Alan Ernest Fryar

Curriculum Vitae

August 2024

Business address

Department of Earth and Environmental Sciences
University of Kentucky
101 Slone Building
Lexington, KY 40506-0053 USA
Phone: (859) 257-4392
Fax: (859) 323-1938
E-mail: alan.fryar@uky.edu
Web: http://ees.as.uky.edu/users/afryar1

Education

PhD Geology, University of Alberta (Canada), Nov. 1992 (advisors F.W. Schwartz and J. Tóth)
MS Geology, Texas A&M University, Aug. 1986 (advisor P.A. Domenico)
BS *cum laude*, Geology and History, Duke University, Sep. 1984

Expertise

Field, experimental, and modeling studies of groundwater flow, mass transport, and reactions in the subsurface. Areas of emphasis include groundwater/stream interactions; mass transport in karst watersheds; chemical evolution during groundwater recharge and flow; natural attenuation of contaminants; water resources in developing countries; and history of hydrogeology.

Employment History

Department of Earth and Environmental Sciences (formerly Geological Sciences), University of Kentucky (Professor, Jul. 2019–present; Associate Professor, Jul. 2001–Jun. 2019; Assistant Professor, Aug. 1995–Jun. 2001)

> Responsible for teaching courses in hydrogeology, hydrology, and environmental geology; directing research (including supervising MS and PhD advisees); and professional service. Environmental and Sustainability Studies program faculty (2013–present); Faculty Fellow, James B. Beam Institute for Kentucky Spirits (2020–present); member, Kentucky Climate Consortium (2021–present); affiliate, Kentucky Water Research Institute (2023–present).

Department of Forestry and Geology, University of the South, Sewanee, Tennessee (Visiting Associate Professor Aug. 2006–May 2007)

> Taught courses in hydrology and water resources, administered senior comprehensive exams in water resources, and provided guidance to undergraduates on independent-study and group projects (spring 2007); sabbatical visitor (fall 2006).

Kentucky Water Research Institute, University of Kentucky (half-time staff, Aug. 1995–Jan. 1999)

> Assisted the Federal Facilities Oversight Unit in environmental oversight of US Departments of Energy and Defense facilities in Kentucky. Provided advice on monitoring and remediation; reviewed consultants' reports and data; prepared reports and made presentations; and developed a research program to address hydrogeologic data gaps at the Paducah Gaseous Diffusion Plant.

Research Associate, Bureau of Economic Geology, The University of Texas at Austin (Jan. 1992–Jul. 1995)

> Conducted field studies and modeling of groundwater flow and chemical evolution around the US Department of Energy's Pantex Plant. Used ambient tracers to delineate rates and sources of

recharge; identified reactions governing water quality; mapped water levels in wells; measured hydraulic properties of sediments; and prepared reports and made presentations.

Research Assistant, Department of Geology, University of Alberta (May 1987–Aug. 1988; Sep. 1990–Dec. 1991) and Department of Geological Sciences, The Ohio State University (Jan. 1989–Aug. 1990)

Conducted experiments on the transport and reactions of metals in groundwater, including characterizing changes in pore-water chemistry, sediment mineralogy, and hydraulic parameters.

Teaching Assistant, Department of Geology, University of Alberta (Sep. 1986–Apr. 1987; Sep.–Dec. 1988)

Prepared lessons, taught and graded assignments for laboratory sections of Introduction to Hydrogeology and of Earth History.

Hydrogeologist, ERM-South, Inc., Tampa, Florida (Jun.–Aug. 1986)

Monitored groundwater contamination at service stations and an industrial site, including sampling and water-level measurement, tabulation of data, and mapping of flow paths.

Teaching Assistant, Department of Geology, Texas A&M University (Aug. 1985–Apr. 1986)

Prepared lessons, taught, and graded assignments for laboratory sections of Introductory Geology for Non-Majors and of Geology for Civil Engineers.

Engineering Aide, U.S. Army Corps of Engineers, Jacksonville (Florida) District (Jun.–Aug. 1982; Jun.–Aug. 1983)

Mapped and classified soil borings, calculated earth-removal volumes at dam sites, and assisted in preparation of reports.

Professional Affiliations

American Geophysical Union
Association of Women Geoscientists
Geological Society of America
Geological Society of Kentucky
International Association of GeoChemistry
International Association of Hydrogeologists
International Association of Hydrological Sciences
Kentucky Academy of Science
National Ground Water Association

Honors

James B. Thompson Distinguished International Lecturer, Geological Society of America, 2024–2025
Fulbright-Kalam Climate Fellow, India, Jan.–May 2023
Sigma Xi (Scientific Research Honor Society), 2021
George Burke Maxey Distinguished Service Award, Hydrogeology Division, Geological Society of America, 2019
Fulbright Specialist, Environmental Science: Pakistan, Dec. 2009–Jan. 2010; India, Feb.–Mar. 2017
International Service Award, U.S. National Chapter, International Association of Hydrogeologists, 2016
Fulbright Research Scholar, Geology, Morocco, Jan.–May 2014
Fellow, Geological Society of America, 2006
W.G. Mills Memorial Fellowship in Hydrology, Texas Water Resources Institute, Texas A&M University, 1985–1986
Davidson Fellowship, Graduate College, Texas A&M University, 1984–1985
Dean’s List, Duke University, 1981–1984
Class Honors, Duke University, 1981–1982
Phi Eta Sigma (Freshman Honor Society), Duke University, 1981–1982
National Merit Scholarship, 1981–1982

Publications (* = current or former advisee; † = Fryar corresponding author [if not lead author])

Journal papers (IF = 2022 JCR impact factor; n = citations as of Jan. 2024 [SCI except as noted])

Fryar, A.E., Milewski, A.M., Agouridis, C.T., Hanley, C.D., Schroeder, P.A., Sultan, M., *Ward, J.W., Laftouhi, N., Pandjaitan, N.H., El Kadiri, R., Benaabidate, L., Fekri, A., Suharyanto, A., and Yilmaz, K.K., Skills development in hydrologic sciences for cohorts of graduate students from Morocco, Egypt, Türkiye, and Indonesia: Journal of Contemporary Water Research & Education, *accepted*.

Ashjari, J., Tobin, B., Fryar, A.E., and Ashjari, Z., 2024, Numerical modeling of development of Leandras and Double Bopper caves, Grand Canyon, USA: Hydrogeology Journal, 18 p., https://doi.org/10.1007/s10040-024-02812-z (IF = 2.8).

*Haile, E., *Currens, B.J., and †Fryar, A.E., 2024, Stable isotopic evidence of paleorecharge in the northern Gulf Coastal Plain (USA): Hydrology, v. 11, article 118, https://doi.org/10.3390/hydrology11080118 (IF = 3.2).

*Mukherjee, A., Coomar, P., Sarkar, S., Johannesson, K.H., Fryar, A.E., Schreiber, M.E., Ahmed, K.M., Alam, M.A., Bhattacharya, P., Bundschuh, J., Burgess, W., Chakraborty, M., Coyte, R., Farooqi, A., Guo, H., Ijumulana, J., Jeelani, G., Mondal, D., Nordstrom, D.K., Podgorski, J., Polya, D., Scanlon, B.R., Shamsudduha, M., Tapia, J., and Vengosh, A., 2024, Arsenic and other geogenic contaminants in global groundwater: Nature Reviews Earth & Environment, v. 5, p. 312–328, https://doi.org/10.1038/s43017-024-00519-z (IF = 42.1).

Zhu, C., Fryar, A.E., and Apps, J., 2024, Inorganic hydrogeochemistry in the 21st century: Groundwater, v. 62, no. 2, p. 174–183, https://doi.org/10.1111/gwat.13342 (IF = 2.6).

*Dapkus, R.T., †Fryar, A.E., Tobin, B.W., Byrne, D.M., *Sarker, S.K., Bettel, L., and Fox, J.F., 2023, Utilization of tryptophan-like fluorescence as a proxy for *E. coli* contamination in a mixed-land-use karst basin: Hydrology, v. 10, article 74, https://doi.org/10.3390/hydrology10040074 (**invited**) (IF = 3.2).

Fryar, A.E., *Currens, B.J., and *Alvarez Villa, C.S., 2023, Hydrochemical delineation of spring recharge in an urbanized karst basin, central Kentucky: Environmental & Engineering Geoscience, v. 29, p. 203–216, https://doi.org/10.2113/EEG-D-22-00066 (IF = 0.9).

*Sarker, S.K., Zhu, J., †Fryar, A.E., and Jeelani, G., 2023, Hydrological functioning and water availability in a Himalayan karst basin under climate change: Sustainability, v. 15, article 8666, https://doi.org/10.3390/su15118666 (IF = 3.9).

Al-Mohammdawi, J.A., Al-Abadi, A.M., Al-Ali, A.K., Shahid, S., Fryar, A., and Wang, X., 2022, Assessing the spatial and temporal variations of terrestrial water storage of Iraq using GRACE satellite data and reliability-resiliency-vulnerability indicators: Arabian Journal of Geosciences, v. 15, article 342, https://doi.org/10.1007/s12517-022-09626-x

*Avery, E., Samonina, O., Kryshtop, L., Vyshenska, I., Fryar, A.E., and Erhardt, A.M., 2022, Use of isotopes in examining precipitation patterns in north-central Ukraine: Isotopes in Environmental and Health Studies, v. 58, no. 4–6, p. 380–401, https://doi.org/10.1080/10256016.2022.2131781 (IF = 1.3, n = 1).

*Avery, E., Samonina, O., Vyshenska, I., Fryar, A.E, and Erhardt, A.M., 2022, Variation of tap-water isotope ratios and municipal water sources across Kyiv city, Ukraine: Discover Water, v. 2, article 13, https://doi.org/10.1007/s43832-022-00021-x

Bagheri, D., Taheri Tizro, A., Okhravi, S., Fryar, A., Kazakis, N., and Voudouris, K., 2022, Delineation of groundwater potential areas using RS/GIS method and its comparison with resistivity surveys: A case study in western part of Iran: Arabian Journal of Geosciences, v. 15, article 1633, https://doi.org/10.1007/s12517-022-10791-2

Chakraborty, M., *Mukherjee, A., Ahmed, K.M., Fryar, A.E., Bhattacharya, A., Zahid, A., Das, R., and Chattopadhyay, S., 2022, Influence of lithology-controlled hydrostratigraphy on three-dimensional distribution of groundwater arsenic in the transboundary Ganges River aquifer, India and Bangladesh: Geological Society of America Bulletin, v. 134, no. 9–10, p. 2680–2692, https://doi.org/10.1130/B36068.1 (IF = 4.9).

*Sarker, S., and †Fryar, A.E., 2022, Characterizing hydrological functioning of three large karst springs in the Salem Plateau, Missouri, USA: Hydrology, v. 9, no. 6, article 96, https://doi.org/10.3390/hydrology9060096 (IF = 3.2, n = 3).

Zarinmehr, H., Taheri Tizro, A., Fryar, A.E., Pour, M.K., and Fasihi, R., 2022, Prediction of groundwater level variations based on gravity recovery and climate experiment (GRACE) satellite data and a time-series analysis: a case study in the Lake Urmia basin, Iran: Environmental Earth Sciences, v. 81, article 180, https://doi.org/10.1007/s12665-022-10296-x (IF = 2.8, n = 5).

Al-Abadi, A., Fryar, A.E., Rasheed, A.A., and Pradhan, B., 2021, Assessment of groundwater potential in terms of the availability and quality of the resource: a case study from Iraq: Environmental Earth Sciences, v. 80, article 426, https://doi.org/10.1007/s12665-021-09725-0 (IF = 2.8, n = 9).

Al-Mayahi, H.M., Al-Abadi, A., and Fryar, A.E., 2021, Probability mapping of groundwater contamination by hydrocarbon from the deep oil reservoirs using GIS-based machine-learning algorithms: a case study of the Dammam aquifer (middle of Iraq): Environmental Science and Pollution Research, v. 28, p. 13736–13751, https://doi.org/10.1007/s11356-020-11158-4 (IF = 5.8, n = 3).

Al-Ozeer, A.Z., Al-Abadi, A.M., Hussain, T.A., Fryar, A., Pradhan, B., Alamri, A., and Maulud, K.M.A., 2021, Modeling of groundwater potential using cloud computing platform: a case study from Nineveh Plain, northern Iraq: Water, v. 13, article 3330, https://doi.org/10.3390/w13233330 (IF = 3.4, n = 2).

Cao, L., Liu, S., Wang, S., Cheng, Q., Fryar, A.E., Zhang, Z., Zhang, L., Yue, F., and Peng, T., 2021, Factors controlling discharge-suspended sediment hysteresis in karst basins, southwest China: implications for sediment management: Journal of Hydrology, v. 594, article 125792, https://doi.org/10.1016/j.jhydrol.2020.125792 (IF = 6.4, n = 15).

Fryar, A.E., Schreiber, M.E., Pholkern, K., Srisuk, K., and Ziegler, B.A., 2021, Variability in groundwater flow and chemistry in the Mekong River alluvial aquifer (Thailand): implications for arsenic and manganese occurrence: Environmental Earth Sciences, v. 80, no. 6, article 225, https://doi.org/10.1007/s12665-021-09522-9 (IF = 2.8, n = 2).

Nosair, A.M., Shams, M.Y., AbouElmagd, L.M., Hassanien, A.E., †Fryar, A.E., and Abu Salem, H.S., 2021, Predictive model for progressive salinization in a coastal aquifer using artificial intelligence and hydrogeochemical techniques: A case study of the Nile Delta aquifer, Egypt: Environmental Science and Pollution Research, v. 29, p. 9318–9340, https://doi.org/10.1007/s11356-021-16289-w (IF = 5.8, n = 16).

Taheri Tizro, A., Fryar, A.E., Vanaei, A., Kazakis, N., Voudouris, K., and Mohammadi, P., 2021, Estimation of total dissolved solids in Zayandehrood River using intelligent models and PCA analysis: Sustainable Water Resources Management, v. 7, no. 2, article 22, https://doi.org/10.1007/s40899-021-00497-w (IF = 2.1, n = 4).

*Tripathi, G.N., †Fryar, A.E., Hampson, S.K., and *Mukherjee, A., 2021, Seasonal to decadal variability in focused groundwater and contaminant discharge along a channelized stream: Groundwater Monitoring & Remediation, v. 41, no. 1, p. 32–45, https://doi.org/10.1111/gwmr.12422 (**cover feature**) (IF = 1.9, n = 1).

*Bandy, A.M., Cook, K., Fryar, A.E., and Zhu, J., 2020, Differential transport of *Escherichia coli* isolates compared to abiotic tracers in a karst aquifer: Groundwater, v. 58, no. 1, p. 70–78, https://doi.org/10.1111/gwat.12889 (IF = 2.6, n = 6).

*Barna, J.M., Fryar, A.E., Cao, L., *Currens, B.J., Peng, T., and Zhu, C., 2020, Variability in groundwater flow and chemistry in the Houzhai karst basin, Guizhou Province, China: Environmental & Engineering Geoscience, v. 26, no. 3, p. 273–289, https://doi.org/10.2113/EEG-2306 (IF = 0.9, n = 3).

Cao, L., Wang, S., Peng, T., Cheng, Q., Zhang, L., Zhang, Z., Yue, F., and Fryer, A.E. (*sic*), 2020, Monitoring of suspended sediment load and transport in an agroforestry watershed on a karst plateau, Southwest China: Agriculture, Ecosystems and Environment, v. 299, article 106976, https://doi.org/10.1016/j.agee.2020.106976 (IF = 6.6, n = 19).

Lyon, E., Freeman, R., Bathon, J., Fryar, A., McGlue, M., Erhardt, A., Rosen, A., Sampson, S., Nelson, A., and Parsons, J., 2020, Attitudinal impediments to geoscience major recruitment among ninth graders at a STEM high school: Journal of Geoscience Education, v. 68, no. 3, p. 237–253, https://doi.org/10.1080/10899995.2019.1700593 (Scopus CiteScore = 4.0, n = 1 [Scopus]).

Coomar, P., *Mukherjee, A., Bhattacharya, P., Bundschuh, J., Verma, S., Fryar, A.E., Ramos Ramos, O., Ormachea Muñoz, M., Gupta, S., Mahanta, C., Quino, I., and Thunvik, R., 2019, Contrasting controls on hydrogeochemistry of arsenic-enriched groundwater in the homologous tectonic settings of Andean and Himalayan basin aquifers, Latin America and South Asia: Science of the Total Environment, v. 689, p. 1370–1387, https://doi.org/10.1016/j.scitotenv.2019.05.444 (IF = 9.8, n = 25).

*Currens, B.J., Hall, A., Brion, G.M., and Fryar, A.E., 2019, Use of acetaminophen and sucralose as co-analytes to differentiate sources of human excreta in surface waters: Water Research, v. 157, p. 1–7, https://doi.org/10.1016/j.watres.2019.03.023 (IF = 12.8, n = 16).

Hanley, C., Freeman, R.L., †Fryar, A.E., *Sherman, A.R., and Edwards, E., 2019, Water in India and Kentucky: developing an online curriculum with field experiences for high school classes in diverse settings: Journal of Contemporary Water Research & Education, v. 168, p. 78–92, https://doi.org/10.1111/j.1936-704X.2019.03322.x (IF = 0.7).

*Howell, B.A., †Fryar, A.E., Benaabidate, L., Bouchaou, L., and Farhaoui, M., 2019, Variable responses of karst springs to recharge in the Middle Atlas region of Morocco: Hydrogeology Journal, v. 27, p. 1693–1710, https://doi.org/10.1007/s10040-019-01945-w (IF = 2.8, n = 8).

*Mukherjee, A., Gupta, S., Coomar, P., Fryar, A.E., Guillot, S., Verma, S., Bhattacharya, P., Bundschuh, J., and Charlet, L., 2019, Plate tectonics influence on geogenic arsenic cycle: from primary source to global groundwater enrichment: Science of the Total Environment, v. 683, p. 793–807, https://doi.org/10.1016/j.scitotenv.2019.04.255 (IF = 9.8, n = 49).

Taheri Tizro, A., Fryar, A.E., Pour, M.K., Voudouris, K.S., and Mashhadian, M.J., 2019, Groundwater flow simulation under climate change in a semi-arid area of western Iran: Groundwater for Sustainable Development, v. 9, article 100273, https://doi.org/10.1016/j.gsd.2019.100273 (IF = 5.9, n = 8).

*Bandy, A., Cook, K., Fryar, A.E., and Polk, J., 2018, Use of molecular markers to compare *Escherichia coli* transport to traditional groundwater tracers in epikarst: Journal of Environmental Quality, v. 47, no. 1, p. 88–95, http://doi.org/10.2134/jeq2017.10.0406 (IF = 2.4, n = 4).

Jeelani, G., Shah, R., Fryar, A., Deshpande, R., *Mukherjee, A., and Perrin, J., 2018, Hydrological processes in glacierized high altitude basins of western Himalaya: Hydrogeology Journal, v. 26, no. 2, p. 615–628, http://doi.org/10.1007/s10040-017-1666-1 (IF = 2.8, n = 22).

*Mukherjee, A., Fryar, A.E., *Eastridge, E.M., Nally, R.S., Chakraborty, M., and Scanlon, B.R., 2018, Controls on high and low groundwater arsenic on the opposite banks of the lower reaches of River Ganges, Bengal basin, India: Science of the Total Environment, v. 645, p. 1371–1387, http://doi.org/10.1016/j.scitotenv.2018.06.376 (IF = 9.8, n = 28).

*Haile, E., and †Fryar, A.E., 2017, Chemical evolution of groundwater in the Wilcox aquifer of the northern Gulf Coastal Plain, USA: Hydrogeology Journal, v. 25, p. 2403–2418, http://doi.org/10.1007/s10040-017-1608-y (IF = 2.8; n = 8).

Hssaisoune, M., Bouchaou, L., N'Da, B., Malki, M., Abahous, H., and Fryar, A.E., 2017, Isotopes to assess sustainability of overexploited groundwater in the Souss-Massa system (Morocco): Isotopes in Environmental and Health Studies, v. 53, no. 3, p. 298–312, http://doi.org/10.1080/10256016.2016.1254208 (IF = 1.3; n = 14).

Jeelani, G., Shah, R.A., Deshpande, R.D., Fryar, A.E., Perrin, J., and *Mukherjee, A., 2017, Distinguishing and estimating recharge to karst springs in snow and glacier dominated mountainous basins of the western Himalaya, India: Journal of Hydrology, v. 550, p. 239–252, https://doi.org/10.1016/j.jhydrol.2017.05.001 (IF = 6.4; n = 29).

Moumouni, A., and †Fryar, A.E., 2017, Controls on groundwater quality and dug-well asphyxiation hazard in Dakoro area of Niger: Groundwater for Sustainable Development, v. 5, p. 235–243, https://doi.org/10.1016/j.gsd.2017.08.004 (IF = 5.9).

Garrison, T., Hower, J.C., Fryar, A.E., and D'Angelo, E.M., 2016, Water and soil quality at two eastern-Kentucky (USA) coal fires: Environmental Earth Sciences, v. 75, no. 7, article 574, http://doi.org/10.1007/s12665-016-5380-4 (IF = 2.8; n = 12).

*Tripathi, G.N., and Fryar, A.E., 2016, Integrated surface geophysical approach to locate a karst conduit: a case study from Royal Spring Basin, Kentucky, USA: Journal of Nepal Geological Society, v. 51, p. 27–37, https://www.nepjol.info/index.php/JNGS/article/view/24085/20383

*Ward, J.W., *Warden, J.G.,*Bandy, A.M., †Fryar, A.E., Brion, G.M., Macko, S.A., Romanek, C.S., and Coyne, M.S., 2016, Use of nitrogen-15-enriched *Escherichia coli* as a bacterial tracer in karst aquifers: Groundwater, v. 54, no. 6, p. 830–839, http://doi.org/10.1111/gwat.12426 (IF = 2.6; n = 5).

*Coakley, T.L., Brion, G.M., and Fryar, A.E., 2015, Prevalence of and relationship between two human-associated DNA biomarkers for Bacteroidales in an urban watershed: Journal of Environmental Quality, v. 44, p. 1694–1698, http://doi.org/10.2134/jeq2014.11.0494 (IF = 2.4; n = 4).

