Melanie A. Mayes

Environmental Sciences Division
Oak Ridge National Laboratory
P.O. Box 2008
Oak Ridge, TN 37831-6038
(865) 574-7336
mayesma@ornl.gov

Education

Ph.D., Geological Sciences (2006)
University of Tennessee, Knoxville, TN
Thesis: Solute Transport and U(VI) Reactivity in Natural Heterogeneous Sediments

M.S., Geological Sciences (1999)
University of Tennessee, Knoxville, TN
Thesis: Multispecies Contaminant Transport in Undisturbed Columns of Weathered Fractured Saprolite

B.S., Geological Sciences (1995)
University of Missouri, Columbia, MO

Research Experience

Staff Scientist, Associate *January, 2006 – Present*
Oak Ridge National Laboratory (UT-Battelle)

Staff Scientist, Assistant *September, 2002 – December, 2005*
Oak Ridge National Laboratory (UT-Battelle)

- Directed research team for Hanford projects. Investigated and modeled contaminant (U(VI), CoEDTA, Sr, Cr(VI)) transport in partially-saturated and heterogeneous porous sediments http://www.esd.ornl.gov/research/earth_sciences/fate_transport_metals_radionuclides.shtml
- Investigated the transport and sequestration of organic carbon in natural forests and switchgrass production fields under fertilization
- Investigated processes influencing the migration of dissolved and particulate explosive compounds through various soil types
- Reviewed applications for site licenses for nuclear power plants through NRC
- Used heat as a tracer for identifying conductive fracture zones and calculating recharge
- Authored and contributed to multiple proposals, prepared peer-review manuscripts, interfaced with sponsors, attended conferences and workshops
- Mentored post-doctorate, graduate, and undergraduate researchers
- Assisted with numerous field-scale tracer injections

Adjunct Professor *December, 2008 – Present*
University of Tennessee Earth and Planetary Sciences Department

- Co-supervise graduate research and teaching assistants

Post-masters Research Associate *February, 1999 – September, 2002*
Oak Ridge Institute for Science and Education

- Determined the influence of water content on solute mobility in fractured rocks and in layered sands using a variety of experimental techniques
- Analyzed samples using Inductively Coupled Plasma Mass Spectrophotometer (ICP-MS), Kinetic Phosphorescence Analyzer (KPA), Gas Chromatography Mass Spectrophotometer (GC-MS)
- Mentored graduate and undergraduate researchers

Graduate Research Assistant *January, 1997 – December, 1998*
University of Tennessee and Oak Ridge National Laboratory
- Determined the influence of preferential flow on the reactions of radionuclide-organic complexes
- Modeled tracer transport using convective-dispersive, mobile-immobile, and reactive transport models (e.g., CXTFIT, MRTM)
- Predicted the speciation of aqueous solutions using geochemical speciation models (e.g., GEOCHEM)
- Analyzed samples using Inductively Coupled Argon Plasma Spectrophotometer (ICAP)

Science and Engineering Research Semester *January – July, 1996*
Oak Ridge Institute for Science and Education
- Investigated reaction between metal-organic complexes with iron oxides in stirred-flow reactor
- Analyzed samples using Ion Chromatrography (IC), Atomic Absorption Spectroscopy (AAS), Scanning UV/Visible Spectrophotometer

Undergraduate Research *January – December, 1995*
University of Missouri
- Sampled the evolution of groundwater geochemistry within the flow system of a cave
- Prepared rock samples and worked in a geochemical laboratory
- Mapped the delineation, distribution, and deformation of geologic units in Lander, Wyoming

Teaching Experience

Staff Scientist and Research Associate *February, 1999 – present*
Oak Ridge National Laboratory
- Mentored researchers at the post-doctoral (1), post-masters (2), post-bachelors (1), and undergraduate (13) levels
- Generated research topics appropriate for students with diverse backgrounds and levels of expertise
- Instructed students on experimental techniques, sample analysis, and safe laboratory practices
- Advised students on hypothesis testing, literature review, interpretation of results, and oral and written presentation of research findings

