Pin Shuai

Post Doctorate Research Associate
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Research Topics

Groundwater and surface water interactions, nutrient cycling, hyporheic zone, field hydrogeology, numerical modeling and techniques.

Education

Texas A&M University (College Station, TX), Ph.D. Geology 2017

Dissertation: Nutrients and Contaminants Fate and Transport under the Impact of Groundwater and Surface Water Interactions [link]

Advisor: Dr. Peter Knappett (Co-advised by Dr. M. Bayani Cardenas at UT Austin)

Wuhan University (China), M.S. Water Resources Engineering 2013

Wuhan University (China), B.S. Water Resources Engineering 2011

Research Experience

Post Doctorate Research Associate, Advanced Study & Development Group 2017 - present

Pacific Northwest National Laboratory, Richland, Washington

Graduate Research Assistant, Department of Geology and Geophysics 2013 - 2017

Texas A&M University, College Station, Texas

Alternate Student Fellowship, Atmospheric Sciences & Global Change Group summer, 2016

Pacific Northwest National Laboratory, Richland, Washington

Graduate Research Assistant, College of Water Resources and Hydropower Engineering 2011 - 2013

Wuhan University, Wuhan, China

Publications

Also see my Google Scholar

Journal Articles

[7] **Shuai, P.**, X. Chen, X. Song, G. Hammond, J. Zachara, P. Royer, H. Ren, W. Perkins, M. Richmond, M. Huang (2018). Dam Operations and Subsurface Hydrogeology Control Dynamics of Hydrologic Exchange Flows in a Regulated River Reach. *Water Resources Research*. https://doi.org/10.1029/2018WR024193

[6] Berube, M., K. Jewell, K. Myers, P. S.K. Knappett, **P. Shuai**, N. Dimova, A. Hossain, M. Lipsi, S. Hossain, J. Peterson, K. M. Ahmed, S. Datta (2018). The fate of arsenic in groundwater discharged to the Meghna River, Bangladesh. *Environmental Chemistry*, 15(2), 29. https://doi.org/10.1071/EN17104

[5] **Shuai, P.**, M. B. Cardenas, P. S. K. Knappett, P. C. Bennett, B. T. Neilson (2017). Denitrification in the banks of fluctuating rivers: The effects of river stage amplitude, sediment hydraulic conductivity and dispersivity, and ambient groundwater flow. *Water Resources Research*, 53(9), 7951–7967. https://doi.org/10.1002/2017WR020610

[4] **Shuai, P.**, P. S. K. Knappett , S. Hossain, A. Hosain, K. Rhodes, K. M. Ahmed, M. B. Cardenas (2017). The Impact of the Degree of Aquifer Confinement and Anisotropy on Tidal Pulse Propagation. *Groundwater*, 55(4), 519–531. https://doi.org/10.1111/gwat.12509

[3] Knappett, P.S.K., B.J. Mailloux, I. Choudhury, M.R. Khan, H.A. Michael, S. Barua, D.R. Mondal, M.S. Steckler, S.H. Akhter, K.M. Ahmed, B. Bostick, C.F. Harvey, M. Shamsudduha, **P. Shuai**, I. Mihajlov, R. Mozumder, A. van Geen (2016). Vulnerability of low-arsenic aquifers to municipal pumping in Bangladesh. *Journal of Hydrology*, 539, 674–686. https://doi.org/10.1016/j.jhydrol.2016.05.035

[2] Briody, A.C., M.B. Cardenas, **P. Shuai**, P.S.K. Knappett, and P.C. Bennett (2016). Groundwater flow, nutrient, and stable isotope dynamics in the parafluvial-hyporheic zone of the regulated Lower Colorado River (Texas, USA) over the course of a small flood. *Hydrogeology Journal*. https://doi:10.1007/s10040-016-1365-3.

