

Postdoctoral Research Associate  
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## **Education**

**Doctor of Philosophy (Ph.D.)** from Department of Geology and Geophysics, Indian Institutes of Technology (IIT) Kharagpur (June-2017).

Thesis title: *Groundwater recharge and storage across parts of the Indian sub-continent by in situ measurements, satellite-based observations, and numerical simulations*

**Master of Science (M.Sc.)** in Environmental Science from University of Calcutta (November-2009).

Thesis title: *Regional warming over India*

**Bachelor of Science (B.Sc.)** in Chemistry (Honours), Physics and Mathematics from University of Calcutta (July-2007).

## **Research Experiences**

1. Postdoctoral Research Associate, Environmental Sciences Division, Oak Ridge National Laboratory from 14th June 2021 to present. Research topic: *Fully resolved, 3-D application of Advance Terrestrial Simulator (ATS) at regional scale catchments and machine learning based approaches to reduce computational cost of complex physical models*
2. C. V. Raman Postdoctoral Fellow, Interdisciplinary Centre for Water Research (ICWaR), Indian Institute of Science (IISc) Bangalore from 22nd August, 2019 to 4th June, 2021. Research topic: *Groundwater storage quantification and biogeochemical model development for simulating water quality parameters*
3. Postdoctoral Fellow, Athabasca University, Canada from 15th August, 2017 to 31st July, 2019. Research topic: *Biogeochemical model development in SWAT framework; Chemical changes associated with soil organic matter decomposition and oxygen diffusion in soil-water environment, the processes are mainly responsible for oxidation-reduction potential, pH, water quality dynamics, soil greenhouse gas emissions*
4. CSIR- Shyama Prasad Mukherjee Fellow (SPMF), Department of Geology and Geophysics, Indian Institute of Technology (IIT) Kharagpur from 2nd July, 2012 to 19th June, 2017. Research topic: *Groundwater recharge and storage using in situ measurements, satellite-based observations and numerical simulations*
5. Science Collaborator at Hydrological Sciences Laboratory, Goddard Space Flight Center (GSFC), NASA between 24th August, 2015 and 23rd May, 2016. Research topic: *Satellite geodesy applications in water resources, data assimilation*
6. Research Intern, Department of Geosciences, University of Calgary from 27<sup>th</sup> February to 30<sup>th</sup> March, 2014. Research topic: *Estimation of frost depth by electromagnetic induction (EMI) technique*
7. Junior Research Fellow (CSIR) from 2<sup>nd</sup> January, 2012 to 1<sup>st</sup> July, 2012 in Department of Geology and Geophysics, Indian Institute of Technology (IIT) Kharagpur

8. Project Assistant at the Civil Engineering department, Indian Institute of Technology (IIT) Kharagpur from 24<sup>th</sup> September, 2009 to 14<sup>th</sup> December, 2011. Research topic: *Submicron Aerosols; chemical composition, optical properties and climate impacts*
9. Summer intern at the Centre for Oceans, Rivers, Atmosphere and Land sciences (CORAL), Indian Institute of Technology (IIT) Kharagpur. Research topic: *Regional warming over India*

### **Research expertise**

1. Distributed and semi-distributed hydrological modeling
2. Machine learning and remote sensing-based applications in Earth Sciences
3. Biogeochemical model development for simulating the water quality applications and soil greenhouse gas emissions
4. Groundwater storage quantification, groundwater-surface water interaction, water management

