Xiaodong Chen, Ph.D.

Pacific Northwest National Laboratory
PO Box 999, MS: K9-30
Richland, WA 99352
Phone: +1-509-372-6448
E-mail: xiaodong.chen@pnnl.gov
Website: http://www.xiaodongchen.com/

Research Interests

- Hydroclimate Extreme Events (extreme precipitation and flooding)
- Regional Climate Modeling and Applications
- Machine Learning and Neuralhydrology
- Engineering Hydrometeorology

Research Experience

2018.3 - now	Postdoctoral Research Associate Pacific Northwest National Laboratory, Richland, WA, USA
2013.7 - 2013.8	Visiting Scholar National Institute for Environmental Studies, Tsukuba, Ibaraki, Japan

Degrees

2015.3 – 2017.12	Ph.D. in Civil and Environmental Engineering *Dissertation: "Understanding probable maximum precipitation and safety of water management infrastructures under a changing climate"* Department of Civil and Environmental Engineering, University of Washington, USA
2011.9 – 2015.3	M.S. in Civil and Environmental Engineering *Thesis: "Model estimate of Pan-Arctic wetland methane emissions and their climate sensitivity during 1960-2006"* Department of Civil and Environmental Engineering, University of Washington, USA
2007.9 – 2011.7	Bachelor in Hydraulic Engineering Department of Hydraulic Engineering, Tsinghua University, China

Honors and Awards

2020	Editor's Award (*Journal of Hydrometeorology*)	American Meteorological Society
2020	4th Yuxiang Early Career Award	Chinese-American Oceanic and Atmospheric Association
2019	EED Of-The-Year Award	PNNL Energy and Environment Directorate

2019	Editor's Award, *Advances in Atmospheric Sciences*	Springer Sciences+Business Media and Science Press
2017	Chinese Government Award for Outstanding Self-Financed Students Abroad	China Scholarship Council
2015	Graduate Student Fellowship	University of Washington
2010	Friend of Tsinghua-Huang Qianheng Scholarship	Tsinghua University
2010	Second Prize in 2nd Hydrological Innovation Competition	Tsinghua University
2009	Allen T. Chwang Award of Fluid Mechanics	Tsinghua University

Publications

* Indicates corresponding author(s)

1. Anderson, C. et al. (2020), Soil moisture and hydrology projections of the permafrost region - A model intercomparison, *The Cryosphere*, 14, 445–459.
2. **Chen, X.***, Z. Duan, L. R. Leung*, and M. Wigmosta (2019), A framework to delineate precipitation-runoff regimes: Precipitation vs. snowpack in the western U.S., *Geophys. Res. Lett.*, 46, 13044–13053. [EOS Highlight]
3. Perkins et al. (2019), Parallel distributed hydrology model using global arrays, *Env. Mod. Soft.*, 122, 104533.
4. **Chen, X.***, L. R. Leung*, M. Wigmosta, and M. Richmond (2019), Impact of atmospheric rivers on surface hydrological processes in western U.S. watersheds, *J. Geophys. Res.: Atmos.*, 124, 8896–8916. [EOS Highlight] [Cover Image]
5. **Chen, X.**, and F. Hossain (2019), Understanding future safety of dams in a changing climate, *B. Am. Meteorol. Soc.*, 100, 1395-1404.
6. Eldardiry, H. et al. (2019), Atmospheric river-induced precipitation and snowpack during the western United States cold season, *J. Hydrometeor.*, 20, 613-630.
7. **Chen, X**., L. R. Leung, Y. Gao, Y. Liu, M. Wigmosta, and M. Richmond (2018), Predictability of extreme precipitation in western U.S. watersheds based on atmospheric river occurrence, intensity, and duration, *Geophys. Res. Lett.*, 45, 11693–11701.
8. **Chen, X.**, and F. Hossain (2018), Understanding model-based probable maximum precipitation estimation as a function of location and season from atmospheric reanalysis, *J. Hydrometeor.,* 19, 459-475.
9. **Chen, X.**, F. Hossain, and L. R. Leung (2017), Probable maximum precipitation in the U.S. Pacific Northwest in a changing climate, *Water Resour. Res.*, 53, 9600-9622.
10. **Chen, X.**, F. Hossain, and L. R. Leung (2017), Establishing a numerical modeling framework for hydrologic engineering analyses of extreme storm events, *J. Hydrol. Eng*. 22, 04017016.
11. Xia, J., McGuire, A. D., Lawrence, D., Burke, E., Chen, G., **X. Chen**, et al. (2017), Terrestrial ecosystem model performance in simulating net primary productivity and its vulnerability to climate change in the northern permafrost region. *J. Geophys. Res.: Biogeosciences*., 122, 430-446.
12. **Chen, X.** and Hossain, F. (2016), Revisiting extreme storms of the past 100 years for future safety of large water management infrastructures. *Earth's Future*, 4, 306–322.

