

# Katherine D. Romanak

## Professional Summary

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## Professional Preparation

### Academic Background

Ph.D. Geology, The University of Texas at Austin, 1997

M.S. Geology, The University of Texas at Arlington, 1988

B.S. Geology, Southern Methodist University, Dallas, Texas, 1984

### Professional Appointments

Present Position: Research Associate, Bureau of Economic Geology, The University of Texas at Austin (June 2008 - Present). Potential impacts of CO<sub>2</sub>-enhanced oil recovery on shallow groundwater resources Southwest Carbon Partnership Phase II (October 2007-August 2010), characterization of soil-gas at the stacked storage injection site at Cranfield Mississippi Southeast Carbon Partnership phase II (May 2008-Sept 2009), near-surface observatory for monitoring plugged and abandoned well sites at carbon sequestration sites, Southeast Carbon Partnership phase III (October 2009-current), high pressure-temperature experimental investigations of supercritical CO<sub>2</sub>-brine-rock interactions, University of Texas Center for Frontiers of Subsurface Energy Security, a U.S. DOE Energy Frontier Research Center (2008-current).

Principal Investigator, IPAC-CO<sub>2</sub> Kerr Farm Assessment, Saskatchewan Canada.

Principal Investigator, Grant from Center for Frontiers of Subsurface Energy Security.

Staff Scientist, Smithsonian Institution (1988 - 1990 ). National Museum of Natural History, Division of Mineral Sciences, Global Volcanism Program, Washington D.C.--Gathered, evaluated, and disseminated information about ongoing and urgent global volcanic activity to the worldwide volcanological community. Maintained working relationships with volcanologists world-wide. Produced technical documents such as the monthly Scientific Event Alert Network Bulletin (35,000 subscribers) as well as columns for Geotimes, EOS, and the Bulletin of Volcanology.

Field Research Scientist, Smithsonian Institution/U.S.G.S Hawaiian Volcano Observatory (1988 - 1988 ). Gathered field measurements for delineating the regional structure and gravitational stresses on Kilauea Volcano, Hawaii.

AWU-DOE Graduate Fellow, The University of Texas at Arlington (1985 - 1985 ). Conducted field research on the Cerros del Rio lava field, Jemez Mountains, New Mexico, funded by the Department of Energy in collaboration with scientists at Los Alamos National Laboratory. Work included delineating stratigraphy of volcanic deposits, defining phreato-magmatic eruption mechanisms, locating vents and collecting samples for geochemical, petrological and isotopic analysis.

## Professional Registrations and Certificates

American Association for the Advancement of Science

American Geophysical Union

International Association of Geochemistry

International Association of Geochemistry

## Theses

1988, Trace-element geochemistry and stable isotope constraints on the petrogenesis of Cerros Del Rio Lavas, Jemez Mountains, New Mexico: University of Texas at Arlington, Master's thesis, 316 p.

## Dissertations

1997, Vadose-zone geochemistry of Playa wetlands, High Plains, Texas: The University of Texas at Austin, Ph.D. dissertation, 273 p.

## Areas of Expertise

### Areas of Expertise

Carbon cycling and carbonate equilibria

Environmental monitoring at geologic CO<sub>2</sub> storage sites, including soil gas and groundwater geochemical monitoring

Fate and transport of organic contaminants

Geochemical behavior of fluids in deep engineered reservoirs

Shallow geochemical monitoring at carbon sequestration sites

Soil-gas and aqueous geochemistry

## Awards

### Awards and Honorary Societies

Bureau of Economic Geology Rainmaker Award for attracting significant grants and contracts in FY 2017

Bureau of Economic Geology Rainmaker Award for attracting significant grants and contracts in FY 2018

Bureau of Economic Geology Rainmaker Award for attracting significant grants and contracts, 2019

Inventor Award (FY17-18 U.S. Patent Recipient Award): The University of Texas Office of Technology Commercialization, 2018

FY16-17 U.S. Patent Recipient Award: The University of Texas Office of Technology Commercialization, 2017

Outstanding Reviewer, International Journal of Greenhouse Gas Control, 2017

2016 Jackson School Outstanding Research Award presented to the Gulf Coast Carbon Center, 2016

Friend of Water-Rock Interaction Award, in recognition of many valuable contributions to the International Symposium on Water-Rock Interaction, 2016

Career Development Publications Award, 2014

Energy Game Changer in the field of Carbon Capture and Storage, Shultz-Stephenson Task Force on Energy Policy, Stanford University's Hoover Institution and the Massachusetts Institute

of Technology Energy Initiative, 2014

Bureau of Economic Geology 2013 Publication Award, Exemplary Publication of Scientific or Economic Impact, for Process-based approach to CO<sub>2</sub> leakage detection by vadose zone gas monitoring at geologic CO<sub>2</sub> storage sites, 2013

Most Groundbreaking, Innovative, and Insightful Presentation at the 12 Annual Conference on Carbon Capture Utilization & Sequestration, for "Protocol for Response to Claims of CO<sub>2</sub> Leakage: Case Study at the Kerr Farm, Weyburn-Midale Oilfield", 2013

AGU Research Spotlight for Geophysical Research Letters paper, Process-based approach to CO<sub>2</sub> leakage detection by vadose zone gas monitoring at geologic CO<sub>2</sub> storage sites: Geophysical Research Letters, v. 39, L15405, doi:10.1029/2012GL052426., 2012

Short-listed candidate for the 1st working group on Carbon Dioxide Capture and Storage under the Clean Development Mechanism of the United Nations Framework Convention on Climate Change, 2012

Top 14 Presentation for Assessment of alleged CO<sub>2</sub> leakage at the Kerr Farm using a simple process-based soil gas technique: Implications for carbon capture, utilization, and storage (CCUS) monitoring, presented at NETL in Pittsburgh in May, 2012

Jackson School Equipment Award for High Pressure/Temperature Experimental Apparatus for Investigations of Supercritical CO<sub>2</sub>-Water-Rock Interactions in Geologic Reservoirs, 2010

Career Development Publications Award, 2009

Jackson School Equipment Award for Integrated Near-Surface CO<sub>2</sub> Monitoring Observatory, 2009

## Service

### University Committees

Invited Member, Jackson School of Geosciences Diversity and Inclusion Committee, 2018

Member, Bureau of Economic Geology Strategic Planning Committee, 2018

Member, Jackson School Equipment Committee, 2013-2017

Member, website development and redesign committee, September-December 2015

Member, Scientific Facilities Planning Committee (SFPC), Bureau of Economic Geology, April 2009-2011

Designated contact point, United Nations Framework Convention on Climate Change, for The University of Texas at Austin, December 2015-Present

Chair, Jackson School Equipment Committee, 2017

Member, Interview committee for Contracts and Grants Specialist, Bureau of Economic Geology

Member, Interview committee for the Associate Director of Energy, Bureau of Economic Geology

### External Committees Participation

Invited Member, Technical Advisory Board, Subsurface Evaluation of CCS and Unconventional Risks (SECURE) Project, Horizon 2020 LCE27 EU-funded project, Nottingham, UK, April 2018-Present

Invited Member, Special Advisory Group of the Norwegian CCS Research Centre (NCCS), Research Council of Norway. The Special Advisory Group advises the NCCS Board on strategic issues, trends, and new developments in CCS, and positions the Centre globally, November 2017-Present

Invited Member, Stakeholder Advisory Board, Strategies for Environmental Monitoring of Marine Carbon Capture and Storage (STEMM-CCS), 2017-Present

Expert Abstract Reviewer, American Association of Petroleum Geologists (AAPG) 2022 International Conference & Exhibition, Cartagena, Colombia, December 2021

Expert Proposal Reviewer, ACT - Accelerating CCS Technologies, May-July 2021

Invited Participant, Convergence Accelerator on Carbon Reducing Technologies, National Science Foundation, Carbon capture and geologic storage as a focus for the National Science Foundation., virtual, September 28-October 6, 2020

Steering Committee Member, Monitoring and Environmental Network Meeting, International Energy Agency Greenhouse Gas R&D Programme, Calgary, Alta., Canada, August 21-22, 2019

Session Chair, CO<sub>2</sub> Storage and Monitoring, Mission Innovation Challenge #3 - CCUS, Trondheim, Norway, June 19-20, 2019

Session Chair, CO<sub>2</sub> Injectivity and EOR, The 10th Trondheim Conference on CO<sub>2</sub> Capture, Transport and Storage, Trondheim, Norway, June 19, 2019

Session Chair, Technical Session, Monitoring--Novel Tools and Challenging Settings, GHGT-14, Melbourne, Australia, October 23, 2018

