

# Katherine D. Romanak

## Professional Summary

September 20, 2020

Business address: The University of Texas at Austin  
Bureau of Economic Geology  
University Station, Box X  
Austin, TX 78713-8924  
Telephone: (512) 471-6136  
E-mail address: katherine.romanak@beg.utexas.edu

## 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

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, ECO2 Sub-seabed CO2 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 CO2 Migration: From the Reservoir to the Surface, , Canberra, Australia, August, 2013

Session Chair, Geochemistry of geological CO2 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 CO2 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

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/avsnitt/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 CO2GeoNet. 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 CO2 '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 CO2 levels in soil: GHG Reduction Technologies Monitor: v. 6, no. 26, p. 8-9 (Romanak heavily quoted)

Romanak, Katherine, 2011, No CO2 contamination found at Kerr farm, IPAC-CO2 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 CO2 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

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.

## Teaching and Advising

### University Courses Taught

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

## Presentations

### Invited Presentations

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 CO<sub>2</sub> Capture, Transport and Storage (TCCS-10), Trondheim, Norway, June 17-19, 2019.

Keynote Speech: Risk Assessment on CO<sub>2</sub> Leakage at CO<sub>2</sub> 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 CO<sub>2</sub>- 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.

CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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.

## Presentations

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.

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

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-CO2: The Kerr Investigation, documenting the work of the IPAC-CO2 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=C20924AD0EgsToPDskKW2eABkFNHfA4JLauAFv7>

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 CO2 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.

Technical contributor to United States EPA Draft Underground Injection Control (UIC) Program Class VI Well Testing and Monitoring Guidance under the United States Environmental Protection Agency Safe Drinking Water Act SDWA 1422, 40 CFR Parts 144 and 146 [EPA-HQ-OW-2008-0390; FRL-8743-4], 2012.

## 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).

Principal Investigator: Innovative process-based technology for characterizing and monitoring complex near-surface systems, U.S. Department of Energy Office of Science (February-December 2015; \$225,000).

## Publications

### Peer Reviewed Journal Articles

Romanak, K. D., and Bomse, D. S., 2020, Field assessment of sensor technology for environmental monitoring using a process-based soil gas method at geologic CO<sub>2</sub> storage sites: International Journal of Greenhouse Gas Control, v. 96, no. 103003, 12 p., <http://doi.org/10.1016/j.ijggc.2020.103003>.

Anderson, J. S., Romanak, K. D., Alfi, M., and Hovorka, S. D., 2019, Light hydrocarbon and noble gas migration as an analogue for potential CO<sub>2</sub> leakage: numerical simulations and field data from three hydrocarbon systems: Greenhouse Gases: Science and Technology, v. 9, no. 2, p. 226-244, <http://doi.org/10.1002/ghg.1841>.

Anderson, J. S., Romanak, K. D., and Meckel, T., 2018, Assessment of shallow subsea

hydrocarbons as a proxy for leakage at offshore geologic CO<sub>2</sub> storage sites: *International Journal of Greenhouse Gas Control*, v. 74, p. 19-27, <http://doi.org/10.1016/j.ijggc.2018.04.010>.

Anderson, J. S., Romanak, K. D., Yang, C., Lu, J., Hovorka, S. D., and Young, M. H., 2017, Gas source attribution techniques for assessing leakage at geologic CO<sub>2</sub> storage sites: Evaluating a CO<sub>2</sub> and CH<sub>4</sub> soil gas anomaly at the Cranfield CO<sub>2</sub>-EOR site: *Chemical Geology*, v. 454, p. 93-104, <http://doi.org/10.1016/j.chemgeo.2017.02.024>.

Yang, C., Romanak, K. D., Reedy, R. C., Hovorka, S. D., and Treviño, R. H., 2017, Soil gas dynamics monitoring at a CO<sub>2</sub>-EOR site for leakage detection: *Geomechanics and Geophysics for Geo-Energy and Geo-Resources*, v. 3, p. 351-364, <http://doi.org/10.1007/s40948-017-0053-7>.

Gilbert, K., Bennett, P. C., Wolfe, W., Zhang, T., and Romanak, K. D., 2016, CO<sub>2</sub> solubility in aqueous solutions containing Na<sup>+</sup>, Ca<sup>2+</sup>, Cl<sup>-</sup>, SO<sub>4</sub><sup>2-</sup> and HCO<sub>3</sub><sup>-</sup>: the effects of electrostricted water and ion hydration thermodynamics: *Applied Geochemistry*, v. 67, p. 59-67, <http://doi.org/10.1016/j.apgeochem.2016.02.002>.

Dixon, T.E, and Romanak, K.D., 2015, Improving monitoring protocols for CO<sub>2</sub> geological storage with technical advances in CO<sub>2</sub> attribution monitoring: *International Journal of Greenhouse Gas Control*, v. 41, p. 29-40, <http://doi.org/10.1016/j.ijggc.2015.05.029>.

