

MEINHARD BAYANI R. CARDENAS

Curriculum Vitae as of June 2014

Associate Professor and William T. Stokes Centennial Teaching Fellow

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

Born: 1977 in Goettingen, Germany to Marlito Samuel L. Cardenas (†) and Maria Lydia R. Cardenas

Nationality: Philippines; USA Permanent Resident since 2009

Marital status: Married to Maria Theresa (Tracy) S. Cardenas since 1999

Children: Makisig Miguel, born in 2002 in Lincoln, Nebraska

Mayumi Olivia, born in 2007 in Austin, Texas

EDUCATION

- Ph.D., 2006 Earth and Environmental Science (Hydrology), New Mexico Inst. of Mining and Technol.
Adviser: John L. Wilson; Committee Members: Fred M. Phillips, Robert S. Bowman
(deceased), Daniel B. Stephens, Glenn Spinelli, David Love
- M.S., 2002 Geology (Hydrogeology), University of Nebraska-Lincoln
Adviser: Vitaly A. Zlotnik; Committee Members: Norman D. Smith, Darryll T. Pederson
- B.S., 1999 Geology, University of the Philippines-Diliman

RESEARCH INTERESTS

Hydrology and hydrogeology: physical, chemical, and ecological processes

PROFESSIONAL APPOINTMENTS

- 2011-present, 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

- 2013: Faculty Science Performance Award, Dept. of Geological Sciences, The University of Texas at 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 2nd Gordon Research Conference on Permeable Sediments

2005: American Geophysical Union Horton (Hydrology) Research Grant
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 supervised students and post-docs

2014

Outstanding Graduate Student in UT Hydrogeology Field Camp – Matt Kaufman
Best MS Student Presentation, Jackson School of Geosciences MS Student day – Alyse Briody
Best Represented Research Group (1st Place), Jackson School of Geosciences Annual Research Symposium

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 Presentation – 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 – Annie Dunckel

2010

Assoc. Sci. of Limnology & Oceanography Summer Meeting Outstanding Student Poster – Audrey Sawyer
National Science Foundation Graduate Fellowship – Katy Gerech
Geol. Soc. of America Student Research Grant (Outstanding Proposal) – Kuldeep Chaudhary
Massachusetts Water Resour. Res. Conf. First Place Student Poster – Katy Gerech
UT-Dept. of Geological Sciences 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 – Annie Dunckel
 Jackson School of Geosciences Merit Scholarship – Annie Dunckel
 University Honors and Recognized Dean's List – Annie Dunckel

2007

Noble Energy Fellowship – Blair Stanley (now Francis)

ADVISING AND RELATED STUDENT SERVICES

Post-doctoral fellows, serves or served as supervisor or co-supervisor:

| Name | Period |
|----------------|---------------|
| Wen Deng | 2010 - 2014 |
| Benjamin Hardt | 2010 - 2012 |
| Judson Partin | 2008 - 2011 |

PhD students, serves or served as supervisor:

| Name | Started under my supervision | Passed candidacy | Graduation |
|--------------------|-------------------------------------|-------------------------|-------------------|
| Matthew H. Kaufman | Fall 2013 | na | In progress |
| Eric J. Gultinan | Fall 2013 | na | In progress |
| Lizhi Zheng | Fall 2012 | Spring 2014 | In progress |
| Lichun Wang | Fall 2010 | Spring 2012 | In progress |
| Peter B. Zamora | Fall 2010 | Spring 2012 | In progress |
| Kevin M. Befus | Fall 2010 | Spring 2012 | In progress |
| 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:

| Name | Started under my supervision | Graduation |
|--------------------------------|-------------------------------------|-------------------|
| Raquel Flinker | Fall 2012 | In progress |
| Alyse Briody | Fall 2012 | In progress |
| 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 |
|--------------------|-------------------------------------|--------------------|---------------------------------|
| Aimee E. Ford | Spring 2014 | UT | In progress |
| Julianne P. Wooten | Fall 2012 | UT | Fall 2012 |

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|----------------------|-------------|---------------|-------------|
| Benjamin J. Bass | Fall 2010 | UT | Fall 2011 |
| Michael S. Markowski | Summer 2009 | UT | Spring 2010 |
| Katelyn E. Gerech | Summer 2009 | Smith College | Spring 2010 |
| Anne E. Dunckel | Summer 2008 | UT | Fall 2009 |

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

| Name | Institution | Year |
|-----------------|---------------------------------|------|
| Hannah Leiberg | Univ. of Maryland-Baltimore Co. | 2013 |
| Nancy Pattyn | Anderson High School | 2010 |
| Katelyn Gerech | Smith College | 2009 |
| Selene Castillo | Baylor University | 2009 |
| Anne Dunckel | UT | 2008 |
| Laura Merner | Clark University | 2007 |

Visiting students or scientists, serves or served as supervisor or host:

| Name | Date of visit | Institution | Supervisor |
|-------------------|---------------|----------------------------------|---------------|
| Dr. Xiaobing Chen | Summer 2014 | Hohai University (China) | na |
| 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:

| Name | Institution | Project completed |
|-----------------|-------------------------|-------------------|
| Alperen Karanci | Harmony Science Academy | Spring 2010 |

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

| Name | Department | Dissertation defense | Supervisor |
|---------------------|-------------------------|----------------------|-----------------|
| 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 Nittrouer | Geological Sciences | Fall 2010 | David Mohrig |
| Donald Slotke | 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, serves as dissertation committee member (Ph. D. in progress at UT):

| Name | Department | Supervisor |
|-----------------|---------------------|------------|
| Gihye Shin | Civil Engineering | Ben Hodges |
| Kyung-won Chang | Geological Sciences | Marc Hesse |

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|-------------------|---------------------|----------------|
| Wendy Robertson | Geological Sciences | Jack Sharp |
| Brian Kiel | Geological Sciences | Lesli Wood |
| John Warden | Geological Sciences | Dan Breecker |
| Lauren Andrews | Geological Sciences | Ginny Catania |
| Travis Swanson | Geological Sciences | David Mohrig |
| Eugenio Santillan | Geological Sciences | Philip Bennett |
| Kimberly Gilbert | Geological Sciences | Philip Bennett |

Doctoral students, served on candidacy exam committee:

| Name | Department | Candidacy exam | Supervisor |
|-------------------|---------------------|-----------------------|-------------------|
| 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:

| Name | Institution | Dissertation defense | Supervisor |
|--------------|--------------------|-----------------------------|-------------------|
| Adam Kessler | Monash University | In progress | Perran Cook |
| Jesus Gomez | New Mexico Tech | Summer 2013 | John Wilson |

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

| Name | Institution | Thesis defense | Supervisor |
|--------------------|-------------------------------|-----------------------|-------------------|
| Maria Isabel Senal | University of the Philippines | Summer 2013 | Gil Jacinto |

