

**Praveen Kumar**  
**Lovell Professor of Civil and Environmental Engineering**

**Contact Information:** 205 North Mathews Avenue, Department of Civil and Env. Engineering, University of Illinois, Urbana, Illinois 61801, U.S.A. E-mail: [kumar1@illinois.edu](mailto:kumar1@illinois.edu), Ph# 217-333-4688

---

**Education:**

Ph.D. in Civil Engineering, 1993, University of Minnesota, Minneapolis, Minnesota  
M.S. in Civil Engineering, 1989, Iowa State University, Ames, Iowa  
B. Tech. in Civil Engineering, 1987, Indian Institute of Technology, Bombay, India.

**Professional Employment:**

1993-1995	Visiting Res. Scientist	Univ. Space Res. Assoc./NASA-Goddard Space Flight Center
1995-2001	Assistant Professor	Department of Civil and Env. Eng., Univ. of Illinois
2001-2006	Associate Professor	Department of Civil and Env. Eng., Univ. of Illinois
2006-present	Professor	Department of Civil and Env. Eng., Univ. of Illinois
1995-present	Affiliate Faculty	Computational Science & Eng. Program, Univ. of Illinois
2010-present	Affiliate Faculty	Department of Atmospheric Science, Univ. of Illinois
2015-present	Professor	Institute for Sustainability, Energy, and Environment, UIUC

**Research Experience:**

Dr. Kumar joined as a faculty at Univ. of Illinois in 1995 where he has been since. His research deals with Hydrocomplexity, the quantitative understanding and prediction of emergent patterns of form and function that arise from complex non-linear multi-scale interactions between soil, water, climate, vegetation and human systems; and how this understanding can be used for innovative solutions to water and sustainability challenges. He has made extensive, deep and signature contributions pertaining to Critical Zone science for intensively managed landscapes, biosphere-hydrosphere interactions, multi-scale variability of hydrologic processes, hydrogeomorphology, hydroinformatics, and information theory in geosciences. His research has been funded by federal agencies such as NSF, NASA, and NOAA.

**Editorial Duties:**

2018-present *Field Chief Editor (Founding), Frontiers in Water*  
2009-2013 *Editor-in-Chief, Water Resources Research, American Geophysical Union*  
2006-2009 *Editor, Geophysical Research Letters, American Geophysical Union*  
2003-2004 *Associate Editor, Journal of Hydrologic Engineering, American Soc. of Civil Engineers*  
1998-2001 *Associate Editor, Water Resources Research, American Geophysical Union*  
2000-2001 *Guest Editor, Advances in Water Resources*

**Publications**

Praveen Kumar is the author of 1 Authored Handbook, 2 Edited Books, 11 book chapters, 140 published peer reviewed articles (55 in AGU journals). The list below is illustrative of the range of topics covered through these publications.

1. Kumar P. and E. Foufoula-Georgiou, "Wavelet Analysis for Geophysical Applications," *Reviews of Geophysics*, 35:4, pp. 385-412, 1997.
2. Chen J. and P. Kumar, "Topographic Influence of the Seasonal and Inter-Annual Variation of Water and Energy Balance of Basins in North America," *Journal of Climate*, 14(5), pp. 1989-2014, 2001.
3. Saco, P.M. and P. Kumar, "Kinematic Dispersion in Stream Networks, Part 1: Coupling Hydraulic and Network Geometry," *Water Res. Res.*, 38(11), 1245, 2002.
4. Saco, P.M. and P. Kumar, "Kinematic Dispersion in Stream Networks, Part 2: Scale Issues and Self-Similar Network Organization," *Water Res. Res.*, 38(11), 1245, 2002.
5. Amenu G.G., and P. Kumar, "Interannual Variability of Deep-Layer Hydrologic Memory and Mechanisms of Its Influence on Surface Energy Fluxes," *Journal of Climate*, 18, 5024 – 5045, 2005.
6. Amenu G. G. and P. Kumar, "A Model For Hydraulic Redistribution Incorporating Coupled Soil-Root Moisture Transport", *Hydrol. Earth Syst. Sci.* 12, 55–74, 2008.
7. Dominguez F. and P. Kumar, "Precipitation Recycling Variability and Ecoclimatological Stability – A Study using NARR Data. Part I: Central USA Plains Ecoregion", *J. of Climate*, Vol. 21, No. 20, 5165-5186, 2008.
8. Dominguez F., P. Kumar, and E. Vivoni, "Precipitation Recycling as a Mechanism for Ecoclimatological Stability Through Local and Non-Local Interactions Part II: North American Monsoon Region", *J. of Climate*, 20(21), 2008.

