Phong V. V. Le
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Environmental Sciences Division
Oak Ridge National Laboratory
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EDUCATION

- **PhD,** Civil Engineering, University of Illinois at Urbana-Champaign, 2016
- **MS,** Civil Engineering, University of Illinois at Urbana-Champaign, 2011
- **BE,** Hydrology, Vietnam Water Resources University, 2006

RESEARCH AREAS

- **Hydroclimatology:** Understanding complexity in hydrologic and climate systems using a combination of theory, modeling, and data analysis.
- **Hydro-epidemiology:** Nonlinear dynamics of vector-borne diseases; impacts of environmental change on human health
- **Other interests:** Numerical methods and high-performance parallel computing, spectral analysis, machine learning.

RESEARCH AND PROFESSIONAL EXPERIENCE

- R&D Staff, Environmental Sciences Division, Oak Ridge National Laboratory (2025 -)
- R&D Associate, Environmental Sciences Division, Oak Ridge National Laboratory (2022 - 2025)
- Visiting Associate Researcher, University of California Irvine (2022 - 2024)
- Postdoctoral Scholar, University of California Irvine (2020 - 2022)
- Lecturer, Vietnam National University (2017 - 2020)
- Postdoctoral Associate, University of Illinois at Urbana-Champaign (2016 - 2017)
- Graduate Research Assistant, University of Illinois at Urbana-Champaign (2009 - 2016)
- Visiting Research Scientist, University of Heidelberg, Germany (2008)
- Research Scientist, Vietnam Institute of Meteorology and Hydrology (2006 - 2009)

FELLOWSHIPS, AWARDS & HONORS

- Computational Science and Engineering Fellowship, University of Illinois (2013 – 2014)
- Vietnam Education Foundation Fellowship (2009 – 2011)
- Research Excellence Award, Vietnam Institute of Meteorology and Hydrology (2008)

GRANTS AND PROPOSALS

- 2023-2024: Addressing Critical Challenges of Coal Mines for Underground Pumped Storage Hydropower (UPSH) using Numerical Calculations (DOE WPTO, Co-PI)
- 2022-2027: SETx UIFL: Equitable Solutions for Communities caught between Floods and Air Pollution (DOE BER, Co-PI)
- 2020-2021: Deep learning to capture dynamic scaling of growing interfaces (XSEDE, PI)
- 2018–2020: Land loss and its impacts on agricultural production in the Vietnamese Mekong Delta under climate change (NAFOSTED Vietnam, Co-PI).
- 2016–2017: Role of micro-topographic variability on nutrient concentration and mean age dynamics (NCSA, Co-PI).
- 2015–2016: Understanding ecohydrologic dynamics under climate change (NCSA, Co-PI).
- 2013–2014: Integration of Biological, Mathematical and Engineering Approaches to the Management of Mosquito-Borne Disease: An Interdisciplinary Global Challenge (University of Illinois, Co-PI).

