

ROSEMARY T. BUSH

Assistant Professor of Instruction

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Academic Adviser

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EDUCATION

2014 **Ph.D.** Earth and Planetary Sciences *Northwestern University, Evanston, Illinois*
2008 **M.S.** Plant Biology and Conservation *Northwestern University, Evanston, Illinois*
2006 **B.A.** Environmental Biology *University of Colorado, Boulder, Colorado*

PROFESSIONAL APPOINTMENTS

2018 - Present *Assistant Professor of Instruction*, Earth and Planetary Sciences, and
College Adviser, Weinberg College of Arts & Sciences, Northwestern University
2016 - 2018 *Lecturer*, Earth and Planetary Sciences, and
College Adviser, Weinberg College of Arts & Sciences, Northwestern University
2016, 2017 *Instructor*, College First, Chicago Botanic Garden (summer)
2015 - 2016 *Research Associate*, Earth and Planetary Sciences, Northwestern University
2014 - 2015 *Postdoctoral Researcher*, Civil & Environmental Engineering & Earth Sciences,
University of Notre Dame
2010 - 2013 *EPA STAR Graduate Fellow*, Earth and Planetary Sciences, Northwestern
University
2007 - 2014 *Graduate Research/Teaching Assistant*, Earth and Planetary Sciences,
Northwestern University

PUBLICATIONS

Bush, R.T., H.V. Graham, F.A. McInerney, K.H. Freeman, E.D. Currano, and B.F. Jacobs. *In revision*. Plant macrofossil sampling techniques for molecular and stable isotope analysis. *Review of Paleobotany and Palynology*.

Cernusak, Lucas A., A. Barbeta, **R.T. Bush**, R.Eichstaedt (Bögelein), J.P. Ferrio, L.B. Flanagan, A. Gessler, P. Martín-Gómez, R.T. Hirl, A. Kahmen, C. Keitel, C.-T. Lai, N.C. Munksgaard, D.B. Nelson, J. Ogée, J.S. Roden, H. Schnyder, S.L. Voelker, L. Wang, H. Stuart-Williams, L. Wingate, W. Yu, L. Zhao, and M. Cuntz. 2022. Do 2H and 18O in leaf water reflect environmental drivers differently? *New Phytologist* 235: 41-51. <https://doi.org/10.1111/nph.18113>.

Bush, R.T., A. Dutton, M.N. Evans, R. Loft, and G.A. Schmidt. 2020. Perspectives on data reproducibility and replicability in climate and paleoclimate science. *Harvard Data Science Review* 2(4). <https://doi.org/10.1162/99608f92.00cd8f85>

Currano, E., B. Jacobs, **R. Bush**, A. Novello, M. Feseha, F. Grímsson, F. McInerney, L. Michel,

- A. Pan, S. Phelps, P. Polissar, C. Strömberg, and N. Tabor. 2020. Ecological dynamic equilibrium in an early Miocene (21.7 Ma) forest, Ethiopia. *Palaeogeography, Palaeoclimatology, Palaeoecology*. 539: 109425.
- Berke, M.A., A. Cartagena-Sierra, **R.T. Bush**, D. Cheah, K. O'Connor. 2019. Controls on leaf wax fractionation and $\delta^2\text{H}$ values in tundra vascular plants from western Greenland. *Geochimica et Cosmochimica Acta* 244:565-583.
- Bush, R.T.**, J. Wallace, E.D. Currano, B.F. Jacobs, F.A. McInerney, R.E. Dunn, and N.J. Tabor. 2017. Cell anatomy and leaf $\delta^{13}\text{C}$ as proxies for shading and canopy structure in a Miocene forest from Ethiopia. *Palaeogeography, Palaeoclimatology, Palaeoecology* 485:593-604.
- Bush, R.T.**, M.A. Berke, and A.D. Jacobson. 2017. Plant water δD and $\delta^{18}\text{O}$ of tundra species from West Greenland. *Arctic, Antarctic and Alpine Research* 49(3):341-358.
- Bush, R.T.** and F.A. McInerney. 2015. The effect of temperature and C_4 abundance on *n*-alkane chain-length distributions across the central USA. *Organic Geochemistry* 79:65-73.
- Bush, R.T.** and F.A. McInerney. 2013. Leaf wax *n*-alkane distributions in and across modern plants: Implications for paleoecology and chemotaxonomy. *Geochimica et Cosmochimica Acta* 117: 161-179.
- Bush, R.T.**, T.R. Seastedt, and D. Buckner. 2007. Plant community response to the decline of diffuse knapweed in a Colorado grassland. *Ecological Restoration* 25: 169-174.

