

# 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.org/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 Article

- [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 12th 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 for 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 Annual 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