

Daniel R. Green, PhD

Postdoctoral Research Scientist, Columbia University
Earth Institute and Lamont-Doherty Earth Observatory
dgreen@ldeo.columbia.edu | www.danielrgreen.org | +1 (248) 250-4495
Columbia University | 61 Rte 9W, Palisades, NY 10964, United States

Education

- Ph.D.** May 2017
Harvard University, Department of Human Evolutionary Biology
Laboratory of Tanya M. Smith
Dissertation Title: *Reconstructing oxygen isotope seasonality in large herbivores through mineralization modeling, experimentation and optimization*
- A.M.** May 2012
Harvard University, Department of Human Evolutionary Biology
- B.S.** May 2008
University of Michigan
Majors in Anthropology–Zoology, History, French and Francophone Studies
Minor in Biology

Appointments

- Earth Institute Postdoctoral Fellow** July 2021 – present
Columbia University
Earth Institute
Lamont-Doherty Earth Observatory
Laboratory of Dr. Kevin Uno
- Lecturer**
College Fellow Jun 2020 – July 2021
Associate Concentration Advisor Jun 2019 – May 2020
Harvard University
Department of Human Evolutionary Biology
- Research Associate** Mar 2019 – present
Turkana Basin Institute
National Museums of Kenya
- NIH Ruth L. Kirschstein T90 Postdoctoral Research Fellow** Jan 2017 – Jun 2019
The Forsyth Institute, Harvard School of Dental Medicine
Mineralized Tissue Biology
- Research Associate** Jan 2017 – Jun 2019
Harvard University
Department of Human Evolutionary Biology
- Graduate Research Fellow** Sep 2009 – Dec 2016
Harvard University
Department of Human Evolutionary Biology
Laboratory of Tanya M. Smith

Research Assistant
University of Michigan
Department of Anthropology
Laboratory of Milford Wolpoff and William Sanders

Jan 2006 – May 2006

Research Assistant
University of Michigan
Department of Ecology and Evolutionary Biology
Laboratory of Jianzhi Zhang

Oct 2003 – May 2005

Publications

- Smith TM, Austin C, Cook L, Dirks W, **Green DR**, Arora M (2021) Biological rhythms and chemical records in teeth reveal juvenile diet, health, and neurotoxicant exposures retrospectively. *In Press, Bioessays*.
- Merceron G, Berlioz E, Vonhof H, **Green DR**, Garel M, Noûs C, Tütken T (2021) Tooth tales told by dental diet proxies: an alpine community of sympatric ruminants as a model to decipher the ecology of fossil fauna. *Palaeogeography, Palaeoclimatology, Palaeoecology* 562:110077.
- Stiffler CA, Jakes J, North JD, **Green DR**, Weaver JC, Gilbert PU (2021) Crystal misorientation correlates with hardness in tooth enamels. *Acta Biomaterialia* 120:124-3.
- Green DR**, Hardt M, Schulte F, Lee K-H, Pugach MK, Bidlack FB (2019) Mapping the Tooth Enamel Proteome and Amelogenin Phosphorylation Onto Mineralizing Porcine Tooth Crowns. *Frontiers in Physiology* 10:925.
- Goodson JM, Hardt M, Hartman M-L, Alqaderi H, **Green DR**, Tavares M, Mutawa A-L, Ariga J, Soparkar P, Behbehani J, Behbehani K (2019) Salivary N1-Methyl-2-pyridone-5-carboxamide, a biomarker for uranium uptake, in Kuwaiti children exhibiting exceptional weight gain. *Frontiers in Endocrinology* 10:382.
- Smith TM, * Austin C*, **Green DR***, Joannes-Boyau R*, Bailey S, Dumitriu D, Fallon S, Grün R, James HF, Moncel M-H, Williams IS, Wood R, Arora M (2018) Wintertime stress, nursing, and lead exposure in Neanderthal children. *Science Advances* 4: eaau9483 *These authors contributed equally to this work.
- Green DR**, Smith TM, Green GM, Bidlack FB, Tafforeau P, Colman AS (2018) Quantitative reconstruction of seasonality from stable isotopes in teeth. *Geochimica et Cosmochimica Acta* 235:483–504.
- Green DR**, Olack G, Colman AS (2018) Determinants of blood water $\delta^{18}\text{O}$ variation in a population of experimental sheep: implications for paleoclimate reconstruction. *Chemical Geology* 485:32-43.
- Green DR**, Green GM, Bidlack FB, Colman AS, Tafforeau P, Smith TM (2017) Synchrotron imaging and Markov Chain Monte Carlo reveal tooth mineralization patterns. *PLoS ONE* 12(10): e0186391.
- Cho S, Huang ZY, **Green DR**, Smith DR, Zhang J (2006) Balancing selection generates trans-species polymorphisms at the complementary sex-determination locus of honey bees. *Genome Research* 16:1366-1375.

