Paleolake Sediment*

BROWN UNIVERSITY Providence, RI

**May 2016** M.Sc., Earth, Environmental, and Planetary Sciences

Advisor: James M. Russell

Thesis: *Leaf wax biomarker record of rainfall from West Turkana, Kenya*

AMHERST COLLEGE Amherst, MA

**May 2012** B.A., (cum Laude) Geology

Advisor: Tekla A. Harms

Thesis: *New Constraints on Cooling Ages for Proterozoic Accreted Arc and Metamorphic Core Zone Rocks of the Big Sky Orogen in Southwestern Montana*

### Research Experience

**Postdoctoral Research Scientist**, Lamont-Doherty Earth Observatory Palisades, NY

July 2019 – Present, Peter de Menocal and Kevin Uno, Organic Geochemistry Lab

- Leaf wax biomarker hydrogen and carbon isotope analyses of marine sediment cores using GC-IRMS
- Column chemistry and alkane compound distributions using MSD
- Paleoclimate studies of North Africa and Sahel
- Advanced time series and statistical analyses of climate variability from millions to hundreds of years
- Research grant and fellowship proposal writing

**Graduate Student Researcher**, Brown University Providence, RI

August 2014 - May 2019, James Russell, Organic Geochemistry Lab

- Leaf wax biomarker hydrogen and carbon isotope analyses of lacustrine sediment using GC-IRMS
- Column chemistry and alkanic acid compound distributions using FID
- East African paleohydrology and vegetation studies with advanced time series analysis techniques
- Team member of the large, international Hominin Sites and Paleolakes Drilling Project
- Fieldwork to collect lacustrine cores from South Sulawesi, Indonesia

**Research Assistant**, Lamont-Doherty Earth Observatory Palisades, NY

August 2012 - July 2014, Steven Goldstein, Radiogenic Isotope Lab

- Ultraclean lab column chemistry and measurements of Neodymium isotopes using ICP-MS
- Paleoceanographic studies of circulation strength using Pleistocene Southern Ocean marine sediment

## Publications

1. Potts, R., Dommain, R., Moerman, J.W., Behrensmeyer, A.K., Deino, A.L., Beverly, E.J., Brown, E.T., Deocampo, D., Kinyanjui, R., **Lupien, R.L.**, Owen, R.B., Rabideaux, N., Riedl, S., Russell, J.M., Stockhecke, M., deMenocal, P., Faith, J.T., Garcin, Y., Noren, A., Scott, J.J., Western, D., Bright, J., Clark, J.B., Cohern, A.S., Heil Jr., C.W., Keller, C.B., King, J., Levin, N., Brady, K., Muiruri, V., Renaut, R., Rucina, S.M., Uno, K. (2020). Increased ecological resource variability during a critical transition in hominin evolution. *Science Advances*, 6:43. doi:10.1126/sciadv.abc8975
2. **Lupien, R.L.**, Russell, J.M., Grove, M., Beck, C.C., Feibel, C.S., Cohen, A.S. (2020). Abrupt climate change and its impacts on hominin evolution during the early Pleistocene in the Turkana Basin, Kenya. *Quaternary Science Reviews*, 245. doi:10.1016/j.quascirev.2020.106531
3. **Lupien, R.L.**, Russell, J.M., Yost, C.L., Kingston, J.D., Deino, A.L., Logan, J., Schuh, A., Cohen, A.S. (2019). Vegetation change in the Baringo Basin, East Africa across the onset of Northern Hemisphere glaciation 3.3–2.6 Ma. In Special Issue: A high resolution, multi-proxy record of Pliocene hominin environments in the Kenya Rift Valley: Analysis of the Baringo-Tugen Hills-Barsemoi (BTB) Drill Core. *Palaeogeography, Palaeoclimatology, Palaeoecology*. doi:10.1016/j.palaeo.2019.109426
4. Liang, J., Russell, J.M., Xie, H., **Lupien, R.L.**, Si, G., Wang, J., Hou, J., Zhang, G. (2019). Vegetation effects on temperature calibrations of branched glycerol dialkyl glycerol tetraether (brGDGTs) in soils. *Organic Geochemistry*, 127, 1-11. doi:10.1016/j.orggeochem.2018.10.010
5. **Lupien, R.L.**, Russell, J.M., Feibel, C., Beck, C., Castañeda, I., Deino, A., Cohen, A.S. (2018). Reply to Comments by Nutz & Schuster (2018) on: “A leaf wax biomarker record of early Pleistocene hydroclimate from West Turkana, Kenya”. *Quaternary Science Reviews*, 201C, 508-510. doi:10.1016/j.quascirev.2018.10.015
6. **Lupien, R.L.**, Russell, J.M., Feibel, C., Beck, C., Castañeda, I., Deino, A.L., Cohen, A.S. (2018). A leaf wax biomarker record of early Pleistocene hydroclimate from West Turkana, Kenya. *Quaternary Science Reviews*, 186, 225-235. doi:10.1016/j.quascirev.2018.03.012