Teaching Assistantships
University of Tennessee *September – December, 1996*
- Introductory Geology Laboratory

University of Missouri *January – December, 1995*
- Introductory Geology Laboratory

Awards and Recognition

- *Editor's Citation for Excellence in Manuscript Review.* Soil Science Society of America Journal (May, 2006)
- *Special Performance Award.* Successful sampling trip to DOE Hanford Reservation. ORNL Environmental Sciences Division. ($2000) (November, 2005)
- *Special Performance Award.* Program development with Hanford site contractors (CH2M Hill Hanford Group). ORNL Environmental Sciences Division. ($1500) (January, 2005)
- *Outstanding Mentor Award.* US Department of Energy Office of Science Undergraduate Research Program (December, 2004)
- *Waste Management Research and Education Institute Fellowship* ($4000/y). The University of Tennessee (2002)

- *Award of Excellence*, Society for Technical Communication, East Tennessee Chapter (2000).
- *"Bright Flight" Scholarship* ($4000/y). State of Missouri (1990–1995)
- *Carr Foundation Scholarship* ($1000/y). (1990-1994)
- *Excellence Award* ($500/y). University of Missouri (1990–1994)

Professional and Community Activities

- Associate Editor, Soil Science Society of America Journal, S-1 Soil Physics Division (January 2007 – December 2012)
- Reviewer for Journal of Contaminant Hydrology, Chemosphere, Environmental Science and Technology, Vadose Zone Journal, various other journals and publications (3-6 per y)
- Member, Soil Science Society of America (since 2001)
- Member, American Chemical Society (since 2001)
- Member, American Geophysical Union (since 2001)
- Member, American Association for the Advancement of Science (since 2008)
- Oakwood-Lincoln Park Neighborhood Association Board of Directors (2003–2005), Environmental Representative (2002–2005), member of Beautification, Environment, and Safety Team (2007). Organized neighborhood clean-ups, planted trees, and coordinated neighborhood watch.

Research Grants and Contracts

"Climate Change Mitigation Scientific Focus Area" (**co-principal investigator**) U.S. Dept. of Energy, Office of Biological and Environmental Research, Climate Change Research Division, 2006-open, $1,100,000/y.

"Mobility of Particulate and Dissolved Munitions Constituents in the Vadose Zone at Operational Ranges" (**principal investigator**) U.S. Dept. of Defense, Strategic Environmental Research and Development Program, 2009-2012, $380,000/y.

"Role of Microenvironments and Transition Zones in Subsurface Reactive Contaminant Transport" (**external collaborator**) U.S. Dept. of Energy, Environmental Remediation Science Program, Pacific Northwest National Laboratory Subsurface Focus Area, 2008-2011, $200,000/y.

"Quantification of Hydrological, Geochemical, and Mineralogical Processes Governing the Fate and Transport of Uranium over Multiple Scales in Hanford Sediments" (**principal investigator**) U.S. Dept. of Energy, Environmental Remediation Science Program, 2006-2008, $500,000/y.

"Hydrological and Geochemical Controls on the Fate and Transport of Cr(VI), U, and CoEDTA in Undisturbed Sediments from the Hanford 200E Area" (**principal investigator**) Tank Farm Vadose Zone Group of CH2M HILL Hanford Group, Inc., 2004-open, $150,000/y.

"Coupled Hydrological and Geochemical Processes Governing the Fate and Transport of Radionuclides and Toxic Metals in the Hanford Vadose Zone" (**co-principal investigator**) U.S. Dept. of Energy, Environmental Management Science Program, 2003-2005, $300,000/y.

"In Situ Immobilization of Uranium in Structured Porous Media via Biomineralization at the Fracture/Matrix Interface" (**contributing investigator**) U.S. Dept. of Energy, Natural and Accelerated Bioremediation Program, 2003-2006, $300,000/y.