Session Chair, Technical Session, Monitoring--Separating Signal from Noise in the Near-Surface, GHGT-14, Melbourne, Australia, October 23, 2018

Co-Chair, International Steering Committee, 3rd International Workshop on Offshore Geological CO<sub>2</sub> Storage, Oslo, Norway, May 3-4, 2018

Facilitator, Interactive Session, Brainstorming Toward an International Collaborative Project, 3rd International Workshop on Offshore Geological CO<sub>2</sub> Storage, Oslo, Norway, May 3-4, 2018

Session Chair, Monitoring Offshore CO<sub>2</sub> storage/EOR, 3rd International Workshop on Offshore Geological CO<sub>2</sub> Storage, Oslo, Norway, May 3-4, 2018

Invited Expert Technical Panelist, Mission Innovation Carbon Capture Challenge, co-led by the U.S. and Saudi Arabia. Mission Innovation is a paradigm representing the commitment of 22 countries to accelerate clean energy development by doubling their R&D budgets over 5 years, Houston, Tex., September 26-28, 2017

Co-Chair, International Steering Committee, 2nd International Workshop on Offshore Geologic CO<sub>2</sub> Storage, Center for Innovation, Commercialization and Entrepreneurship at Lamar University, Beaumont, Tex., June 19-21, 2017

Invited Steering Committee Member, 11th IEAGHG Monitoring Network Meeting, Traverse City, Mich., June 13-15, 2017

Invited member of the Technical Review Panel, GHGT-13 Conference, IEAGHG, Lausanne, Switzerland, November 14-18, 2016

Expert Mentor for Students, 10th IEAGHG International Summer School, Regina, Saskatchewan, Canada, July 17-23, 2016

Co-Chair, International Steering Committee, 1st International Workshop on Offshore Geological CO<sub>2</sub> Storage, Austin, Tex., April 19-21, 2016

Lead organizer, International Offshore CO<sub>2</sub> Storage Workshop, in partnership with SANEDI (South African National Energy Development Initiative), IEAGHG, and the Carbon Sequestration Leadership Forum, for forming a global needs assessment for offshore CCS, initiating a discussion about the various aspects of offshore transport and storage, and building an international community of parties interested in offshore storage. The workshop facilitated countries to identify their specific issues, challenges, opportunities, etc.; identify synergies, common gaps, and goals; and define common action items. Bureau of Economic Geology, April

19-21, 2016

Invited Member, Expert Panel of the 13th International Conference on Greenhouse Gas Control Technologies, GHGT-13, Switzerland, January 2016

Member, Conference Programming Committee, Carbon Management Technology Conference, Sugarland, Texas, July-November 2015

Chair, session on the impact of CO<sub>2</sub> in the terrestrial environment: Magnitude of Impacts and Baseline, IEAGHG Risk Management and Environmental Research Network Meeting, Southampton, UK, September 29-October 2, 2015

Invited Panel Leader, Initiatives for an International Offshore CCS Demonstration Project, IEAGHG Risk Management and Environmental Research Network Meeting, Southampton, UK, September 29-October 2, 2015

Invited Member, International Steering committee, IEAGHG Risk Management and Environmental Research Network Meeting, Southampton, UK, April-September 2015

Invited Panel Member, International Perspectives in Geologic Carbon Storage, Near-Surface Monitoring, DOE/NETL Carbon Storage R&D Project Review Meeting, Pittsburgh, PA, August 18-20, 2015

Invited Member, International Steering Committee, IEAGHG 10th Monitoring Network Meeting, Berkeley, CA, June 10-12, 2015

Invited Session Chair, Monitoring Tool Development, IEAGHG 10th Monitoring Network Meeting, Lawrence Berkeley National Laboratory, June 10-12, 2015

Invited Member, Expert Panel, 12th International Conference on Greenhouse Gas Control Technologies GHGT-12, Austin, TX, October 5-9, 2014

Invited Member, International Steering Committee, The IEAGHG Combined Monitoring and Modelling Network Meeting, Morgantown, WV, August 4-8, 2014

Invited member, 4-person panel presenting international updates on geologic storage monitoring, U.S. Department of Energy Regional Carbon Sequestration Partnership Review, Pittsburgh, PA, August 2014

Invited External member, Science Advisory board, ECO<sub>2</sub> Sub-seabed CO<sub>2</sub> Storage Impact on Marine Ecosystems European Project, June 2014-June 2014

Participant, meeting of the Technical group, Carbon Sequestration Leadership Forum Meeting of the Technical Group, Seoul, Korea, March 2014-March 2014

Session Chair, Detection of Leakage into Shallow Groundwater, IEAGHG Monitoring Network and Environmental Research Network--Combined Meeting Realistic Monitoring of CO<sub>2</sub> Migration: From the Reservoir to the Surface, , Canberra, Australia, August, 2013

Session Chair, Geochemistry of geological CO<sub>2</sub> sequestration, at 14th Water-Rock Interaction Conference, Avignon, France, 14th Water-Rock Interaction Conference, Avignon, France, June, 2013

Invited Member, Research Coordination Network on Multidisciplinary Approaches to Carbon Capture, Utilization and Storage (CCUS), National Science Foundation February, 2013

Lead Guest Editor, Special issue: Geochemical aspects of geologic carbon storage, Applied Geochemistry, 2013

Chair, Monitoring: Geochemical Methods, 11th International Conference on Greenhouse Gas Control Technologies (GHGT-11, Kyoto, 18th-22nd November 2012)November, 2012

Chair, Official UNFCCC side event, CCS Capacity Building and Global Status: Educational Opportunities and Lessons Learned, United Nations Framework Convention on Climate Change

COP18/CMP8, Doha, Qatar, November 2012

Panel Discussion Chair, Communication of Leakage, IEAGHG Environmental Impacts of CO<sub>2</sub> Storage Workshop, Bozeman, Montana, July 17-19, 2012

Panel Session Leader, Hydrology-SECARB Cranfield Project, 7th Annual Southeast Regional Carbon Sequestration Partnership Stakeholders' Briefing, Mobile, Alabama March 7-8,, 2012

Member, Expert Panel, 11th International Conference on Greenhouse Gas Control Technologies (GHGT-11, Kyoto, 18th-22nd November 2012), 2012

Member, Steering Committee, 2011 IEAGHG 7th Monitoring Network Meeting, Potsdam, Germany June 7-9, 2011

Session Chair, Updates and Permanent Installations: Current and Future Activities, 2011 IEAGHG 7th Monitoring Network Meeting, Potsdam, Germany June 7-9, 2011

Member, Drafting Committee for the Research and Independent Nongovernmental Organizations (RINGOS) final statement, COP17 United Nations Climate Change Conference, 2011

Session Chair, Combining Learnings from Natural Releases of CO<sub>2</sub> for CO<sub>2</sub> Storage: Processes, Impacts, and Scale, American Geophysical Union Annual Meeting, San Francisco,, 2011

Session Chair, Workshop: Natural Releases of CO<sub>2</sub>: Building Knowledge for CO<sub>2</sub> Storage Environmental Impact Assessments: Monitoring Challenges in Light of Natural Systems, Maria Laach, Germany, IEAGHG November 2-4, 2010

Member, Expert Panel on Site-Specific Monitoring, funded by EPA and CCP, Natchez, MS, May 5, 2010

Member, Steering Committee, Workshop on Natural Releases of CO<sub>2</sub>: Building Knowledge for CO<sub>2</sub> Storage Environmental Impact Assessments, Maria Laach, Germany, IEAGHG, 2010

Member, Scientific Facilities Planning Committee (SFPC), Bureau of Economic Geology, 2009

## Published Interviews

Aitken, S., Briseño, A., and Romanak, K. D., 2022, Jackson School Researcher Advocates for Carbon Capture and Storage at COP26 in Glasgow, Global Texas website, <https://global.utexas.edu/news/jackson-school-researcher-advocates-carbon-capture-and-storage-cop26-glasgow>

Romanak, K. D., 2021, CCS is our hope: Czech Ecologist, <https://ekolist.cz/cz/publicistika/nazory-a-komentare/katherinen-romanak-ccs-je-nase-jedina-nadeje>

Romanak, K. D., 2021, Profiled by the UT Jackson School of Geosciences for Women's History Month, <https://twitter.com/txgeosciences/status/1374479644418658304>

Romanak, K. D., 2021, Safely capture and store CO<sub>2</sub>: Euro Magazine, v. 36, <https://www.tydenikeuro.cz/bezpecne-zachytavat-a-ukladat-oxid-uhlicity/> (in Czech).