Lu, J., Mickler, P., Nicot, J. -P., Yang, C., and Romanak, K. D., 2014, Geochemical impact of oxygen on siliciclastic carbon storage reservoirs: *International Journal of Greenhouse Gas Control*, v. 21, p. 214-231, <http://doi.org/10.1016/j.ijggc.2013.12.017>

Romanak, K. D., Wolaver, B. D., Yang, C., Sherk, G. W., Dale, J., Dobeck, L. M., and Spangler, L. H., 2014, Process-based soil gas leakage assessment at the Kerr Farm: comparison of results to leakage proxies at ZERT and Mt. Etna: *International Journal of Greenhouse Gas Control*, v. 30, p. 42-57, <http://doi.org/doi:10.1016/j.ijggc.2014.08.008>.

Yang, C., Dai, Z., Romanak, K. D., Hovorka, S. D., and Treviño, R. H., 2014, Inverse modeling of water-rock-CO<sub>2</sub> batch experiments: potential impacts on groundwater resources at carbon sequestration sites: *Environmental Science and Technology*, v. 48, no. 5, p. 2798-2806, doi: 10.1021/es4041368

Yang, C., Treviño, R. H., Zhang, T., Romanak, K. D., Kerstan, W., Lu, J., Mickler, P., and Hovorka, S. D., 2014, Regional assessment of CO<sub>2</sub>-solubility trapping potential: a case study of the coastal and offshore Texas Miocene interval: *Environmental Science and Technology*, v. 48, p. 8275-8282, <http://doi.org/10.1021/es502152y>.

Yang, Changbing, Mickler, P., Reedy, R. C., Scanlon, B. R., Romanak, Katherine, Nicot, J. -P., Hovorka, S. D., Treviño, R. H., and Larson, T., 2013, Single-well push-pull test for assessing potential impacts of CO<sub>2</sub> leakage on groundwater quality in a shallow Gulf Coast aquifer in Cranfield, Mississippi: *International Journal of Greenhouse Gas Control*, v. 18, p. 375-387.

Yang, Changbing, Romanak, Katherine, Hovorka, S. D., and Treviño, R. H., 2013, Modeling CO<sub>2</sub> release experiment in the shallow subsurface and sensitivity analysis: *Environmental & Engineering Geoscience*, v. 19, no. 3, p. 207-220.

Yang, Changbing, Romanak, Katherine, Hovorka, S. D., Holt, R. M., Lindner, J., and Treviño, R. H., 2013, Near-surface monitoring of large-volume CO<sub>2</sub> injection at Cranfield: Early field test of SECARB Phase III: *SPE Journal*, v. 18, no. 3, p. 486-494.

Lu, J., Cook, P. J., Hosseini, S. A., Yang, C., Romanak, K. D., Zhang, T., Freifeld, B. M., Smyth, R. C., Zeng, H., and Hovorka, S. D., 2012, Complex fluid flow revealed by monitoring CO<sub>2</sub> injection in a fluvial formation: *Journal of Geophysical Research*, v. 117, B03208, doi:10.1029/2011JB008939.

Romanak, K. D., Bennett, P. C., Yang, C., and Hovorka, S. D., 2012, 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.

Romanak, K. D., Smyth, R. C., Yang, C., Hovorka, S. D., Rearick, M., and Lu, J., 2012, Sensitivity of groundwater systems to CO<sub>2</sub>: application of a site-specific analysis of carbonate monitoring parameters at the SACROC CO<sub>2</sub>-enhanced oil field: *International Journal of Greenhouse Gas Control*, v. 5, no. 1, p. 142-152.

Fryar, A. E., Macko, S. A., Mullican, W. F., Romanak, Katherine, and Bennett, P. C., 2000, Nitrate reduction during ground-water recharge, Southern High Plains, Texas: *Journal of Contaminant Hydrology*, v. 40, 335-363.

Nicot, J. -P., Bennett, P. C., and Romanak, K. D., 1998, Gas phase dynamics of playa wetlands: *Journal of Environmental Engineering*, v. 124, 1038-1046.

Duncker, K. E., Wolff, J. A., Harmon, R. S., Leat, P. T., Dickin, A. P., and Thompson, R. N., 1991, Diverse mantle and crustal components in lavas of the NW Cerros del Rio volcanic field, Rio Grande rift, New Mexico: *Contributions to Mineralogy and Petrology*, v. 108, 331-345.

### Peer Reviewed Book Chapters

Romanak, K.D., Womack, G.L., Bomse, D.S., and Dodds, K., 2015, Chapter 37: Field practical guide to environmental and leak characterization using a process-based soil gas monitoring method., in Gerdes, K. F., ed., *Carbon dioxide capture for storage in deep geological formations--results from the CO<sub>2</sub> Capture Project, Volume 4: CCS Technology Development and Demonstration Results (2009-2014)*: UK, CPL Press and BP, p. 705-732.

