Jan 10, 2022

DAN BREECKER

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EDUCATION

Ph.D. Earth and Planetary Sciences, The University of New Mexico Ph.D. coadvisors: Z.D. Sharp & L.D. McFadden	2008
M.S. Earth and Planetary Sciences, The University of New Mexico	2004
B.A. Geology, Amherst College	2001

PROFESSIONAL EXPERIENCE

Professor, The University of Texas at Austin	2021-present
Associate Professor, The University of Texas at Austin	2015-2021
Assistant Professor, The University of Texas at Austin	2009-2015
NSF Earth Science Post-Doctoral Fellow, The University of Arizona Postdoctoral advisor: J. Quade	2008-2009

HONORS AND AWARDS

G. Moses & Carolyn G. Knebel Distinguished Teaching Award (UT JSG)	2019
GSA Bulletin exceptional reviewer	2014
G. Moses & Carolyn G. Knebel Distinguished Teaching Award (UT JSG)	2011
NSF Earth Sciences Postdoctoral Fellowship	2008-2009
Outstanding Ph.D. student (UNM E&PS)	2008
Vincent C. Kelley Graduate Fellowship (UNM E&PS)	2004-2007
Outstanding M.S. student (UNM E&PS)	2004
Outstanding Teaching Assistant (UNM, university-wide)	2004
Frank E. Kottlowski Award (New Mexico Geological Society)	2004
Robert Wellnitz Scholarship for excellence in field research (New Mexico Geological Society)	2003
Outstanding Beginning Teaching Assistant (UNM E&PS)	2002/2003
John Mason Clarke 1877 Fellowship (Amherst College)	2002-2004
Magna cum Laude, Amherst College	2001
Pond Prize for Most Distinguished Thesis in Geology (Amherst College)	2001

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TEACHING, MENTORING AND TEACHING DEVELOPMENT

COURSES

Physical Geology (GEO 401)

Introductory course required for Geoscience majors. Lectures redesigned, demonstrations incorporated (e.g. freezing tootsie rolls in liquid nitrogen to demonstrate the influence of temperature on rheology). G. Moses & Carolyn G. Knebel Distinguished Teaching Award in 2019 (for undergraduate education in the Geosciences)

Semesters taught (instructor rating, enrollment)

- Fall 2009 (4.4, 128)
- Fall 2010 (4.3, 120; 4.1, 127) cotaught two sections with J. Barnes
- Fall 2011 (4.3, 111)
- Fall 2012 (4.5, 137)
- Fall 2013 (4.5, 125)
- Fall 2014 (4.2, 141)
- Fall 2015 (4.5, 106)
- Fall 2016 (4.7, 114)
- Fall 2017 (4.4, 110)
- Fall 2018 (4.6, 81) taught MWF 1-2 instead of normal time T-Th 2-3:30
- Fall 2019 (4.3, 92)
- Fall 2020 (4.3, 70) taught online due to COVID 19

Environmental Isotope Geochemistry (GEO 388H/376E)

Techniques, theory and applications of low temperature stable and radiogenic isotope geochemistry. Designed all new lectures and homework assignments. Homework assignments are problems I have needed to solve in the past for my research- an attempt to make the course as applicable as possible.

Semesters taught (instructor rating, enrollment)

- Spring 2011 (4.6, 27)
- Spring 2013 (4.4, 20)
- Spring 2015 (4.8, 19)
- Spring 2017 (4.7, 18)
- Spring 2019 (4.5, 15)
- Spring 2021 (4.1, 18) taught online due to COVID 19

Proposal Writing (GEO 191)

A course I developed that is required for 2nd semester Ph.D. students in the Jackson School of Geosciences (JSG). This course is an “active learning” introduction to scientific proposal writing involving peer review and discussion of proposals written by Ph.D. scientists in the JSG. I give a formal lecture on scientific writing and individual feedback on students’ written and verbally communicated proposals. G. Moses & Carolyn G. Knebel Distinguished Teaching Award in 2011 (awarded to 1 out of 53 JSG faculty for best graduate level course).

Semesters taught (instructor rating, enrollment)

- Spring 2011 (4.4, 37)
- Spring 2012 (4.2, 42)

Spring 2013 (4.5, 43)
Spring 2014 (4.5, 33)
Spring 2015 (4.4, 31)
Spring 2016 (4.0, 26)
Spring 2017 (4.0, 38)
Spring 2018 (4.2, 21) co-taught with Ginny Catania and Kyle Spikes

Asian Monsoon (GEO 291)

A seminar-style course cotaught with Julia Clarke and Liang Yang aimed at developing interdisciplinary science questions regarding the drivers of monsoon variability and its effect of life.

Semesters taught (instructor rating, enrollment)
Spring 2018 (4.5, 8)

Connecting Internship Experience (BDP 321)

Review of weekly journal entries and final summary of a student's summer internship
Summer 2011

Forensic Geology (TC 302)

A Plan II and signature course I co-developed with Jaime Barnes covering the geoscience-related methods of forensic investigations. Topics covered murder/kidnapping investigations, provenance of food and people and the authenticity of art and antiquities. The classroom portion of course was a mixture of lecture and group discussion of readings. The course involved laboratory exercises focused on making observations and interpreting data. The final project required students to write mystery solved using methods discussed during the semester.