Publications in Preparation

Green DR, Olack G, Tütken T, Leichliter J, Winkler DE, Clauss M, Vonhof H, Colman AS (in review, *Rapid Communications in Mass Spectrometry*) A simple method for measuring blood oxygen isotope compositions.

Green DR, Cote S, Dirks W, Williams IS, Smith TM (in prep) High resolution paleoenvironmental records from East African fossil apes.

Green DR, Olack G, Colman AS, Prat S, Lewis J, Brugal J-P, Harmand S, Leakey M, Smith TM (in preparation) Plio-Pleistocene seasonality at west Lake Turkana. For submission to the *American Journal of Physical Anthropology*.

Green DR, Olack G, Colman AS (in preparation) Phosphate-water $\delta^{18}\text{O}$ offset in large herbivores for paleoclimate reconstruction. For submission to *Geochimica et Cosmochimica Acta*.

Research Funding

Earth Institute Postdoctoral Research Fellowship Earth Institute at Columbia University – competitive fellowship <i>How does orbital forcing affect rainfall seasonality? A case study in the Pleistocene East African Rift System with implications for human evolution.</i> Awarded \$157,000	2021 –
Australian Research Council Discovery Project <i>Constructing robust climate proxies to explore human and primate evolution</i> Jointly awarded with Tanya Smith and Ian Williams. Grant total \$349,765	2021 – 2022
Australian Academy of Science Regional Collaborations Programme <i>Tracing Ancient Environments During the Peopling of Southeast Asia</i> Jointly awarded with Tanya Smith, Ian Williams and Hallie Buckley, and Tanya Smith as lead PI. Grant total \$79,000	2019 – 2021
American School of Prehistoric Research <i>Systematics of east African fossil herbivore dentitions through neural network-based image processing</i> Awarded \$3,500	2019
National Institutes of Health Postdoctoral Training Fellowship Forsyth Institute Internal Competitive T90 Application <i>Inferring toxicant exposure timing and magnitude from human deciduous teeth</i> Awarded \$144,000	2018 – 2019
Forsyth Institute Pilot Grant <i>Inferring toxin exposure timing and magnitude from deciduous teeth</i> Awarded \$7,830	2017 – 2019
Leakey Foundation General Grant <i>Plio-Pleistocene Seasonal Precipitation through isotopes in Bovid molars, West Turkana</i> Awarded \$12,000	2014 – 2017
Wenner-Gren Foundation Dissertation Grant	2014 – 2016

- Experimental Reconstruction of Seasonal Rainfall for Paleoclimate Research*
Awarded \$18,810
- National Science Foundation Doctoral Dissertation Improvement Grant** 2012 – 2014
Experimental Determination of Tooth Mineralization Patterns in Ungulates for Application to Paleoseasonality Reconstruction
Awarded \$19,855
- National Science Foundation Graduate Research Fellowship** 2011 – 2014
A New Isotopic Sampling Method Combining Microtomography and Histology: Signal Distortion through Sampling Technique and Diagenesis
Awarded \$90,000
- Harvard University Committee on African Studies Summer Research Grant** 2012
Plio-Pleistocene Seasonal Precipitation through isotopes in Bovid molars, West Turkana
Awarded \$5,000
- European Synchrotron Radiation Facility Research Award** 2012
Determination of Enamel Mineralization Pattern by Scans of Successive Developmental Stages With Application for Study of Paleoecology
Awarded: 3 days beam time, est. \$10,000/day