### *In Review*

1. Yost, C.L., **Lupien, R.L.**, Beck, C., Feibel, C., Archer, S., Cohen, A.S. Grassland composition and fire paced by insolation during the Early Pleistocene in the Turkana Basin, Kenya. *Frontiers in Earth Science*.
2. Liang, J., **Lupien, R.L.**, Vachula, R.S., Stevenson, M.A., Han, B-P., Lin, Q., He, Y., Wang, M., Liang, P., Huang, Y., McGowen, S., Hou, J., Russell, J.M. Large-bodied zooplankton altered algal community responses to global change in a Tibetan aquatic system during past 600 years. *Paleoceanography and Paleoclimatology*.

### *In Preparation*

1. **Lupien, R.L.**, Russell, J.M., Castañeda, I., Pearson, E., Lamb, H., Schäbitz, F., Campisano, C., Sier, M., Deino, A., Cohen, A., Orbital-scale controls on Plio-Pleistocene East African hydroclimate. [*to be submitted to the Proceedings of the National Academy of Sciences*].
2. **Lupien, R.L.**, Russell, J.M., Subramanian, A., Uno, K., deMenocal, P., Potts, R., The history of East African environmental variation and its role in the evolution and technological advancement of *Homo* since 1 Ma. [*to be submitted to the Journal of Human Evolution*].

## Research Grants – \$314,297 in total

- 2018            **NSF-EAR:** A 750,000-yr Leaf Wax Biomarker Record to Assess Environmental Change Across the Plio-Pleistocene Boundary in Tropical East Africa. **Co-Author**, \$302,472
- 2017 and 2018   Institute at Brown for Environment and Society Graduate Research Grant, \$4,950, \$5,000
- 2016            Geological Society of America Graduate Student Research Grant, \$1,875

## Invited Presentations

1. Environmental Geology & Geochemistry Seminar Lecture Series, Department of Geosciences, *Princeton University*, October 2020
2. Invited Speaker Seminar, Department of Geological Sciences, *Binghamton University State University of New York*, April 2020 – Delayed due to COVID-19
3. Biology and Paleo Environment Seminar, *Lamont-Doherty Earth Observatory of Columbia University*, April 2020
4. Sack Lunch Seminar Series, Department of Earth, Atmospheric and Planetary Sciences, *Massachusetts Institute of Technology*, March 2019
5. Biology and Paleo Environment Seminar, *Lamont-Doherty Earth Observatory of Columbia University*, October 2016

## Teaching

**Teaching Assistant**, Columbia in Kenya, Columbia and Princeton Universities

2020 Spring    *Terrestrial Paleoecology*

Three-week field course for Columbia and Princeton undergraduate students as part of a Tropical Biology and Sustainability semester abroad in Kenya

**Instructor**, 2018 STEM II Program, Brown University

2018 Summer   *Human Evolution and the Environment*

Two-week intensive pre-college science course on climate change and human evolution