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

| Name | Department | Graduated | Supervisor |
|--------------------|---------------------|------------------|-------------------|
| 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 |

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|--------------------|---------------------|-------------|----------------|
| Elspeth Steinhauer | Geological Sciences | Spring 2008 | Philip Bennett |
|--------------------|---------------------|-------------|----------------|

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

| Name | Department | Thesis defense | Supervisor |
|---------------------|---------------------|----------------|----------------|
| 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 |

STUDENT THESES AND DISSERTATIONS

Doctoral dissertations in progress:

Matthew H. Kaufman, started Fall 2013, topic: Coupled flow and transport processes in hyporheic zones
Eric J. Gultinan, started Fall 2013, topic: Pore-scale multiphase flow phenomena
Lizhi Zheng, started Fall 2012, topic: Coupled flow and transport processes in hyporheic zones
Kevin M. Befus, started Fall 2010, topic: The coastal groundwater continuum
Lichun Wang, started Fall 2010, topic: Fluid flow and transport processes through fractures
Peter B. Zamora, started Fall 2010, topic: Groundwater-seawater mixing dynamics and nutrient transport at the land-ocean interface

MS theses in progress:

Alyse C. Briody, started Fall 2012, topic: Groundwater-surface water interactions in regulated rivers
Raquel H. Flinker, started Fall 2012, topic: Soil moisture dynamics in a high CO₂ world

Doctoral dissertations completed (including most recent known employment):

Kuldeep Chaudhary, completed Summer 2013, title: Pore scale controls of fluid flow laws and the capillary trapping of CO₂
(research geologist at Conoco-Phillips)
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 Professor at University of Kentucky)

MS theses completed (including most recent known employment):

Michael R. Kanarek, completed Summer 2013, topic: Understanding the effects of wildfire on soil moisture dynamics, plant water uptake, and recharge using electrical resistivity
(consultant at INTERA)
F. Alexander Norman, completed Spring 2013, title: An experimental assessment of the influence of bedforms on coupled hyporheic flow and heat transport
(na)
John D. Nowinski, completed Summer 2010, title: Intra-meander groundwater-surface water interactions in a losing experimental stream
(hydrogeologist at Pastor, Behling and Wheeler)
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)
Blair A. Francis (nee Stanley), completed Spring 2009, title: Effects of dam-induced daily river stage fluctuations on groundwater flow paths
(geologist at BP)

BS honors theses in progress:

Aimee E. Ford, started Spring 2014, topic: Hyporheic flow and dissolved oxygen distribution in fish nests

BS honors and undergrad theses completed:

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

Michael S. Markowski, completed Spring 2010, title: Characterizing groundwater-surface water interactions in a regulated river using electrical resistivity

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

PROFESSIONAL and PUBLIC SERVICE

Internal service (University of Texas at Austin):

2013, 2014: Faculty performance review committee, DGS

2013: Committee for developing dissertation format and expectations, JSG

2013: Conceptualized, organized and led field trip to the Philippines for the JSG Undergraduate Honors Research Program

2012, 2013: Faculty performance review committee, DGS

2010-2012: Hydrogeology and Glaciology Discipline, leader, JSG

2011: Hydrogeology Faculty Search, Chair, DGS

2010: PhD Curricular Review and Revisions Committee, member, JSG

2010-2011: Admissions, Awards and Support Committee, member, JSG

2010: Technical Sessions Committee, member

2007-2009: BS Environmental Science Curriculum Design Committee, UT

2007-2009: Earth Surface and Hydrologic Processes Faculty/ Researcher Search Committee, member, JSG

2007: Geoscience Education Faculty Position Search Committee, member, DGS

2007: BS Geology Option III (Hydrogeology) Curriculum Revision Committee, chair, DGS

2007: Ad Hoc Undergraduate Teaching Equipment Grant Committee, member (Hydrogeology representative), DGS

Educational Outreach:

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, 1st Grade science class

2013: Guest lecturer, Austin ISD Kiker Elementary School, 5th 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: Geophysical Research Letters (2013-present)

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

Guest Paper Editor: Proceedings of the National Academy of Sciences (2013)

Manuscript reviewer:

Advances in Water Resources; ASCE Journal of Hydrologic Engineering; Biogeosciences; Computational Geosciences; Computers and Geosciences; Ecosystems; Environmental Fluid Mechanics; 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; Remote Sensing of Environment; 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 panel member: National Science Foundation (Hydrologic Sciences; Water Sustainability and Climate-Category 2)

Proposal reviewer: National Science Foundation (Hydrologic Sciences; Major Research Instrumentation; Paleo Perspectives on Climate Change; Geomorphology and Land Use Dynamics); Israel Science Foundation; Swiss National Science 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:

2013-2015: Geological Society of America Hydrogeology Kohout Early Career Award Committee
2012-2014: American Geophysical Union Hydrologic Sciences Early Career Award Committee
2011-2013: Geological Society of America Hydrogeology Division O. E. Meinzer Award Committee
2010-2012: American Geophysical Union Hydrology Section Groundwater Technical Committee

Chaired sessions in conferences:

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, “CO₂ 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”

COMPLETE PUBLICATIONS RECORD

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

Underline denotes student or post-doctoral fellow author, * denotes undergraduate student

Peer-reviewed papers under review or revision:

83. Kessler, A. J., **M. B. Cardenas**, I. R. Santos, and P. L. M. Cook, Enhancement of denitrification in permeable carbonate sediment due to intra-granular porosity: a multi-scale modelling study, *Geochimica et Cosmochimica Acta*, submitted.
82. Kanarek, M. R., and **M. B. Cardenas**, Soil moisture dynamics across a wildfire burn boundary in a loblolly pine (*Pinus taeda*) forest, *Journal of Hydrology*, submitted.
81. Senal, M. I., G. S. Jacinto, P. B. Zamora, **M. B. Cardenas**, R. S. Rodolfo, H. B. Cabria, F. P. Siringan, and N. P. Zamora, Tidally influenced nutrient fluxes from submarine groundwater discharge in Bolinao, Pangasinan, northwestern Philippines, *Marine Pollution Bulletin*, submitted.
80. Zamora, P. B., **M. B. Cardenas**, R. Lloren, and F. P. Siringan, Groundwater-seawater mixing dynamics in intertidal and subtidal sediment overlying focused discharge zones, *Water Resources Research*, submitted.
79. **Cardenas, M. B.**, B. T. Neilson, M. Doering, and C. T. Robinson, Understanding the thermal dynamics of a proglacial river by combined energy balance modeling and ground-based thermal imaging, *Water Resources Research*, submitted.
78. Wang, L., **M. B. Cardenas**, D. T. Slottke, R. A. Ketcham, and J. M. Sharp, Jr., Generalized local cubic law for inertial flow through tortuous and rough fractures, *Water Resources Research*, submitted.