Abstracts and Presentations

- Green DR**, Smith TM, Arora M, Austin C (2020) Trace metal compositions in forming teeth reflect both mineralization and diet. *The Society of Vertebrate Paleontology 80th Annual Meeting*, Virtual, October 12-16, 2020.
- Merceron G, Berlioz E, Vonhof H, **Green DR**, Garel M, Noûs C, Tütken T (2020) Ground Truthing Dental Ecological Proxies On A Modern Alpine Community Of Sympatric Ruminants. *The Society of Vertebrate Paleontology 80th Annual Meeting*, Virtual, October 12-16, 2020.
- Green DR**, Cote S, Dirks W, Reid DJ, Williams IS, Smith TM (2020) Seasonal Isotope Ecology in the East African Miocene Ape *Afropithecus*. *89th Annual Meeting of the American Association of Physical Anthropologists*, Los Angeles, CA and online, April 15-18, 2020.
- Green DR**, Cote S, Williams IS, Smith TM (2019) High resolution paleoenvironmental records from East African fossil apes. *20th International Union for Quaternary Research Congress*, Dublin, Ireland, July 25-31, 2019.
- Smith TM, **Green DR**, Williams IS (2019) Weekly oxygen isotope measurements in teeth reveal environmental variation. *20th International Union for Quaternary Research Congress*, Dublin, Ireland, July 25-31, 2019.
- Pugach MK, Jang JY, **Green DR**, Depalle B, Bidlack FB (2019) Investigating potential roles of ameloblastin and enamelin in enamel development. *The 13th International Conferences on the Chemistry and Biology of Mineralized Tissues*, Montebello, Quebec, October 20-25, 2019.
- Smith TM, Austin C, **Green DR**, Joannes-Boyau R, Bailey S, Dumitriu D, Fallon S, Grün R, James HF, Moncel M-H, Williams IS, Wood R, Arora M (2019) Tales teeth tell: wintertime stress, nursing, and lead exposure in Neanderthal children. *88th Annual Meeting of the American Association of Physical Anthropologists*, Cleveland, OH, March 27-30, 2019.
- Green DR**, Hardt M, Schulte F, Lee K-H, Pugach MK, Bidlack FB (2018) Mapping amelogenesis proteins in an expanded enamel proteome. *Gordon Research Conference on Biomineralization*, New London, NH (poster).

- Depalle B, Pugach MK, Jang JY, **Green DR**, Yaskell T, Bidlack FB (2018) The Role of Amelogenin for pH Buffering during Amelogenesis. *Gordon Research Conference on Biomineralization*, New London, NH.
- Smith TM, **Green DR**, Austin C, Arora M, Grun R, Williams I (2018) Environmental variation and nursing history revealed by sensitive high resolution ion microprobe (SHRIMP) analyses of oxygen isotopes. *87th Annual Meeting of the American Association of Physical Anthropologists*, Austin, TX, April 10-14, 2018.
- Green DR**, Colman AS (2017) How tooth isotope sample number and location affect seasonality reconstruction. *Society of Vertebrate Paleontology annual meeting*, Calgary (presentation).
- Green DR**, Colman AS, Green GM, Tafforeau P, Bidlack F, Smith TM (2017) Seasonal climate reconstruction from seasonality in teeth. *National Cabinet of Archaeology*, Havana (presentation).
- Green DR**, Colman AS, Green GM, Tafforeau P, Bidlack F, Smith TM (2017) New Tooth Growth Model for Studying Ancient Climate. *Goldschmidt annual meeting*, Paris (presentation).
- Green DR**, Colman AS (2017) Phosphate-water $\delta^{18}\text{O}$ offset revision improves paleoclimatic reconstructions. *American Association of Physical Anthropologists annual meeting*, New Orleans (poster).
- Smith TM, Austin C, **Green DR**, Arora M (2017) Trace element studies support rapid tooth enamel mineralization at the enamel-dentine junction. *86th Annual Meeting of the American Association of Physical Anthropologists*, New Orleans, LA, April 19-22, 2017.
- Green DR**, Colman AS, Green GM, Bidlack F, Tafforeau P, Smith TM (2016) Experimental water switch in sheep improves models for seasonal climate reconstruction. *American Association of Physical Anthropologists annual meeting*, Atlanta (poster).
- Green DR**, Colman AS, Green GM, Tafforeau P, Bidlack F, Smith TM (2015) Seasonal climate reconstruction with isotopes and synchrotron X-rays. *Cleveland Museum of Natural History Paleoecology Symposium*. Cleveland, OH (poster)
- Green DR**, Green GM, Colman AS, Tafforeau P, Smith TM (2015) Synchrotron x-ray imaging and MCMC support seasonal climate reconstruction. *American Association of Physical Anthropologists annual meeting*, St. Louis, MO (poster)
- Green DR**, Green GM, Tafforeau P, Weaver J, Colman AS, Smith TM (2014) Synchrotron imaging helps reconstruct mineralization patterns, and ancient climate. *Gordon Conference on Biomineralization*, New London, NH (poster)
- Green DR**, Green GM, Smith TM, Tafforeau P (2013) Microtomographic assessment of mineralization patterns to inform isotope paleoenvironmental reconstruction. *American Association of Physical Anthropologists annual meeting*, Knoxville, TN (poster)
- Green DR**, Weaver J, Smith TM (2012) Quantitative Density with micro-Computed tomography: mapping mineralization. *Society of Integrative and Comparative Biology: Division of Vertebrate Morphology annual meeting*. Amherst, MA (presentation)
- Green DR**, Glowacka H, Schwartz GT, Reid DJ, Martin LB, Smith TM (2011) Developmental Variation in Great Ape Molar Crowns. *American Association of Physical Anthropologists annual meeting*, Minneapolis, MN (poster)
- Smith TM, Zermeno JP, **Green DR**, Reid DJ, Tafforeau P (2011) Daily secretion rates, prism paths, and cuspal formation times in hominoid molars. *15th International Symposium on Dental Morphology*, Newcastle, UK, August 24-27, 2011.
- Green DR**, Braun J, Morgan M, Pilbeam D, Tuross N, Smith TM (2010) Integrating carbon and oxygen isotope signals: seasonality in the Siwaliks, Pakistan. *Society of Integrative and*