9. Ruddell B. L. and P. Kumar, "Ecohydrologic Process Networks: Part 1-Identification", *Water Res. Res.*, 45, 2009.
10. Ruddell B. L. and P. Kumar, "Ecohydrologic Process Networks: Part 2-Analysis and Characterization", *Water Res. Res.*, 45, 2009.
11. Drewry D.T., P. Kumar, S. Long, C. Bernachi, X-Z. Liang, and M. Sivapalan, "Ecohydrological Responses of Dense Canopies to Environmental Variability Part 1: Interplay Between Vertical Structure and Photosynthetic Pathway", *J. Geophys. Res. Biogeosciences*, 115, G04022, 2010.
12. Drewry D.T., P. Kumar, S. Long, C. Bernachi, X-Z. Liang, and M. Sivapalan, "Ecohydrological Responses of Dense Canopies to Environmental Variability Part 2: Role of Acclimation Under Elevated CO<sub>2</sub>", *J. Geophys. Res. Biogeosciences*, 115, G04023, 2010.
13. Quijano J. C., P. Kumar, D. T. Drewry, A. Goldstein, and L. Mission, "Competitive and Mutualistic Dependencies in Multi-Species Vegetation Dynamics Enabled by Hydraulic Redistribution", *Water Res. Res.*, 48, W05518, doi:10.1029/2011WR011416, 2012.
14. Phong V. V. Le, P. Kumar, D. T. Drewry, "Implications for The Hydrologic Cycle Under Climate Change due to the Expansion of Bioenergy Crops in the Midwestern United States", *PNAS*, 108 (37), 2011.
15. Quijano J., P. Kumar, D. Drewry, "Passive Regulation of Soil Biogeochemical Cycling by Root Water Uptake", *Water Res. Res.*, 49(6), pp. 3729-3746, 2013.
16. Drewry D., P. Kumar, S. Long, "Simultaneous Improvement in Productivity, Water Use and Albedo through Crop Structural Modifications", *Global Change Biology*, 20(6), pp. 1955-196, 2014.
17. Woo D. K. and P. Kumar, "Role of Micro-topographic Variability on Age of Soil Nitrogen in Intensively Managed Landscape", *Water Res. Res.*, 53, 2017.
18. Roque-Malo S. and P. Kumar, "Patterns of Change In The Variability of High Frequency Precipitation", *Nature Scientific Reports*, 7, Article number: 10853. 2017.
19. Richardson M. and P. Kumar, "Critical Zone Services as Environmental Assessment Criteria in Intensively Managed Landscapes", *Earth's Future*, 4, 2017.
20. Goodwell A. and P. Kumar, "Temporal Information Partitioning: Characterizing Synergy, Uniqueness, And Redundancy in Interacting Environmental Variables", *Water Resour. Res.*, 53, 2017.
21. Goodwell A. and P. Kumar, "Temporal Information Partitioning Networks (TIPNets): A Process Network Approach to Infer Ecohydrologic Shifts", *Water Resour. Res.*, 53, 2017
22. Kumar, P. et al. (19 authors), Critical Transition in Critical Zone of Intensively Managed Landscapes, *Anthropocene*, 22 (10-19), 2018.
23. Goodwell, A., P. Kumar, A. Fellows, and G. Flerchinger, Process connectivity explains ecohydrologic responses to rainfall pulses and drought, *PNAS*, 115 (37) E8604-E8613, 2018.
24. Jiang, P. and P. Kumar, Information transfer from causal history in complex system dynamics, *Physical Review E*, 99, 012306, 2019.
25. Jiang, P., and P. Kumar, Using Information Flow for Whole System Understanding from Component Dynamics, *Water Resources Research*, 55, 8305– 8329, 2019. <https://doi.org/10.1029/2019WR025820>

**Honors and Awards:**

Visiting Fellow, Hokkaido River Disaster Prevention Research Institute, Japan	1993
Award for Promise and Potential of a Young Scientist, USRA/NASA	1993
NASA New Young Investigator Award	1996
Listed in <i>List of Instructors Ranked as Excellent by the Students</i> at the Univ. of Illinois: Spring 2001, 2002, 2006, 2007, 2008, 2009, 2010, 2011, 2016, 2017 and Fall 2005, 2017, 2019.	
Faculty Fellow at National Center for Supercomputing Applications	2001-2002, 2006-2007
Xerox Award for Faculty Research	2005
Associate, Center for Advanced Studies, University of Illinois	2011-2012
Colonel Harry F. and Frankie M. Lovell Endowed Professor in Civil and Env. Eng.	2011
AGU Fellow	2015
Edward Silberman Distinguished Lecture, University of Minnesota	2015
Wolman Lecture, CUAHSI Fifth Biennial Colloquium, Shepherdstown, WV	2016
Harleman Lecture, PennState Univ.	2017
Mahatma Gandhi Pravasi Samman (Non-Resident Honor) Award by NRI Welfare Society of India	2017
Distinguished Alumnus Award, Indian Institute of Technology, Bombay, India	2018
AMS Fellow	2018

**Professional Society Memberships:**

Member of AGU (1988-present), AMS (1996-present), ASCE (1996-present), EGU (2010 - present)