[1] **Shuai, P.**, L. Shi, S. Cai and J. Yang (2014). The usage of bromide as a tracer to estimate groundwater recharge rate at Northern China Plain. *Journal of Irrigation and Drainage*. 33, no. 2:11-16. (In Chinese) [link]

Conference Proceedings

[1] Knappett, P. S. K., K. Myers, **P. Shuai**, K. Rhodes, K. Jewell, J. Peterson, N. Dimova et al. (2016). Tracking the fate of arsenic in groundwater discharged to the Meghna River. *In Arsenic Research and Global Sustainability: Proceedings of the Sixth International Congress on Arsenic in the Environment (As2016)*, June 19-23, 2016, Stockholm, Sweden, p. 43. CRC Press. [link]

Working Papers and Works in Progress

Zachara J., X. Chen, X. Song, **P. Shuai**, C. Murray, C. Resch. Kilometer-scale hydrologic exchange flows in a river corridor and their implications to solute migration. (*Submitted to Water Resources Research*)

Shuai P., X. Chen et al. The effects of river morphology and sediment permeability on river corridor seasonal thermal regime under hydropeaking and thermopeaking. (*In Preparation*)

Song X., X. Chen, J.M. Zachara, J. Gomez-Velez, **P. Shuai**, H. Ren, and G. Hammond. (2019). "Dynamic River Stage Variations Lead to Multimodal Residence Time Distributions of Hydrological Exchange Flow." (*In Preparation*)

Wang L., **P. Shuai**, P. S. K. Knappett, M. B. Cardenas. Accumulation of arsenic in dynamic iron oxide barriers due to river stage oscillations: A multiphysics modeling analysis. (*In Preparation*)

Conference Presentations

Shuai P., X. Chen, X. Song, G. Hammond, J.M. Zachara, P.D. Royer, and H. Ren, et al. (2019). "Dam Operations and Subsurface Hydrogeology Control Dynamics of Hydrologic Exchange Flows in a Large Regulated River Corridor within the Hanford Reach, Washington." *Oral presentation 12 th Washington Hydrogeology Symposium*, Tacoma, Washington.

Song X., X. Chen, J.M. Zachara, J. Gomez-Velez, **P. Shuai**, H. Ren, and G. Hammond. (2019). "Dynamic River Stage Variations Lead to Multimodal Residence Time Distributions of Hydrological Exchange Flow." *Oral presentation at 12th Washington Hydrogeology Symposium*, Tacoma, Washington.

Shuai P., X. Chen, X. Song, G.E. Hammond, J.M. Zachara, P.D. Royer, and H. Ren, et al. (2018). "Hydrogeomorphic Controls on Hydrologic Exchange Flows Dynamics within a Large Regulated River Corridor." *Poster presentation at AGU Fall meeting 2018*, Washington Dc, District Of Columbia. United States.

Shuai P., X. Chen, X. Song, G.E. Hammond, J.M. Zachara, P.D. Royer, and H. Ren, et al. (2018). "Hydrologic Exchange Flows Dynamics along a Large Regulated River Corridor." *Oral presentation at Post-graduate Research Symposium at PNNL*, Richland, Washington, United States.

Wang L., **P. Shuai**, P. S. K. Knappett, M. B. Cardenas. Accumulation of arsenic in dynamic iron oxide barriers due to river stage oscillations: A multiphysics modeling analysis.*Oral presentation at AGU Fall meeting 2018*, Washington Dc, District Of Columbia. United States.

Bao J., Y. Fang, X. Song, Z. Duan, H. Ren, X. Chen, and **P. Shuai**, et al. (2018). "Three-Dimensional OpenFOAM-PFLOTRAN Coupled Model for Mechanistic Simulation of Hydrologic Exchange Flows in Varied Hydromorphic Settings." *Poster presentation at AGU Fall meeting 2018*, Washington, D.C., United States.

Chen X., **P. Shuai**, X. Song, G.E. Hammond, T.C. Johnson, and J.M. Zachara. (2018). "Using Sensitivity Analysis and Data Assimilation to Improve Process Understanding of Hydrologic Exchange Flows in Dynamic River Corridors." *Poster presentation at AGU Fall Meeting 2018*, Washington, District Of Columbia, United States.

Chen X., X. Song, J.M. Zachara, **P. Shuai**, G.E. Hammond, and J.C. Stegen. (2018). "The Importance of Long-term Monitoring and Numerical Modeling fo Understanding Contaminant Transport in Dynamic System." *Oral presentation at International Summit Forum of Chinese Academy of Engineering on Water Pollution*, Hangzhou, China.