"Fate and Transport of Radionuclides Beneath the Hanford Tank Farms: Unraveling Coupled Geochemical and Hydrological Processes in the Vadose Zone" (**contributing investigator**) U.S. Dept. of Energy, Environmental Management Science Program, 2000-2002, $425,000/y.

"Fate and Transport of ^{90}Sr Beneath the Hanford Tank Farms" (**contributing investigator**) U.S. Dept. of Energy, Hanford Environmental Management Science Program, 2000-2001, $100,000 - 150,000/y.

"Microbiological Controls on the Fate and Transport of Chelated Radionuclides: Multiscale Investigations in Unsaturated Structured Media" (**contributing investigator**) U.S. Dept. of Energy, Natural and Accelerated Bioremediation Program, 1997-2000, $450,000/y.

"Influence of Coupled Processes on the Fate and Transport of Industrial Mixed Waste Plumes in Structured Media" (**contributing investigator**) U.S. Dept. of Energy, Environmental Technology Partnership Program, 1997-2000, $500,000/y.

"A Parallel Computer Model and Integrated Visualization System for Assessing the Migration of Industrial Mixed Waste Plumes: Development and Field-Scale Applications" (**contributing investigator**) U.S. Dept. of Energy, Environmental Technology Partnership Initiative, 1996, $386,000.

Peer-Reviewed Manuscripts

Mayes, M.A., Tang, G., Jardine, P.M., McKay, L.D., Yin, X.L., Pace, M.N., Parker, J.C., Zhang, F., Mehlhorn, T.L., and Dansby-Sparks, R.N. 2009. Influence of sedimentary bedding on reactive transport parameters under unsaturated conditions. Soil Science Society of America Journal 73:1938-1946.

Tang, G., Mayes, M.A., Parker, J.C., Yin, X.L., Watson, D.B., Jardine, and P.M. 2009. Improving parameter estimation for column experiments by multi-model evaluation and comparison. Journal of Hydrology 376, 567–578. doi:10.1016/j.jhydrol.2009.07.063.

Tang, G., Mayes, M.A., Parker, J.C., and Jardine, P.M. CXTFIT/Excel – A modular adaptable approach for parameter estimation and uncertainty/sensitivity analysis. Accepted by Computers and Geosciences.

C.T. Garten, Jr., C.T., Smith, J.L., Amonette, J.E., Bailey, V.L., Brice, D.J., Gonzalez, H.F., Graham, R.L., Gunderson, C.A., Izaurralde, R.C., Jardine, P.M., Jastrow, J.D., Kerley, M.K., Matamala, R., Mayes, M.A., Metting, F.B., Miller, R.M., Moran, K., Post III, W.M., Sands, R.D., Schadt, C.W., Phillips, J.R., Thomson, A.M., Tyler, D.D., Vugteveen, T., West, T.O., and Wullschleger, S.D. Intra-annual changes in biomass, carbon, and nitrogen dynamics at 4-year old switchgrass field trials in West Tennessee, USA. Accepted by Agriculture, Ecosystems, and Environment..

Mayes, M.A. Review of Soil Carbon Sequestration and the Greenhouse Effect (2009); R. Lal and R.F. Follett, Co-editors; Soil Science Society of America Special Publication 57 2nd Edition. 2009. In press with Vadose Zone Journal.

Cropper, S.C., Perfect, E., van den Berg, E.H. and M.A. Mayes. Comparison of average and point capillary pressure-saturateion functions determined by steady-state centrifugation. Submitted to Vadose Zone Journal Sep 30 2009.

Stewart, B.D., Mayes, M.A., and Fendorf, S.E. Impact of uranyl-calcium-carbonato complexes on uranium(VI) adsorption to synthetic and natural sediments. In review with Environmental Science and Technology.

Tang, G., Alshawabkeh, A.N. and **Mayes, M. A.** 2008. Automatic time stepping with global error control for groundwater flow models. Journal of Hydrologic Engineering 13(9):803-810.