### Patents

Romanak, K. D., and Bennett, Philip C., Process-Based Approach for Detection of Deep Gas Invading the Surface: 61/840,224, Patent Number 9645129, received May 9, 2017.

Romanak, Katherine, 2013, Patent Application: Process-Based Approach for the Detection of CO<sub>2</sub> Injectate Leakage: Serial No.: 61/840,234.

Romanak, Katherine, 2013, U.S. Patent Application: Gas Sensor to Enhance Implementation of a Process-Based Leakage Monitoring Method, Serial No. 61/866,578.

Romanak, Katherine, 2013, U.S. Patent Application: Process-Based Approach for Detection of Deep Gas Invading the Surface, Serial No. 61/840,224.

### Non Peer Reviewed Journal Articles

Hannis, S., Lu, J., Chadwick, A., Hovorka, S. D., Kirk, K., Romanak, K. D., and Pearce, J., 2017, CO<sub>2</sub> storage in depleted or depleting oil and gas fields: What can we learn from existing projects?: *Energy Procedia*, 13th International Conference on Greenhouse Gas Control Technologies, GHGT-13, 14-18 November 2016, Lausanne, Switzerland, v. 114, p. 5680-5690, <http://doi.org/10.1016/j.egypro.2017.03.1707>.

Romanak, K. D., Yang, C., and Darvari, R., 2017, Towards a method for leakage quantification and remediation monitoring in the near-surface at terrestrial CO<sub>2</sub> geologic storage sites: *Energy Procedia*, 13th International Conference on Greenhouse Gas Control Technologies, GHGT-13, 14-18 November 2016, Lausanne, Switzerland, v. 114, p. 3855-3862, <http://doi.org/10.1016/j.egypro.2017.03.1517>.

Meckel, T. A., Hovorka, S. D., Treviño, R. H., Smyth, R. C., and Romanak, K. D., 2014, Toward an international program for offshore storage of CO<sub>2</sub>: international Initiative for CCS sub-sea (iCCSc): *Energy Procedia*, Proceedings of 12th International Conference on Greenhouse Gas Control Technologies GHGT12, v. 63, p. 5015-5020, <http://doi.org/10.1016/j.egypro.2014.11.531>.

Romanak, K. D., Womack, G. L., and Bomse, D. S., 2014, Field test of in situ sensor technology for process-based soil gas monitoring: *Energy Procedia*, v. 63, p. 4027-4030.

Smyth, R. C., Hovorka, S. D., Romanak, K. D., Wolaver, B. D., Mickler, P., and Yang, C., 2014, Monitoring CO<sub>2</sub>: The quest for a clean signal (examples from UT Austin BEG research): *Energy Procedia*, Proceedings of 12th International Conference on Greenhouse Gas Control Technologies GHGT12, v. 63, p. 4035-4042, <http://doi.org/doi: 10.1016/j.egypro.2014.11.435>.

Dixon, Tim, Romanak, Katherine, Neades, S., and Chadwick, A., 2013, Getting science and technology into international climate policy: Carbon dioxide capture and storage in the UNFCCC: *Energy Procedia*, v. 37, p. 7590-7595.

Nicot, J. -P., Solano, Silvia, Lu, Jiemin, Mickler, P., Romanak, Katherine, Yang, Changbing, and Zhang, X., 2013, Potential subsurface impacts of CO<sub>2</sub> stream impurities on geologic carbon storage: *Energy Procedia*, v. 37, Proceedings of 11th International Conference on Greenhouse Gas Control Technologies GHGT11, November 18-22, Kyoto, Japan, p. 4552-4559.

Olson, H. C., Olson, J., Bryant, Steve, Lake, L. W., Bommer, P., Romanak, Katherine, Hovorka, S. D., Smyth, R. C., and Williams, I., 2013, Meeting the grand challenge for future carbon management engineers and scientists: Stimulating workforce capacity through teacher professional development: *Energy Procedia*, v. 37, p. 7265-7272.

Romanak, Katherine, Dobeck, L., Dixon, Tim, and Spangler, L., 2013, Potential for a process-based monitoring method above geologic carbon storage sites using dissolved gases in freshwater aquifers: *Procedia Earth and Planetary Science*, v. 7, p. 746-749, doi: 10.1016/j.proeps.2013.03.122, Proceedings of the 14th Water Rock Interaction Symposia, Avignon, France.

Romanak, Katherine, Harmon, R. S., and Kharaka, Yousif, 2013, Editorial: Geochemical aspects of geologic carbon storage, *Applied Geochemistry (Special Issue)*, v. 30, 1-3.