Zachara J.M., X. Chen, **P. Shuai**, D.B. Kent, and G.E. Hammond. (2018) "Surface Complexation from the Grain to Plume Scale in a Gravel Aquifer Influenced by Surface Water Exchange." *Presented at ACS National Meeting*, New Orleans, Louisiana.

Shuai, P., K. Myers, P. S. K. Knappett, M.B. Cardenas (2017) "Tidal and Seasonal River Stage Fluctuations Impact the Formation of Permeable Natural Reactive Barriers in Riverbank Sediments", *Oral presentation at AGU Fall Meeting, New Orleans*, LA

Shuai, P., A. Hosain, P. S. K. Knappett, S. Hossain, M. B. Cardenas, K. Rhodes, K. M. Ahmed,(2016) "Estimating hydraulic properties of a river bank aquifer under tidal influence", *Poster presentation at GSA Annual Meeting*, Denver, CO

Knappett, P. S. K., S. Datta, N. Dimova, K. Myers, A. Hossain, M. Berube, **P. Shuai**, K. Rhodes, K. Jewell, M. Lipsi, S. Hossain, A. Hosain, J. Peterson, K. Ahmed, (2016) "Hydrological mechanism

for arsenic deposits in Meghna River hyporheic zone sediments," *Poster Presentation at EGU General Assembly 2016*, Vienna, Austria

Shuai, P., Hossain, A., Rhodes, K., Knappett, P. S. K., Dimova, N., Cardenas, M. B., Matin, K. R., Michael, H., Mozumder, R., van Geen, A. (2015) "Modeling arsenic mobilization in a riverbank aquifer under the influence of tidally fluctuating river and irrigation pumping," *Poster Presentation at AGU Fall Meeting 2015*, San Francisco, CA

Projects Participation

U.S. Department of Energy (DOE), Subsurface Biogeochemistry Research, Participant 2017 - present

Influences of Hydrologic Exchange Flows on River Corridor and Watershed Biogeochemical Function

National Science Foundation (NSF), EAR-Hydrologic Sciences, Participant 2014 - 2017

Collaborative Research: The effects of river regulation on lateral and integrated longitudinal mass and energy transfers in coupled terrestrial-aquatic systems

Geological Society of America, Graduate Research Grant, PI 2015 - 2016

Investigating impacts of irrigation pumping on Arsenic migration from Meghna River

National Program on Key Basic Research Project of China (973 Program), Participant 2011 - 2013

Evolution Mechanism and Control of Groundwater in the North China Plain

Teaching Experience

Graduate Teaching Assistant, Intro to Geochemistry (GEOL 453), Texas A&M University 2017

Graduate Teaching Assistant, Hydrogeology (GEOL 410), Texas A&M University 2016

Graduate Teaching Assistant, Physical Geology Lab (GEOL 104), Texas A&M University 2015

Graduate Teaching Assistant, Principals of Geology (GEOL 101), Texas A&M University 2014

Fellowships & Awards

Texas A&M University, Graduate Fellowship 2013 - 2017

Geological Society of America, On To the Future (OTF) travel award 2016

Geological Society of America, Student Research Grant 2015

Wuhan University (China), Graduate Fellowship 2011 - 2013

Professional Memberships

American Geophysical Union (AGU), Member 2015 - present

Geological Society of America (GSA), Member 2014 - 2015

International Association for Hydro-Environment Engineering and Research (IAHR), Member 2011-2013

Professional and Public Service

Manuscript reviewer for Water Resources Research, Journal of Hydrology

Student judge for Outstanding Student Presentation Awards at AGU Anual Meeting 2018

Skills

Programming: Matlab••• Python•• R•• Shell•• C/C++• Fortran•

Software: PFLOTRAN••• COMSOL Multiphysics••• MODFLOW•• HYDRUS 2D•• ParaView•• QGIS•• Adobe Illustrator••• Adobe Photoshop•• MS Office•••

OS: Windows••• Unix••

Languages: Chinese••• English••

•••Native/Proficient ••Professional/Experienced •Elementary