

## Meinhard Bayani Ramos Cardenas

(shortened as M. Bayani Cardenas)

Curriculum Vitae as of January 2023

J. Nalle Gregory Regents Professor in Geological Sciences  
Department of Geological Sciences, Jackson School of Geosciences, The University of Texas at Austin  
Phone: (512)471-6897, Email: cardenas@jsg.utexas.edu

### Biographical Information

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Birth: 1977 in Göttingen, Germany

Nationality: Philippines; US permanent resident in 2009 and naturalized citizen since 2015

Marital status: Married since 1999 with a son born in 2002 and a daughter in 2007

### Academic Background

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Ph.D. in Earth and Environmental Science (Hydrology), 2006, New Mexico Inst. of Mining and Technol.

Adviser: John L. Wilson

M.S. in Geology (Hydrogeology), 2002, University of Nebraska-Lincoln

Adviser: Vitaly A. Zlotnik

B.S. in Geology, 1999, University of the Philippines-Diliman

### Research Profile

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*Discipline:* Hydrology - surface and subsurface

*Environments:* Terrestrial, aquatic, coastal, marine, semi-arid, tropical, arctic

*Processes:* Flow and reactive transport, including non-isothermal, variable-density, and multiphase flows, and multi-component transport

*Methods:* Laboratory experiments (analogue experiments and chemical analyses), in situ field observations (conventional water sampling and hydraulic monitoring, geophysics, ground-based and airborne remote-sensing), hydroinformatics and data mining, mathematical modeling (computational, analytical, statistical)

*Applications:* Water quality and quantity

### Professional Appointments

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2020-present, J. Nalle Gregory Regents Professor in Geological Sciences, The University of Texas at Austin

2016-2020, Professor, The University of Texas at Austin

2011-2016, Associate Professor, The University of Texas at Austin

2006-2011, Assistant Professor, The University of Texas at Austin

2002-2006, Research Assistant, New Mexico Bureau of Geology and Mineral Resources

2004-2005, Teaching Assistant, New Mexico Inst. of Mining and Technology

1999-2002, Teaching and Laboratory Assistant, University of Nebraska-Lincoln

### Honors and Recognition

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2017: Faculty Science Performance Award (Top Full Prof.), Dept. of Geological Sciences, UT Austin

2016: Faculty Science Performance Award (Top Assoc. Prof.), Dept. of Geological Sciences, UT Austin

2015: Faculty Science Performance Award (Top Assoc. Prof.), Dept. of Geological Sciences, UT Austin

2013: Faculty Science Performance Award (Top Asst. Prof.), Dept. of Geological Sciences, UT Austin

2012: Fred Holmsley Moore Distinguished Lecturer, University of Virginia

Kohout Early Career Award, Geological Society of America (GSA) Hydrogeology Division  
 2011: Hydrologic Sciences Early Career Award, American Geophysical Union (AGU) Hydrology Section  
 AGU Editors' Citation for Excellence in Refereeing - Water Resources Research  
 AGU Editors' Citation for Excellence in Refereeing - Geophysical Research Letters  
 2010: National Science Foundation CAREER Award  
 G. Moses and Carolyn G. Knebel Distinguished Teaching Award (UT-Jackson School of Geosciences)  
 2009: Top Referee Award, Journal of Hydrology (Elsevier)  
 Big XII Faculty Fellowship  
 2008: Balik Scientist, Department of Science and Technology, Republic of the Philippines  
 2007: G. Moses and Carolyn G. Knebel Distinguished Teaching Award (UT-Jackson School of Geosciences)  
 2006: Plenary Speaker for the 2<sup>nd</sup> Gordon Research Conference on Permeable Sediments  
 2005: American Geophysical Union Horton Research Grant (Hydrology Section)  
 New Mexico Water Resources Research Institute Student Grant  
 2004: American Geophysical Union Outstanding Student Paper Award (Hydrology Section)  
 2003: CH2M-Hill Outstanding Hydrology Teaching Assistant (New Mexico Tech)  
 2002-2006: Frank M. Kottowski Fellowship (New Mexico Tech)  
 2002: Sigma Gamma Epsilon National Honor Society for the Earth Sciences  
 2001: American Association of Petroleum Geologists Paul Danheim Nelson Award  
 2001: Nebraska Geological Society Yatkola-Edwards Research Grant  
 2000 and 2001: University of Nebraska-Lincoln Department of Geosciences Summer Fellowship  
 1999: Arthur Saldivar-Sali Award (Best Senior Thesis in Geology, University of the Philippines-Diliman)  
 1999: Outstanding BS Geology Graduate (University of the Philippines-Diliman)  
 1996-1999: Dean's List (University of the Philippines-Diliman)

### **Honors and recognition to current and former supervised students and post-docs**

#### **2022**

Geol. Soc. of America Student Research Grant – Ebony Williams  
 AAPJ in Geoscience: Inclusivity, Leadership, and Experience (AGILE) fellowship – Amber Nguyen  
 Champions of Diversity mentee fellowship – Amber Nguyen

#### **2021**

Office of Science Graduate Student Research Award (Dept. of Energy) – Anna Turetcaia

#### **2020**

National Science Foundation Graduate Research Fellowship – William Nguyen  
 NASA Fellowship– Sophy Wu (as co-supervisor; supervised by Prof. Ann Chen)  
 Best Poster Presentation (2<sup>nd</sup> place), Jackson School Annual Research Symposium – Micaela Pedrazas

#### **2019**

Outstanding Teaching Assistant UT-DGS – Stephen Ferencz  
 Geol. Soc. of America Student Research Grant – Cansu Demir  
 Geol. Soc. of America Student Research Grant – Micaela Pedrazas  
 Ivanhoe Foundation Fellowship – Micaela Pedrazas  
 Best Seminar Award UT-DGS – Michael O'Connor

#### **2018**

Fulbright Fellowship (Turkish Fulbright Commission) – Cansu Demir  
 Linus Pauling Distinguished Postdoctoral Fellowship (Pacific Northwest Nat. Lab.) – Matthew Kaufman  
 Office of Science Graduate Student Research Award (Dept. of Energy) – Michael O'Connor  
 Best Undergraduate Presentation, Jackson School Annual Research Symposium – Sebastian Muñoz

#### **2017**

American Geophysical Union Horton Research Grant – Michael O'Connor  
 American Geophysical Union Outstanding Student Paper Award – Sebastian Muñoz

American Geophysical Union Outstanding Student Paper Award – Matthew Kaufman  
CUAHSI Pathfinder Fellowship – Michael O’Connor

**2016**

UT-DGS Outstanding Teaching Assistant – Michael O’Connor  
American Assoc. of Petroleum Geologists Student Research Grant – Michael O’Connor  
Geol. Soc. of America Student Research Grant – Michael O’Connor  
Geol. Soc. of America Student Research Grant – Stephen Ferencz  
Geol. Soc. of America Student Research Grant – Matthew Kaufman  
Outstanding Graduate Student in UT Hydrogeology Field Camp – Stephen Ferencz

**2015**

Geol. Soc. of America Student Research Grant (Outstanding Proposal) – Michael O’Connor  
Geol. Soc. of America Alexander Sisson Research Award – Michael O’Connor  
USGS Mendenhall Postdoctoral Research Fellow – Kevin Befus

**2014**

American Geophysical Union Outstanding Student Paper Award – Matthew Kaufman  
American Geophysical Union Outstanding Student Paper Award – Kevin Befus  
American Geophysical Union Horton Research Grant – Kevin Befus  
Best MS Student Presentation, Jackson School MS Student day – Alyse Briody  
Best Represented Research Group (1<sup>st</sup> Place), Jackson School Annual Research Symposium  
Outstanding Graduate Student in UT Hydrogeology Field Camp – Matthew Kaufman

**2013**

American Assoc. of Petroleum Geologists Frank E. Kottowski Memorial Grant – Lichun Wang

**2012**

Petroleum School of Norway Travel Award – Kuldeep Chaudhary  
Ivanhoe Foundation Fellowship – Raquel Flinker

**2011**

Ozarka Earth Science Scholarship – Kevin Befus  
American Geophysical Union Outstanding Student Paper Award – Audrey Sawyer  
Geol. Soc. Of America Student Research Grant – Kevin Befus  
Geol. Soc. Of America Student Research Grant (Outstanding Proposal) – Peter Zamora  
ExxonMobil Student Research Grant – Kuldeep Chaudhary  
ConocoPhillips SPIRIT Scholar – Kuldeep Chaudhary  
University of Texas COOP Undergraduate Research Fellowship – Ben Bass  
National Science Foundation Graduate Research Fellowship – Anne Dunckel

**2010**

Assoc. Sci. of Limnology & Oceanography Summer Meeting Outstanding Student Poster – Audrey Sawyer  
National Science Foundation Graduate Research Fellowship – Katy Gerecht  
Geol. Soc. of America Student Research Grant (Outstanding Proposal) – Kuldeep Chaudhary  
Massachusetts Water Resour. Res. Conf. First Place Student Poster – Katy Gerecht  
UT-DGS Tech Sessions Outstanding MS Student Presentation – John Nowinski  
UT-DGS Tech Sessions Outstanding MS Student Presentation – Travis Swanson  
ConocoPhillips SPIRIT Scholar – Travis Swanson

**2009**

American Geophysical Union Horton Research Grant – Audrey Sawyer  
Geol. Soc. of America Student Research Grant – Travis Swanson  
Geol. Soc. of America Student Research Grant – John Nowinski  
James A. Gibbs Hydrogeology and Engineering Geology Graduate Fellowship – Blair Stanley (now Francis)  
ConocoPhillips SPIRIT Scholar – Blair Stanley (now Francis)  
ConocoPhillips SPIRIT Scholar – Travis Swanson

Hess Fellowship – Travis Swanson

**2008**

Geol. Soc. of America Student Research Grant – Blair Stanley (now Francis)

UT-DGS Outstanding Teaching Assistant – Audrey Sawyer

Geol. Soc. of America Student Research Grant (Outstanding Proposal) – Audrey Sawyer

American Assoc. of Petroleum Geologists Student Research Grant – Audrey Sawyer

BP Fellowship – John Nowinski

University of Texas COOP Undergraduate Research Fellowship – Anne Dunckel

Jackson School of Geosciences Merit Scholarship – Anne Dunckel

University Honors and Recognized Dean's List – Anne Dunckel

**2007**

Noble Energy Fellowship – Blair Stanley (now Francis)