Romanak, K. D., 2021, The Carbon Removal Show, Apple Podcast #5 DAC and storage: can we engineer our way out of this? <https://podcasts.apple.com/us/podcast/5-dac-and-storage-can-we-engineer-our-way-out-of-this/id1590522755?i=1000541308388>

Romanak, K. D., 2021, Your COP 26 questions answered: carbon capture and storage: Nature Video, doi:10.1038/d41586-021-03391-9.

Romanak, K. D., 2020, The International CCS Knowledge Centre video series "Lead. Care. Adapt,": Katherine Romanak discusses the opportunities for CCS in developing countries and

explains the support available to these regions to help move projects forward.

Romanak, K. D., 2019, Carbon sequestration series part II: discussing risks with Dr. Katherine Romanak: American Shoreline Podcast Network, audio interview, <https://anchor.fm/aspn/episodes/Carbon-Sequestration-Series-Part-II-Discussing-Risks-with-Dr--Katherine-Romanak-e3q7uq/a-adjd9f>.

Romanak, K. D., 2019, Katherine Romanak - Research Scientist, BEG, Jackson School of Geosciences on GHGT14: International Energy Agency Greenhouse Gas R&D Programme, video interview, <https://www.youtube.com/watch?v=z4EvoCzpMNg>. Recorded at the 14th International Conference on Greenhouse Gas Control Technologies (GHGT-14).

Romanak, K. D., 2019, Partnership seeks to fight climate change and boost Caribbean nation's economy: American Association for the Advancement of Science (AAAS) EurekAlert!

Romanak, K. D., 2019, Realising CCS [CO<sub>2</sub> Capture, Transport, and Storage]: Norwegian CCS Research Centre, video interview, <https://www.sintef.no/projectweb/nccs/>.

Romanak, K. D., 2019, Spectrum News (cable TV), "Climate Change Partnership": story highlighting Romanak's initiative for developing CCS in Trinidad and Tobago.

Romanak, K. D., 2018, Radio interview, The Texas Standard: Experts Say Government Leadership, Technology and Individual Action Are Key to Fighting Climate Change, <http://www.texasstandard.org/stories/experts-say-government-leadership-technology-and-individual-action-are-key-to-fighting-climate-change/>

Romanak, K. D., 2017, Förhandlingar och fästingar i ett varmare klimat (Negotiations and ticks in a warmer climate): Swedish National Radio, <http://sverigesradio.se/sida/avschnitt/977526?programid=3345>

Romanak, K. D., 2017, Le captage et le stockage de carbone éveillent l'intérêt international (Carbon capture and storage sparks international interest): ICI Radio-Canada, <http://ici.radio-canada.ca/nouvelle/1059497/symposium-boundary-dam-estevan-saskatchewan-saskpower>

Romanak, K. D., 2017, mentioned in the 2nd session of the 28th Legislative Assembly of Saskatchewan no. 25A, Debates and Proceedings; <http://docs.legassembly.sk.ca/legdocs/Legislative%20Assembly/Hansard/28L1S/161116Debate%20s.pdf>

Romanak, K. D., 2017, SaskPower's Boundary Dam 3 in the spotlight during CCS symposium: Global News Canada, <https://globalnews.ca/news/3783906/saskpowers-boundary-dam-3-in-the-spotlight-during-ccs-symposium/>

Romanak, K. D., 2015, Carbon Capture and Storage (CCS): Achievements and Opportunities for Developing Country Involvement. Presented by: International Energy Agency Greenhouse Gas (IEAGHG) Research and Development Programme, The University of Texas at Austin, Carbon Capture and Storage Association (CCSA), and CO<sub>2</sub>GeoNet. Reported by International Institute for Sustainable Development (IISD) Reporting Services: <http://www.iisd.ca/climate/cop21/enbots/1dec.html#event-6>

Romanak, K. D., 2015, Nations urged to consider offshore storage, Upstream: The International Oil and Gas Newspaper (Romanak heavily quoted)

Romanak, K. D., 2015, Technological solution proposed, COP-21 CCS side event covered by NHK World News, Tokyo

Romanak, Katherine, 2013, Researchers seek CO<sub>2</sub> 'fingerprint' to monitor carbon capture projects: ClimateWire, [www.eenews.net/climatewire/stories/1059985981/feed](http://www.eenews.net/climatewire/stories/1059985981/feed), published August 14, 2013 (Romanak quoted)

Romanak, Katherine, and Hovorka, S. D., 2013, Kyoto: have hopes for CCS been realized?: Conference highlights: Greenhouse Gases Science and Technology, v. 3, p. 5-7 [Katherine Romanak and Susan Hovorka mentioned]

Romanak, K., and Briere, K., 2011, Study seeks answers to farm's hydrocarbon puzzle, in Regina Bureau, Saskatchewan, Canada (Romanak heavily quoted).

Romanak, Katherine, 2011, Geologists develop new method for measuring CO<sub>2</sub> levels in soil: GHG Reduction Technologies Monitor: v. 6, no. 26, p. 8-9 (Romanak heavily quoted)

Romanak, Katherine, 2011, No CO<sub>2</sub> contamination found at Kerr farm, IPAC-CO<sub>2</sub> report says, in Leader-Post, Regina, Saskatchewan, Canada (Romanak quoted).

Romanak, Katherine, 2011, Researchers to find truth on Kerr farm, Weyburn Review, Weyburn, Saskatchewan, Canada (Romanak heavily quoted)

Romanak, Katherine, and Boudreau, J., 2011, Researchers from Texas in Weyburn to study ground CO<sub>2</sub> contamination possibly from the Carbon Capture Storage site: Prairie Media Watch Ltd., CBKFT-TV, Regina, Saskatchewan, Canada (Romanak quoted).

Wolaver, B. D., Romanak, Katherine, and Nikkel, G., 2011, Researchers to find truth on Kerr farm, Weyburn Review, Weyburn, Saskatchewan, Canada (Wolaver quoted)

Romanak, Katherine, and Hovorka, S. D., ed., 2001, Need for DOE oil, gas R&D seen rising: inside energy/with Federal Lands, August 13, p. 1, 9-10 [feature summarizing Tinker's views on DOE's role in funding energy research; extensive quotations from Tinker].

## Outreach Activities

Panelist: Discussion on CCUS: presented to AWG (Association for Women Geoscientists) Lone Star chapter, May 20, 2021.

Mentor: Oxford Climate Society School of Climate Change Capstone Project: A zero municipal solid waste (MSW) strategy to combat climate change in Nigeria, Abimbola Abikoye, Rana Moumneh, Wahyu Nurbandi, Weronika Slesak, February-March 2021.

Supervisor, undergraduate student intern, Parker Medford: Developing automated continuous monitoring microcosms for studying soil gas ratios in waterlogged systems: May-August 2015.

Technical Expert at the pre-legislative session "open house" for media: presented at The University of Texas at Austin, Austin, TX, January 22, 2015.

Supervisor, undergraduate student intern, Jack Jones: June-July 2014.

Student Mentor: 6th IEAGHG International CCS Summer School, Tsinghua University, Beijing, China, August 12-18, 2012.

Facilitated a half-day workshop entitled "What to do with CO<sub>2</sub>": presented to 5th-8th grade girls from St. Gabriel's Catholic School, Austin, Texas, March 2012.

Mentored Mason Mangum, 5th grader at Eanes Elementary School, in a science fair project entitled "You've probably heard of global warming but have you heard of ocean acidification?" Project won 3rd place in Eanes Elementary School Science Fair and advanced to Austin Energy Regional Science Festival, where it won a blue ribbon: 2012.

Climate change and climate mitigation technology: keynote speech presented at Florida Association of Science Teachers FAST 2011--Celebrating Science in Our World, in conjunction with STORE, GCCC's outreach partner, Orlando, Florida, October 20-22, 2011.

Energy, climate, and water in the 21st Century: presented at 2-week professional development workshop sponsored by STORE, GCCC's education and outreach program, for middle- and high-school teachers, in collaborations with TXESS and TWDB, Austin, Texas, March 7-8, 2011.

What to do with CO<sub>2</sub>?: presented at GirlTalk: Energy, Climate and Water in the 21st Century,



Ursuline Academy, Dallas, Texas, October 1 and 2, 2010.

Capture that gas: understanding carbon dioxide (CO<sub>2</sub>): presented at UT Explore, Austin, Texas, March 7, 2009.

## Proposal Review Panels Participation

Expert Proposal Reviewer, Accelerating CCS Technologies (proposal call 3), 2021

## Teaching and Advising

### University Courses Taught

Environmental impacts of CO<sub>2</sub> storage: presented to Institut Teknologi Bandung (ITB) and The IEA Greenhouse Gas R&D Programme (IEAGHG), presented at International Virtual Course of "Carbon Capture, Utilization and Storage for Asia - Oceania Regions", virtual, November 9-20, 2020.