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

2014

77. Befus, K. M., **M. B. Cardenas**, D. R. Tait, and D. V. Erler, Geoelectrical signals of geologic and hydrologic processes in a fringing reef lagoon setting, *Journal of Hydrology*, accepted.
76. Altman, S. J., B. Aminzadeh, M. T. Balhoff, P. C. Bennett, S. L. Bryant, **M. B. Cardenas**, K. Chaudhary, R. T. Cygan, W. Deng, T. Dewers, D. A. DiCarlo, P. Eichhubl, M. A. Hesse, C. Huh, E. N. Matteo, Y. Mehmani, C. M. Tenney, and H. Yoon, Chemical and hydrodynamic mechanisms for long-term geological carbon storage, *Journal of Physical Chemistry C*, accepted.
75. Zlotnik, V. A., D. Toundykov, and **M. B. Cardenas**, An effective approach for flow analysis in aquifers with spatially varying top boundary, *Ground Water*, in press.
74. Kiel, B. A., and **M. B. Cardenas**, Lateral hyporheic exchange throughout the Mississippi River network, *Nature Geoscience*, 7, 413-417, doi:10.1038/ngeo2157, 2014.
73. Norman, F. A., and **M. B. Cardenas**, Heat transport in hyporheic zones: an experimental study, *Water Resources Research*, 50, doi:10.1002/2013WR014673, 2014.
72. Wang, L., and **M. B. Cardenas**, Non-Fickian transport through two-dimensional rough fractures: Assessment and prediction, *Water Resources Research*, 50(2), 871–884, doi: 10.1002/2013WR014459, 2014.
71. Kessler, A. J., L. A. Bristow, **M. B. Cardenas**, R. N. Glud, B. Thamdrup, and P. L. M. Cook, The isotope effect of denitrification in permeable sediments, *Geochimica et Cosmochimica Acta*, 133, 156-

167, doi: 10.1016/j.gca.2014.02.029, 2014.

70. Deng, W., M. B. Cardenas, and P. C. Bennett, Extended Roof snap-off for a continuous nonwetting fluid and an example case for supercritical CO₂, *Advances in Water Resources*, 64, 34-46, doi:10.1016/j.advwatres.2013.12.001, 2014.

2013

69. Kessler, A. J., R. N. Glud, M. B. Cardenas, and P. L. M. Cook, Transport zonation limits coupled nitrification-denitrification in permeable sediments, *Environmental Science & Technology*, 47(23), 13404–13411, doi:10.1021/es403318x, 2013.
68. Deng, W., M. B. Cardenas, M. F. Kirk, S. J. Altman, and P. C. Bennett, The effect of permeable biofilm on micro- and macro-scale flow and transport in bioclogged pores, *Environmental Science & Technology*, 47(19), 11092–11098, doi: 10.1021/es402596v, 2013.
67. Tait, D. R., I. R. Santos, D. V. Erler, K. M. Befus, M. B. Cardenas, and B. D. Eyre, Estimating submarine groundwater discharge in a South Pacific coral reef lagoon using different radioisotope and geophysical approaches, *Marine Chemistry*, 156, 49-60, doi:10.1016/j.marchem.2013.03.004, 2013.
66. Deng, W., and M. B. Cardenas, Dynamics and dislodgment from pore constrictions of a trapped nonwetting droplet stimulated by seismic waves, *Water Resources Research*, 49(7), 4206–4218, doi: 10.1002/wrcr.20335, 2013.
65. Wong, W. W., M. R. Grace, I. Cartwright, M. B. Cardenas, P. B. Zamora, and P. L. M. Cook, Dynamics of groundwater-derived nitrate and nitrous oxide in a tidal estuary from radon mass balance modeling, *Limnology and Oceanography*, 58(5), 1689-1706, doi:10.4319/lo.2013.58.5.1689, 2013.
64. Chaudhary, K., M. B. Cardenas, W. W. Wolfe, J. A. Maisano, R. A. Ketcham, and P. C. Bennett, Pore-scale trapping of supercritical CO₂ and the role of grain wettability and shape, *Geophysical Research Letters*, 40, doi:10.1002/grl.50658, 2013.
63. Befus, K. M., M. B. Cardenas, D. V. Erler, I. R. Santos, and B. D. Eyre, Heat transport dynamics at a sandy intertidal zone, *Water Resources Research*, 49(6), 3770-3786, doi:10.1002/wrcr.20325, 2013.
62. Bardini, L., F. Boano, M. B. Cardenas, A. H. Sawyer, R. Revelli, and L. Ridolfi, Small-scale heterogeneity has negligible effects on nutrient cycling in streambeds, *Geophysical Research Letters*, 40, 1–5, doi:10.1002/grl.50224, 2013.
61. Smith, V. B., C. H. David, M. B. Cardenas, and Z.-L. Yang, Climate, river network, and vegetation cover relationships across a climate gradient and their potential for predicting effects of decadal-scale climate change, *Journal of Hydrology*, 488, 101–109, doi:10.1016/j.jhydrol.2013.02.050, 2013.
60. Chaudhary, K., M. B. Cardenas, W. Deng, and P. C. Bennett, Pore geometry effects on intra-pore viscous to inertial flows and effective hydraulic parameters, *Water Resources Research*, 49(2), 1149-1162, doi:10.1002/wrcr.20099, 2013.
59. Marshall, J. A., A. J. Castillo, and M. B. Cardenas, Assessing student understanding of physical hydrology, *Hydrology and Earth System Sciences*, 17, 829-836, doi:10.5194/hess-17-829-2013, 2013.
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3. **Cardenas, M. B.**, J. L. Wilson, and V. A. Zlotnik, Impacts of heterogeneity, bed forms, and stream curvature on subchannel hyporheic exchange, *Water Resources Research*, 40, W08307, doi: 10.1029/2004WR003008, 2004.
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1. **Cardenas, M. B.**, and V. A. Zlotnik, A simple constant-head injection test for streambed hydraulic

conductivity estimation, *Ground Water*, 41(6), 867-871, 2003.

Books or book chapters:

2. Lawler, D., **M. B. Cardenas**, G. Old, and D. Sear, Geomorphology and Sediments of the Hyporheic Zone, In *The Hyporheic Handbook: A handbook on the groundwater–surface water interface and hyporheic zone for environment managers*, UK Environment Agency, pp 16-47, 2009.
1. **Cardenas, M. B.**, and J. L. Wilson, Driving while under the influence: pumping-driven circulation under the influence of regional groundwater flow, in *A New Focus on Groundwater–Seawater Interactions* (Proceedings of Symposium HS1001 at IUGG2007, Perugia, July 2007), edited by Ward Sanford, Christian Langevin, Maurizio Polemio & Pavel Povinec. IAHS Publ. 312, 2007, 229-236.

