WENDY J. HARRISON

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EDUCATION

University of Manchester, U.K., BSc. Geology 1976
University of Manchester, U.K., PhD. Geology 1979
Pre-doctoral Fellow, Geophysical Laboratory, Carnegie Institution of Washington, Washington D.C. 1977-1979

CAREER EXPERIENCE

1997-present:	Professor, Colorado School of Mines
1991-1997:	Associate Professor, Colorado School of Mines
1988-1991:	Assistant Professor, Colorado School of Mines
1981-1988:	Research Specialist, Exxon Production Research Company, Houston, Texas
1980-1981:	National Research Council Fellow, NASA-Johnson Space Center, Houston, Texas
1979-1980:	Visiting Research Scientist, Lunar and Planetary Institute, Houston, Texas

ACADEMIC and SCIENCE LEADERSHIP APPOINTMENTS

2015-present:	Senior Faculty Advisor for Strategic Initiatives, Colorado School of Mines
2012-2014:	Division Director, Earth Sciences, Geoscience Directorate, National Science Foundation, Washington D.C.
2008-2011:	Associate Provost and Dean of Undergraduate Studies and Faculty, Colorado School of Mines
2008:	Interim Division Director, Liberal Arts and International Studies, Colorado School of Mines
2005-2006:	Interim Principal Tutor and Director, McBride Honors Program in Public Affairs for Engineers, Colorado School of Mines
2004:	Visiting Scientist, Daresbury Synchrotron Laboratory, UK
2004:	Honorary Visiting Lecturer, Manchester University, UK
1995/6; 97/8:	Chairman, Geochemistry Program, Colorado School of Mines

RESEARCH INTERESTS

Thermodynamic and experimental studies of chemical reactions in aqueous fluids
Paleohydrologic and diagenetic evolution of sedimentary basins
Environmental mineralogy and geochemistry
Reactive transport in shallow crustal environments
Fluid-rock interactions during enhanced oil and gas recovery processes

Theoretical, experimental, and field studies of acid mine drainage
Geology and human health
Geoscience education

RESEARCH SUPPORT

Research support received since 1988 from the National Science Foundation, Colorado Water Resources Research Institute, Colorado Advanced Software Institute, Environmental Protection Agency, Colorado Department of Public Health and the Environment, United States Geological Survey, Department of Homeland Security, Federal Highway Administration, Lawrence Livermore National Laboratory, Arizona State University, major oil companies (including Exxon-Mobil, Amoco, Chevron, EOG Resources, Texaco, Marathon), industrial sponsors (including Western Mining Inc., Placer Dome, Holland Associates, Inc., Adrian Brown, Inc., Parsons Engineering, Hydrosearch, Inc., American Colloid), several philanthropic foundations, and multiple awards from internal university sources. These awards include standard federal research grants, major equipment acquisition grants, educational research awards, unrestricted funds, and direct research contracts. Details are available upon request.

AWARDS and HONORS

Pre-doctoral Fellowship, Geophysical Laboratory, 1977-1979.
National Research Council, Research Associate, 1980-1981.
Dept. of Geology and Geol. Engineering: Teacher of the Year, 1990.
American Association of Petroleum Geologists Distinguished Lecturer, 1991-1992.
President's Best Paper Award, Colorado Scientific Society, 1994.
Association of Geoscience Students “Best Professor Award”, 2001, 2002, 2004.
Ange Melaragno Service Award, McBride Honors Program, 2006.
Outstanding Faculty Member, CSM Alumni Foundation, 2006.

PROFESSIONAL AFFILIATIONS

American Geophysical Union
Geochemical Society
Mineralogical Society of America
International Association of Geochemistry and Cosmochemistry

RECENT INVITED PRESENTATIONS (2012-2016)

Managing successful student transfers: American Geophysical Union Workshop - "Unique Research Experiences for two-year college faculty and students. Washington DC, 7/13/12

From Disciplinary Science to Global Impact: Water Research at NSF. National Science Board 2/9/13 and Office of Science and Technology Policy, Washington DC 5/22/13

Strategic Directions in Carbon Research. Deep Carbon Observatory International Science Meeting, Carnegie Institution of Washington, 3/4/13