13. Sikder, S., **X. Chen**, F. Hossain, J. Roberts, F. Robertson, C. Shum, and F. Turk (2016), Are general circulation models ready for operational streamflow forecasting for water management in the Ganges and Brahmaputra river basins? *J. Hydrometeor.*, 17, 195–210.
14. McGuire, A. D., et al. (2016), Variability in the sensitivity among model simulations of permafrost and carbon dynamics in the permafrost region between 1960 and 2009, *Global Biogeochem. Cycles*, 30, 1015–1037.
15. Wang, W., et al. (2016), Evaluation of air–soil temperature relationships simulated by land surface models during winter across the permafrost region, *The Cryosphere*, 10, 1721-1737.
16. Peng, S., et al. (2016), Simulated high-latitude soil thermal dynamics during the past 4 decades, *The Cryosphere*, 10, 179-192.
17. Bonnema, M., S. Sikder, Y. Miao, **X. Chen**, F. Hossain, I. Ara Pervin, S. M. Mahbubur Rahman, and H. Lee (2016), Understanding satellite-based monthly-to-seasonal reservoir outflow estimation as a function of hydrologic controls, *Water Resour. Res.*, 52, 4095–4115.
18. **Chen, X.**, Bohn, T. J., and Lettenmaier, D. P. (2015), Model estimates of climate controls on pan-Arctic wetland methane emissions, *Biogeosciences*, 12, 6259-6277.
19. Rawlins, M. A., et al. (2015), Assessment of model estimates of land-atmosphere CO2 exchange across Northern Eurasia, *Biogeosciences*, 12, 4385-4405.
20. Koven, C. D., et al. (2015), A simplified, data-constrained approach to estimate the permafrost carbon–climate feedback. *Phil. Trans. R. Soc. A*, 373: 20140423.
21. Bohn, T. J., et al. (2013), Modeling the large-scale effects of surface moisture heterogeneity on wetland carbon fluxes in the West Siberian Lowland, *Biogeosciences*, 10, 6559-6576.

<u>In Preparation/Review</u>

1. Yan, H., N. Sun, **X. Chen**, and M. Wigmosta, Next-generation intensity-duration-frequency curves for climate-resilient infrastructure design: advances, opportunities, and design scaling. (under review)
2. Dong L., L. Leung, Y. Qian, Y. Zou, F. Song, and **X. Chen**, Meteorological environments associated with California wildfires and their role in wildfire changes during 1984-2017. (under review)
3. Wang, L., Y. Qian*, L.R. Leung, **X. Chen***, et al., Multiple metrics informed projections of future precipitation in China. (submitted)
4. **Chen, X.***, L. R. Leung*, Y. Gao, and Y. Liu, Response of U.S. West Coast mountain snowpack to local sea surface temperature perturbations: Insights from regional climate simulations and machine learning models. (to be submitted)
5. **Chen, X.***, L. R. Leung*, Y. Gao, and Y. Liu, Sensitivities of landfalling atmospheric rivers along the U.S. west coast to nearshore sea surface temperature perturbations. (to be submitted)

<u>Non Peer-reviewed Articles</u>

1. Miao, Y., **X. Chen**, and F. Hossain (2016), Maximizing Hydropower Generation with Numerical Modeling of the Atmosphere, *J. Hydrol. Eng.* (forum article), 21, 02516002.

