

Particle transport papers (January 2016):

2015

1. Bradford, S. A., B. Headd, G. Arye, and J. Šimůnek, Transport of *E. coli* D21g with runoff water under different solution chemistry conditions and surface slopes, *Journal of Hydrology*, 525, 760-768, 2015.
2. Bradford, S. A., Y. Wang, S. Torkzaban, and J. Šimůnek, Modeling the release of *E. coli* D21g with transients in water content, *Water Resources Research*, 51(5), 3303-3316, doi:10.1002/2014WR016566, 2015.
3. Bradford, S. A., B. Headd, G. Arye, and J. Šimůnek, Transport of *E. coli* D21g with runoff water under different solution chemistry conditions and surface slopes, *Journal of Hydrology*, 525, 760-768, 2015.
4. Morales, I., J. A. Amador, and T. Boving, Bacteria transport in a soil-based wastewater treatment system under simulated operational and climate change conditions, *Journal of Environmental Quality*, 44(5), 1459-1472, doi:10.2134/jeq2014.12.0547, 2015.
5. Ngwenya, B. T., P. Curry, and L. Kapetas, Transport and viability of *Escherichia coli* cells in clean and iron oxide coated sand following coating with silver nanoparticles, *Journal of Contaminant Hydrology*, 179, 35–46, 2015.
6. Stevenson, M. E., R. Sommer, G. Lindner, A. H. Farnleitner, S. Toze, A. K.T. Kirschner, A. P. Blaschke, and J. P.S. Sidhu, Attachment and detachment behavior of human adenovirus and surrogates in fine granular limestone aquifer material, *Journal of Environmental Quality*, 44(5), 1392-1401, doi:10.2134/jeq2015.01.0052, 2015.
7. Sun, Y., B. Gao, S. A. Bradford, L. Wu, H. Chen, X. Shi, and J. Wu, Transport, retention, and size perturbation of graphene oxide in saturated porous media: Effects of input concentration and grain size, *Water Research*, 68, 24-33, 2015.
8. Wang, D., P. J. Deb, J. Yan, Y. Jin, and D. Zhou, Transport and retention of Polyvinylpyrrolidone-coated silver nanoparticles in natural soils, *Vadose Zone Journal*, 14(7), doi:10.2136/vzj2015.01.0007, 2015.
9. Wang, D., Jin, Y., and D. P. Jaisi, Cotransport of hydroxyapatite nanoparticles and hematite colloids in saturated porous media: Mechanistic insights from mathematical modeling and phosphate oxygen isotope fractionation, *Journal of Contaminant Hydrology*, 182, 194–209, 2015.
10. Wikiniyadhane, R., S. Chotpantararat, and S. K. Ong, Effects of kaolinite colloids on Cd²⁺ transport through saturated sand under varying ionic strength conditions: Column experiments and modeling approaches, *Journal of Contaminant Hydrology*, 182, 146–156, 2015.

2014

11. Bradford, S. A., Y. Wang, H. Kim, S. Torkzaban, and J. Šimůnek, Modeling microorganism transport and survival in the subsurface, *Journal of Environmental Quality*, 43(2), 421-440, doi:10.2134/jeq2013.05.0212, 2014.
12. Frohnert, A., S. Apelt, S. Klitzke, I. Chorus, R. Szewzyk, and H.-C. Selinka, Transport and removal of viruses in saturated sand columns underoxic and anoxic conditions – Potential implications for groundwater protection, *International Journal of Hygiene and Environmental Health*, 217, 861–870, 2014.