Semesters taught (instructor rating, enrollment)
Spring 2020 (5.0, 14)
Spring 2021 (4.0, 9) taught online due to COVID 19

TEACHING DEVELOPMENT

Reviewer for Cambridge University Press ("Essentials of the Biogeochemistry of Soils" by Ron Amundson). 2019.

W.H. Freeman focus group for instructors of Introductory Geology courses. 2013.

Reviewer for Pearson Education/Prentice Hall Publishers ("How Does Earth Work?" by Smith and Pun, 2nd edition). 2011.

Participant, "Interactive Techniques for Large Classes," hosted by DIIA (Division of Instructional Innovation and Assessment), University of Texas at Austin. 2009.

FIELD TRIPS

Southern Peru (Spring 2019): Undergraduate Honors Research Program International Field Trip. An 8-day transect with 16 undergraduate students across the Andes from forearc to foreland basin with stops ranging from excavation of soils pits in Pleistocene and Holocene stream terraces, to Miocene growth strata, to alpine glacial moraines. Co-leader Liz Cassel. Coordinator Mark Cloos.

Xian-Lanzhou-Yunnan (Spring 2018): a combination of visits to field locations, universities and museums this trip was an extension of the Asian Monsoon seminar co-led with Julia Clarke and Liang Yang. The trip introduced students to the geology and paleontology of Gansu and Yunnan provinces in China and to international collaborative research.

POSTDOCTORAL MENTORING

Elizabeth Cassel (2011-2014)
Worked on hydrogen isotopes in volcanic glasses as a proxy for the paleoelevation of ancient mountain belts
Now Associate Professor of Geological Sciences at the University of Idaho

Timothy Gallagher (2017 – 2020)
NSF postdoctoral fellow and subsequently supported by NSF SitS grant working on the seasonality of soil carbonate formation
Now Assistant Professor at Kent State University

Angelina Locker (2020-2021)
PT2050 SOAR Postdoc working on provenance of humans from archaeological remains
Now postdoc at Vanderbilt

GRADUATE STUDENT SUPERVISION

(current/total): Masters (0/9), Ph.D. (3/5)

Graduate student committees

Chair & Co-Chair

Ph.D.

Nicole Czwakiel (2^{nd} year, started Fall 2020)

Evan Ramos (2020, co-chair Dr. Jaime Barnes)
now NSF postdoctoral fellow at Rice University

Natasha Sekhon (2020, co-chair Dr. Jay Banner)
now postdoc at Brown University

Lily Serach (2020)
now at VISA

Peter Carlson (2018, co-chair Dr. Jay Banner)
now Geospatial Engineer at the Climate Corporation

John Warden (2016, co-chair Dr. Phillip Bennett)
now at Hydrologist at USGS

M.S.

Sol Cooperdock (2017)
now Laboratory Technician at U. southern California

Timothy Charlton (2016, co-chair Dr. Jay Banner)
now Geologist at Apache Corporation

Chris Cacciatore (2016)
now at Amazon

Michael Patson (2015)

Brandon Okafor (2014)
now Hydrogeologist at URS corporation

Marlo Gawey (2013)
now at Hess

Kyle Meyer (2012, co-chair Dr. Jay Banner)
Ph.D. University of Michigan
now postdoctoral fellow at Portland State University

Nathan Meyer (2012)
now at Halliburton

Lacey Pyle (2012, co-chair Dr. Robert Dickinson)
Ph.D. Rice University
now Soil Data Scientist at Arva Intelligence

Member

Ph.D.: Michael O'Connor, Aaron Jones, Peter Zamora, Xitian Cai, Brendan Murphy, Wendy Robertson, Kim Gilbert, Daria Akhbari, Colin McNeece, Mahmoud Hasan Al-Nazghah, Anna Weiss, Lily Jackson, Seungwon Chung, Jacob Anderson, Simon Scarpetta, Kiara Gomez, Natallia Piatrunia, Chijun Sun, Joshua Lively, Alison Tune, Anna Turetcaia, Scarlette Hsia, Veronika Parson, Stacie Skwarcan, Liam Norris, Patty Standring

M.S.: Brian Cowan, Meaghan Gorman, Aaron Jones, Lisa Helper Meyer, Vera Stoynova, Lindsey Sydow, Kaustubh Thirumalai, Travis Wicks, Mary Hingst, Rosemary Hatch, Rebekah Simon, Michelle Hulewicz, Alex Resovsky, Chiara Tornabene, Ian Moede, Christina James, Heather Chistensen, Kendra Bunnell, Emily White (University of Idaho), Esben Pedersen

Outside Examining Member (Ph.D.)

Engin Alkin, Bruce Frederick, Will Gelnaw, Jacob Anderson, Joshua Lively, Anthony Barone, Andrew Gase, Hector Garza

UNDERGRADUATE STUDENT MENTORING

Chair of Undergraduate Honors Thesis Committee

Laura Arnold "Thermodynamic mineral stability assessment of ancient Martian pCO2" expected May 2022
Carolyn Bland "Experimental investigation of soil carbonate formation" May 2020
Emma Heitmann "Asian monsoon variability after the MCT" May 2016

Mentor for GeoVISION program (summer research experiences in simulation and visualization for minority undergraduate students)

Jada Siverand "Weathering congruency of volcanic rocks correlates positively with temperature" 2020

Mentoring of undergraduate student Environmental Science Senior Research Projects

Katherine McGlaughlin "The oxidative ratio of soil respiration from soil incubation experiments" 2016
Mauricio Eduardo Flores "Controls on seasonal cave CO_2 variations: ventilation versus respiration" 2017

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Capstone EVS Research

Derry Xu “Isotopic compositions of soil water across an elevation gradient in southern Peru” Spring 2016 - Spring 2018

Member of Undergraduate Honors Thesis Committee

Daniel Reyes “Effects of Urbanization on Groundwater Quality in a Rapidly Urbanizing Watershed” April 2012.
Now a Hydrogeologist at Leggette, Brashears & Graham, Inc.