Selected Presentations

1. **Chen, X.**, L. R. Leung, Z. Duan, Y. Gao, Y. Liu, M. Wigmosta, M. Marshall, 2020, Footprint of atmospheric rivers on land and implications for managing water resources (invited talk), California Extreme Precipitation Symposium, Davis, CA
2. **Chen, X.**, L. R. Leung, C. Dang, Y. Gao, and Y. Liu, 2020, Precipitation Morphology in the Western United States: Its Relationship to Ambient Atmospheric Conditions and Future Changes (oral), American Meteorological Society (AMS) 100th Annual Meeting, Boston, MA
3. **Chen, X.**, Z. Duan, L. R. Leung, M. Wigmosta, A framework to delineate precipitation-runoff regimes: Precipitation vs. snowpack in the western U.S. (oral), PNNL Post Graduate Research Symposium, Richland, WA, 2019
4. **Chen, X.**, L. R. Leung, M. Wigmosta, M. Richmond, 2018, Impact of Atmospheric Rivers on the Seasonal Surface Water Balance and Water Resources of Western U.S. Watersheds (poster), American Geophysical Union Fall Meeting, Washington, DC
5. **Chen, X.**, L. R. Leung, Y. Gao, Y. Liu, M. Wigmosta, M. Richmond, 2018, Predictability of Extreme Precipitation in Western U.S. Watersheds Based on Atmospheric River Occurrence, Intensity, and Duration (oral), PNNL Post Graduate Research Symposium, Richland, WA
6. **Chen, X.**, and F. Hossain, Climate Controls on the Extreme Rainstorms in the Contiguous US: 1979-2015

   (poster) EWRI World Environmental & Water Resources Congress, Sacramento, CA, 2017

   (oral), American Meteorological Society 97th Annual Meeting, Seattle, WA, 2017

   (poster), American Geophysical Union Fall Meeting, San Francisco, CA, 2016
7. **Chen, X.**, F. Hossain, and L. R. Leung, 2015, Investigation of Atmospheric Modelling Framework for Better Reconstruction on Historical Extreme Precipitation Event in PMP Estimation (poster), American Geophysical Union Fall Meeting, San Francisco, CA
8. **Chen, X.**, T. J. Bohn, D. P. Lettenmaier, 2015, Model Estimates of Climate Controls on Pan-Arctic Wetland Methane Emissions (poster), European Geosciences Union General Assembly, Vienna, Austria
9. **Chen, X.**, 2013, Introduction to VIC model and its application in wetland methane emissions estimation (talk), National Institute of Environmental Studies workshop, Tsukuba, Japan
10. **Chen, X.**, T. J. Bohn, M. Glagolev, S. Maksyutov, D. P. Lettenmaier, Model Estimates of Pan-Arctic Lakes and Wetlands Methane Emissions (invited talk), ENVIROMIS-2012 Summer Workshop, Irkutsk, Russia, 2012

Memberships

- American Geophysical Union (2012 - present)
- American Meteorological Society (2015 - present)
- American Association for the Advancement of Science (2012 - present)
- American Society of Civil Engineers (2015 - present)

  Observer of the Task Committee "Infrastructure Impacts of Landscape-driven Weather Change"

Grants

PNNL	Approaching High-resolution Downscaling of Climate Projections with Machine Learning	$7,000	PI	10/19-09/20

Community Services

Associate Editor	Journal of Hydrometeorology (2018 - present)
Referee	Advances in Atmospheric Sciences; Atmospheric Sciences Letters; Earth's Future; Geophysical Research Letters; Journal of Applied Meteorology and Climatology; Journal of Geophysical Research: Atmosphere; Journal of Hydrologic Engineering; Journal of Hydrology; Journal of Hydrometeorology; Water Resources Research
Judge	PNNL Post Graduate Research Symposium (2018)

Revised May 2020