*Mukherjee, A., Scanlon, B.R., Fryar, A.E., Saha, D., Ghosh, A., Chowdhuri, S., and Mishra, R., 2012, Solute chemistry and arsenic fate in aquifers between Himalayan foothills and Indian craton (including the central Gangetic plain): Influence of geology and geomorphology: Geochimica et Cosmochimica Acta, v. 90, p. 283–302, http://doi.org/10.1016/j.gca.2012.05.015 (IF = 5.0; n = 79).

*Mukherjee, A., Fryar, A.E., Scanlon, B.R., Bhattacharya, P., and Bhattacharya, A., 2011, Elevated arsenic in deeper groundwater of the western Bengal basin, India: extent and controls from regional to local scale: Applied Geochemistry, v. 26, no. 4, p. 600–613, http://doi.org/10.1016/j.apgeochem.2011.01.017 (IF = 3.4; n = 118).

*Reed, T.M., †Fryar, A.E., Brion, G.M., and *Ward, J.W., 2011, Differences in pathogen indicators between proximal urban and rural karst springs, central Kentucky, USA: Environmental Earth Sciences, v. 64, no. 1, p. 47–55, http://doi.org/10.1007/s12665-010-0816-8 (IF = 2.8; n = 15).

Benaabidate, L., and †Fryar, A.E., 2010, Controls on ground water chemistry in the central Couloir sud rifain, Morocco: Groundwater, v. 48, no. 2, p. 306–319, http://doi.org/10.1111/j.1745-6584.2008.00533.x (IF = 2.6; n = 5).

Fryar, A.E., *Thompson, K.E., Hendricks, S.P., and White, D.S., 2010, Incorporating a watershed-based summary field exercise into an introductory hydrogeology course: Journal of Geoscience Education, v. 58, no. 4, p. 214-220, https://doi.org/10.5408/1.3534861 (Scopus CiteScore = 4.0; n = 7 [Scopus]).

*Reed, T.M., *McFarland, J.T., †Fryar, A.E., Fogle, A.W., and Taraba, J.L., 2010, Sediment discharges during storm flow from proximal urban and rural karst springs, central Kentucky, USA: Journal of Hydrology, v. 383, p. 280–290, http://doi.org/10.1016/j.jhydrol.2009.12.043 (IF = 6.4; n = 17).

Fryar, A.E., 2009, Springs and the origin of bourbon: Groundwater, v. 47, no. 4, p. 605–610, http://doi.org/10.1111/j.1745-6584.2008.00543.x (IF = 2.6; n = 2).

*Mukherjee, A., Bhattacharya, P., Shi, F., Fryar, A.E., Mukherjee, A.B., Xie, Z.M., Sracek, O., Jacks, G., and Bundschuh, J., 2009, Chemical evolution in the high arsenic groundwater of the Huhhot basin (Inner Mongolia, P.R. China) and its difference from the western Bengal basin, India: Applied Geochemistry, v. 24, p. 1835–1851, http://doi.org/10.1016/j.apgeochem.2009.06.005 (IF = 3.4; n = 127).

*Mukherjee, A., Fryar, A.E., and Thomas, W.A., 2009, Geologic, geomorphic and hydrologic framework and evolution of the Bengal basin, India and Bangladesh: Journal of Asian Earth Sciences, v. 34, p. 227–244, http://dx.doi.org/10.1016/j.jseaes.2008.05.011 (IF = 3.0; n = 119).

*Ward, J.W., *Reed, T.M., Fryar, A.E., and Brion, G.M., 2009, Using the AC/TC ratio to identify fecal inputs in a karst groundwater basin: Environmental & Engineering Geoscience, v. 15, no. 2, p. 57–65, http://doi.org/10.2113/gseegeosci.15.2.57 (IF = 0.9; n = 4).

*LaSage, D.M., †Fryar, A.E., *Mukherjee, A., Sturchio, N.C., and Heraty, L.J., 2008, Groundwater-derived contaminant fluxes along a channelized Coastal Plain stream: Journal of Hydrology, v. 360, p. 265–280, http://doi.org/10.1016/j.jhydrol.2008.07.026 (IF = 6.4; n = 19).

*LaSage, D.M., *Sexton, J.L., *Mukherjee, A., †Fryar, A.E., and Greb, S.F., 2008, Groundwater discharge along a channelized Coastal Plain stream: Journal of Hydrology, v. 360, p. 252–264, http://doi.org/10.1016/j.jhydrol.2008.06.026 (IF = 6.4; n = 8).

*Mukherjee, A., and Fryar, A.E., 2008, Deeper groundwater chemistry and geochemical modeling of the arsenic affected western Bengal basin, West Bengal, India: Applied Geochemistry, v. 23, no. 4, p. 863–894, http://doi.org/10.1016/j.apgeochem.2007.07.011 (IF = 3.4; n = 199).

*Mukherjee, A., von Brömssen, M., Scanlon, B.R., Bhattacharya, P., Fryar, A.E., Hasan, M.A., Ahmed, K.M., Chatterjee, D., Jacks, G., and Sracek, O., 2008, Hydrogeochemical comparison and effects of overlapping redox zones on groundwater arsenic near the Western (Bhagirathi sub-basin, India) and

Eastern (Meghna sub-basin, Bangladesh) margins of the Bengal Basin: Journal of Contaminant Hydrology, v. 99, p. 31–48, http://doi.org/10.1016/j.jconhyd.2007.10.005 (IF = 3.6; n = 127).

Fryar, A.E., 2007, The future of hydrogeology, then and now: a look back at O.E. Meinzer's perspectives, 1934–47: Groundwater, v. 45, no. 2, p. 246–249, http://doi.org/10.1111/j.1745-6584.2006.00228.x (IF = 2.6; n = 6).

Fryar, A.E., *Thompson, K.E., Hendricks, S.P., and White, D.S., 2007, Groundwater flow and reservoir management in a tributary watershed along Kentucky Lake: Journal of the Kentucky Academy of Science, v. 68, no. 1, p. 11–23, https://doi.org/10.3101/1098-7096(2007)68[11:GFARMI]2.0.CO;2

*Mukherjee, A., Fryar, A.E., and Howell, P.D., 2007, Regional hydrostratigraphy and groundwater flow modeling of the arsenic affected western Bengal basin, West Bengal, India: Hydrogeology Journal, v. 15, no. 7, p. 1397–1418, http://doi.org/10.1007/s10040-007-0208-7 (IF = 2.8; n = 155).

*Mukherjee, A., Fryar, A.E., and Rowe, H.D., 2007, Regional-scale stable isotopic signature of recharge and deep groundwater in the arsenic affected areas of West Bengal, India: Journal of Hydrology, v. 334, p. 151–161, http://doi.org/10.1016/j.jhydrol.2006.10.004 (IF = 6.4; n = 117).

Taheri Tizro, A., Fryar, A.E., and Akbari, K., 2007, Hydrogeological framework and groundwater modeling of the Sujas basin, Zanjan Province, Iran: Journal of Applied Sciences, v. 7, no. 16, p. 2241–2251, http://docsdrive.com/pdfs/ansinet/jas/2007/2241-2251.pdf (n = 5 [Scopus]).

*Aseltyne, T.A., Rowe, H.D., and Fryar, A.E., 2006, Stable isotopic fingerprint of a hyporheic-hypolentic boundary in a reservoir: Hydrogeology Journal, v. 14, no. 8, p. 1688–1695, http://doi.org/10.1007/s10040-006-0088-2 (IF = 2.8; n = 6).

*Mukherjee, A., †Fryar, A.E., and *LaSage, D.M., 2005, Using tracer tests to assess natural attenuation of contaminants along a channelized Coastal Plain stream: Environmental & Engineering Geoscience, v. 11, no. 4, p. 371–382, http://doi.org/10.2113/11.4.371 (IF = 0.9; n = 11).

*Mehta, S., and Fryar, A.E., 2003, Discussion of "Associations between rural land uses and ground water quality in the Ogallala aquifer, northwest Texas," by Paul F. Hudak: Groundwater Monitoring & Remediation, v. 23, no. 4, p. 97–98, http://doi.org/10.1111/j.1745-6592.2003.tb00699.x (IF = 1.9, n = 1).

Etienne, N., *Butler, D.L., Fryar, A.E., and Coyne, M.S., 2001, Trichloroethene biodegradation potential in wetland soils and paleowetland sediments: Bioremediation Journal, v. 5, no. 1, p. 27–50, http://doi.org/10.1080/20018891079186 (IF = 2.0; n = 3 [Scopus]).

Fryar, A.E., Mullican, W.F., III, and Macko, S.A., 2001, Groundwater recharge and chemical evolution in the southern High Plains of Texas, USA: Hydrogeology Journal, v. 9, no. 6, p. 522–542, http://doi.org/10.1007/s10040-001-0161-9 (IF = 2.8; n = 25).

Fryar, A.E., Macko, S.A., Mullican, W.F., III, Romanak, K.D., and Bennett, P.C., 2000, Nitrate reduction during ground-water recharge, Southern High Plains, Texas: Journal of Contaminant Hydrology, v. 40, p. 335–363, http://doi.org/10.1016/S0169-7722(99)00059-5 (IF = 3.6; n = 47).

Fryar, A.E., *Wallin, E.J., and Brown, D.L., 2000, Spatial and temporal variability in seepage between a contaminated aquifer and tributaries to the Ohio River: Groundwater Monitoring & Remediation, v. 20, no. 3, p. 129–146, http://doi.org/10.1111/j.1745-6592.2000.tb00279.x (IF = 1.9; n = 31).

*Mehta, S., Fryar, A.E., and Banner, J.L., 2000, Controls on the regional-scale salinization of the Ogallala aquifer, Southern High Plains, Texas, USA: Applied Geochemistry, v. 15, no. 6, p. 849–864, http://doi.org/10.1016/S0883-2927(99)00098-0 (IF = 3.4; n = 34).

*Mehta, S., Fryar, A.E., Brady, R.M., and Morin, R.H., 2000, Modeling regional salinization of the Ogallala aquifer, Southern High Plains, TX, USA: Journal of Hydrology, v. 238, p. 44–64, http://doi.org/10.1016/S0022-1694(00)00314-0 (IF = 6.4; n = 22).

Fryar, A.E., and Schwartz, F.W., 1998, Hydraulic-conductivity reduction, reaction-front propagation, and preferential flow within a model reactive barrier: Journal of Contaminant Hydrology, v. 32, p. 333–351, http://doi.org/10.1016/S0169-7722(98)00057-6 (erratum: Fryar, A.E., and Schwartz, F.W., 2001, Journal of Contaminant Hydrology, v. 51, p. 127–129). (IF = 3.6; n = 33).

Fryar, A.E., and Schwartz, F.W., 1994, A method for studying diagenesis in shallow sediments using flow-through columns: Journal of Sedimentary Research, v. 64, no. 3a, p. 679–681, http://doi.org/10.1306/D4267E5B-2B26-11D7-8648000102C1865D (IF = 1.23 [2001]; n = 2).

Fryar, A.E., and Schwartz, F.W., 1994, Modeling the removal of metals from ground water by a reactive barrier: experimental results: Water Resources Research, v. 30, no. 12, p. 3455–3469, http://doi.org/10.1029/94WR01780 (IF = 5.4; n = 15).

Fryar, A.E., and Domenico, P.A., 1989, Analytical inverse modeling of regional-scale tritium waste migration: Journal of Contaminant Hydrology, v. 4, p. 113–125, http://doi.org/10.1016/0169-7722(89)90016-8 (IF = 3.6; n = 3 [Scopus]).

Book and proceedings chapters

Tobin, B.W., *Arpin, S.M., and Fryar, A.E., 2023, Cumberland Plateau case study: the Green River basin in Kentucky, *in* Stevens, L.E., ed., Springs of the World: Distribution, Ecology, and Conservation Status: Springs Stewardship Institute, Flagstaff, Arizona, p. 159–160, https://docs.springsdata.org/PDF/GlobalSprings.pdf

Stevens, L.E., Aly, A.A., *Arpin, S.M., and 58 others, 2022, The ecological integrity of spring ecosystems: a global review, *in* DellaSala, D.A., and Goldstein, M.I., eds., Imperiled: The Encyclopedia of Conservation: Elsevier, Amsterdam, p. 436–451, https://doi.org/10.1016/B978-0-12-821139-7.00111-2 (n = 10 [Scopus]).

Fryar, A.E., 2021, Groundwater of carbonate aquifers, *in* *Mukherjee, A., Scanlon, B., Aureli, A., Langan, S., Guo, H., and McKenzie, A., eds., Global Groundwater: Source, Scarcity, Sustainability, Security and Solutions: Elsevier, Amsterdam, p. 23–34, https://doi.org/10.1016/B978-0-12-818172-0.00002-5 (n = 4 [Scopus]).

Fryar, A.E., and *Mukherjee, A., 2021, Groundwater hydrogeology, *in* Elias, S., and Alderton, D., eds., Encyclopedia of Geology, 2nd edition, v. 6: Elsevier, Amsterdam, p. 399–407, https://doi.org/10.1016/B978-0-12-409548-9.12115-3

Fryar, A.E., *Barna, J.M., Benaabidate, L., *Howell, B.A., *Mehta, S., and *Mukherjee, A., 2021, Using oxygen-18 and deuterium to delineate groundwater recharge at different spatial and temporal scales, *in* Pandey, A., Kumar, S., and Kumar, A., eds., Hydrological Aspects of Climate Change: Springer Nature, Singapore, p. 303–312, https://doi.org/10.1007/978-981-16-0394-5_16

Chakraborty, M., *Mukherjee, A., Ahmed, K.M., Bhattacharya, P., and Fryar, A.E., 2019, Identifying the arsenic-safe aquifers of the Ganges Delta: some insights into sustainable aquifer management, *in* Zhu, Y., Guo, H., Bhattacharya, P., Ahmad, A., Bundschuh, J., and Naidu, R., eds., Environmental Arsenic in a Changing World: Proceedings of the 7th International Congress and Exhibition on Arsenic in the Environment (AS 2018), July 1–6, 2018, Beijing, P.R. China: CRC Press, Boca Raton, Florida, p. 627–628 (n = 1 [Scopus]).

*Barton, A.M., *Black Eagle, C.W., and †Fryar, A.E., 2012, Bourbon and springs in the Inner Bluegrass region of Kentucky, *in* Sandy, M.R., and Goldman, D., eds., On and around the Cincinnati Arch and Niagara Escarpment: Geological field trips in Ohio and Kentucky for the GSA North-Central Section Meeting, Dayton, Ohio, 2012: Geological Society of America Field Guide 27, p. 19–31, http://doi.org/10.1130/2012.0027(02) (n = 6 [Scopus]).

*Mukherjee, A., Fryar, A.E., Scanlon, B.R., Bhattacharya, P., Thunvik, R., and Bhattacharya, A., 2012, Wide spread arsenic in deeper groundwater of western Bengal basin, West Bengal, India: implications for sustainable alternate drinking water sources, *in* Ng, J.C., Noller, B.N., Naidu, R., Bundschuh, J., and Bhattacharya, P., eds., Understanding the Geological and Medical Interface of Arsenic – As 2012: CRC Press, Boca Raton, Florida, p. 522–525.

*Mukherjee, A., Fryar, A.E., and O'Shea, B.M., 2009, Major occurrences of elevated arsenic in groundwater and other natural waters, *in* Henke, K.R., ed., Arsenic—Environmental Chemistry, Health Threats and Waste Treatment: John Wiley & Sons, Chichester, U.K., p. 303–350 (n = 51 [Scopus]).

*Adank, K.M., Barton, C.D., and Fryar, A.E., 2008, Selected water quality attribute analyses of infiltrated waters from reforested loose-graded mine spoils in Eastern Kentucky, *in* Proceedings, EPA/NGWA Abandoned Mine Conference. National Ground Water Association, Westerville, Ohio, 15 p., http://ngwa.confex.com/ngwa/mine08/webprogram/Paper5457.html

*Haile, E., and Fryar, A.E., 2008, Geochemical modeling of regional hydrochemical evolution in the Wilcox aquifer of Missouri and Arkansas: Gulf Coast Association of Geological Societies Transactions, v. 58, p. 339–342.

Taheri Tizro, A., Fryar, A.E., Chulli, B., and Lahooni, S., 2007, Hydrogeological framework and groundwater modeling of the Sujas basin, Zanjan Province, Iran. In Proceedings of OttawaGeo2007: 60th Canadian Geotechnical Conference & 8th Joint CGS/IAH-CNC Groundwater Conference, p. 119–122.

Benaabidate, L., Fryar, A.E., and Zian, A., 2006, An approach to geochemical study of thermal springs in northern Morocco, *in* Laftouhi, N., and Hanich, L., eds., GIRE3D 2006, Integrated Water Resources Management and Challenges of the Sustainable Development, Marrakech, Morocco (CD-ROM), 8 p.

Fryar, A.E., and *Mukherjee, A., 2006. Arsenic pollution in the western Bengal basin: Is deeper water an alternate safe source? In Laftouhi, N., and Hanich, L., eds., GIRE3D 2006, Integrated Water Resources Management and Challenges of the Sustainable Development, Marrakech, Morocco (CD-ROM), 4 p.

Fryar, A.E., 1998, Self-organization in hydrogeologic systems, *in* Domenico, P.A., and Schwartz, F.W., Physical and Chemical Hydrogeology, 2nd edition: John Wiley & Sons, New York, Section 16.4, p. 341–342.

Fryar, A.E., Macko, S.A., Romanak, K.D., Bennett, P.C., and Mullican, W.F., III, 1995, Evidence of limited denitrification beneath playas recharging the Ogallala aquifer, *in* Jensen, Ric, ed., Proceedings of the 24th Water for Texas Conference: Texas Water Resources Institute, College Station, p. 443–452.

Fryar, A.E., Macko, S.A., Romanak, K.D., Bennett, P.C., and Mullican, W.F., III, 1995, Evidence of partial denitrification during ground-water recharge, Southern High Plains, Texas, *in* Charbeneau, R.J., ed., Groundwater Management: American Society of Civil Engineers, New York, p. 115–120 (n = 1 [Scopus]).

Mullican, W.F., III, Fryar, A.E., and Johns, N.D., 1994, Vertical transport of contaminants through perched aquifers to the Ogallala aquifer, Pantex Plant area, Southern High Plains, Texas, *in* Dutton, A.R., ed., Toxic Substances and the Hydrologic Sciences: American Institute of Hydrology, Minneapolis, p. 547–562.

Mullican, W.F., III, Johns, N.D., and Fryar, A.E., 1994, What a difference a playa can make: defining recharge scenarios, rates, and contaminant transport to the Ogallala (High Plains) aquifer, *in* Urban, L.V., and Wyatt, A.W., eds., Proceedings, Playa Basin Symposium: Lubbock, Texas Tech University, p. 97–106.

Essays, reviews, and columns

Fryar, A., 2023, Fulbright opportunities are for hydrogeologists, too: The Hydrogeologist (Newsletter of the Geological Society of America Hydrogeology Division), no. 110, p. 14–16, http://community.geosociety.org/hydrodivision/resources/newsletters

Fryar, A., and Wells-Hosley, J., 2022, UK grad studies water resources in Ukraine through Fulbright scholarship: University of Kentucky News, Dec. 20, https://uknow.uky.edu/research/uk-grad-studies-water-resources-ukraine-through-fulbright-scholarship

Fryar, A.E., 2019, Citation, 2019 O.E. Meinzer Award presented to Bridget Scanlon: Geological Society of America – Honors & Awards, http://www.geosociety.org/GSA/About/awards/GSA/Awards/2019/meinzer.aspx

Fryar, A., 2018, Preamble on Groundwater Quality of South Asia, *in* Mukherjee, A., ed., Groundwater of South Asia: Springer, Singapore, p. xxiv.

Fryar, A., 2017, Review of “High and Dry: Meeting the Challenges of the World’s Growing Dependence on Groundwater”: Groundwater, v. 55, no. 4, p. 483–484, https://doi.org/10.1111/gwat.12537 (IF = 2.6).

Fryar, A., 2015, Field sketches: EARTH Magazine, v. 60, no. 8, p. 68, http://www.earthmagazine.org/article/geologic-column-field-sketches

Fryar, A., 2014, Review of “Too Hot to Touch: The Problem of High-Level Nuclear Waste”: Groundwater, v. 52, no. 3, p. 335–336, https://doi.org/10.1111/gwat.12192 (IF = 2.6).

Fryar, A., 2014, Chair's corner: The Hydrogeologist, no. 83, p. 2.

Fryar, A., 2014, Chair's corner: The Hydrogeologist, no. 82, p. 2, 5.

Fryar, A., 2014, Chair's corner: The Hydrogeologist, no. 81, p. 2.

Fryar, A., 2013, Review of "History of the Development of Hydrogeology in the United States (2nd Edition)" and "History of Hydrogeology": Groundwater, v. 51, no. 6, p. 813–814, https://doi.org/10.1111/gwat.12123 (IF = 2.6, n = 1).

Fryar, A., 2013, Hijabs, hydrology, and Lyle Lovett: The Chronicle of Higher Education, v. 59, no. 18, p. B20.

Fryar, A., and Milewski, A., 2013: The BOOST initiative: International Association of Hydrogeologists, U.S. National Chapter Newsletter, v. 42, no. 2, p. 15–16, https://iah-usa.org/wp-content/uploads/newsletter/fall2013.pdf

Fryar, A., 2011, Pakistan beyond the headlines: an American professor's perspective: International Educator, v. 20, no. 6, p. 50–51.

Fryar, A., 2011, My midlife French lessons: The Chronicle of Higher Education, v. 57, no. 22, p. B20.

*Mukherjee, A., Bhattacharya, P., and Fryar, A.E., 2011, Preface: Arsenic and other toxic elements in surface and groundwater systems: Applied Geochemistry, v. 26, no. 4, p. 415–420, http://doi.org/10.1016/j.apgeochem.2011.01.001 (IF = 3.4; n = 13).

