

Curriculum Vitae

Zexuan Xu

Postdoc Fellow
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Education

05/2016 **Ph.D.** in Geology (hydrology modeling), Florida State University (FSU)
Advisor: Dr. Bill X. Hu

06/2012 **B.Sc.** in Geo-information Sci. & Tech., Zhejiang University (ZJU), China

Research Experience

09/2017 – present **BIDS Data Science Fellow**, Berkeley Institute for Data Sciences (BIDS) and U.S./China Clean Energy Research Center for Water-Energy Technologies (CERC-WET)
Supervisor: Dr. Saul Perlmutter

05/2016 – present **Postdoctoral Fellow**, Climate & Ecosystem Science Division (CESD) Lawrence Berkeley National Laboratory (LBNL), Berkeley, CA
Supervisor: Dr. William Collins

08/2012 – 05/2016 **Graduate Research Assistant**, Dept. of EOAS, FSU, Tallahassee, FL

06/2015 – 08/2015 **Intern**, Florida Geological Survey (FGS), Tallahassee, FL

05/2014 – 08/2014 **Intern**, Idaho National Laboratory (INL), Idaho Falls, ID

Short-term Education

05/2013 – 07/2013 Visiting Student, China University of Geoscience, Beijing, China

08/2010 – 09/2010 Exchange Student, University of California, Los Angeles, CA

Research Projects

LBNL:

- (on-going) BIDS Data Science Fellow collaborated with CERC-WET project 4.1: *Climate Impact Modeling, Methods, & Sciences for Energy-Water System: Telescopic Techniques for Multi-scale Analysis* (single PI, \$81k)
- (on-going) Watershed Function SFA Reactor (on-going): *Modeling the interactions of snowmelt and reactive transport in Copper Creek, Colorado* (postdoc, PI: Carl Steefel)
- LBNL LDRD: *Modeling the Earth's hydrological cycle from watershed to global scales* (postdoc, PI: Hans Johansen and William Collins)

FSU:

- *Numerical modeling of seawater intrusion in coastal karst aquifer with well-developed conduits* (graduate research assistant, PI: Bill Hu)

INL:

- *Phase-field modeling of solute precipitation/dissolution chemical reaction using MOOSE: A finite element method* (graduate intern, PI: Hai Huang)

Research Interests

- Dynamical downscaling of global and regional climate models
- Reproducible data tools for earth science and data-driven hydroclimate predictive model
- Multi-scale integrated hydrology and reactive transport modeling
- Numerical simulation of flow and solute transport in porous and fracture media
- Numerical modeling of variable-density flow and salinity transport problems
- Uncertainty quantification and sensitivity analysis

Academic Skills

Programming:

Fortran, C/C++, Python, R, SQL, NCAR Command Language (NCL), Unix shell scripting, OpenMP, MPI

Numerical Models:

Climate/Atmosphere: CESM (CAM, CLM, etc.), WRF

Hydrology: PAWS, WRF-Hydro, Amanzi/ATS, ParFlow, MODFLOW, MODFLOW-CFP, MT3DMS, SEAWAT, MODFLOW-SWI, UMT3D, Groundwater Vistas

Uncertainty analysis: PEST, UCODE

Software:

MATLAB, Mathematica, ArcGIS, QGIS, Cubit, ParaView

Teaching Experience

01/2012 – 05/2016 Teaching Assistant, Dept. of EOAS, FSU
GLY1000 Dynamic Earth / GLY1000L Dynamic Earth Laboratory
GLY4751/5757 Introduction to Remote Sensing and GIS

Peer-reviewed Publications

Xu, Z., Woodburn, E., Dwivedi, D., Steefel, C.I., and Carroll, R.W.H., A reactive transport modeling approach for understanding concentration-discharge relationship at Copper Creek, Colorado, in preparation

Xu, Z., Rhoades, A.M., Johansen, H., Ullrich, P.A. and Collins, W.D, A sensitivity study of simulating mountain snowpack and water resources in California and Nevada using WRF, in preparation.

Xu, Z., Rhoades, A.M., Johansen, H., Ullrich, P.A. and Collins, W.D., 2018, An intercomparison of GCM and RCM dynamical downscaling for characterizing the hydroclimatology of California and Nevada, submitted to Journal of Hydrometeorology (under revision).

