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 (2019). 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

[6] 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. (*In Revision at Water Resources Research*)

[5] Zheng L., L. Wang, T. Wang, J. Zhou, **P. Shuai**; K. Singh, Z. Wang, and X. Chen. (2019). A pore-scale diagnosis of critical Reynolds number for shear-thinning flow in porous media. (*Under Review at Chemical Engineering Science*)

[4] 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. (*Submitted at Water Resources Research*)

[3] Chen K., X. Chen, X. Song, G. Hammond, H. Zhan, **P. Shuai**, and J. M. Zachara. (2019). Using Ensemble Data Assimilation to Estimate Transient Hydrologic Exchange Fluxes under Highly Dynamic Flow Conditions. (*Submitted at Water Resources Research*)

[2] **Shuai P.**, X. Chen, X. Song, K. Chen and G. Hammond. Dam Induced Hydrologic Exchange Flows Alter River Corridor Thermal Regime. (*In Preparation*)

[1] 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*)

Scholarly Presentations

Invited Talks

Shuai P.. (2019). "HEFs Control on Temperature Regime and Ecological Impacts". *SFA Community Watershed Workshop at PNNL*, Richland, Washington, United States.

Shuai P.. (2019). "Simulating flow and heat transport in a large regulated river corridor". *Workshop on Critical Timescales of Hydrologic Transport at University of California, Berkeley*, Berkeley, California, United States.

Conference Presentations

Shuai P., X. Chen, X. Song, K. Chen, and G. Hammond, (2019). "Hydrologic Exchange Flows Alter River Corridor Thermal Regime at Hanford Reach." *Oral presentation at Post-graduate Research Symposium at PNNL*, Richland, Washington, United States.

Shuai P., X. Chen, X. Song, and K. Chen. (2019). "Boosting Research Reproducibility: Managing High Performance Model Simulation Workflow Using Jupyter Notebook." *Oral presentation at Techfest 2019*, Richland, Washington.

Shuai P., X. Chen, X. Song, K. Chen, and G. Hammond, (2019) "Modeling River Corridor Thermal Regime Using High Performance Parallel Subsurface Simulator: An Example with PFLOTRAN." *Oral presentation at Modflow and More 2019*, Golden, Colorado.

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 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*, Washington, DC, United States.

Wang L., **P. Shuai**, P. S. K. Knappett, M. B. Cardenas, (2018) "Accumulation of arsenic in dynamic iron oxide barriers due to river stage oscillations: A multiphysics modeling analysis."" *Oral presentation at AGU Fall meeting*, Washington, DC, United States (presented for Lichun Wang).

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.

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

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*, San Francisco, CA

Grants Funded/Research Projects

Pacific Northwest National Laboratory, Laboratory Directed Research and Development (Quick-starter), PI 2019 - 2020

A collection of Jupyter notebooks for geoscientist

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

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

National Science Foundation (NSF), EAR-Hydrologic Sciences, Research Assistant 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), Research Assistant 2011 - 2013

Evolution Mechanism and Control of Groundwater in the North China Plain

Teaching Experience

Guest Lecturer, Hydrogeology (GEOL 410), Texas A&M University 2017

Graduate Teaching Assistant, Introduction 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 (GEOL 104), Texas A&M University 2015

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

Fellowships and 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	Python, R, Matlab, Shell, SQL, C/C++, Fortran
Software	PFLOTRAN, COMSOL Multiphysics, MODFLOW, HYDRUS 2D, ParaView, QGIS Adobe Illustrator, Adobe Photoshop, MS Office
Lab/Field	Ion Chromatography, Trimble Total Stations & RTX, YSI Water Quality Meter Solinst Levelogger & Water Level Meter
OS	Windows, Unix, Linux
Languages	Chinese, English