GUOPING TANG

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Profile

- Multidisciplinary knowledge and experience in geosciences, civil and environmental engineering, applied mathematics, and computer application.
- Expertise in simulating complex processes, particularly subsurface water flow and contaminant transport, with strength in numerical solution, parameter estimation /inverse problem, uncertainty/sensitivity analysis, optimization, and model evaluation /discrimination.
- Exceptional programming skill in C++, FORTRAN, VBA, and MATLAB built on over 15 years experience including commercial software design, reactive transport modeling and parallel computing.

Education

Ph.D., Civil Engineering, Northeastern University, Boston, MA, 2006
B.S., Geosciences, Nanjing University, China, 1992

Experience

Research and Development Associate, Oak Ridge National Laboratory, 11/10-present

Post Doctoral Research Associate, Oak Ridge National Laboratory, 09/06-10/10

- Worked on multi-scale multi-process contaminant fate and transport modeling for DOE Oak Ridge Integrated Field Research Challenge site using supercomputers;
- Simulated transport of multiple tracers including reactive cobalt species in 17 large Hanford intact sediment cores with CXTFIT/Excel, HGC5 and PEST;

Research/Teaching Assistant, Northeastern University, 09/02-08/06

- Investigated temporal approximation methods for ground water flow and solute transport modeling;
- Conducted experimental study of nonreactive and reactive solute transport in fine-grained soils under consolidation;

Intern, FM Global-Structures and Materials Research, Norwood, MA, 05/05-08/05

- Developed a convection heat transfer model; wrote FORTRAN subroutines for ABAQUS to analyze the thermal stresses in paper dryers due to accelerated cooling using water.

System Analyst, Beijing Lizheng Software Research Institute, China, 06/00-06/02

- Designed commercial engineering analysis and design software products: soil nailing wall design (> 50 copies were sold in the first year), rock slope stability analysis, foundation soil improvement toolbox, hydraulic tunnel lining analysis, and seepage analysis;

Civil Engineer, Central Research Institute of Building and Construction Ministry of Metallurgical Industry, Beijing, China, 05/95-06/00

- Designed and applied a data acquisition and processing software for large scale structure tests;
- Conducted more than a dozen of large scale lab and in situ structure tests;
- Consulted and monitored two mass concrete construction projects and three braced excavation projects for deep foundations in soft soils.

Undergraduate Research Assistant, Nanjing University, China, 09/1991-07/1992

- Conducted field geologic survey; recorded boring logs; collected intact soil samples; conducted soil lab tests; participated in expansive soil investigation.

Publications

Journal

- **Tang, G.**, D'Azevedo, E. F., Zhang, F., Parker, J. C., Watson, D. B. and Jardine, P. M. Application of a hybrid MPI/OpenMP implementation for parallel groundwater model calibration on multi-core computers. Computers & Geosciences, DOI: 10.1016/j.cageo.2010.04.013.
- **Tang, G.**, Mayes, M. A., Parker, J. C., and Jardine, P. M. 2010. CXTFIT/Excel-a modular adaptable code for parameter estimation, sensitivity analysis and uncertainty analysis. Computers & Geosciences. 36(9), 1200-1209, DOI:10.1016/j.cageo.2010.01.013.
- **Tang**, **G.**, Mayes, M. A., Parker, J. C., Yin, X.L., Watson, D. B, and Jardine, 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
- 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. 2009. Influence of sedimentary bedding on reactive transport parameters under unsaturated condition. Soil Science Society of America Journal. 73, 1938-1946. DOI: 10.2136/sssaj2008.0317.
- **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(2), 493-499. DOI: 10.2136/vzj2007.0013

- **Tang, G.**, Alshawabkeh, A. N. and Mayes, M. A. 2008 Automatic time stepping with global error control for groundwater flow models. ASCE Journal of Hydrologic Engineering 13(9), 803-810. DOI: 10.1061/(ASCE)1084-0699(2008)13:9(803).
- Parker, J. C., Park, E. and **Tang, G.** 2008. Dissolved plume attenuation with DNAPL source remediation, aqueous decay and volatilization–analytical solution, model calibration and prediction uncertainty. Journal of Contaminant Hydrology, 102, 61-71. DOI: 10.1016/j.jconhyd.2008.03.009.
- Zhang, F., Parker, J. C., Brooks, S. C., Kim, Y.-J., **Tang, G**., Jardine, P. M. and Watson, D. B. 2008 Comparison of approaches to calibrate a surface complexation model for U(VI) sorption to weathered saprolite. Transport in Porous Media. 78, 185-197. DOI: 10.1007/s11242-008-9294-9.
- **Tang, G.**, Alshawabkeh, A. N. and Bernal, D. 2007 Semi-analytical time integration for numerical simulation of transient groundwater flow in confined aquifers. Journal of Hydrologic Engineering, 12(1), 73-82. DOI: 10.1061/(ASCE)1084-0699(2007)12:1(73).
- **Tang, G.**, and Alshawabkeh, A. N. 2006 A semi-analytical time integration for numerical solution of Boussinesq Equation. Advances in Water Resources, 29(12), 1953-1968. DOI: 10.1016/j.advwatres.2006.02.003.