COLLEGE ADVISING

I advise ~200 Weinberg College undergraduates at any given time, and students represent the full range of backgrounds and majors/minors. First-year students are assigned in the winter quarter, and they remain my advisees until they graduate or transfer out of the College. The pedagogical focus is on developmental advising: (1) meeting regularly with students throughout their academic careers to discuss their individual goals and challenges, (2) guiding students to reflect on and interrogate their priorities for their degrees, and (3) connecting students as necessary to resources and opportunities across campus.

COURSES

EARTH 390-5: Paleobiology, Northwestern University

ENVR_SCI 201: Earth: A Habitable Planet, Northwestern University

Environmental Science 101: Man and Environment 1, Wilbur Wright College (College First)

UNIVERSITY AND PROFESSIONAL SERVICE

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|----------------|---|
| 2020 – Present | GeoEquity Anti-Racism Pillar member, Dept. of Earth and Planetary Sciences |
| 2017 – Present | Advisors Working Group member, Associate Provost of Undergraduate Education |
| 2019 – 2020 | Member, Curriculum Transition Committee, Weinberg College |
| 2018 - 2019 | Member, Advising Systems Committee, Weinberg Advising Office |
| 2017 - 2019 | Member, Diversity and Inclusion Committee, Weinberg Advising Office |
| 2014 - 2015 | Member, Notre Dame Women's Postdoc Committee |

2012 - 2013 Student Panelist, Northwestern University Diversity Council's Faculty Recruitment and Retention working group
 April 2012 Panelist, Northwestern Undergraduate PhD Preparation Program
 October 2011 Recorder, NSF SEES Workshop, Minneapolis, MN
 July 2011 Recorder, NSF Paleomap Workshop, Field Museum, Chicago, IL
 2009 Student Panelist, Plant Biology and Conservation Invitation for Prospective PhD Students

ADDITIONAL TEACHING AND ADVISING

Spring 2021 ENVR SCI 399: Independent Research, Momoe Anno
 2019-2020 Faculty adviser for SESP 298 Alternative Spring Break, The Farm (Winter 2020)
 Winter 2020 ENVR SCI 399: Independent Research, Julia Ansolabehere
 Fall 2019 ENVR SCI 399: Independent Research, Julia Ansolabehere
 2018 - 2019 Faculty adviser for SESP 298 Alternative Spring Break Mission:Wolf (Winter 2019, and Winter 2020)
 2018 Faculty adviser for undergraduate Amy Rogin, during her summer research on sustainability in Costa Rica through Community-Based Fellowship program, Buffett Institute
 2014 - 2015 Supervised and trained 3 undergraduates and 2 graduate students, Notre Dame
 2012 Guest lecturer, Earth's Changing Climate (EARTH 316)
 2011 - 2012 Supervised undergraduate thesis work of Debra Chen
 2009 - 2011 SERTS Workshop Leader for non-science major undergraduates
 Science and Engineering Research and Teaching Synthesis, EARTH 114
 2009 *Teaching Assistant*, The Ocean, The Atmosphere, and Our Climate (EARTH 106)
 2009 - 2010 Supervised undergraduate thesis work of John Kapnick
 2008 Supervised NSF REU student Kathleen Quigley
 2008 *Teaching Assistant*, Plant-People Interactions (BIOL_SCI 104)
 2007 - 2008 Supervised undergraduate thesis work of Benjamin Farah