13. Knappett, P. S. K., J. Du, P. Liu, V. Horvath, B. J. Mailloux, J. Feighery, A. van Geen, and P. J. Culligan, Importance of reversible attachment in predicting *E. coli* transport in saturated aquifers from column experiments, *Advances in Water Resources*, *63*, 120-130, 2014.
14. Lutterodt, G., J. Willem, A. Foppen, and S. Uhlenbrook, *Escherichia coli* strains harvested from springs in Kampala, Uganda: cell characterization and transport in saturated porous media, *Hydrological processes*, *28*(4), 1973-1988, 2014.
15. Mekonen, A., P. Sharma, and F. Fagerlund, Transport and mobilization of multiwall carbon nanotubes in quartz sand under varying saturation, *Environ. Earth. Sci.*, *71*, 3751-3760, doi:10.1007/s12665-013-2769-1, 2014.
16. Morales, I., J. A. Atoyan, J. A. Amador, and T. Boving, Transport of pathogen surrogates in soil treatment units: Numerical modeling, *Water*, *6*(4), 818-838, doi:10.3390/w6040818, 2014.
17. Neukum, C., A. Braun, and R. Azzam, Transport of stabilized engineered silver (Ag) nanoparticles through porous sandstones, *Journal of Contaminant Hydrology*, *158*, 1-13, 2014.
18. Park, J.-A, J.-K. Kang, J.-H. Kim, S.-B. Kim, S. Yu, and T.-H Kim, Transport and removal of bacteriophages MS2 and PhiX174 in steel slag-amended soils: column experiments and transport model analyses, *Environmental Technology*, *35*(10), 1199-1207, doi:10.1080/09593330.2013.865061, 2014.
19. Treumann, S., S. Torkzaban, S. A. Bradford, R. M. Visalakshan, and D. Page, An explanation for differences in the process of colloid adsorption in batch and column studies, *Journal of Contaminant Hydrology*, *164*, 219-229, 2014.
20. Wang, Y., S. A. Bradford, and J. Šimůnek, Estimation and upscaling of dual-permeability model parameters for the transport of *E. coli* D21g in soils with preferential flow, *Journal of Contaminant Hydrology*, *159*, 57-66, 2014.
21. Wang, Y., S. A. Bradford, and J. Šimůnek, Physical and chemical factors influencing the transport and fate of *E. coli* D21g in soils with preferential flow, *Vadose Zone Journal*, *13*(1), doi:10.2136/vzj2013.07.0120, 10 pp., 2014.

2013

22. Bai, C., K. M. Eskridge, and Y. Li, Analysis of the fate and transport of nC₆₀ nanoparticles in the subsurface using response surface methodology, *Journal of Contaminant Hydrology*, *152*, 60-69, 2013.
23. Bradford, S. A., V. L. Morales, W. Zhang, R. W. Harvey, A. Packman, A. Mohanram, and C. Welty, Transport and fate of microbial pathogens in agricultural settings, *Critical Reviews in Environmental Sciences and Technology*, *43*(8), 775-893, doi: 10.1080/10643389.2012.710449, 2013.
24. Cornelis, G., L. Pang, C. Doolette, J. K. Kirby, and M. J. McLaughlin, Transport of silver nanoparticles in saturated columns of natural soils, *Science of the Total Environment*, *463-464*, 120-130, 2013.
25. Fang, J., Mei-jia Xu, Deng-jun Wang, Bei Wen, Jing-yi Han, Modeling the transport of TiO₂ nanoparticle aggregates in saturated and unsaturated granular media: Effects of ionic strength and pH, *Water Research*, *47*, 1399-1408, 2013.
26. Goebel, M.-O., S. K. Woche, P. M. Abraham, G. E. Schaumann, and J. Bachmann, Water repellency enhances the deposition of negatively charged hydrophilic colloids in a water-