PEER-REVIEWED PUBLICATIONS

1. Perez, G., Coon, E.T., Rathore, S.S., **Le, P.V.V.** (2024). Advancing process-based flood frequency analysis for assessing flood hazard and population flood exposure. *Journal of Hydrology*, 639, 131620.
2. **Le P.V.V.**, Rathore, S.S., Coon, E.T., Ward, A., Haggerty, R., Painter, S.L. (2024). Hydrologic connectivity and dynamics of solute transport in a mountain stream: Insights from a long-term tracer test and multiscale transport modeling informed by machine learning. *Journal of Hydrology* 639, 1131562
3. Tran A.P., Son D.H., Duc N.A., Pham V.C., Nguyen T.T., Tran M.C., Nguyen N.A., **Le P.V.V.**, Pham V.H. Bayesian merging of numerical modeling and remote sensing for saltwater intrusion quantification in the Vietnamese Mekong Delta. *Environ Monit Assess* 195, 1415 (2023). https://doi.org/10.1007/s10661-023-11947-7
4. Kumar P., Nguyen T.H., **Le P.V.V.**, Yan J., Zhao L., Allan B.F., Taylor-Robinson A.W. Envisioning urban environments resilient to vector-borne diseases: a protocol to study dengue in Vietnam. *Explor Digit Health Technol*. 2023;1:17–27. https://doi.org/10.37349/edht.2023.00004
5. **Le, P.V.V.**, Rathore, S.S., Painter, S.L. (2023). A multiscale model for solute transport in stream corridors with unsteady flow. *Journal of Hydrology* 622, Part A, 129670
6. **Le, P.V.V.,** Randerson, J.T., Willett, R. et al. Climate-driven changes in the predictability of seasonal precipitation. *Nature Communications* 14, 3822 (2023). https://doi.org/10.1038/s41467-023-39463-9
7. C. Guilloteau, **P. V. V. Le** and E. Foufoula-Georgiou (2023). Constraining the Multiscale Structure of Geophysical Fields in Machine Learning: The Case of Precipitation. *IEEE Geoscience and Remote Sensing Letters,* vol. 20, pp. 1-5, Art no. 7503405, doi: 10.1109/LGRS.2023.3284278.
8. Baijnath-Rodino, J. A., **Le, P.V.V.**, Foufoula-Georgiou, E., Banerjee, T. (2023). Historical spatiotemporal changes in fire danger potential across biomes. *Science of The Total Environment*, volume 870, 161954,
9. Phan-Van, T., Nguyen-Ngoc-Bich, P., Ngo-Duc, T., Vu-Minh, T., **Le., P.V.V.**, Trinh-Tuan, L., Nguyen-Thi, T., Pham-Thanh, H., Tran-Quang, D (2022). Drought over Southeast Asia and its association with large scale drivers. *Journal of Climate* 35 (15), 4959-4978
10. **Le, P.V.V.**, Pham, V.H., Bui, K.L., Tran, N.A., Pham, V.C., Nguyen, V.G., Tran, A.P. (2021). Responses of groundwater to precipitation variability and ENSO in the Vietnamese Mekong Delta. *Hydrology Research*; nh2021024.
11. **Le, P.V.V.**, Guilloteau, C., Mamalakis, A., Foufoula-Georgiou, E. (2021). Underestimated MJO variability in CMIP6 models. *Geophysical Research Letters*, 48, e2020GL092244.
12. Bui, L.K., **Le, P.V.V.**, Dao, P.D., Long, N. Q., Pham, H.V., Tran, H.H., Xie, L. (2021). Recent land deformation detected by Sentinel-1A InSAR data (2016–2020) over Hanoi, Vietnam, and the relationship with groundwater level change. *GIScience & Remote Sensing*, 58(2), 161-179.
13. Guilloteau, C., Mamalakis, A., Vulis, L., **Le, P.V.V.**, Georgiou, T. T., Foufoula-Georgiou, E. (2021). Rotated spectral principal component analysis (rsPCA) for identifying dynamical modes of variability in climate systems. *Journal of climate*, 34(2), 715-736.
14. Li, M., Foster, J., **Le, P.V.V.**, Yan, Q., Stumpf, A., Hou, T., Papanicolaou, A.T., Wacha, K., Wilson, C.G., Wang, J., Kumar, P. (2020). A new dynamic wetness index (DWI) predicts soil moisture persistence and correlates with key indicators of surface soil geochemistry. *Geoderma*, 368, 114239.
15. **Le, P.V.V**., Phan-Van, T., Mai, K.V., Tran, D.Q. (2019). Space–time variability of drought over Vietnam. *International Journal of Climatology*, 39(14), 5437-5451.
16. **Le, P.V.V.**, Kumar, P., Ruiz, M.O., Mbogo, C., Muturi, E.J. (2019). Predicting the direct and indirect impacts of climate change on malaria in coastal Kenya. *PLOS One*, 14(2), e0211258.
17. Yan, Q., **Le, P.V.V.**, Woo, D. K., Hou, T., Filley, T., Kumar, P. (2019). Three-Dimensional Modeling

of the Coevolution of Landscape and Soil Organic Carbon. *Water Resour. Res.,* 55(2), 1218-1241.