Tang, G., Perfect, E., van den Berg, E. H., **Mayes, M. A.** and Parker, J. C. 2008. Estimating effective hydraulic parameters of unsaturated layered sediments using a Cantor Bar composite medium model. Vadose Zone Journal 7:493-499 (doi:10.2136/vzj2007.0013).

Pace, M.N., **Mayes, M.A.**, Jardine, P.M., McKay, L.D, Yin, X.L., Mehlhorn, T.L., Liu, Q., and H. Gürleyük. 2007. Transport of Sr^{2+} and $SrEDTA^{2-}$ in partially-saturated and heterogeneous sediments. Journal of Contaminant Hydrology 91:267-287 (doi:10.1016/j.jconhyd.2006.11.006).

Gwo, J.-P., **Mayes, M.A.**, and Jardine, P.M. 2007. Quantifying the physical and chemical mass transfer processes for the fate and transport of Co(II)EDTA in a partially-weathered limestone-shale saprolite. Journal of Contaminant Hydrology 90:184-202 (doi:10.1016/j.jconhyd.2006.09.013).

Jardine, P.M., **Mayes, M.A.,** Mulholland, P.J., Hanson, P.J., Tarver, J.R., Luxmoore, R.J., McCarthy, J.F., and Wilson, G.V. 2006. Vadose zone flow and transport of dissolved organic carbon at multiple scales in humid regimes. Vadose Zone Journal 5:140-152.

Ginder-Vogel, M., Borch, T., **Mayes, M.A.,** Jardine, P.M., and Fendorf, S.E. 2005. Chromate reduction and retention processes within Hanford sediments. Environmental Science and Technology 39:7833-7839.

Mayes, M.A., Mehlhorn, T.L., and Jardine, P.M. 2005. Coupled hydrological and geochemical processes influencing the transport of chelated metals in the ORNL vadose zone and groundwater. *In:* ACS Symposium Series 910: *Biogeochemistry of Chelating Agents*, Nowack, B. and Van Briesen, J., Eds., pp. 297-315.

Mayes, M.A., Yin, X.L., Pace, M.N., and Jardine, P.M. 2005. Rates and mechanisms of Co(II)EDTA^{2-} interactions with sediments from the Hanford site. *In:* ACS Symposium Series 910: *Biogeochemistry of Chelating Agents*, Nowack, B. and Van Briesen, J., Eds., pp. 278-296.

Mayes, M.A., Pace, M. N., Jardine, P.M., Fendorf, S.E., Farrow, N.D., Yin, X.L, and Zachara, J.M. 2005. Coupled hydrological and geochemical processes governing the fate and transport of Sr and U in the Hanford vadose zone. *In:* ACS Symposium Series 904: *Subsurface Contamination Remediation Accomplishments of the Environmental Management Science Program*, Zachry, T., and Berkey, E., Eds., pp. 229-250.

Mayes, M.A., Jardine, P.M., Mehlhorn, T.L., Bjornstad, B.N., Ladd, J.L., and Zachara, J.M. 2003. Transport of multiple tracers in variably saturated humid region structured soils and semi-arid region laminated sediments. Journal of Hydrology 275: 141-161.

Pace, M.N., **Mayes, M.A.**, Jardine, P.M., Mehlhorn, T.L., Zachara, J.M., and Bjornstad, B.N. 2003. Quantifying the effects of small-scale heterogeneities on flow and transport in undisturbed cores from the Hanford Formation. Vadose Zone Journal 2: 664-676.

Gwo, J.P., D'Azevedo, E.F., Frenzel, H., **Mayes, M.A.**, Yeh, G.-T., Jardine, P.M., Salvage, K.M., and Hoffman, F.M. 2001. HBGC123D: a high performance computer model of coupled hydrological and biogeochemical processes. Computer and Geosciences 27: 1231-1242.

Mayes, M.A., Jardine, P.M., Larsen, I.L., Brooks, S.C., and Fendorf, S.E. 2000. Multispecies transport of metal-EDTA and chromate complexes through undisturbed columns of weathered fractured saprolite. Journal of Contaminant Hydrology 45: 243-265.