Environmental Impacts of Geologic CO<sub>2</sub> Storage: presented to International Energy Agency Greenhouse Gas R&D Programme International Carbon Capture and Storage (CCS) Summer School, presented at International CCS Knowledge Centre, Regina, Sask., Canada, July 9, 2019.

Shallow Monitoring Onshore and Offshore: presented to International Energy Agency Greenhouse Gas R&D Programme International Carbon Capture and Storage (CCS) Summer School, presented at International CCS Knowledge Centre, Regina, Sask., Canada, July 9, 2019.

Monitoring in the Near-Surface for Public Assurance: presented to Shell Science Council, Bangalore, India, January 29, 2019.

Environmental Impacts of CO<sub>2</sub> Storage: presented to the 13th IEAGHG International Summer School, Trondheim, Norway, June 25-29, 2018.

Portrait of an Anomaly-An exercise in leakage attribution: presented to the 13th IEAGHG International Summer School, Trondheim, Norway, June 25-29, 2018.

Shallow Monitoring and Verification in the Onshore and Offshore Environments: presented to the 13th IEAGHG International Summer School, Trondheim, Norway, June 25-29, 2018.

Shallow Monitoring and Verification in the Onshore and Offshore Environments: presented to 11th IEAGHG International Summer School, Regina, Saskatchewan, Canada, July 18-23, 2017.

Environmental Impacts of CO<sub>2</sub> Storage: presented to 11th IEAGHG International Summer School, Regina, Saskatchewan, Canada, July 18-22, 2017.

Environmental impacts of CO<sub>2</sub> storage: presented to 10th IEAGHG International Summer School, Regina, Saskatchewan, Canada, July 17-23, 2016.

Shallow monitoring and verification in the onshore and offshore environments: presented to 10th IEAGHG International Summer School, Regina, Saskatchewan, Canada, July 17-23, 2016.

Field Methods in Soil Gas Analysis: presented to The University of Texas at Austin Hydro Field Camp, Brackenridge Field Laboratory, May 21, 2015.

Environmental impacts of geologic CO<sub>2</sub> storage, 7th IEAGHG International CCS Summer School, University of Nottingham, United Kingdom: July 2013.

Monitoring at geologic CO<sub>2</sub> storage sites, 7th IEAGHG International CCS Summer School, University of Nottingham, United Kingdom: July 2013.

Environmental impacts of geologic CO<sub>2</sub> storage: 6th IEAGHG International CCS Summer School: presented at Tsinghua University, Beijing, China, August 12-18, 2012.

Monitoring at geologic CO<sub>2</sub> storage sites: 6th IEAGHG International CCS Summer School:

presented at Tsinghua University, Beijing, China, August 12-18, 2012.

Geologic CO<sub>2</sub> storage: The University of Texas at Austin, Department of Engineering, Grand Challenges in Engineering series, Austin, Texas: January 30, 2012.

Monitoring research within the Southeast U.S. Regional Carbon Sequestration Partnership in Cranfield, Mississippi: UTSA EES CE 6221 Graduate Seminar, University of Texas at San Antonio: April 8, 2010.

Monitoring the behavior of CO<sub>2</sub> in shallow environments: evidence from one natural and two industrial carbon-storage analogue sites: presented at Bureau of Economic Geology Seminar, Austin, Texas, December 11, 2009.

Dockum groundwater study: example of geochemical modeling: presented at UTSA EES 5483 Environmental Hydrogeology graduate seminar, San Antonio, Texas, May 19, 2009.

### Continuing Education Courses Taught

Carbon Capture and Storage Association official UNFCCC side event: presented at COP17 United Nations Climate Change Conference, Durban, South Africa, November 29, 2011.

### Student Committee Supervision

Supervisor, M.S. Thesis Committee, Marlo Gawey, Experimental Analysis and Modeling of PFT and SF<sub>6</sub> Transport in the Vadose Zone: Implications for Monitoring CO<sub>2</sub> Leakage at CCS Sites: The University of Texas at Austin, Austin, Texas, 2013

Supervisor, M.S. Thesis Committee, Mary Hingst, Geochemical Effects of Elevated Methane and Carbon Dioxide in Near-Surface: The University of Texas at Austin, Austin, Texas, 2013

### Student Committee Participation

External Examiner, Doctor of Philosophy, Examination, Dillon Ramsook, Techno-economic carbon constrained energy planning on Trinidad and Tobago's power generation sector, The University of Trinidad and Tobago, Virtual, 2022

## Presentations

### Invited Presentations

Deep and shallow monitoring of CO<sub>2</sub> geological storage: presented at Indonesian Petroleum Association CCUS Short Course, virtual presentation, August 19, 2021.

Environmental impacts of CO<sub>2</sub> storage: presented to ITB-IEAGHG International Virtual CCUS Course, Asia-Oceanic Region, July 29, 2021., August 3, 2021.

Onshore and offshore shallow monitoring and verification: presented to ITB-IEAGHG International Virtual CCUS Course, Asia-Oceanic Region, July 29, 2021.

Industrial decarbonization & the role of CCUS: presented to Kay Bailey Hutchison North American Energy Dialogue Series, virtual presentation, June 22, 2021.

CO<sub>2</sub> Storage Regulations and Process-Based Environmental Monitoring: presented at Occidental and GSI Lunch and Learn, June 11, 2021.

Environmental Monitoring: Lessons Learned from CO<sub>2</sub> Storage Project Experience: presented to EU SeCURE Project's International Platform for Environmental Monitoring, virtual presentation, May 12, 2021.

Technical considerations for satisfying global regulations in CO<sub>2</sub> storage: presented to European Association of Geoscientists and Engineers (EAGE) Energy Transition Series-Putting Carbon Underground, May 11, 2021.

Technical Considerations for Satisfying Global Regulations in CO<sub>2</sub> Storage: presented to European Association of Geoscientists and Engineers Energy Transition Series: Putting Carbon

Underground, virtual presentation, May 11, 2021.

Carbon Capture and Storage: presented to The University of Texas at Austin McCombs School of Business, presented at Upstream Shop Talk, virtual presentation, April 9, 2021.

Monitoring to Demonstrate Secure Storage: presented to Heidelberg Cement Group, virtual presentation, April 7, 2021.

Environmental Monitoring of Geological CO<sub>2</sub> Storage: presented to AAPG Europe, presented at Virtual Workshop in Carbon Capture Use and Storage, January 21, 2021.

A Process-Based Soil-Gas Approach for CO<sub>2</sub> Leakage Attribution: presented at IEAGHG Monitoring Network; an expertise showcase for post-closure monitoring, January 2021.

International Perspective on CCS Regulations: presented at The ACTOM Project webinar on potential conflicts in regulations and technological capabilities of monitoring carbon capture and storage, virtual, October 13, 2020.

"Message from the World": presented at Japan CCS Japan-Asia Pacific CCUS Forum, virtual, October 6, 2020.

Panelist and roundtable discussion leader: presented at AAPG Energy Opportunities Executive Forum on Carbon Capture Use and Storage - Making Petroleum and Industrial Processes More Sustainable, virtual, September 10, 2020.

Panelist, Regulation, Industry and Research - Translating Monitoring Research to Meet Commercial Needs: presented to IEAGHG Monitoring Network, virtual, August 12, 2020.

International Collaborations in Advancing Carbon Capture and Storage (CCS): presented to Japan Pavillion event "Saving our Beautiful Planet with CCS", presented at United Nations Framework Convention on Climate Change Conference of Parties 25, Madrid, Spain, December 13, 2019.

Monitoring to Demonstrate Secure Storage - A Technical Perspective: presented to CO<sub>2</sub> Capture Project event at International Emissions Trading Association pavillion, presented at United Nations Framework Convention on Climate Change Conference of Parties 25, Madrid, Spain, December 4, 2019.

Monitoring, Safety and Stakeholder Engagement: presented to Carbon Removal and Return - Can CCS Decarbonise Industry in South America and Help the Oceans?, a United Nations Framework Convention on Climate Change (UNFCCC) Conference of Parties 25 (COP25) official side event, presented at UNFCCC COP25, Madrid, Spain, December 4, 2019.

Monitoring, Safety and Stakeholder Engagement: presented at Developing a National Carbon Capture and Storage Programme in Trinidad and Tobago - An International Knowledge-Sharing Symposium, University of Trinidad and Tobago, Couva, Trinidad, October 29, 2019.