**Advising, Mentoring, and Supervision**

**Post-doctoral fellows, serves or served as supervisor or co-supervisor (denoted by \*):**

<b>Name</b>	<b>Period</b>	<b>Most recent known position</b>
Lichun Wang	2015-2018	Assoc. Professor, Tianjin University
Wen Deng	2010 - 2014	Asst. Professor, Missouri Univ. of Sci. and Technol.
Benjamin Hardt*	2010 - 2012	Mendenhall Postdoctoral Fellow, USGS
Judson Partin*	2008 - 2011	Research Associate, UT Inst. for Geophysics

**PhD students, serves or served as supervisor or co-supervisor (denoted by \*):**

<b>Name</b>	<b>Started under my supervision</b>	<b>Passed candidacy</b>	<b>Graduation</b>
Cameron deFabry	Summer 2022	na	In progress
Neelarun Mukherjee	Fall 2021	na	In progress
Tyson McKinney	Fall 2020	na	In progress
William Nguyen	Fall 2020	na	In progress
Cansu Demir	Fall 2018	Fall 2020	In progress
Yue Sophy Wu*	Fall 2017	Fall 2019	In progress
Anna Turetcaia	Fall 2017	Spring 2019	Summer 2022
Stephen B. Ferencz	Fall 2015	Fall 2017	Spring 2020
Michael T. O'Connor	Fall 2014	Spring 2016	Spring 2019
Matthew H. Kaufman	Fall 2013	Spring 2015	Summer 2018
Eric J. Guiltinan	Fall 2013	Spring 2015	Summer 2018
Lizhi Zheng	Fall 2012	Spring 2014	Summer 2017
Lichun Wang	Fall 2010	Spring 2012	Summer 2015
Peter B. Zamora	Fall 2010	Spring 2012	Summer 2015
Kevin M. Befus	Fall 2010	Spring 2012	Summer 2015
Kuldeep Chaudhary	Spring 2010	Fall 2010	Summer 2013
Audrey H. Sawyer	Fall 2007	Spring 2008	Spring 2011

**MS & MA students, serves or served as supervisor:**

<b>Name</b>	<b>Started under my supervision</b>	<b>Graduation</b>
Aya Shika Bangun	Fall 2021	In progress
Ebony Williams	Fall 2021	In progress

Micaela Pedrazas	Fall 2018	Spring 2020
Jeffery Watson	Fall 2014	Summer 2016
Raquel Flinker	Fall 2012	Fall 2014
Alyse Briody	Fall 2012	Summer 2014
Michael Kanarek	Fall 2012	Summer 2013
F. Alexander Norman	Fall 2010	Spring 2013
Wai Sum Chan	Fall 2010	Summer 2011
John D. Nowinski	Fall 2008	Spring 2010
Travis E. Swanson	Spring 2008	Spring 2010
Ashleigh Barber-Bomar	Summer 2008	Spring 2009
Meredith Mackey	Summer 2008	Spring 2009
Blair A. Francis (nee Stanley)	Fall 2007	Spring 2009

**BS students who worked on an undergrad or honors thesis, serves or served as supervisor:**

Name	Started under my supervision	Institution	Thesis/project completed
David Keith	Fall 2022	UT	In progress
Amber Nguyen	Spring 2022	UT	In progress
Morgan Teel	Fall 2021	UT	Spring 2022
Christian Roumelis	Spring 2019	UT	Spring 2020
Kindra Nicholaides	Spring 2017	UT	Spring 2018
Sebastian Muñoz	Spring 2017	UT	Spring 2018
Aimee E. Ford	Spring 2014	UT	Spring 2015
Julianne P. Wooten	Fall 2012	UT	Fall 2012
Benjamin J. Bass	Fall 2010	UT	Fall 2011
Michael S. Markowski	Summer 2009	UT	Spring 2010
Katelyn E. Gerecht	Summer 2009	Smith College	Spring 2010
Anne E. Dunckel	Summer 2008	UT	Fall 2009

**BS students, served as undergraduate research assistant supervisor:**

Name	Year
Jacob Mehr	2020-2022
Zachary Mungia	2018-2019
Sebastian Muñoz	2016-18
Kindra Nicholaides	2016-18
Lane Cockrell	2016-17
Austin Rio Mursinna	2016
Collin Roland	2016

**BS students, served as Research Experience for Undergrads or Teachers supervisor:**

Name	Institution	Year
Lauryn Martinez	Univ. of Puerto Rico-Mayaguez	2017
Hannah Leiberger	Univ. of Maryland-Baltimore Co.	2013
Nancy Pattyn	Anderson High School	2010
Katelyn Gerecht	Smith College	2009
Selene Castillo	Baylor University	2009
Anne Dunckel	Univ. of Texas	2008

Laura Merner	Clark University	2007
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**Visiting students or scientists, serves or served as supervisor or host:**

<b>Name</b>	<b>Date of visit</b>	<b>Institution</b>	<b>Supervisor</b>
M. Drazen Medina	2022	independent	na
Fu Liao	2019-20	China Univ. of Geosciences-Beijing	Guangcai Wang
Dr. Xiaobing Chen	2019	Hohai University (China)	na
Anzy Lee	2018	Purdue University	Antoine Aubeneau
Jiaqing Zhou	2016-2017	Wuhan University (China)	Yi-Feng Chen
Xiaobing Chen	Summer 2014	Hohai University (China)	Li Chen
Adam Kessler	Spring 2013	Monash University (Australia)	Perran Cook
Tyler Cyronak	Summer 2012	Southern Cross Univ. (Australia)	Bradley Eyre
Douglas Tait	Summer 2012	Southern Cross Univ. (Australia)	Isaac Santos
Laura Bardini	Spring 2011	Politecnico di Torino (Italy)	Luca Ridolfi
Jesus Gomez	Fall 2009	New Mexico Tech	John Wilson
Louis Areepitak	Summer 2008	Texas A&M-Kingsville	Jianhong Ren
Dr. Moon-su Kim	2007-2008	Nakdong River IER (S. Korea)	na
Daniel Käser	Fall 2007	Lancaster University (UK)	Andrew Binley

**High school students supervised who worked on science projects:**

<b>Name</b>	<b>Institution</b>	<b>Project completed</b>
Alperen Karanci	Harmony Science Academy	Spring 2010

**Doctoral students, served or serves as dissertation committee member (graduated):**

<b>Name</b>	<b>Department</b>	<b>Defended</b>	<b>Supervisor</b>
Alison Tune	Geological Sciences	Spring 2021	Daniella Rempe
Wen-ying Wu	Geological Sciences	Summer 2021	Zong-Liang Yang
Lingcheng Li	Geological Sciences	Summer 2020	Z.-L. Yang & Ashley Matheny
Charles Abolt	Geological Sciences	Spring 2019	Michael Young
Baiyuan Gao	Geological Sciences	Summer 2018	Peter Flemings
Peirong Lin	Geological Sciences	Spring 2018	Zong-Liang Yang
Colin McNeece	Geological Sciences	Spring 2018	Marc Hesse
Allan Jones	Geological Sciences	Fall 2017	Kevan Moffett
John Warden	Geological Sciences	Fall 2016	Dan Breecker
Kimberly Gilbert	Geological Sciences	Fall 2015	Philip Bennett
Lauren Andrews	Geological Sciences	Fall 2015	Ginny Catania
Gihye Shin	Civil Engineering	Fall 2015	Ben Hodges
Brian Kiel	Geological Sciences	Spring 2015	Lesli Wood
Wendy Robertson	Geological Sciences	Spring 2014	Jack Sharp
Eugenio Santillan	Geological Sciences	Spring 2014	Philip Bennett
Kyung-won Chang	Geological Sciences	Fall 2013	Marc Hesse
Corrine Wong	Geological Sciences	Spring 2013	Jay Banner
Megan Franks	Geological Sciences	Spring 2012	Philip Bennett
Julia Schneider	Geological Sciences	Fall 2011	Peter Flemings
Erin Eastwood	Geological Sciences	Spring 2011	Gary Kocurek
Jeffrey Nitttrouer	Geological Sciences	Fall 2010	David Mohrig

Donald Slottke	Geological Sciences	Spring 2010	Jack Sharp
Enrique Rosero	Geological Sciences	Spring 2009	Zong-Liang Yang
Mauricio Santillana	Comp. and Applied Math.	Spring 2008	Clint Dawson

**Doctoral students, served on candidacy exam committee:**

<b>Name</b>	<b>Department</b>	<b>Candidacy exam</b>	<b>Supervisor</b>
Zachary Murphy	Geological Sciences	Fall 2019	Peter Flemings
Alison Tune	Geological Sciences	Spring 2018	Daniella Rempe
Ningjie Hu	Geological Sciences	Spring 2018	Jake Covault
Wen-Ying Wu	Geological Sciences	Fall 2017	Zong-Liang Yang
Max Daniller-Varghese	Geological Sciences	Spring 2017	Wonsuck Kim
Lingcheng Li	Geological Sciences	Spring 2017	Zong-Liang Yang
Charles Abolt	Geological Sciences	Spring 2017	Michael Young
Alison Northup	Integrative Biology	Spring 2016	Timothy Keitt
Dmitrii Merzlikin	Geological Sciences	Fall 2015	Sergey Fomel
Colin McNeece	Geological Sciences	Fall 2014	Marc Hesse
Baiyuan Gao	Geological Sciences	Fall 2014	Peter Flemings
Jenna Kromann	Geological Sciences	Spring 2014	Jack Sharp
Peirong Lin	Geological Sciences	Spring 2014	Zong-Liang Yang
Allan Jones	Geological Sciences	Spring 2014	Kevan Moffett
Gihye Shin	Civil Engineering	Spring 2013	Ben Hodges
Meredith Bush	Geological Sciences	Spring 2013	Brian Horton
Lauren Andrews	Geological Sciences	Spring 2012	Ginny Catania
Travis Swanson	Geological Sciences	Spring 2012	David Mohrig
John Warden	Geological Sciences	Spring 2012	Dan Breecker
Rudra Chatterjee	Geological Sciences	Fall 2011	John Lassiter
Wendy Robertson	Geological Sciences	Spring 2011	Jack Sharp
Virginia Smith	Geological Sciences	Fall 2010	David Mohrig
Corrine Wong	Geological Sciences	Spring 2010	Jay Banner
Eugenio Santillan	Geological Sciences	Spring 2010	Philip Bennett
Kimberly Gilbert	Geological Sciences	Spring 2010	Philip Bennett
Jeffrey Nittrouer	Geological Sciences	Spring 2009	David Mohrig
Erin Eastwood	Geological Sciences	Spring 2009	Gary Kocurek
Megan Franks	Geological Sciences	Spring 2009	Philip Bennett
Carla Sanchez	Geological Sciences	Spring 2009	Ron Steel