SCHOLARLY PRESENTATIONS

Invited lectures:

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 CO₂ 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”

Conference presentations and abstracts:

2014

116. Cardenas, M. B., The residence times of surface water-groundwater exchange from 10^{-3} to 10^3 m and why long tails matter, European Geosciences Union General Assembly, Vienna, Austria, May, 2014.

115. Kessler, A. J., R. N. Glud, R. N., **M. B. Cardenas**, and P. L. M. Cook, Coupled nitrification-denitrification is inhibited in permeable sediments, Joint AGU, ASLO, TOC Ocean Sciences Meeting, Abstracts with Programs, Honolulu, Hawaii, February, 2014.

2013

114. Wang, L., **M. B. Cardenas**, D. T. Slotke, R. A. Ketcham, and J. M. Sharp, Generalized Local Cubic Law for inertial fluid flow and solute transport through tortuous and rough fractures, AGU Fall Meeting, San Francisco, California, December, 2013.

113. Befus, K. M., **M. B. Cardenas**, D. R. Tait, and D. V. Erler, Characterizing heterogeneous coastal groundwater pathways using multi-scale onshore-to-offshore electrical resistivity surveys, AGU Fall Meeting, San Francisco, California, December, 2013.

112. Kanarek, M. R., and **M. B. Cardenas**, The effects of wildfire on soil moisture dynamics, AGU Fall Meeting, San Francisco, California, December, 2013.

111. Deng, W., **M. B. Cardenas**, M. F. Kirk, S. J. Altman, and P. C. Bennett, The effect of permeable biofilm on micro- and macro-scale flow and transport in bioclogged pores, AGU Fall Meeting, San Francisco, California, December, 2013.

110. **Cardenas, M. B.**, and B. A. Kiel, Water cycling between rivers and aquifers throughout the Mississippi River network and their control on nitrogen export, AGU Fall Meeting, San Francisco, California, December, 2013.

109. Chaudhary, K. C., **M. B. Cardenas**, W. W. Wolfe, J. A. Maisano, R. A. Ketcham, and P. C. Bennett, Pore-scale imaging of capillary trapped supercritical CO₂ as controlled by water-wet vs. CO₂-wet media and grain shapes, AGU Fall Meeting, San Francisco, California, December, 2013.

108. Zheng, L., and **M. B. Cardenas**, The effects of diurnal temperature variations on nitrogen dynamics in bedform induced hyporheic zones, AGU Fall Meeting, San Francisco, California, December, 2013.

107. Jones, A., K. M. Befus, **M. B. Cardenas**, J. W. McClelland, and K. B. Moffett, Salinity structure of a tidal freshwater ecosystem under multiple tidal conditions, Mission River, TX, USA, AGU Fall Meeting, San Francisco, California, December, 2013.

106. Zamora, P. B., **M. B. Cardenas**, R. Lloren, and F. P. Siringan, Groundwater-seawater mixing in intertidal and subtidal sediment overlying areas of focused discharge, AGU Fall Meeting, San Francisco, California, December, 2013.

105. Partin, J. W., T. M. Quinn, C.-C. Shen, **M. B. Cardenas**, F. P. Siringan, M. Hori, Y. Okumura, J. L. Banner, K. Lin, X. Jiang, and F. W. Taylor, Insolation and abrupt climate change effects on the Western Pacific maritime monsoon, AGU Fall Meeting, San Francisco, California, December, 2013.

104. Briody, A., and **M. B. Cardenas**, Nutrient cycling in the bank hyporheic zone of the regulated Lower Colorado River, Austin, Texas, AGU Fall Meeting, San Francisco, California, December, 2013.

103. Castillo, A. J., J. A. Marshall, and **M. B. Cardenas**, Assessing the effect of adding interactive modeling to the geoscience curriculum, AGU Fall Meeting, San Francisco, California, December, 2013.

102. Cardenas, M. B., K. M. Befus, T. P. Gleeson, M. A. Hesse, X.-W. Jiang, E. Luijendijk, D. Toundykov, and V. A. Zlotnik, The old and the new: the use of classical regional groundwater flow models to

- address problems of the future, AGU Fall Meeting, San Francisco, California, December, 2013.
101. Flinker, R. H., **M. B. Cardenas**, T. G. Caldwell, R. Rich, and P. B. Reich, The soil-water balance simulations of a grassland in response to CO₂, rainfall, and biodiversity manipulations at BioCON, AGU Fall Meeting, San Francisco, California, December, 2013.
 100. Befus, K. M., **M. B. Cardenas**, D. R. Tait, and D. V. Erler, Applications of DC resistivity for mapping hydrogeologic processes in coastal areas, SEG Annual Meeting, Houston, Texas, September, 2013.
 99. Kessler A.J., L. A. Bristow, **M. B. Cardenas**, R. N. Glud, B. Thamdrup, and P. L. M. Cook, Measuring the isotope fractionation of denitrification in permeable sediments, Goldschmidt Conference, Florence, Italy, August, 2013.
 98. Bardini, L., F. Boano, **M. B. Cardenas**, A. H. Sawyer, R. Revelli, and L. Ridolfi, Impact of sediment heterogeneity on nutrient reactions in rippled streambeds, EGU General Assembly, Vienna, Austria, April, 2013.
 97. Kanarek, M. R., and **M. B. Cardenas**, Understanding the effects of wildfire on soil moisture dynamics, plant water uptake, and recharge using electrical resistivity, GSA Abstracts with Programs, South Central Meeting, Austin, Texas, April, 2013.
 96. Zamora, P. B., **M. B. Cardenas**, M. S. Senal, G. S. Jacinto, R. S. Rodolfo, H. B. Cabria, F. P. Siringan, and K. M. Befus, Transformation of nitrogen near a discrete zone of submarine groundwater discharge, ASLO Aquatic Sciences Meeting, New Orleans, Louisiana, February 2013.
 95. Befus, K. M., **M. B. Cardenas**, T. E. Swanson, D. Tait, I. R. Santos, and D. Erler, Thermal dynamics of intertidal sediment affected by diffuse groundwater discharge, ASLO Aquatic Sciences Meeting, New Orleans, Louisiana, February 2013.
 94. **Cardenas, M. B.**, K. E. Gerecht, M. S. Markowski, J. D. Nowinski, A. H. Sawyer, T. E. Swanson, and A. J. Guswa, How the pulse of a river affects its liver, ASLO Aquatic Sciences Meeting, New Orleans, Louisiana, February 2013.