GRANT AND MANUSCRIPT REVIEWS

NASEM Gulf Research; NSF; Nature Geoscience; Organic Geochemistry; Quaternary Science Reviews; Annals of Botany; Geochimica et Cosmochimica Acta; Oecologia; Palaeoecology, Palaeoclimatology, Palaeogeography; Chemical Geology; Journal of Quaternary Science

PROFESSIONAL DEVELOPMENT WORKSHOPS

February 2019 Inclusive Teaching Forum, hosted by Searle Center
 October 2018 LGBTQ Ally Training, hosted by Office of Equity

ADDITIONAL PROFESSIONAL WRITING

Bush, R.T. 2018. *Perspectives on Reproducibility and Replication of Results in Climate Science*; background paper used in drafting the report National Academies of Sciences, Engineering, and Medicine. 2019. *Reproducibility and Replicability in Science*.

Washington, DC: The National Academies Press. <https://doi.org/10.17226/25303>. Link: <https://www.nap.edu/resource/25303/Reproducibility%20and%20Replication%20in%20Climate%20Science.pdf>.

RESEARCH GRANTS AND AWARDS

Summer URAP, Northwestern Office of Undergraduate Research	April 2019
GSA Travel Grant, Annual Meeting (Charlotte, NC)	October 2012
AWG Sand Student Research Presentation Travel Award	September 2012
Sigma Xi Grant-in-Aid of Research	April 2012
The Paleontological Society Mid-America Outstanding Student Research Award	April 2012
Runner-up prize from AWG Takken Student Award	September 2011
Lawrence L. Sloss Fund graduate research funding	June 2010
EPA STAR (Science To Achieve Results) Graduate Fellowship	2010-2013
Conference Travel Grant, Northwestern University Graduate School	2009, 2010, 2011
GSA Travel Grant, North-Central Section Meeting (Rockford, IL)	March 2009
Northwestern University Plant Biology and Conservation Research Award	September 2008
Northwestern University Travel Award in Plant Biology and Conservation	June 2008
Center for Humans and Nature Climate Chaos Symposium Scholarship	May 2008
Northwestern University Plant Biology and Conservation Research Award	February 2008
Shaw Fellowship in Plant Biology and Conservation	2006-2007

ACADEMIC AND TEACHING HONORS

- 2015 Best Postdoctoral Science Presentation, Notre Dame Research Symposium
- 2011 Best Student Poster Presentation Award, Climate and Biota of the Early Paleogene Conference, Salzburg, Austria
- 2010 Marion Sloss Award for Outstanding Graduate Teaching Assistant, Department of Earth and Planetary Sciences, Northwestern University

CONFERENCE ABSTRACTS (* = STUDENT)

Ansolabehere, J.* and **R.T. Bush**. 2020. Cell wall undulation as shade proxy in *Cercidiphyllum japonicum* leaves. *North-Central Section of the Geological Sciences of America (Duluth, MN)*.

Cernusak, Lucas. A., Adrià Barbeta, Rebekka Bögelein, **Rosemary T. Bush**, Juan Pedro Ferrio, Lawrence B. Flanagan, Arthur Gessler, Paula Martín-Gómez, Regina Hirl, Ansgar Kahmen, Claudia Keitel, Chun-Ta Lai, Niels Munksgaard, Daniel B. Nelson, Jerome Ogee, John S. Roden, Hans Schnyder, Steven Voelker, Lixin Wang, Hilary Stuart-Williams, Lisa Wingate, Wusheng Yu, Liangju Zhao, and Matthais Cuntz. 2019. The dominant environmental driver of leaf water stable isotope enrichment differs for ^2H compared to ^{18}O . *American Geophysical Union Fall Meeting (San Francisco, CA)*.

McInerney, F.A., **R.T. Bush**, A.A. Baczynski, J.W. Andrae, E. Bunney, and S. Howard. October 2017. Why do leaf wax *n*-alkane distributions change during the Paleocene-Eocene Thermal Maximum? *Geological Society of America Annual Meeting (Seattle, WA)*.