**Teaching Assistant**, Earth, Environment, and Planetary Sciences, Brown University

2016 Fall        *Stratigraphy and Sedimentology*

2016 Spring    *Earth: Evolution of a Habitable Planet*

## Pedagogical Training

2019-2020      **Inclusive Teaching: Supporting All Students in the College Classroom**

ColumbiaX: Columbia University Center for Teaching and Learning

[Verified Certificate](#)

2014-2015      **Reflective Teaching**

The Sheridan Center for Teaching, Brown University

## Academic Mentoring

*Graduate Level*

**Mock Prelim Exam Committee Member**, Brown University: Nora Richter, Ariel Deutsch, Ashley Palumbo, Rachel Sheppard, Abigale Bodner, Jenna Pearson, Richard Vachula, Sloane Garelick, Jennifer Kowalczyk

**1<sup>st</sup> Year Graduate Mentoring Program Mentor**, Brown University, 2017-2019

*Undergraduate and High School Level*

**Lamont Summer Intern Program Mentor**, LDEO, 2020: Cole Hazan, Queen's University, Time Series Analyses of Northeast African Hydroclimate Variability

**Undergraduate Thesis Advisor**, Brown University, 2018: Avinash Subramanian, Statistical Analysis of East African Paleoclimate Variations During the Late Pleistocene, and Implications for Human Evolution

**Undergraduate Teaching and Research Award Advisor**, Brown University, 2017: Tristan Reinecke  
**Science & Technological Investigative Research**, 2017: Dheivanai Moorthy, Suffern High School

## Fellowships and Awards

2017-2018 Institute at Brown for Environment and Society Graduate Fellowship, Brown University  
2016 Urbino Summer School of Paleoclimatology Travel Grant and Stipend, NSF  
2014-2015 Charles Wilson Brown Fellowship, Brown University  
2011 Richard M. Foose Award, Amherst College

## Professional Development

2018 Advanced Climate Dynamics Course (ACDC), Finse, Norway  
2017 International Continental Drilling Project (ICDP) Course, Windischeschenbach, Germany  
2016 Urbino Summer School in Paleoclimatology (USSP), Urbino, Italy

## Service

*Professional*

**Reviewer** of journal manuscripts for *PNAS*; *Geophysical Research Letters*; *Climate of the Past*; *Palaeogeography, Palaeoclimatology, Palaeoecology*; *Organic Geochemistry*; *Journal of Great Lakes Research*; *Climate Dynamics*; *Biogeosciences*  
**Session Convener**, 2020, 2018 AGU Fall Meeting

*Departmental*

**Co-Chair**, Biology and Paleo Environment Seminar Series, 2019-present, LDEO  
**Leader**, Graduate Women in Science and Engineering, 2015-2018, Brown University  
**Member**, Diversity Working Group, 2015-2019, Brown University  
**Mentor**, 1<sup>st</sup> Year Graduate Mentoring Program, 2017-2019, Brown University  
**President**, Geology Graduate Student Group (GeoClub), 2015-2016, Brown University

*Community*

**Tutor**, Columbia Volunteer Tutor Program for affiliates effected by the COVID-19 crisis, 2020  
**Science Teacher**, Vartan Gregorian Elementary School, Providence, RI, 2014-2017

## Outreach

**Media**, [Time Scavengers](#), [Center for Climate and Life](#), [Women Doing Science](#), [Science-A-Thon](#)  
**Scientist**, Skype-A-Scientist, 2017-present  
**Member and Social Media**, 500 Women Scientists Providence Pod, 2017-2019  
**Workshop leader**, The Lincoln School International Women's Day, 2016  
**Speaker**, NerdNite Providence, 2015

## Professional Affiliations

Earth Science Women's Network  
Geological Society of America  
American Geophysical Union