Kevin Meyer “Southwest U.S. Paleoclimate Over the Past 30 ky : Insights From Speleothem $\delta^{18}O$ and Growth Rate Time Series” November 2011.

Ashley Payne (née Quinn), “Carbon Isotope Analysis of the Sources and Mechanisms of CO_2 Input and Removal from Central Texas Cave Systems” May 2010.
Now Assistant Professor at the University of Michigan

Mentoring of undergraduate students working in stable isotope laboratory (*=current)

Jason Dahlberg
Laura Arnold
Matthew Riley
Derry Xu
Sebastian Munoz
Mauricio Eduardo Flores
Emma Heitmann (now Ph.D. student at the University of Washington)
Shelly Bergel (now MS student at Hebrew University)
Adam Schopper
Chris Cacciatore (continued for MS at UT Austin)
Brandon Okafor (continued for MS at UT Austin)
Marty Martinez (M.S. from University of Tennessee)

Bridging Disciplines Program Mentor for Emily Petri summer 2011

NSF Research Experience for Undergraduates (REU) mentor
(The NSF REU program pairs undergraduate students with researchers at major research institutions for summer internships. Minority students and students from institutions without strong research programs are given preference)

2017
Nkeng Ntonghanwah “Kinetics of calcite precipitation” co-mentored by Dr. Lynn Katz (Environmental Engineering)

2014
Mitch Sellers (U. Of Kansas). “A shift in respiratory quotient of soil respiration across a precipitation gradient in Texas” co-mentored by Dr. Christine Hawkes (Associate Professor of Integrative Biology at UT Austin)

2012
Jacob Fathal (U. of Guam), “Measuring $\delta^{13}C_r$ of *Juniperus ashei*, *Ulmus crassifolia*, and *Quercus virginiana*/ *Quercus fusiformis* (C_3 plants)”

2011

Owen Hunter (SUNY College of Environmental Science and Forestry), "Organic Matter Bonding in Soil: The Effect of Varying Soil Configuration on the Adsorption of Organic Matter"

Marcy Nadel (Macalester College), "Carbon Isotopes in Soil Organic Matter" Marcy presented a poster at the American Geophysical Union annual meeting in 2011.

2010

Carolyn Ball (U. of Florida), "Tracing cave CO_2 in central Texas caves using stable carbon isotope ratios" Carolyn presented a poster at the Geological Society of America Annual meeting in 2010.

Marissa Tremblay (Columbia U.), "Comparison of the carbon isotope composition of soil repired CO_2 and bulk soil organic matter"
Now Ph.D. student at UC Berkeley

SERVICE

Departmental (the Department of Geological Sciences at UT Austin):

Teaching evaluation for Daniella Rempe (GEO 376S/382S)	F2021
Structural Geology Faculty Search Committee	(F2021-S2022)
Faculty Annual Evaluations committee for WCE	S2021
Water Climate and Environment Program leader (lead 13 faculty)	F2018-F2020
Department of Geological Sciences Executive Committee (consultant to department chair)	F2018-F2020
Mentor for Geeta Persad (Assistant Professor in DGS)	F2020-present
Teaching evaluation for Elizabeth Catlos (GEO 401)	S2020
Chair of communications director search	F2019
Undergraduate honors field trip co-leader	S2019
Daniella Rempe 3rd year Review Committee	S2019
Climate Science faculty search committee member	F2018-S2019
Teaching evaluation of Joel Johnson (Earth, Wind and Fire)	Spring 2018
GLOW scholarship judge	Spring 2017
Ad hoc opportunity faculty hire search committee	2015
Ad hoc DGS chair search committee	2015
Ad hoc DGS Strategic planning committee	2014-2015
Host for visiting scientist Shunchuan Ji (student at Lanzhou University)	2013
Tour Guide, Freshman Orientation	2013
Undergraduate student mentor	2013
Ad hoc DGS chair committee	2011
Department Safety Officer	2010-present
Undergraduate Honors Program Colloquium Invited Speaker	2010
Bid review committee for Barnes/Breecker/Shanahan/Quinn laboratory renovation	2009
Host for visiting scientist Yong Wang (professor at Southwest University, BeiBei District, Chongqing, China)	2010

School (the Jackson School of Geosciences at UT Austin):

DGS chair search committee	2020
Graduate Admission and Support Committee (~400 applicants/year)	2016-present
GSC Dialogue Committee	2017-present
Name-reader at commencement	spring 2018

Co-Director Jackson Scholars Program	2015-2018
Ad hoc GSC subcommittee on PhD program	2015
Ad hoc Dissertation Committee	2013-2014
Carbon, Climate and Geobiology Theme Executive Committee member	2013-present
Graduate Studies Committee Curriculum Committee	2010-2013
Climate Systems Science Website representative	2009-2011