Bush, R.T., E.D. Currano, B.F. Jacobs, F.A. McInerney, R.E. Dunn, and N.J. Tabor. 2017.

- Bringing leaf shade proxies into the light: what do undulation index and leaf $\delta^{13}\text{C}$ mean in a fossil forest? *Geological Society of America Annual Meeting (Seattle, WA)*.
- Barclay, R.S., **Bush, R.T.**, Baczynski, A.A., France, C., and Wing, S.L. October 2016. Constraining the drivers of variance in leaf $\delta^{13}\text{C}$ in fossil *Ginkgo adiantoides* and extant *Ginkgo biloba*: Canopy effect or diagenesis?. *Geological Society of America Annual Meeting (Denver, CO)*.
- Bush, R.T.**, Wallace, J.R., Currano, E., Jacobs, B.F., McInerney, F.A., Dunn, R.E., and Tabor, N.J. October 2016. Leaf carbon isotopes and cell anatomy as indicators of indicators of shading and canopy structure in a Miocene forest from Ethiopia. *Geological Society of America Annual Meeting (Denver, CO)*.
- Berke, M.A., **Bush, R.T.**, Cartagena Sierra, A., Cheah, D., Costello, C., Muldoon, T. and Tillema, M. December 2015. Environmental and physiological controls on plant leaf wax δD from western Greenland. *American Geophysical Union Fall Meeting (San Francisco, CA)*.
- Bush, R.T.** and Berke, M.A. 13-18 September 2015. Stable isotopes in plant waters from western Greenland. *27th International Meeting on Organic Geochemistry (Prague, Czech Republic)*.
- Bush, R.T.**, Diefendorf, A.F., Wing, S.L., and McInerney, F.A. December 2013. Influences of floral composition and environment on plant biomarkers across a Cretaceous landscape (Big Cedar Ridge). *American Geophysical Union Fall Meeting (San Francisco, CA)*.
- McInerney, F.A., **Bush, R.T.**, and Baczynski, A.A. October 2013. Do leaf wax lipids record plant community change or climate change? *14th Conference on Australasian Vertebrate Evolution, Paleontology, and Systematics (Adelaide, Australia)*.
- McInerney, F.A., **Bush, R.T.**, and Baczynski, A.A. January 20-25, 2013. Can leaf wax *n*-alkane distributions be used to reconstruct plant communities? Oral presentation. *Southern Connections Congress (Dunedin, New Zealand)*.
- McInerney, F.A., **Bush, R.T.**, Baczynski, A. A., Wing, S. L., Kraus, M. J., and Bloch, J. I. December 2012. Do Palaeocene-Eocene Thermal Maximum HMW *n*-alkanes record plant community change or climate change? Oral presentation. *Australian Organic Geochemistry Conference (Sydney, Australia)*.
- Bush, R.T.**, A.A. Baczynski, F.A. McInerney, D. Chen. 3 December 2012. Re-assessing the role of plant community change in the PETM *n*-alkane record. *American Geophysical Union Fall Meeting (San Francisco, CA)*.
- Bush, R.T.**, F.A. McInerney, D. Chen. 4 November 2012. Do plant *n*-alkane distributions record climate more than plant type? Oral presentation. *Geological Society of America Annual Meeting (Charlotte, NC)*.
- Bush, R.T.**, F.A. McInerney, and S.L. Wing. December 2011. Fidelity of fossil *n*-alkanes from leaf to paleosol and applications to the Paleocene-Eocene Thermal Maximum. Poster presentation. *American Geophysical Union Fall Meeting (San Francisco, CA)*.
- Bush, R.T.**, F.A. McInerney, and S.L. Wing. 6-8 June 2011. Composition of *n*-alkanes in individual fossil leaves from the Paleocene-Eocene Boundary. Poster presentation. *Climate and Biota of the Early Paleogene (Salzburg, Austria)*.
- Bush, R.T.** and F.A. McInerney. 14 December 2010. Variations in *n*-alkane distributions in modern plants: Questioning applications of *n*-alkanes in chemotaxonomy and paleoecology. Poster presentation. *American Geophysical Union Fall Meeting (San Francisco, CA)*.