**Doctoral students at other institutions, serves or served on dissertation committee or supervision:**

<b>Name</b>	<b>Institution</b>	<b>Dissertation defense</b>	<b>Supervisor</b>
Raymond S. Rodolfo	University of the Philippines	na	TBD
Danica Mancenido	University of the Philippines	December 2020	Fernando Siringan
Pin Shuai	Texas A&M University	Summer 2016	Peter Knappett
Adam Kessler	Monash University	Spring 2015	Perran Cook
Jesus Gomez	New Mexico Tech	Summer 2013	John Wilson

**MS students at other institutions, serves or served on thesis committee:**

<b>Name</b>	<b>Institution</b>	<b>Thesis defense</b>	<b>Supervisor</b>
Aljon Eligado	University of the Philippines	Summer 2020	Caroline Jaraula
Raymond S. Rodolfo	Ateneo De Manila University	Fall 2017	Rene Claveria
Rezaul Haider	Utah State University	Spring 2017	Bethany Neilson
Maria Isabel Senal	University of the Philippines	Summer 2013	Gil Jacinto

**MS students, served as thesis committee member (graduated):**

<b>Name</b>	<b>Department</b>	<b>Graduated</b>	<b>Supervisor</b>
Cameron deFabry	Geological Sciences	Summer 2022	Mrinal Sen
Jacob Helper	Geological Sciences	Spring 2022	Jaime Barnes
Austin Rechner	Geological Sciences	Summer 2020	Ashley Matheny
Adenike Tokan-Lawal	Geological Sciences	Summer 2014	Peter Eichubl
L. Joy Mercier	Geological Sciences	Summer 2014	Jack Sharp
William Betts	Geological Sciences	Spring 2014	Peter Flemings
Lindsey Sydow	Geological Sciences	Summer 2013	Philip Bennett
Molly Kent	Geological Sciences	Spring 2011	Philip Bennett
Michael Passarello	Geological Sciences	Spring 2011	Jack Sharp
Jennifer Cessna	Geological Sciences	Spring 2011	Marc Hesse
Mishal Al-Johar	Geological Sciences	Fall 2010	Jack Sharp
Corrine Wong	Geological Sciences	Spring 2009	Jay Banner
Elsbeth Steinhauer	Geological Sciences	Spring 2008	Philip Bennett

**BS students, served as honors thesis committee member (graduated):**

<b>Name</b>	<b>Department</b>	<b>Thesis defense</b>	<b>Supervisor</b>
Logan Schmidt	Geological Sciences	Spring 2017	Joe Levy
Katherine Markovich	Geological Sciences	Spring 2012	Suzanne Pierce
Sarah Doyle	Geological Sciences	Spring 2010	Jack Sharp
Spencer Whitman	Geological Sciences	Spring 2010	David Mohrig
Katherine Dlubac	Geological Sciences	Spring 2008	Jack Holt
Elke Baitis	Geological Sciences	Spring 2008	David Mohrig

## **Supervision of Theses and Dissertations**

Parentetical statement denotes immediate position of student after graduation or last known position

**Doctoral dissertations in progress:**

Cameron deFabry, started Fall 2022, topic: Regional groundwater flow and transport and its connection with land deformation

Neelarun Mukherjee, started Fall 2021, topic: Flow and transport processes in supra-permafrost aquifers in the Arctic

Tyson McKinney, started Fall 2020, topic: TDB, on leave from graduate school and working full time

William Nguyen, started Fall 2020, topic: Reactive transport of iron and arsenic in dynamic surface water-groundwater mixing zones



Cansu Demir, started Fall 2018, topic: Coastal groundwater flow and transport in Arctic lagoons  
Yue Wu, co-advised with Dr. Jingyi Chen (lead adviser), started Fall 2017, topic: Quantifying deformation, water content, and soil organic carbon above permafrost through InSAR

**MS theses in progress:**

Aya Shika Bangun, started Fall 2021, topic: Geochemistry of hydrothermal submarine groundwater discharge in the Philippines  
Ebony Williams, started Fall 2021, topic: Remote sensing of submarine groundwater discharge in the Philippines

**Doctoral dissertations completed (including position after graduation or most recent employment):**

Anna B. Turetcaia, completed Summer 2022: Aerobic metabolism of organic matter across the terrestrial-aquatic interface through the lens of flume experiments and models  
Stephen B. Ferencz, completed Spring 2020: Surface water-groundwater exchanges under conditions of daily river stage fluctuations: implications for fluid, solute, and heat dynamics in dam regulated river corridors (Postdoctoral Fellow, Sandia National Laboratory)  
Michael T. O'Connor, completed Spring 2019: Controls governing active layer thermal hydrology: How predictable subsurface properties influence thaw, groundwater flow, and soil moisture (Geological Society of America Congressional Science Fellow, then Dept. of Energy)  
Matthew H. Kaufman, completed Summer 2018: Physical, chemical, and microbial dynamics in the hyporheic zone (Linus Pauling Distinguished Postdoctoral Fellow then Staff Scientist, Pacific Northwest National Laboratory)  
Eric J. Guiltinan, completed Summer 2018: Multiphase flow properties of sealing caprocks for CO<sub>2</sub> geological storage (Postdoctoral Fellow then Staff Scientist, Los Alamos National Laboratory)  
Lizhi Zheng, completed Summer 2017: Nitrate removal efficiency in hyporheic zones: the effect of temperature and bedform dynamics (Associate Professor, Tianjin Normal University)  
Peter B. Zamora, completed Summer 2015, topic: Mixing dynamics of groundwater-seawater systems at the land ocean interface (Assistant Professor, University of North Carolina-Wilmington)  
Lichun Wang, completed Spring 2015: Flow and transport through and deformation of rough fractures: analytical and numerical modeling studies (Associate Professor, Tianjin University)  
Kevin M. Befus, completed Spring 2015, topic: Groundwater flow controls on coastal water quality and global groundwater ages (Assistant Professor, University of Wyoming then University of Arkansas)  
Kuldeep Chaudhary, completed Summer 2013, title: Pore scale controls of fluid flow laws and the capillary trapping of CO<sub>2</sub> (Assistant Professor, Kent State University)  
Audrey H. Sawyer, completed Spring 2011, title: Complexity in river-groundwater exchange due to permeability heterogeneity, in-stream flow obstacles, and river stage fluctuations (Assistant then Associate Professor, Ohio State University)

### **MS theses completed (including most recent known employment):**

- Micaela Pedrazas, completed Spring 2020, topic: Ice-free lagoon sediment in areas of continuous Arctic permafrost revealed through electrical resistivity imaging  
(LRE Water)
- Jeffery Watson, completed Summer 2016, topic: Thermal dynamics of a riparian aquifer subject to flooding: Lower Colorado River, Texas, USA  
(Hays-Trinity Groundwater Conservation District)
- Raquel H. Flinker, completed Fall 2014, topic: Grassland soil moisture dynamics in response to CO<sub>2</sub> and biodiversity manipulations  
(Schlumberger, Brazil)
- Alyse C. Briody, completed Summer 2014, topic: Flow, nutrient, and stable isotope dynamics of groundwater in the parafluvial/hyporheic zone of a regulated river during a small pulse  
(USGS New Mexico Water Science Center)
- Michael R. Kanarek, completed Summer 2013, topic: Understanding the effects of wildfire on soil moisture dynamics, plant water uptake, and recharge using electrical resistivity  
(INTERA)
- F. Alexander Norman, completed Spring 2013, title: An experimental assessment of the influence of bedforms on coupled hyporheic flow and heat transport
- John D. Nowinski, completed Summer 2010, title: Intra-meander groundwater-surface water interactions in a losing experimental stream  
(CH2M)
- Travis E. Swanson, completed Spring 2010, title: Heat transport and tracing within the hyporheic zone of pool-riffle-pool sequences  
(PhD student at the University of Texas at Austin, then Shell)
- Blair A. Francis (nee Stanley), completed Spring 2009, title: Effects of dam-induced daily river stage fluctuations on groundwater flow paths  
(BP)

### **BS honors theses or research projects in progress:**

- David Keith, topic: Coastal groundwater-surface water interactions
- Amber Nguyen, topic: Submarine groundwater discharge, coral reefs, and volcanic activity

### **BS honors and undergrad theses completed:**

- Morgan E. Teel, completed Spring 2022: Thermal and chemical stratification of Lake Travis
- Christian Roumelis, completed Spring 2020: Far-field interactions between a river and an aquifer due to regulated and natural floods  
(graduate student at Ohio State University)
- Sebastian Muñoz, completed Spring 2018: Heat transport variability across the streambed of a large, regulated river subject to hydropeaking  
(Fulbright Fellow, Chile; graduate student at Brown University)
- Kindra Nicholaides, completed Spring 2018: Arctic groundwater model informed by characterization of tundra soils  
(Southwest Research Institute)
- Aimee E. Ford, Plan II Honors, completed Spring 2015, topic: Hyporheic flow and dissolved oxygen distribution in fish nests  
(law student at the University of Michigan)

Julianne P. Wooten, completed Fall 2012, title: Hyporheic exchange flows and biogeochemical patterns near a meandering stream: East Fork of the Jemez River, Valles Caldera National Preserve, New Mexico

Benjamin J. Bass, completed Fall 2011, title: Seasonal soil moisture dynamics throughout a semiarid valley ecotone using quasi-3D time-lapse electrical resistivity imaging  
(graduate student at Rice University)

Michael S. Markowski, completed Spring 2010, title: Characterizing groundwater-surface water interactions in a regulated river using electrical resistivity  
(graduate student at Texas State University)

Anne E. Dunckel, completed Fall 2009, title: Thermal imaging of microbial mats provides clues to thermophile community structure: El Tatio Geysir, Chile  
(graduate student at the University of Virginia)

## Professional and Public Service

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### Internal service (University of Texas at Austin):

2022: Assoc. Chair for Water, Climate and Environment program, DGS  
Ad Hoc Review Committee for Full Professor promotion, UT-MSI

2021: Assoc. Chair for Water, Climate and Environment program, DGS

2020: Internal Department Chair Candidates Interview Committee, chair, JSG  
Civil Engineering Faculty (Planet Texas 2050) Search Committee, member  
Appointments Committee, chair, JSG  
Surface and Hydrologic Processes Research Theme, leader, JSG