Romanak, Katherine, Harmon, R. S., and Kharaka, Yousif, eds., 2013, Geochemical aspects of geologic carbon storage, *Applied Geochemistry (Special Issue)*, v. 30, 1-190.

Romanak, Katherine, Sherk, G. W., Hovorka, S. D., and Yang, Changbing, 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: *Energy Procedia*, v. 37, p. 4242-4248.

Olson, H. C., Ellins, K. K., Olson, J., and Romanak, K. D., 2012, Energy, climate and water in the 21st century-Texas and Florida share a strong connection with future challenges in the earth sciences: *FAST Journal*, <http://www.fastscience.org/Journal.aspx>, 4 p.

Wolaver, B. D., Romanak, K. D., Yang, C., and Dale, J., 2012, Hydrogeology of the Kerr site, in *The Kerr investigation: final report findings of the investigation into the impact of CO<sub>2</sub> on the Kerr property*: IPAC-CO<sub>2</sub> Research Inc., Regina, Saskatchewan, Canada.

Yang, Changbing, Romanak, Katherine, Holt, R. M., Linder, J., Smith, L., Treviño, R. H., Roecker, Frank, Xia, Y., and Rickerts, J., 2012, Large volume of CO<sub>2</sub> injection at the Cranfield, early field test of the SECARB Phase III: near-surface monitoring, in *Carbon Management Technology Conference*, 7-9 February, Orlando, Florida, USA, DOI: 10.7122/151428-MS.

Hovorka, S. D., Meckel, Timothy, Treviño, R. H., Lu, Jiemin, Nicot, J. -P., Choi, Jong-Won, Freeman, D., Cook, P. G., Daley, Tom, Ajo-Franklin, J., Freifeld, Barry, Doughty, C. A., Carrigan, C. R., La Brecque, D., Kharaka, Yousif, Thordsen, J. J., Phelps, Tommy, Yang, Changbing, Romanak, Katherine, Zhang, Tongwei, Holt, R. M., Lindler, J. S., and Butsch, R. J., 2011, Monitoring a large volume CO<sub>2</sub> injection: year two results from SECARB project at Denbury's Cranfield, Mississippi, USA, in *Energy Procedia*, v. 4, Proceedings of 10th International Conference on Greenhouse Gas Control Technologies GHGT10, September 19-23, Amsterdam, The Netherlands, p. 3478-3485.

Romanak, K. D., Smyth, R. C., Yang, Changbing, Hovorka, S. D., and Lu, J., 2010, Role of dedolomitization in the detection of anthropogenic CO<sub>2</sub> in freshwater aquifers, in *Proceedings, 13th International Conference on Water-Rock Interaction, WRI-13*, Guanajuato, Mexico, August

16-20, p. 887-890.

Romanak, Katherine, 2009, Volcanoes, in Laubach, S. E., and Tinker, S. W., eds., 2009, *Earth's art: celebrating the Centennial of the Bureau of Economic Geology, 1909-2009: The University of Texas at Austin, Bureau of Economic Geology*, p. 78-79.

Smyth, R. C., Hovorka, S. D., Lu, Jiemin, Romanak, Katherine, Partin, J. W., Wong, Corinne, and Yang, Changbing, 2009, Assessing risk to fresh water resources from long term CO<sub>2</sub> injection--laboratory and field studies: *Energy Procedia*, v. 1, p. 1957-1964.

Fryar, A. E., Macko, S. A., Romanak, Katherine, Bennett, P. C., and Mullican, W. F., 1995, Evidence of limited denitrification beneath playas recharging the Ogallala Aquifer, in *Proceedings, Water for Texas: Research Leads the Way Conference*, January

## Contract Reports

Nicot, J.-P., Hosseini, S. A., Dashtian, H., Kamali, A., Romanak, K. D., Darvari, R., and Gil-Egui, R., 2019, Headspace gas monitoring to infer dissolved gas concentrations at the Glenhaven Site (QLD): prepared for Australian National Low Emissions Coal Research & Development (ANLEC R&D), Canberra, Australia, 94 p.

Romanak, K. D., 2019, Optimising a process-based approach for near-surface leakage assessment: final report prepared for Australian National Low Emissions Coal Research & Development, Canberra, Australia, under contract no. 7-1116-0291, 47 p.

Romanak, K. D., Nicot, J.-P., and Bomse, D., 2019, Isotopic characterization of source CO<sub>2</sub> and naturally occurring CO<sub>2</sub>, Glenhaven: final report prepared for Australian National Low Emissions Coal Research & Development, Canberra, Australia, under contract no. 7-1116-0293, 45 p.

Romanak, K. D., 2017, Initial Site Characterisation and Assessment of Environmental M&V at Glenhaven: prepared for Australian National Low Emissions Coal Research and Development (ANLEC R&D), under contract no. 7-1116-0297, 36 p.