2012

93. Wang, L., **M. B. Cardenas**, and W. Deng, Theory for dynamic dispersion in Poiseuille and Hagen-Poiseuille flow, AGU Fall Meeting, San Francisco, California, December, 2012.
92. Chaudhary, K., **M. B. Cardenas**, W. Deng, and P. C. Bennett, Role of intra-pore eddies and angularity of diverging-converging pores in Darcy to Forchheimer flow regimes, AGU Fall Meeting, San Francisco, California, December, 2012.
91. Deng, W., I. A. Beresnev, and **M. B. Cardenas**, Dynamics of trapped nonwetting phase droplet under seismic stimulation in constricted pores, AGU Fall Meeting, San Francisco, California, December, 2012.
90. **Cardenas, M. B.**, K. M. Befus, P. B. Zamora, J. Ong, V. A. Zlotnik, P. L. M. Cook, D. R. Tait, D. Erler, I. R. Santos, and F. P. Siringan, Applications of electrical resistivity imaging for characterizing groundwater-surface water interactions from local to regional scales, AGU Fall Meeting, San Francisco, California, December, 2012.
89. Zlotnik, V. A., **M. B. Cardenas**, D. Toundykov, and S. Cohn, Feedbacks between numerical and analytical models in hydrogeology, AGU Fall Meeting, San Francisco, California, December, 2012.
88. Partin, J. W., T. M. Quinn, C.-C. Shen, **M. B. Cardenas**, F. P. Siringan, J. L. Banner, K. Lin, and F. W. Taylor, Insolation and abrupt climate change effects on the Western Pacific maritime monsoon, AGU Fall Meeting, San Francisco, California, December, 2012.
87. Castillo, A. J., J. Marshall, and **M. B. Cardenas**, Assessing student understanding of physical hydrology, AGU Fall Meeting, San Francisco, California, December, 2012.
86. Norman, F. A., and **M. B. Cardenas**, Experimental assessment of the influence of bedforms and sediment size on coupled hyporheic flow and heat transport, AGU Fall Meeting, San Francisco, California, December, 2012.
85. Christensen, H., J. P. Wooten, E. Swanson, J. J. Senison, K. D. Myers, K. M. Befus, J. Warden, P. B. Zamora, J. D. Gomez, J. L. Wilson, A. Groffman, M. S. Rearick, and **M. B. Cardenas**, Hyporheic exchange flows and biogeochemical patterns near a meandering stream: East Fork of the Jemez River, Valles Caldera National Preserve, New Mexico AGU Fall Meeting, San Francisco, California, December, 2012.

84. Gomez, J. D., J. L. Wilson, and **M. B. Cardenas**, Dynamics of sinuosity-driven hyporheic zones: the effects of hydraulic and biogeochemical timescales, AGU Fall Meeting, San Francisco, California, December, 2012.
83. **Cardenas, M. B.**, A. H. Sawyer, K. E. Gerecht, M. S. Markowski, B. A. Francis, L. K. Francis, T. E. Swanson, J. D. Nowinski, and A. J. Guswa, Groundwater-surface water interactions in a regulated river, ASLO Summer Meeting, Lake Biwa, Japan, July, 2012.
82. Bardini, L., F. Boano, **M. B. Cardenas**, R. Revelli, and L. Ridolfi, Modeling dune-induced hyporheic exchange and nutrient reactions in stream sediments, EGU General Assembly, Vienna, Austria, April, 2012.

2011

81. Bardini, L., F. Boano, **M. B. Cardenas**, R. Revelli, and L. Ridolfi, Nutrient cycling in dune-induced hyporheic exchange of reactive solutes, AGU Fall Meeting, San Francisco, California, December, 2011.
80. Bass, B. J., K. M. Befus, and **M. B. Cardenas**, Seasonal soil moisture dynamics throughout a semi-arid valley ecotone using quasi-3D time-lapse electrical resistivity imaging, AGU Fall Meeting, San Francisco, California, December, 2011.
79. Norman, F. A., W. S. Chan, and **M. B. Cardenas**, Experimental assessment of the influence of bedforms on coupled hyporheic flow and heat transport, AGU Fall Meeting, San Francisco, California, December, 2011.
78. Befus, K. M., **M. B. Cardenas**, T. E. Swanson, D. V. Erler, I. R. Santos, D. R. Tait, Groundwater flow and heat transport dynamics across an intertidal zone, AGU Fall Meeting, San Francisco, California, December, 2011.
77. **Cardenas, M. B.**, A. M. F. A. Lagmay, B. J. Andrews, R. S. Rodolfo, H. B. Cabria, P. B. Zamora, M. R. Lopus, Intense groundwater circulation and heat flow near a volcanic lake: Taal Volcano, Philippines, AGU Fall Meeting, San Francisco, California, December, 2011.
76. Zamora, P. B., **M. B. Cardenas**, R. S. Rodolfo, H. B. Cabria, K. M. Befus, and M. I. Senal, Tidal response of the subterranean estuary revealed by electrical resistivity imaging, AGU Fall Meeting, San Francisco, California, December, 2011.
75. Deng, W., **M. B. Cardenas**, and P. C. Bennett, Snap-off of supercritical CO₂ within circular and noncircular pores, AGU Fall Meeting, San Francisco, California, December, 2011.
74. Wang, L., W. Deng, **M. B. Cardenas**, J. M. Sharp, R. A. Ketcham, P. C. Bennett, and D. T. Slotke, Comparison of analytical and CFD solution-derived flow and transport properties within discrete 2D fractures, AGU Fall Meeting, San Francisco, California, December, 2011.
73. Zamora, P. B., **M. B. Cardenas**, R. S. Rodolfo, H. B. Cabria, K. M. Befus, and M. I. Senal, Tidal response of the subterranean estuary revealed by electrical resistivity imaging and hydraulic monitoring, Water Resource Sustainability Issues on Tropical Islands, Honolulu, Hawaii, November, 2011.
72. Befus, K. M., **M. B. Cardenas**, T. E. Swanson, D. V. Erler, I. R. Santos, and D. Tait, Fluid and heat fluxes across the intertidal zone, Water Resource Sustainability Issues on Tropical Islands, Honolulu, Hawaii, November, 2011.
71. **Cardenas, M. B.**, P. B. Zamora, K. M. Befus, F. P. Siringan, D. V. Erler, I. R. Santos, D. Tait, R. S. Rodolfo and M. R. Lopus, Off-shore electrical resistivity imaging for multi-scale characterization of near shore hydrogeologic processes and submarine groundwater discharge, Water Resource Sustainability Issues on Tropical Islands, Honolulu, Hawaii, November, 2011.
70. Ong, J. B., V. A. Zlotnik, J. W. Lane, Jr., T. Halihan, J. B. Swinehart, **M. B. Cardenas**, K. M. Befus, S. C. Fritz, J. D. Lenters, and H. Raanan-Kiperwas, Combined hydraulic, geophysical, and geochemical investigations to characterize groundwater flow and mass transport near saline lakes in the semi-arid Nebraska Sand Hills, USA, GSA Abstracts with Programs, Minneapolis, Minnesota, October, 2011.
69. Neilson, B. T., C. Bandaragoda, S. C. Chapra, D. K. Stevens, N. M. Schmadel, Q. G. Bingham, C. M. U Neale, and **M. B. Cardenas**, Use of instream heat budgets and supporting data for predicting surface and subsurface transient storage influence, GSA Abstracts with Programs, Minneapolis, Minnesota, October, 2011.