United Nations Framework Convention on Climate Change funding mechanisms and opportunities for engagement in carbon capture and storage: presented at Developing a National Carbon Capture and Storage Programme in Trinidad and Tobago - An International Knowledge-Sharing Symposium, University of Trinidad and Tobago, Couva, Trinidad, October 29, 2019.

CO<sub>2</sub> Storage, Monitoring, Verification and Accounting: presented at 4th Biennial CO<sub>2</sub> for Enhanced Oil Recover as Carbon Capture, Utilization, and Storage Conference, Houston, Tex., September 25, 2019.

Characterization for Environmental Monitoring at Glenhaven, Queensland: presented to International Energy Agency Greenhouse Gas R&D Programme Monitoring and Environmental Networks Meeting, presented at University of Calgary, Calgary, Alta., Canada, August 21-22, 2019.

Recent Developments and Challenges in Soil Gas Sensing: presented to International Energy

Agency Greenhouse Gas R&D Programme Monitoring & Environmental Research Networks, presented at University of Calgary, Calgary, Alta., Canada, August 21-22, 2019.

Revelations in monitoring: why environmental monitoring isn't just for leakage anymore: presented to The Research Council of Norway, presented at 10th Trondheim Conference on CO2 Capture, Transport and Storage (TCCS-10), Trondheim, Norway, June 17-19, 2019.

Keynote Speech: Risk Assessment on CO2 Leakage at CO2 Storage Sites: presented to Japan CCS Technical Workshop, Tokyo, January 16, 2019.

Demonstrating Storage and Assistance for Developing Countries: presented to Official UNFCCC Side Event, COP-24, Katowice, Poland, December 12, 2018.

CCS in Nationally Determined Contributions and Mid-Century Strategies--The Bureau of Economic Geology's perspective: presented to IETA Business Hub Side Event, presented at UNFCCC COP-24, Katowice, Poland, December 5, 2018.

Expanding a Process-Based Soil Gas Method to Identify Industrial Signals at CO2- EOR Sites: presented at GHGT-14, Melbourne, Australia, October 23, 2018.

Sharing Experience and Stimulating Interest in Offshore CCS in Developing Countries: presented at GHGT-14, Melbourne, Australia, October 23, 2018.

CO2 Storage - What's Left to Do?: presented at BHP CCUS Partners Discussion, Melbourne, Australia, September 26, 2018.

Integrating HR3D Seismic with Geochemistry: presented to U.S. National Energy Technology Laboratory, Carbon Storage Technology Webinar: Offshore Focus, September 17, 2018.

Field Validation of MVA Technology for Offshore CCS, Tomakomai, Japan: presented at US National Energy Technology Laboratory, Mastering the Subsurface Through Technology Innovation, Partnerships and Collaboration: Carbon Storage and Oil and Natural Gas Technologies Review Meeting, Pittsburgh, Pa., August 14, 2018.

Advances in Attribution: presented to GCCC Industrial Associates Meeting, Houston, Tex., July 2018.

Scene Setting: Learning from Our Learnings: presented to 3rd International Workshop on Offshore Geological CO2 Storage, Oslo, Norway, May 3, 2018.

Portrait of an Anomaly-An Attribution Game: presented to Strategies for Environmental Monitoring of Marine Carbon Capture and Storage (STEMM-CCS) short training course, Castelldefels, Spain, March 13-14, 2018.

Project Experience in Monitoring - Onshore and Offshore: presented at United Nations Framework Convention on Climate Change COP 23, Bonn, Germany, November 7, 2017.

Advancements in CO2 Storage and the Path Forward: presented at the International CCS Knowledge Center's Global CCS Symposium, Regina, Saskatchewan, Canada, October 3-5, 2017.

Field Validation of MVA Technology for Offshore CCS: Environmental Monitoring at the Tomakomai CCS Demonstration Project, Japan: presented at Mastering the Subsurface through Technology Innovation, Partnerships and Collaboration: Carbon Storage and Oil and Natural Gas Technologies Review Meeting, August 1-3, 2017.

Near Surface/Surface Baseline Monitoring Commonalities/Site-Specific Subtleties and Leakage Monitoring: presented at 11th IEAGHG Monitoring Network Meeting, Traverse City, Mich., June 13-15, 2017.

Environmental monitoring at CCS sites: presented at SENER's Specialized Program for CCS Capacity Development Workshop on Geologic Storage of CO2 in Deep Saline Aquifers, Mexico City, Mexico, April 25, 2017.

SECARB Early Test Retrospective: presented at 2016 DOE NETL Annual Stakeholders Meeting: Mastering the Subsurface through Technology Innovation & Collaboration Conference, Pittsburgh, Pa., August 16-18, 2016.

Shallow Monitoring Summary of the IEAGHG 11th Monitoring Network Meeting: presented at 2016 DOE NETL Annual Stakeholders Meeting: Mastering the Subsurface through Technology Innovation & Collaboration Conference, Pittsburgh, Pa., August 16-18, 2016.

Environmental Monitoring Over CO<sub>2</sub> Geologic Storage Sites: presented to California Air Resources Board, CCS Technical Discussion Series on Monitoring, August 5, 2016.

Modeling Near-Surface Processes: presented to IEAGHG Monitoring and Modeling Network Combined Meeting, Edinburgh, Scotland, July 6-8, 2016.

Environmental Quality over CO<sub>2</sub> Injection Sites: presented at the California Air Resources Board Well Integrity Technical Discussion, May 12, 2016.

A new way of looking at baselines: presented to IEAGHG Risk Management and Environmental Research Network Meeting, Berkeley, CA, September 29-October 2, 2015.

Scene setting: the detection-attribution-quantification cycle: presented at IEAGHG 10th Monitoring Network Meeting, Berkeley, CA, June 10-12, 2015.

Current and emerging near-surface monitoring techniques--technical advances and cost-effectiveness from a recent case study: presented at IEAGHG R&D Programme Combined Monitoring and Modelling Network Meeting, Morgantown, WV, August 4-8, 2014.

Monitoring and environmental protection at geologic carbon storage sites: presented at US Congressional Briefing Series: Energy from the Earth: Geologic Carbon Storage, Washington, DC, July 18, 2014.

Process-based leakage detection, application to marine environments: presented at 3rd Annual Meeting of the ECO<sub>2</sub> Sub-Seabed CO<sub>2</sub> Storage Impact on Marine Ecosystems European Project, Salina, Italy, June 2-4, 2014.

Soil gas monitoring techniques and implications for MMV plans: presented at the International Energy Agency 6th CCS Regulatory Network Meeting: Taking stock of progress and identifying next steps, Paris, France, May 27-28, 2014.

Monitoring and Environmental Aspects of CCS: presented at IEAGHG-OPEC Workshop on CCS in the UNFCCC Clean Development Mechanism, Vienna, Austria, October 2013.

Protocol for Response to Claims of CO<sub>2</sub> leakage developed at the Kerr Farm: Weyburn-Midale Oilfield: presented at Joint University of Queensland Energy Initiative, SMI, Centre for CSG Seminar, the University of Queensland, Brisbane, Australia, September 4, 2013.

Detection of signal over hydrocarbon-induced noise at Cranfield: presented at IEAGHG Monitoring Network and Environmental Research Network--Combined Meeting Realistic Monitoring of CO<sub>2</sub> Migration: From the Reservoir to the Surface, Canberra, Australia, August 2013.

Insights into CO<sub>2</sub> migration from non-CCS perspectives: presented at IEAGHG Monitoring Network and Environmental Research Network--Combined Meeting Realistic Monitoring of CO<sub>2</sub> Migration: From the Reservoir to the Surface, Canberra, Australia, August 2013.

Environmental impacts of geologic CO<sub>2</sub> storage: presented at 7th IEAGHG International CCS Summer School, University of Nottingham, UK, Nottingham, United Kingdom, July 2013.

Monitoring CO<sub>2</sub> injection: presented to workshop titled "The Role of Computation in Protected the Environment," hosted by NSF, CDI, CSM, ICES, BEG, STORE, DOE, and GCCC via Skype, Austin, Texas, July 2013.

Near-surface monitoring at geologic CO<sub>2</sub> storage sites: presented at 7th IEAGHG International

CCS Summer School, University of Nottingham, UK, Nottingham, United Kingdom, July 2013.

CCS Technical Workshop: presented at Research Institute of Innovative Technology for the Earth, Tokyo, Japan, January 2013.

Environmental impacts of geologic CO<sub>2</sub> storage: presented at 6th IEAGHG International CCS Summer School, Tsinghua University, Beijing, China, August 12-18, 2012.

Near-surface monitoring at geologic CO<sub>2</sub> storage sites: presented at 6th IEAGHG International CCS Summer School, Tsinghua University, Beijing, China, August 12-18, 2012.