- Bush, R.T.** and F.A. McInerney. 18 December 2009. Re-evaluating the isotopic divide between angiosperms and gymnosperms using *n*-alkane $\delta^{13}\text{C}$ values. Oral presentation. *American Geophysical Union Fall Meeting (San Francisco, CA)*.
- Bush, R.T.** and F.A. Smith. 3 April 2009. Molecular variation in leaf wax *n*-alkanes and chemotaxonomic implications for the PETM. Oral presentation. *Geological Society of America North-Central Section Meeting, Session T14 (Rockford, IL)*.
- Bush, R.T.** and F.A. Smith. 5 October 2008. Chemotaxonomy of *n*-alkanes in epicuticular leaf waxes of modern angiosperms and gymnosperms: Applications to the Paleocene-Eocene thermal maximum. Poster presentation. *Geological Society of America Joint Meeting, Session 153 (Houston, TX)*.

EDUCATIONAL OUTREACH AND COMMUNITY SERVICE

- Judge*, Invention Convention for 6th through 8th grade students April 2017
Martin Luther King Jr. Literary and Fine Arts Middle School, Evanston, IL
- Library Exhibit*, “2° and You: An NU Approach to Climate Change” January-March 2014
Contributed research findings and materials to Northwestern Main library exhibit
- Activity Leader*, Outreach field trip for Niles North High School students May 2013
Capstone trip for remedial students to excite interest in chemistry and geosciences
Designed and led educational exercises in paleoecology
- Speaker*, Bighorn Basin Paleontology Symposium, Worland, WY June 2012
Presented “Interpreting the environment with plant *n*-alkanes” at public symposium hosted by the Washakie Museum and Cultural Center
- Invited Speaker*, Adlai E. Stevenson High School, Lincolnshire, IL April 2012
Presented science of anthropogenic climate change in Environmental Leadership Summit
- Activity Leader*, Project EXCITE, Northwestern University 2010, 2011, 2012
Science education for minority elementary students from Evanston, IL
Designed, organized, and led paleoclimate exercises with 3rd, 4th, and 6th grade students
- Guest Speaker*, Saturday field trip with Northwestern ISP students October 2009
Spoke on bog ecology during field trip to Moraine Hills and Volo Bog State Parks, IL
- Darwin Fellow*, One Book One Northwestern 2008-2009
University-wide reading and engagement program aimed at building campus community
- Graduate Fellow*, Slivka Residential College of Science and Engineering 2008-2013
Participation with undergraduate students outside the classroom and laboratory
Hosted “fireside” talks and off-campus dinners, participated in regular college events
- Guest Lecturer*, College First, Chicago Botanic Garden June 2007
Program for high school students who are the first in their families to attend college
Lectured on research applications and career possibilities in paleoecology
- Speaker*, “Alien Invaders” Ecosystem Public Symposium, Boulder, CO April 2006
Presented research to a public audience at the Boulder Public Library, hosted by the Boulder County Nature Association

INVITED TALKS

- 4/2018 Earth and Planetary Sciences Department, Northwestern University, Evanston, IL
5/2016 Climate Change Forum, The Field Museum of Natural History, Chicago, IL

2/2014 Dept. of Civil & Environmental Engineering & Earth Sciences, University of Notre Dame, Notre Dame, IN

RESEARCH INTERESTS

Ecology and paleoecology, paleoclimate, and climate-ecosystem dynamics; organic and stable isotope geochemistry; physiological plant ecology; leaf wax biomarkers; conservation, restoration, and management of invaded ecosystems

PROFESSIONAL AFFILIATIONS

Phi Beta Kappa; Sigma Xi; Geological Society of America (GSA); American Geophysical Union (AGU); The Paleontological Society; Association of Women Geoscientists (AWG)