Jardine, P.M., Fendorf, S.E., **Mayes, M. A.**, Larsen, I.L., Brooks, S.C., and Bailey, W.B. 1999. Fate and transport of hexavalent chromium in undisturbed heterogeneous soil. Environmental Science and Technology 33: 2939-2944.

Selected Public Presentations

Mayes, M.A., Phillips, J.R., Jardine, P.M., Garten, Jr., C.T., and West, T.O. 2008. Carbon mobility and nitrogen transformation in forested and agricultural ecosystems. Soil Science Society of America, October 5-9, Houston, TX.

Mayes, M.A., Yin, X.L., Tang, G., Parker, J.C., and Hinkel, K.V. 2008. Relationship between radionuclide transport, water content, and flowpaths in anisotropic layered sands. Soil Science Society of America, October 5-9, Houston, TX.

E.H. van den Berg, Perfect, E., Turkbey-Cihan, S.P., and **Mayes, M.A.** 2008. Centrifugal estimation of capillary pressure-saturation relationship at a physical point. Soil Science Society of America, October 5-9, Houston, TX.

E.H. van den Berg, Perfect, E., and **Mayes, M.A.** 2008. Centrifugal determination of unsaturated soil hydraulic properties. Soil Science Society of America, October 5-9, Houston, TX.

E.H. van den Berg, Perfect, E., and **Mayes, M.A.** 2007. Measurement of relative permeability using single-step transient flow centrifuge experiments. American Geophysical Union, December 10-14, San Francisco, CA.

Mayes, M.A., Mehlhorn, T.L., Tang, G., and Parker, J.C. 2007. Investigating the influence of anisotropic transport in layered unsaturated sediments. Soil Science Society of America, Novermber 4-11, New Orleans, LA.

Tang, G., **Mayes, M. A**. and Parker, J. C. 2007. Model discrimination for nonlinear least square fitting of breakthrough curves using uncertainty analysis. Unsaturated Zone Interest Group, August 27-30, Los Alamos National Laboratory.

Mayes, M.A., Perfect, E., Parker, J.C., Gwo, J-P., Jardine, P.M., Tang, G., and van den Berg, E. 2006. Coupled processes influencing the transport of uranium over multiple scales. Environmental Remediation Sciences Program Principal Investigator Meeting, Oak Ridge, TN, October 23-25, Oak Ridge, TN (http://public.ornl.gov/nabirfrc/workshop2006.cfm).

van den Berg, E., Perfect, E., **Mayes, M.A.**, Parker, J.C., Tang, G., Jardine, P., and Fendorf, S. 2006. Transient flow centrifugation for determining unsaturated hydraulic properties of Hanford sediments. Environmental Remediation Sciences Program Principal Investigator Meeting, Oak Ridge, TN, October 23-25, Oak Ridge, TN.

Zhang, F., Parker, J.C., Jardine, P.M., **Mayes, M.A.**, Mehlhorn, T.L., and Gwo, J.-P. 2006. Effects of scale, flow regime and transport model formulation on apparent transport and reaction rate coefficients. Environmental Remediation Sciences Program Principal Investigator Meeting, Oak Ridge, TN, October 23-25, Oak Ridge, TN.

Mayes, M.A., Jardine, P.M., Pace, M.N., McKay, L.D., and E. Perfect. 2006. The influence of natural sedimentary layering upon solute transport. Environmental Remediation Sciences Program Workshop, June 12-14, Idaho Falls, ID. (http://www.inl.gov/conferences/ersp/agenda.shtml).

Mayes, M.A., Jardine, P.M., Pace, M.N., McKay, L.D., and E. Perfect. 2006. The influence of natural sedimentary layering upon solute transport. Informal presentation to Tank Farm Vadose Zone Group and others, June 8, Richland, WA.