2019: Post-tenure Review Committee (Terry Quinn, Full Professor), DGS  
Third-year Pre-tenure Review Committee (Daniella Rempe, Asst. Professor), DGS  
Teaching Evaluation (Daniella Rempe, Asst. Professor), DGS  
Ad-hoc Committee for Investigation of Behavioral Issues, Graduate Studies Committee, JSG  
Appointments Committee, JSG (chair beginning fall 2019)  
Reviewer, Dr. Cécile DeWitt-Morette France-UT Endowed Excellence Grants, UT VP for Research  
Task Force on Window Signage Rules for Faculty and Staff Offices, UT Office of the President

2018: Appointments Committee, member, JSG

2017: Hydrologic and Water Science Faculty Search Committee, chair, DGS

2016: Committee on Strategic Plan Implementation, Graduate Studies Committee, member, JSG  
Space Management Committee, member, DGS  
MSc Program Review Committee, member, JSG  
Undergraduate Curriculum Redesign Committee, DGS

2015: MSc Program Review Committee, member, JSG  
Water Science Faculty Search Committee, member, DGS

2014: Faculty Performance Review Committee, DGS

2013: Faculty Performance Review Committee, DGS  
Committee for developing dissertation format and expectations, JSG  
Conceptualized, organized and led field trip to the Philippines for the JSG Undergraduate Honors Research Program

2012: Hydrogeology and Glaciology Discipline, leader, JSG

2011: Hydrogeology Faculty Search Committee, chair, DGS  
Hydrogeology and Glaciology Discipline, leader, JSG  
Admissions, Awards and Support Committee, member, JSG

2010: Hydrogeology and Glaciology Discipline, leader, JSG  
PhD Curricular Review and Revisions Committee, member, JSG

Admissions, Awards and Support Committee, member, JSG  
Technical Sessions Committee, DGS, member  
2009: BS Environmental Science Curriculum Design Committee, UT  
2008: Earth Surface and Hydrologic Processes Faculty/ Researcher Search Committee, member, JSG  
2007: Earth Surface and Hydrologic Processes Faculty/ Researcher Search Committee, member, JSG  
Geoscience Education Faculty Position Search Committee, member, DGS  
BS Geology Option III (Hydrogeology) Curriculum Revision Committee, chair, DGS  
Ad Hoc Undergraduate Teaching Equipment Grant Committee, member, DGS

#### **Educational Outreach:**

2022: Organized guest lectures in kinder classrooms, Austin ISD Kiker and Oaksprings Elementary Schools, kinder classes  
2021: Guest lecture (via Zoom), Austin ISD Kiker Elementary School, kinder class  
2020: Speaker, Scuba Nights Lockdown Edition, Scuba Academy Manila/Scuba Schools International  
2018: Speaker, Austin ISD Kiker Elementary School, 5<sup>th</sup> Grade career fair  
2017: Speaker, Austin ISD Kiker Elementary School, 5<sup>th</sup> Grade career fair  
Guest lecture, Austin ISD Kiker Elementary School, kinder class  
2016: Guest lecturer, Austin ISD Kealing Middle School, 8<sup>th</sup> Grade science class  
2015: Public science lecture on paleoclimate and climate change to officials and employees of Puerto Princesa City, Philippines  
Guest lecturer/ field trip supervisor, Austin ISD LBJ Liberal Arts and Science Academy AP Environmental Science class  
Guest participant, University of Texas/Fish and Wildlife Service Kaktovik Marine Science Camp, Alaska  
2014: Guest lecturer/ field trip supervisor, Austin ISD LBJ Liberal Arts and Science Academy AP Environmental Science class  
Guest lecturer, Austin ISD Kiker Elementary School, 1<sup>st</sup> Grade science class  
Resource person, Austin ISD Kiker Elementary School, 5<sup>th</sup> Grade career fair  
2013: Guest lecturer, Austin ISD Kiker Elementary School, 5<sup>th</sup> Grade science class  
2012: Guest lecturer/ field trip supervisor, Austin ISD LBJ Liberal Arts and Science Academy AP Environmental Science class  
2011: Guest lecturer/ field trip supervisor, Texas A&M Wetland and Riparian Seminar  
Guest lecturer/ field trip supervisor, Austin ISD Crockett High School AP Environmental Science class  
Guest lecturer/ field trip supervisor, Austin ISD LBJ Liberal Arts and Science Academy AP Environmental Science class  
Flume experiment demonstrations, Anderson High School Environmental Systems class  
2010: Guest lecturer, Colorado River Foundation Teacher Institute  
Guest lecturer/ field trip supervisor, Texas A&M Wetland and Riparian Seminar  
Guest lecturer/ field trip supervisor, Austin ISD LBJ Liberal Arts and Science Academy AP Environmental Science class  
2009: Guest lecturer/ field trip supervisor, Texas A&M Wetland and Riparian Seminar  
2008: Guest lecturer, Jackson School of Geosciences - GeoFORCE  
2007-present: Participant (supervisor, lecturer and field trip leader), UT-Environmental Science Institute Research Experience for Undergraduates program

#### **External service:**

**Editor:** AGU Advances (2022-)  
Geophysical Research Letters (2013-2019)

**Associate Editor:** Reviews of Geophysics (2010-2014); Water Resources Research (2010-2013)  
Hydrogeology Journal (2009-2012)

**Guest Paper Editor:** Proceedings of the National Academy of Sciences (2013, 2014, 2020)

**Manuscript reviewer:**

Advances in Water Resources; ASCE Journal of Hydrologic Engineering; Biogeosciences; Computational Geosciences; Computers and Geosciences; Ecosystems; Environmental Fluid Mechanics; Environmental Research Letters; Environmental Science and Technology; Eos; Estuarine, Coastal, and Shelf Science; Freshwater Science; Geography Compass; Geology; Geophysical Research Letters; Ground Water; Hydrogeology Journal; Hydrology and Earth System Sciences; Hydrological Processes; International Journal of Rock Mechanics and Mining Sciences; Journal of Environmental Management; Journal of Geophysical Research – Biogeosciences; Journal of Geophysical Research – Earth Surface; Journal of Hydrology; Journal of Marine Systems; Limnology and Oceanography; Limnology and Oceanography: Fluids and Environments; Nature; Nature Communications; Nature Geoscience; Nature Reviews Earth & Environment; PNAS; Remote Sensing of Environment; Science; Science Advances; Science of the Total Environment; Sedimentology; Transport in Porous Media; Water Research; Water Resources Management; Water Resources Research

**Book chapter reviewer:**

Treatise in Fluvial Geomorphology (Elsevier)

**Proposal review panel member:** National Science Foundation (Hydrologic Sciences; Water Sustainability and Climate-Category 2; Panel Review of CUAHSI); Department of Energy (Subsurface and Biogeochemical Research; Early Career Grants)

**Proposal reviewer:** National Science Foundation (Hydrologic Sciences; Major Research Instrumentation; Paleo Perspectives on Climate Change; Geomorphology and Land Use Dynamics; CAREER; Arctic Natural Sciences); Department of Energy (Basic Energy Sciences; Office of Science Graduate Student Research); Israel Science Foundation; Swiss National Science Foundation; Austrian Science Fund; Royal Society Te Aparangi (Marsden Fund); German Research Foundation; American Chemical Society-Petroleum Research Fund; United States Geological Survey National Institute for Water Resources; Graduate Women in Science Fellowships; Utah State University

**Committee membership in professional societies:**

2022: American Geophysical Union Hydrologic Sciences Award Committee

2021-2022: American Geophysical Union Hydrologic Sciences Task Force on Future Honors

2012-2014: American Geophysical Union Hydrologic Sciences Early Career Award Committee

2013-2014: Geological Society of America Hydrogeology Kohout Early Career Award Committee

2011-2013: Geological Society of America Hydrogeology Division O. E. Meinzer Award Committee

2010-2014: American Geophysical Union Hydrology Section Groundwater Technical Committee

**Chaired sessions in conferences:**

2021: Philippine-American Academy of Science and Engineering Annual Scientific Meeting, “Earth and Environmental Sciences” (virtual)

2020: Philippine-American Academy of Science and Engineering Annual Scientific Meeting, “Earth and Environmental Sciences” (virtual)

2012: Association for the Sciences of Limnology and Oceanography Aquatic Sciences Meeting, Lake Biwa, Japan, “Groundwater-surface water interactions in freshwater and marine environments”

2010: American Geophysical Union Fall Meeting, San Francisco, CA, “CO<sub>2</sub> Sequestration Inside Pores: From Molecules to Microbes” (two sessions)

American Geophysical Union Fall Meeting, San Francisco, CA, “Emerging Topics in Interdisciplinary Hydrology: Biogeochemistry, Ecology, and Geomorphology”

- 2009: American Geophysical Union Fall Meeting, San Francisco, CA, “Everything, everywhere, every time: Integration of high-resolution data with high-fidelity hydrologic models”
- 2008: Geological Society of America Annual Conference held in Houston TX, “Groundwater-surface water interactions”
- 2007: Geological Society of America Annual Conference held in Denver CO, “50 years of hydrogeology in the desert: A tribute to Mahdi Hantush and his legacy”
- 2006: Geological Society of America Annual Conference held in Philadelphia PA, “Stream-hyporheic Interactions: Hydrology, Geochemistry, and Biology”

## Publications

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Researcher ID: <http://www.researcherid.com/rid/B-4940-2011>

Google Scholar: <http://scholar.google.com/citations?user=peswPxUAAAAJ&hl=en&oi=ao>

Underline denotes student or post-doctoral fellow author supervised or co-supervised by Cardenas

\* denotes undergraduate student

Cardenas is often second author or follows student authors in supervised student-led publications.