## Conference Abstracts

\* denotes mentee | ^ denotes invited

1. **Lupien, R.L.**, Uno, K.T., Habicht, H., deMenocal, P.B., 2020. West African hydroclimate trends and variability during the Cenozoic. Abstract to be presented virtually (due to COVID-19) at the 2020 AGU Fall Meeting.
2. \*Hazan, C., **Lupien, R.L.**, Uno, K.T., deMenocal, P.B., Polissar, P., 2020. Time series analyses of northeast African hydroclimate variability. Abstract to be presented virtually (due to COVID-19) at the 2020 AGU Fall Meeting.
3. Schäbitz, F., Foerster, V., Asrat, A., Cohen, A.S., Chapot, M.S., Dean, J.R., Deino, A., Deocampo, D., Düsing, W., Günter, C., Junginger, A., Kaboth-Bahr, S., Lamb, H., Lane, C., Leng, M., Opitz, S., **Lupien, R.L.**, Roberts, H., Ramsey, C., Russell, J., Pearson, E., Trauth, M.H., Vidal, C., Viehberg, F., Vogelsang, R., and HSPDP, 2020. The paleoclimate of Chew Bahir, Ethiopia, during the last 200 kyr: Human responses to hydroclimate fluctuations. Abstract to be presented virtually (due to COVID-19) at the 2020 AGU Fall Meeting.
4. ^**Lupien, R.L.**, deMenocal, P.B., Uno, K.T., Rose, C., Polissar, P., 2020. Northeast African Plio-Pleistocene climate patterns using plant wax isotopes from Mediterranean sapropels. Abstract to be presented virtually (due to COVID-19) at the 2020 GSA Annual Meeting.
5. Schäbitz, F., Asrat, A., Cohen, A.S., Dean, J., Deino, A., Deocampo, D., Düsing, W., Foerster, V., Günter, C., Junginger, A., Lamb, H., Lane, C., Leng, M., **Lupien, R.L.**, Roberts, H., Ramsey, C., Russell, J., Pearson, E., Vidal, C., Trauth, M., and HSPDP, 2020. Good times for leaving home? The paleoenvironment of Chew Bahir in south Ethiopia: implications for human evolution, dispersal and technological innovation. Abstract presented virtually (due to COVID-19) at EGU General Assembly 2020.
6. Yehudai, M., Goldstein, S.L., Pena, L.D., Jaume-Seguí, M., Kim, J., Hartman, A.E., **Lupien, R.L.**, 2020. The Atlantic Meridional Overturning Circulation from Nd Isotopes. Abstract presented virtually (due to COVID-19) at EGU General Assembly 2020, Vienna, Austria.
7. **Lupien, R.L.**, Russell, J.M., Subramanian, A., Uno, K., deMenocal, P., Potts, R., 2019. The Role of Terrestrial Vegetation Variations in Hominin Evolution and behavioral Change in East Africa Throughout the Last One Million Years. Abstract presented at the 2019 AGU Fall Meeting, San Francisco, CA.
8. Mitsunaga, B., Stubbs, B., **Lupien, R.L.**, Deino, A., Kingston, J., Stockhecke, M., Brown, E., Russell, J.M., 2019. A Leaf Wax Biomarker Record of Plio-Pleistocene Environment Change from the Baringo Basin (Tugen Hills), Kenya. Abstract presented at the 2019 AGU Fall Meeting, San Francisco, CA.
9. Goldstein, S.L., Pena, L.P., Yehudai, M., Jaume-Seguí, M., Kim, J., Knudson, K., Basak, C., Hartman, A., **Lupien, R.L.**, 2019. AMOC Variability over the Last ~2 Ma from a North-South Atlantic Transect Using Nd Isotopes. Abstract presented at the 2019 AGU Fall Meeting, San Francisco, CA.
10. Goldstein, S.L., Pena, L.P., Yehudai, M., Kim, J., Jaume-Seguí, M., Knudson, K., Basak, C., Hartman, A., **Lupien, R.L.**, 2019. A 1.5 Myr History of the Atlantic Meridional Overturning Circulation from Nd isotopes. Abstract presented at Goldschmidt 2019, Barcelona, Spain.
11. Yehudai, M., Goldstein, S.L., Pena, L.D., Jaume-Seguí, M., Kim, J., Hartman, A.E., **Lupien, R.L.**, 2019. Modes of the Atlantic Meridional Overturning Circulation from Nd Isotopes. Abstract presented at Goldschmidt 2019, Barcelona, Spain.
12. Lamb, H., Asrat, A., Ramsey, C.B., Cohen, A., Chapot, M., Davies, S., Dean, J., Deino, A., Düsing, W., Foerster, V., Grove, M., Junginger, A., Lane, C., Leng, M., **Lupien, R.L.**, Pearson, E., Roberts, H., Russell, J., Schäbitz, F., Trauth, M., Vidal, C., 2019. The 600,000-year palaeoenvironmental record from Chew Bahir, Ethiopia: testing