### **Awards/Honours/Grants**

1. My article was highlighted in **Nature Asia** page:  
<https://www.natureasia.com/en/nindia/article/10.1038/nindia.2020.6>
2. **C. V. Raman Postdoctoral Fellowship 2019** from Indian Institute of Science (IISc), India. Total approved grant: INR 40,00,000 (~USD 53,000) for 2 years.
3. **Postdoctoral fellowships** from **NASA Jet Propulsion Laboratory (JPL), USA; International Institute for Applied Systems Analysis (IIASA), Austria; Natural Resources Research Institute (LUKE), Finland; University of Guelph, Canada.** (Offered)
4. My article was highlighted in **Nature Asia** page:  
<https://www.natureasia.com/en/nindia/article/10.1038/nindia.2018.121>
5. My article was highlighted in **NASA's "IMAGE of the Day"** blog:  
<https://earthobservatory.nasa.gov/IOTD/view.php?id=91008>
6. Publication recognized by Ministry of Water Resources, River Development and Ganga Rejuvenation and Ministry of Rural Development, Government of India
7. **National Postdoctoral Fellowship 2017**, India. Total approved grant for two years: INR 19,20,000 (~USD 27,500) (Offered)
8. Won '**Best Poster Award**' in '**Best Science Story**' category at NASA Goddard Space Flight Center (GSFC)'s annual poster event, Annual Poster Blowout party, 2016, after competing with more than 150 NASA scientists and engineers
9. **Fulbright-Nehru Doctoral Research fellowship 2015-16** and worked as a Science Collaborator at Hydrological Sciences Laboratory, Goddard Space Flight Center (GSFC), NASA between August 24, 2015 and May 23, 2016. Total approved grant: USD 23,000 for 9 months.
10. **Shastri Indo-Canadian Institute (SICI) Student mobility award 2013-14** for doing an Internship in a Canadian University for 5 weeks. Total approved grant: ~CAD 5,000 for 5 weeks.
11. **CSIR- Shyama Prasad Mukherjee Fellowship (SPMF) in Earth sciences.** SPM fellowship is awarded to the toppers of the National Eligibility Test (NET) conducted by the Council of Scientific & Industrial Research (CSIR) to pursue doctoral research in India
12. UGC NET June (2012), Junior Research Fellowship in Environmental Sciences (**All India Rank within top 10** out of approximately 8500 students)

13. Secured an **All India Rank (AIR) 4<sup>th</sup>** out of approximately 6000 students on Joint CSIR UGC NET June (2011), Junior Research Fellowship in Earth Sciences
14. Joint CSIR UGC NET December (2010), Lectureship in Earth Sciences (**All India Rank: 64** out of approximately 6000 students)

## **Publications**

Citation details (Google Scholar): <https://scholar.google.com/citations?user=74-FyiAAAAA&hl=en>

Citations: **1364**; h-index: **19**; i-10 index: **29**; International journal articles: **36**; 1st-authored: **16**;  
Cumulative journal impact factors: **183.13**

SCOPUS profile: <https://www.scopus.com/authid/detail.uri?authorId=56797910500>

Peer reviewed journal articles (Published/Accepted):

### *Biogeochemical model development for water quality applications and soil greenhouse gas emissions*

1. **S. N. Bhanja**, J. Wang, R. Bol (2022). Soil CO<sub>2</sub> emission largely dominates the total ecosystem CO<sub>2</sub> emission at Canadian boreal forest. *Frontiers in Environmental Science*. [**I. F.: 5.41**]
2. **S. N. Bhanja**, J. Wang (2021). Influence of environmental factors on autotrophic, soil and ecosystem respirations in Canadian boreal forest. *Ecological Indicators*, 125, 107517. [**I. F.: 6.26; Citations: 5**]
3. J. Wang, N. K. Shrestha, M. A. Delavar, T. W. Meshesha, **S. N. Bhanja** (2021). Modelling watersheds and river basins in cold climate regions: A review. *Water*, 13(4), 518. [**I. F.: 3.53; Citations: 6**]
4. **S. N. Bhanja**, J. Wang (2020). Estimating influences of environmental drivers on terrestrial heterotrophic respiration. *Environmental Pollution*, 257, 113630. [**I. F.: 9.99; Citations: 13**]
5. **S. N. Bhanja**, J. Wang, N. Shrestha, X. Zheng (2019). Modelling microbial kinetics and thermodynamic processes for quantifying soil CO<sub>2</sub> emission. *Atmospheric Environment*, 209, 125-135. [**I. F.: 5.76; Citations: 16**]
6. **S. N. Bhanja**, J. Wang, N. Shrestha, X. Zheng (2019). Microbial kinetics and thermodynamic (MKT) processes for soil organic matter decomposition and dynamic oxidation-reduction potential: Model descriptions and applications to soil N<sub>2</sub>O emissions. *Environmental Pollution*, 247, 812-823. [**I. F.: 9.99; Citations: 20**]