Hannis, S, Lu, J., Chadwick, A., Hovorka, S. D., Kirk, K., Romanak, K. D., and Pearce, J, 2016, Case studies of CO<sub>2</sub> storage in depleted oil and gas fields: IEA CON/15/231: Contract Report prepared for British Geological Survey and IEAGHG, 145 p.

Romanak, K. D., Zhang, T., and Darvari, R., 2016, Practical isotopic analyzer for subsurface gases: DE-FOA-0001366, SBIR/STTR FY 2016 Phase I Release 1 prepared for Mesa Photonics, 28 p.

Bomse, D., Romanak, K. D., and Yang, C., 2015, Real-time, in-situ process-based soil gas analyzer: Phase I STTR, under contract no. DE-SC0013267, 49 p.

Romanak, Katherine, Womack, G. L., Bomse, D. S., and Dodds, K., 2014, Field Practical Guide to Environmental and Leak Characterization Using a Process-Based Soil Gas Monitoring Method: The University of Texas at Austin, Bureau of Economic Geology, final contract report prepared for CO<sub>2</sub> Capture Project (CCP), SMV-037 BP Agreement Reference: 61798, 140 p..

Davis, D., Nuñez, Vanessa, Hovorka, S. D., Wolaver, B. D., Hosseini, S. A., Porse, S., Romanak, Katherine, 2013, Final Report for the MVA Construction Phase Phase 2B at West Hastings Field, Gulf Coast Carbon Center at the Bureau of Economic Geology, a unit of The University of Texas at Austin, final report, prepared for Air Products and Chemicals, Inc., DOE award number DE-FE-0002381.

Davis, D., Nuñez-López, V., Hovorka, S. D., Wolaver, B. D., Hosseini, S. A., Porse, S. L., and Romanak, K. D., 2013, Monitoring verification and accounting for demonstration of CO<sub>2</sub> capture & sequestration for steam methane reforming gas for large-scale production: The University of Texas at Austin, Bureau of Economic Geology, Phase 2B final report prepared for Department of Energy, under DOE Award Number DE-FE-0002381, 30 p.

Nicot, J. -P., Lu, C., Mickler, P., Yang, A. L., Romanak, Katherine, and Zhang, T., 2013, Impact

of CO<sub>2</sub> impurities on storage performance and assurance; Tasks 3 and 4: Geochemistry: The University of Texas at Austin, Bureau of Economic Geology, contract report prepared for CO<sub>2</sub> Capture Project (CCP) Phase III, 224 p.

Nuñez López, Vanessa, Hovorka, S. D., Wolaver, B. D., Zahid, K., Sun, A. Y., Hosseini, S. A., and Romanak, K. D., 2011, Phase 2A at West Hastings field: The University of Texas at Austin, Bureau of Economic Geology, Gulf Coast Carbon Center, final report for the MVA Design Phase prepared for Denbury Onshore, LLC, 126 p.

Nuñez-López, V., Hovorka, S. D., Wolaver, B. D., Zahid, K. M., Sun, A. Y., Hosseini, S. A., and Romanak, K. D., 2011, Monitoring verification and accounting for demonstration of CO<sub>2</sub> capture & sequestration for steam methane reforming gas for large-scale production: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for U.S. Department of Energy, under DOE Award Number: DE-FE-0002381.

Nuñez-López, V., Hovorka, S. D., Wolaver, B. D., Zahid, K., Sun, A. Y., Hosseini, S. A., and Romanak, K. D., 2011, Monitoring verification and accounting subcontracted work for the "Lake Charles CCS Project": The University of Texas at Austin, Bureau of Economic Geology, Gulf Coast Carbon Center, final report, prepared for Denbury Onshore, LLC, under DOE Award Number: DE-FE-0002314, 126 p.

Sherk, G. W., Romanak, K. D., Dale, J., Gilfillan, S. M. V., Haszeldine, R. S., Ringler, E. S., Wolaver, B. D., and Yang, C., 2011, The Kerr investigation: findings of the investigation into the impact of CO<sub>2</sub> on the Kerr property: IPAC Research Inc., final report prepared for property owners Cameron and Jean Kerr, 181 p.

Romanak, Katherine, 2010, Analysis of dissolved gases in groundwater at Flowers Ranch: The University of Texas at Austin, Bureau of Economic Geology, Gulf Coast Carbon Center, report prepared for Van Kelley, Intera, under award no. UTAUS CN 10841, 7 p..

Romanak, Katherine, and Yang, Changbing, 2009, Field test of CO<sub>2</sub> sensor for carbon sequestration applications: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for Applied Nanotech, Inc., 14 p.

Romanak, Katherine, Smyth, R. C., Yang, Changbing, Hovorka, S. D., Nicot, J. -P., and Lu, Jiemin, 2009, Recent results of the SACROC Groundwater Geochemistry Study: The University of Texas at Austin, Bureau of Economic Geology, Gulf Coast Carbon Center, report prepared for U.S. EPA, NODA, 5 p..