University (UT Austin):

Ethics and Leadership Flag Committee	2017-2020
Reviewer for VPR-RCG competition	fall 2019
Holistic Admission Practices Discussion (University-wide discussion of graduate admissions processes and best practices)	2017
Discussion leader: Mentoring undergraduate students, ESI NSF REU	2017
ESI NSF REU	2010-2012
Faculty review committee for program applicants	
Communication skills feedback session	
Seminar to REU group	
Honors Colloquium, "Atmospheric CO_2: Looking Back to Predict the Future"	July 22, 2011
Bridging Disciplines Program Mentor for Emily Petri	summer 2011

National:

"On to the Future" Mentor at National GSA conference	Fall 2021
NSF Panelist (program undisclosed)	Spring 2021
NSF Panelist (program undisclosed)	Spring 2019
Tenure Reviews for Assistant professor at US universities (3)	
Steering Committee member for NSF paleoCO2 RCN	2016-present
NSF Panelist (program undisclosed)	Spring 2017
NSF Postdoctoral Luncheon at AGU	2011

I was invited to attend this luncheon as a former NSF postdoctoral fellow to provide feedback to NSF on the postdoc program and to informally answer questions from current NSF postdoctoral fellows.

Ad-hoc reviewer for American Chemical Society Petroleum Research Fund

Ad-hoc reviewer for proposals to Federal agencies

National Science Foundation
- EAR Postdoctoral Fellowship program
- EAR Tectonics Program
- EAR Sedimentary Geology and Paleobiology Program
- EAR P2C2 program
- EAR Geobiology and Low Temperature Geochemistry Program
- EAR FESD program
- EAR Instruments and Facilities
- Polar Research Postdoctoral Fellowship program
- MRI

International:

International Continental Drilling Program Xi'an workshop (invited to help assess and generate ideas regarding scientific drilling in the Weihe Basin, China) 2019

Mentor for Goldschmidt2020 Mentor Program

Reviewer for Deutsche Forschungsgemeinschaft (DFG), German Research Foundation

Reviewer for ETH Zurich Research Commission

Guest editor: Quaternary Science Reviews Special Issue: Novel approaches to and new insights from speleothem-based climate reconstructions, published November 1, 2015 http://www.sciencedirect.com/science/journal/02773791/127

Co-convener: Terrestrial Records of Pleistocene, Holocene, and Anthropocene Climate Change, Goldschmidt Conference session 2014

Ad-hoc reviewer for peer reviewed journals (average 15 manuscripts per year)

Anthropocene
Atmospheric Environment
Biogeochemistry
Chemical Geology
Earth and Planetary Science Letters
Environmental Research Letters
Geochemistry, Geophysics, Geosystems
Geochimica Cosmochimica Acta
Geological Society of America Bulletin
Geology
Geophysical Research Letters
Global Change Biology
Journal of Earth System Science
Journal of Cave and Karst Science
Journal of Hydrology
Journal of Sedimentary Research
Journal of Geophysical Research- Biogeosciences
Journal of Quaternary Science
Nature Communications
Nature Geoscience
Palaeogeography, Palaeoclimatology, Palaeoecology
Proceedings of the National Academy of Sciences of the U.S.A.
Quaternary Research
Quaternary Science Reviews
Radiocarbon
Rapid Communications in Mass Spectrometery
Reviews in Mineralogy and Geochemistry
Sedimentology
Science of the Total Environment
Scientific Reports
Soil Science Society of America Journal
Vadose Zone Journal

Community:

ATX Scioly (Science Olympiad) Tournament invited awards ceremony speaker (Fall 2021)

Lecture and activity on soils to 4th grade students (4 classes of ~20 students each) at Gullett Elementary School, Austin Independent School District (2020)

Exhibited rocks and minerals (February 28, 2013) and bones and fossils (March 19, 2013) to Pre-Kindergarten class at the University of Texas Child Development Center.

Lecture to NSF-REU students at UT 2010, 2011, 2012: Reconstructing atmospheric CO_2 using paleosol carbonate.

Guest Speaker at Highlands High School, Albuquerque, NM, December 12, 2008. Spoke to 9^{th} and 10^{th} grade students about climate change and renewable energies.

UNM special awards Judge for 2007 Intel International Science and Engineering Fair (Albuquerque, NM)

Lecture to NSF-REU students (undergraduates) at the Sevilleta National Wildlife Refuge, summer 2007, Studying soil respiration using below ground measurements: Monitoring the concentration and carbon isotope composition of soil CO_2.

SPONSORED RESEARCH

Total external funding to UT Austin: $2,566,935

National Science Foundation (Frontier Research in Earth Sciences)
"Collaborative Research: CO2PIP- A Community Project to advance and standardize approaches to paleo-CO_2 reconstruction and to build the next-generation Phanerozoic record "
08/2021 – 07/2025
Lead PI: **Daniel O. Breecker** (UT-Austin; $462,315)
Co-PIs: Isabel Montanez (UC Davis), Dana Royer (Wesleyan University), Gabe Bowen (University of Utah, Bärbel Hönisch (Columbia Uniersity), Kate Huntington (University of Washington), Lydia Chilton (Columbia University) and Steven Feiner (Columbia University);
Total awarded to all institutions: $3,000,000
Total awarded to UT-Austin: $462,315.