- saturated sand matrix, *Colloids and Surfaces A: Physicochem. Eng. Aspects*, *431*, 150–160, 2013.
27. Kasel, D., S. A. Bradford, J. Šimůnek, M. Heggen, H. Vereecken, and E. Klumpp, Transport and retention of multi-walled carbon nanotubes in saturated porous media: Effects of input concentration and grain size, *Water Research*, *47*(2), 933-944, 2013.
 28. Kasel, D., S. A. Bradford, J. Šimůnek, T. Pütz, H. Vereecken, and E. Klumpp, Limited transport of functionalized multi-walled carbon nanotubes in two natural soils, *Environmental Pollution*, *180*, 152-158, <http://dx.doi.org/10.1016/j.envpol.2013.05.031>, 2013.
 29. Lamy, E., L. Lassabatere, B. Bechet, and H. Andrieu, Effect of a nonwoven geotextile on solute and colloid transport in porous media under both saturated and unsaturated conditions, *Geotextiles and Geomembranes*, *36*, 55-65, 2013.
 30. Liang, Y., S. A. Bradford, J. Šimůnek, Vereecken, and E. Klumpp, Sensitivity of the transport and retention of stabilized silver nanoparticles to physicochemical factors, *Water Research*, *47*, 2572-2582, doi:10.1016/j.watres.2013.02.025, 2013.
 31. Liang, Y., S. A. Bradford, J. Šimůnek, M. Heggen, H. Vereecken, and E. Klumpp, Retention and remobilization of stabilized silver nanoparticles in an undisturbed loamy sandy soil, *Environmental Science & Technology*, *47*(21), 12229-12237, doi:10.1021/es402046u, 2013.
 32. Liu, Z., M. Flury, J. B. Harsh, J. B. Mathison, and C. Vogs, Colloid mobilization in an undisturbed sediment core under semiarid recharge rates, *Water Resources Research*, *49*, 4985–4996, doi:10.1002/wrcr.20343, 2013.
 33. Mondal, P. K., and B. E. Sleep, Virus and virus-sized microsphere transport in a dolomite rock fracture, *Water Resources Research*, *49*(2), 808-824, doi: 10.1002/wrcr.20086, 2013.
 34. Ren, D., and J. A. Smith, Protein-capped silver nanoparticle transport in water-saturated sand, *J. Environ. Eng.*, *139*, 781-787, 2013.
 35. Sadeghi, G., T. Behrends, J. F. Schijven, S. M. Hassanizadeh, Effect of dissolved calcium on the removal of bacteriophage PRD1 during soil passage: The role of double-layer interactions, *Journal of Contaminant Hydrology*, *144*, 78–87, 2013.
 36. Shang, J., C. Liu, and Z. Wang, Transport and retention of engineered nanoporous particles in porous media: Effects of concentration and flow dynamics, *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, *417*, 89-98, 2013.
 37. Schijven, J. F., H. H. J. L., van den Berg, M. Colin, Y. Dullemeont, W. A.M. Hijnen, A. Magic-Knezev, W. A. Oorthuizen, and G. Wubbels, A mathematical model for removal of human pathogenic viruses and bacteria by slow sand filtration under variable operational conditions, *Water Research*, *47*, 2592-2602, 2013.
 38. Wang, Y., S. A. Bradford, and J. Šimůnek, Transport and fate of microorganisms in soils with preferential flow under different solution chemistry conditions, *Water Resources Research*, *49*(5), 2424-2436, doi:10.1002/wrcr.20174, 2013.

2012

39. Firouzi, A. F., M. Homaei, E. Klumpp, R. Kasteel, and M. Sattari, Modeling microbial contaminant transport and deposition in calcareous soils under saturated conditions, *Journal of Science and Technology of Agriculture and Natural Resources*, *15*(58(B)), 53-68, 2012.

40. Jones, E. H., and C. Su, Fate and transport of elemental copper (Cu^0) nanoparticles through saturated porous media in the presence of organic materials, *Water Research*, 46(7), 2445-2456, 2012.
41. Russell, T. L., K. M. Yamahara, and A. B. Boehm, Mobilization and transport of naturally occurring Enterococci in beach sands subject to transient infiltration of seawater, *Environmental Science & Technology*, 46(11), 5988-5996, doi: 10.1021/es300408z, 2012.
42. Tian, Y., B. Gao, Y. Wang, V. L. Morales, R. M. Carpena, Q. Huang, and L. Yang, Deposition and transport of functionalized carbon nanotubes in water-saturated sand columns, *Journal of Hazardous Materials*, 213, 265-272, doi: 10.1016/j.jhazmat.2012.01.088, 2012.
43. Wang, D., S. A. Bradford, M. Paradelo, W. J. G. M. Peijnenburg, and D. Zhou, Facilitated transport of Copper with hydroxyapatite nanoparticles in saturated sand, *Soil Sci. Soc. Am. J.*, 76, 375-388, 2012.
44. Zhang, Q., S. M. Hassanizadeh, A. Raoof, M. Th. van Genuchten, and S. M. Roels, Modeling virus transport and remobilization during transient partially saturated flow, *Vadose Zone J.*, 2, doi:10.2136/vzj2011.0090, 11 pp., 2012.

2011

45. Bradford, S. A., S. Torkzaban, and J. Šimůnek, Modeling colloid transport and retention in saturated porous media under unfavorable attachment conditions, *Water Resour. Res.*, 47, W10503, doi:10.1029/2011WR010812, 2011.
46. Kodešová, R., A. Kapička, J. Lebeda, H. Grison, M. Kočárek, and E. Petrovský, Numerical simulation of fly-ash transport in three sands of different particle-size distribution using HYDRUS-1D, *Journal of Hydrology and Hydromechanics*, 59(3), 206- 216, 2011.
47. Lutterodt, G., J. W. A. Foppen, A. Maksoud, and S. Uhlenbrook, Transport of Escherichia coli in 25 m quartz sand columns, *Journal of Contaminant Hydrology*, 119(1-4), 80-88, 2011.
48. Magal, M., N. Weisbrod, Y. Yechieli, S. L. Walker, A. Yakirevich, Colloid transport in porous media: Impact of hyper-saline solutions, *Water Research*, 45, 3521-3532, 2011.
49. Sadeghi, G., J. F. Schijven, T. Behrends, S. M. Hassanizadeh, J. Gerritse, and P. J. Kleingeld, Systematic study of effects of pH and ionic strength on attachment of phage PRD1, *Ground Water*, 49(1), 12-19, 2011.
50. Wang, D., M. Paradelo, S. A. Bradford, W. J. G. M. Peijnenburg, L. Chu, and D. Zhou, Facilitated transport of Cu with hydroxyapatite nanoparticles in saturated sand: Effects of solution ionic strength and composition, *Water Research*, 45, 5909-5915, 2011.