Fryar, A.E., 2009, Citation, 2009 O.E. Meinzer Award presented to W. Mike Edmunds: Geological Society of America – Honors & Awards, http://www.geosociety.org/awards/09speeches/meinzer.htm

Fryar, A.E., 2008, Review of "When the Rivers Run Dry: Water—The Defining Crisis of the Twenty-First Century": Environmental & Engineering Geoscience, v. 14, no. 1, p. 53–54, https://doi.org/10.2113/gseegeosci.14.1.53 (IF = 0.9).

Fryar, A.E., 2005, Review of "Fundamentals of Ground Water": Environmental & Engineering Geoscience, v. 11, no. 3, p. 285–286, https://doi.org/10.2113/11.3.285 (IF = 0.9).

Fryar, A., 2003, "Don't miss the boat"…join us in Seattle for GSA 2003: The Hydrogeologist, no. 59, p. 1, 16.

Fryar, A., 2003, Seattle GSA Annual Meeting taking shape: The Hydrogeologist, no. 58, p. 6, 17.

Fryar, A.E., 1999, Review of "Groundwater in Geologic Processes": Journal of Geoscience Education, v. 47, p. 498, https://doi.org/10.5408/1089-9995-47.5.498 (Scopus CiteScore = 4.0).

Reports (selected)

Sullivan, P.L., Wymore, A.S., McDowell, W.H., and 51 others, 2017, New opportunities for critical zone science, 2017 CZO Arlington Meeting White Booklet: Critical Zone Observatories, U.S. NSF National Program, 41 p.

*Currens, B., Fryar, A., and Agouridis, C., 2014, Common hazards in karst terrain: University of Kentucky, College of Agriculture, Food and Environment, Cooperative Extension Service Bulletin AEN-126, http://www2.ca.uky.edu/agc/pubs/AEN/AEN126/AEN126.pdf

Fryar, A., Milewski, A., Schroeder, P., Agouridis, C., Hanley, C., Tanaka, K., and Reed, M., 2014, BOOST H_2O (Helping Hydrologic Outreach) in Indonesia and Turkey: final report prepared for the U.S. Department of State under grant S-LMAQM-12-GR-1140, 23 p.

Fryar, A., Milewski, A., and Sultan, M., 2014, Enhancing capacity for water-resource studies in Egypt and Morocco: final report prepared for the U.S. Department of State under grant S-LMAQM-11-GR-1026, 24 p.

Hampson, S., Fryar, A., Woolery, E., Zhu, J., and Henke, K., 2014, Hydrolithostratigraphy data compilation summary for the Paducah Gaseous Diffusion Plant: report prepared by the Kentucky Research Consortium for Energy and Environment for the U.S. Department of Energy under grant number DE-FG05-03OR23032, 87 p.

Fryar, A.E., *Ward, J.W., *Reed, T.M., Coyne, M.S., and Brion, G.M., 2007, Tracking of fecal indicator microorganisms through karst environments, Inner Bluegrass region, Kentucky: final SB-271 project report prepared for the College of Agriculture, University of Kentucky, 38 p.

*Reed, T.M., †Fryar, A.E., Brion, G.M., Coyne, M.S., Taraba, J.L., Fogle, A.W., 2005, Suspended sediment and pathogen transport in two Inner Bluegrass karst ground-water basins: final SB-271 project report prepared for the College of Agriculture, University of Kentucky, 40 p.

Boutwell, G.P., Jr., Fryar, A.E., Kenny, J.E., Malone, P.G., and Ricci, P.F., 2002, Long-term stabilization design for long-term cover systems: Technical peer review report ASME/CRTD-RP-02-37, *in* Institute for Regulatory Science, Assessment of Technologies Supported by the Office of Science and Technology, Department of Energy, Results of the Peer Review for Fiscal Year 2002: New York, ASME International, p. 484–494.

Fryar, A.E., *Butler, D.L., *Etienne, N., *Sweat, C.J., and Coyne, M.S., 1999, Summary report on hydrogeologic investigations at Metropolis Lake: report prepared for the Kentucky State Nature Preserves Commission, 14 p.

Fryar, A.E., Brown, D.L., Wenner, D.B., Rasmussen, T.C., and *Wallin, E.J., 1998, Spatial and temporal variability in seepage between a contaminated aquifer and tributaries to the Ohio River: University of Kentucky, Kentucky Water Resources Research Institute Research Report 203, 48 p.

Fryar, A.E., 1997, Subsurface degradation and sorption of chloroethenes in the vicinity of the Paducah Gaseous Diffusion Plant: report prepared for the Federal Facilities Oversight Unit, Kentucky Water Resources Research Institute, University of Kentucky, 46 p.

Mullican, W.F., III, Johns, N.D., and Fryar, A.E., 1997, Playas and recharge of the Ogallala aquifer on the Southern High Plains of Texas—an examination using numerical techniques: The University of Texas at Austin, Bureau of Economic Geology Report of Investigations No. 242, 72 p.

Fryar, A.E., and Mullican, W.F., III, 1995, Delineating controls on the composition of ground water in the vicinity of the Pantex Plant, Southern High Plains, Texas: The University of Texas at Austin, Bureau of Economic Geology, final contract report prepared for the U.S. Department of Energy under subgrant to DOE Grant No. DE-FG04-90AL65847, 88 p.

Mullican, W.F., III, Johns, N.D., and Fryar, A.E., 1995, Development and sensitivity analysis of steady-state and transient Ogallala aquifer ground-water flow and particle tracking models: The University of Texas at Austin, Bureau of Economic Geology, final contract report prepared for the U.S. Department of Energy under subgrant to DOE Grant No. DE-FG04-90AL65847, 115 p.

Kreitler, C.W., Akhter, M.S., Mullican, W.F., III, Avakian, A.J., and Fryar, A.E., 1994, Abandoned well characterization: a methodology to evaluate regional hydraulic controls on flow from hydrocarbon reservoirs into underground sources of drinking water: The University of Texas at Austin, Bureau of Economic Geology, final contract report prepared for the American Petroleum Institute, 149 p.

Dissertation/thesis

Fryar, A.E., 1992, The geochemical and hydraulic evolution of reaction fronts in sand columns: Edmonton, Canada, University of Alberta, PhD dissertation, 190 p.

Fryar, A.E., 1986, Determination of transport parameters from coincident chloride and tritium plumes at the Idaho National Engineering Laboratory: College Station, Texas A&M University, MS thesis, 69 p.

Conference abstracts (* = current or former student; † = presenter [if not lead author])

Fryar, A., Das, P., Walia, D., and Pathak, M.K., 2024, Controls on groundwater chemistry and recharge on the karstified rim of the Meghalaya Plateau, India: Geological Society of America Abstracts with Programs, v. 56, no. 5, doi: 10.1130/abs/2024AM-404537

Fryar, A., Milewski, A., Hanley, C., El Kadiri, R., Garing, C., Laftouhi, N., Benaabidate, L., Zemzami, M., 2024, Examining groundwater sustainability in Morocco through a field-centered training project: doi: 10.1130/abs/2024AM-404577.

Geological Society of America Abstracts with Programs, v. 56, no. 5,Erhardt, A., *Avery, E., Samonina, O., Kryshtop, L., Vyshenska, I., and Fryar, A., 2023, A holistic view of water sources in Kyiv, Ukraine using tap water, surface water, groundwater, and precipitation hydrogen (δ^2H) and oxygen (δ^{18}O) stable isotope ratios: EGU General Assembly 2023, Vienna, Austria, 24–28 Apr. 2023, EGU23-7356, https://doi.org/10.5194/egusphere-egu23-7356

Fryar, A.E., Schreiber, M.E., Pholkern, K., Srisuk, K., and Ziegler, B.A., 2023, Controls on arsenic and manganese occurrence in the Mekong River alluvial aquifer (Thailand): Geological Society of America Abstracts with Programs, v. 55, no. 6, doi: 10.1130/abs/2023AM-395791

*Sarker, S.K., Fryar, A.E., Byrne, D.M., *Dapkus, R.T., and Hutchison, J.M., 2023, Modeling health risks of pathogens in karst basins: implications of data uncertainty and detection limits: Geological Society of America Abstracts with Programs, v. 55, no. 6, doi: 10.1130/abs/2023AM-391757

Song, M., Brookfield, A.E., and Fryar, A.E., 2023, Integrated hydrologic model calibration under non-stationary climates: Geological Society of America Abstracts with Programs, v. 55, no. 6, doi: 10.1130/abs/2023AM-392564

*Arimes, A., *Chappuies, J., *Dapkus, R., and Fryar, A.E., 2022, Comparing controls on water quality in two karst basins, Inner Bluegrass Region, Kentucky: Geological Society of America Abstracts with Programs, v. 54, no. 4, doi: 10.1130/abs/2022NC-375534

*Arpin, S.M., and Fryar, A.E., 2022, Hydrogeology of Silvertip Mountain, Bob Marshall Wilderness Area, Montana: 2022 NSS Convention Program Guide, p. 42, https://nss2022.caves.org/index.php/program-guide/

*Avery, E., Samonina, O., Kryshtop, L., Vyshenska, I., Fryar, A.E., and Erhardt, A.M., 2022, Use of isotopes in examining precipitation patterns in north-central Ukraine: EGU General Assembly 2022, Vienna, Austria, 23–27 May 2022, EGU22-6246, https://doi.org/10.5194/egusphere-egu22-6246

*Dapkus, R., Fryar, A.E., Byrne, D.M., and *Sarker, S., 2022, Variability in E. coli and tryptophan-like fluorescence in two karst basins, Inner Bluegrass Region, Kentucky: Geological Society of America Abstracts with Programs, v. 54, no. 4, doi: 10.1130/abs/2022NC-374843

*Dapkus, R., Fryar, A.E., *Sarker, S.K., and Byrne, D.M., 2022, Examining the utility of tryptophan-like fluorescence as a proxy for fecal contamination in karst basins, Inner Bluegrass Region, Kentucky, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 26–27.

Erhardt, A.M., *Alvarez, C., Fichtner, V., Parris, T.M., Zhu, J., Fryar, A., Webb, S.E., and Munizzi, J., 2022, Causes and extent of elevated methane concentrations in the groundwater of eastern Kentucky: Geological Society of America Abstracts with Programs, v. 54, no. 4, doi: 10.1130/abs/2022NC-375609

Fryar, A.E., 2022, Isotopic evidence of paleo-recharge to regional confined aquifers in the continental USA, *in* Theme Concepts & Abstracts, 2nd Roorkee Water Conclave 2022: Indian Institute of Technology Roorkee and National Institute of Hydrology, Roorkee, p. 6, https://www.iitr.ac.in/rwc/pdf/final_abstract_book.pdf

Fryar, A., *Currens, B., *Alvarez Villa, C., 2022, Delineating stormwater drainage during a record-wet year in an urbanized karst basin, Lexington, Kentucky: Kentucky Academy of Science 2022 Annual Meeting Program, https://mms.kyscience.org/members/publication/program_issue.php?iid=1112921

Fryar, A., Milewski, A., Laftouhi, N., Saad, A., Allen, M., Chaney, H., Davidson, L., Gee, M., Proteau, M., Richards, D., 2022. Dryland recharge assessment in Morocco (DReAM): cross-cultural education in hydrology and water resources for U.S. students: Geological Society of America Abstracts with Programs, v. 54, no. 5, doi: 10.1130/abs/2022AM-381594

*Haile, E., *Currens, B.J., and †Fryar, A., 2022, Paleoclimate controls on stable isotope compositions of groundwater in the Wilcox aquifer of the Mississippi Embayment: Geological Society of America Abstracts with Programs, v. 54, no. 5, doi: 10.1130/abs/2022AM-381672

Erhardt, A.M., *Alvarez, C., Fichtner, V., Parris, T.M., Zhu, J., Fryar, A.E., Webb, S.E., and Munizzi, J., 2021, Using sulfate and methane isotopes to track methane sources in Eastern Kentucky groundwater: American Geophysical Union Fall Meeting Abstract H51G-08, https://agu.confex.com/agu/fm21/meetingapp.cgi/Paper/806525

Fryar, A.E., 2021, Reflecting on water: contrasting lessons from two courses during the pandemic: Geological Society of America Abstracts with Programs, v. 53, no. 6, doi: 10.1130/abs/2021AM-369299

*Sarker, S.K., and Fryar, A.E., 2021, Susceptibility of a mountainous karst spring to climate and land use/ landcover change, Liddar basin, Kashmir, India: Geological Society of America Abstracts with Programs, v. 53, no. 6, doi: 10.1130/abs/2021AM-366940

*Avery, E., Samonina, O., Kryshtop, L., Vyshenska, I., Fryar, A.E., and Erhardt, A.M., 2020, Utilizing stable isotopes of water to investigate climate change in north-central Ukraine: American Geophysical Union Fall Meeting Abstract H167-0017, https://agu.confex.com/agu/fm20/meetingapp.cgi/Paper/688936

*Currens, B.J., *Alvarez Villa, C., and †Fryar, A.E., 2020, Stable isotopic delineation of recharge in an urban karst basin, central Kentucky (USA): Geological Society of America Abstracts with Programs, v. 52, no. 6, doi: 10.1130/abs/2020AM-357449.

Fryar, A.E., 2020, Using oxygen-18 and deuterium to delineate groundwater recharge at different spatial and temporal scales, *in* Theme Concepts & Abstracts, Roorkee Water Conclave 2020: Indian Institute of Technology Roorkee, p. 19, https://www.iitr.ac.in/rwc2020/pdf/theme_concepts_abstracts-book.pdf

Fryar, A., *Barna, J., and *Howell, B., 2020, Variable responses of mountainous karst springs to seasonal precipitation, *in* Conservation of Fragile Karst Resources: A Workshop on Sustainability and Community, https://digitalcommons.wku.edu/con_karst_res_proc/con_karst_pro_2020/day_one/19

*Mukherjee, A., Gupta, S., Coomar, P., Fryar, A.E., Bhattacharya, P., Guillot, S., Verma, S., and Charlet, L., 2020, Does plate tectonics generate primary source for worldwide groundwater arsenic? Geological Society of America Abstracts with Programs, v. 52, no. 6, doi: 10.1130/abs/2020AM-354550.

*Alvarez Villa, C., Erhardt, A.M., Fryar, A., Parris, T.M., Zhu, J., and Webb, S.E., 2019, Identification of the causes and extent of elevated methane concentrations in the groundwater of eastern Kentucky: 2019 Eastern Section AAPG Technical Program.

*Alvarez Villa, C., Erhardt, A.M., Fryar, A., Parris, T.M., Zhu, J., and Webb, S.E., 2019, Identification of the causes and extent of elevated methane concentrations in the groundwater of eastern Kentucky: Geological Society of America Abstracts with Programs, v. 51, no. 5, doi: 10.1130/abs/2019AM-337591.

Brion, G., *Currens, B.J., Fryar, A.E., and Hall, A., 2019, Use of acetaminophen and sucralose as co-analytes to differentiate sources of human excreta in surface waters: American Geophysical Union Fall Meeting Abstract H33D-06, https://agu.confex.com/agu/fm19/meetingapp.cgi/Paper/486623

Fryar, A., *Bandy, A., and *Ward, J., 2019, Tracing bacterial transport in epikarst and karst-conduit aquifers with injected E. coli. In Gómez Hérnandez., J.J., and Andreo Navarro, B., Groundwater Management and Governance—Coping with Uncertainty, Proceedings of IAH2019, the 46th Annual Congress of the International Association of Hydrogeologists. Asociación Internacional de Hidrogeólogos – Grupo Español, Barcelona, p. 617.

McQueen, B., *Avery, E.A., Zhu, J., Fryar, A., and Erhardt, A.M., 2019, Using geochemical methods to trace groundwater/surface water interaction: Geological Society of America Abstracts with Programs, v. 51, no. 5, doi: 10.1130/abs/2019AM-339725.

*Peterman, C., Fryar, A., Edwards, D., Gorman-Sanisaca, L., and Gellis, A.C., 2019, Sensitivity of fluvial source contributions in a mixed land-use environment: Otter Creek, Fort Knox, Kentucky: Geological Society of America Abstracts with Programs, v. 51, no. 2, doi: 10.1130/abs/2019SC-327124.

*Bandy, A.M., and †Fryar, A.E., 2018, Use of *E. coli* serotypes as tracers in epikarst and karst-conduit aquifers: Geological Society of America Abstracts with Programs, v. 50, no. 6, doi: 10.1130/abs/2018AM-321075.

*Barna, J.M., Fryar, A.E., Peng, T., Cao, L., and Zhu, C., 2018, Variability in groundwater flow and chemistry in the Houzhai karst basin, Guizhou province, China: Geological Society of America Abstracts with Programs, v. 50, no. 6, doi: 10.1130/abs/2018AM-320962.

Fryar, A.E., Freeman, R.L., Hanley, C., and *Sherman, A.R., 2018, Exploring water quality in eastern India and Kentucky: an integrated online and field project for place-based and cross-cultural geoscience education: Geological Society of America Abstracts with Programs, v. 50, no. 3, doi: 10.1130/abs/2018SE-312516.

Fryar, A.E., Hanley, C., Freeman, R.L., and *Sherman, A.R., 2018, WIIKY (Water In India and Kentucky): integrating field experiences with an online platform for high school classes: Geological Society of America Abstracts with Programs, v. 50, no. 6, doi: 10.1130/abs/2018AM-322401.

*Peterman, C., Fryar, A., Edwards, D., Gorman-Sanisaca, L., and Gellis, A.C., 2018, Sensitivity of fluvial source contributions in a mixed land-use environment: Otter Creek, Fort Knox, Kentucky: Geological Society of America Abstracts with Programs, v. 50, no. 6, doi: 10.1130/abs/2018AM-319124.

*Sherman, A.R., *Merrick, J., Zhu, J., Fryar, A., and Lee, B., 2018, Water corrosivity analysis for the public water supply system of Lexington, Kentucky: Geological Society of America Abstracts with Programs, v. 50, no. 6, doi: 10.1130/abs/2018AM-319356.

*Sherman, A.R., *Merrick, J., Zhu, J., Fryar, A., and Lee, B., 2018, Water quality analysis in municipal water supply system for Lexington, KY with a focus on corrosivity, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 54–55.

Zhu, C., and Fryar, A., 2018, Hydrogeochemistry of the past 25 and the next 25 years: a review of Frank Schwartz's contributions to hydrogeochemistry and the state of the subdiscipline: Geological Society of America Abstracts with Programs, v. 50, no. 6, doi: 10.1130/abs/2018AM-317740.

Elkins, J.T., Fryar, A.E., and Mosher, M.D., 2017, Geochemical and physiographic influence on the location of Kentucky bourbon and Tennessee whiskey distilleries: Geological Society of America Abstracts with Programs, v. 49, no. 6, doi: 10.1130/abs/2017AM-308143.

Freeman, R., Bathon, J., Fryar, A.E., Lyon, E., and McGlue, M.M., 2017, Early college STEM-focused high schools: a natural and overlooked recruitment pool for the geosciences: American Geophysical Union Fall Meeting Abstract ED21C-07.

Fryar, A.E., *Ward, J.W., *Howell, B.A., and *Reed, T.M., 2017, Responses of karst springs to precipitation reflect land use, lithology, and climate: National Ground Water Association Groundwater Summit, https://ngwa.confex.com/ngwa/2017gws/webprogram/meeting.html

Fryar, A.E., *Ward, J.W., *Howell, B.A., and *Reed, T.M., 2017, Thermal and chemical responses of karst springs to forcings at multiple time scales, *in* Proceeding, 11th International Symposium on Geochemistry of the Earth's Surface: State Key Laboratory of Environmental Geochemistry, Guiyang, China.

Lyon, E., Rosen, A., Freeman, R., Fryar, A., McGlue, M., and Bathon, J., 2017, Elevating the standards: using the Next Generation Science Standards to promote geoscience awareness in STEM high schools: Geological Society of America Abstracts with Programs, v. 49, no. 6, doi: 10.1130/abs/2017AM-308145.

*Merrick, J., Beck, G., and Fryar, A., 2017, Numerical modeling of anthropogenic impacts on groundwater availability in an agricultural landscape, Jackson Purchase region, Kentucky, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 61–62.

*Peterman, C.L., Fryar, A.E., and Edwards, D., 2017, Determining the provenance of a contemporary sediment load within the Otter Creek watershed, Kentucky: Geological Society of America Abstracts with Programs, v. 49, no. 6, doi: 10.1130/abs/2017AM-298650.

*Peterman, C., Fryar, A., and Edwards, D., 2017, Soil and sediment fingerprinting of the Otter Creek watershed draining Fort Knox: an advanced game of match, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 65–66.

*Sherman, A.R., Fryar, A., Walles, G., Marshall, C., and Moumouni, A., 2017, Temporal and spatial variability in groundwater flow and chemistry along the Cumberland River, Artemus, Kentucky: Geological Society of America Abstracts with Programs, v. 49, no. 6, doi: 10.1130/abs/2017AM-303623.

*Sherman, A.R., *Merrick, J., Zhu, J., Fryar, A., and Lee, B., 2017, GIS ArcMap cost distance tool used to determine public water supply relative risk metals sampling sites in Lexington, Kentucky: Geological Society of America Abstracts with Programs, v. 49, no. 6, doi: 10.1130/abs/2017AM-303524.

*Bandy, A., Fryar, A., Cook, K., Polk, J., McClanahan, K., and Macko, S., 2016, Mobility of *Escherichia coli* compared to traditional groundwater tracers within karst terrains. In White, W., Herman, E., Rutigliano, M., Herman, J., Vesper, D., and Engel, S., Eds., Karst Groundwater Contamination and Public Health. Selected papers and abstracts of the symposium held January 27 through 30, 2016, San Juan, Puerto Rico. Special Publication 19, Karst Waters Institute, Leesburg, Virginia, p. 13, http://karstwaters.org/wp-content/uploads/2016/12/SP19_Final-reduced.pdf

*Yeley, M.R., *Tholt, O., *Fredericks, S., *Dixon, N., and Fryar, A., 2016, Testing water quality in the Wolf Run basin: Showcase of Undergraduate Scholars, University of Kentucky, p. 89, http://www.uky.edu/academy/sites/www.uky.edu.academy/files/Abstract%20Book%20COMPLETE%20-%20WEBSITE.pdf

*Young, H.A., *Peterman, C.L., Fryar, A.E., and Murray, K.S., 2016, Surface water quality assessment of Otter Creek, Meade County, Kentucky: Geological Society of America Abstracts with Programs, v. 48, no. 7, doi: 10.1130/abs/2016AM-284525.