### Peer-reviewed papers under review or revision:

- Wilson, S. J., A. Moody, T. McKenzie, **M. B. Cardenas**, ... and I. R. Santos, Global subterranean estuaries control groundwater nutrient loading to the ocean.
- Turetcaia, A. B., V. A. Garayburu-Caruso, M. H. Kaufman, R. E. Danczak, J. C. Stegen, R. K. Chu, J. G. Toyoda, **M. B. Cardenas**, and E. B. Graham, Rethinking aerobic respiration in the hyporheic zone under variation in carbon and nitrogen limitations.
- Wu, Y., J. Chen, M. T. O'Connor, G. W. Kling, and **M. B. Cardenas**, Substantial stocks of seasonally-thawed soil organic carbon may determine near-term responses of the Arctic to climate change.
- Li, B., **M. B. Cardenas**, X. Chen, and X. Liu, Mechanistic definition and prediction of the mass transfer coefficient between rivers and hyporheic zones: the  $\alpha$  of two  $\Omega$ s.
- Elegado, A. F. K. P., C. G. Conaco, A. T. Bautista, N. D. S. Mendoza, R. S. Rodolfo, **M. B. Cardenas**, M. R. Lopus, M.-C. Liang, and C. M. B. Jaraula, The microbiome and biogeochemistry of a shallow hydrothermal vent near biodiverse tropical reefs.
- Gomez-Velez, J. D., **M. B. Cardenas**, X. Chen, and T. D. Scheibe, Riverbed respiration is important for local and global CO<sub>2</sub> cycles.
- Zamora, P. B., **M. B. Cardenas**, H. B. Cabria, and R. S. Rodolfo, Freshwater flooding of a subterranean estuary.
- Kaufman, M. H., **M. B. Cardenas**, and R. González-Pinzón, Assessment of resazurin-resorufin tracing for estimating hyporheic zone respiration.

### Peer-reviewed papers in print, in press or accepted:

**2023**

153. Liao, F., **M. B. Cardenas**, X. Chen, and G. Wang, Riverine groundwater discharge estimation in a dynamic river corridor using <sup>222</sup>Rn, *Hydrological Processes*, 37(1), doi:10.1002/hyp.14788, 2023.

**2022**

152. Varner, T. S., H. V. Kulkarni, W. D. Nguyen, K. Kwak, **M. B. Cardenas**, P. S. K. Knappett, A. S. Ojeda, N. Malina, M. U. Bhuiyan, K. M. Ahmed, and S. Datta, Contribution of sedimentary organic matter to arsenic mobilization along a potential natural reactive barrier (NRB) near a river: the Meghna River, Bangladesh, *Chemosphere*, 308, doi:10.1016/j.chemosphere.2022.136289, 2022.
151. Huang, Y., P. S. K. Knappett, M. Berube, S. Datta, **M. B. Cardenas**, K. A. Rhodes, N. T. Dimova, I. Choudhury, K. M. Ahmed, and A. van Geen, Mass fluxes of dissolved arsenic discharging to the

Meghna River are sufficient to account for the mass of arsenic in riverbank sediments, *Journal of Contaminant Hydrology*, 251, doi:10.1016/j.jconhyd.2022.104068, 2022.

150. Xu, B., **M. B. Cardenas**, I. R. Santos, W. C. Burnett, M. A. Charette, V. Rodellas, S. Li, E. Lian, and Z. Yu, Closing the global marine <sup>226</sup>Ra budget reveals the biological pump as a dominant removal flux, *Geophysical Research Letters*, 49(12), doi:10.1029/2022GL098087, 2022.
149. Wang, L., **M. B. Cardenas**, T. Wang, J.-Q. Zhou, L. Zheng, Y.-F. Chen, and X. Chen, The effect of permeability on Darcy-to-Forchheimer flow transition, *Journal of Hydrology*, 610, doi:10.1016/j.jhydrol.2022.127836, 2022.
148. Lee, A., A. F. Aubeneau, **M. B. Cardenas**, and X. Liu, Hyporheic exchange due to cobbles on sandy beds, *Water Resources Research*, 58(1), doi: 10.1029/2021WR030164, 2022.

#### 2021

147. Ferencz, S. B., **M. B. Cardenas**, and B. T. Neilson, Aerobic respiration in riparian exchange zones of regulated river corridors, *Hydrological Processes*, 35(11), doi:10.1002/hyp.14386, 2021.
146. Zamora, P. B., **M. B. Cardenas**, and P. L. M. Cook, Groundwater-surface water interactions in a river estuary and the importance of geomorphology: Insights from hydraulic, thermal and geophysical observations, *Hydrological Processes*, 35(10), doi:10.1020/hyp.14372, 2021.
145. Correa, R. E., **M. B. Cardenas**, R. S. Rodolfo, M. R. Lapus, J. C. Fullon, K. L. Davis, A. Giles, J. C. Fullon, M. Hajati, N. Moosdorf, C. J. Sanders, and I. R. Santos, Submarine groundwater discharge releases CO<sub>2</sub> to a coral reef, *ACS EST Water*, 1(8), 1756–1764, doi:10.1021/acsestwater.1c00104, 2021.
144. Flinker, R. H., **M. B. Cardenas**, T. G. Caldwell, G. N. Flerchinger, R. Rich, and P. B. Reich, Promise and pitfalls of modeling grassland soil moisture in a free-air CO<sub>2</sub> enrichment experiment (BioCON) using the SHAW model, *Pedosphere*, 31(5), 783-795, doi: 10.1016/S1002-0160(21)60037-1, 2021.
143. Sobolevskaia, V., **M. B. Cardenas**, A. K. Hasanov, and P. S. K. Knappett, Aquifer diffusivity estimation through joint inversion of the amplitude ratios and time lags of dominant frequencies of fluctuating head, *Water Resources Research*, 57(6), doi: 10.1029/2020WR027912, 2021.
142. Yuan, Y., X. Chen, **M. B. Cardenas**, X. Liu, and L. Chen, Hyporheic exchange driven by submerged rigid vegetation: a numerical study, *Water Resources Research*, 57(6), doi: 10.1029/2019WR026675, 2021.
141. Liao, F., **M. B. Cardenas**, S. Ferencz, X. Chen, and G. Wang, Tracing bank storage and hyporheic exchange dynamics using <sup>222</sup>Rn: Virtual and field tests and comparisons with other tracers, *Water Resources Research*, 57(5), doi: 10.1029/2020WR028960, 2021.
140. Zlotnik, V. A., K. D. Cole, **M. B. Cardenas**, and A. V. Zlotnik, Enabling the application of large footprint open-bottom permeameters through new shape factors, *Water Resources Research*, 57(5), doi: 10.1029/2020WR029315, 2021.
139. Pedrazas, M. N., **M. B. Cardenas**, A. Hossain, C. Demir, K. M. Ahmed, S. H. Akhter, L. Wang, S. Datta, and P. S. K. Knappett, Application of electrical resistivity to map the stratigraphy and salinity of fluvio-deltaic aquifers: case studies from Bangladesh reveal benefits and pitfalls, *Hydrogeology Journal*, doi: 10.1007/s10040-021-02342-y, 2021.
138. Ferencz, S. B., S. Muñoz\*, B. T. Neilson, and **M. B. Cardenas**, Riverbed temperature and heat transport in a hydropeaked river, *Water Resources Research*, 57(4), doi:10.1029/2021WR029609, 2021.
137. Lee, A., A. F. Aubeneau, X. Liu, and **M. B. Cardenas**, Hyporheic exchange in sand dunes under a freely deforming river water surface, 57(3), doi:10.1029/2020WR028817, *Water Resources Research*, 2021.
136. Kaufman, M., J. Warden, **M. B. Cardenas**, J. Stegen, E. Graham, and J. Brown, Evaluating a laboratory flume microbiome as a window into natural riverbed biogeochemistry, *Frontiers in Water*, 30, doi: 10.3389/frwa.2021.596260, 2021.
135. Gultinan, E. J., J. E. Santos, **M. B. Cardenas**, D. N. Espinoza, and Q. Kang, Two-phase fluid flow properties of rough fractures with heterogeneous wettability: analysis with lattice Boltzmann simulations, *Water Resources Research*, 57(1), doi:10.1029/2020WR027943, 2021.

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134. Pedrazas, M. N., M. B. Cardenas, C. Demir, J. A. Watson, C. T. Connolly, and J. W. McClelland, Absence of ice-bonded permafrost beneath an Arctic lagoon, *Science Advances*, 6(43), doi: 10.1126/sciadv.abb5083, 2020.
133. Wang, L., M. B. Cardenas, J. Zhou, and R. A. Ketcham, The complexity of nonlinear flow and non-Fickian transport in fractures driven by three-dimensional recirculation zones, *Journal of Geophysical Research-Solid Earth*, 125(9), doi:10.1029/2020JB020028, 2020.
132. Zeng, C., W. Deng, and M. B. Cardenas, Resonance of droplets in constricted capillary tubes: critical factors and energy balance, *Physical Review Fluids*, 5(8), doi: 10.1103/PhysRevFluids.5.083604, 2020.
131. Chen, J., Y. Wu, M. O' Connor, M. B. Cardenas, K. Schaefer, R. Michaelides, and G. W. Kling, InSAR reveals factors affecting soil active layer freeze-thaw and water storage patterns above continuous permafrost on the North Slope of Alaska, *Remote Sensing of Environment*, 248, 112007, doi: 10.1016/j.rse.2020.112007, 2020.
130. O'Connor, M. T., M. B. Cardenas, S. B. Ferencz, Y. Wue, B. T. Neilson, J. Chen, and G. W. Kling, Empirical models for predicting water and heat flow properties of permafrost soils, *Geophysical Research Letters*, 47(11), doi: 10.1029/2020GL087646, 2020.
129. Lee, A., M. B. Cardenas, and A. F. Aubeneau, The sensitivity of hyporheic exchange to fractal properties of riverbeds, *Water Resources Research*, 56(5), doi: 10.1029/2019WR026560, 2020.
128. Connolly, C. T., M. B. Cardenas, G. A. Burkart, R. G. M. Spencer, and J. W. McClelland, Groundwater as a major source of dissolved organic matter to Arctic coastal waters, *Nature Communications*, 11, 1479, doi: 10.1038/s41467-020-15250-8, 2020.
127. Li, B., X. Liu, M. H. Kaufman, A. Turetcaia, X. Chen, M. B. Cardenas, Flexible and modular simultaneous modeling of flow and reactive transport in hyporheic zones, *Water Resources Research*, 56(2), doi: 10.1029/2019WR026528, 2020.
126. Cardenas, M. B., R. S. Rodolfo, M. R. Lopus, H. B. Cabria, J. Fullon, G. R. Gojunco, D. O. Breecker, D. M. Cantarero, J. Evaristo, F. P. Siringan, and T. Zhang, Submarine groundwater and vent discharge in a volcanic area associated with coastal acidification, *Geophysical Research Letters*, 47(1), doi:10.1029/2019GL085730, 2020.