Conductivity measuring to access brine impact, Katherine Romanak on behalf of Jeff Paine, The University of Texas at Austin, Texas: presented at The IEAGHG Environmental Impacts of CO<sub>2</sub> Storage Workshop, Bozeman, Montana, July 17-19, 2012.

Process-based approach to soil gas monitoring: presented at The IEAGHG Environmental Impacts of CO<sub>2</sub> Storage Workshop, Bozeman, Montana, July 17-19, 2012.

Using natural and controlled CO<sub>2</sub> releases for communication: presented at The IEAGHG Environmental Impacts of CO<sub>2</sub> Storage Workshop, Bozeman, Montana, July 17-19, 2012.

Large volume CO<sub>2</sub> injection at Cranfield: early field test of the SECARB Phase III: near-surface monitoring: presented at 7th Annual Southeast Regional Carbon Sequestration Partnership Stakeholders' Briefing, Mobile, Alabama, March 7-8, 2012.

Dialog between Engineering Societies and CCS Tech Leaders: presented to CCS, Caribe Royal, Orlando, Florida, February 9, 2012.

Geologic CO<sub>2</sub> storage: presented at STORE, The University of Texas at Austin, Department of Engineering, Austin, Texas, January 30, 2012.

Geologic CO<sub>2</sub> storage: presented to Longhorn Grand Challenges Scholars Program group, Austin, Texas, January 30, 2012.

Monitoring CO<sub>2</sub> storage in deep geological formations: presented at The University of Bern, Bern, Switzerland, November 10, 2010.

Pilot studies of CO<sub>2</sub> injection into geologic reservoirs as a prelude to large scale carbon sequestration: presented at The University of Geneva, Séminaire du Département de Géologie et Paléontologie, Geneva, Switzerland, November 8, 2010.

Soil-gas behavior and measurement in a carbon-reactive natural analogue; implications for near-surface monitoring: presented at The IEAGHG workshop: Natural Releases of CO<sub>2</sub>: Building Knowledge for CO<sub>2</sub> Storage Environmental Impact Assessments, Maria Laach, Germany, November 2-4, 2010.

Review of GCCC groundwater studies at British Petroleum (BP) America offices: recent results of groundwater studies at the SACROC oilfield in Texas and the Cranfield oilfield in Mississippi: presented to BP Houston and UK (via weblink) personnel, Houston, Texas, May 19, 2010.

Monitoring CO<sub>2</sub> storage in geological formations: presented to Environmental Science and Engineering (CE 6221), Graduate Department of Civil and Environmental Engineering, The University of Texas at San Antonio, San Antonio, Texas, April 8, 2010.

Modeling shallow groundwater geochemistry for CO<sub>2</sub> storage evaluation at an EOR site, West Texas: presented at Lawrence Berkeley National Laboratory, Berkeley, California, December 16, 2009.

U.S.-China Collaboration on CCS: presented to the China Corporate Pavilion, UNFCCC COP 26, presented at International Collaboration Opportunities for CCS in China Event, Glasgow, Scotland, November 11, 2021-Present.

The safety of CO<sub>2</sub> geological storage: presented at UNFCCC COP 26, Glasgow, Scotland, November 10, 2021-Present.

## Presentations

Technical monitoring considerations for advancing CCS projects under the California Low Carbon Fuel Standard in relation to other global regulatory regimes: presented at 15th International Conference on Greenhouse Gas Control Technologies, GHGT-15, virtual presentation, March 18, 2021.

International outreach and next steps: presented at UTCCS-5 The University of Texas Fifth Conference on Carbon Capture and Storage, Austin, Tex., January 28, 2020.

Results from environmental field studies: presented at UTCCS-5 The University of Texas Fifth Conference on Carbon Capture and Storage, Austin, Tex., January 28, 2020.

A New Way of Looking at Vadose Zone Science: presented at 6th Annual Bureau of Economic Geology Research Symposium, The University of Texas at Austin, September 28, 2018.

SECARB "Early Test" at Cranfield: presented at U.S. Department of Energy, Annual SECARB Project Review Meeting, Atlanta, Ga., March 7-8, 2018.

Evolution of fluid chemistry from deep reservoir to near-surface: presented to Gulf Coast Carbon Center Industrial Associates, presented at UTCCS-4, Austin, Tex., January 30-31, 2018.

How would leakage really occur?: presented to Gulf Coast Carbon Center Industrial Associates, presented at UTCCS-4, Austin, Tex., January 30-31, 2018.

Advances in Attribution and Quantification of Leakage: presented at GCCC Industrial Sponsors Meeting, Houston, Tex., September 20, 2017.

Evolution of Fluid Chemistry from Deep Reservoir to Near-Surface: presented at GCCC Industrial Sponsors Meeting, Houston, Tex., September 20, 2017.

Marine Environmental Monitoring: presented at GCCC Industrial Sponsors Meeting, Houston, Tex., September 20, 2017.

Towards a method for leakage quantification and remediation monitoring in the near-surface: presented at International Conference on Greenhouse Gas Technologies GHGT-13, Lausanne, Switzerland, November 14-18, 2016.

Getting on the path to CCS: presented at UNFCCC COP 22 side event at Opportunities for Africa in Carbon Capture and Storage, Marrakesh, Morocco, November 8, 2016.

Task 7: Vadose Zone Monitoring: presented to Hillcorp, The Bureau of Economic Geology, August 25, 2016.

Simple Method for Leakage Attribution and Quantification in the Near-Surface: presented at 2016 DOE NETL Annual Stakeholders Meeting: Mastering the Subsurface through Technology Innovation & Collaboration Conference, Pittsburgh, Pa., August 16-18, 2016.

Discussion Panel Leader: Implications Long-term Natural Variability in Near-Surface Monitoring: presented at IEAGHG R&D Monitoring and Modeling Combined Network Meeting, Edinburgh, Scotland, July 6-8, 2016.

Toward a Simple Method for Leakage Quantification in the Near-Surface: presented at CCUS Conference, Tysons, Va., June 14-16, 2016.

GCCC's Impact at COP-21: presented at Gulf Coast Carbon Center Members bi-annual stakeholders meeting, The University of Texas at Austin, January 2016.

Signal Attribution and Quantification in the Near-Surface: presented at Gulf Coast Carbon Center Members bi-annual stakeholders meeting, The University of Texas at Austin, January 2016.

Toward an International Collaboration on Offshore Storage: presented at Gulf Coast Carbon Center members bi-annual stakeholders meeting, The University of Texas at Austin, January 2016.

2016.

Global offshore CO<sub>2</sub> storage demonstration project: presented at UNFCCC COP-21, Paris, France, December 9, 2015.

Improving the ease and accuracy of environmental monitoring at CCS sites: presented at Carbon Management Technology Conference, Sugarland, Texas, November 17, 2015.

Technical advances and cost-effective monitoring: results from a case study of sensor development for a new process-based monitoring method: presented at 14th Annual Carbon Capture, Utilization & Storage Conference, Pittsburgh, PA, April 28-May 1, 2015.

Environmental impacts of geologic CO<sub>2</sub> storage: presented at 8th IEAGHG International CCS Summer School, The University of Texas at Austin, Austin, Texas, USA, July 2014.

Evolution of fluid chemistry from deep reservoir to near-surface: implications for geologic carbon storage: presented at GCCC Industrial sponsor meeting, Houston, Texas, July 2014.

Monitoring and environmental protection at geologic carbon storage sites: presented at Energy from the Earth: Practical geoscience to inform energy legislation, Geologic Carbon Storage: Feasibility, Technology, and Challenges, US Congressional Briefing Series, Part 6, July 2014.

Near-surface monitoring at geologic CO<sub>2</sub> storage sites: presented at 8th IEAGHG International CCS Summer School, The University of Texas at Austin, Austin, Texas, USA, July 2014.

Near-surface Monitoring at Geologic CO<sub>2</sub> storage sites: presented to World Bank CCS Training tour for the Botswana Geological Survey and the Department of Environmental Affairs, Austin, Texas, July 2014.

Principal Investigator: presented to World Bank CCS Training tour for the Botswana Geological Survey and the Department of Environmental Affairs, Austin, Texas, July 2014.

Student Mentor: presented to 8th IEAGHG International CCS Summer School, The University of Texas at Austin, Austin, Texas, USA, July 2014.

Process-based leakage detection, application to marine environments: presented to 3rd annual meeting of the ECO<sub>2</sub> Sub-seabed CO<sub>2</sub> Storage Impact on Marine Ecosystems European Project, Salina Island, Italy, June 2014.