2010

51. Mohanram, A., Ch. Ray, R. W. Harvey, D. W. Metge, J. N. Ryan, J. Chorover, and D. D. Eberl, Comparison of transport and attachment behaviors of *Cryptosporidium parvum* oocysts and oocyst-sized microspheres being advected through three mineralogically different granular porous media *Water Research*, 44, 5334-5344, 2010.
52. Torkzaban, S., Y. Kim, M. Mulvihill, J. Wan, T. K. Tokunaga, Transport and deposition of functionalized CdTe nanoparticles in saturated porous media, *Journal of Contaminant Hydrology*, 118, 208-217, 2010.

2009

53. Bradford, S. A., S. Torkzaban, F. J. Leij, J. Šimůnek, and M. Th. van Genuchten, Modeling the coupled effects of pore space geometry and velocity on colloid transport and retention, *Wat. Resour. Res.*, *45*, W02414, doi:10.1029/2008WR007096, 15 pp., 2009.
54. Paradelo, M., J. Šimůnek, J. C. Novoa-Muñoz, M. Arias-Estevez, and J. E. Lopez-Periago, Transport of copper oxychloride-based fungicide particles in saturated quartz sand, *Environ. Sci. and Technol.*, *8*(4), 8860-8866, 2009.

2008

55. Charles, K. J., F. C. Souter, D. L. Baker, C. M. Davies, J. F. Schijven, D. J. Roser, D. A. Deere, P. K. Priscott, and N. J. Ashbolt, Fate and transport of viruses during sewage treatment in a mound system, *Water Research*, *42*(12), 3047-3056, 2008.
56. Gargiulo, G., S. A. Bradford, J. Šimůnek, P. Ustohal, H. Vereecken, and E. Klumpp, Bacteria transport and deposition under unsaturated conditions: the role of bacteria surface hydrophobicity, *Vadose Zone Journal*, *7*(2), doi:10.2136/vzj2007.0068, 406-419, 2008.
57. Pang, L., M. McLeod, J. Aislabie, J. Šimůnek, M. Close, and R. Hector, Modeling transport of fecal coliforms and *Salmonella* bacteriophage in ten undisturbed New Zealand soils under dairy shed effluent irrigation, *Vadose Zone Journal*, *7*(1), 97-111, 2008.
58. Shang, J., M. Flury, G. Chen, and J. Zhuang, Impact of flow rate, water content, and capillary forces on in situ colloid mobilization during infiltration in unsaturated sediments, *Water Resour. Res.*, *44*, W06411, doi:10.1029/2007WR006516, 2008.
59. Sharma, P., H. M. Abdou, and M. Flury, Effect of the lower boundary condition and flotation on colloid mobilization in unsaturated sandy sediments, *Vadose Zone J.*, *7*, 930-940, 2008.
60. Shen, C., Y. Huang, B. Li, and Y. Jin, Effects of solution chemistry on straining of colloids in porous media under unfavorable conditions, *Water Resour. Res.*, *44*, W05419, doi:10.1029/2007WR006580, 2008.
61. Tazehkand, S. S., S. Torkzaban, S. A. Bradford, and S. L. Walker, Cell preparation methods influence *Escherichia coli* D21g surface chemistry and transport in saturated sand, *J. Environ. Qual.*, *37*, 2108-2115, 2008.
62. Torkzaban, S., Bradford, S. A., M. Th. van Genuchten, S. L. Walker, Colloid transport in unsaturated porous media: The role of water content and ionic strength on particle straining, *J. Contam. Hydrology*, *96*, 113-127, 2008.
63. Torkzaban, S., S. S. Tazehkand, S. L. Walker, and S. A. Bradford, Transport and fate of bacteria in porous media: Coupled effects of chemical conditions and pore space geometry, *Water Resour. Res.*, *44*, W04403, doi:10.1029/2007WR006541, 2008.