National Science Foundation (Low Temperature Geochemistry Program)
"Collaborative Research: Boron in soil carbonates: development of a quantitative soil CO_2 proxy"
09/2021 – 08/2024
Lead PI: **Daniel O. Breecker** (UT-Austin; $388,170)
Co-PI: Mark Torres (Rice University; $319,659)
Total awarded to all institutions: $707,829
Total awarded to UT-Austin: $388,170.

The University of Texas at Austin Bridging Barriers Planet Texas 2050 initiative
"PaleoTexas: Synthesizing data for reconstructing impacts of climate change on past ecosystems and human societies of central Texas"
9/2019-8/2020
Lead PI: **Daniel O. Breecker (**$74,820)
Co-PIs: Jay Banner, Chris Bell, Tim Shanahan (Geological Sciences), Melissa Kemp (Integrative Biology), Lee Ann Kahlor (School of Advertising and Public Relations, Center for Women's and Gender Studies), Adam Robinowitz (Classics), Jonathan Jarvis (Texas Archaeological Research Laboratory), Darrel Tremaine (Environmental Science Institute),

The University of Texas at Austin Vice President for Research, Research and Creative Grants
"Preliminary assessment of atmospheric carbon dioxide levels during an ancient global warming event"
11/2018-8/2019
Sole PI: **Daniel O. Breecker** ($10,000)

National Science Foundation (Signals in the Soil, Low Temperature Geochemistry Program)
"EAGER SitS: Studying soil biotic and abiotic processes through continuous, high-precision monitoring of soil CO_2 an O_2 concentrations"
09/2018 – 08/2020
Sole PI: **Daniel O. Breecker** (UT-Austin; $298,057)
Total awarded to all institutions: $298,057
Total awarded to UT-Austin: $298,057.

National Science Foundation (Antarctic Earth Science Program)
"Activity, preservation and fossilization of cryptoendolithic microorganisms in Antarctica"
9/2016-8/2018
Lead PI: C. Omelon (UT Austin; $154,814)
co-PIs: P. Bennett (UT Austin) and **Daniel O. Breecker** (UT Austin).
Total awarded to all institutions: $154,814
Total awarded to UT-Austin: $154,814.

National Science Foundation (Paleoclimate Program)
"Collaborative Research: Assessing climate-biosphere linkages using Late Holocene records of climate variability and vegetation dynamics from the Brazilian Amazon and Savanna"
07/2018 – 05/2021
Lead PI: **Daniel O. Breecker** (UT-Austin; $180,106), former PI: Corinne Wong
Co-PIs: Lucas Silva (University of Oregon; $92,395);
Total awarded to all institutions: $272,501
Total awarded to UT-Austin: $180,106.

National Science Foundation (Tectonics Program)
"Collaborative Research: Quantifying Paleotopography and Paleoclimate to Test Geodynamic Models in the Peruvian Andes"
06/2016 – 05/2019
Lead PI: Elizabeth Cassel (University of Idaho; $430,082)
Co-PIs: Christopher Poulsen (University of Michigan; $208,241); **Daniel O. Breecker** (UT-Austin; $61,138)
Total awarded to all institutions: $699,461
Total awarded to UT-Austin: $61,138.

National Science Foundation (Partnerships for International Research and Education)
"PIRE: DUST stimulated drawn-down of atmospheric CO_2 as a trigger for Northern Hemisphere Glaciation"
10/2015-9/2021
Lead PI: Carmala Garzione (the University of Rochester; $3,454,557)
Co-PI: John Tarduno (the University of Rochester)
Subcontract to **Daniel O. Breecker** (UT Austin; $365,676)
Total awarded to all institutions: $3,454,557
Total awarded to UT-Austin: $365,676.

National Science Foundation (Geobiology and Low Temperature Geochemistry Program)
"Collaborative Research: What hydrogeochemical processes control weathering in the deep critical zone of unburied karst landscapes?"
8/2015-7/2018
Lead PI: Jason Gulley (the University of South Florida; $194,940)
Co-PIs: **Daniel O. Breecker** & Jay Banner (UT Austin; $185,422)
Total awarded to all institutions: $380,362
Total awarded to UT-Austin: $185,422.

National Science Foundation (Small Business Phase II Program)
"SBIR Phase II: Towards Precision Ultra-Portable $^{13}C/^{12}C$ CO_2 Atmospheric Isotopic Ratio Monitors Using Quantum Cascade Lasers"
Lead PI: Stephen So (the Laser Sensing Company; $707,968)
Subcontract to **Daniel O. Breecker** (UT Austin; $37,091)
Total awarded to all institutions: $707,968
Total awarded to UT-Austin: $37,091.

National Science Foundation (Geobiology and Low Temperature Geochemistry Program)
"Carbon in karst: investigating sources, transport and isotopic fractionation to better inform the interpretation of speleothem climate records"
8/2012-7-2015
Lead PI: **Daniel O. Breecker** (UT Austin; $223,903)
Co-PIs: Jay Banner (UT Austin); Pat Mickler (UT Austin)
Total awarded to all institutions: $223,903
Total awarded to UT-Austin: $223,903.

United States Fish and Wildlife Service (Challenge Cost Share)
“Grassland Carbon Sequestration”
2011-2010
Lead PI: Tim Menard (Flint Hills National Wildlife Refuge; $1000)
Co-PI: **Daniel O. Breecker** (UT Austin; $15,000)
Total awarded to all institutions: $16,000
Total awarded to UT-Austin: $15,000.