Soil gas monitoring techniques and implications for MMV plans (invited talk): presented to International Energy Agency 6th CCS Regulatory Network Meeting: Taking stock of progress and identifying next steps, Paris, France, May 2014.

New process-based approach to gas leakage detection in groundwater and soils at geologically-engineered sites (poster): presented at Bureau of Economic Geology Industry Day, April 2014.

Innovations in near-surface monitoring (invited talk): presented to Korea Carbon Capture & Sequestration R&D Center, Daejeon, South Korea, March 2014.

Co-presenter: presented to Side Meeting to Discuss an International Collaboration on an offshore CO<sub>2</sub> Geo-sequestration Demonstration Project, 5th Carbon Sequestration Leadership Forum Ministerial Meeting, Washington, D.C., USA, November 2013.

Environmental impacts of geologic CO<sub>2</sub> storage: presented at 8th IEAGHG International CCS Summer School, University of Nottingham, UK, Nottingham, United Kingdom, July 2013.

Monitoring CO<sub>2</sub> injection: presented to workshop titled "The Role of Computation in Protected the Environment," hosted by NSF, CDI, CSM, ICES, BEG, STORE, DOE, and GCCC, Austin, Texas, July 2013.

Protocol for Response to Claims of CO<sub>2</sub> Leakage: Case Study at the Kerr Farm, Weyburn-Midale Oilfield: presented at 7th Trondheim CCS Conference, Trondheim, Norway, June 4-6 2013.



Potential for a process based monitoring method above geologic carbon storage sites using dissolved gases in freshwater aquifers: presented at 14th Water-Rock Interaction Conference, Avignon, France, June 2013.

Protocol for Response to Claims of CO<sub>2</sub> Leakage: A Case Study at the Kerr Farm, Weyburn-Midale Oilfield: presented at 14th Water-Rock Interaction Conference, Avignon, France, June 2013.

Case study: a field survey in response to claims of CO<sub>2</sub> leakage--Weyburn-Midale oil field: presented at RITE CCS Technical workshop, Tokyo, Japan, January 2013.

Impact of meetings attended: presented at GCCC Associates meeting, January 2013.

New application of a process-based assessment of groundwater: presented at GCCC Associates meeting, January 2013.

Assessment of alleged CO<sub>2</sub> leakage at the Kerr farm using a simple process-based soil gas technique: Implications for carbon capture, utilization, and storage (CCUS) monitoring: presented at 11th International Conference on Greenhouse Gas Control Technologies, Kyoto, Japan, November 18-22, 2012.

Monitoring CCS-EOR systems using a new process-based leakage detection method assessment of alleged CO<sub>2</sub> leakage at the Kerr Farm, Weyburn-Midale EOR field, Saskatchewan: presented at 11th Annual Carbon Capture, Utilization, and Sequestration Conference, Pittsburgh, Pennsylvania, April 30-May 3, 2012.

Monitoring CCS-EOR systems using a new process-based leakage detection method assessment of alleged CO<sub>2</sub> leakage at the Kerr Farm, Weyburn-Midale EOR field, Saskatchewan: presented at 11th Annual Carbon Capture, Utilization, and Sequestration Conference, Pittsburgh, Pennsylvania, May 1, 2012.

Assessment of alleged CO<sub>2</sub> leakage at the Kerr Farm using a simple process-based soil gas technique: Implications for carbon capture, utilization, and storage (CCUS) monitoring: presented at NETL, Pittsburgh, Pennsylvania, May 2012.

Challenges for young researchers and ways to overcome them: presented at the Bureau of Economic Geology 1st Grant Writing Workshop, Austin, Texas, March 29, 2012.

Negotiations on carbon capture and storage in the clean development mechanism: presented to Research and Independent Nongovernmental Organizations (RINGOS), COP18 United Nations Climate Change Conference, Doha, Qatar, 2012.

Extraction of dissolved gaseous hydrocarbons from brine at an engineered CO<sub>2</sub> injection, Cranfield, Mississippi: presented at AGU Fall Meeting, San Francisco, California, December 13-17, 2011.

What to do with CO<sub>2</sub>?: teacher workshop presented at Florida Association of Science Teachers FAST 2011--Celebrating Science in Our World, Orlando, Florida, October 20-22, 2011.

Groundwater protection: presented at United Nations Framework Convention on Climate Change SBSTA Technical Workshop, Abu Dhabi, United Arab Emirates, September 11, 2011.

Sensitivity of shallow groundwater systems to CO<sub>2</sub>: case studies from the Cranfield and SACROC EOR fields: presented at Carbon and Capture Conference 6, Trondheim, Norway, June 14-16, 2011.

Soil-gas identification of vadose-zone carbon cycling: implications for near-surface modeling at CCS sites: presented at Carbon and Capture Conference 6, Trondheim, Norway, June 14-16, 2011.

Natural CO<sub>2</sub> releases providing messages for stakeholders: presented at 10th Annual Conference on Carbon Capture and Sequestration, Pittsburgh, Pennsylvania, May 2011.

Near-surface monitoring analogue studies: presented at Gulf Coast Carbon Center (GCCC) Annual Meeting of its Industrial Associates, Austin, Texas, January 2011.

Effective use of Natural CO<sub>2</sub>-rich systems for stakeholder communication: CO<sub>2</sub>FACTS.org.: poster presented at American Geophysical Union Fall Meeting, San Francisco, California, December 5-9, 2011.

Natural CO<sub>2</sub> releases providing messages for stakeholders: presented at American Geophysical Union Fall Meeting, San Francisco, California, December 5-9, 2011.

Process-based approach to carbon storage leakage detection using soil gas monitoring: lessons from natural and industrial analogues: poster presented at American Geophysical Union Fall Meeting, San Francisco, California, December 5-9, 2011.

The role of dedolomitization in the detection of anthropogenic CO<sub>2</sub> in freshwater aquifers: presented at the 13th meeting of the Water Rock Interaction Working Group of the International Association of Geochemistry and Cosmochemistry, Guanajuato, Mexico, August 13-17, 2010.

Detection of anthropogenic CO<sub>2</sub> in dilute groundwater: field observations and geochemical modeling of the Dockum aquifer at the SACROC oilfield, West Texas, USA: presented at the National Energy and Technology Laboratory (NETL) Annual Carbon Capture and Storage (CCS) Meeting, Pittsburgh, Pennsylvania, May 10-13, 2010.

Targeted soil-gas methodologies for monitoring an engineered plugged and abandoned well site, Cranfield Mississippi: presented at the National Energy and Technology Laboratory (NETL) Annual Carbon Capture and Storage (CCS) Meeting, Pittsburgh, Pennsylvania, May 10-13, 2010.

U-tube sampling and near-surface monitoring demonstrations: presented at the International Energy Agency (IEA) Greenhouse Gas (GHG) R&D Programme Monitoring Network Meeting, Natchez, Mississippi, May 6-8, 2010.

Near-surface monitoring: presented at Gulf Coast Carbon Center (GCCC) Annual Meeting of its Industrial Associates, Austin, Texas, January 21, 2010.

Detection of anthropogenic CO<sub>2</sub> in dilute groundwater: field observations and geochemical modeling of the Dockum aquifer at the SACROC oilfield, West Texas, USA: presented at Ninth Annual Conference on Carbon Capture & Sequestration, Pittsburgh, Pennsylvania, May 10-13, 2010.

Evaluation of CO<sub>2</sub>, He, C<sub>1</sub>-C<sub>5</sub> gaseous hydrocarbons at an engineered CO<sub>2</sub> injection, Cranfield, Mississippi: presented at the Ninth Annual Conference on Carbon & Capture Sequestration, Pittsburgh, Pennsylvania, May 10-13, 2010.

Overview of major CCS projects in the U.S.: targeted soil-gas methodologies for monitoring an engineered plugged and abandoned well site, Cranfield, Mississippi: presented at Ninth Annual Conference on Carbon Capture & Sequestration, Pittsburgh, Pennsylvania, May 10-13, 2010.

Soil-gas identification of factors affecting CO<sub>2</sub> concentrations beneath a playa wetland: implications for environmental monitoring at carbon storage sites: presented to the American Geophysical Union, San Francisco, California, December 9, 2009.

Near-surface monitoring at GS sites: recent advances by the Gulf Coast Carbon Center: presented at the Gulf Coast Carbon Center sponsors meeting, Houston, Texas, August 24, 2009.

Near-surface monitoring at GS sites: recent advances by the Gulf Coast Carbon Center: presented at the Gulf Coast Carbon Center sponsors meeting, Houston, Texas, August 24, 2009.