hypotheses of climate change and human origins. Abstract presented at the 2019 INQUA 20<sup>th</sup> Congress, Dublin, Ireland.

13. Cohen, A.S., Billingsley, A., Campisano, C., **Lupien, R.L.**, Muiruri, V., Owen, B., Russell, J.M., Stockhecke, M., Yost, C., HSPDP Team Members, 2019. A comparative analysis of African Plio-Pleistocene patterns of environmental variability and biological evolutionary implications. Abstract presented at the 2019 INQUA 20<sup>th</sup> Congress, Dublin, Ireland.
14. **Lupien, R.L.**, Russell, J.M., Beck, C., Feibel, C., Cohen, A.S., 2018. Early Pleistocene Millennial-Scale Hydroclimate Fluctuation in Kenya with Implications for Hominin Evolution. Abstract presented at the 2018 AGU Fall Meeting, Washington, D.C.
15. Russell, J.M., **Lupien, R.L.**, Cohen, A.S., Beck, C., Campisano, C., Castañeda, I., Deino, A., Feibel, C., Kingston, J., Lamb, H., Potts, R., 2018. Orbital-scale controls on Plio-Pleistocene African climate. Abstract presented at the 2018 AGU Fall Meeting, Washington, D.C.
16. \*Subramanian, A., **Lupien, R.L.**, Russell, J.M., Potts, R., Deino, A., Behrensmeier, A.K., Dommair, R., 2018. Middle to Late Pleistocene Paleoenvironmental Variations at the Ologesailie Basin, Kenya. Abstract presented at the 2018 AGU Fall Meeting, Washington, D.C.
17. Cohen, A.C., Billingsley, A., Campisano, C., **Lupien, R.L.**, Muiruri, V.M, Bernhard, O.R., Russell, J.M., Stockhecke, M., Yost, C.L., and The HSPDP Team Members, 2018. Records of Plio-Pleistocene environmental variability from the Hominin Sites and Paleolakes Drilling Project (HSPDP): Comparison with other African records and implications for hominin evolution. Abstract presented at the 2018 AGU Fall Meeting, Washington, D.C.
18. Castañeda, I.S., Thompson-Munson, M.E., Gilchrist, S., **Lupien, R.L.**, Russell, J.M, Salacup, J., Feibel, C., Cohen, A.S., 2018. Early Pleistocene temperature history of Paleolake Lorenyang, West Turkana Basin (Kenya). Abstract presented at the 2018 AGU Fall Meeting, Washington, D.C.
19. deMenocal, P.B., Polissar, P., Uno, K., Rose, C., Tierney, J., **Lupien, R.L.**, Russell, J., 2018. Paleoenvironmental Contexts of Hominin Evolution. Abstract presented at the 2018 AGU Fall Meeting, Washington, DC.
20. deMenocal, P.B., Polissar, P., Uno, K., Rose, C., Tierney, J., **Lupien, R.L.**, Russell, J., 2018. Paleoenvironmental Contexts of Hominin Evolution. Abstract presented at the 2018 GSA Annual Meeting, Indianapolis, IN.
21. Westover, K., Stone, J., Rabideaux, N., Yost, C.L., **Lupien, R.L.**, Kingston, J., 2018. Extreme hydroclimate variability in the Late Pliocene of Kenya's Baringo Basin: the diatom record. Abstract presented at the 2018 GSA Annual Meeting, Indianapolis, IN.
22. **Lupien, R.L.**, Russell, J.M., Cohen, A.S., Beck, C., Campisano, C., Castañeda, I., Deino, A., Feibel, C., Kingston, J., Lamb, H., Pearson, E., Potts, R., 2018. East African Paleoclimate and Human Evolution. Abstract presented at the 12<sup>th</sup> Graduate Climate Conference, Seattle, WA.
23. **Lupien, R.L.**, Russell, J.M., Cohen, A.S., Beck, C., Campisano, C., Castañeda, I., Deino, A., Feibel, C., Kingston, J., Lamb, H., Pearson, E., Potts, R., 2018. Site-Corrected Leaf Wax Biomarker Records Synthesized to Characterize East African Plio-Pleistocene Climate. Abstract presented at Goldschmidt 2018, Boston, MA.
24. Goldstein, S.L., Pena, L.D., Yehudai, M., Jaume-Seguí, M., Kim, J., Knudson, K., Basak, C., Hartman, A.E., **Lupien, R.L.**, 2018. The Atlantic Meridional Overturning Circulation Over Time From Nd Isotopes. Abstract presented at Goldschmidt 2018, Boston, MA.