Role of America’s Geologic Heritage in fulfilling Broader Impacts at NSF. International Union of Geological Sciences workshop, Denver CO, 3/18/13

Sustainability - Water: an educational video series with NBC Learn. Preview for Office of Science and Technology Policy, Washington DC 7/10/13

Current and Future Earth Science Issues for the Nation. National Research Council, Board of Earth Science and Resources, 25th Anniversary Meeting, Washington DC, 11/18/13

Strategic Planning in Earth Sciences at NSF. National Research Council, Division of Earth and Life Studies, Washington DC, 1/8/14

Strategies and Challenges in Preparing and Retaining Scientist-leaders in the Federal Government. ICF International and the National Science Foundation, Washington DC, 2/13/14

Geothermal Energy: Global Reach, Local Impact: Plenary Lecture, Peer Review Geothermal Technologies Office, DOE, Denver CO, 5/11/15

Communicating geosciences with policy-makers: a grand challenge for academia, AGU Annual Meeting, San Francisco, 12/14/15

SELECTED RECENT PROFESSIONAL ACTIVITIES AND SERVICE

Co-Chair National Academies Roundtable on Unconventional Hydrocarbon Development 2015-2018

Member of the Kazakhstan - U.S. Joint Commission on Scientific and Technological Cooperation, Working Group on Management of Natural Resources and Minerals, 2015-current

Member of organizing consortium for *Energy from Earth: Practical Geoscience to Inform Energy Legislation*: 2012-present. Provide monthly briefings for Congress to inform energy policy. http://sciencepolicy.agu.org/energyfromtheearth/.

Member of the following Federal interagency committees, 2012-2014:

- National Earthquake Hazards Reduction Program
- NSTC Committee on Strategic Disaster Reduction
- NSTC Subcommittee on Critical Materials

Executive Director of the Board of the International Continental Drilling Program, 2013

Academic Advisor to the Faculty Fellows Program at Red Rocks Institute for Sustainability in Education (RISE), 2011-ongoing

Delegate (invited), *"Pathways to College and Beyond: Colorado Community College Summit"*, 2011

Peer Review Panel Member or Chair, National Science Foundation:

- Division of Undergraduate Education-Classroom Curriculum and Laboratory Improvement: 1996
- Hydrologic Sciences: 2 panels per year between 2004-2007. Chair for 2007 panels.
- Consortium of Universities for the Advancement of Hydrologic Science Inc. -CUAHSI Management Review: 2008
- Partnerships in International Research and Education PIRE: 2009
- Division of Undergraduate Education –Transforming Undergraduate Education in STEM: 2011

- Division of Undergraduate Education –Advanced Technological Education: 2011
- Consortium of Universities for the Advancement of Hydrologic Science Inc. Panel Chair for CUAHSI Management Review: 2012

Technical Expert, American Colloid Corporation: surface characterization of quartz in bentonites. 2003-2010

FEDERAL SCIENCE LEADERSHIP AND ADMINISTRATION

Division Director for Earth Sciences at the National Science Foundation (2012-2014): responsible for leadership and management of 40 staff and an annual award budget of $185M. Accountable for meeting numerous Agency performance goals related to advancing frontiers of science and engineering; promoting STEM education; strategic planning and Federal budget development and deployment; development and oversight of national research facilities, including contracting, compliance and conflict of interest; creating and maintaining interagency and international partnerships.

Accomplishments of my tenure with positive impact for the national research and education communities include:

- Leadership of a Foundation-wide strategy for promoting water research: presentations to National Science Board and Office of Science and Technology Policy, White House.
- Developed a strategic plan for Earth Sciences to prepare new initiatives for future funding in the face of a 6% budget retraction in FY 2013.
- Increased the FY 2013 base budget support for the earth sciences research community by 10% ($18M) through internal and external partnerships.
- Initiated early funding of frontier research to couple processes at the atmosphere-land surface interface to improve groundwater resource predictions.
- Provided seed funding for research in Early Earth history, including collaboration with NSF's Division of Materials Research for extreme conditions measurements through the new *Materials Innovation Platform* initiative.
- Published three new solicitations for new research funding: Integrated Earth Systems; Earth-Life Transitions; and Science, Engineering and Education for Sustainability: Hazards.
- Completed 12 new Major Research Infrastructure awards and 5 INSPIRE awards leveraging $8M of new funding, external to Division.
- Successfully promoted NSF's Innovation opportunities within the earth science community, leading to new Industry-University Research Consortia (I/UCRC), Grants for Liaison with Industry (GOALI), and iCORPS teams, establishing a Geosciences Directorate funded program to nurture and sustain innovation.
- Completed the re-competition, expansion, and full deployment of the Critical Zone Observatory Network ($9M).
- Completed the re-competition and renewal of the national seismological (IRIS, Inc.) and geodetic (UNAVCO, Inc.) facilities, including EarthScope ($40M).
- Completed the new competition and award for the national continental drilling program management office (formerly under DOSECC Inc.).
- Increased funding for postdoctoral fellowship program by 100%

- Conceptualized and funded the *Future of Geoscience Education Summit* (January 2014) (http://www.jsg.utexas.edu/events/future-of-geoscience-undergraduate-education/).
- Provided technical underpinning and production advice for "*Sustainability: Water'*, a 6-part educational video series with NBC Learn (http://www.nbclearn.com/water).
- Leadership of a Foundation-wide initiative to analyze, assess, and improve *Broader Impacts* activities in research awards.
- Executed two interagency agreements between NSF and United States Geological Survey to (a) continue the Powell Data Synthesis Center and (b) establish operations and maintenance protocols for the Central and Eastern US Seismic Network.
- Renewed agreement with National Science Foundation of China in *Critical Transitions*
- Executed a letter of partnership with the Chinese Earthquake Administration
- Drafted new agreement with UK-NERC to collaborate in an International Critical Zone Observatory Network (pending clearance 2/14)

UNIVERSITY LEADERSHIP AND ADMINISTRATION

Senior Faculty Advisor for Strategic Initiatives, 2015-present

Academic leadership, strategic planning, oversight, budgeting, policy development and operational administration for University-wide projects as prioritized by CSM's President and Executive team. Recent significant projects include:

- Nazarbayev University, KZ: Developed and executed contracts to found a School of Mining and Geoscience at Nazarbayev University including oversite of curriculum, research agenda, and hiring of faculty and staff. Phase 2 contract ($30M) in progress (2016)
- College of Petroleum Engineering and Geosciences, King Fahd University of Petroleum and Minerals (KFUPM), Saudi Arabia. Developed successful preproposal invited by KFUPM for 6 research thrusts and graduate-level degree programs; currently awaiting contract completion ($XM)
- Kuwait Oil Company
    - Developed a proposal requested by KOC to establish multiple facets of a Master Research Agreement currently targeted at $16M for 5 years, including primary responsibility for outline of research platform and initial projects, management, infrastructure, and operational aspects of the MRA
    - Project currently awaiting resolution of intellectual property and licensing agreements
- Development of strategic plan for implementing on-line education (in progress; CSM does not currently offer any courses or degree options that involve on-line delivery)

Associate Provost, Dean of Undergraduate Studies and Faculty, 2008-2011

Academic leadership, strategic planning, oversight, budgeting, policy development and operational administration for Academic Affairs with specific responsibilities for: (1) the Undergraduate Program (4000 science and engineering students; 13 degree programs); (2) Faculty Affairs (250 full-time faculty, 100 research-only faculty, 100 temporary faculty); and (3) overarching university management and development. There are six direct reports for this position: the Director of Academic Assessment, the Registrar, the Academic Advising Coordinator, the Articulation Coordinator, the Office of International

Programs, and the Director of the Engineering Practices Introductory Course Sequence (EPICS). Associate Provost is a member of the President's Executive Cabinet and President's Strategic Planning Council.