Yang, C., Romanak, K. D., Hovorka, S. D., Paine, J. G., Lu, J., Treviño, R. H., Holt, R. M., and Linder, J., 2009, Phase III Task 9.1.3b: Surface monitoring plan, SECARB Phase III (early) Project at Cranfield: The University of Texas at Austin, Bureau of Economic Geology, technical report prepared for SECARB, 57 p.

Yang, Changbing, Nicot, J. -P., Smyth, R. C., Romanak, Katherine, and Hovorka, S. D., 2009, The importance of considering rock-water interaction when studying potential impacts of geological CO<sub>2</sub> sequestration on drinking water resources: The University of Texas at Austin, Bureau of Economic Geology, Gulf Coast Carbon Center, report prepared for U.S. EPA, NODA,, 5 p..

Gustavson, T. C., Bebout, D. G., Bennett, P. C., Fish, E. B., Fryar, A. E., Hovorka, S. D., Hua, H.-P., Kirschenmann, Kyle, Laun, Scot, Minehardt, T. J., Mullican, W. F., III, Nicot, J. -P., Paine, J. G., Pezzolesi, T. P., Rainwater, Ken, Ramsey, Heyward, Reeduer, Alan, Romanak, K. D., Scanlon, B. R., Thompson, David, Xiang, Jiannan, and Zartman, R. E., 1995, Summary hydrogeologic assessment, U.S. Department of Energy Pantex Plant, Carson County, Texas: The University of Texas at Austin, Bureau of Economic Geology, milestone report prepared for U.S. Department of Energy, 98 p.

## Published Reports

Dixon, T. E., Romanak, K. D., Hovorka, S. D., and Meckel, T., 2016, International Workshop on



Offshore Geologic CO<sub>2</sub> Storage: IEAGHG, Report 2016/TR2, 42 p.

Meckel, T., Hovorka, S. D., Romanak, K. D., Treviño, R. H., Smyth, R. C., and CSLF Task Force on Offshore Storage, 2015, Technical Barriers and R&D Opportunities for Offshore, Sub-seabed Geologic Storage of Carbon Dioxide: Carbon Sequestration Leadership Forum, 128 p.

### Published Abstracts

Meckel, T., Hovorka, S. D., Treviño, R. H., Smyth, R. C., and Romanak, K. D., 2014, Toward an international program for offshore storage of CO<sub>2</sub>: international Initiative for CCS sub-sea (iCCSc) (ext. abs.): *Energy Procedia*, v. 63, p. 5015-5020, <http://doi.org/10.1016/j.egypro.2014.11.531>.

Gawey, M. R., Larson, T., Romanak, Katherine, Hovorka, S. D., and Phelps, Tommy, 2013, Experimental analysis and modeling of PFT and SF<sub>6</sub> transport in organic rich vadose zones: Implications for monitoring CO<sub>2</sub> leakage at CCS sites (abs.): in American Association of Petroleum Geologists Annual Convention and Exhibition, Pittsburgh, Pennsylvania, May 19-22, abstracts, CD-ROM.

Yang, C., Hovorka, S. D., Young, M. H., Porse, S. L., Romanak, K. D., and Smyth, R. C., 2013, Geochemical (and pressure) sensitivities to CO<sub>2</sub> leakage in shallow aquifers (abs.): presented at the AAPG 2013 International Conference and Exhibition, Cartagena, Colombia, September 10, 2013.

Smyth, R. C., Yang, C., Romanak, K., Mickler, P., Lu, J., and Hovorka, S. D., 2012, Detecting potential impacts of deep subsurface CO<sub>2</sub> injection on shallow drinking water (abs.), in AGU Fall Meeting, December 3-7, San Francisco, California.

Dixon, Tim, Romanak, Katherine, and Camps, Ameena, 2011, Natural CO<sub>2</sub> releases providing messages for stakeholders (abs.), in 10th Annual Conference on Carbon Capture and Sequestration, Pittsburgh, May.

Romanak, Katherine, Bennett, P. C., Yang, Changbing, and Hovorka, S. D., 2011, Soil-gas identification of vadose-zone carbon cycling: implications for near-surface modeling at CCS sites (abs), in Carbon and Capture Conference 6, Trondheim, Norway, June 14-16.

Romanak, Katherine, Smyth, R. C., Yang, Changbing, and Hovorka, S. D., 2011, Sensitivity of shallow groundwater systems to CO<sub>2</sub>: lessons from the NETL SWP study at the SACROC oilfield (abs.), in 10th Annual Conference on Carbon Capture and Sequestration, Pittsburgh, May.

Romanak, Katherine, Yang, Changbing, Hovorka, S. D., and Bennett, P. C., 2011, Method for distinguishing signal from noise in the near-surface using simple soil-gas measurements: lessons from natural and industrial analogues (abs.), in 10th Annual Conference on Carbon Capture and Sequestration, Pittsburgh, May.