*Dixon, N., *Sanchez, C., Fryar, A.E., and *Bandy, A.M., 2015, Water quality in the Wolf Run basin, Lexington, Kentucky: Geological Society of America Abstracts with Programs, v. 47, no. 7, p. 526.

*Howell, B.A., Fryar, A.E., and Benaabidate, L., 2015, Spring responses to storms and seasonal variations in recharge in the Middle Atlas region of Morocco: American Geophysical Union Fall Meeting Abstract H43D-1527.

*Sanchez, C., *Dixon, N., *Bandy, A., and Fryar, A., 2015, Water quality in the Wolf Run basin, Lexington, Kentucky: Showcase of Undergraduate Scholars, University of Kentucky, p. 65–66, http://www.uky.edu/academy/sites/www.uky.edu.academy/files/Abstract%202015%20-%20Full.2.pdf

*Bandy, A.M., Fryar, A.E., Macko, S.A., and Cook, K., 2014, Use of isotopically-tagged isolates of *E. coli* for tracking bacterial movement in karst environments: American Geophysical Union Fall Meeting Abstract H31C-0628, https://agu.confex.com/agu/fm14/meetingapp.cgi/Paper/19461

*Bandy, A.M., Fryar, A.E., Macko, S.A., and Cook, K., 2014, Use of stable isotope-labeled *Escherichia coli* as a tracer in karst aquifers: Geological Society of America Abstracts with Programs, v. 46, no. 6, p. 458.

*Currens, B.J., Sawyer, A.H., and Fryar, A.E., 2014, Deuterium and oxygen-18 diffusion in a confined aquifer: a numerical model of stable isotope diffusion across aquitard-aquifer boundaries: American Geophysical Union Fall Meeting Abstract PP31D-1157.

Fryar, A.E., and Milewski, A.M., 2014, BOOST to ARCHES: enhancing capacity and networking for early-career hydrologic scientists from North Africa to Southeast Asia: Proceedings, 41st International Association of Hydrogeologists Congress, CD-ROM.

Fryar, A.E., Schreiber, M., Pholkorn, K., Srisuk, K., and Ziegler, B., 2014, Spatial and seasonal variability in arsenic and other solutes in groundwater along the Mekong River, northeast Thailand: Geological Society of America Abstracts with Programs, v. 46, no. 6, p. 688.

Agustina, C., Fajri, P.N.Y., Fathoni, F., Gusti, T.P., Harifa, A.C., Hendra, Y., Hertanti, D.R., Lusiana, N., Rohmat, F.I., Agouridis, C., Fryar, A.E., Milewski, A., Pandjaitan, N., Santoso, R., and Surharyanto, A., 2013, Field training activities for hydrologic science in west Java, Indonesia: American Geophysical Union Fall Meeting Abstract ED22A-08.

Derin, Y., Hatipoglu, E., Sunnetci, M.O., Tanyas, H., Unal Ercan, H., Aktuna, Z., Agouridis, C., Fryar, A.E., Milewski, A., Schroeder, P., Ece, O.I., and Yilmaz, K.K., 2013, BOOST H2O – field training activities for hydrologic science near Lake Iznik, Turkey: American Geophysical Union Fall Meeting Abstract ED22A-07.

Derin, Y., Milewski, A., Fryar, A.E., and Schroeder, P., 2013, An integrated approach for understanding anthropogenic and climatic impacts on lakes: a case study from Lake Iznik, Turkey: American Geophysical Union Fall Meeting Abstract H31H-1312.

Fryar, A.E., Milewski, A.M., Sultan, M., Benaabidate, L., Laftouhi, N., Fekri, A., Cherif, O., Elewa, H., Garamoon, H., Ward, J.W., and Hanley, C., 2013, Building Opportunity Out of Science and Technology (BOOST): enhancing capacity for hydrologic science in Morocco and Egypt: American Geophysical Union Fall Meeting Abstract ED22A-06.

Fryar, A.E., Milewski, A.M., Agouridis, C., Schroeder, P.A., Sultan, M., Hanley, C., Tanaka, K., and Reed, M.R., 2013, Enhancing capacity for hydrologic science from North Africa to Southeast Asia: the BOOST initiative: Geological Society of America Abstracts with Programs, v. 45, no. 7, p. 646.

Milewski, A., Fryar, A.E., Durham, M.C., Schroeder, P., Agouridis, C., Hanley, C., and Rotz, R.R., 2013, ARCHES: Advancing Research & Capacity in Hydrologic Education and Science: American Geophysical Union Fall Meeting Abstract ED22A-05.

El Kadiri, R., Milewski, A., Durham, M., and Fryar, A.E., 2012, Rainfall-runoff modeling for the assessment of renewable water resources over Moroccan watersheds: Sebou, Melouya, Souss, Bouregrag, Tensift, and Oum Er Rbia: Geological Society of America Abstracts with Programs, v. 44, no. 7, p. 116.

El Moulat, M., Fekri, A., Fryar, A.E., Milewski, A., and Gloaguen, R., 2012, Delineation of groundwater potential zones and zones of groundwater quality suitable for domestic purposes using remote sensing and GIS techniques: Geological Society of America Abstracts with Programs, v. 44, no. 7, p. 117.

Fryar, A.E., Milewski, A.M., and Sultan, M., 2012, Enhancing capacity for water-resource studies in the Middle East and North Africa: building opportunity out of science and technology: Congress Program and Abstracts, 39th International Association of Hydrogeologists Congress, p. 65.

Fryar, A.E., *Ward, J.W., Milewski, A., Elyomni, S., Alnaimy, M., Ammar, M., El Moulat, M., Tifratine, S., and Zamrane, Z., 2012, Enhancing capacity for water-resource studies in Egypt and Morocco: field training activities in arid zone hydrology: Geological Society of America Abstracts with Programs, v. 44, no. 7, p. 116.

Laftouhi, N., Fekri, A., Benaabidate, L., Markhi, A., Zamrane, Z., Fryar, A.E., Milewski, A., and Sultan, M.I., 2012, The integration of GIS and remote sensing in training and research in the field of water resources management in Morocco: evolution and benefits: Geological Society of America Abstracts with Programs, v. 44, no. 7, p. 116.

Markhi, A., Laftouhi, N., Soulaimani, A., Milewski, A., and Fryar, A.E., 2012, Problem of watershed erodibility in the High Atlas of Marrakech (Morocco) and its impact on water resources: Geological Society of America Abstracts with Programs, v. 44, no. 7, p. 117.

Milewski, A., El Kadiri, R., Durham, M., Fryar, A.E., Abu Salem, H., Mahdy, M., Merkhi, A., Nosair, A., Zemzami, M., and Ouzzani Ibrahimi, K., 2012, Hydrological capacity building in the Middle East and North Africa: examples from distance learning and applied workshops: Geological Society of America Abstracts with Programs, v. 44, no. 7, p. 115.

*Skees, C.F., and Fryar, A.E., 2012, Delineation of solute inputs to the headwaters portion of the Cane Run/Royal Spring basin of north central Kentucky, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 83.

*Skees, C.F., and Fryar, A.E., 2012, Using geochemical analyses to delineate solute inputs to the headwaters portion of the Cane Run/Royal Spring basin of north central Kentucky: Geological Society of America Abstracts with Programs, v. 44, no. 5, p. 3.

*Tripathi, G., and †Fryar, A.E., 2012, Integrating hydraulic and thermal techniques to examine focused groundwater discharge at multiple scales: Geological Society of America Abstracts with Programs, v. 44, no. 7, p. 50.

Zamrane, Z., Laftouhi, N., Fniguire, F., Markhi, A., Laignel, B., Milewski, A., and Fryar, A.E., 2012, Characterization of drought periods in the Tensift watershed (west-central Morocco): Geological Society of America Abstracts with Programs, v. 44, no. 7, p. 116.

*Barton, A., and Fryar, A., 2011, Fate of stable isotope label during predation of ^{15}N-tagged wild-type *Escherichia coli* by protozoa, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 65–66.

*Barton, A., Romanek, C.S., Brion, G.M., and Fryar, A., 2011, Potential attenuation of stable isotope label during predation of ^{15}N-tagged wild-type *Escherichia coli* by protozoa: Geological Society of America Abstracts with Programs, v. 43, no. 5, p. 667.

*Eastridge, E.M., *Mukherjee, A., *Hatch, R., and Fryar, A.E., 2011, Spatial variability in sediment arsenic concentrations, Murshidabad district, West Bengal, India: Geological Society of America Abstracts with Programs, v. 43, no. 5, p. 221.

*Tripathi, G., Fryar, A.E., and *Mukherjee, A., 2011, Thermal profiling of focused groundwater discharge along a channelized stream in western Kentucky: Geological Society of America Abstracts with Programs, v. 43, no. 5, p. 390.

*Eastridge, E.M., *Hatch, R., *Mukherjee, A., Fryar, A.E., and Scanlon, B., 2010, Arsenic speciation in aquifer sediments, West Bengal, India: Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 437.

Fryar, A.E., 2010, Integrating hydraulic and geochemical modeling with remotely sensed data to apportion stream flow contributions in the Indus basin, *in* Program, Indo-Asia Continental Collision Workshop, Islamabad, Pakistan, May 10-11, 2010, p. 13.

Fryar, A.E., *LaSage, D.M., *Sexton, J.L., and *Mukherjee, A., 2010, Groundwater discharge and contaminant fluxes along a channelized coastal plain stream, *in* Program, Water Across Interfaces: CUAHSI's Second Biennial Science Meeting: Consortium of Universities for the Advancement of Hydrologic Science, Inc., Washington, DC, p. Pst-11–Pst-12.

Fryar, A.E., *Mukherjee, A., and Scanlon, B., 2010, Variable arsenic concentrations in groundwater east and west of the River Bhagirathi-Hoogly, West Bengal, India, *in* Abstract Volume, 2nd International Conference, Integrated Water Resources Management and Challenges of the Sustainable Development (GIRE3D 2010): Moroccan Committee of the International Association of Hydrogeologists, Agadir, p. 88-89.

Fryar, A.E., *Thompson, K.E., Hendricks, S.P., and White, D.S., 2010, A watershed-based summary field exercise for an introductory hydrogeology course: Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 441.

*Mukherjee, A., Fryar, A.E., and Bhattacharya, P., 2010, Regional to local-scale extent and controls on existence of deeper groundwater arsenic in western parts of Bengal basin: Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 550.

*Schumacher, A.M., Beck, E.G., Takacs, K.G., Parris, T.M., and Fryar, A.E., 2010, Modeling of CO_2-water-rock interactions in Mississippian sandstone and carbonate reservoirs of Kentucky, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 23.

*Schumacher, A.M., Parris, T.M., and Fryar, A.E., 2010, Modeling of CO_2-water-rock interactions in Mississippian sandstone and carbonate reservoirs of Kentucky: Geological Society of America Abstracts with Programs, v. 42, no. 2, p. 52.

*Schumacher, A.M., Parris, T.M., Fryar, A.E., Beck, E.G., and Takacs, K.G., 2010, Modeling of CO_2-water-rock interactions in Mississippian sandstone reservoirs of Kentucky: American Association of Petroleum Geologists Search and Discovery Article #90116, http://www.searchanddiscovery.net/abstracts/pdf/2010/eastern/abstracts/ndx_schumacher.pdf

*Warden, J.G., and Fryar, A.E., 2010, Feasibility of using ^{15}N-enriched *E. coli* as a bacterial tracer in the Cane Run/Royal Spring basin, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 73.

*Coakley, T., Brion, G., and Fryar, A., 2009, Identification of human and animal fecal sources in central Kentucky watersheds by PCR of 16sDNA markers from host-specific fecal anaerobes, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 21.

Fryar, A.E., 2009, Limestone water and the origin of bourbon: Geological Society of America Abstracts with Programs, v. 41, no. 7, p. 696.

*Tripathi, G.N., Fryar, A.E., Paylor, R.L., Dinger, J.S., Currens, J.C., and Strohmeyer, J.S., 2009, Use of integrated geophysical techniques to locate a karst conduit in the Inner Bluegrass region, Kentucky: Geological Society of America Abstracts with Programs, v. 41, no. 4, p. 15.

*Tripathi, G.N., Fryar, A.E., Paylor, R.L., Dinger, J.S., Currens, J.C., and Strohmeyer, J.S., 2009, Use of surface geophysical techniques to locate a karst conduit in the Cane Run – Royal Spring basin,

Kentucky, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 73.

*Warden, J.G., Fryar, A.E., Brion, G.M., Macko, S.A., and Ward, J.W., 2009, Bacterial survival and the fate of ^{15}N in isotope-enriched *Escherichia coli* in preparation for pathogen tracing: Geological Society of America Abstracts with Programs, v. 41, no. 7, p. 651.

*Warden, J.G., Ruthrof, K., Hardy, G., and Fryar, A.E., 2009, The hydrology of Yalgorup National Park and its relation to Tuart (*Eucalyptus gomphocephala*) health: Geological Society of America Abstracts with Programs, v. 41, no. 7, p. 465.

Fryar, A.E., *McFarland, J.T., and *Reed, T.M., 2008, Sediment discharges from proximal urban and rural karst basins during storm flow: Geological Society of America Abstracts with Programs, paper 50279.

*Haile, E., and Fryar, A.E., 2008, Chemical evolution of groundwater in the Wilcox aquifer of the Mississippi Embayment, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 17.

*Haile, E., and Fryar, A.E., 2008, Regional-scale chemical evolution of groundwater in the Wilcox aquifer, northern Mississippi Embayment, *in* Abstract Book of the 2008 Ground Water Summit: National Ground Water Association, Westerville, OH, p. 128.

Benaabidate, L., and †Fryar, A.E., 2007, Hydrochemistry of thermal springs in the Couloir Sud Rifain region, northern Morocco: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 37.

*Haile, E., and Fryar, A.E., 2007, Recharge and regional-scale chemical evolution of groundwater in the Wilcox aquifer, northern Mississippi Embayment, USA: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 267.

*Mukherjee, A., and †Fryar, A.E., 2007, Mechanisms of arsenic contamination of deep groundwater of the western Bengal basin, India: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 517.

*Mukherjee, A., and Fryar, A.E., 2007, Regional groundwater dynamics and hydrochemical evolution in the coastal aquifers of western Bengal basin. In Proceedings of International Conference on Coastal Zone Environment and Sustainable Development, New Delhi, India.

*Mukherjee, A., Scanlon, B.R., Chaudhary, S., Mishra, R., Ghosh, A., and Fryar, A.E., 2007, Geologic and geomorphic control on the occurrence of arsenic in the shallow aquifers of the central Gangetic basin, India: some preliminary results. In Proceedings of International Workshop on Arsenic Sourcing and Mobilisation in Holocene Deltas, Kolkata, India.

*Mukherjee, A., Scanlon, B.R., Chaudhary, S., Mishra, R., Ghosh, A., Fryar, A.E., and Ramanathan, A., 2007, Regional hydrochemical study of groundwater arsenic contamination along transects from the Himalayan alluvial deposits to the Indian shield, central Gangetic basin, India: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 519.

*Ward, J.W., Fryar, A.E., Brion, G.M., and Coyne, M., 2007, Determining transport properties of solute and particle tracers under various flow conditions in a karst groundwater basin, Inner Bluegrass region, Kentucky, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 13–14.

*Ward, J.W., Fryar, A.E., Brion, G.M., and Coyne, M., 2007, Solute and particle tracer movement under various flow conditions in a karst groundwater basin, Inner Bluegrass region, Kentucky, *in* Proceedings, 4th Conference on Hydrogeology, Ecology, Monitoring, and Management of Ground Water in Karst Terrains: National Ground Water Association, Westerville, OH.

*Ward, J.W., Fryar, A.E., Brion, G.M., Coyne, M., and Macko, S.A., 2007, Solute and bacterial transport to a karst spring, Inner Bluegrass region, Kentucky: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 37.

*Ward, J.W., Fryar, A.E., Brion, G.M., Coyne, M., and Macko, S.A., 2007, Transport properties of solute, particle and ^{15}N-labeled microbial tracers under various flow conditions in a karst groundwater basin, Inner Bluegrass region, Kentucky, *in* Proceedings, International Conference on Karst Hydrogeology and Ecosystems 2007, Western Kentucky University, Bowling Green, KY, p. 26–27.

Fryar, A.E., *Reed, T.M., Brion, G.M., Coyne, M.S., Taraba, J.L., and Fogle, A.W., 2006, Suspended sediment and pathogen transport in two Inner Bluegrass karst ground-water basins, *in* Kentucky

Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 15–16.

*Mukherjee, A., and Fryar, A., 2006, Arsenic mobilization and retention caused by partial redox equilibrium in deeper groundwater of the western Bengal basin, West Bengal, India: Geological Society of America Abstracts with Programs, v. 38, no. 7, p. 242.

*Mukherjee, A., Von Brömssen, M., Jacks, G., Ahmed, K.M., Fryar, A., Hasan, M.A., and Bhattacharya, P., 2006, Hydrogeochemical contrast between two arsenic affected areas near the eastern and western margins of Bengal basin: some preliminary results: Geological Society of America Abstracts with Programs, v. 38, no. 7, p. 180.

*Reed, T.M., *Ward, J.W., Fryar, A.E., and Brion, G.M., 2006, Delineating sources of fecal contamination in a karst groundwater basin, Inner Bluegrass region, Kentucky, *in* Abstract Book of the 2006 Ground Water Summit: National Ground Water Association, Westerville, OH, p. 139.

*Sexton, J.L., Fryar, A.E., and Greb, S.F., 2006, Geologic mapping of near-surface sediments in the northern Mississippi Embayment, McCracken County, Kentucky: Geological Society of America Abstracts with Programs, v. 38, no. 3, p. 76.

*Ward, J.W., *Reed, T.M., Fryar, A.E., and Brion, G.M., 2006, Delineating fecal contaminant sources and travel times in a karst groundwater basin, Inner Bluegrass region, Kentucky: Eos, Transactions, American Geophysical Union, v. 87, no. 52, Fall Meeting Supplement, Abstract H43C-0509.

*Aseltyne, T.A., and Fryar, A.E., 2005, Solute cycling in a tributary embayment, Kentucky Lake, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 27–28.

*Aseltyne, T.A., Fryar, A.E., and Rowe, H.D., 2005, Isotopic fingerprint of a hyporheic-hypolentic boundary: Eos, Transactions, American Geophysical Union, v. 86, no. 18, Joint Assembly Supplement, Abstract H33B-01.

Carmo, A.M., Fryar, A.E., *Sweat, C.J., and Sachleben, J.R., 2005, Molecular characterization of lignite deposits in the Upper Cretaceous McNairy Formation of the Gulf Coastal Plain: Geological Society of America Abstracts with Programs, v. 37, no. 7, p. 355.

Ghosh, D., Deb, A., Patra, K.K., Sengupta, R., *Mukherjee, A., and Fryar, A.E., 2005, Double health risk in arsenic contaminated drinking water—evidence of enhanced alpha radioactivity: Geological Society of America Abstracts with Programs, v. 37, no. 7, p. 170.

*Mukherjee, A., and Fryar, A.E., 2005, A composite approach to characterize deep groundwater of the arsenic-contaminated western Ganges-Brahmaputra-Meghna delta: Geological Society of America Abstracts with Programs, v. 37, no. 7, p. 170.

*Mukherjee, A., and Fryar, A.E., 2005, Arsenic in deep groundwater of the western Bengal basin, India: a contradiction of the conventional belief, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 29–30.

*Mukherjee, A., and Fryar, A.E., 2005, Status of arsenic contamination and hydrogeochemistry of deeper groundwater in eastern part of river Bhagirathi, West Bengal, India. In Proceedings of the National Conference on Arsenic Pollution in West Bengal, Srikrishna College, Bagula, West Bengal, India.

*Mukherjee, A., and Fryar, A.E., 2005. Understanding the regional scale groundwater flow and chemistry in the arsenic affected western Bengal basin, India. In Proceedings, 92nd Session, Indian Science Congress. Earth System Sciences, Indian Science Congress Association.

*Aseltyne, T.A., Fryar, A.E., and Rowe, H.D., 2004, Impact of reservoir-stage manipulation on ground-water discharge and chemical variation in a tributary embayment: Geological Society of America Abstracts with Programs, v. 36, no. 5, p. 132.

*Mukherjee, A., Fryar, A.E., and Chakraborti, A., 2004, Regional groundwater chemistry and its relation to arsenic contamination in the western Bengal basin, *in* Proceedings XXXIII Congress IAH & 7° Congress ALHSUD, International Association of Hydrogeologists, Zacatecas, México, paper WS-AS-04, 4 p.

*Mukherjee, A., and Fryar, A.E., 2004, Regional-scale hydrostratigraphy and groundwater chemistry in the western Bengal basin, India: Geological Society of America Abstracts with Programs, v. 36, no. 5, p. 566.

*Mukherjee, A., and Fryar, A.E., 2004, Trends in arsenic and other solutes in deep groundwater along a topographic gradient within the western Bengal basin, India, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 9–10.

*Mukherjee, A., Fryar, A.E., and Chakrabarti, A., 2004. Study on spatial distribution of arsenic in Bengal groundwater as a function of regional groundwater flow and palaeogeomorphology: A curtain raiser. In Proceedings, 91st Session, Indian Science Congress. Earth System Sciences, Indian Science Congress Association.

*Mukherjee, A., and †Fryar, A.E., 2003, Evaluating natural attenuation of contaminants along a first-order Coastal Plain stream: Geological Society of America Abstracts with Programs, v. 35, no. 6, p. 375.

*Mukherjee, A., and Fryar, A.E., 2003, Identification of natural attenuation of trichloroethene and technetium along Little Bayou Creek, Kentucky, by tracer tests, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute.

*Mukherjee, A., and Fryar, A.E., 2003, Natural attenuation of trichloroethene and technetium-99 along Little Bayou Creek, Kentucky: Geological Society of America Abstracts with Programs, v. 35, no. 1, p. 73.

*Reed, T.M., Fryar, A.E., Brion, G.M., Fogle, A., and Taraba, J.L., 2003, Role of suspended sediment in facilitating pathogen transport in Inner Bluegrass karst aquifers: Geological Society of America Abstracts with Programs, v. 35, no. 6, p. 198.