Modeling shallow groundwater geochemistry and carbon isotopes: test of methodology for CO<sub>2</sub> storage evaluation at an EOR site, West Texas, USA: presented at KinderMorgan, Austin,

Texas, May 22, 2009.

Volcanoes! What makes them explode?: presented at Eanes Elementary Science Day, Austin, Texas, February 27, 2009.

Assessing risk to fresh water resources from long term CO<sub>2</sub> injection--laboratory and field studies: presented at the GHGT-9 (Green House Gas Technology) Conference, Washington, D.C., November 16-20, 2008.

Geochemical investigation of CO<sub>2</sub> impact to shallow groundwater at SACROC, Permian Basin, Texas: presented at Southwest Regional Partnership on Carbon Sequestration, Phase II Annual Meeting, Albuquerque, New Mexico, October 23, 2008.

The knowns and unknowns of geologic sequestration: presented to San Antonio Association of Professional Landmen, San Antonio, Texas, October 13, 2008.

## Activities of a Professional Nature

### Professional Societies

American Geophysical Union

International Association of Geochemistry

### Major Field Campaigns

Development of a near-surface observatory for monitoring plugged and abandoned well sites at carbon sequestration sites, Southeast Carbon Partnership Phase III (October 2009-current)

Principal Investigator, IPAC-CO<sub>2</sub> Kerr Farm investigation of claims of CO<sub>2</sub> leakage above the Weyburn-Midale CO<sub>2</sub>-EOR site, Saskatchewan, Canada (2011-2012).

Principal Investigator: Optimizing a process-based approach for near-surface leakage assessment, Carbon Transport and Storage Corporation Pty Ltd (CTSCo) Surat CCS demonstration project, Queensland Australia. The project is designed to demonstrate the technical viability, integration, and safe operation of Carbon Capture and Storage (CCS) in the Surat Basin, 2017-present

Soil gas monitoring design and implementation, NRG-PetroNova West Ranch CO<sub>2</sub>-EOR Project, September 2015-present

### Activities of a Professional Nature

Co-organizer and co-chair of the Fourth International Workshop on Offshore Geologic CO<sub>2</sub> Storage, Bergen Norway (February 11-13, 2020)

Invited Signatory and Contact Point, BEG Memorandum of Understanding with Saskpower and the University of Regina, Canada (February 2016-February 2020)

Lead Organizer, United Nations Framework Conference on Climate Change official side event on carbon capture and storage (CCS) at Conference of Parties 25, Carbon Removal and Return - Can CCS Decarbonise Industry in South America and Help the Oceans? (December 4, 2019)

Discussion Leader, Creating a Paradigm Shift for Carbon Capture and Storage (CCS) in the United Nations Environment, round table discussion with government, industry, and academic stakeholders at Developing a National CCS Programme in Trinidad and Tobago - An International Knowledge-Sharing Symposium (October 30, 2019)

Co-Organizer, Developing a National Carbon Capture and Storage Programme in Trinidad and Tobago - An International Knowledge-Sharing Symposium (October 29-30, 2019)

Activity Leader, Portrait of an Anomaly - an Attribution Game, conducted at the International Energy Agency Greenhouse Gas R&D Programme International Carbon Capture, Transport, and Storage Summer School, Regina, Sask., Canada (July 10, 2019)

Lead Organizer, Official UNFCCC Side Event on Carbon Capture and Storage at COP-24, Carbon Capture and Storage (CCS): Achievements and Opportunities for Developing Country Involvement (April-December 2018)

Expert Student Mentor, 13th IEAGHG International Summer School, Trondheim, Norway (June 25-29, 2018)

Expert Reviewer, GHGT-14 (April-May 2018)

Lead Organizer, UNFCCC official side event at COP 2: CCS, Oceans, and Small Island Developing Nations (November 7, 2017)

Originator and facilitator, Workshop on Climate Technology Centre and Network (CTCN) to introduce and facilitate applications from developing countries to the CTCN for funding to build capacity in Carbon Capture and Storage technology. (April 2016)

Lead Organizer, Official UNFCCC Side Event on Carbon Capture and Storage at COP-21, Carbon Capture and Storage (CCS): Achievements and Opportunities for Developing Country Involvement (December 9, 2015)

Invited signatory of an open letter to Ms. Christiana Figueres, Executive Secretary of the United Nations Framework Convention on Climate Change, with assurances that CCS is secure and safe and critical to climate change mitigation. (December 2015)

Designated Contact Point for The University of Texas at Austin's delegation to the United Nations Framework Convention on Climate Change (November 2015)

Participant, Legislative Media Open House for Texas Journalists, The University of Texas at Austin (January 21, 2015)

Originator and Program Leader, BEG membership in the UNFCCC Climate Technology Center and Network (August 2015-Present)

Appearance in video on YouTube, IPAC-CO<sub>2</sub>: The Kerr Investigation, documenting the work of the IPAC-CO<sub>2</sub> led team of international experts investigating the source of carbon dioxide on the Kerr Property, 170 km southeast of Regina, Saskatchewan, uploaded December 7, 2011. <http://www.youtube.com/watch?v=wcxIXpl21IQ&context=C20924ADOEgsToPDskKWx2eABkFNHfA4JLauAFv7>

Attendee at an international forum with women from the Global Women Scholars Network (a research collaborative network funded by the National Science Foundation) and Climate Wise Women (a part of the Earth Island Institute), who were running an interactive multimedia event on women and climate change at Austin's SXSW Conference March 10, 2012. Climate Wise Women is a group of grassroots women community leaders who travel the globe to share their experiences of living with climate change.

Clean Air Task Force (CATF), 2012, Comment on the Draft Underground Injection Control (UIC) Program Class VI Well Testing and Monitoring Guidance: [http://www.catf.us/resources/testimony/files/20120329-CATF\\_Comments\\_Class\\_VI\\_Monitoring\\_Guidance.pdf](http://www.catf.us/resources/testimony/files/20120329-CATF_Comments_Class_VI_Monitoring_Guidance.pdf).

Co-led (with Ramón Treviño) a side event at the Carbon Sequestration Leadership Forum meeting, Washington, DC, on US DOE initiative for a Global offshore CCS demonstration project, November 4, 2013

Expert Mentor for group work on how to develop CCS projects under the new rules and procedures for CCS under the Clean Development Mechanism, at the IEAGHG-OPEC Workshop on CCS in the UNFCCC Clean Development Mechanism, October 29-30, 2013

Expert reviewer for Hydrosphere Biosphere Monitoring Program, Shell Canada's QUEST CO<sub>2</sub> storage project, March 2012.

Expert student mentor, 7th IEAGHG International CCS Summer School, 21st-26th July, 2013,

University of Nottingham, UK

Expert student mentor, 8th IEAGHG International CCS Summer School, University of Nottingham, United Kingdom, July 2013

Facilitated a half-day workshop with 5th-8th grade girls from St. Gabriel's Catholic School, called "What to do with CO<sub>2</sub>"

Mentored Mason Mangum, 5th grader at Eanes Elementary School, in a science fair project entitled "You've probably heard of global warming but have you heard of ocean acidification?" Project won 3rd place in Eanes Elementary School Science Fair and advanced to Austin Energy Regional Science Festival, where it won a blue ribbon.

Organizer and Leader, Field trip with eight international visitors to Skyonics Capitol SkyMine carbon capture and mineralization plant, San Antonio, Texas, April 7, 2014

Participant, Climate Strategies Round Table Discussion on Technology Development, United Nations Framework Convention on Climate Change, December 2, 2012, Doha, Qatar

Shell--Expert Review of Hydrosphere Biosphere Monitoring Program for the QUEST Project, 2012

Stratus Consulting--Expert review of EPA scoping papers on surface monitoring technologies, 2012

Supervisor to Intern Grace Womack, incoming freshman at Drexel, deploying a sensor array for continuous process-based soil gas monitoring. University June-August 2013

Supervisor to visiting scholar Very Susanto, Ph.D candidate from Kyoto University, working on process-based soil gas methods, January-March 2013

Technical contributor to Federal Requirements under the Underground Injection Control (UIC) Program for Carbon Dioxide (CO<sub>2</sub>) Geologic Sequestration (GS) Wells' (73 FR 43492). Notice of Data Availability and Request for Comment (EPA-HQ-OW-2008-0390-0297), United States Environmental Protection Agency and Department of Energy National Energy Technology Laboratory Interim Data Request, 2012.

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## Funding

### Research Support

Principal Investigator: Practical isotopic analyzer for subsurface gases, Phase I SBIR/STTR from the U.S. Department of Energy Office of Science through Mesa Photonics (February-December 2016; \$225,000).

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