Significant achievements of my tenure include:

- An initiative to produce sustainable institutional change in the ability of Student Life and Academic Affairs faculty and staff to work cooperatively to enable the success of undergraduate students, leading to:
    - an increase in first year student retention from 85% to 88%;
    - a 16-fold increase of students applying for the nationally competitive scholarships;
- An initiative that changed institutional culture by establishing the instructional faculty as equal partners with the tenure-line faculty in the educational enterprise, leading to:
    - a reduction of credit hour delivery in the lower division by adjunct faculty from 36% to 23%;
    - addition of 21 new full-time instructional faculty positions;
- A strategic cluster hire strategy to strengthen CSM's research capacity in biological engineering and life sciences, in high performance computing, in nuclear science and engineering, in science and technology policy, and in STEM education;
- Successfully hired 40 new tenure-line faculty, 25% of whom are from underrepresented groups.
- New summer and international programs that yield over $500,000 in new tuition revenue;
- Development of an innovative academic program for a $10M endowment establishing the Harvey Scholarships to promote diversity in elite scholars;
- Institutional lead and initial preparation for 2012 Higher Learning Commission accreditation and CSM's Quality Initiative project which entailed implementation of institution-wide academic assessment;
- Numerous policy developments and procedures changes related to a growth in sponsored research volume of 50%, a growth in graduate student enrollment of 50%, and growth in undergraduate student enrollment of 18%;
- The proposed design of a College of Earth Resources Science and Engineering (founded 10/2012)

Institutional Official for Human Subjects Research Oversight and Exemption Reviews, 2010-2012

Responsible for reviewing all human subjects research, approving exemptions, providing investigator training, and coordinating IRB review requests.

Principal Tutor & Interim Director, McBride Honors Program in Public Affairs, 2005-2006

Academic leadership, oversight, budgeting, and administration for a program involving 150 undergraduates, 30 faculty, and a full-time program assistant. Created a strategic plan for the program with focus in public policy for engineers. Led the redesign of the undergraduate curriculum. Led the search for a permanent director with expertise in public policy. Articulated a vision for expansion into graduate education. Initiated annual newsletter and fundraising drives. Proposed and managed program budget including faculty remuneration ($1.5M). Staffed seminars with on-campus and adjunct faculty and evaluated faculty

performance. Managed student admissions, advising, internship, and foreign study programs, and program social events.

Chairman, CSM Interdisciplinary Geochemistry Program, 1995-96, 1997-98

An interdisciplinary graduate degree program requiring academic oversight for 35 graduate students in MS and PhD programs and 17 faculty with affiliations in either Geology and Geological Engineering or Chemistry Departments.

FACULTY GOVERNANCE AND COMMITTEE SERVICE

CSM Board of Trustees, Faculty Trustee, 2015-2017
President, CSM Faculty Senate, 2003-2004
Executive Committee member, CSM Faculty Senate, 1992 and 1994
Senator, CSM Faculty Senate, 1990-1993, 1994-1997, 2001-2004

Senate Committees: Undergraduate Readmission (Chair and member), Committee on Committees (Chair and member); Academic Affairs Committee, Faculty Affairs, Graduate Council, Undergraduate Council (various terms, some multiple).
Ad-hoc Committees: Academic Faculty Salary Committee, Academic Planning Council, Analytical Facilities Committee, CCHE Undergraduate Assessment Committee, Calendar Revisions Committee, Ethics across the Campus Committee; Faculty Compensation Committee, Student Substance Abuse Committee, Watson Foundation Fellowship nominations, Petroleum Institute Curriculum Development Committee. Provost Search Committee (2007-2009) (various terms, some multiple).
Geology and Geological Engineering Department Committees: Soft Rock Faculty Group (Chair); Option Showcase Coordinator; SYGN101 Coordinator; Computer Resource Acquisition Committee; Mineral Analysis Laboratories supervisor. (various terms, some multiple).

CSM University Promotion and Tenure Committee, 2001-2004. *Advisory to the Provost; reviews all candidates for promotion and/or tenure following departmental recommendations.*

Strategic Planning Council, 2003-2004 *Faculty Senate President and representative to university committee developing CSM's Strategic Plan 2004-2014. Promoted faculty-administration-board consensus and obtained vote of acceptance of plan by the entire faculty body.*

SYNGERGISTIC ACTIVITIES

Active in pedagogy of undergraduate education, including innovative approaches to integrating analytical methods into the undergraduate curriculum, international field experiences, and in leadership of professional development workshops for geoscience faculty.