*McFarland, J.T, and Fryar, A.E., 2002, Characterizing sediment transport during storm flow through a karst aquifer, Inner Bluegrass region, Kentucky: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 162.

*McFarland, J.T, Fryar, A.E., Currens, J.C., and Paylor, R.L., 2002, Characterizing sediment transport during storm flow through an Inner Bluegrass karst aquifer: Geological Society of America Abstracts with Programs, v. 34, no. 2, p. A-44.

*Thompson, K.E., Fryar, A.E., Hendricks, S.P., and White, D.S., 2002, Reservoir-stage manipulation and ground-water flow in the Ledbetter Creek watershed, Calloway County, Kentucky: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 528.

Fryar, A.E., and Howell, P.D., 2001, Using serendipity and the World-Wide Web to teach non-majors about natural disasters: Geological Society of America Abstracts with Programs, v. 33, no. 6, p. A-125.

Fryar, A.E., and *LaSage, D.M., 2001, Technetium-99 as an in-situ tracer of ground-water/stream interactions and organic co-contaminant fate: Geological Society of America Abstracts with Programs, v. 33, no. 6, p. A-110.

Fryar, A.E., *Sweat, C.J., and Sachleben, J.R., 2001, Trichloroethene sorption to wetland soils and lignitic sediments from the northern Gulf Coastal Plain, in Eleventh Annual V.M. Goldschmidt Conference, LPI Contribution No. 1088: Houston, Lunar and Planetary Institute, abstract no. 3770 (CD-ROM).

Fryar, A.E., and *Sweat, C.J., 2000, Similar sorption of trichloroethene to alluvial soils and Cretaceous sediments from the lower Ohio valley: Geological Society of America Abstracts with Programs, v. 32, no. 7, p. A-484.

*LaSage, D.M., and Fryar, A.E., 2000, Quantifying discharge of contaminated ground water into a first-order stream, McCracken County, Kentucky: 45th Annual Midwest Groundwater Conference Program and Abstracts, p. 47.

*Thompson, K.E., Fryar, A.E., Hendricks, S.P., and White, D.S., 2000, Ground water flow in the Ledbetter Creek watershed, Calloway County, Kentucky: 45th Annual Midwest Groundwater Conference Program and Abstracts, p. 58.

Fryar, A.E., *Butler, D.L., *Etienne, N., *Sweat, C.J., and Coyne, M.S., 1999, Seepage to Metropolis Lake and implications for contaminant fate, in Kentucky Water Resources Annual Symposium

Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 5–6.

*Mehta, S., Fryar, A.E., Morin, R.H., and Brady, R.M., 1999, Modeling of regional salinization of the Ogallala aquifer, Southern High Plains, Texas: Geological Society of America Abstracts with Programs, v. 31, no. 7, p. A-493.

*Butler, D.L., *Etienne, N., Fryar, A.E., and Coyne, M.S., 1998, Assessing potential biodegradation of trichloroethene in wetland soils and sediments along the Ohio River, McCracken County, Kentucky: Eos, Transactions, American Geophysical Union, v. 79, no. 17, p. S108.

*Butler, D.L., *Etienne, N., Fryar, A.E., and Coyne, M.S., 1998, Natural attenuation of trichloroethene in wetland soils: Geological Society of America Abstracts with Programs, v. 30, no. 4, p. 5–6.

*Etienne, N., *Butler, D.L., Coyne, M.S., and Fryar, A.E., 1998, Natural attenuation of trichloroethene in wetland soils and paleowetland sediments, *in* Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 9–10.

*Etienne, N., Coyne, M.S., *Butler, D., and Fryar, A., 1998, Characterization of paleowetland sediments for TCE biodegradation: Agronomy Abstracts, Annual Meeting, p. 339.

Fryar, A.E., and *Wallin, E.J., 1998, Spatial and temporal variability in seepage between a contaminated aquifer and tributaries of the Ohio River in western Kentucky: Geological Society of America Abstracts with Programs, v. 30, no. 7, p. A-23.

*Mehta, S., and Fryar, A.E., 1998, Geochemical characterization of regional-scale salinization in the Ogallala aquifer, Southern High Plains, Texas, in Third Annual Kentucky Geosciences Symposium Proceedings: Lexington, Kentucky Society of Professional Geologists, unpaginated.

*Mehta, S., and Fryar, A.E., 1998, Controls on regional scale salinization of the Ogallala aquifer, Southern High Plains, Texas: Geological Society of America Abstracts with Programs, v. 30, no. 7, p. A-22.

*Sweat, C.J., and Fryar, A.E., 1998, The role of organic carbon in trichloroethene sorption to paleowetland sediments and wetland soils, McCracken County, Kentucky: Eos, Transactions, American Geophysical Union, v. 79, no. 17, p. S98.

*Sweat, C.J., and Fryar, A.E., 1998, Natural attenuation of trichloroethene in paleowetland sediments and wetland soils in western Kentucky: The role of organic carbon: Geological Society of America Abstracts with Programs, v. 30, no. 4, p. 62.

Colwell, F., Smith, R., Fredrickson, J.K., McKinley, J.P., Lehman, R., Delwiche, M., McLing, T., Kieft, T., Smith, R., Bukowski, J., and Fryar, A., 1997, Biologically active contaminant degradation zones in a basalt aquifer: Eos, Transactions, American Geophysical Union, v. 78, no. 46, p. F326.

Fryar, A.E., 1997, Subsurface degradation and sorption of chloroethenes in the vicinity of the Paducah Gaseous Diffusion Plant, in Kentucky Water Resources Annual Symposium Proceedings: Lexington, University of Kentucky, Kentucky Water Resources Research Institute, p. 63.

Fryar, A.E., Clausen, J.L., *Wallin, E.J., Brown, D.L., and *Butler, D.L., 1997, Groundwater/surface water interactions and contaminant mobility near the Ohio River, McCracken County, Kentucky, *in* Kentucky Geosciences Symposium Proceedings: Lexington, Kentucky Society of Professional Geologists, p. 6–7.

Fryar, A.E., and Mullican, W.F., III, 1997, Delineating controls on the composition of ground water in the vicinity of the Pantex Plant, Southern High Plains, Texas, *in* Kentucky Geosciences Symposium Proceedings: Lexington, Kentucky Society of Professional Geologists, p. 4–5.

Fryar, A.E., *Nodurft, E.N., Royer, J.M., Smith, R.W., Colwell, F.S., and McLing, T., 1997, Experimental measurements of trichloroethene uptake by Snake River Plain basalt: Geological Society of America Abstracts with Programs, v. 29, no. 6, A-383.

*Wallin, E.J., and Fryar, A.E., 1997, Ground-water discharge to tributary streams: a possible mechanism of contaminant transport to rivers?: Geological Society of America Abstracts with Programs, v. 29, no. 6, A-430.

Fryar, A.E., and Mullican, W.F., III, 1996, Models of chemical evolution during ground-water recharge and flow, Southern High Plains, Texas: Geological Society of America Abstracts with Programs, v. 28, no. 7, p. A-77.

*Wallin, E.J., Fryar, A.E., and Brown, D.L., 1996, Combining hydraulic, thermal, and hydrochemical approaches to delineating seepage between contaminated aquifers and streams: Eos, Transactions, American Geophysical Union, v. 77, no. 46, p. F260.

*Wallin, E.J., Fryar, A.E., and Brown, D.L., 1996, Spatial and temporal variability in seepage fluxes between contaminated aquifers and tributary streams: 41st Annual Midwest Groundwater Conference Program and Abstracts, p. 8–9.

Fryar, A.E., and †Mullican, W.F., III, 1994, Geochemical evolution of recharge and ground water on the Southern High Plains of Texas, *in* Nash, D.J., ed., From the far corners to the Four Corners: Proceedings, 70th Annual Meeting of the Southwestern and Rocky Mountain Division, American Association for the Advancement of Science: American Association for the Advancement of Science, Southwestern and Rocky Mountain Division, Program and Abstracts, v. 34, no. 1, p. 21–22.

Fryar, A.E., and Mullican, W.F., III, 1994, Hydrochemical and hydraulic evidence for flux across perched aquifers to the Ogallala (High Plains) aquifer: Eos, Transactions, American Geophysical Union, v. 75, no. 44, p. 250.

Fryar, A.E., Romanak, K.D., Macko, S.A., Bennett, P.C., Mullican, W.F., III, and Scanlon, B.R., 1994, Stable isotopic evidence for denitrification in the Southern High Plains of Texas: Geological Society of America, Abstracts with Programs, v. 26, no. 7, p. A-321.

Mullican, W.F., III, †Fryar, A.E., and Johns, N.D., 1994, Vertical transport of solutes through perched aquifers to the Ogallala aquifer, Pantex Plant area, Southern High Plains, Texas, *in* Annual Spring Meeting of the Texas Section, Association of Engineering Geologists: College Station, Association of Engineering Geologists, Lone Star Student Chapter, p. 9.

Mullican, W.F., III, Johns, N.D., and Fryar, A.E., 1994, Focused recharge—a new approach to the numerical simulation of ground-water flow in the Ogallala aquifer, *in* Nash, D.J., ed., From the far corners to the Four Corners: Proceedings, 70th Annual Meeting of the Southwestern and Rocky Mountain Division, American Association for the Advancement of Science: American Association for the Advancement of Science, Southwestern and Rocky Mountain Division, Program and Abstracts, v. 34, no. 1, p. 22.

Mullican, W.F., III, Johns, N.D., and Fryar, A.E., 1994, Impact of alternative recharge scenarios on rates of contaminant transport to the Ogallala (High Plains) aquifer: Geological Society of America, Abstracts with Programs, v. 26, no. 7, p. A-362.

Dutton, A.R., Darling, B., Fryar, A., Mullican, W.F., III, Tweedy, S.W., and Horton, B.D., 1993, An improved field method for direct precipitation of dissolved inorganic carbon for ^{14}C dating of old and young ground waters: Geological Society of America, Abstracts with Programs, v. 25, no. 6, p. A-90.

Fryar, A.E., Macko, S.A., and Mullican, W.F., III, 1993, Using stable isotopes of nitrogen and carbon to trace ground-water contamination on the Southern High Plains of Texas: Geological Society of America, Abstracts with Programs, v. 25, no. 6, p. A-349.

Fryar, A.E., and Mullican, W.F., III, 1993, Geochemical characterization of groundwater in the vicinity of the Pantex Plant near Amarillo, Texas: American Association of Petroleum Geologists Bulletin, v. 77, no. 9, p. 1573.

Mullican, W.F., III, Fryar, A.E., and Johns, N.D., 1993, Hydrostratigraphic controls on the formation of perched aquifers: Eos, Transactions, American Geophysical Union, v. 74, no. 43, p. 273.

Mullican, W.F., III, Fryar, A.E., and Johns, N.D., 1993, Perched aquifers—their potential impact on contaminant transport in the Southern High Plains, Texas: American Association of Petroleum Geologists Bulletin, v. 77, no. 9, p. 1575–1576.

Mullican, W.F., III, Johns, N.D., and Fryar, A.E., 1993, Quantification of recharge to the Ogallala aquifer using perched aquifers: Geological Society of America, Abstracts with Programs, v. 25, no. 6, p. A-441.

Fryar, A.E., and Schwartz, F.W., 1992, Experimental modeling of reaction-front evolution in ferric-calcareous sand columns: Geological Society of America, Abstracts with Programs, v. 24, no. 7, p. A128.

Mullican, W.F., III, and Fryar, A.E., 1992, Characterization and modeling of flow and reaction in a perched aquifer at the Pantex Plant, Texas: Eos, Transactions, American Geophysical Union, v. 73, no. 43, p. 235.

Mullican, W.F., III, and Fryar, A.E., 1992, The role of a perched aquifer in contaminant transport at a proposed Superfund site on the Southern High Plains of Texas: Geological Society of America, Abstracts with Programs, v. 24, no. 7, p. A252.

Fryar, A.E., and Schwartz, F.W., 1991, Physical modeling of contaminant-induced diagenesis in a sand aquifer: Eos, Transactions, American Geophysical Union, v. 72, no. 17, p. 124.

Fryar, A.E., and Schwartz, F.W., 1990, Small-scale hydraulic conductivity measurements on sediments in a reaction-transport study: Society of Exploration Geophysicists Research Workshop on Permeability, Fluid Pressure and Pressure Seals in the Crust, Technical Abstracts, p. 49.

Fryar, A.E., and Domenico, P.A., 1986, Determination of transport parameters from coincident chloride and tritium plumes at the Idaho National Engineering Laboratory: Geological Society of America, Abstracts with Programs, v. 18, no. 6, p. 606.

Invited Lectures

Contrasting responses of mountainous springs to precipitation in Morocco, China, and India: presented at DReAM Project Seminar, Faculté des Sciences et Techniques Fès, Fez, Morocco, June 5, 2024, and at South and Central Asia Fulbright Conference, Kochi, India, Feb. 27, 2023.

Using oxygen-18 and deuterium to delineate groundwater recharge at different spatial and temporal scales: presented to Stable Isotope Geochemistry class (EES 630/480), Department of Earth and Environmental Sciences, University of Kentucky, April 19, 2024; to Faculté Polydisciplinaire Taroudant, Morocco, June 6, 2022; at First International Congress on Natural Resources: Research & Strategies for a Sustainable Development, Fez/Meknes, Morocco, May 26, 2022; to Faculté des Sciences Semlalia, Marrakech, Morocco, May 23, 2022; at 6th Multi Disciplinary Student Research International Conference, University of Wah, Pakistan, Dec. 1, 2021 (*virtual*); to INTERA Inc., Austin, Texas, May 19, 2021 (*virtual*); and at Roorkee Water Conclave 2020, Indian Institute of Technology Roorkee, Feb. 26, 2020.

Checking the pulse and taking the temperature: how do springs (*or* karst springs) respond to environmental stresses?: presented to the Department of Geology, University of Georgia, Athens, Mar. 15, 2024; the Department of Geosciences, East Tennessee State University, Johnson City, Tennessee, September 1, 2023; the Department of Geology, North-Eastern Hill University, Shillong, India, May 26, 2023; the Department of Earth Sciences, University of Kashmir, Srinagar, India, Mar. 4, 2020; the Nepal Geological Society, Kathmandu, Nepal, Feb. 24, 2020; and the Department of Geosciences, Georgia State University, Atlanta, Sep. 20, 2018.

Groundwater use in an era of climate change: implications for agriculture: presented in the International Seminar on Impacting Groundwater by Climate Change, Mining, Urban Mining and Chemical Contamination—Successful Mitigation Solutions, Centre for Ground Water Studies, Kolkata, India, Jan. 3, 2024 (*virtual*); the International Conference on Climate Change, Ecosystems, Natural Resource Management for Sustainable Livelihood, Sripat Singh College, Jiaganj, India, Oct. 10, 2023 (*virtual*); and the International Conference on Biodiversity, Food Security, Sustainability and Climate Change, Assam Agricultural University, Jorhat, India, Apr. 25, 2023.

Karst landforms and hydrology: field examples from four continents: presented to the School of Environmental Science and Engineering, SRM University-AP, Amaravati, India, Nov. 21, 2023 (*virtual*).

Controls on arsenic and manganese occurrence in the Mekong River alluvial aquifer (Thailand): presented in the Arsenic, Fluoride, and Other Geogenic Contaminants in Groundwater: Advances in Application of Data Science, Machine Learning for Risk Assessment and Monitoring for Sustainable

Mitigation of Associated Health Hazards topical session, GSA Connects 2023, Pittsburgh, October 15, 2023.

Groundwater use in an era of climate change: presented to Army Public School, Shillong, India, May 25, 2023, and the Department of Geology, North-Eastern Hill University, Shillong, India, Apr. 27, 2023.

Water resources of India: a visitor's perspective: presented to the Department of Geological Sciences, Jadavpur University, Kolkata, India, May 22, 2023; the Department of Applied Geology and the Department of Environmental Sustainability and Climate Science, American University of Central Asia, Bishkek, Kyrgyzstan, May 16, 2023; and the Department of Geology, Calcutta University, Kolkata, India, May 12, 2023.

Water resources of (Northeast) India: a visitor's perspective: presented to the Department of Earth Sciences, Manipur University, Imphal, India, Apr. 23, 2023.

Water resources of Meghalaya (*or* Meghalaya and India): a visitor's perspective: presented at Youth Forum—Lecture Series on Biodiversity and Mineral Resources with Reference to the State of Meghalaya, Shillong College, Shillong, India, Mar. 30, 2023, and to the Department of Geology, North-Eastern Hill University, Shillong, India, Mar. 17, 2023.

How interactions between climate and land use/land cover changes can affect water resources: presented to the School of Environmental Science and Engineering, SRM University-AP, Amaravati, India, Mar. 27, 2023, and the Department of Geological Sciences and Department of Environmental Sciences, Gauhati University, Guwahati, India, Mar. 22, 2023.

Arsenic in groundwater (*or* alluvial aquifers) in South and Southeast Asia: presented to Kaziranga University, Jorhat, India, Mar. 20, 2023; at International Workshop on Climate Change Impacts on Groundwater Quality and Health Issues, Sri Shakthi Institute of Technology, Coimbatore, India, Apr. 22, 2021 (*virtual*); to the University of Wah, Pakistan, Feb. 23, 2021 (*virtual*); the Department of Civil Engineering, Indian Institute of Technology Guwahati, Feb. 17, 2017; and the State Key Laboratory of Environmental Geochemistry, Guiyang, China, May 18, 2016.

Using ambient and introduced tracers to delineate groundwater recharge at different scales: presented at Water Summit 2023, Water Security in India: Challenges and Prospects, Faridabad, India, Feb. 24, 2023 (*virtual*).

Land subsidence and groundwater sustainability: case studies and lingering questions: presented at 1st International Iranian Hydraulic Conference, Ahvaz, Iran, Feb. 9, 2023 (*virtual*).

Flooding in Pakistan and Kentucky: presented at 7th Multi Disciplinary Student Research International Conference, University of Wah, Pakistan, Nov. 29, 2022 (*virtual*).

Paleoclimate controls on stable isotope compositions of groundwater in the Wilcox aquifer of the Mississippi Embayment: presented in the Groundwater for the Present and Future in the Mississippi Embayment Aquifer System, South-Central United States topical session, GSA Connects 2022, Denver, Oct. 11, 2022.

Reflecting on water: insights from a career of "happy little accidents" in hydrogeology: presented to the Department of Geosciences, Middle Tennessee State University, Murfreesboro, September 28, 2022.

Isotopic evidence of paleorecharge to regional confined aquifers in the continental USA: presented at Roorkee Water Conclave 2022, Indian Institute of Technology Roorkee, Mar. 2, 2022 (*virtual*).

Bourbon and branch: presented to the Kentucky Stormwater Association, Lexington, Kentucky, July 16, 2021.

Impacts of development and climate change on water resources of South Asia: presented at PRITHVI 2020, Department of Geology and Geophysics, Indian Institute of Technology Kharagpur, Mar. 13, 2020, and at 4th Multi Disciplinary Student Research International Conference, University of Wah, Pakistan, Aug. 29, 2018.

Geologic controls on groundwater flow and chemistry at multiple scales in the Mississippi Embayment: presented to the College of Construction Engineering, Jilin University, Changchun, China, Jun. 6, 2019, and the Department of Earth Sciences, University of Memphis, Oct. 5, 2018.

How do karst springs respond to environmental stresses? Field studies from China and Kentucky: presented to the College of New Energy and Environment, Jilin University, Changchun, China, Jun. 5, 2019.

Use of *E. coli* serotypes as tracers in epikarst and karst-conduit aquifers: presented in the Dye Tracing and Emerging Environmental Tracers in Hydrogeology topical session, Geological Society of America Annual Meeting, Indianapolis, Nov. 4, 2018.

From bourbon to bacteria: some uses and abuses of Inner Bluegrass (*or* Kentucky) karst springs: presented to Walnut Hill Church, Lexington, Kentucky, Sep. 23, 2018; the Faculty and Family Gathering, University of Kentucky, Lexington, Oct. 6, 2017; the Department of Geological Sciences, Indiana University, Bloomington, Sep. 14, 2015; the Department of Geosciences, Virginia Tech, Blacksburg, Nov. 14, 2014; the Department of Earth Sciences, University of Oran, Oran, Algeria, May 13, 2014; the Groundwater Research Center, Khon Kaen University, Khon Kaen, Thailand, Jan. 14, 2014; the Department of Geology, University of Georgia, Athens, Oct. 11, 2013; the Department of Geological Sciences, Ohio University, Athens, Mar. 22, 2013; the Department of Earth and Environmental Sciences, University of Kentucky, Jan. 12, 2012; the Department of Geology, University of Kansas, Lawrence, Sep. 15, 2011, and the Department of Plant and Soil Sciences, University of Kentucky, Feb. 13, 2009.

Karst hydrogeology: an American perspective: presented to the Department of Resources and Environment, Anshun University, Anshun, China, Jun. 25, 2018.

Thermal and chemical responses of karst springs to forcings at multiple time scales: presented to the Department of Environmental Science and Engineering, Guizhou University, Guiyang, China, Jun. 20, 2018, and at the 11th International Symposium on Geochemistry of the Earth's Surface, Guiyang, China, Jun. 14, 2017.

Water resources of Morocco: presented to Anthropology of North Africa class (ANT 331), Department of Anthropology, University of Kentucky, Oct. 17, 2017.

Impact of climate change on water resources of South Asia: presented in Ignite: Fostering Dialogue & Collaboration on Climate Change, Water Week 2017, Tracy Farmer Institute for Sustainability and the Environment, University of Kentucky, Lexington, Oct. 9, 2017; and Water: the Growing Global Thirst, Fall Conference 2013, Patterson School of Diplomacy and International Commerce, University of Kentucky, Oct. 18, 2013.

Groundwater-stream interactions and contaminant fate at a nuclear site, midcontinent USA: presented to the School of Environmental Science and Engineering, Indian Institute of Technology Kharagpur, Mar. 2, 2017.

Springs, water resource and cultural heritage: presented to the School of Environmental Science and Engineering and the Department of Geology and Geophysics, Indian Institute of Technology Kharagpur, Mar. 1, 2017.