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125. Ferencz, S. B., M. B. Cardenas, and B. T. Neilson, Analysis of the effects of dam release properties and ambient groundwater flow on surface water-groundwater exchange over a 100-km-long reach, *Water Resources Research*, 55(11), 8526-8546, doi:10.1029/2019WR025210, 2019.
124. Wang, L., and M. B. Cardenas, Analysis of permeability change in dissolving rough fractures using depth-averaged flow and reactive transport models, *International Journal of Greenhouse Gas Control*, 91, 102824, doi:10.1016/j.ijggc.2019.102824, 2019.
123. Zheng, L., M. B. Cardenas, L. Wang, and D. Mohrig, Ripple effects: bedform morphodynamics cascading into hyporheic zone biogeochemistry, *Water Resources Research*, 55(8), 7320-7342, doi:10.1029/2018WR023517, 2019.
122. O'Connor, M. T., M. B. Cardenas, K. D. Nicholaides, B. T. Neilson, and G. W. Kling, Active layer groundwater flow: the interrelated effects of stratigraphy, thaw, and topography, *Water Resources Research*, 55(8), 6555-6576, doi: 10.1029/2018WR024636, 2019.
121. Zhou, J., Y. Chen, H. Tang, L. Wang, and M. B. Cardenas, Disentangling the simultaneous effects of inertial losses and fracture dilation on permeability of pressurized fractured rocks, *Geophysical Research Letters*, 46, 8862-8871, doi: 10.1029/2019GL083355, 2019.
120. Cantarero, D. L. M., A. Blanco, M. B. Cardenas, K. Nadaoka, and F. P. Siringan, Offshore submarine groundwater discharge (SGD) at a coral reef front controlled by faults, *Geochemistry, Geophysics, Geosystems*, 20(7), 3170-3185, doi:10.1029/2019GC008310, 2019.
119. Zhou, J., Y. Chen, L. Wang, and M. B. Cardenas, Universal relationship between viscous and inertial permeability of geologic media, *Geophysical Research Letters*, 46, 1441-1448, doi:10.1029/2018GL081413, 2019.



118. Zhou, J., L. Wang, Y. Chen, M. B. Cardenas, Mass transfer between recirculation and main flow zones: Is physically-based parameterization possible?, *Water Resources Research*, 55(1), 345-362, doi: 10.1029/2018WR023124 2019.

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117. Gultinan, E. J., D. N. Espinoza, L. Cockrell, and M. B. Cardenas, Textural and compositional controls on mudrock breakthrough pressure and permeability, *Advances in Water Resources*, 121, 162-172, doi: 10.1016/j.advwatres.2018.08.014, 2018.
116. Wang, L., and M. B. Cardenas, Connecting pressure-saturation and relative permeability models to fracture properties: the case of capillary-dominated flow of supercritical CO<sub>2</sub> and brine, *Water Resources Research*, 54, 6965–6982, doi: 10.1029/2018WR023526, 2018.
115. Zheng, L., and M. B. Cardenas, Diel stream temperature effects on nitrogen cycling in hyporheic zones, *Journal of Geophysical Research-Biogeosciences*. 123, 2743-2760, doi:10.1029/2018JG004412, 2018.
114. Neilson, B. T., M. B. Cardenas, M. T. O'Connor, M. T. Rasmussen, T. V. King, and G. W. Kling, Groundwater flow and exchange across the land surface explain carbon export patterns in continuous permafrost watersheds, *Geophysical Research Letters*, 45(15), 7596-7605, doi:10.1029/2018GL078140, 2018.
113. Chen, X., M. B. Cardenas, and L. Chen, Hyporheic exchange driven by three-dimensional sandy bedforms: sensitivity to and prediction from bedform geometry, *Water Resources Research*, 54(6), 4131-4149, doi:10.1029/2018WR022663, 2018.
112. Watson, J. A., M. B. Cardenas, S. B. Ferencz, P. S. K. Knappett, and B. T. Neilson, The effects of floods on the temperature of riparian groundwater, *Hydrological Processes*, 32(9), doi:10.1002/hyp.11504, 2018.
111. Moldwin, M. B., F. Florindo, G. Okin, A. Robock, E. J. Rohling, M. B. Cardenas, A. Carlton, K. H. Chen, M. Crucifix, A. Gettelman, A. Hubbard, T. Katsura, and T. H. Painter, When and how to write a high-impact review paper: lessons from eight years of editorial board service to Reviews of Geophysics, *Reviews of Geophysics*, 55(4), 860-863, doi:10.1002/2017RG000587, 2018.

#### 2017

110. Gomez-Velez, J. D., J. L. Wilson, M. B. Cardenas, and J. W. Harvey, Flow and residence times of dynamic river bank storage and sinuosity-driven hyporheic exchange, *Water Resources Research*, 53(10), 8572–8595, doi:10.1002/2017WR021362, 2017.
109. Shuai, P., M. B. Cardenas, P. S. K. Knappett, P. C. Bennett, and B. T. Neilson, Denitrification in the banks of fluctuating rivers: the effects of river stage amplitude, sediment hydraulic conductivity and dispersivity, and ambient groundwater flow, *Water Resources Research*, 53(9), 7951–7967, doi:10.1002/2017WR020610, 2017.
108. Kaufman, M. H., M. B. Cardenas, J. Buttles, A. J. Kessler, and P. L. M. Cook, Hyporheic hot moments: dissolved oxygen dynamics in the hyporheic zone in response to surface flow perturbations, *Water Resources Research*, 53(8), 6642-6662, doi:10.1002/2016WR020296, 2017.
107. Zamora, P. B., M. B. Cardenas, R. Lloren, and F. P. Siringan, Seawater-groundwater mixing in and fluxes from coastal sediment overlying discrete fresh seepage zones: a modeling study, *Journal of Geophysical Research-Oceans*, 122(8), 6565-6582, doi:10.1002/2017JC012769, 2017.
106. Gultinan, E. J., M. B. Cardenas, P. C. Bennett, T. Zhang, and D. N. Espinoza, The effect of organic matter and thermal maturity on the wettability of supercritical CO<sub>2</sub> on organic shales, *International Journal of Greenhouse Gas Control*, 65, 15-22, doi:10.1016/j.ijggc.2017.08.006, 2017.
105. Befus, K. M., S. Jasechko, E. Luijendijk, T. Gleeson, and M. B. Cardenas, The rapid yet uneven turnover of Earth's groundwater, *Geophysical Research Letters*, 44(11), 5511-5520, doi:10.1002/2017GL073322, 2017.
104. Wang, L., and M. B. Cardenas, Linear permeability evolution of expanding conduits due to feedback between flow and fast phase-change, *Geophysical Research Letters*, 44(9), 4116–4123, doi: 10.1002/2017GL073161, 2017.

103. Hester, E. T., **M. B. Cardenas**, R. Haggerty, and S. Apte, The importance and challenge of hyporheic mixing, *Water Resources Research*, 53(5), 3565–3575, doi:10.1002/2016WR02000, 2017.
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100. Jasechko, S., D. Perrone, K. M. Befus, **M. B. Cardenas**, G. Ferguson, T. Gleeson, E. Luijendijk, J. J. McDonnell, R. G. Taylor, Y. Wada, and J. W. Kirchner, Global aquifers dominated by fossil groundwaters but vulnerable to modern contamination, *Nature Geoscience*, 10, 425–429, doi:10.1038/ngeo2943, 2017.
99. Ferencz, S. B., and **M. B. Cardenas**, Diel stream temperature regimes of Bukovsky eco-regions of the conterminous United States, *Geophysical Research Letters*, 44(5), 2264–2271, doi:10.1002/2017GL072641, 2017.
98. Bass, B. J.\*, **M. B. Cardenas**, and K. M. Befus, Seasonal shifts in soil moisture throughout a semi-arid hillslope ecotone during drought: a geoelectrical view, *Vadose Zone Journal*, 16(2), 10.2136/vzj2016.11.0108, 2017.
97. Wang, L., and **M. B. Cardenas**, Transition from Non-Fickian to Fickian longitudinal transport through 3-D rough fractures: Scale-(in)sensitivity and roughness dependence, *Journal of Contaminant Hydrology*, 198, 1–10, doi:10.1016/j.jconhyd.2017.02.002, 2017.

#### 2016

96. **Cardenas, M. B.**, A. E. Ford\*, M. H. Kaufman, A. J. Kessler, and P. L. M. Cook, Hyporheic flow and dissolved oxygen distribution in fish nests: the effects of open channel velocity, permeability patterns, and groundwater upwelling, *Journal of Geophysical Research-Biogeosciences*, 121(12), 3113–3130, doi:10.1002/2016JG003381, 2016.
95. Wang, L., and **M. B. Cardenas**, Development of an empirical model relating permeability and specific stiffness for rough fractures from numerical deformation experiments, *Journal of Geophysical Research-Solid Earth*, 121(7), 4977–4989, doi:10.1002/2016JB013004, 2016.
94. Briody, A. C., **M. B. Cardenas**, P. C. Bennett, P. Shuai, and P. S. K. Knappett, Groundwater flow, nutrient, and stable isotope dynamics in the parafluvial-hyporheic zone of the regulated Lower Colorado River (Texas, USA) over the course of a small flood, *Hydrogeology Journal*, 24(4), 923–935, doi:10.1007/s10040-016-1365-3, 2016.
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#### 2015

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### **Scholarly Presentations**

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#### **Invited lectures:**

##### **2022**

University of Minnesota- “Water cycling across terrestrial-aquatic interfaces from pore to planetary scales”  
Brown University- “The importance of hydrology on the fate of carbon trapped in permafrost in the Arctic”  
Texas A&M University- “A global perspective on groundwater age and turnover rates: insights on renewability, vulnerability and elasticity”

##### **2021**

Badong International Geohazards Symposium– “The fate of carbon trapped in permafrost in the Arctic: one of the biggest hazards of the planet”

##### **2020**

Old Dominion University – “Coastal groundwater, coral reefs, calderas and carbon cycling: Connections that are common?”