Mayes, M.A., Jardine, P.M., Yin, X.L., Dansby-Sparks, R.N., and Pace, M.N. 2006. Variability of the reactivity of Hanford sediments to U(VI) and Co-EDTA. Abstracts of the Papers of the American Chemical Society, 231:77-GEOC.

Mayes, M.A., Yin, X.L., Dansby-Sparks, R.N., Pace, M.N., and Jardine, P.M. 2006. Influence of mineralogical and hydrological heterogeneities upon contaminant migration. Geological Society of America Abstracts with Programs, Vol. 38, No. 3, p. 70.

Mayes, M.A., Pace, M.N., Fendorf, S.E., Jardine, P.M., and Yin, X.L. 2005. Uranium hydrogeochemistry of the Hanford caliche layer. Geochimica et Cosmochimica Act 69 (10): A424.

Kamolpornwijit, W., Kim, Y.J., Brooks, S.C., Scheibe, T.D. and **Mayes, M.A.** 2005. Estimation of groundwater flow distribution in structured media from non-reactive tracer results under unsaturated condition. Eos. Trans. AGU, 86(18), Jt. Assem. Suppl., Abstract H51A-05, May 23-27, New Orleans, LA.

Mayes, M.A., Pace, M.N., Jardine, P.M., Fendorf, S.E., and Yin, X.L. 2004. Coupled hydrology and uranium geochemistry of the Hanford caliche layer. Eos. Trans. AGU, 85(47), Fall Meet. Suppl., Abstract H31D-0445, December 13-17, San Fransisco, CA.

Gwo, J., Jardine, P., and **Mayes, M.** 2004. Scaling up a conceptual model of matrix diffusion from laboratory to field. Eos. Trans. AGU, 85(47), Fall Meet. Suppl., Abstract H14B-03:, December 13-17, San Fransisco, CA.

Pace, M.N., **Mayes, M.A.**, Jardine, P.M., Mehlhorn, T.L., Liu, Q., and Yin, X. 2004. Unraveling the fate and transport of $SrEDTA^{2-}$ and Sr^{2+} in Hanford sediments. Eos. Trans. AGU, 85(47), Fall Meet. Suppl., Abstract H31D-0433, December 13-17, San Fransisco, CA.

Pace, M.N., **Mayes, M.A.**, Jardine, P.M., Mehlhorn, T.L., Yin, X., Liu, Q., and Zachara, J.M. 2004. Determination of reactive mineralogies in unsaturated strontium transport in undisturbed sandy media. Soil Science Society of America, October 31-November 4, Seattle, WA.

Jardine, P.M., **Mayes, M.A.**, Pace, M.N., Mehlhorn, T.L., Yin, X.L., Fendorf, S.E., and Criddle, C.S. 2004. Exploring contaminant fate and transport processes at multiple scales. Gordon Research Conference, Plymouth, New Hampshire. June 27-August 2.

Mayes, M.A. 2004. The Coster Shop controversy: Geologic, environmental, and political interpretations. East Tennessee Geological Society, Pellisippi State Technical Community College, February 9, Knoxville, TN.

Pace, M.N., **Mayes, M.A.**, Jardine, P.M., Yin, X., Mehlhorn, T.L., Zachara, J.M. and Bjornstad, B.N. 2003. Unsaturated transport of uranium in undisturbed cores from the Hanford site vadose zone. Geological Society of America Annual Meeting, November 2-6, Seattle, WA.

Mayes, M.A., Yin, X.L, Pace, M.N., and Jardine, P.M. 2003. Coupled hydrology and geochemistry of chelated metals in intact Hanford and ORNL subsurface sediments. American Chemical Society, September 7-11, New York, NY.

Yin, X., **Mayes, M.A.**, Pace, M.N, Liu, Q., Jardine, P.M., Fendorf, S.E., and Mehlhorn, T.L. 2003. Kinetics and mechanisms of metal-EDTA oxidation, dissociation, and adsorption on subsurface soils from the Hanford vadose zone. American Chemical Society, September 7-11, New York, NY.