2010

68. **Cardenas, M. B.**, K. M. Befus, M. Markowski, J. Ong, P. B. Zamora, F. P. Siringan, V. A. Zlotnik, Detection and characterization of local to regional groundwater inputs to rivers, lakes and oceans with electrical imaging, AGU Fall Meeting, San Francisco, California, December, 2010.
67. **Cardenas, M. B.**, P. L. M. Cook, H.-S. Jiang, P. Traykovski, Integrating turbulent flow, biogeochemical, and poromechanical processes in rippled coastal sediment, AGU Fall Meeting, San Francisco, California, December, 2010.
66. Smith, V. B., **M. B. Cardenas**, C. H. David, Using observed climate-landscape-vegetation patterns across a regional gradient to predict potential response to climate change, AGU Fall Meeting, San Francisco, California, December, 2010.
65. Sawyer, A. H., **M. B. Cardenas**, J. L. Buttle, Quantifying hyporheic zones formed by large woody debris: Synthesis of numerical, laboratory flume, and field experiments, AGU Fall Meeting, San Francisco, California, December, 2010.
64. Gerecht, K., **M. B. Cardenas**, A. J. Guswa, A. H. Sawyer, T. E. Swanson, J. D. Nowinski, Hyporheic flow and heat transport within a bed-to-bank transect of a large regulated river: Colorado River, Austin, TX, AGU Fall Meeting, San Francisco, California, December, 2010.
63. Chaudhary, K., **M. B. Cardenas**, P. C. Bennett, R. A. Ketcham, The role of different grain shapes in modifying intra-pore flow and transport phenomena, AGU Fall Meeting, San Francisco, California, December, 2010.
62. Deng, W., **M. B. Cardenas**, P. C. Bennett, Investigation of snap-off of sCO₂ inside pores between packed ideal grains during imbibition, AGU Fall Meeting, San Francisco, California, December, 2010.
61. Chaudhary, K., **M. B. Cardenas**, P. C. Bennett, R. A. Ketcham, The effects of grain shapes on the intra-pore flow and transport processes, Gordon Research Conference on Flow and Transport in Permeable Media, Bates College, July 2010.
60. Bingham, Q. G., B. T. Neilson, C. M. Neale, and **M. B. Cardenas**, Delineation of dead zones in rivers using remotely-sensed data and their utility in improving two-zone temperature and solute transport model, ASLO Aquatic Sciences Meeting, June 2010.
59. Gomez, J. D., J. L. Wilson, and **M. B. Cardenas**, Exploring the dynamics of sinuosity-driven hyporheic exchange, ASLO Aquatic Sciences Meeting, June 2010.
58. Sawyer A. H., **M. B. Cardenas**, and J. Buttle, Quantifying hydrologic and thermal processes within hyporheic zones formed by large woody debris: numerical and laboratory flume experiments, ASLO Aquatic Sciences Meeting, June 2010.
57. **Cardenas, M. B.**, P. L. Cook, K. E. Gerecht*, H. S. Jiang, M. S. Markowski, J. D. Nowinski, A. H. Sawyer, T. E. Swanson, J. L. Wilson, Fluid dynamic interactions near sediment-water interfaces in aquatic and coastal environments, ASLO Aquatic Sciences Meeting, June 2010.
56. **Cardenas, M. B.**, P. L. M. Cook, H. S. Jiang, and P. A. Traykovski, The coupled hydrodynamics and biogeochemistry of wave-influenced marine sediment under steady and unsteady forcing: lessons from numerical models, Joint AGU, ASLO, TOC Ocean Sciences Meeting, Abstracts with Programs, Portland, Oregon, February, 2010.

2009

55. Gomez, J. D., **M. B. Cardenas**, and J. L. Wilson, Residence time distributions of dynamic hyporheic exchange through meanders, AGU Fall Meeting, San Francisco, California, December, 2009.
54. Andrews, B. J., **M. B. Cardenas**, and P. C. Bennett, Imaging, velocimetry, and spatio-temporal analysis of turbulent mixing of hydrothermal water discharging to a river (Breitenbush Hot Springs, Oregon), AGU Fall Meeting, San Francisco, California, December, 2009.
53. **Cardenas, M. B.**, P. L. M. Cook, H. S. Jiang, and P. A. Traykovski, Constraining denitrification in permeable wave-influenced marine sediment using linked hydrodynamic and biogeochemical modeling, AGU Fall Meeting, San Francisco, California, December, 2009.
52. **Cardenas, M. B.**, P. L. M. Cook, H. S. Jiang, and P. A. Traykovski, Constraining denitrification in permeable wave-influenced marine sediment using linked hydrodynamic and biogeochemical modeling, AGU Fall Meeting, San Francisco, California, December, 2009.