Active in promoting research opportunities for first-generation college undergraduates and minority high school students.

Active in promoting leadership awareness for women in science and engineering careers.

GRADUATE STUDENT THESES

J. Ben Wesley: Overpressures and regional fluid flow in the Green River Fm of the Uinta basin - a study of hydrocarbon generation. T-3826; December, 1990; MS

Andang Bachtiar: Facies and Diagenesis in the Hygiene Member of the Pierre Shale, Denver Basin, Colorado. T- 4021; December, 1991; MS

Greg Anderson: Depositional and diagenetic controls on the distribution of porosity in the lower Cretaceous Fall River Sandstone, Southern Powder River Basin, Wyoming. T-4357; May 1993, MS

Ward Whiteman: Material transfer in shale-encased, valley-fill sandstones, Muddy Formation, Wind River Basin, Wyoming. T-4247; May 1993, MS

Regina Tempel: Conceptual model and procedure for quantitative evaluation of diagenesis with application to the Eocene Wilcox Group of the Gulf of Mexico basin. T-4346; December, 1993, PhD

Kenneth J. Esposito: Thermal model for alteration of smectite to illite in the Cascade Mts., Washington. December, 1993; MS

David C. Keith: Geochemical responses of mixed siliciclastic-carbonate reservoirs to steamflood enhanced oil recovery. T-4564; December 1994; PhD

Hening Sugiatno: Shaly sand analyses of the East Barrow Gas Field, Alaska. T-4625; December, 1994; MS

Win Aldy: Well log determination of the organic richness of the Mowry shale in the North Park and Denver basins and the Niobrara Chalk in the Denver basin. T-4611; December, 1994; MS

Agung Wibawa: Professional Degree, Petroleum Geology, December 1994

Vincent J. Coringrato: Paleohydrologic Controls on diagenetic trends in the Weber Sandstone, Northeastern Uinta Basin, Utah and northern Piceance Basin, Colorado. T-4067; December, 1995; MS

Christine A. Staples: Theoretical geochemical interactions resulting from CO_2 disposal on the ocean floor. T4746; May 1996; MS

Cynthia A. Rice: Variations in minor element abundances in anhydrite from the Pennsylvanian Paradox Formation, Paradox basin, Utah and Colorado. December 1996; MS

Timothy R. Klett: Effects of aqueous carbon dioxide on reservoir quality of carbonate-cemented sandstones. May, 1997; PhD

Suzanne S. Paschke: Reactive transport of metals between an alluvial aquifer and a natural wetland impacted by acid mine drainage, Tennessee Park, Leadville, Colorado; December, 1998. PhD

Jeannette Jerz : Acid generation reactions in fluvially-deposited tailings, Arkansas River, Colorado; December, 1998. MS.

Efem Altinok: Diagenesis of the Burro Canyon Formation, Lisbon Valley Region, Utah-Colorado; December 1998. MS

Soamwadee Suwanakijiboriharn: Thermodynamics of Ferroan Carbonates under Shallow Crustal Conditions; December, 1999. PhD.

Kristin Witte: Use of Englemann Spruce (*Picea engelmannii*) as a biological monitor of changes in the historic metals load in a mining impacted watershed: Waldorf, Colorado; December 2001. MS.

Heather A. Lowers: Origin of fibrous amphiboles in the Iron Hill carbonatite complex, Gunnison County, Colorado. T5996; May 2005. MS.

Fairda Malem: Hydrogeochemistry of the Waldorf Mine Waste Dump, Georgetown, Colorado; December 2006. PhD.

Richard Henry: An experimental investigation of the solubility of fluorite at low temperatures and applications to fluoride concentrations in surface and groundwater. PhD; in progress.

POSTDOCTORAL ASSOCIATES

Geoffrey D. Thyne (1990-1992). Experimental and thermodynamic investigations of metal-organic acid complexes.