Yang, Changbing, Romanak, Katherine, Lindler, J. S., Roecker, Frank, Hovorka, S. D., Treviño, R. H., Paine, J. G., Holt, B., Smith, L., Xia, Y., Smyth, R. C., and Rearick, Michael, 2011, Sensitivity of shallow groundwater systems to CO<sub>2</sub>: case studies from the Cranfield and SACROC EOR fields, in Carbon and Capture Conference 6, Trondheim, Norway, June 14-16.

Yang, Changbing, Romanak, Katherine, Smyth, R. C., and Hovorka, S. D., 2011, Sensitivity of shallow groundwater systems to CO<sub>2</sub>: case studies from the Cranfield and SACROC EOR fields (abs.), in 6th Trondheim CCS Conference (TCCS-6), Trondheim, Norway, June 14-16.

Cook, P. J., Freifeld, B., Romanak, K. D., Lu, J., Yang, C., Phelps, T., Pfiffner, S., and Hovorka, S. D., 2010, U-tube geochemical sampling at SECARB Cranfield DAS project, (abs.), in National Energy and Technology Laboratory (NETL) Annual Carbon Capture and Storage (CCS) Meeting, May 10-13, Pittsburgh.

Romanak, K. D., Smyth, R. C., Yang, C., and Hovorka, S. D., 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 (abs.), in National Energy and Technology Laboratory (NETL) Annual Carbon Capture and Storage (CCS) Meeting, May 10-13, Pittsburgh.

Romanak, K. D., Yang, C., and Hovorka, S. D., 2010, Targeted soil-gas methodologies for monitoring an engineered plugged and abandoned well site, Cranfield Mississippi, (abs.), in National Energy and Technology Laboratory (NETL) Annual Carbon Capture and Storage (CCS) Meeting, May 10-13, Pittsburgh.

Romanak, K., Zhang, T., Yang, C., Gilbert, K., Bennett, P. C., and Hovorka, S. D., 2010, Extraction of dissolved gaseous hydrocarbons from brine at an engineered CO<sub>2</sub> injection, Cranfield, Mississippi (abs.), in Fall Meeting, AGU, San Francisco, December 13-17 Abstract H13B-0968.

Romanak, Katherine, Smyth, R. C., Yang, Changbing, and Hovorka, S. D., 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 (abs.) In Ninth Annual Conference on Carbon Capture & Sequestration, Pittsburgh, May 10-13, CD-ROM.

Romanak, Katherine, Yang, Changbing, and Hovorka, S. D., 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 (abs.) In Ninth Annual Conference on Carbon Capture & Sequestration, Pittsburgh, May 10-13, CD-ROM.

Romanak, Katherine, Zhang, Tongwei, Yang, Changbing, Gilbert, K., Bennett, P. C., and Hovorka, S. D., 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 (abs.) In Ninth Annual Conference on Carbon Capture & Sequestration, Pittsburgh, May 10-13, CD-ROM.

Thordsen, J. J., Kharaka, Y. K., Ambats, G., Manning, M. A., Cole, D. R., Phelps, T. J., Horita, J., Lu, J., Romanak, K. D., and Cook, P. J., 2010, Chemical composition of brine and gas in the Tuscaloosa Formation: preliminary baseline and post CO<sub>2</sub> injection results from SECARB-III test at Cranfield, MS, (abs.), in National Energy and Technology Laboratory (NETL) Annual Carbon Capture and Storage (CCS) Meeting, May 10-13, Pittsburgh.

Yang, C., Romanak, K. D., Hovorka, S. D., Linder, J., Smyth, R. C., Treviño, R. H., Paine, J. G., Holt, R. M., Smith, L. T., Xia, Y., and Lu, J., 2010, Geochemical characterization of shallow groundwater at the Cranfield aquifer and numerical simulation: can pH and carbonate parameters be used to detect potential CO<sub>2</sub> leakage at geological CO<sub>2</sub> sequestration sites? (abs.), in National Energy and Technology Laboratory (NETL) Annual Carbon Capture and Storage (CCS) Meeting, May 10-13, Pittsburgh.

Yang, C., Romanak, K., Hovorka, S. D., Reedy, R. C., Treviño, R. H., and Scanlon, B. R., 2010, Monitoring and modeling CO<sub>2</sub> dynamics in the vadose zone near an abandoned historic oil well: implications for detecting CO<sub>2</sub> leakage at geological CO<sub>2</sub> sequestration sites (abs.), in GSA Denver Annual Meeting, October 31-November 3, poster no. H33E-1202.