Comparative Biology: Division of Vertebrate Morphology annual meeting. Cambridge, MA
(presentation)

Training Programs

Harvard University Instructor Training The Derek Bok Center for Teaching and Learning	2013, 2014
East Turkana Geological Field School National Science Foundation, Turkana, Kenya Directors: Thure Cerling, PhD and Frank Brown, PhD	2011
Stable Isotope Biogeochemistry and Ecology Short Course University of Utah Stable Isotope Ratio Facility for Ecological Research Directors: Jim Ehleringer, PhD and Thure Cerling, PhD	2010

Teaching Experience

Lecturer, Head instructor

<i>Harvard University</i> , Department of Human Evolutionary Biology: Introduction to Human Evolution – Sophomore Concentration Tutorial	2021
Graduate Introduction to the Hominin Fossil Record	2021
Graduate Proseminar, Introduction to Human Evolution (co-taught)	2019
Climate Change and Human Evolution	2018, 2020

Lecturer, Instructor

<i>Turkana University College</i> : MHEB 824 – Introduction to stable isotopes in ecology and paleontology	2021
---	------

Teaching Assistant

<i>Harvard University</i> , Department of Human Evolutionary Biology: Introduction to Human Evolution – Sophomore Concentration Tutorial	2015, 2017
Human Evolutionary Anatomy	2012

Teaching Assistant

<i>Turkana Basin Institute & SUNY Stony Brook</i> , Field School: Geology, Ecology, Paleontology, Archaeology, Evolution and Anatomy	2011
---	------

Honors and Awards

Harvard University Certificate of Distinction in Teaching	2012, 2020
Italian Institute for Philosophical Studies Warburg Seminar Award	2009
University of Michigan Aix-en-Provence Travel Award	2006 – 2007
University of Michigan Biological Station Academic Scholarship	2006
University of Michigan Honors Program	2003 – 2008

Public Outreach, Service and Mentorship

Reviewer <i>Geochimica et Cosmochimica Acta, Chemical Geology, Quaternary International, FeBS Federation of European Biochemical Societies</i>	2016 – present
--	----------------

Journal, Journal of Archaeological Science, BMC Biology, the Leakey Foundation

Wikipedia editor authored 60+ articles, including on the Turkana Basin, with more than 4 million pageviews	2011 – present
Forsyth Institute undergraduate laboratory research mentor	2017
Harvard University Eliot House Resident Tutor focus on biology, graduate school applications, Marshall, Rhodes, and Fulbright fellowships, research experiences and funding.	2012 – 2016
Harvard University undergraduate laboratory research mentor	2009 – 2016
Harvard Museum of Comparative Zoology Volunteer	2011 – 2013
University of Michigan Society of Biology Students Co-President	2007 – 2008

Additional Skills

Python; HTML; qGIS; French

References

Dr. Kevin Uno

Columbia University
Associate Research Professor
Lamont-Doherty Earth Observatory
Postdoctoral Research Adviser
+1 (845) 365-8308
kevinuno@ldeo.columbia.edu

Dr. Tanya M. Smith

Griffith University
Professor
Australian Research Centre for Human Evolution
Doctoral Research Adviser
+61 (0)7 3735 7496
tanya.smith@griffith.edu.au

Dr. David Pilbeam

Harvard University
Henry Ford II Professor of Human Evolution
Department of Human Evolutionary Biology
Graduate Committee Member
(617) 495-4736
pilbeam@fas.harvard.edu

Dr. Daniel Lieberman

Harvard University
Edwin M. Lerner II Professor of Biological Sciences
Department of Human Evolutionary Biology
Graduate Committee Member
(617) 495-5479
danlieb@fas.harvard.edu

Dr. Thure Cerling

University of Utah

Francis Brown Presidential Chair
Department of Geology & Geophysics
(801) 581-7062
thure.cerling@utah.edu

Dr. Albert Colman

Rice University

Adjunct Associate Professor
Department of Earth, Environmental and Planetary Sciences
Graduate Committee Member
(443) 838-1327
ascolman@gmail.com

Dr. Thomas Van Dyke

The Forsyth Institute

Vice President of Clinical and Translational Research
NIH Postdoctoral Training Program Director
(617) 892-8503
tvandyke@forsyth.org