Xu, Z., Hu, B.X., **Xu, Z.***, Ye, M., Wu, X., Simulating seawater intrusion in a coastal karst aquifer with complex conduit structures using an improved VDFST-CFP model, submitted to Hydrology and Earth System Sciences (under review).

- Chang, Y., Hu, B.X., **Xu, Z.**, et al., Numerical simulation of seawater intrusion to coastal aquifers and brine water/freshwater interaction in south coast of Laizhou Bay, China, submitted to *Journal of Contaminant Hydrology* (under review).
- Rhoades, A.M., Ullrich, P.A., Zarzycki, C.M, Johansen, H., Margulis, S., **Xu, Z.** and Collins, W.D., Truncation vs Transport – A Variable-Resolution CESM case study of the comparative importance of model resolution and microphysics in a mountainous region, submitted to *Journal of Hydrometeorology* (under review).
- Xu, Z.**, Hu, B.X. and Ye, M., 2017, Numerical modeling and sensitivity analysis of seawater intrusion in a dual-permeability coastal karst aquifer with conduits, *Hydrology and Earth System Sciences*, accepted, in press, doi: 10.5194/hess-2017-85.
- Xu, Z.** and Hu, B.X., 2017, Development of a discrete-continuum VDFST-CFP numerical model for simulating seawater intrusion to a coastal karst aquifer with a conduit system, *Water Resources Research*, 53, 688-711.
- Xu, Z.**, Bassett, S., Hu, B.X. and Dyer, S., 2016, Long distance seawater intrusion through a karst conduit network in the Woodville Karst Plain, Florida, *Scientific Reports* 6, 32235.
- Xu, Z.**, Hu, B.X., Davis, H. and Kish, S., 2015, Numerical study of groundwater flow cycling controlled by seawater/freshwater interaction in a coastal karst aquifer through conduit networks using CFPv2, *Journal of Contaminant Hydrology*, 182, 131-145.
- Xu, Z.**, Hu, B.X., Davis, H. and Cao, J., 2015, Simulating long-term nitrate-N contamination processes in the Woodville Karst Plain using CFPv2 with UMT3D, *Journal of Hydrology*, 52(4), 72-88.

Book Chapter

- Hu, B.X. and **Xu, Z.**, 2016, Numerical Simulation of Groundwater Flow and Solute Transport in a Karst Aquifer with Conduits, *Groundwater – Contaminant and Resource Management*, edited by Dr. Muhammad Salik Javaid (Ed.), InTech, ISBN 978-953-51-2466-5.

Conferences Proceedings

- Xu, Z.**, Rhoades, A.M., Johansen, H., Ullrich, P.A. and Collins, W.D., An intercomparison of GCM and RCM dynamical downscaling for characterizing the hydroclimatology of California and Nevada, American Geophysical Union (AGU) 2017 Fall Meeting, New Orleans, Louisiana, December 2017 (oral).
- Xu, Z., **Xu, Z.**, Hu, B.X., Numerical study of groundwater flow and salinity distribution cycling controlled by seawater/freshwater interaction in karst aquifer using SEAWAT, American Geophysical Union (AGU) 2017 Fall Meeting, New Orleans, Louisiana, December 2017.
- Hu, B.X. and **Xu, Z.**, Development of a discrete-continuum VDFST-CFP numerical model for simulating seawater intrusion to a coastal karst aquifer with a conduit system. European Geosciences Union (EGU) General Assembly 2017, Vienna, Austria, April 2017.
- Xu, Z.**, Bassett, S.B, Hu, B.X. and Dyer, S.B, Field observations of extended seawater intrusion through subsurface karst conduit networks at Wakulla Spring in the Woodville Karst Plain, Florida, American Geophysical Union (AGU) 2016 Fall Meeting, San Francisco, California, December 2016.