Conference

- **Tang, G.**, Alshawabkeh, A. N., Mayes, M. A. and Parker, J. C. Adaptive time integration for the convection-dispersion equation. GeoCongress08, 03/9-03/12/08 New Orleans, LA.
- **Tang, G.** and Alshawabkeh, A. N. A semi-analytical time integration for numerical solution of advection diffusion equation for contaminant transport. 5th International Congress on Environmental Geotechnics, 06/26-06/30/06 Cardiff, Wales, UK.
- **Tang, G.**, Alshawabkeh, A. N. and Sheahan, T. C. Experimental study of nonreactive solute transport in fine-grained soils under consolidation. Geofrontiers 2005, 01/24-01/26/05 Austin, TX.
- **Tang, G**. and Alshawabkeh, A. N. Experimental study of reactive solute transport in fine-grained soils under consolidation. Green 4, International Symposium on Geotechnics Related to the Environment, 06/28-07/1/04 Wolverhampton, UK.
- Alshawabkeh, A. N., Rahbar, N., Sheahan, T. C., and **Tang G**. Volume change effects on solute transport in clay under consolidation. Geo-2004, 03/07-03/10/04 Irbid, Jordan.
- **Tang, G**. and Lin, Z. Research and development of data acquisition software for large-scale structure tests with object-oriented technique. First International Conference on Computing and Information Technology for Architecture, Engineering & Construction 05/16-05/17/96, Singapore.

Presentation/Abstract/Poster

- **Tang**, **G.**, Mayes, M. A., Parker, J. C., Jardine, P. M. and Brooks, S. C. 2010 Simulating reactive transport of cobalt-EDTA complexes through large intact sediment cores. Goldschmidt--Earth, Energy, and the Environment June, 13-18, 2010. Knoxville, TN.
- Watson, D. B., **Tang**, **G.**, Parker, J. C., and Brooks, S. C. 2010 Quantifying nitrate migration and natural attenuation in a shale/saprolite pathway from a former waste disposal site. Goldschmidt--Earth, Energy, and the Environment June, 13-18, 2010. Knoxville, TN.
- Gu, B., Watson, D. B., **Tang**, **G**., Zhang, F., Kemner, K. M., Wu, W.-M., Schadt, C. W., Kostka, J., Zhou, J., Parker, J. C., and Brooks, S. C. Subsurface pH controls for the immobilization of uranium and technetium. DOE SBR PI Meeting, March 29-31, 2010. Washington, DC.
- Parker, J. C., Zhang, F., **Tang, G.**, Luo, J., Wu, W.-M., Gu, B., Spalding, B., Brooks, S. C. Watson, D., and Jardine, P. M. Multi-Scale Coupled Process Modeling at the IFRC site. DOE SBR PI Meeting, March 29-31, 2010. Washington, DC.
- Zhang, F., **Tang, G.**, Parker, J. C., Luo, J., Wu, W.-M., Zhang, G., Kelly, S., Mehlhorn, T., Carley, J., Kemner, K. M., Criddle, C., Schadt, C., Luo, W., Gu, B., Spalding, B. P., Brooks, S. C., Watson, D. B., and Jardine, P. M. Multi-process and multi-scale modeling and data analysis at IFC site, Oak Ridge, TN. DOE ERSP PI Meeting, April 20-23, 2009. Lansdowne, Virginia.
- Mayes, M. A., Yin, X. L., **Tang, G.**, Parker, J. C. and Hinkel, K. Relationship between radionuclide transport, water Content, and flowpaths in anisotropic layered unsaturated sands. 2008 Joint Annual Meeting, 05/10-09/10/08 Houston, TX
- **Tang, G.**, Improving column experiment data interpretation. ORNL YESSS seminar, 02/06/08 Oak Ridge, TN.
- **Tang, G.**, Mayes, M. A. and Parker, J. C. Evaluating and discriminating nonlinear least squares fitting of breakthrough curves. Unsaturated Zone Interest Group meeting, 08/27-08/30/07 Los Alamos, NM.
- Mayes, M. A., Mehlhorn, T., **Tang**, **G**. and Parker, J. C. Investigating the influence of anisotropic transport in layered unsaturated sediments. ASA-CSSA-SSSA 2007 International Annual Meetings, 11/04-11/08/07, New Orleans, LA.
- Mayes, M. A**., Tang, G.**, Parker, J.C., Perfect, E. and van den Berg, E. H., Coupled processes influencing the transport of uranium over multiple scales, DOE ERSP PI Meeting, 04/16-04/19/07, Lansdowne, VA.
- 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. DOE ERSP PI Meeting, Oak Ridge, TN, October 23-25, Oak Ridge, TN

Professional Organizations

- American Geophysical Union
- American Society of Civil Engineers
- American Chemical Society

Manuscript Review

- Vadose Zone Journal
- Bioresource Technology
- Transport in Porous Media
- Soil Science Society of America Journal
- Journal of Environmental Management
- Journal of Hydrologic Engineering, ASCE
- Journal of Geotechnical and Geoenvironmental Engineering, ASCE
- Journal of Stochastic Environmental Research & Risk Assessment

Selected Training

- Visualization with VisIt 2009, NCCS, ORNL (1 day).
- Cray XT5 Quad-core Workshop 2009, NCCS, ORNL (4 days).
- Supercomputing Crash Courses 2008 (advanced), 2008, NCCS, ORNL (1 day).
- Summer school in Geophysical Porous Media: Multi-disciplinary Science from Nano- to Global-Scale, 2006, Purdue University (2 weeks, developed a multiple population model to explain the depth-dependent irreversible sorption of colloids in columns).

Registration

- Professional Engineer (VA)

Skill

- HYDROGEOCHEM 5.0, PEST, CXTFIT, HYDRUS, MODFLOW, MT3DMS, PHREEQC, and GMS
- Visual C++, MATLAB, FORTRAN, VBA, ABAQUS and AutoCAD
- OpenMP, MPI and some experience with Petsc