51. **Cardenas, M. B.**, D. T. Slottke, R. A. Ketcham, and J. M. Sharp, Effects of inertia and directionality on flow and transport in a rough asymmetric fracture, AGU Fall Meeting, San Francisco, California, December, 2009.
50. Andrews, B. J., **M. B. Cardenas**, and P. C. Bennett, Imaging and spatio-temporal analysis of turbulent mixing of hydrothermal water discharging to a river (Breitenbush Hot Springs, Oregon), GSA Abstracts with Programs, Portland, Oregon, October, 2009.
49. Sawyer, A. H., and **M. B. Cardenas**, Dynamics of river-groundwater exchange driven by large woody debris: numerical and laboratory flume experiments, GSA Abstracts with Programs, Portland, Oregon, October, 2009.
48. Gerecht, K. E.*, M. Markowski*, J. D. Nowinski, A. H. Sawyer, T. E. Swanson, and **M. B. Cardenas**, Fluid flow and heat transport within the hyporheic and riparian zones of a regulated river: Colorado River, Austin, TX, GSA Abstracts with Programs, Portland, Oregon, October, 2009.
47. Nowinski, J. D., **M. B. Cardenas**, T. E. Swanson, A. E. Lightbody, Response of intra-meander hyporheic exchange due to flooding and permeability change in a losing artificial stream, GSA Abstracts with Programs, Portland, Oregon, October, 2009.
46. Swanson, T. E., **M. B. Cardenas**, A. H. Sawyer, and J. D. Nowinski, Evaluation of models for heat tracing in streambeds (hyporheic zones) along a pool-riffle-pool sequence: Jaramillo Creek, Valles Caldera National Preserve, NM, GSA Abstracts with Programs, Portland, Oregon, October, 2009.
45. **Cardenas, M. B.**, K. E. Gerecht*, M. Markowski*, J. D. Nowinski, A. H. Sawyer, B. A. Stanley, and T. E. Swanson, The familiar as a frontier: persistent transient stream-groundwater interactions, GSA Abstracts with Programs, Portland, Oregon, October, 2009.
44. Siringan, F. P., P. Zamora, L. Soria, **M. B. Cardenas**, G. Jacinto, M. Sand Diego-McGlone, C. Villanoy, O. Cabrera, and M. I. Senal, Submarine groundwater discharge and sediment flux in the Santiago reef flat, Bolinao Island, Philippines, IOC/WESTPAC Workshop on Coral Reef under Climate & Anthropogenic Perturbations, Shanghai, China, May, 2009.
43. Jaworowski, C., H. Heasler, C. Neale, **M. B. Cardenas**, and S. Sivarajan, Using night-time, thermal infrared imagery to remotely monitor the hydrothermal system at Hot Spring Basin, Yellowstone National Park, Geological Society of America Rocky Mountain Section Annual Meeting Abstracts with Programs, Orem, Utah, May, 2009.
42. Packman, A. I., J. W. Harvey, A. Worman, **M. B. Cardenas**, R. Schumer, D. J. Jerolmack, R. Schumer, J. L. Tank, and S. H. Stonedahl, Multi-scale surface-groundwater interactions: Processes and Implications, American Geophysical Union Joint Assembly, Toronto, Ontario, May, 2009.
41. **Cardenas, M. B.**, Towards the 'hyporheic meter': prediction of hyporheic exchange from bedforms to bars to bends, European Geosciences Union General Assembly Abstracts, Vienna, Austria, April, 2009.
40. Sawyer, A. H., and **M. B. Cardenas**, Hyporheic flow and residence time distributions in heterogeneous cross-bedded sediment, EGU General Assembly Abstracts, Vienna, Austria, April, 2009.
39. Sawyer, A. H., **M. B. Cardenas**, A. Bomar, and M. Mackey, Impact of dam operations on hyporheic exchange in the riparian zone of a regulated river, American Society for Limnology Oceanography Aquatic Sciences Meeting Conference Proceedings, Niece, France, January, 2009.
38. Janssen, F., **M. B. Cardenas**, J. Krietsch, T. Dammrich, and D. de Beer, Pore water flow in rippled bed-a combined numerical and experimental approach, ASLO Aquatic Sciences Meeting Conference Proceedings, Niece, France, January, 2009.
- 2008**
37. **Cardenas, M. B.**, Computational geohydrology from pores to basins, from continents to coasts, Geological Society of the Philippines Annual Conference Abstracts, Manila, Philippines, December, 2008.
36. **Cardenas, M. B.**, P. L. M. Cook, H. S. Jiang, and P. Traykovski, Constraining denitrification in permeable wave-influenced marine sediment using linked hydrodynamic and biogeochemical modeling, Geological Society of America Annual Meeting Abstracts with Programs, Houston, Texas, October, 2008.
35. Harlow, J. L.*, B. A. Stanley, S. Cox*, R. Vyas*, B. Linhoff, A. H. Sawyer, T. A. Swanson, A.

- Groffman, M. Rearick, and **M. B. Cardenas**, Groundwater - surface water interactions and geochemistry along a high-sinuosity meander in a mountain meadow, GSA Abstracts with Programs, Houston, Texas, October, 2008.
34. Sawyer, A. H., and **M. B. Cardenas**, Hyporheic flow and residence time distributions in heterogeneous cross-bedded sediment, to appear in GSA Abstracts with Programs, Houston, Texas, October, 2008.
 33. Stanley, B. A., T. A. Swanson, and **M. B. Cardenas**, Effects of dam-induced daily river stage fluctuations and sedimentary architecture of a large gravel bar on groundwater flow paths, GSA Abstracts with Programs, Houston, Texas, October, 2008.
 32. Swanson, T. A., Nowinski, J. D., Sawyer, A. H., Marr, J., Lightbody, A., and **M. B. Cardenas**, 3D Surface water – groundwater interactions in a large experimental channel, GSA Abstracts with Programs, Houston, Texas, October, 2008.
 31. Dunckel, A. E.*, A. H. Sawyer, M. Franks, P. C. Bennett, and **M. B. Cardenas**, Surface water temperature controls on microbial communities at the El Tatio Geysir Field, Chile, GSA Abstracts with Programs, Houston, Texas, October, 2008.
 30. Slotke, D., Ketcham, R., **Cardenas, M. B.**, Sharp, J., Jr., Roughness effects on fluid flow and transport: Implications for predictive modeling [abs]: 33rd International Geological Congress, Oslo, Norway, August, 2008.
 29. Sharp, J. M. Jr, Slotke, D. T., Ketcham, R. A., and **M. B. Cardenas**, Evaluating the effects of fracture roughness on fluid flow and solute transport: is scaling possible?, GSA Abstracts with Programs, North-Central Section, Evansville, April, 2008.

2007

28. **Cardenas, M. B.**, Understanding processes in streambeds with reductive models and high-resolution data, AGU Fall Meeting, San Francisco, California, December, 2007.
27. **Cardenas, M. B.**, Flow and anomalous transport through a three-dimensional pore, AGU Fall Meeting, San Francisco, California, December, 2007.
26. Gooseff, M. N., **M. B. Cardenas**, J. P. Zarnetske, W. B. Bowden, M. Greenwald-Johnston, J. P. McNamara, J. H. Bradford, T. R. Brosten, Channel-Streambed Interactions Over and Under Ice, AGU Fall Meeting, San Francisco, California, December, 2007.
25. **Cardenas, M. B.**, Power-law scaling of residence times: the geomorphological signature of ground water-surface water connection at nested scales, GSA Abstracts with Programs, Denver, October, 2007.
24. **Cardenas, M. B.**, D. T. Slotke, R. A. Ketcham, J. M. Sharp, Jr., Navier-stokes flow and transport simulations using real fractures shows heavy tailing due to eddies, GSA Abstracts with Programs, Denver, October, 2007.
23. **Cardenas, M. B.**, and J. L. Wilson, Heat transport in the hyporheic zone as controlled by interaction of a turbulent current with bedforms, vol. 9, 10490, EGU General Assembly, Vienna, April, 2007.
22. Wilson, J. L., and **M. B. Cardenas**, Streamflow, turbulent eddies and interfacial exchange with the hyporheic zone, Geophysical Research Abstracts, vol. 9, 10523, EGU General Assembly, Vienna, April, 2007.
21. **Cardenas, M. B.**, and J. L. Wilson, Understanding complex processes in groundwater-surface water system using high-fidelity models and high-resolution data, International Union of Geodesy and Geophysics General Assembly, Perugia, Italy, July, 2007.
20. **Cardenas, M. B.**, and J. L. Wilson, Driving while under the influence: pumping-driven circulation while under the influence of regional groundwater flow, IUGG General Assembly, Perugia, Italy, July, 2007
19. **Cardenas, M. B.**, P. Cook, H. Jiang and P. Traykovski, Coastal sediments as reactors: linking hydrodynamic models with biogeochemical modes, Texas Bays and Estuaries Meeting, Port Aransas, Texas, February, 2007.