Karst, bourbon and terroir: presented in the Project Varanasi symposium, Indian Institute of Technology (Banaras Hindu University) Varanasi, Feb. 22, 2017.

Recharge-discharge relations and transport of sediment and bacteria in karst basins: presented to the Department of Ecology, Jinan University, Guangzhou, China, May 25, 2016, and the State Key Laboratory of Environmental Geochemistry, Guiyang, China, May 19, 2016.

Recharge and hydrochemical evolution in regional sedimentary aquifers: presented to the State Key Laboratory of Environmental Geochemistry, Guiyang, China, May 19, 2016; the Department of Earth Sciences, University of Oran, Oran, Algeria, May 14, 2014; the Applied Geology and Geo-Environment Laboratory, Faculty of Sciences Agadir, Agadir, Morocco, Apr. 24, 2014; the Groundwater Research Center, Khon Kaen University, Khon Kaen, Thailand, Jan. 14, 2014; the Department of Civil and Environmental Engineering, Bogor Agricultural University, Bogor, Indonesia, June 17, 2013; the Department of Geological Engineering, Middle East Technical University, Ankara, Turkey, June 6, 2013; the General Directorate of Water Management, Ankara, Turkey, June 5, 2013; the Department of Geosciences, Western Michigan University, Kalamazoo, Jan. 30, 2012; and in the International Seminar, Impact of Climate Change on Water Resources and Glaciers; Concerns and Challenges: Department of Earth Sciences, Quaid-i-Azam University, and National Center for Physics, Islamabad, Pakistan, Jan. 7, 2010.

Groundwater-stream interactions and contaminant fate: presented to the State Key Laboratory of Environmental Geochemistry, Guiyang, China, May 18, 2016.

Groundwater chemistry and interactions with surface water in the Lower Mekong Basin: presented at the International Workshop to Explore Research Frontiers through Partnerships in the Lower Mekong Basin, Laurel, Maryland, Sep. 25, 2015.

Arsenic in south Asian floodplain aquifers: presented to the Department of Plant and Soil Sciences, University of Kentucky, Lexington, Feb. 6, 2015.

Enhancing capacity for hydrologic science from North Africa to Southeast Asia: the BOOST initiative: presented at the International Youth Water Justice Summit, University of Kentucky, Lexington, Jul. 12, 2014.

Identifying event-scale and seasonal signals in spring flow from the Middle Atlas: presented in the Twenty-First Annual Moroccan Studies Symposium, Moroccan-American Commission for Educational & Cultural Exchange, Rabat, Morocco, May 8, 2014.

Enhancing capacity for water-resource studies in the Middle East and North Africa: building opportunity out of science and technology: presented to the Department of Water Resources Engineering, University of Brawijaya, Malang, Indonesia, June 18, 2013, and the Tensift Hydraulic Basin Agency, Marrakech, Morocco, May 22, 2013.

Hijabs, hydrology and Lyle Lovett: presented to the Donovan Forum, Osher Lifelong Learning Institute, University of Kentucky, Lexington, Mar. 28, 2013.

Future water research needs in Kentucky: a big-picture perspective: presented at the Kentucky Water Resources Annual Symposium, Lexington, Mar. 19, 2012.

Contaminant hydrogeology: a field view: presented to the Department of Environmental Science, Fatima Jinnah Women University, Rawalpindi, Pakistan, May 18, 2010; the College of Earth and Environmental Sciences, University of the Punjab, Lahore, Pakistan, May 17, 2010; and the Geoscience Advance Research Laboratory, Geological Survey of Pakistan, Islamabad, Jan. 2, 2010.

Deeper groundwater chemistry and flow in arsenic affected areas of the western Bengal basin: presented to the School of Civil and Environmental Engineering, National University of Sciences & Technology, Islamabad, Pakistan, May 12, 2010.

Integrated monitoring to apportion streamflow contributions in the Indus basin: presented in the Indo-Asia Continental Collision Workshop, Islamabad, Pakistan, May 11, 2010.

Groundwater discharge and contaminant fluxes along a channelized stream: presented in International Seminar, Impact of Climate Change on Water Resources and Glaciers; Concerns and Challenges: Department of Earth Sciences, Quaid-i-Azam University, and National Center for Physics, Islamabad, Pakistan, Jan. 8, 2010.

Keynote address: presented in International Seminar, Impact of Climate Change on Water Resources and Glaciers; Concerns and Challenges: Department of Earth Sciences, Quaid-i-Azam University, and National Center for Physics, Islamabad, Pakistan, Jan. 7, 2010.

A tale of two aquifers: recharge and hydrochemical evolution in the High Plains and Wilcox aquifers, midcontinent USA: presented to the Department of Geological Sciences, Indiana University, Bloomington, Nov. 19, 2007.

Mechanisms of arsenic contamination of deep groundwater of the western Bengal basin, India: presented in the Arsenic: From Nature to Human topical session, Geological Society of America Annual Meeting, Denver, Oct. 31, 2007.

“Nor any drop to drink”? Earth Week presentation, University of the South, Sewanee, Tennessee, Apr. 19, 2007.

Geology, hydrology, and the largest mass poisoning in history: presented to the Department of Forestry and Geology, University of the South, Sewanee, Tennessee, Mar. 10, 2006.

Regional groundwater flow, water quality and arsenic distributions in West Bengal: presented in National Seminar on Environmental Hazards & Archaeological Studies: Some New Thoughts, School of Studies in Environmental Radiation and Archaeological Sciences, Jadavpur University, Kolkata, India, Jun. 10, 2004.

Evaluating natural attenuation of contaminants along a first-order Coastal Plain stream: presented to the Louisville District, U.S. Army Corps of Engineers, Nov. 21, 2003, and to the Department of Earth Sciences, Eastern Kentucky University, Richmond, Aug. 27, 2003.

Trichloroethene biodegradation potential in wetland soils and paleowetland sediments: presented to the Department of Geological Sciences, University of Missouri, Columbia, Nov. 16, 2001.

Trichloroethene sorption to wetland soils and lignitic sediments from the northern Gulf Coastal Plain: presented in the Geochemistry of Contaminated Aquifers symposium, 11th Annual V.M. Goldschmidt Conference, Hot Springs, Virginia, May 22, 2001.

Some basics of well testing: presented at the Kentucky Ground Water Association Meeting, Louisville, Mar. 9, 2001.

Natural attenuation of contaminants at the Paducah Gaseous Diffusion Plant: a watershed perspective: presented to the Department of Geological Sciences, University of Tennessee–Knoxville, Oct. 4, 2001; the Department of Biosystems and Agricultural Engineering, University of Kentucky, Lexington, Mar. 30, 2001; and the Department of Agronomy, University of Kentucky, Lexington, Oct. 15, 1999.

Natural attenuation of contaminants: a watershed perspective: presented to the Department of Geology, Miami University, Oxford, Ohio, Oct. 6, 1999.

Careers in geology: presented to Garden Springs Elementary School, Lexington, Kentucky (3rd grade class, Oct. 12, 2001; 4th and 5th grade classes, Mar. 22, 1999), and to primary classes at Eastern Elementary School, Scott County, Kentucky, May 9, 1997.

Spatial and temporal variability in seepage between a contaminated aquifer and tributaries of the Ohio River in western Kentucky: presented to the Department of Geology, University of Cincinnati, Oct. 14, 1998.

Groundwater/surface water interactions and contaminant mobility near the Ohio River, McCracken County, Kentucky: presented to the Department of Geological Sciences, The Ohio State University, Columbus, Sep. 12, 1997.

Models of chemical evolution during ground-water recharge and flow, Southern High Plains, Texas: presented to the Department of Geological Sciences, Wright State University, Dayton, Ohio, May 22, 1997, and to the Department of Geology, University of Cincinnati, Oct. 16, 1996.

Ground-water sampling: presented to Hydrologic Field Methods class (FOR 620), Department of Forestry, University of Kentucky, Lexington, Aug. 15 and Sep. 6, 1996.

By what abiological mechanisms are chlorinated organics degraded in the subsurface at TAN (Test Area North)? presented to the Idaho National Engineering and Environmental Laboratory, Idaho Falls, Feb. 15, 1996.

Evidence of partial denitrification during ground-water recharge, Southern High Plains, Texas: presented to the Department of Agronomy, University of Kentucky, Lexington, Sep. 22, 1995.

Nitrogen isotopes: presented to Isotope Hydrology class (GEO 391), Department of Geological Sciences, The University of Texas at Austin, Mar. 23, 1995.

Evidence of limited denitrification beneath playas recharging the Ogallala aquifer: presented to the Idaho National Engineering Laboratory, Idaho Falls, Jun. 23, 1995; the Department of Geology, University of South Florida, Tampa, Feb. 27, 1995; and the Department of Geology, Baylor University, Waco, Texas, Feb. 2, 1995.

Vertical transport of solutes through perched aquifers to the Ogallala aquifer, Pantex Plant area, Southern High Plains, Texas: presented to the Department of Geological Sciences, University of Kentucky, Lexington, Jan. 31, 1995.

Evidence of denitrification during ground-water recharge in the Southern High Plains: presented to the Texas Agricultural Experiment Station, Amarillo, Sep. 27, 1994.

Geochemical characterization of ground water in the vicinity of the Pantex Plant near Amarillo, Texas: presented to the Panhandle Geological Society, Amarillo, Texas, Nov. 18, 1993.

Hydrogeologic research at the Bureau of Economic Geology: presented to the Texas Groundwater Protection Committee, Austin, Aug. 31, 1993.

Experimental modeling of diagenetic fronts in a contaminated sand aquifer: presented to INTERA Inc., Austin, Texas, Apr. 8, 1993, and to the Department of Geology, Texas A&M University, College Station, Feb. 23, 1993.

Characterizing ground-water flow at a U.S. nuclear site: presented to the Department of Geology, University of Alberta, Edmonton, Canada, Nov. 26, 1992.

Experimental modeling of reaction-front evolution in ferric-calcareous sand columns: presented to the Department of Geological Sciences, University of Kentucky, Lexington, Jan. 30, 1995, and in the Frontiers of Chemical Mass Transport in Contaminant Systems symposium, Geological Society of America Annual Meeting, Cincinnati, Oct. 27, 1992.

Experimental modeling of contaminant-induced diagenesis: presented in the Hydrogeology Brown-Bag Seminar Series, Department of Geological Sciences, The University of Texas at Austin, Oct. 23, 1992.

Experimental modeling of porous media patterning with heterogeneous reaction fronts: presented to the Bureau of Economic Geology, The University of Texas at Austin, Feb. 1, 1991.

Media Coverage

"Water in Kentucky": Farm and Home, University of Kentucky Warren County Extension, Aug. 7, 2024, https://www.youtube.com/watch?v=BBg90BzyqAU

"Talk program conducted": The Sangai Express, Imphal, India, April 24, 2023, p. 10.

"RISE Episode 3": Martin, T., WEKU-FM, Richmond, Kentucky, Jan. 26, 2023, https://www.weku.org/podcast/rise/2023-01-26/rise-episode-3

"Cultural history category winner 2022," Karst Waters Institute Photo Contest, 2022, https://karstwaters.org/kwi-photo-contest/kwi-photo-contest-2022/

"Focus on management of water resources in the context of aridity": Agence Marocaine de Presse, May 23, 2022.

"Journey of Prof. Alan Fryar": Seasoned Scholars, Dec. 31, 2021, https://www.youtube.com/watch?v=tFJ0FhZh6Bk

"Flooding could shut down one-quarter of America's critical infrastructure": Grist, Oct. 15, 2021, https://grist.org/buildings/flooding-could-shut-down-one-quarter-of-americas-critical-infrastructure/

"As a Kentucky community recovers from flooding, experts say more is on the way": Spectrum News 1 Louisville, Oct. 5, 2021, https://spectrumnews1.com/ky/louisville/news/2021/10/05/carlisle-ky-home--business-owners-recovering-from-flood-two-months-later

"Stormwater and groundwater": UK Stormwater, University of Kentucky College of Agriculture, Food and Environment, May 26, 2021, https://www.youtube.com/watch?v=O2u98fJXgL0

"Arsenic: is the curse getting bigger?": panelist, South Asian Environment Dialogue, Climate Channel Canada and noTV Bangla, Mar. 4, 2021, https://www.youtube.com/watch?v=on-eaaGeabg

"How global geologic processes lace your glass of water with arsenic": Mongabay-India, Jul. 15, 2019, https://india.mongabay.com/2019/07/how-global-geologic-processes-lace-your-glass-of-water-with-arsenic/

"Exploring McConnell Springs": KYH2O podcast, Jun. 24, 2019, https://kyh2o.podbean.com/e/exploring-mcconnell-springs/

"Geology and bourbon": KYH2O podcast, Jun. 17, 2019, https://kyh2o.podbean.com/e/geology-and-bourbon/

"Schools from US and India come together to study water quality in their regions": United News of India, Jun. 24, 2018, http://www.uniindia.com/schools-from-us-and-india-come-together-to-study-water-quality-in-their-regions/states/news/1269885.html

"Water quality testing brings Kentucky and eastern Indian students together": The Economic Times (Mumbai, India), Jun. 22, 2018, https://economictimes.indiatimes.com/news/science/water-quality-testing-brings-kentucky-and-eastern-indian-students-together/articleshow/64702370.cms

"Belfry High School students win 2018 East Kentucky Leadership Award for Youth Leadership": WYMT-TV, Hazard, Kentucky, http://www.wymt.com/content/news/Belfry-High-School-students-win-2018-East-Kentucky-Leadership-Award-for-Youth-Leadership-480607321.html

"Liquid of life": The Telegraph (Kolkata, India), Mar. 28, 2018, Young Metro section, p. 8–9.

"UK helping Belfry High School research team get to India": University of Kentucky News, Feb. 26, 2018, https://uknow.uky.edu/research/uk-helping-belfry-high-school-research-team-get-india

"Belfry High School team to travel to India to present water quality research": Williamson (West Virginia) Daily News, Feb. 6, 2018, http://www.williamsondailynews.com/features/belfry-high-school-team-to-travel-to-india-to-present/article_9b1eed0b-df4f-5547-bb28-4e2660d5ef0e.html

"Learning the basics of water analysis": The Hindu (Chennai, India), Dec. 22, 2017, http://www.thehindu.com/todays-paper/tp-in-school/learning-the-basics-of-water-analysis/article22217114.ece

"Meet a friend of limestone, Dr. Alan Fryar": Friends of Limestone blog, Oct. 10, 2017, https://friendsoflimestone.wordpress.com/2017/10/10/meet-a-friend-of-limestone-dr-alan-fryar/

"Is Kentucky's terroir the secret to great bourbon?": Bell, E., Vinepair, Feb. 16, 2016, http://vinepair.com/wine-blog/kentucky-terroir-the-secret-of-great-bourbon/

"UK partnership will prepare STEAM students for geosciences careers": University of Kentucky News, Feb. 8, 2016, http://uknow.uky.edu/content/uk-partnership-will-prepare-steam-students-geosciences-careers

"Spatio-temporal variability in groundwater discharge and contaminant fluxes along Little Bayou Creek": Kentucky Research Consortium for Energy and Environment, Nov. 23, 2015, https://www.youtube.com/watch?v=VndPEYJAAAw

"On the road again": Ampersand Magazine, College of Arts & Sciences, University of Kentucky, Fall 2014.

"Is Kentucky limestone water indispensable for bourbon?": Peterson, E., WFPL-FM, Louisville, Kentucky, Nov. 27, 2013, http://wfpl.org/post/kentucky-limestone-water-indispensible-bourbon

"Amerika'nın en önemli iki üniversitesinden akademisyenler, dünya genelinde 4 ülkeyi kapsayan araştırma gezisi için Bursa'nın Orhangazi ilçesine geldi" ("Professors from two important universities of United States of America are conducting a field trip which covers 4 countries in the world, come to Bursa, Orhangazi"): TSI NNNN Bursa (Turkey), May 31, 2013, http://www.sondakika.com/haber/haber-iznik-golunde-inceleme-4685879/

Interviewed in The Drunken Botanist: The Plants That Create the World's Great Drinks, Stewart, A., Algonquin Books, 2013, p. 47, http://www.amystewart.com/books/drunkenbotanist/

"UK professor leads water research project for Egyptian and Moroccan students": University of Kentucky News, Nov. 14, 2012, http://uknow.uky.edu/content/uk-professor-leads-water-research-project-egyptian-and-moroccan-students

"ASU hosts hydrology students for a week": Brollier, D., San Angelo (Texas) Standard-Times, Jul. 3, 2012.

"North African students coming to San Angelo to study water sciences": Brollier, D., San Angelo (Texas) Standard-Times, Jun. 12, 2012, p. A1, A6.

"Kentucky's secret to bourbon production": audio interview, College of Arts & Sciences, University of Kentucky, Feb. 2011, https://www.as.uky.edu/node/158925/

"Chronicling a new love of language": University of Kentucky News, Feb. 9, 2011, http://uknow.uky.edu/content/chronicling-new-love-language

"Going with the flow": Ampersand Magazine, College of Arts & Sciences, University of Kentucky, Fall 2008, p. 20–23, http://www.as.uky.edu/sites/default/files/Insinde-f08.pdf

"Paducah creek is polluted": Carroll, J.R., The Courier-Journal (Louisville, Kentucky), Dec. 26, 1999, p. A1, A14 (**headline story, distributed via Associated Press**).

Research, Training, and Instrumentation Grants

SCRP23 Kyrgyzstan water resource management at University of Kentucky (A.E. Fryar, PI; K.E. Rignall, co-PI): U.S. Department of Agriculture, $49,989, Oct. 2023–Sep. 2025.

IRES Track I: A multi-faceted approach for understanding hydrologic controls on transmission losses in dryland environments (A.M. Milewski [University of Georgia] and A.E. Fryar, PIs; R. El Kadiri [Middle Tennessee State University], C. Garing [University of Georgia], and C.D. Hanley, co-PIs): National Science Foundation, $299,908 (UK share $90,952), Sep. 2020–Feb. 2025.

Kentucky Research Consortium for Energy and Environment, budget period 7, allocation revisions (A.E. Fryar, PI; R. Andrews, co-PI): U.S. Department of Energy, $36,018, Oct. 2022–Mar. 2024.

Identifying recharge signals in spring flow on the Shillong Plateau, Meghalaya (India) (A.E. Fryar, PI [direct award]): U.S.-India Educational Foundation, $17,976, Jan.–May 2023.

Early detection and quantitative risk assessment of microbial contamination in karst basins (A.E. Fryar, PI; R.T. Dapkus and D.M. Byrne, co-PIs): Kentucky Water Resources Research Institute, $10,001, Sep. 2021–Aug. 2022.

GP-IMPACT: Early college high school pathways to geoscience majors and careers: Full STEAM ahead! (R.L. Freeman, PI; J. Bathon, A.E. Fryar, and M.M. McGlue, co-PIs): National Science Foundation, $297,389, Jul. 2016–Jun. 2019.

Exploring water quality in Kolkata and Kentucky (C.D. Hanley, PI; R.L. Freeman and A.E. Fryar, co-PIs): U.S. Department of State, $150,418, May 2017–Nov. 2018.

Aquifer quality study at H.L. Disney Training site (A.E. Fryar, PI): Kentucky Department of Military Affairs, $146,946, Sep. 2016–Oct. 2018.

Water quality analysis in municipal water supply system for Lexington, KY with a focus on corrosivity (J. Zhu, PI; A.E. Fryar, A. Sherman, and J. Merrick, co-PIs): Kentucky Water Resources Research Institute, $5,000, Mar. 2017–Feb. 2018.

Research equipment grant—liquid water isotope analyzer (A.M. Erhardt, PI; A.E. Fryar, co-PI): Office of the Vice-President for Research, University of Kentucky, $79,816, Dec. 2017.

Hydrogeochemical studies and modeling of the Houzhaihe Catchment, Puding (A.E. Fryar, PI; Chen Zhu and Tao Peng, co-PIs): State Key Laboratory for Environmental Geochemistry (China), 100,000 RMB ($15,248), Jun. 2016–May 2017.

Research equipment grant—portable gas chromatograph (T.M. Parris, PI; A.E. Fryar, R.L. McCulley, K.G. Pennell, co-PIs): Office of the Vice-President for Research, University of Kentucky, $26,648, Mar. 2017.

Sediment fingerprinting and biogeochemical erosional model of the Otter Creek basin, Fort Knox Army Post, Kentucky (A.E. Fryar, PI; D. Edwards and C.L. Peterman, co-PIs): Kentucky Water Resources Research Institute, $5,000, Mar. 2016–Feb. 2017.

Kentucky Research Consortium for Energy and Environment: Task 4: Fate and Transport (A.E. Fryar, PI): U.S. Department of Energy, $171,415, Apr. 2009–Sep. 2015.

US-Thailand planning visits: Influence of climate on groundwater interactions with Mekong River: Implications for arsenic concentrations in alluvial aquifers (A.E. Fryar and M. Schreiber [Virginia Tech], PIs): National Science Foundation, $36,511 (UK share $25,521), Oct. 2013–Dec. 2014.

Identifying seasonal signals in spring flow from the Middle Atlas (A.E. Fryar, PI [direct award]): Moroccan-American Commission for Educational & Cultural Exchange, $15,744, Jan.–May 2014.

BOOST H_2O (Helping Hydrologic Outreach) in Indonesia and Turkey (A.E. Fryar, PI; C. Agouridis, C. Hanley, M. Reed, and K. Tanaka [University of Kentucky] and A. Milewski and P. Schroeder [University of Georgia], co-PIs): U.S. Department of State, $197,299, Sep. 2012–Mar. 2014.

Enhancing capacity for water-resource studies in Egypt and Morocco (A.E. Fryar, PI; A. Milewski [University of Georgia] and M. Sultan [Western Michigan University], co-PIs): U.S. Department of State, $247,472, Sep. 2011–Dec. 2013.

Delineating solute inputs to the headwaters portion of the Cane Run-Royal Spring basin (A.E. Fryar, PI; C.F. Skees and J.S. Dinger, co-PIs): Kentucky Water Resources Research Institute, $5,000, Mar. 2011–Feb. 2012.