Mayes, M.A., Pace, M.N., Yin, X., Jardine, P.M., Fendorf, S.E., and Bjornstad, B.N. 2003. Coupled hydrogeochemical processes controlling the transport of U and chelated metals through the Hanford vadose zone. 9th Biannual Unsaturated Zone Interest Group meeting, October 8-10, Richland, WA.

Pace, M.N., **Mayes, M.A.**, Jardine, P.M., Yin, X.L., Mehlhorn, T.L., Zachara, J.M., and B.N. Bjornstad. 2003. Unsaturated transport of uranium in undisturbed cores from the Hanford site vadose zone. 9th Biannual Unsaturated Zone Interest Group, October 8-10, Richland, WA.

Mayes, M.A., Jardine, P.M., Pace, M.N., Yin, X., Fendorf, S.E., and Zachara, J.M. 2003. Fate and transport of radionuclides beneath the Hanford tank farms: unraveling coupled geochemical and hydrological processes in the vadose zone. Environmental Management Science Program Principal Investigator Workshop, Pacific Northwest National Laboratory, May 5-7, Richland, WA (http://www.pnl.gov/emsp/fy2003/agenda.stm)

Mayes, M.A., Jardine, P.M., Fendorf, S.E., Pace, M. N., Yin, X., Mehlhorn, T.L., and Zachara, J.M. 2003. Coupled hydrological and geochemical processes governing the fate and transport of radionuclides and toxic metals in the Hanford vadose zone. American Chemical Society, March 23-27, New Orleans, LA (Invited).

Mayes, M.A., Jardine, P.M., Pace, M.N., and Mehlhorn, T.L. 2002. The effects of unstable flow on metal transport in variably saturated undisturbed cores of laminated sediments. Soil Science Society of America, November 10-14, Indianapolis, IN.

Mayes, M.A., Uhle, M., Nesbit, R.M., Todd, D.E., and Jardine, P.M. 2002. Dynamics of natural organic carbon in a humid forest soil profile. Soil Science Society of America, November 10-14, Indianapolis, IN.

Pace, M.N., **Mayes, M.A.**, Jardine, P.M., Mehlhorn, T.L., and Zachara, J.M. 2002. Hydrologic processes governing the transport of radionuclides through the Hanford Formation, Hanford, WA. Soil Science Society of America, November 10-14, Indianapolis, IN.

Roh, Y., **Mayes, M.A.**, Pace, M.N., Choi, S., Chorover, J., Phillips, D.H., and P.M. Jardine. 2002. Mineralogical characteristics of sediments and Hanford site, WA. The Clay Minerals Society, June 8-12, Boulder, CO.

Mayes, M.A., Jardine, P.M., Mehlhorn, T.L., Pace, M.N., Roh, Y., Ladd, J.L., and Bjornstad, B.N. 2001. Hydrologic processes controlling the transport of radionuclides through the Hanford vadose zone. Soil Science Society of America, October 22-25, Charlotte, NC.

Pace, M.N., Jardine, P.M., **Mayes, M.A.**, Mehlhorn, T.L., Zachara, J.M. 2001. Unsaturated flow and transport in undisturbed cores from the Hanford Formation, Richland, WA. Soil Science Society of America, October 22-25, Charlotte, NC.

Mayes, M.A., Jardine, P.M., Pace, M.N., Fendorf, S.E., Mehlhorn, T.L., Roh, Y., Ladd, J.L., and Bjornstad, B.N. 2001. Hydrologic processes governing the transport of radionuclides through the Hanford vadose zone. Eos. Trans. AGU, 82(47), Fall Meet. Suppl., Abstract H52C-0429, December 10-14, 2001, San Francisco, CA.

Mayes, M.A., Jardine, P.M., Fendorf, S.E., Mehlhorn, T.L., and Bjornstad, B.N. 2001. Hydrologic and geochemical processes controlling the transport of uranium and cesium through the Hanford vadose zone. American Chemical Society, August 26-30, 2001, Chicago, IL (Invited).