- Rhoades, A., Ullrich, P.A., Johansen, H., Zarzycki, C.M., **Xu, Z.** and Collins, W.D., Understanding California mountain wintertime hydroclimate trends using an ensemble of high-resolution variable-resolution CESM simulations, American Geophysical Union (AGU) 2016 Fall Meeting, San Francisco, California, December 2016.
- Xu, Z.** and Hu, B.X., Numerical simulation of freshwater/seawater interaction in a dual-permeability karst system with conduits: the development of a discrete-continuum VDFST-CFP model, European Geosciences Union (EGU) General Assembly 2016, Vienna, Austria, April 2016 (oral).
- Xu, Z.** and Hu, B.X., Variable density numerical modeling of seawater intrusion in coastal aquifer with well-developed conduits, American Geophysical Union (AGU) 2015 Fall Meeting, San Francisco, California, December 2015.
- Xu, Z.** and Hu, B.X., Simulating seawater intrusion using numerical variable-density SEAWAT model in coastal karst aquifer with well-developed conduits, Geological Society of America (GSA) Annual Meeting, Baltimore, Maryland, November 2015 (oral).
- Hu, B.X. and **Xu, Z.** (presenter), Numerical study on groundwater flow cycling in the Woodville Karst Plain controlled by seawater intrusion to a karst aquifer through conduit network using CFPv2, OMICS International Conference on Geology, Orlando, Florida, June 2015 (oral).
- Xu, Z.,** Hu, B.X., Davis, H. and Kish, S., Numerical study of a groundwater flow cycling controlled by seawater intrusion within karst conduit networks using MODFLOW-CFP, American Geophysics Union (AGU) 2014 Fall Meeting, San Francisco, California, December 2014.
- Xu, Z.,** Hu, B.X. and Davis, H., Using CFP numerical solute transport method to simulate nitrate-N and chloride contamination in Woodville Karst Plain, Geological Society of America (GSA) 125th Annual Meeting, Denver, Colorado, October 2013 (oral).

Seminar/Colloquium/Symposium Presentations

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| 10/2017 | 3 rd Young Scholars' Forum in Groundwater Science, Guilin, Guangxi, China |
| 05/2017 | (Invited) Seminar at School of Earth Science, Nanjing University, Nanjing, China |
| 12/2016 | (Invited) Seminar at College of the Environment and Ecology, Xiamen University, Xiamen, China |
| 04/2016 | (Invited) Seminar at Institute of Groundwater Management, Dresden University of Technology (TUD), Dresden, Germany |
| 02/2016 | 5 th UF Water Institute Symposium, University of Florida, Gainesville, Florida |
| 09/2015 | Open workshop: Study on groundwater and surface water in the Woodville Karst Plain, GFDI, FSU, Tallahassee, Florida (workshop organizer). |
| 06/2015 | (Invited) Seminar at NFWFMD (Northwest Florida Water Management District), Midway, Florida |
| 02/2015 | Southwest Florida Water Resources Conference, Florida Gulf Coast University, Fort Myers, Florida |
| 10/2014 | Natural Sciences Graduate Symposium, FSU, Tallahassee, Florida |
| 11/2013 | Thalassic Society EOAS Student Symposium, FSU, Tallahassee, Florida |

Professional Activities

Primary Convener, AGU Fall Meeting Session H029, 2017: Characterization, Modeling and Remediation of Karst and Structurally Variable Flow Systems in a Changing Environment.

Reviewer for Journals

- Hydrology and Earth System Sciences (5)
- Stochastic Environment Research and Risk Assessment (5)
- Water Resources Research (3)
- Journal of Geophysical Research – Atmospheres (1)
- Scientific Reports (1)
- Hydrogeology Journal (1)
- Environmental and Engineering Geoscience (1)
- Civil Engineering and Environmental System (1)

Honors and Awards

- Berkeley Institute of Data Science Fellow, University of California, Berkeley (2017)
- J O'Brien Graduate Travel Grant, Dept. of EOAS, FSU (2016)
- Dissertation Research Grant, College of Graduate Studies, FSU (2015)
- Lyman Toulmin Memorial Fund, FSU (2015-2016)
- Robert Lamar Parker Endowed Memorial Fund, FSU (2014-2015)
- COGS Travel Grant, FSU (2013, 2014, 2015)
- Outstanding Undergraduate Student of Zhejiang Province, China (only 200 winner each year, 2012)
- Panasonic Scholarship, ZJU (only 20 winner each year, 2011)
- First-Class Scholarship for Outstanding Students, ZJU (3%, 2010)
- Excellent Student Awards, ZJU (15%, triple, 2011, 2010 & 2009)

Memberships

- American Geophysical Union (AGU)
- European Geosciences Union (EGU)
- Geological Society of America (GSA)