Yang, Changbing, Romanak, Katherine, Hovorka, S. D., Linder, J., Smyth, R. C., Treviño, R. H., Paine, J. G., Holt, B., Smith, L., Xia, Y., and Lu, Jiemin, 2010, Geochemical characterization of shallow groundwater at the Cranfield aquifer and numerical simulation: can pH and carbonated parameters be used to detect potential CO<sub>2</sub> leakage at geological CO<sub>2</sub> sequestration sites? (abs.) In Ninth Annual Conference on Carbon Capture & Sequestration, Pittsburgh, May 10-13, CD-ROM.

Yang, Changbing, Romanak, Katherine, Hovorka, S. D., Reedy, R. C., Treviño, R. H., and Scanlon, B. R., 2010, Monitoring and modeling CO<sub>2</sub> dynamics in the vadose zone near an abandoned historic oil well: implications for detecting CO<sub>2</sub> leakage at geological CO<sub>2</sub> sequestration sites (abs.), in AGU Fall Meeting, San Francisco, December 13-17.

Zhang, T., Romanak, K. D., Gilbert, K., Yang, C., Bennett, P., and Hovorka, S. D., 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, (abs.), in National Energy and Technology Laboratory (NETL) Annual Carbon Capture and Storage (CCS) Meeting, May 10-13, Pittsburgh.

Kosterev, A. A., Dong, L., Thomazy, D., Tittel, F. K., Pavlovsky, I., and Romanak, K., 2009, Portable spectroscopic carbon dioxide monitor for carbon sequestration applications (abs.), in 2009 Conference on Quantum Electronics and Laser Science, June, p. 1-2.

Romanak, K. D., and Bennett, P. C., 2009, Soil-gas identification of environmental factors affecting CO<sub>2</sub> concentrations beneath a playa wetland: implications for soil-gas monitoring at carbon storage sites (abs.): *Eos*, v. 90, no. 52, Fall Meeting Supplement, Abstract No. H13I-03.

Romanak, K. D., Smyth, R. C., Yang, C., and Hovorka, S. D., 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 (abs.): *Eos*, v. 90, no. 22, Abstract V13C-03.

Romanak, Katherine, Smyth, R. C., Yang, Changbing, and Hovorka, S. D., 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 (abs.): *Eos*, v. 90 no. 22, Abstract V13C-03.

Smyth, R. C., Romanak, Katherine, Yang, Changbing, and Hovorka, S. D., 2009, Shallow groundwater monitoring at the SACROC oilfield, Scurry County, TX: good news for geologic storage of CO<sub>2</sub> despite a complex hydrogeologic and geochemical setting (abs.): *Eos*, v. 90, no. 52, Fall Meeting Supplement, Abstract No. H13I-02.

Wu, S., Romanak, Katherine, and Yang, Changbing, 2009, Laser absorption spectroscopy methods for subsurface monitoring of CO<sub>2</sub> in water and air phases at sequestration sites (abs.): *Eos*, v. 90, no. 52, Fall Meeting Supplement, Abstract No. H21E-0900.

Yang, Changbing, Romanak, Katherine, and Hovorka, S. D., 2009, CO<sub>2</sub> release experiment in the shallow subsurface at the Brackenridge Field Laboratory and numerical modeling (abs.): *Eos*, v. 90, no. 52, Fall Meeting Supplement, Abstract No. H21E-0895.

Romanak, K. D., and Smyth, R. C., 2008, Geochemical effects of CO<sub>2</sub>-enhanced oil recovery on the shallow Dockum aquifer, west Texas (abs.), in 7th Annual Conference on Carbon Capture & Sequestration, May 5th-8th, 2008, Pittsburgh, Pennsylvania.

Smyth, R. C., Hovorka, S. D., Romanak, K. D., Partin, J. W., Meckel, Timothy, Wong, Corinne, Nicot, J. -P., and Holt, R. M., 2008, Assessing risk to fresh water resources from long term CO<sub>2</sub> injection--laboratory and field studies (abs.), in 9th International Conference on Greenhouse Gas Technologies, November 16-20, Washington, D.C.

Romanak, K. D., Bennett, P. C., and Nicot, J. -P., 1996, Vadose zone processes beneath a perched playa wetland, Texas High Plains (abs.): *Geological Society of America Abstracts with Programs*, South-Central Section, v. 28, no. 1, p. 61.

Duncker, K. E., Wolff, J. A., Harmon, R. S., Leat, P. T., Thompson, R. N., and Dickin, A. P., 1989, Mantle and crustal components in mafic to intermediate lavas of the Cerros del Rio volcanic field, Rio Grande rift, New Mexico (abs.): *New Mexico Bureau of Mines Mineral Resources Bulletin*, v. 131, p.77.

Duncker, K. E., Wolff, J. A., Harmon, R. S., Leat, P. T., Thompson, R. N., and Dickin, A. P., 1987, Stable isotope constraints on the petrogenesis of Cerros del Rio Magmas (abs): *EOS*, v. 68, p. 1532.