TEACHING AND RELATED ACTIVITIES

Undergraduate

•Physical Geology-GEOL101 •Earth Systems Science-GEOL101 •Earth and Environmental Systems –SYGN101•Optical Mineralogy -GEOL212 •Sedimentary Petrology-GEOL306/7 •Atmosphere, Weather, and Climate-GEOC/ESGN407 •Engineering Practices Introductory Course Sequence Project Design-EP202 •Freshman Success Seminar-CSM101 •McBride Program Technology and Socio-Economic Change -HNRS302 •McBride Program Foreign Area Study: Brazil -HNRS400 •Field Studies in Scotland - GEOL498

Graduate

•Evolution of Natural Groundwater Systems-GEGN585 •Petrology of the Clastic Rocks-GEOL621 •Clastic Diagenesis-GEOL631 •Chemical Modeling of Aqueous Systems-GEGN684 •Clay Mineral Characterization-GEOL530 • Transmitted and Reflected Light Microscopy –GE498 • Topics in Earth Science Seminar (a) Can Oil and Water Mix? (b) Heat and Mass Transfer in Geochemical Processes (c) Meteorites and Bolides (d) Pegmatites (e) Medical Geology - GE631• Graduate Seminar-GEOL607 •Introduction to College Teaching-SYGN600

Professional Short Courses

•Geochemical Modeling •Paleohydrologic Analysis (with C.M. Bethke, Univ. Illinois). •Using EQ3/6 – International Groundwater Modeling Center (with S. Paschke).

K-12 and College Recruiting

•Environmental Geoscience Summer Field Program and San Juan Mountains Adventure Field Camps (high school student geoscience and college preparation residential camps).

•Field trip leader, Daniels Fund Summer College Experience (high school student college preparation)

•Facilities access and mentoring for high school science student research projects one of whom was a semi-finalist in the Siemens Competition in Science and Technology

•Denver Metro Region Science Fair judge; Lakewood High School search committee member for science faculty

Significant Pedagogy and Curriculum Development

- •Developed approaches to cross-curricular instrumentation instruction in analytical methods in mineralogy and petrology (with R.F. Wendlandt: 1994-1998).
- •Member of CSM's curriculum development team for *The Petroleum Institute*, Abu Dhabi, (2000-2002).
- •Restructured laboratory curriculum and faculty and teaching assistant staffing for lower division Earth and Environmental Systems (2001-2003).
- •Developed and implemented a strategic plan for managing Earth and Environmental Systems-SYGN101 using lecturers in place of tenure line faculty (2005).
- • Developed and implemented a plan for modernizing both teaching methods and laboratory facilities in optical microscopy (1999-2007).
- •Instructor for two of the National Science Foundation's 'On the Cutting Edge' series of workshops for faculty development: *Teaching Petrology* (2003) and *Teaching Public Policy in the Earth Sciences* (2006).
- •Led curriculum redesign for McBride Honors Program in Public Affairs for Engineers (2004-2006).
- •Developed and co-directed undergraduate field studies in Scotland (2005 and 2008).
- •Led review and subsequent realignment of CSM's foundation design courses (Engineering Practices Introductory Course Sequence) 2008.
- •Led review and subsequent realignment of CSM's Humanitarian Engineering Program (2011).
- •Led university-wide redesign of undergraduate core curriculum and academic advising (2008-2010).
- •Created and currently implementing a strategic plan for increasing the number of Colorado community college articulation agreements with CSM (2009-current).
- •Led development of 3 interdisciplinary minors: Energy (2009), Underground Tunneling and Construction (2010), Space Exploration Science and Engineering (2010).

Community Service

Fire Fighter, Golden Gate Fire Protection District (2006-2009)

Certifications: Wildland Interagency Incident Qualification Card (Red Card); Incident Command Initial Attack Type IV; Hazardous Materials-Operations Level.

Emergency Medical Technician-Basic: State Registration (2006-current)

Mountain High Beekeeper's Cooperative member (2001-current)

Abstracts

Harrison, W.J., 1977: An experimental study of partitioning of samarium between garnet and liquid at high pressures (Abs.). In "Papers presented to the International Conference on Experimental Trace Element Geochemistry" Sedona, AZ. 1977, pp 41-42.