Mobility of ^{15}N-enriched *E. coli* within the Royal Spring basin, Kentucky (A.E. Fryar, PI; A.M. Barton, co-PI): Kentucky Water Resources Research Institute, $3,000, Mar. 2010–Feb. 2011.

Tracing the fate of ^{15}N in isotopically labeled E. coli and determining fecal indicator die-off rates in an Inner Bluegrass karst basin, central Kentucky (A.E. Fryar, PI; J.G. Warden, co-PI): Kentucky Water Resources Research Institute, $5,000, Mar. 2009–Feb. 2010.

Defining bacterial loads, sources, ages, and transport in an urban-fringe karst basin, central Kentucky (A.E. Fryar, PI): University of Kentucky College of Agriculture, Senate Bill 271 program, $57,000, Feb. 2008–Jun. 2009.

Identification of human and animal fecal sources in central Kentucky watersheds by PCR of 16SDNA markers from host specific fecal anaerobes (G.M. Brion, PI; T.L. Coakley and A.E. Fryar, co-PIs): Kentucky Water Resources Research Institute, $4,977, Mar. 2008–Feb. 2009.

Role of adsorption and desorption on the movement and tracking of fecal indicator microbes through soil and karst environments (A.E. Fryar, PI; M.S. Coyne and G.M. Brion, co-PIs): University of Kentucky College of Agriculture, Senate Bill 271 program, $112,205, Jul. 2004–Oct. 2008.

Development of a conceptual stratigraphic model for the Paducah Gaseous Diffusion Plant (A.E. Fryar, PI; S.F. Greb, co-PI): U.S. Department of Energy, $116,002, May 2004–Sep. 2008.

Environmental Research Initiative (ERI) (G.M. Brion, PI; D.A. Atwood and A.E. Fryar, co-PIs): Kentucky NSF/EPSCoR program, $387,342, Jul. 2005–Jun. 2008.

Chemical evolution of groundwater in the Wilcox aquifer of the Mississippi Embayment (A.E. Fryar, PI; E. Haile, co-PI): Kentucky Water Resources Research Institute, $5,000, Mar. 2007–Feb. 2008.

The mobility of fecal indicator microorganisms within a karst groundwater basin in the Inner Bluegrass Region, Kentucky (A.E. Fryar, PI; J.W. Ward, co-PI): Kentucky Water Resources Research Institute, $4,800, Mar. 2006–Feb. 2007.

Freeze-dryer for isotopic analysis (C.D. Barton, PI; J.S. Dinger, E.G. Beck, and A.E. Fryar, co-PIs): University of Kentucky College of Agriculture, Senate Bill 271 program, $10,511, May–Jun. 2006.

Impact of land management on vadose zone drainage water entering the groundwater body (O.O. Wendroth, PI; A.E. Fryar, co-PI): University of Kentucky College of Agriculture, Senate Bill 271 program, $9,562, May–Jun. 2006.

Kentucky Environmental Research and Education Consortium (KEREC): University of Kentucky environmental research training (G.M. Brion, PI; F.R. Ettensohn and A.E. Fryar, co-PIs): Kentucky NSF/EPSCoR program, $2,368,748, Mar. 2002–Feb. 2005.

Regional ground-water flow and water-quality trends in the Bengal basin (A.E. Fryar, PI): Office of the Vice-President for Research, University of Kentucky, Research Committee Grant, $3,500, Jul. 2003–Jun. 2004.

Natural attenuation of trichloroethene and technetium-99 (A.E. Fryar, PI): Kentucky Department for Environmental Protection, $22,800, Jul. 2002–Jun. 2004.

Role of suspended sediment in facilitating pathogen transport in Inner Bluegrass karst aquifers (A.E. Fryar, PI; G.M. Brion, M.S. Coyne, and J.L. Taraba, co-PIs): University of Kentucky College of Agriculture, Senate Bill 271 program, $70,884, Jul. 2002–Jun. 2004.

Major research equipment grant—ductless laboratory fume hood (A.E. Fryar, PI): Office of the Vice-President for Research, University of Kentucky, $12,577, Feb. 2002.

Laboratory investigations of abiotic attenuation of trichloroethene by soils and sediments (A.E. Fryar, PI): Kentucky Department for Environmental Protection, $20,274, Feb. 1999–Jun. 2002.

Natural attenuation of trichloroethene and technetium-99 during seepage to and flow within Little Bayou Creek (A.E. Fryar, PI; D.M. LaSage, co-PI): Kentucky Department for Environmental Protection, $35,644, Feb. 1999–Jun. 2002.

Reservoir-watershed linkages: the effects of water level management on hydrology and water quality in hydro-electric reservoirs (S.P. Hendricks [Murray State University], PI; A.E. Fryar, G.W. Kipphut and D.S. White [Murray State University], and L.W. Cooper [Oak Ridge National Laboratory], co-PIs): Kentucky DOE/EPSCoR program, $49,898 (UK share $10,500), Oct. 1999–Sep. 2001.

Modeling of chemical evolution during ground-water recharge and flow, Southern High Plains, Texas: Office of the Vice-President for Research and Graduate Studies, University of Kentucky, Special Summer Faculty Research Fellowship, $7,500, Jun.–Aug. 2000.

Natural attenuation of trichloroethene in wetland soils and paleowetland sediments (A.E. Fryar, PI; M.S. Coyne and A.D. Karathanasis [University of Kentucky], D.L. Balkwill [Florida State University], and S.A. Macko [University of Virginia], co-PIs): U.S. Geological Survey, Regional Water-Resources Competitive Grants Program, $57,380, Sep. 1997–Aug. 2000.

Experimental and mathematical modeling of trichloroethene sorption to and diffusion in basalt (A.E. Fryar, PI): Office of the Vice-Chancellor for Research and Graduate Studies, University of Kentucky, Research Committee Grant, $3,230, Jun.–Aug. 1999.

Spatial and temporal variability in seepage fluxes between contaminated aquifers and tributary streams (A.E. Fryar, PI; D.L. Brown [University of Kentucky], D.B. Wenner and T.C. Rasmussen [University of Georgia], co-PIs): U.S. Geological Survey, Regional Water-Resources Competitive Grants Program, $16,118, Sep. 1996–Feb. 1998.

Proposed laboratory studies of abiotic reductive dechlorination of trichloroethene by basalt and sediments (A.E. Fryar, PI): Battelle Pacific Northwest National Laboratory, $25,000, Nov. 1995–Aug. 1997.

Teaching—University of Kentucky

(overall student evaluations noted [quality of course and teaching out of 4, 1995–2015; out of 5, 2016–])

A&S 100/UK 100 (Pathways and Barriers to Environmental Sustainability), *2 hours* (team-taught with C. Agouridis, M. Arthur, and S. Bell)
Fall 2015: section 001, 12 students (course 3.75, teaching 3.38); section 002, 10 students (course 3.30, teaching 3.60); section 003, 13 students (course 3.64, teaching 3.91)
Fall 2014: section 002, 20 students (course 2.8, teaching 2.9); section 003, 20 students (course 2.8, teaching 3.2); section 004, 13 students (course 2.9, teaching 3.5); section 005, 13 students (course 2.8, teaching 3.5)

A&S 100/UK 100 (A World of Rivers), *1 hour*
Spring 2016: 9 students (no evaluations provided)
Spring 2015: 18 students (course 2.21, teaching 2.71)

A&S 101/BIO 199 (Tracking Contaminants in the Central Kentucky Water Supply), *1 hour*
Spring 2016: 3 students (no evaluations provided)
Spring 2015: 2 students (no evaluations provided)

EES 295 (Geoscience Orientation), *1 hour* (team-taught with E.W. Woolery)
Spring 2022: 12 students (course 4.8, teaching 4.6)

ENS 300/EES 480 (World/Global Water Issues), *3 hours*
Spring 2021: 25 students (ENS 300: course 4.5, teaching 4.8; EES 480: no evaluations provided)
Spring 2019: 16 students (ENS 300: course 4.3, teaching 4.4; EES 480: no evaluations provided)
Spring 2018: 31 students (ENS 300: course 4.3, teaching 4.4; EES 480: course 4.7, teaching 4.8)

GLY/EES 110 *and* GLY 242 (Endangered Planet: An Introduction to Environmental Geology), *3 hours*
Fall 2023: 187 students (course 3.6, teaching 3.8)
Fall 2007: 189 students (course 3.5, teaching 3.7)
Fall 2003: 159 students (course 3.3, teaching 3.6)
Spring 2002: 158 students (course 2.9, teaching 3.1)
Fall 2001: 155 students (course 3.1, teaching 3.5)
Spring 2001: 117 students (course 3.1, teaching 3.5)
Fall 2000: 137 students (course 3.0, teaching 3.3)
Fall 1999: 100 students (course 2.9, teaching 3.1)
Fall 1996: 89 students (course 2.5, teaching 2.3)

GLY/EES 385 (Hydrology and Water Resources) *and* GLY 480 (Environmental Geohydrology), *3 hours*

Spring 2024: 15 students (course 4.2, teaching 4.0)
Fall 2022: 8 students (no evaluations provided)
Fall 2021: 18 students (course 4.1, teaching 4.3)
Fall 2020: 12 students (course 4.0, teaching 3.83)
Fall 2019: 16 students (course 4.2, teaching 4.3)
Fall 2018: 24 students (course 4.6, teaching 4.7)
Fall 2017: 18 students (course 4.1, teaching 4.5)
Fall 2016: 24 students (course 4.53, teaching 4.42)
Fall 2015: 21 students (course 3.28, teaching 3.17)
Fall 2014: 13 students (course 3.5, teaching 3.5)
Fall 2012: 27 students (course 3.3, teaching 3.2)
Fall 2011: 26 students (course 3.5, teaching 3.5)
Fall 2010: 26 students (course 3.6, teaching 3.8)
Fall 2009: 23 students (course 3.4, teaching 3.7)
Fall 2008: 22 students (course 3.1, teaching 3.3)
Fall 2007: 20 students (course 3.3, teaching 3.5)

GLY 470 (Senior Seminar: Recent Advances in Geological Sciences), *1 hour*
Fall 1995: 9 students (course 2.9, teaching 3.0)

GLY/EES 570 (Seminar in Geological Sciences: Current Topics in Geology), *1 hour*
Fall 2014: 15 students (course 3.57, teaching 3.64)
Spring 2012: 11 students (course 3.1, teaching 3.8)
Spring 2009: 5 students (course 3.6, teaching 3.8)
Fall 2008: 9 students (course 3.6, teaching 3.8)
Spring 2008: 9 students (course 3.8, teaching 3.8)
Spring 2006: 11 students (course 3.2, teaching 3.6)
Fall 2005: 13 students (course 3.3, teaching 3.7)
Spring 2005: 8 students (course 3.0, teaching 3.8)
Fall 2004: 8 students (course 2.0, teaching 2.6)

GLY 570 (Seminar in Geological Sciences: Professional Practice in Earth Sciences), *1 hour*
Fall 2012: 6 students (course 3.0, teaching 3.5)

GLY/EES 585 (Hydrogeology), *3 hours*
Spring 2022: 15 students (course 4.8, teaching 4.7)
Spring 2021: 9 students (course 4.6, teaching 4.7)
Spring 2019: 17 students (course 4.1, teaching 4.4)
Spring 2018: 24 students (course 4.3, teaching 4.3)
Spring 2013: 25 students (course 3.7, teaching 3.8)
Spring 2012: 23 students (course 3.5, teaching 3.8)
Spring 2011: 15 students (course 3.8, teaching 3.9)
Spring 2010: 21 students (course 3.4, teaching 3.6)
Spring 2009: 13 students (course 3.4, teaching 3.5)
Spring 2008: 9 students (course 3.7, teaching 3.8)
Spring 2006: 20 students (course 3.4, teaching 3.7)
Spring 2005: 11 students (course 3.4, teaching 3.6)
Spring 2004: 12 students (course 3.5, teaching 3.8)
Spring 2003: 15 students (course 3.5, teaching 3.7)
Spring 2002: 19 students (course 3.4, teaching 3.3)
Spring 2001: 7 students (course 3.4, teaching 3.4)
Spring 2000: 13 students (course 3.5, teaching 3.7)
Spring 1998: 15 students (course and teaching 2.8)
Summer 1997 (on videotape via satellite broadcast): 5 students (course and teaching 3.0)
Spring 1997: 13 students (course 3.2, teaching 3.5)
Spring 1996: 17 students (course and teaching 3.1)

GLY 610 (Topics in Hydrogeology and Surficial Processes: Environmental Characterization and Restoration at U.S. Department of Energy Facilities), *3 hours*
Fall 2009: 9 students (course 3.4, teaching 3.9)

GLY 610 (Topics in Hydrogeology and Surficial Processes: Contaminant Hydrogeology) *and* GLY 787 (Research in Hydrogeology and Low-Temperature Geochemistry: Contaminant Hydrogeology Seminar), *3 hours*
Fall 2004: 11 students (course and teaching 3.3)
Fall 2002: 8 students (course 3.6, teaching 3.8)
Fall 1998: 6 students (course 3.4, teaching 3.6)
Fall 1997: 7 students (course and teaching 3.9)

GLY 750 (Sedimentology/Stratigraphy Seminar: Stratigraphic and Structural Controls on Ground-Water Flow), *3 hours* (team-taught with W.A. Thomas)
Spring 2000: 9 students (course 3.3, teaching 3.5 [Fryar])

Teaching—University of the South

(overall student evaluations noted [relative to other Sewanee professors; average = 3])

FORS 240-A (Special Topics in Forestry: Water Resources and Policy), *full credit*
Easter semester 2007: 20 students (instruction 3.6)

FORS/GEOL 314 (Hydrology), *full credit with lab*
Easter semester 2007: 9 students (instruction 3.6)

Advising

Graduated MS/PhD advisees (University of Kentucky)

Ryan Dapkus (MS 2022, now Staff Geologist, Hart & Hickman), *Utilization of a proxy for fecal contamination in karst basins in the Inner Bluegrass region of Kentucky*. Awards: Karst Waters Institute Wilson Scholarship; Kentucky Geological Survey Commonwealth Research Assistantship; University of Kentucky College of Agriculture, Food and Environment Casner Fellowship

Cara Peterman-Phipps (PhD 2020 [co-advised by Dwayne Edwards], now Hydrologist, U.S. Geological Survey), *Tracing source contributions to assess spatial patterns of erosion in a mixed land use environment: Otter Creek catchment, Fort Knox, Kentucky*. Awards: University of Kentucky Graduate School Dissertation Enhancement Award; University of Kentucky College of Agriculture, Food and Environment Casner Fellowship

Joshua Barna (MS 2019, now Project Geologist, ARM Group), *Variability in groundwater flow and chemistry in the Houzhai karst basin, Guizhou province, China*. Award: University of Kentucky Confucius Institute Graduate Travel Grant

Amanda Sherman (MS 2019, now Regional Environmental Coordinator, U.S. Air Force), *Temporal and spatial variability in groundwater flow and chemistry along the Cumberland River, Artemus, Kentucky*

Ashley Bandy (PhD 2016, now Environmental Specialist, BAE Systems), *Mobility of* Escherichia coli *within karst terrains, Kentucky, USA*. Awards: Cave Research Foundation Graduate Research Grant; Consortium of Universities for the Advancement of Hydrologic Science Inc. Pathfinder Fellowship; Geological Society of America Research Grant; University of Kentucky College of Agriculture, Food and Environment Research Grant; US Department of Agriculture AFRI-NIFA Fellowship

Benjamin Currens (MS 2016, now Environmental Scientist, Kentucky Division of Water), *Deuterium and oxygen-18 diffusion in a confined aquifer: a numerical model of stable isotope diffusion across aquitard-aquifer boundaries*. Awards: Geological Society of America Research Grant (declined); National Science Foundation Graduate Research Fellowship

Brett Howell (MS 2016, now Geologist, AECOM), *Spring responses to storms and seasonal variations in recharge in the Middle Atlas region of Morocco*

Ganesh Tripathi (PhD 2013, now Senior Divisional Geologist, Nepal Department of Mines and Geology), *Spatio-temporal variability in groundwater discharge and contaminant fluxes along a channelized stream in western Kentucky*

Ashley Bandy (née Barton) (MS 2011, now Environmental Specialist, BAE Systems), *Fate of stable isotope label during predation of ^{15}N-tagged wild-type* Escherichia coli *by protozoa*

Tricia Coakley (MS 2011 [co-advised by Gail M. Brion], now Assistant Director of Planning and Assessment, College of Agriculture, Food and Environment, University of Kentucky), *Locating hot spots of human fecal pollution in an urban watershed of central Kentucky using Bacteroides 16S rRNA markers*

Emily Eastridge (MS 2011), *Arsenic heterogeneity in aquifer sediments from West Bengal, India*. Award: Geological Society of America Hydrogeology Division Research Grant

Estifanos Haile (PhD 2011, now Assistant Professor, Department of Physics, Geosciences, and Astronomy, Eastern Kentucky University), *Chemical evolution and residence time of groundwater in the Wilcox aquifer of the northern Gulf Coastal Plain*. Awards: Gulf Coast Association of Geological Societies Research Grant

John Warden (MS 2010, now Hydrologist, U.S. Geological Survey), *Feasibility of using ^{15}N-enriched* Escherichia coli *as a bacterial tracer in the Cane Run/Royal Spring basin, Kentucky*. Awards: Geological Society of America Southeastern Section Research Grant; University of Kentucky Tracy Farmer Institute for Sustainability and the Environment Casner Fellowship

Ganesh Tripathi (MS 2009, now Senior Divisional Geologist, Nepal Department of Mines and Geology), *Use of surface geophysical techniques to locate a karst conduit in the Cane Run – Royal Spring basin, Kentucky*

James Ward (PhD 2008, now independent consultant), *The mobility of fecal indicator microorganisms within a karst groundwater basin in the Inner Bluegrass region, Kentucky*

Abhijit Mukherjee (PhD 2006, now Professor, Department of Geology and Geophysics, Indian Institute of Technology Kharagpur), *Deeper groundwater flow and chemistry in the arsenic-affected western Bengal basin, West Bengal, India*. Awards: Geological Society of America Hydrogeology Division and Southeastern Section Research Grants; University of Kentucky Graduate School Dissertation Enhancement Award

Thomas Reed (MS 2006, now Hydrogeologist, Office of Environmental Management, U.S. Department of Energy), *Suspended sediment and pathogen transport in two Inner Bluegrass karst ground-water basins, Woodford County, Kentucky*

Joshua Sexton (MS 2006 [co-advised by Stephen F. Greb], now Reality Capture Technology Manager, Stantec), *Lithologic and stratigraphic compilation of near surface sediment for the Paducah Gaseous Diffusion Plant, McCracken County, Kentucky*

Danita Maynard LaSage (PhD 2004, retired Environmental Scientist, Kentucky Division of Mine Permits), *Natural attenuation along a first-order stream receiving contaminated ground-water discharge*. Award: Geological Society of America Southeastern Section Research Grant

Todd McFarland (MS 2003, now Vice President and Geologist, WSP USA), *Groundwater flow and sediment transport through a karst basin, Inner Bluegrass region, Kentucky*. Award: Geological Society of America Southeastern Section Research Grant

Abhijit Mukherjee (MS 2003, now Professor, Department of Geology and Geophysics, Indian Institute of Technology Kharagpur), *Identification of natural attenuation of trichloroethene and technetium-99 along Little Bayou Creek, McCracken County, Kentucky*. Award: Geological Society of America Southeastern Section Research Grant

Karen Exton Thompson (MS 2002, now Senior Technical Manager, ALL4 Inc.), *Ground-water flow in the Ledbetter Creek watershed, Calloway County, Kentucky*

Sunil Mehta (PhD 2000 [co-advised by William A. Thomas], now Vice-President and Principal Scientist, INTERA Inc.), *Investigation of the source of regional salinization of the Ogallala aquifer, Southern High Plains, Texas, U.S.A.* Awards: American Association of Petroleum Geologists Grant-in-Aid; Geological Society of America Hydrogeology Division Research Grant; University of Kentucky Graduate School Commonwealth Research Award (2); University of Kentucky Graduate School Dissertation Enhancement Award; University of Kentucky Graduate School Fellowship

Christofer Sweat (MS 2000, now science teacher, Southern Middle School, Lexington, Kentucky), *The role of organic carbon in natural attenuation of a trichloroethene-contaminated aquifer system, Paducah, Kentucky*

David Butler (MS 1999, now Manager of Sustainability, Alltech), *Assessment of potential trichloroethene biodegradation in wetland soils, McCracken County, Kentucky*. Awards: Kentucky Water Resources Research Institute Environmental Protection Scholarship; University of Kentucky Graduate School Fellowship

Eric Wallin (MS 1998, now Field Operator, Beaufort-Jasper Water and Sewer Authority, South Carolina), *Ground-water/stream-water interactions in the vicinity of the Paducah Gaseous Diffusion Plant, McCracken County, Kentucky*

Current MS/PhD advisees (University of Kentucky)

Sarah Arpin (PhD candidate), *Quantifying karst formation and developmental controls in alpine environments, Silvertip Mountain, Montana (USA).* Awards: Cave Research Foundation Graduate Research Grant; Crawford Hydrology Laboratory Research Grant; Geological Society of America Southeastern Section Research Grant; National Speleological Society Ralph Stone Fellowship; National Speleological Society Northern Rocky Mountain Grotto Grant

Shishir Sarker (PhD candidate), *Susceptibility of karst springs to climate change, land use/landcover change and pollution*. Awards: Carbonate Critical Zone Research Coordination Network Travel Grants (2)

PhD/Master's committee member (University of Kentucky unless otherwise noted)