25. **Lupien, R.L.**, Russell, J.M., Campisano, C., Feibel, C., Deino, A., Kingston, J., Potts, R., Cohen, A., 2017. A synthesis of Plio-Pleistocene leaf wax biomarker records of hydrological variation in East Africa and their relationship with hominin evolution. Abstract presented at the 2017 AGU Fall Meeting, New Orleans, LA.
26. **Lupien, R.L.**, Russell, J.M., Castañeda, I., Campisano, C., Cohen, A.C., 2017. Plio-Pleistocene biomarker records of climate in East Africa. Abstract presented at the 2017 Past Global Changes Open Science Meeting, Zaragoza, Spain.
27. **Lupien, R.L.**, Russell, J.M., Cohen, A., Feibel, C., Beck, C., Castañeda, I., 2016. Leaf wax biomarker reconstruction of Early Pleistocene hydrological variation during hominin evolution in West Turkana, Kenya. Abstract presented at the 2016 AGU Fall Meeting, San Francisco, CA.
28. **Lupien, R.L.**, Russell, J.M., Castañeda, I., Cohen, A., Feibel, C., Beck, C., 2015. Leaf wax biomarker record of rainfall from West Turkana, Kenya. Abstract presented at the 2016 Graduate Climate Conference, Woods Hole, MA.
29. **Lupien, R.L.**, Russell, J.M., Castañeda, I., Cohen, A., Feibel, C., Beck, C., 2015. Leaf wax biomarker record of rainfall from West Turkana, Kenya. 2015 Geological Society of America Annual Meeting, Baltimore, November 2015
30. Thompson-Munson, M., Castañeda, I.S., **Lupien, R.L.**, Russell, J.M., 2015. Late Pliocene and Early Pleistocene temperature reconstructions from paleolakes of the West Turkana and North Awash Basins, East Africa. Abstract presented at the 2015 GSA Annual Meeting, Baltimore, MD.
31. **Lupien, R.L.**, Pena, L., Goldstein, S., 2014. AMOC variability during the last 400 ka from Nd isotopes in the Southern Ocean. Abstract presented at the 2014 AGU Fall Meeting, San Francisco, CA.
32. **Lupien, R.L.**, Pena, L., Goldstein, S., 2013. Southern Ocean Nd isotope end-member variability during the last 400 kyr. Abstract presented at the 2013 AGU Fall Meeting, San Francisco, CA.
33. Pena, L.D., Goldstein, S.L., **Lupien, R.L.**, 2013. Abrupt Changes in Thermohaline Circulation During the Mid-Pleistocene Transition. Abstract presented at the 11<sup>th</sup> International Conference on Paleoceanography, Barcelona, Spain.
34. **Lupien, R.L.**, Harms, T.A., Hames, W.E., 2012. New constraints on cooling ages for Proterozoic accreted arc and metamorphic core zone rocks of the Big Sky orogen, SW Montana. Abstract presented at the 2012 GSA Northeastern Section Meeting, Hartford, CT.