National Science Foundation (Geobiology and Low Temperature Geochemistry Program)
“Collaborative Research: Calibrating the paleosol carbonate CO_2 barometer for vertic paleosols by monitoring soil CO_2 in modern Vertisols”
8/2009-7/2013
Lead PI: **Daniel O. Breecker** (UT Austin; $195,243)
Co-PIs: Steve Driese & Lee Nordt (Baylor University; $96,957)
Total awarded to all institutions: $292,200
Total awarded to UT-Austin: $195,243.

National Science Foundation (EAR Postdoctoral Fellow Program)
“Calibrating the Paleosol CO_2 Barometer by Monitoring Modern Calcic Soils”
7/2008-6/2009
Sole PI: **Daniel O. Breecker** ($80,000)

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INVITED LECTURES

- University of South Florida, 'Best of Karst', Spring 2021, The source of carbon for caves and stalagmites
- Texas A&M, Ions@work Symposium, Spring 2020, Has eastern China always been summer-wet?
- Chinese Academy of Sciences, Institute for Earth Environment, Xi'an, China, invited lecture at the Weihe Basin drilling workshop, Fall 2019, Has eastern China always been summer-wet?
- Nanjing University, Nanjing, Jiangsu, China, Fall 2019, Reconstructing atmospheric CO_2 from paleosols
- PETM workshop, Santa Cruz, California, Fall 2019, invited lecture at workshop sponsored by UC Santa Cruz, Soil respiration rates during the PETM and ETM2
- Yunnan University, Kunming, China, Spring 2018, Extinct soils of the PermoCarboniferous
- Chinese Academy of Sciences, Institute for Earth Environment, Xi'an, China, Spring 2018, The geochemistry of boron in soils: development of a hybrid paleo-CO_2 proxy and application to an Eocene hyperthermal event
- Northwest University, Xi'an, China, Spring 2018, Atmospheric CO_2, east Asian monsoon variability and C4 plants: Miocene and Pliocene records from the Tianshui Basin and the Red Clay Jiaxian section
- Syracuse University, Department of Earth Sciences, Spring 2017, Carbon in Karst: Toward interpreting the carbon isotope composition of cave calcite
- University of California, Irvine, Department of Earth System Science, Fall 2015, Carbon in Karst: Toward interpreting the carbon isotope composition of cave calcite
- University of Waikato, Department of Earth Science, Summer 2015, The down profile increase in the $\delta^{13}C$ values of soil organic matter
- Lanzhou University, Key Laboratory of Western China's Environmental Systems, Summer 2015, Miocene Atmospheric CO_2
- Lanzhou University, Key Laboratory of Western China's Environmental Systems, Summer 2015, Interpreting the $\delta^{13}C$ values of speleothem calcite
- Austin Geological Society, Fall 2013, The formation of calcium carbonate in soils
- University of Texas Arlington, Spring 2013, Soil carbonate and atmospheric CO2
- University of New Mexico, Spring 2013, Toward interpreting the carbon isotope composition of speleothem calcite
- Kavli Royal Society International Centre, Fall 2011, Calibrating the paleosol carbonate CO_2 barometer. Conference name: "Reconstructing and understanding CO_2 variability in the past"
- University of Washington, Department of Earth and Space Science, Spring 2011, Seasonality of soil carbonate formation: Implications for reconstructing paleoelevations and paleoatmospheric CO_2.
- Southern Methodist University, Huffington Department of Earth Sciences, Spring 2010, Modern soils and ancient atmospheric CO_2: calibrating the paleosol carbonate CO_2 barometer.
- University of Hawaii, Department of Geology and Geophysics, Spring 2010, Modern soils and ancient atmospheric CO_2: calibrating the paleosol carbonate CO_2 barometer.
- Baylor University, Department of Geology, Spring 2010, Modern soils and ancient atmospheric CO_2: calibrating the paleosol carbonate CO_2 barometer.
- University of Texas at Austin, Bureau of Economic Geology, Fall 2009, The stable isotope composition of CO_2 in soils and caves: investigating processes in the critical zone.

- University of Texas at Austin, Department of Geological Sciences, Fall 2009, The stable isotope composition of CO_2 in soils and caves: investigating processes in the critical zone.
- Rensselaer Polytechnic Institute, Spring 2008, Extreme conditions of pedogenic carbonate formation: Implications for reconstructing paleoenvironments.
- University of Houston, Spring 2008, Extreme conditions of pedogenic carbonate formation: Implications for reconstructing paleoenvironments.
- University of Texas at Austin, Spring 2008, Extreme conditions of pedogenic carbonate formation: Implications for reconstructing paleoenvironments.
- Los Alamos National Laboratory, Fall 2008, Calibrating pedogenic carbonate as a paleoenvironmental indicator.
- New Mexico Institute of Mining and Technology, Fall 2008, Improved understanding of soil carbonate formation reveals sensitivity of Earth's climate to atmospheric CO_2.