Wendlandt, R.F. and Harrison, W.J., 1978: Rare earth element partitioning between coexisting immiscible carbonate and silicate liquids and CO2 vapor in the system K2O-Al2O3-SiO2-CO2. In "Abstracts with Program" Geol. Soc. Amer. Annual Mtg., Toronto, 10, p. 514

Harrison, W.J., 1979: REE partitioning between garnet peridotite minerals and melts during partial melting. In: "Abstracts with Program" Geol. Soc. Amer. Annual Mtg., San Diego, 11, p.439.

Harrison, W.J., 1980: Implications of non-Henry's Law DREE garnet/liquid for petrogenetic models. EOS, 61, p. 1141.

Harrison, W.J., P.C. Lindahl, and D.R. Pevear, 1984: Trace elements in pyrites from Green River Fm. oil shales. (abs.) S.E.P.M. Midyear Meeting, San Jose, CA. August 1984.

Harrison, W.J. and C.M. Bethke, 1986: Paleohydrologic analysis of interacting meteoric and compactional flow regimes in the U.S.Gulf Coast. In: "Collected Abstracts for the Workshop on Geochemical Modeling", Sept. 14-17, Fallen Leaf Lake, California,1986.

Harrison, W.J. and C.M. Bethke, 1986: Paleohydrologic analysis of interacting meteoric and compactional flow regimes in the U.S. Gulf Coast. In: "Abstracts with Program" Geol. Soc. Amer. Annual Mtg., San Antonio, 18, p.630.

Bethke, C.M. and Harrison, W.J., 1986: Dynamics of geopressured zones during compaction of the U.S. Gulf Coast Basin. In: "Abstracts with Program" Geol. Soc. Amer. Annual Mtg., San Antonio, 18, p.540.

Grabowski, G.J. Jr., S.C. Williams, R.M. Kick, W.J. Harrison, E. McFarlan Jr., S.A. Reeckman, and J. Kauffman, 1987: Aquifer model for early diagenesis and porosity prediction, Smackover Formation (Upper Jurassic), northern Gulf Basin. (Abs.) S.E.P.M. Midyear Meeting, Austin TX.

Drez, P.E. and W.J. Harrison, 1987: Do organic acids play a role in diagenesis? (Abs.) AAPG Research Conference "Prediction of Reservoir Quality through Chemical Modelling" Park City, Utah.

Drez, P.E., R. Warren and W.J. Harrison, 1987: Possible silicification of tuffaceous sediments by brines from microseepage of hydrocarbons. (Abs.) AAPG Research Conference "Prediction of Reservoir Quality through Chemical Modeling" Park City, Utah.

Harrison, W.J., R.H. McCallister, and D.L. Shettel, 1987: A diagenetic model for dolomite formation in Latrobe Group Sandstones, Gippsland Basin, Australia. (Abs.) AAPG Research Conference "Prediction of Reservoir Quality through Chemical Modeling" Park City, Utah.

Finkelman, R.B., J.D. Yeakel and W.J. Harrison, 1987; Sodium in coals of the Wasatch Plateau, Utah: Mode of occurrence, geologic controls and possible source. In: "Abstracts with Program" Geol. Soc. Amer. Annual Mtg., Phoenix, 19, p.418.

Harrison, W.J. and R.F. Wendlandt, 1987; Geochemical equilibrium calculations of trace element precipitation from seawater. Transactions, A.G.U. EOS, v. 68, p. 1538-1539.

Harrison, W.J., and C.M. Bethke, 1988; Paleohydrologic analysis of geopressure development and infiltration of meteoric water in the Gulf of Mexico Basin. (Invited Paper). EOS, 69, p.630.

Harrison, W.J. 1988; Modeling fluid/rock interactions in sedimentary basins (Invited Paper). Workshop on Quantitative Dynamic Stratigraphy, Feb 14-18, 1988, Lost Valley Ranch, Colorado.

Harrison, W.J., and C.M. Bethke, 1988; Paleohydrologic analysis of geopressure development and infiltration of meteoric water in the Gulf of Mexico Basin. (Invited Paper). Meeting of the Geological Society (Germany), Evolution of Sedimentary Basins, Feb. 24-26, Julich, West Germany. Terra Cognita 8, p 18.