2006

18. **Cardenas, M. B.**, and J. L. Wilson, Multiphysics modeling of processes along sediment-water interfaces: towards fundamental understanding and mechanistic predictions, AGU Fall Meeting, San Francisco, California, December, 2006.
17. **Cardenas, M. B.**, and J. L. Wilson, The relationship between shape and drag of triangular bedforms: a

- numerical simulation study, AGU Fall Meeting, San Francisco, California, December, 2006.
16. **Cardenas, M. B.**, Flumes, finite-elements, field observations, Fourier-series and fractals: fundamental linkages in hyporheic zone research, GSA Abstracts with Programs, Philadelphia, October, 2006.
 15. Wilson, J. L., and **M. B. Cardenas**, Streamflow, turbulent eddies, interfacial exchange and heat transport in the hyporheic zone, New Mexico Water Research Symposium, Socorro, NM, August, 2006.

Pre-2006

14. Mendez-Barroso, L. A., **et al.**, Spatial and temporal analysis of hydrometeorological conditions in the Valles Caldera, New Mexico during the North American Monsoon, AGU Fall Meeting, San Francisco, California, December, 2005.
13. **Cardenas, M. B.**, and J. L. Wilson, Heat transport near sediment-water interfaces with bedforms, AGU Fall Meeting, San Francisco, California, December, 2005.
12. Wilson, J. L., and **M. B. Cardenas**, Multiphysics modeling of strongly coupled hydrologic phenomena, GSA Abstracts with Programs, Salt Lake City, October, 2005.
11. **Cardenas, M. B.**, and J. L. Wilson, Flow dynamics near an irregular sediment-water interface under ambient groundwater discharge, GSA Abstracts with Programs, Salt Lake City, October, 2005.
10. Rinehart, A., **et al.**, Design and implementation of a hydrometeorological field campaign in the Valles Caldera, New Mexico, New Mexico Water Research Symposium, Socorro, NM, August, 2005.
9. **Cardenas, M. B.**, and J. L. Wilson, Water flow above and below a sediment-water interface under ambient groundwater discharge, ASLO Aquatic Sciences Meeting Conference Proceedings, Salt Lake City, February, 2005.
8. **Cardenas, M. B.**, and J. L. Wilson, Hydrodynamic interactions of free-flowing fluids and pore-fluids in triangular bed forms, AGU Fall Meeting, San Francisco, California, December, 2004.
7. **Cardenas, M. B.**, and J. L. Wilson, Coupled modeling of river-hyporheic zone fluid flow with explicit bed forms, New Mexico Water Research Symposium, Socorro, NM, August, 2004.
6. **Cardenas, M. B.**, Three-dimensional modeling of hyporheic flow through heterogeneous sediments, GSA Abstracts with Programs, Seattle, Washington, November, 2003.
5. **Cardenas, M. B.**, and V. A. Zlotnik, Assessment of bend bed topography models via calibration to a ground-penetrating radar profile and permeability data, AGU Fall Meeting, San Francisco, California, December, 2002.
4. Zlotnik, V. A., S. J. Kollet, **M. B. Cardenas**, and D. Woodward, Study of stream-aquifer interactions in the Platte River Watershed using methods of aquifer hydraulics, sedimentology, geophysics and geostatistics, GSA Abstracts with Programs, Denver, Colorado, October, 2002.
3. **Cardenas, M. B.**, Three-dimensional characterization of the permeability field of heterogeneous modern streambed deposits, *AAPG Bull.*, 85(11), p. 2047, 2001.
2. **Cardenas, M. B.**, and V. A. Zlotnik, Hydrogeological Model of Active Meander Deposits Based on Three-dimensional Hydraulic Characterization, in *Fluvial Sedimentology 2001: 7th International Conference on Fluvial Sedimentology Program and Abstracts*, edited by J. A. Mason, R. F. Diffendal, Jr., and R. M. Joeckel, p.148, Open-File Report 60, CSD, University of Nebraska-Lincoln, Nebraska, 2001.
1. **Cardenas, M. B.**, and V. A. Zlotnik, Mapping modern heterogeneous streambed deposits through hydraulic testing, GSA Abstracts with Programs, Reno, Nevada, 2000.

RESEARCH CONTRACTS/ GRANTS and PROPOSALS SUBMITTED

Pending proposals:

Center for Frontiers of Subsurface Energy Security, pending with 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), 2014-2019.

Collaborative Research: Controls on chemical fate and transport in arctic headwaters: Understanding the role of riparian and in-stream processes in a changing climate, pending with the *National Science*

Foundation (\$999,000, UT portion-\$361,366), Utah State Univ. PI (lead institution): Bethany Neilson. UT PI: M. Bayani Cardenas, Univ. of Michigan PI: George Kling

Current or funded projects:

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.

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.

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.

Completed projects:

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

University of Texas at Austin

2014: Summer: GEO 376L (Field Methods in Hydrogeology)

Spring: GEO 371C and 391C (Intro. to Mathematical Modeling for Geoscientists, grad and undergrad classes taught jointly)

- 2013:** Fall: GEO 376S and 382S (Physical Hydrology, grad and undergrad classes taught jointly)
- 2012:** Fall: GEO 376S and 382S (Physical Hydrology, grad and undergrad classes taught separately)
Spring: GEO 382G (Fluid Physics for Geologists), Summer: GEO 476L (Field Methods in Hydrogeology)
- 2011:** Fall: GEO 376S and 382S (Physical Hydrology, grad and undergrad classes taught separately)
- 2010:** Fall: GEO 376S and 382S (Physical Hydrology, grad and undergrad classes taught separately)
Summer: GEO 376L (Field Methods in Hydrogeology)
Spring: GEO 346C (Intro. to Physical and Chemical Hydrogeology)
- 2009:** Fall: GEO 376S and 382S (Physical Hydrology)
Summer: GEO 392M (Modern Geological Sciences-UTeach)
Spring: GEO 346C (Intro. to Physical and Chemical Hydrogeology)
- 2008:** Fall: GEO 376s and 382S (Physical Hydrology)
Summer: GEO 376L (Field Methods in Hydrogeology)
Spring: GEO 346C (Environmental Hydrogeology), GEO 391C (Surface water-groundwater interactions)
- 2007:** Fall: GEO 376S and 382S (Physical Hydrology)
Summer: GEO 376L (Field Methods in Hydrogeology)
Spring: GEO 346C (Environmental Hydrogeology)

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

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

University of Nebraska-Lincoln (as 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)