2007

64. Gargiulo, G., S. A. Bradford, J. Šimůnek, P. Ustohal, H. Vereecken, and E. Klumpp, Transport and deposition of metabolically active and stationary phase *Deinococcus Radiodurans* in unsaturated porous media, *Environ. Sci. and Technol.*, *41*(4), 1265-1271, 2007.

65. Gargiulo, G., S. A. Bradford, J. Šimůnek, P. Ustohal, H. Vereecken, and E. Klumpp, Bacteria transport and deposition under unsaturated conditions: the role of the matrix grain size and the bacteria surface protein, *J. Contam. Hydrology*, 92 doi: 10.1016/j.jconhyd.2007.01.009, 255-273, 2007.

2006

66. Bradford, S. A., and M. Bettahar, Concentration dependent transport of colloids in saturated porous media, *Journal of Contaminant Hydrology*, 82(1), 99-117, 2006.
67. Bradford, S. A., J. Šimůnek, and S. L. Walker, Transport and straining of E. coli O157:H7 in saturated porous media, *Water Resour. Res.*, 42, W12S12, doi:10.1029/2005WR004805, 12 pp., 2006.
68. Bradford, S. A., Y. F. Tadassa, and Y. Pachepsky, Transport of *Giardia* and manure suspensions in saturated porous media, *J. Environ. Qual.*, 35, 749-757, 2006.
69. Bradford, S. A., Y. F. Tadassa, and Y. Jin, Transport of coliphage in the presence and absence of manure suspension, *J. Environ. Qual.*, 35, 1692-1701, 2006.
70. Pang, L. and J. Šimůnek, Evaluation of bacteria-facilitated cadmium transport in gravel columns using the HYDRUS colloid-facilitated solute transport model, *Water Resour. Res.*, 42, W12S10, doi:10.1029/2006WR004896, 2006.
71. Šimůnek, J., Changming He, J. L. Pang, and S. A. Bradford, Colloid-facilitated transport in variably-saturated porous media: Numerical model and experimental verification, *Vadose Zone Journal*, 5, 1035-1047, 2006.
72. Torkzaban, S., S. M. Hassanizadeh, J. F. Schijven, H. A. M. de Bruin, and A. M. de Roda Husman, Virus transport in saturated and unsaturated sand columns, *Vadose Zone Journal*, 5(3), 877-885, 2006.
73. Torkzaban, S., S. M. Hassanizadeh, J. F. Schijven, and H. H. J. L. van den Berg, Role of air-water interfaces on retention of viruses under unsaturated conditions, *Water Resour. Res.*, 42, W12S14, doi:10.1029/2006WR004904, 2006.

2005

74. Bradford, S. A., and M. Bettahar, Straining, attachment, and detachment of *cryptosporidium* oocysts in saturated porous media, *J. Environ. Qual.*, 34, 469-478, 2005.
75. Bradford, S. A., J. Šimůnek, M. Bettahar, Yadata Tadassa, M. Th. van Genuchten, and S. R. Yates, Straining of colloids at textural interfaces, *Water Resour. Res.*, 41, W10404, doi:10.1029/2004WR003675, 17 pp, 2005.

2004

76. Zhang, P., J. Šimůnek, and R. S. Bowman, Nonideal transport of solute and colloidal tracers through reactive zeolite/iron pellets, *Water Resour. Res.*, 40, doi:10.1029/2003WR002445, 2004.
77. Bradford, S. A., M. Bettahar, J. Šimůnek, and M. Th. van Genuchten, Straining and attachment of colloids in physically heterogeneous porous media, *Vadose Zone Journal*, 3(2), 384-394, 2004.

2003

78. Bradford, S. A., J. Šimůnek, M. Bettehar, M. Th. van Genuchten, and S. R. Yates, Modeling colloid attachment, straining, and exclusion in saturated porous media, *Environ. Sci. Technol.*, 37(10), 2242-2250, 2003.

2002

79. Bradford, S. A., S. R. Yates, M. Bettehar, and J. Šimůnek, Physical factors affecting the transport and fate of colloids in saturated porous media, *Water Resources Research*, 38(12), 1327, doi:10.1029/2002WR001340, 63.1-63.12, 2002.
80. Schijven, J., and J. Šimůnek, Kinetic modeling of virus transport at field scale, *J. of Contam. Hydrology*, 55(1-2), 113-135, 2002.