18. **Le, P.V.V.**, Kumar, P., Ruiz, M.O. (2018). Stochastic lattice-based modelling of malaria dynamics. *Malaria Journal* 17, 250.
19. Bertassello, L.E., Rao, P.S.C., Jawitz, J.W., Botter, G., **Le, P.V.V.**, Kumar, P., Aubeneau, A.F. (2018). Wetlandscape fractal topography. *Geophysical Research Letters*, 45(14), 6983-6991.
20. Kumar, P., **Le, P.V.V.**, Papanicolaou, A.T., Rhoads, B.L., Anders, A.M., Stumpf, A., Wilson, C.G., Bettis III, E.A., Blair, N., Ward, A.S. and Filley, T., Lin, H., Keefer, L., Keefer, A.D., Lin, Y-F. Muste, M., Royer, V.T., Foufoula-Georgiou, E., Belmont, P. (2018). Critical transition in critical zone of intensively managed landscapes. *Anthropocene*, 22, 10-19.
21. **Le, P.V.V**. & Kumar, P. (2017). Interaction between ecohydrologic dynamics and microtopographic variability under climate change. *Water Resources Research*, 53, 8383-8403.
22. William, R., Goodwell, A., Richardson, M., **Le, P.V.V.**, Kumar, P., Stillwell, A.S. (2016). An environmental cost-benefit analysis of alternative green roofing strategies. *Ecological Engineering*, 95, 1-9.
23. **Le, P.V.V.**, Kumar, P., Dang, H.V., Valocchi A.J. (2015). GPU-based high-performance computing for integrated surface-subsurface flow modeling. *Environmental Modeling & Software*, 73:1-13.
24. **Le, P.V.V.** & Kumar, P., 2014. Power law scaling of topographic depressions and their hydrologic connectivity. *Geophysical Research Letters*, 41(5), 1553-1559.
25. **Le, P.V.V.**, Kumar, P., Drewry, D.T., Quijano, J.C. (2012). A graphical user interface for numerical modeling of acclimation responses of vegetation to climate change. *Comput. Geosci.*, 49, 91-101.
26. **Le, P.V.V.**, Kumar, P. and Drewry, D.T. (2011). Implications for the hydrologic cycle under climate change due to the expansion of bioenergy crops in the Midwestern United States. *Proceedings of the National Academy of Sciences*, 108(37), 15085-15090.

THESES ANS OTHER PUBLICATIONS

1. **Le, P.V.V.** & Kumar P. (2019). Complexity of malaria dynamics under climate change. *Atlas of Science.*
2. **Le, P.V .V.** (2016). Predicting malaria dynamics under climate change. PhD thesis, University of Illinois at Urbana-Champaign.
3. **Le, P.V.V.** & Kumar P. (2016). Extreme-scale modeling - Understanding ecohydrologic dynamics under climate change. *Blue Waters Annual Report 2016*.
4. Rentschler T., **Le, P.V.V.,** Karki, S. (2015). Identification of potential larval habitat for Culex mosquitoes in South Cook County, Illinois. *ESRI Map Book*, Volume 30.
5. **Le, P.V .V.** (2011). Expansion of bioenergy crops in the midwestern United States: implications for the hydrologic cycle under climate change. MSc Thesis, University of Illinois at Urbana-Champaign.

CONFERENCE PRESENTATIONS & POSTERS

1. Evaluating tropical cyclone projections downscaled from the Energy Exascale Earth System Model. *AGU Meeting,* San Francisco, California, USA, 2023.
2. A Multi-Source Approach to Flood-Relevant Precipitation Projections over Southeast Texas. *DOE UIFL-PI Meeting,* Bethesda, MD, USA 2023.
3. Understanding long-term dynamics of solute transport in a mountainous stream network using a multiscale model and machine learning. *WaDE-SFA Project seminar*, ORNL 2023
4. Evaluating a multiscale stream transport model using a long-term watershed-scale tracer test. *IDEAS-Watersheds seminar,* ORNL 2023
5. A multiscale model for transport in river basins. *ESS-PI Meeting 2023,* Washington D.C., USA 2023.