Mayes, M.A., Jardine, P.M., Mehlhorn, T.L., Pace, M.N., and Bjornstad, B.N. 2001. Hydrologic processes controlling the transport of radionuclides through the Hanford vadose zone. 8th Biannual Unsaturated Zone Interest Group meeting, July 30-August 2, Idaho Falls, ID.

Pace, M.N., Jardine, P.M., **Mayes, M.A.**, Mehlhorn, T.L.,and Zachara, J.M. 2001. Unsaturated flow and transport in undisturbed cores from the Hanford Formation, Richland, WA. 8th Biannual Unsaturated Zone Interest Group meeting, July 30-August 2, Idaho Falls, ID.

Jardine, P.M., **Mayes, M.A.**, Mehlhorn, T.L., and Brooks, S.C. 2001. Reactive transport of chelated radionuclides through weathered shale saprolite: Observations from lab and field experimentation. V.M. Goldschmidt Conference, May 20-24, 2001, Hot Springs, VA (Invited).

Gwo, J.P., Frenzel, H., **Mayes, M.A.**, and Sieve, B.J. 2001. Determining hydrogeochemical parameters for the fate and transport of CdEDTA and CoEDTA in fractured saprolite using HBGC123D. V.M. Goldschmidt Conference, May 20-24, Hot Springs, VA.

Mayes, M.A., Jardine, P.M., Mehlhorn, T.L. 2001. Nonequilibrium mass transfer in fractured saprolite under saturated and unsaturated conditions. Fractured Rock Conference, March 26-28, Ontario, Canada.

Jardine, P.M., **Mayes, M.A.**, Mehlhorn, T.L., Ainsworth, C.C., Bjornstad, B.N., Zachara, Z.M., and Fendorf, S.E. 2000. Fate and transport of radionuclides beneath the Hanford tank farms: Unraveling coupled geochemical and hydrological processes in the vadose zone. Workshop on Hanford Tank Farm Needs, Environmental Management Science Program, Pacific Northwest National Laboratory, November, Richland, WA.

Mayes, M.A., Jardine, P.M., Mehlhorn, T.L., Bjornstad, B.N., and Ladd, J.L. 2000. Solute displacement through variably saturated laminated silts and sands, Geological Society of America, November 13-16, Reno, NV.

Frenzel, H., **Mayes, M.A.**, Gwo, J.P., Jardine, P.M., and Yeh, G.T. 1999. Application of a hydrobiogeochemistry computer model to fate and transport of co-contaminants in fractured saprolite. American Geophysical Union, Dec., 13-17, San Francisco, CA.

Jardine, P.M., Brooks, S.C., **Mayes, M.A.**, Mehlhorn, T.L., Ainsworth, C.C., Bjornstad, B.N., and Fendorf, S.E. 1999. Fate and transport of radionuclides beneath the Hanford tank farms: Unraveling coupled geochemical and hydrological processes in the vadose zone. Workshop on Hanford Tank Farm Needs, Environmental Management Science Program, Pacific Northwest National Laboratory, October, Richland, WA.

Jardine, P.M., Brooks, S.C., **Mayes, M.A.**, and Mehlhorn, T.L. 1999. Field-scale processes that govern the conceptual framework of hydrobiogeochemical models. Fifth SIAM Conference on Mathematical and Computational Issues in the Geosciences, March 24-27, San Antonio, TX.

Mayes, M.A., Reedy, O.C., Larsen, I.L., Brooks, S.C., and Jardine, P.M. 1997. Multispecies contaminant transport in undisturbed columns of weathered fractured saprolite. Soil Science Society of America, October 26-30, Anaheim, CA.

Mayes, M.A., Reedy, O.C., Larsen, I.L., Brooks, S.C., and Jardine, P.M. 1997. Multispecies contaminant transport in undisturbed columns of weathered fractured saprolite. Geological Society of America, October 20-23, Salt Lake City, UT.