PEER REVIEWED PUBLICATIONS

I declare that I made substantial intellectual contributions to all publications listed here.
Please note that in 2017, I began taking the last author position on student-led publications for which I was the senior author and intellectual driver. I made this decision because I believe in the metaphor for putting others first and supporting students and postdocs. Student authorship is particularly important to me and I publish with graduate and undergraduate students that I formally advise and also with students that I do not formally advise. My relationship to student authors is indicated as follows:

* student author, ** graduate student I mentored, *** undergraduate student I mentored, ^{P}Post-doc I mentored

Web of Science Researcher ID: B-4929-2011

IN REVIEW

**Sekhon, N., Banner, J.L., Breecker, D.O., Black, B.A., Miller, N.R., Records of recharge in transition metal concentrations of annually resolved stalagmites: An assessment from the arid Southwest United States.

*Zhang, H., Nie, J., *Abell, J.T., Herbert, T., Winckler, G., Tarduno, J., Pullen, A., *Clinkscales, C., Garzione, C., **Breecker, D.O.**, Peng, W., Ren, X. Volcanic forcing of Late Miocene–Pliocene climate. In review at Nature Communications.

Ramos, E.J., **Breecker, D.O., Barnes, J.D., Li, F., Gingerich, P.D., Loewy, S.L., Satkoski, A.M., Baczynski, A.A., Wing, S.L., Miller, N.R., Lassiter, J.C., Rapid silicate weathering response on floodplains during the Paleocene-Eocene Thermal Maximum. In review at GRL.

PUBLISHED OR IN PRESS:

52) **Li, F., Yang, S., **Breecker, D.O.**, **Ramos, E. J., Huang, X., Duan, Z., Guo, Y., Li, C. & Mei, X. (2022). Responses of silicate weathering intensity to the Pliocene-Quaternary cooling in East and Southeast Asia. *Earth and Planetary Science Letters*, *578*, 117301.

51) Nordt, L., **Breecker, D.O.**, White, J., (2021) Jurassic greenhouse ice-sheet fluctuations sensitive to atmospheric CO_2 dynamics. *Nature Geoscience*, 1-6.

50) [P]Gallagher, T.M., **Serach, L., **Sekhon, N., Zhang, H., Wang, H., Ji, S., Chang, X., Lu, H. & **Breecker, D.O.** (2021) Regional patterns in Miocene-Pliocene aridity across the Chinese Loess Plateau revealed by high resolution records of paleosol carbonate and occluded organic matter. *Paleoceanography and Paleoclimatology*, e2021PA004344.

49) Novello, V. F., da Cruz, F. W., Vuille, M., Campos, J. L. P. S., Stríkis, N. M., Apáestegui, J., Moquet, J. S., Azevedo, V., Ampuero, A., Utida, G., Wang, X., Paula-Santos, G. M., Jaqueto, P., Pessenda, L. C. R., **Breecker, D. O.**, and Karmann, I. (2021) Investigating $\delta^{13}C$ values in stalagmites from tropical South America for the last two millennia, *Quaternary Science Reviews*: 255, 106822.

48) **Ji, S., Ma,.L., Nie, J., Chen, S., Sun, Y., **Breecker, D.O.** (2021) Quantifying soil-respired CO_2 on the Chinese Loess Plateau, *Palaeogeography, Palaeoclimatology, Palaeoecology*: 562 110158.

47) **Sekhon, N., Novello, V.F., Cruz, F.W., *Wortham, B.E., Ribeiro, T.G., **Breecker, D.O.** (2021) Diurnal to seasonal ventilation in Brazilian caves, *Global and Planetary Change*: 197, 103378.

46) Novello, V. F., da Cruz, F. W., Vuille, M., Campos, J. L. P. S., Stríkis, N. M., Apáestegui, J., Moquet, J. S., Azevedo, V., Ampuero, A., Utida, G., Wang, X., Paula-Santos, G. M., Jaqueto, P., Pessenda, L. C. R., **Breecker, D. O.**, and Karmann, I. (2020) δ 13 C values in stalagmites from tropical South America for the last two millennia, *Earth System Science Data Discussions*: 1-27.

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44) [P]Gallagher, T. and **Breecker, D.O.** (2020) The obscuring effects of calcite dissolution and formation on quantifying soil respiration, *Global Biogeochemical Cycles*: 34(12) e2020GB006584.

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35) **Breecker, D.O.**, Royer, D.L., (2019) The pedogenic formation of coal balls by CO_2 degassing through the rootlets of arborescent lycopsids. *American Journal of Science*: 319, 529-548.

34) **Carlson, P.E., Banner, J.L., Johnson, K.R., *Casteel, R.C., **Breecker, D.O.**, (2019) Carbon cycling of subsurface organic matter recorded in speleothem 14C records: maximizing bob-peak model fidelity. *Geochimica et Cosmochimica Acta*: 246, 436-449.

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26) [P]Cassel, E.J. and **Breecker, D.O.** (2017) Long-term stability of hydrogen isotope ratios in hydrated volcanic glass. *Geochimica et Cosmochimica Acta*: 200, 67-86.

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19) [P]Cassel, E.J.; **Breecker, D.O.**, Henry, C.D.; Larson, T.E., Stockli, D.F. (2014) Continuous high topography across the present-day Basin and Range, western U.S., 40-23 million years ago. *Geology*: 42, 1007-1010.

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13) Liu, Z.; **Breecker, D.O.**; Mayer, L.; Zhong, J. (2013) Composition of size-fractioned sedimentary organic matter in coastal environments affected by different physical forcings. *Organic Geochemistry:* 60, 20-32.