Harrison, W.J., W.J. Holzworth, L.L. Summa, and W-L. Huang 1988; Aluminum in authigenic quartz- a possible indicator of paleofluid chemistry? (Abs.) Geological Society of America, Abstracts with Program, Annual Meeting, Denver Colorado, p. A391.

Bethke, C.M., R.F. Wendlandt, and W.J. Harrison 1988; Predicting chemical reactions in the formation and well-bore. (Abs.).Spectroscopy and Geochemistry Symposium Sept. 28-30, Ridgfield, Connecticut.

Wendlandt, R.F., W.J. Harrison and D. Beaty, 1988; A reaction path model for the formation of manto-type massive sulfide replacement deposits at Gilman, Colorado. Transactions, A.G.U., EOS, v. 69, p. 1501.

Harrison W.J. and G.D. Thyne, 1989; Organic acids -fact or fiction? (Abs.) Geological Society of America, Abstracts with Program, Annual Meeting, St. Louis, p. A272.

Harrison W.J. 1990; Paleohydrology of the Gulf of Mexico Basin (Invited abs.) Goldschmidt Conference, May 2-4 1990, Baltimore, MD.

Harrison W.J. 1991; Diagenetic pathways in sedimentary basins (Invited abs.). Geological Society of London Conference, May 10, 1991, "Diagenesis and basin development".

Summa, L., T.F. Schwartzer, R.J. Pottorf, and W.J. Harrison, 1991; Paleohydrology of the Gulf of Mexico basin: Development of compactional overpressure and timing of hydrocarbon migration relative to cementation (Abs.) International Conference on Basin Modeling, May 1991, Norwegian Petroleum Society.

Schwartzer, T.F., Summa L.L., Schroeder F.W., Pottorf R.J., and Harrison W.J., 1991; Integrated modeling of basin fill, paleohydrology, and hydrocarbon migration: exploration application in the Gulf of Mexico: AAPG Annual Convention, Dallas, Texas, April 4, 1991.

Pottorf, R.J., Summa, L.L., Schwartzer T.F., and Harrison W.J., 1991; Modeling the interactions of fluids and rocks to predict reservoir quality: applications to the Gulf Coast Frio Formation: AAPG Annual Convention, Dallas, Texas, April 4, 1991.

Tempel, R.N. and Harrison W.J., 1991; Diagenetic pathways in sedimentary basins: Geological Society of America, Abstracts with Program, Annual Meeting, San Diego.

Thyne, G.D. and W.J. Harrison, 1991; Stability of aluminum oxalate aqueous complexes from 25 - 150 ^{o}C. Geological Society of America, Abstracts with Program, Annual Meeting, San Diego.

Keith D. C., Semimbar, H., Wendlandt, R.F., Harrison, W.J., and Beaty, D., 1993; Laboratory and numerical simulation of fluid-rock interactions during steamflood EOR of a volcaniclastic reservoir: Amer. Chem. Soc. symposium on Enhanced Oil Recovery, Denver, CO, April, 1993.

Tempel, R.N. and Harrison, W.J. 1993; The roles of pCO2, organic acids, and organic acid anions on clastic diagenesis in the Wilcox Group of the Texas Gulf Coast, Geological Society of America, Abstracts with Program, v. 25, no. 26, p. A202.

Tempel, R.N. and Harrison, W.J. 1993; Reaction path models of diagenesis in the Eocene Wilcox Group, Texas Gulf Coast: AGU 1993 Front Range Meeting, Feb 8-10, Golden Colorado.

Wendlandt R.F. and Harrison, W.J., 1993; Network-based instruction in applied mineralogy in the geological engineering curriculum: EOS v. 74, no. 43, p. 83.

Wendlandt, R.F. and Harrison, W.J., 1993; Integration of advanced analytical applications into the geological engineering curriculum: Geological Society of America, Abstracts with Program, v. 25, no. 26, p. A346.

Whiteman, W.A. and Harrison, W.J., 1993; Material transfer in shale encased, valley-fill sandstones, Muddy Formation, Wind River basin, Wyoming: Geological Society of America, Abstracts with Program, v. 25, no. 26, p. A66.

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