Geological Society of the Philippines – “Groundwater and surface water as a single resource: novel insight from Philippine studies”

University of Dhaka-“A global perspective on groundwater resources: renewability, vulnerability, and elasticity”

##### **2019**

Goldschmidt Meeting-“Cascading disequilibrium: a glimpse into dynamic hydro-biogeochemical processes in hyporheic zones”

University of the Philippines-Marine Science Institute-“Land-ocean subsurface connections in volcanic terrain and its impact on coastal ocean acidification”

##### **2018**

American Geophysical Union Fall Meeting- “Perpetual hyporheic motion (and reaction): A glimpse into the dynamic world of the hyporheic zone”



International Association for Hydro-Environment Engineering and Research Groundwater Symposium (Nanjing, China)- “A global perspective on groundwater age and turnover rates: renewability, vulnerability, and elasticity”

International Association of Hydrogeologists Congress- “Denitrification in the banks of fluctuating rivers: the effects of river stage amplitude, sediment hydraulic conductivity and dispersivity, and ambient groundwater flow”

University of Southern Denmark- “Water cycling across aquatic interfaces: how it works and why it matters from the pore to the continental scale”

Göttingen University, Germany- “Water cycling across aquatic interfaces: how it works and why it matters from the pore to the continental scale”

Tuebingen University, Germany- “Water cycling across aquatic interfaces: how it works and why it matters from the pore to the continental scale”

### **2017**

Hohai University, China- “How the pulse of a river affects its liver”

Wuhan University, China- “A global perspective on groundwater resources: renewability, vulnerability, and elasticity” and “Water cycling across aquatic interfaces: how it works and why it matters from the pore to the continental scale”

China University of Geosciences, Wuhan, China - “Water cycling across aquatic interfaces: how it works and why it matters from the pore to the continental scale”

Oak Ridge National Laboratory- “Water cycling across aquatic interfaces: how it works and why it matters from the pore to the continental scale”

University of Utah- “Water cycling across aquatic interfaces: how it works and why it matters from the pore to the continental scale”

Pacific Northwest National Laboratory- “A global perspective on groundwater resources: renewability, vulnerability, and elasticity” and “Water cycling across aquatic interfaces: how it works and why it matters from the pore to the continental scale”

University of the Philippines-Diliman (Geological Sciences)- “A global perspective on groundwater age and turnover rates: renewability, vulnerability, and elasticity”

University of Texas Bureau of Economic Geology- “Water cycling across aquatic interfaces: how it works and why it matters from the pore to the continental scale”

Johns Hopkins University- “Water cycling across aquatic interfaces: how it works and why it matters from the pore to the continental scale”

University of Nebraska-Lincoln- “Water cycling across aquatic interfaces and why it matters from the pore scale to the continental scale”

### **2016**

China University of Geosciences- Beijing- “Taking stock of Earth’s groundwater and its renewability”

China University of Geosciences- Beijing- “Water cycling across aquatic interfaces and why it matters from the pore scale to the continental scale”

Hohai University, China- “Taking stock of Earth’s groundwater and its renewability”

Hohai University, China- “Water cycling across aquatic interfaces and why it matters from the pore scale to the continental scale”

### **2015**

American Geophysical Union Fall Meeting- “Devastation of aquifers from super typhoon Haiyan’s storm surge”

Palawan State University, Philippines- “Paleo-climate insights from Palawan stalagmites: the Western Pacific region’s response to global climate change”

Western Palawan University, Philippines - “Paleo-climate insights from Palawan stalagmites: the Western Pacific region’s response to global climate change”

Holy Trinity University, Puerto Princesa, Philippines- “Paleo-climate insights from Palawan stalagmites: the

Western Pacific region's response to global climate change"

Baylor University (Geology)- "Water cycling across aquatic interfaces and why it matters from the pore scale to the continental scale"

Mapua Institute of Technology, Philippines (Civil, Environmental, and Geological Engineering)- "Devastation of aquifers from super typhoon Haiyan's storm surge"

Mapua Institute of Technology, Philippines (Civil, Environmental, and Geological Engineering)- "Taking stock of Earth's groundwater and its renewability"

Ateneo de Manila University, Philippines (Environmental Science)- "Devastation of aquifers from super typhoon Haiyan's storm surge"

University of the Philippines-Los Baños, Philippines (Environmental Science and Management)- "Devastation of aquifers from super typhoon Haiyan's storm surge"

University of the Philippines- Los Baños, Philippines (Environmental Science and Management)- "Taking stock of Earth's groundwater and its renewability"

University of the Philippines-Diliman (Geological Sciences)- "Devastation of aquifers from super typhoon Haiyan's storm surge"

University of the Philippines-Diliman (Geological Sciences)- "Taking stock of Earth's groundwater and its renewability"

University of Michigan (Earth and Environmental Sciences)- "Water cycling across aquatic interfaces, and why it matters from the pore scale to the continental scale"

#### **2014**

European Geosciences Union, Vienna, Austria- "The residence times of surface water-groundwater exchange from  $10^{-3}$  to  $10^3$  m and why long tails matter"

#### **2013**

American Geophysical Union Fall Meeting- "The old and the new: the use of classical regional groundwater flow models to address problems of the future"

University of Wisconsin-Madison (Civil and Environmental Engineering)- "River-groundwater interactions: local processes with global consequences"

University of Wisconsin-Madison (Geoscience)- "Terrestrial smokers: thermal springs due to hydrothermal convection of groundwater connected to surface water"

University of the Philippines-Diliman (Geological Sciences)- "Pore-scale controls on the trapping of supercritical  $\text{CO}_2$  in reservoirs"

University of the Philippines-Diliman (Marine Science)- "Groundwater inputs into the coastal ocean: large-scale patterns, local dynamics, and implications on material and energy budgets"

Oregon State University (Water Resources Seminar)- "Coupled processes along the surface water-groundwater interface: advances from modeling and measurements"

Portland State University and USGS- "How the pulse of a river affects its liver"

#### **2012**

American Geophysical Union Fall Meeting- "Applications of electrical resistivity imaging for characterizing groundwater-surface water interactions from local to regional scales"

Texas Riparian Association Annual Meeting- "How the pulse of a river affects its liver"

University of Virginia (Civil and Environmental Engineering)- "How the pulse of a river affects its liver"

University of Virginia (Environmental Sciences)- "Coupled processes along the surface water-groundwater interface: advances from modeling and measurements"

University of Virginia (Environmental Sciences)- "Coastal sediment as bio-geo-reactors powered by waves"

University of the Philippines-Diliman (Geological Sciences)- "How can a limestone outcrop warm up a very cold river?"

University of the Philippines-Diliman (Geological Sciences)- "Discovery and analysis of 'terrestrial smokers' in Taal Volcano"

University of the Philippines-Diliman (Geological Sciences)- "Geophysical imaging of ground water-surface

water interactions in rivers, lakes and the coastal ocean”

University of Texas - Marine Science Institute- “Groundwater inputs into the coastal ocean: large-scale patterns, local dynamics, and implications on material and energy budgets”

#### **2011**

Texas A & M University (Water Resources Seminar)- “Coastal sediment as bio-geo-reactors powered by waves”

River Corridor Restoration Conference 2011 Keynote Lecture (EAWAG: Swiss Federal Institute of Aquatic Science and Technology, Switzerland)- “River-aquifer connectivity as a restoration target: what, why and how”

University of California-Berkeley (Civil and Environmental Engineering)- “The surface water-groundwater continuum: hydraulics, biogeochemistry and geophysics”

#### **2010**

American Geophysical Union Fall Meeting- “Integrating turbulent flow, biogeochemical, and poromechanical processes in rippled coastal sediment”

American Geophysical Union Fall Meeting- “Detection and characterization of local to regional groundwater inputs to rivers, lakes and oceans with electrical imaging”

University of the Philippines-National Institute of Geological Sciences- “The effects of river dynamics on river-aquifer interactions”

American Society of Limnology and Oceanography Aquatic Sciences Meeting- “Fluid dynamic interactions near sediment-water interfaces in aquatic and coastal environments”

University of Texas at San Antonio (Water Resources Seminar)- “Effects of dams on groundwater-surface water interactions”

American Geophysical Union/American Society of Limnology and Oceanography/ The Oceanography Society Ocean Sciences Joint Meeting- “Time-averaged versus transient forcing by waves of porewater circulation and transport in permeable sediment”

#### **2009**

American Geophysical Union Fall Meeting- “Effects of inertia and directionality on flow and transport in a fracture”

Geological Society of America Annual Conference- “The familiar as a frontier: persistent transient stream-groundwater interactions”

University of Texas at Arlington (Geology)- “Coastal sediment as bio-geo-reactors powered by waves”

Max-Planck Institute for Marine Microbiology, Bremen, Germany- “Constraining denitrification in permeable coastal sediment using linked biogeochemical and hydrodynamic models”

European Geosciences Union, Vienna, Austria- “Towards the ‘hyporheic meter’-predicting hyporheic exchange from bedforms to bars to bends”

#### **2008**

University of the Philippines-Diliman (Geological Sciences)- “Power-law scaling of residence times: the geomorphological signature of ground water-surface water connection at nested scales”

University of the Philippines-Diliman (Marine Science)- “Constraining denitrification in permeable coastal sediment using linked biogeochemical and hydrodynamic models”

University of Minnesota (St. Anthony Falls Laboratory/ National Center for Earth Surface Dynamics)- “Surface water-groundwater interactions across scales”

#### **2007**

American Geophysical Union Fall Meeting- “Understanding processes in streambeds with reductive models and high-resolution data”

Geological Society of America Annual Conference- “Power-law scaling of residence times: the geomorphological signature of ground water-surface water connection at nested scales”

University of Lancaster (Hyporheic Zone Network Keynote Lecture)- “Exchange across the surface water-ground water interface from bedforms to bends to basins”

University of Texas at Austin (Inst. of Geophysics)- “Complex surface water-ground water interactions revealed”

University of Nevada-Reno (Graduate Program of Hydrologic Sciences)-“Understanding surface water-ground water interactions from bedforms to basin using high-fidelity models”

### 2006

Gordon Research Conference on Permeable Sediments Plenary Lecture- “Dynamics of fluids, solutes, and heat along sediment-water interfaces: a multiphysics modeling study”

American Geophysical Union Fall Meeting- “Multiphysics modeling of processes along sediment-water interfaces: towards fundamental understanding and mechanistic predictions”

Geological Society of America Annual Conference- “Flumes, finite-elements, field observations, Fourier-series and fractals: fundamental linkages in hyporheic zone research”

University of Texas at Austin (Geological Sciences)- “The surface water-groundwater interface: crossing boundaries”

University of Virginia (Environmental Sciences)- “The surface water-groundwater interface: crossing boundaries”

University of Wyoming (Geology and Geophysics)- “The surface water-groundwater interface: crossing boundaries”

University of Pittsburgh (Geology and Planetary Science)- “The surface water-groundwater interface: crossing boundaries”

Georgia State University (Geosciences)- “The surface water-groundwater interface: crossing boundaries”

## Research Grants

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### Current or funded projects:

Collaborative Research: The physical and chemical dynamics of groundwater flow across the land-sea interface in Arctic lagoon ecosystems, funded by *National Science Foundation* (\$1,273,700, UT portion-\$794,976), UT (lead institution) PI: M. Bayani Cardenas, co-PI: James McClelland, Woods Hole Oceanographic Inst. PI: Matthew Charette, 2020-2023.