6. Underestimated MJO variability in CMIP6 models. *ORNL - ESSS Seminar,* ORNL 2022
7. A multiscale model for representing transport in river basins with unsteady flow. *AGU Meeting,* Chicago, Illinois, USA, 2022.
8. Variability of tropical intraseasonal oscillations in CMIP6 models. *AGU Meeting*, New Orleans, Louisiana, USA, 2021.
9. Multi-scale evaluation of dynamical modes of climate variability in CMIP6 models. *AGU Meeting*, Online (2020)
10. Land loss and its impacts on agricultural production in the Mekong Delta under climate change. *AGU Meeting*, San Francisco, California, USA, 2018.
11. 3D Modeling of the Co-evolution of Landscape and Soil Organic Carbon. *AGU Meeting*, San Francisco, California, USA, 2018.
12. Drought characteristics over Vietnam: Observed and Projected changes. *Hanoi Forum - Climate Change*, Hanoi, Vietnam, 2018.
13. Correlative assessment of two predictive soil hydrology models with measured surface soil geochemistry. *AGU Meeting*, San Francisco, California, USA, 2017.
14. *Dhara*: An open framework for Critical Zone modeling. *AGU Meeting*, San Francisco, California, USA, 2016.
15. An environmental cost-benefit analysis of alternative green roofing strategies. *AGU Meeting*, San Francisco, California, USA, 2016.
16. High-resolution modeling for Critical Zone processes. *NSF Meeting - CZO Network Reverse Site Visit*, Washington D.C., USA, 2016.
17. Microtopographic control on ecohydrologic dynamics resulting from vegetation acclimation response to elevated atmospheric CO_2. *AGU Meeting*, San Francisco, California, USA, 2015.
18. High resolution modeling of tile-drained controls on ecohydrologic dynamics in IMLs. *AGU Meeting*, San Francisco, California, USA, 2015.
19. Extreme resolution modeling of integrated critical zone processes. *AGU Meeting*, San Francisco, California, USA, 2015.
20. Microtopography: What does it reveal about landscape structure, organization and processes? *EGU Meeting*, Vienna, Austria, 2015.
21. Extreme resolution ecohydrologic modeling for understanding micro-topographic controls. *AGU Meeting*, San Francisco, California, USA, 2014.
22. Identification of potential larval habitat for Culex mosquitoes in South Cook County, Illinois. *The Focal Point Initiatives Workshop* - University of Illinois, Urbana, Illinois, USA, 2014.
23. Understanding environmental changes impact through extreme resolution ecohydrologic modeling. *The XX International Conference on Computational Methods in Water Resources*, University of Stuttgart, Stuttgart, Germany, 2014.
24. High performance computing for predicting the dynamics of malaria under a changing environment. *Annual Computational Science and Engineering Research Symposium*, University of Illinois, Urbana, Illinois, USA, 2014.
25. Power-law scaling of topographic depressions and their hydrologic connectivity. *AGU Meeting*, San Francisco, California, USA, 2013.
26. Expansion of bioenergy crops: Comparison of its impacts on hydrologic cycle for three sites in the Midwestern United States. *The XIX International Conference on Computational Methods in Water Resources*, University of Illinois, Urbana, Illinois, USA, 2012.
27. Micro-topographic hydrologic variability due to vegetation acclimation under climate change. *AGU Meeting*, San Francisco, California, USA, 2012.

28. Ecological Acclimation and Hydrologic Response: Problem Complexity and Modeling Challenges. *EGU Meeting*, Vienna, Austria, 2012.
29. Expansion of Bioenergy crops: Implication for hydrologic cycle under climate change in the Midwestern United States. *AGU Meeting*, San Francisco, California, USA, 2010.

PROFESSIONAL MEMBERSHIPS AND ACTIVITIES

- **Member:** American Geophysical Union.
- **Associate Editor:** GeoHealth, Journal of Hydrology
- **Journal Reviews:** CABI Agriculture and Bioscience, Earth Surface Processes and Landforms, Environmental Modeling and Software, Frontiers in Forest and Global Change, Frontiers in Water, GeoHealth, Geophysical Research Letters, Groundwater, Hydrological Processes, International Journal of Climatology, Journal of Advances in Modeling Earth Systems, Journal of Environmental Management, Journal of Hydrology, Journal of Soils and Sediments, Journal of Water and Climate Change, Nature Communications, PLOS One, PLOS Water, Proceedings of the Royal Society A, Science Advances, SoftwareX, Water Resources Research.