12) *Michel, L.A.; Driese, S.G.; Nordt, L.C.; **Breecker, D.O.**; Labotka, D.M., Dworkin, S.I. (2013) Stable carbon isotope geochemistry of Vertisols formed on marine limestone and implications for deep-time paleoenvironmental reconstructions. *Journal of Sedimentary Research*: 83, 300-308.

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10) Kirk, M.; Martini, A.; **Breecker, D.O**., Colman, D.R., Takacs-Vesbach, C., Petsch, S.T. (2012) Impact of commercial natural gas production on geochemistry and microbiology in a shale-gas reservoir. *Chemical Geology*: 332-333, 15-25.

9) **Breecker, D.O.**; ***Quinn, A.; Quade, J.; Banner, J.; ***Ball, C; **Meyer, K.W. (2012*)* The sources and sinks of CO_2 in caves under mixed woodland and grassland vegetation. *Geochimica et Cosmochimica Acta*: 96, 230-246.

8) **Breecker, D.O.**; McFadden, L.D.; Sharp, Z.D.; ***Martinez, M.; Litvak, M.E. (2012) Deep autotrophic soil respiration in shrubland and woodland ecosystems in central New Mexico. *Ecosystems*:15, 83-96.

7) Quade, J., **Breecker, D.O.**, Daëron, M., Eiler, J. (2011) The Paleoaltimetry of Tibet: An Isotopic Perspective. *American Journal of Science*: 311, 77-115.

6) *Mintz, J.S., Driese, S.G., **Breecker, D.O.**, and Ludvigson, G.A. (2011) Influence of changing hydrology on pedogenic calcite precipitation in Vertisols, Dance Bayou, Brazoria County, TX: Implications for estimating paleoatmospheric pCO_2. *Journal of Sedimentary Research*: 81, 394-400.

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3) **Breecker, D.**, Sharp, Z.D. and McFadden, L. (2009) Seasonal bias in the formation and stable isotope composition of pedogenic carbonate in modern soils from central New Mexico. *GSA Bulletin*: 121, 630-640.

2) **Breecker, D.** and Sharp, Z.D. (2008) A field and laboratory method for monitoring the concentration and isotopic composition of soil CO_2. *Rapid Communications in Mass Spectrometry*: 22, 449-454.

1) **Breecker, D.** and Sharp, Z.D. (2007) A monazite oxygen isotope thermometer. *American Mineralogist*: 92, 1561-1572.

Jan 10, 2022

INVITED CONFERENCE PRESENTATIONS

*student author, ** graduate student I mentored, *** undergraduate student I mentored, [P]Post-doc I mentored

Serach, L., **Ramos, E.J., Jackson, C.,* ***Breecker, D.O. *(2021) Interpreting $\delta^{13}C$ profiles of organic matter in soils. Geological Society of America Annual Meeting.*

Serach, L., [P]Gallagher, T., Lu, H., Zhang, H., *Wang, H., Ji, S., Huntington, K.W., and* ***Breecker, D.O. *(2020) Has eastern China always been summer wet? Invited Keynote presentation at Goldschmidt Geochemistry Conference.*

Breecker, D.O. *et al. (2017) Boron in soil carbonates: development and initial application of a hybrid CO_2 proxy. Geological Society of America Annual Meeting, GSA Abstracts with Programs v. 49 n.6, doi: 10.1130/abs/2017AM-305027.*

Breecker, D.O. *and Royer, D.L. (2016) Did atmospheric CO_2 force the mid-Cretaceous hot greenhouse? Geological Society of America Annual Meeting, GSA Abstracts with Programs v. 48 n.7, doi:10.1130/abs/2016AM-281853.*

Breecker, D.O. *et al. (2016) A subsoil source to cave-air CO_2 and speleothem calcite in central Texas. Geological Society of America Annual Meeting, GSA Abstracts with Programs v. 48 n.7, doi: 10.1130/abs/2016AM-279385.*

Breecker, D.O.*, Driese, S.G., Nordt, L.C., Beverly, E., Huntington, K. (2013) Seasonal variations in the carbon isotope composition of soil-respired CO_2 and the dominance of root/rhizsophere respiration in desert soils. Fall AGU meeting*

Breecker, D.O.*, Banner, J.L., Larson, T.E. (2013) The transport of CO_2 into central Texas caves. Fall AGU meeting*

Breecker, D.O.*, Meyer, K.W., Feng, W., Banner J.L., Carlson, P.E. (2013) Vegetation and climate signals in the carbon isotope compositions of speleothem calcite. Geological Society of America Abstracts with Programs. GSA Annual Meeting*

Breecker D.O. *(2013) Soil carbonate accumulation: chemical, biological and physical controls. AGU Chapman Conference on Soil-mediated Drivers of Coupled Biogeochemical and Hydrological Processes Across Scales.*

Breecker, D.O.*, ***Payne, A., Quade, J., Banner, J.L., ***Ball, C.E., **Meyer, K.W. (2012) The source of carbon in cave air CO_2 under mixed grassland and woodland vegetation Goldschmidt Geochemistry Conference (June 2012).*

Breecker, D.O. *and Quade, J. (2009) Tracing carbon transfer from soils to a cave using stable carbon isotopes. Geological Society of America Abstracts with Programs, 41(7) p. 398.*