Collaborative Research: The dynamic iron curtain surrounding fluctuating rivers and its impacts on arsenic fate and transport, funded by *National Science Foundation* (\$849,986, UT portion-\$253,841), UT PI: M. Bayani Cardenas, Texas A&M Univ. (lead institution) PI: Peter Knappett, UT San Antonio PI: Saugata Datta, 2019-2022.

Advancing InSAR Technology for Monitoring and Prediction of the Hydrologic State of Permafrost Terrain in the Arctic, pending with the *National Aeronautics and Space Administration* (\$600,000, UT portion-\$305,000), UT PI and lead: Jingyi Chen, co-PI: M. Bayani Cardenas, Univ. of Michigan PI: George Kling

### Completed projects:

Respiration in hyporheic zones: connecting mechanics, microbial biogeochemistry, and models, funded by the *Department of Energy-Biological and Environmental Research* (\$600,000), UT PI and lead: M. Bayani Cardenas, Pennsylvania State University PI: Xiaofeng Liu, PNNL PIs: Xingyuan Chen, Maoyi Huang, and James C. Stegen, 2017-2020 (extended until 2022).

Collaborative Research: The effects of river regulation on lateral and integrated longitudinal mass and energy transfers in coupled terrestrial-aquatic systems, funded by *National Science Foundation* (\$682,264, UT portion-\$360,923), UT PI (lead institution): M. Bayani Cardenas, co-PI: Philip Bennett, Utah State Univ. PI: Bethany Neilson, 2014-2017.

Center for Frontiers of Subsurface Energy Security, funded by the *Department of Energy-Basic Energy Sciences* (\$10,920,000 UT team), PI: Larry Lake, co-PI: M. Bayani Cardenas (1 of 20 PIs at UT), 2014-2018.

The effects of typhoon Haiyan's storm surge on coastal aquifers, funded by *National Science Foundation*

(\$49,581), PI: M. Bayani Cardenas, co-PI: Philip Bennett

CAREER: Multiphysics research and education for understanding coupled mechanical-biogeochemical surface-subsurface processes, funded by *National Science Foundation* (\$569,390), sole-PI: M. Bayani Cardenas, 2010-2015.

Collaborative Research: Holocene hydrologic variability across the Western Pacific Warm Pool, funded by *National Science Foundation* (\$504,522), PI: Judson Partin, co-PIs: Jay Banner, Fred Taylor, M. Bayani Cardenas, 2010-2013.

Center for Frontiers of Subsurface Energy Security: Task 1, Subpore Processes, funded by *Department of Energy-Basic Energy Sciences* (\$1,650,000 out of a total of \$15.5M awarded to UT team), PI: Philip Bennett, co-PI: M. Bayani Cardenas, 2009-2014.

Quantification of denitrification in permeable sediments using a combination of measurements and two-dimensional modeling, funded by *Australian Research Council - Discovery Projects* (\$160,000), PI: Perran L. M. Cook (Monash University, and grant is administered at Monash University), co-PI: M. Bayani Cardenas, 2009-2012.

Assessing, quantifying, and predicting the role of large wood debris as a driver of hydrologic connectivity, funded by *National Science Foundation* (\$282,683): sole PI: M. Bayani Cardenas, 2009-2012.

Paleoclimate of the Western Pacific Warm Pool, funded by *University of Guam* (\$80,000), PI: Jay Banner, co-PIs: M. Bayani Cardenas, Fred Taylor, Terry Quinn, 2008-2010.

Balik Scientist Program, funded by *Philippine Department of Science and Technology* (\$7,000): M. Bayani Cardenas, 2008.

Measurement and ecological implications of multi-scale three-dimensional geomorphology-driven surface water-ground water connections at the Outdoor Stream Lab, funded by *National Center for Earth Surface Dynamics* (a National Science Foundation Science and Technology Center) Visitor Program (\$28,300): Visiting PI: M. Bayani Cardenas, 2008.

Hydrodynamics of groundwater-surface water interactions in gaining and losing channels: an experimental study, funded by *University of Texas Faculty Development Program Summer Research Assignment* (funded for two months summer support): M. Bayani Cardenas. 2007.

Current-topography driven exchange processes between water columns and heterogeneous permeable sediments, funded by *American Chemical Society-Petroleum Research Fund* (\$40,000), sole-PI: M. Bayani Cardenas, 2008-2010

Hydrodynamics of flow along and across sediment-water interfaces: a multiphysics modeling study, funded by the *American Geophysical Union* (Horton Research Grant) for \$10,000, 2006, PI: Audrey H. Sawyer.

Numerical investigation of fluid flow above and below sediment-water interfaces, funded by the *New Mexico Water Resources Research Institute* for \$5000, 2006

Travel Grants from the New Mexico Tech Graduate Student Association

## Courses Taught and Developed

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### University of Texas at Austin

The numbers in parentheses denote in order: number of students completing the course survey, instructor rating (out of 5), and course rating (out of 5). UT averages are 4.4 and 4.1, and college (Jackson School) averages are 4.2 and 3.9.

**2022:** Summer: GEO 376L and 382C (Field Methods in Groundwater Hydrology) (1/1,5.0/5.0,5.0/5.0)  
Spring: GEO 346C (Intro. to Physical and Chemical Hydrogeology) (7, 4.9, 4.6)

**2021:** Fall: GEO 476L (Groundwater Hydrology) (7, 4.7, 4.6)  
Spring: GEO 346C\* (Intro. to Physical and Chemical Hydrogeology) (6, 4.2, 3.7)  
GEO 371C and 391C (Intro. to Mathematical Modeling for Geoscientists) (1/8, 4.0/3.4, 4.0/3.4)

\* class was held virtually

- 2020:** Fall: GEO 476K\* and 391C\* (Groundwater Hydrology) (5, 5.0, 4.8)  
 Spring: GEO 346C\*\* (Intro. to Physical and Chemical Hydrogeology) (10, 4.9, 4.8)  
 \* class was held virtually except for two lab sessions  
 \*\* class was interrupted by the COVID-19 pandemic and shifted to on-line after spring break
- 2019:** Fall: GEO 476K and 391C (Groundwater Hydrology) (10, 4.8, 4.6; 2, 5.0, 5.0)  
 Spring: GEO 346C (Intro. to Physical and Chemical Hydrogeology) (26, 4.4, 4.1)
- 2018:** Fall: GEO 476K (Groundwater Hydrology) (16, 4.2, 3.9)  
 Spring: GEO 303 (Introduction to Geology) (86, 4.0, 3.7)
- 2017:** Summer: GEO 376L (Field Methods in Hydrogeology) (5, 4.8, 4.8)  
 Spring: GEO 371C and 391C (Intro. to Mathematical Modeling for Geoscientists) (12, 4.3, 4.1)
- 2016:** Fall: GEO 376S and 382S (Physical Hydrology, grad and undergrad classes taught jointly) (20, 5.0, 4.8)  
 Summer: GEO 376L (Field Methods in Hydrogeology) (15, 4.8, 4.7)  
 Spring: GEO 346C (Intro. to Physical and Chemical Hydrogeology) (21, 4.6, 4.6)
- 2015:** Fall: GEO 376S and 382S (Physical Hydrology, grad and undergrad classes taught jointly) (12, 4.4, 4.3)
- 2014:** Fall: GEO 376S and 382S (Physical Hydrology, grad and undergrad classes taught jointly) (22, 3.5, 3.3)  
 Summer: GEO 376L (Field Methods in Hydrogeology) (17, 4.8, 4.5)  
 Spring: GEO 371C and 391C (Intro. to Mathematical Modeling for Geoscientists) (13, 4.5, 4.2)
- 2013:** Fall: GEO 376S and 382S (Physical Hydrology) (20, 4.3, 3.9)
- 2012:** Fall: GEO 376S and 382S (Physical Hydrology, grad and undergrad classes taught separately)  
 (17, 4.6, 4.2) (21, 4.5, 4.2)  
 Summer: GEO 376L (Field Methods in Hydrogeology) (18, 4.9, 4.9)  
 Spring: GEO 382G (Fluid Physics for Geologists) (7, 4.3, 3.7)
- 2011:** Fall: GEO 376S and 382S (Physical Hydrology, grad and undergrad classes taught separately)  
 (19, 4.4, 4.2) (8, 3.9, 3.9)
- 2010:** Fall: GEO 376S and 382S (Physical Hydrology, grad and undergrad classes taught separately)  
 (19, 4.2, 3.9) (9, 4.0, 4.0)  
 Summer: GEO 376L (Field Methods in Hydrogeology)  
 Spring: GEO 346C (Intro. to Physical and Chemical Hydrogeology) (45, 3.7, 3.4)
- 2009:** Fall: GEO 376S and 382S (Physical Hydrology) (17, 4.8, 4.3)  
 Summer: GEO 392M (Modern Geological Sciences-UTeach)  
 Spring: GEO 346C (Intro. to Physical and Chemical Hydrogeology) (44, 4.4, 4.0)
- 2008:** Fall: GEO 376s and 382S (Physical Hydrology)  
 Summer: GEO 376L (Field Methods in Hydrogeology) (9, 4.4, 4.5)  
 Spring: GEO 346C (Environmental Hydrogeology) (36, 4.4, 4.1)  
 GEO 391C (Surface water-groundwater interactions) (11, 4.4, 3.6)
- 2007:** Fall: GEO 376S and 382S (Physical Hydrology) (14, 4.4, 4.1)  
 Summer: GEO 376L (Field Methods in Hydrogeology)  
 Spring: GEO 346C (Environmental Hydrogeology) (35, 4.6, 4.3)

**New Mexico Inst. of Mining and Technology** (as Graduate Teaching Assistant)

- 2004:** Fall: HYD 532 (Groundwater Modeling)  
 Spring: HYD 508 (Flow and Transport in Geophysical Systems)

**University of Nebraska-Lincoln** (as Graduate Teaching Assistant)

- 2002:** Spring: GEO 101 lab (Introductory Geology Lab, 2 sections per semester)  
**2001:** Spring and Fall: GEO 101 lab (Introductory Geology Lab, 2 sections per semester)  
**2000:** Spring: GEO 101 lab (Introductory Geology Lab, 2 sections per semester)  
 Fall: Structural Geology  
**1999:** Fall: GEO 101 lab (Introductory Geology Lab, 2 sections per semester)