Graduated

Cristopher Alvarez Villa (MS 2020, Geological Sciences; *co-advisor with Andrea Erhardt*), Atena Amirsoleimani (PhD 2020, Civil Engineering), Robert Andrews (MS 2002, Geology), Elizabeth Avery (PhD 2022, Geological Sciences; *co-advisor with Andrea Erhardt*); Christopher Barton (PhD 1999, Soil Science), Margaret Brewer (PhD 2004, Geology), Rahul Butala (PhD 2014, Chemistry), Somsubhra Chattopadhyay (PhD 2017, Biosystems and Agricultural Engineering), Prakash Dhakal (PhD 2013, Soil Science), Nadège Etienne (MS 1999, Plant and Soil Science), Trenede Garrison (PhD 2015, Geology), Shane Goodnight (MS 2004, Geology), Jayant Gotpagar (PhD 1998, Chemical Engineering), Ann Harris (PhD 2018, Geology), Sierra Heimel (MS 2022, Geological Sciences); Michael Hiett (MS 1996, Geology), Admin Husic (PhD 2018, Civil Engineering), Ravi Kanda (MS 2003, Geology), Dibya Koirala (PhD 2017, Geology), Sleem Kreba (PhD 2013, Soil Science), Matthew Krepps (PhD 2002, Chemistry), Ting-Li Lin (MS 2003, Geology), Jarrod Miller (PhD 2008, Soil Science), Charlotte Moberly (MS 1998, Biosystems and Agricultural Engineering), Cole Musial (MS 2015, Geology), Zachary Musselman (PhD 2006, Geography), Rachael Nipp (MS 2011, Geology), Fidele Nsonguh Tibouo (MS 2016, Geology), Jennifer O'Keefe (PhD 2008, Geology; *co-advisor with James Hower*), Said Ouabderh (Master Sciences et Techniques 2014, Hydrologie de Surface et Qualité des Eaux, Faculté des Sciences et Techniques Fès, Morocco), Cheikh Ould Mohamed (Master Sciences et Techniques 2014, Hydrologie de Surface et Qualité des Eaux, Faculté des Sciences et Techniques Fès, Morocco), Eugenia Pena (PhD 2003, Soil Science), William Pierskalla (MS 2019, Geological Sciences), Sudipta Rakshit (PhD 2006, Soil Science), Allison Richardson (MS 2008, Geology), Anne Schumacher (MS 2013, Geology; *co-advisor with T.M. Parris*), Mohan Song (MSc 2024, Earth and Environmental Sciences, University of Waterloo), Kristin Toth (MS 2004, Geology), Devi Udgata (PhD 2011, Geology), John Walrod (PhD 2017, Chemistry), Kathryn Ward (née Adank) (MS 2009, Geology; *co-advisor with Christopher Barton*), Nathaniel Webb (MS 2010, Chemistry), Jonathan Wilson (MS 2020, Geological Sciences), Yang Yang (PhD 2014, Soil Science), Lois Yoksoulian (PhD 2010, Geology)

Current

Gayatri Basapuram (PhD, Geology, University of Georgia), Maaz Fareedi (MS, Geological Sciences), Sumeet Sharma (PhD, Integrated Plant and Soil Science), Carion Williams (MS, Geological Sciences)

Undergraduate research advisees

Alexandra Arimes (BS 2022, Geological Sciences), Jack Chappuies (BS 2023, Geological Sciences), Jared Fairchild (BS 2019, Geography), Andrea Hughes (née Hougham) (BS 2001, Geology), Colin Marshall (BA 2017, Environmental and Sustainability Studies), Rachel Nally (née Hatch) (BS 2010, Geology), Holly Young (BA 2018, Geological Sciences)

Professional Service

Conference Organization

Co-convener, Status of the Headwaters in our Changing World: Springs and Base Flow topical session, GSA Connects, Sep. 24, 2024

Co-convener, Arsenic, Fluoride, Manganese, and Radiogenic Contaminants in Groundwater Systems—Scientific Knowledge, Public Health Concerns, and Removal Technology topical session, Annual Meeting, Geological Society of America, GSA Connects Online, Oct. 27–28, 2020

Lead convener, Five Decades of Impactful Ideas in Hydrogeology: Recognizing the Contributions of Frank Schwartz topical session, Annual Meeting, Geological Society of America, Indianapolis, Indiana, Nov. 7, 2018

Co-convener, Critical Zone Science in Karst and Carbonate Terrains topical session, Annual Meeting, Geological Society of America, Indianapolis, Indiana, Nov. 7, 2018

Co-convener, Arsenic: Source to Sustainability topical session, Annual Meeting, Geological Society of America, Baltimore, Maryland, Nov. 4, 2015

Lead convener, Building Capacity for Hydrologic Science in Africa and Asia session, American Geophysical Union Fall Meeting, San Francisco, California, Dec. 9–10, 2013

Lead convener, Building Capacity for Hydrologic Science in Water-Stressed Regions of the World topical session, Annual Meeting, Geological Society of America, Charlotte, North Carolina, Nov. 4, 2012

Lead convener, Lessons Learned from Working Abroad technical session, 39th International Association of Hydrogeologists Congress, Niagara Falls, Ontario, Sep. 17, 2012

Leader, Bourbon and Springs in the Bluegrass Region of Kentucky field trip, North-Central Section Meeting, Geological Society of America, Dayton, Ohio, Apr. 21, 2012

Co-convener, Arsenic in Geological Systems topical session, Annual Meeting, Geological Society of America, Denver, Colorado, Oct. 31–Nov. 3, 2010

Co-convener, Geochemistry of Arsenic and Other Toxic Elements and Assessment of Environmental Risks in Global Groundwater Systems topical session, Annual Meeting, Geological Society of America, Portland, Oregon, Oct. 19–20, 2009

Lead convener, Arsenic Occurrence and Fate in Hydrogeologic Systems topical session, Annual Meeting, Geological Society of America, Salt Lake City, Utah, Oct. 17–18, 2005

Lead convener, M. King Hubbert at 100: The Enduring Contributions of Twentieth-Century Geology's Renaissance Man topical session, Annual Meeting, Geological Society of America, Seattle, Washington, Nov. 3, 2003

Lead convener, Mass and Energy Transport in Ground Water: In Memory of Patrick Domenico topical session, Annual Meeting, Geological Society of America, Denver, Colorado, Oct. 30, 2002

Co-convener, Groundwater Flow and Geochemistry in Carbonate Terrains **and** Wetland Hydrology and Biogeochemistry theme sessions, Joint Meeting, North-Central and Southeastern Sections, Geological Society of America, Lexington, Kentucky, Apr. 3–5, 2002

Co-convener, Application of Geochemistry to Understanding Groundwater–Surface Water Interactions topical session, Annual Meeting, Geological Society of America, Boston, Massachusetts, Nov. 5, 2001

Convener, Solute Cycling in Ground Water and Surface Water topical session, Annual Meeting, Geological Society of America, Reno, Nevada, Nov. 16, 2000

Convener, Environmental Geosciences theme session, Joint Meeting, Eastern Section–American Association of Petroleum Geologists and The Society for Organic Petrology, Lexington, Kentucky, Sep. 29, 1997

Convener, High Plains Hydrogeology theme session, Annual Meeting, Geological Society of America, Denver, Colorado, Oct. 28, 1996

Manuscript Reviews

Journal editorial service:

- Applied Geochemistry: Guest co-editor, special issue, Arsenic and Other Toxic Elements in Surface and Groundwater Systems, 2011
- Discover Water (Springer Nature): Editorial Board member, 2020–present
- Environmental & Engineering Geoscience: Co-Editor, 2002–2006; Associate Editor, 2019–present
- Groundwater: Associate Editor, 2000–2002; Book Editor, 2012–present
- Groundwater for Sustainable Development: Associate Editor/Editorial Board member, 2014–2021

Journal reviewer:

Applied Geochemistry; Australian Journal of Soil Research; Chemosphere; Comptes Rendus Geoscience; Environmental & Engineering Geoscience; Environmental Earth Sciences; Environmental Geosciences; Environmental Research Letters; Environmental Science & Technology; Freshwater Science; Geochimica et Cosmochimica Acta; Geofluids; Geology; Geosphere; Groundwater; Hydrogeology Journal; Hydrological Processes; Hydrological Science and Technology; Hydrological Sciences Journal; Hydrology and Earth System Sciences; International Journal of Coal Geology; Journal of the American Water Resources Association; Journal of the Arkansas Academy of Science; Journal of Contaminant Hydrology; Journal of Environmental Quality; Journal of Geophysical Research (Biogeosciences); Journal of Geoscience Education; Journal of Health, Population and Nutrition; Journal of Hydrologic Engineering; Journal of Hydrology; Journal of Hydrology–Regional Studies; Michigan Academician; Quaternary Research; Science of the Total Environment; Soil and Tillage Research; Southeastern Geology; Transactions of the ASABE; Water Policy; Water Environment Research; Water Resources Research

Book/online resource reviewer:

“Environmental Geology” (three chapters), McGraw-Hill; “Environmental Geology Today” (chapter), Prentice-Hall; Geological Society of America Field Guide series; “Ground Water and the Environment” (proposal), Blackwell Scientific; “Groundwater in South Asia” (chapter), Springer; “Kentucky,” in “Worldmark Encyclopedia of U.S. and Canadian Environmental Issues,” Gale Cengage; “Kentucky overview” (webpage), in “GREENR (Global Reference on the Environment, Energy, and Natural Resources),” Gale Cengage; “Practical Problems in Groundwater Hydrology” (chapter), Prentice-Hall

Dissertation/thesis external examiner (PhD except as noted):

- Yassine Ez-Zaouy, International Water Research Institute, Mohammed VI Polytechnic University, Morocco, 2024
- Tanveer Ali Dar, Department of Earth Sciences, Indian Institute of Technology Roorkee, 2023
- Melissa M. Curtis, Department of Geography and Geology, University of the West Indies, Mona, Jamaica, 2023
- Animesh Bhattacharya, School of Environmental Science and Engineering, Indian Institute of Technology Kharagpur, 2022
- Abdul Jabbar Khan, Department of Earth Sciences, Quaid-i-Azam University, Pakistan, 2022
- Mohammed Albadr, MSc thesis, Geology Department, Cairo University, Egypt, 2021
- Peta-Gay Harris, MPhil thesis, Department of Geography and Geology, University of the West Indies, Mona, Jamaica, 2021
- Ujjal Mal, Department of Earth and Environmental Studies, National Institute of Technology Durgapur, India, 2020
- Harsh Oza, Department of Earth Sciences, Indian Institute of Technology Gandhinagar, 2020
- Naveed Iqbal, Department of Earth Sciences, Quaid-i-Azam University, Pakistan, 2018

- Runti Choudhury, Department of Civil Engineering, Indian Institute of Technology Guwahati, 2017
- Nazma Malik, College of Home Economics, University of the Punjab, Pakistan, 2017
- Hend Saeed Taha Soliman Abu Salem, Geology Department, Cairo University, Egypt, 2015
- Mahmoud Zemzami, Laboratory of Georesources and Environment, Faculté des Sciences et Techniques, Université Sidi Mohamed Ben Abdellah, Morocco, 2013
- Khalid Amin Khan, Department of Earth Sciences, Quaid-i-Azam University, Pakistan, 2012
- Anwar Qadir, Department of Earth Sciences, Quaid-i-Azam University, Pakistan, 2012
- Jalal-ud-Din Qureshi, Department of Geology, University of the Punjab, Pakistan, 2010
- Soraya Alvarado, Department of Plant and Soil Sciences, University of Kentucky, 2007
- Arshad Ashraf, Department of Earth Sciences, Quaid-i-Azam University, Pakistan, 2007
- Bethany O'Shea, School of Biological, Earth & Environmental Sciences, University of New South Wales, Australia, 2005
- Wensui Luo, Department of Plant and Soil Sciences, University of Kentucky, 2005
- Arpita Mandal, Department of Geology and Geophysics, Indian Institute of Technology Kharagpur, 2005

Proposal/Project Reviews

British Council, INSPIRE: Strategic Partnership Awards (2009)

Consortium of Universities for the Advancement of Hydrologic Science, Inc., Pathfinder Scholarship Program (2015)

Deutsche Forschungsgemeinschaft (German Research Foundation) (2020, 2021)

Indiana Water Resources Research Center 104(b) Grant Program (2024)

Indo-U.S. Science and Technology Forum (2018)

Inland Northwest Research Alliance (2002)

Karst Waters Institute, William Wilson Scholarship Program (2022)

Kentucky NSF EPSCoR Research Enhancement Grant Program (2013)

Kentucky Water Resources Research Institute 104(b) Grant Program (2019)

National Science Foundation, Directorate for Geosciences:

- Biogeosciences Program (2005)
- Collaborations in Mathematical Geosciences Program (2005)
- Frontier Research in Earth Sciences Program (2022)
- Geobiology and Low-Temperature Geochemistry Program (2006, 2010, 2012 [two reviews])
- Hydrologic Sciences Program (2004, 2005, 2009, 2015, 2016, 2017, 2019, 2020)
- Instrumentation and Facilities Program (2001, 2006, 2017)
- Research Experience for Undergraduates Program (2010)
- Sedimentary Geology and Paleobiology Program (2008)

Ohio Sea Grant Program (1997)

Ohio State University, Office of Research Image Technology Program (1996)

Sustainable Ecosystems Institute, Edwards Aquifer Recovery Implementation Program (2009)

U.S. Army Research Office, Chemical Sciences Program (2022)

U.S. Civilian Research and Development Foundation, International Science and Technology Center Projects (2007)

U.S. Department of Agriculture, National Research Initiative Competitive Grants Program (2000, 2001)

U.S. Department of Defense, Strategic Environmental Research and Development Program (2004, 2009)

U.S. Department of Energy, Office of Science and Technology:

- American Society of Mechanical Engineers Peer Review Committee (Long Term Stabilization Design for Long Term Cover Systems, Fernald Environmental Management Project 2002)
- Environmental Management Science Program (Subsurface Contamination/Vadose Zone panel member 1999)
- Natural and Accelerated Bioremediation Research Program (Biogeochemical Dynamics panel member 1997; Acceleration Element Stocktaking Meeting visiting scientist 1998; reviewer 1998, 2000)

U.S. Geological Survey, National Competitive Grants Program (2002, 2010)

University of Kentucky:

- Center for the Environment, Climate & Health Pilot Research Program (2021)
- College of Agriculture, Food and Environment, Kerri Casner Fellowship program (2015, 2017, 2019, 2021, 2022)
- College of Arts & Sciences, Summer Research Fellowship and Major Research Project programs (2004)
- Kentucky Agricultural Experiment Station, McIntire-Stennis Grant program (2014)
- Research Committee Grants program (panel member 2000)

University of Wisconsin Water Resources Institute (2003, 2004, 2015)

University Service

College of Arts & Sciences:

- Environmental and Sustainability Studies program: Director of Undergraduate Studies, 2016–2017, Oct. 2018–Jun. 2019 (acting); Executive Committee, 2017–2018; Interim Director, Jul.–Dec. 2019; Chair, Director Search Committee, Aug.–Sep. 2020
- Natural Sciences and Mathematics area promotion and tenure committee, 2020–2023 (chair 2021–2023)

Department of Civil Engineering, Raymond-Blythe Professorship Selection Committee, 2012

Faculty Sustainability Council, 2017–2018

Graduate School:

- Committee to Review Department Petitions for Dean's Scholarship Awards, 2009
- Participating faculty, Stream and Watershed Science Graduate Certificate, 2012–present

Greenhouse Environment & Sustainability Residential College, Faculty Co-Director, 2013–2016

Kentucky EPA EPSCoR Committee, 2002–2003

Kentucky Geological Survey:

- Unit review panel, 2010
- Search committee for Water Section Head, 2012
- Search committee for karst hydrogeologist, 2017

Kentucky Water Research Institute:

- Committee on Research and Policy, 2001–2004
- Delegate, Universities Council on Water Resources, 2021–present

Martin-Gatton College of Agriculture, Food and Environment:

- Environment and Natural Resources Committee, 2007
- Natural Resource Conservation and Management curriculum review committee, 2008
- Plant and Soil Sciences departmental review committee, 2017
- Integrated Plant and Soil Science graduate program steering committee, 2018–2020

Tracy Farmer Institute for Sustainability and the Environment (formerly Tracy Farmer Center for the Environment):

- Chair, Watershed Working Group, 2001–2003
- Associate Director, 2003–2005
- Scientific Advisory Board member, 2005–2006

- Environmental Program Assessment Committee, 2008–2009
- Member, Water Working Group, 2014–2019

President's Sustainability Advisory Council, Sep.–Dec. 2019, Sep.–Dec. 2020

University representative, Consortium of Universities for the Advancement of Hydrologic Science, Inc., 2003–2013

University Senate, Jan.–Jul. 2012

Department Service

Alumni relations committee 1995–2001 (organized or co-organized Alumni Week-End, 1996–2001)

China initiative committee 2018–2019

Computer committee 1995–1996 (developed department website)

Curriculum committee 2012–2013, Fall 2019, 2020–2021 (chair), 2022–2023

Director of Graduate Studies 2002–2006, 2009–2013, Jul.–Dec. 2015 (acting)

Director of Undergraduate Studies Jul. 2021–Dec. 2022

Faculty search committees: Department Chair (1996–1997, 2004 [chair]), Surficial Processes/ Engineering Geology (1997–1998), Stable Isotope Geochemistry (2000–2001 [acting chair], 2001–2002, 2014–2015 [chair]), Hydrogeology (2010–2011 [chair])

Geology Club faculty advisor, 2021–present

Personnel and budget committee 2001, 2008, 2012–2013, 2014–2019, 2020–2021, Fall 2022

Recruitment committee 2012–2013, 2014–2019 (chair 2017–2019)

Seminars committee 1995–2009 (chair 1997–2000, 2001–2002, 2008–2009; co-chair 2004–2006)

Other Professional Service

Awards committee, International Association of GeoChemistry, 2021–present

Event supervisor, Hydrogeology, regional Science Olympiad, Lexington, Kentucky, Mar. 5, 2016

Faculty mentor for high school science teachers, STEM PRIDE project, University of Kentucky, 2015–2016

Faculty mentor/host for visiting scholars:

- Prof. Zulfiqar Ahmad (Quaid-i-Azam University, Pakistan), Jan.–May 2011
- Dr. Benyu Su (China University of Mining and Technology), Jan.–May 2018
- Le Cao (PhD student, Institute of Geochemistry, Guiyang, China), Dec. 2019 – Dec. 2020
- Prof. Alaa Al-Abadi (University of Basrah, Iraq), Feb. 2020 – Jul. 2021
- Dr. Javad Ashjari (Abanrood Institute, Iran), Oct. 2022 – May 2024

Fulbright Program:

- Faculty Associate (host): Lahcen Benaabidate (Faculté des Sciences et Techniques, Université Sidi Mohamed Ben Abdellah, Fez, Morocco), Jun.–Aug. 2005; Nour-Eddine Laftouhi (Faculté des Sciences Semlalia, Université Cadi Ayyad, Marrakech, Morocco), Jun.–Sep. 2008; Ahmed Fekri (Faculté des Sciences Ben M'Sik, Université Hassan II, Mohammedia–Casablanca, Morocco), Jun.–Sep. 2011; Moumouni Ali (Faculté des Sciences et Techniques, Université Dan Dicko Dankoulodo, Maradi, Niger), Aug. 2016–Jan. 2017
- Panelist for review of Pakistani applicants, U.S. Educational Foundation in Pakistan, 2010
- Panelist, Middle East and North Africa Pre-Departure Orientation, Washington, DC, Jun. 22–24, 2016
- Discipline Peer Review Committee Member, Environmental/Geosciences, Fulbright U.S. Scholar Program, 2016
- National Screening Committee, Middle East and North Africa, Fulbright U.S. Student Program, 2019–2021
- Campus reviewer, Fulbright U.S. Student Program, University of Kentucky, 2022, 2023
- Panel moderator, Fulbright Indian Scholar Orientation, Kolkata, India, May 12, 2023
- Reviewer for Geology applicants, Fulbright Egyptian Scholar Program, 2023

Fulbright Specialist Program, peer reviewer, Environmental Science, 2023

Geological Society of America:

- Hydrogeology Division: Chair 2013–2014; Management Board 2011–2015; Chair, Historical Committee, 2005–2013; Nominating Committee, 2014–2017; Maxey Distinguished Service Award Committee, 2019–2022; Schwartz Award for Excellence in Mentoring and Education Committee, 2023–2025
- Joint Technical Program Committee, 2002–2003 (co-chair of Hydrogeology Division program at GSA Annual Meeting, 2002 and 2003)
- Publications Committee, 2002–2006
- Technical Program Co-Chair, North-Central/Southeastern Section Meeting, 2022

Instructor:

- ARCHES–An innovative workshop to better understand the water resources of the MENA region (with Adam Milewski, University of Georgia): presented in the Winter Enrichment Program, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia, Jan. 11–13, 2015
- Global Water Issues course: Jilin University, Changchun, China, May 27–Jun. 15, 2021 (*virtual*)
- Groundwater Sustainable Development and Water Resources Management 3-in-1 program: Universitas Brawijaya, Malang, Indonesia, Sep. 8–15, 2021 (*virtual*)

Program advisor, 2021 Groundwater Summit, National Ground Water Association

Reviewer, application for promotion/tenure:

- American University of Beirut, Lebanon, 2021
- Birzeit University, Palestine, 2022, 2024
- Bucknell University, 2013
- Georgia State University, 2021
- Indian Institute of Science Education and Research Bhopal, 2023
- Quaid-i-Azam University, Pakistan, 2010, 2019, 2023
- University College London, UK, 2024
- University of Kansas, 2016
- University of North Carolina–Charlotte, 2021
- University of the Punjab, Pakistan, 2013
- University of South Florida, 2024
- University of Texas at San Antonio, 2021
- University of Toledo, 2020

Reviewer, Application for Rating, National Research Foundation, South Africa, 2007

Reviewer, Ground Water Resource Estimation Methodology, Ministry of Water Resources, River Development and Ganga Rejuvenation, Government of India, 2017

Scientific committee member:

- 2nd International Conference, Integrated Water Resources Management and Challenges of the Sustainable Development (GIRE3D), Agadir, Morocco, Mar. 2010
- 41st International Congress, International Association of Hydrogeologists, Marrakech, Morocco, Sep. 2014
- 5th International Conference, Maghreb Water and Climate Research Network: Global Changes and Water Resources, Assessment, Adaptation and Perspectives, Fez, Morocco, Oct. 2016
- Mediterranean Geosciences Union Annual Meeting (MedGU-21), Istanbul, Turkey, Nov. 2021
- 1st International Congress on Natural Resources: Research and Strategies for a Sustainable Development (RENA 2022), Fez–Meknes, Morocco, May 2022