### *Groundwater recharge, storage and its controlling factors: hydrologic data assimilation*

7. P. Malakar, **S. N. Bhanja**, A. A. Dash, D. Saha, R. K. Ray, S. Sarkar, A. Zahid, A. Mukherjee (2022). Delineating variabilities of groundwater level prediction across the agriculturally intensive transboundary aquifers of South Asia. *ACS ES&T Water*.
8. **S. N. Bhanja**, M. Sekhar (2022). Short-Term and Long-Term Replenishment of Water Storage Influenced by Lockdown and Policy Measures in Drought-Prone Regions of Central India. *Remote Sensing*, 14(8), 1768. [**I. F.: 5.35**]
9. P. Malakar, A. Mukherjee, **S. N. Bhanja**, D. Saha, S. Sarkar, R. Ray (2021). Deep learning-based forecasting of groundwater level trends over India: Implications for crop production and drinking water supply. *ACS ES&T Engineering*. [**Citations: 8**]
10. P. Malakar, A. Mukherjee, **S. N. Bhanja**, A. R. Ganguly, R. K. Ray, A. Zahid, S. Sarkar, D. Saha, and S. Chattopadhyay (2021). Three decades of depth-dependent groundwater response to climate variability and

human regime in the transboundary Indus-Ganges-Brahmaputra-Meghna mega river basin aquifers. *Advances in Water Resources*, 149, 103856. [**I. F.: 5.36; Citations: 14**]

11. P. Malakar, A. Mukherjee, **S. N. Bhanja**, D. Saha, R. Ray, S. Sarkar, A. Zahid (2021). Machine learning-based regional-scale groundwater level prediction using GRACE. *Hydrogeology Journal*, 29 (3), 1027-1042. [**I. F.: 3.15; Citations: 11**]
12. P. Malakar, A. Mukherjee, **S. N. Bhanja**, D. Saha, R. Ray, S. Sarkar, A. Zahid (2020). Importance of spatial and depth-dependent drivers in groundwater level modeling through machine learning. *Hydrology and Earth System Science Discussions*. [**Citations: 6**]
13. **S. N. Bhanja**, A. Mukherjee, M. Rodell (2020). Groundwater storage change: Estimates from major river basins across India. *Hydrological Sciences Journal*, 65(4), 650-659. [**I. F.: 3.94; Citations: 18**]
14. B. Li, M. Rodell, S. Kumar, H. Beaudoin, A. Getirana, B. Zaitchik, L. DeGoncalves, C. Cossetin, **S. N. Bhanja**, A. Mukherjee, S. Tian, N. Tangdamrongsub, Di Long, J. Nanteza, J. Lee, F. Policelli, I. Goni, D. Daira, M. Bila, G. Delannoy, D. Mocko, S. Steele-Dunne, H. Save, S. Bettadpur (2019). Global GRACE data assimilation for groundwater and drought monitoring: Advances and challenges. *Water Resources Research*, 55(9), 7564-7586 [**I. F.: 6.16; Citations: 128**]
15. **S. N. Bhanja**, P. Malakar, A. Mukherjee, M. Rodell, P. Mitra, S. Sarkar (2019). Using satellite-based vegetation cover as indicator of groundwater storage. *Geophysical Research Letters*, 46(14), 8082-8092 [**I. F.: 5.58; Citations: 22**]
16. **S. N. Bhanja**, A. Mukherjee (2019). In situ and satellite-based estimates of usable groundwater storage across India: implications for drinking water supply and food security. *Advances in Water Resources*, 126, 15-23. [**I. F.: 5.36; Citations: 36**]
17. **S. N. Bhanja**, A. Mukherjee, R. Rangarajan, B. R. Scanlon, P. Malakar and S. Verma (2019). Long-term groundwater recharge rates across India by in situ measurements. *Hydrology and Earth System Sciences*, 23, 711-722. [**I. F.: 6.62; Citations: 38**]
18. A. Y. Sun, D. Walling, B. R. Scanlon, Z. Zhang, **S. N. Bhanja**, A. Mukherjee, Z. Zhong (2019). Combining Physically-Based Modeling and Deep Learning for Fusing GRACE Satellite Data: Can We Learn from Mismatch? *Water Resources Research*, 55(2), 1179-1195. [**I. F.: 6.16; Citations: 77**]
19. **S. N. Bhanja**, X. Zheng, and J. Wang (2018). Estimating long-term groundwater storage and its controlling factors in Alberta, Canada. *Hydrology and Earth System Sciences*, 22, 6241-6255. [**I. F.: 6.62; Citations: 31**]
20. A. Mukherjee\*, **S. N. Bhanja\*** and Y. Wada (2018). Groundwater depletion causing reduction of baseflow triggering Ganges river drying. *Scientific Reports*, 8, 12049. [**I. F.: 5.00; Citations: 94** [\*]Joint first author]
21. **S. N. Bhanja**, A. Mukherjee, M. Rodell, Y. Wada, S. Chattopadhyay, I. Velicogna, K. Pangaluru, and J. S. Famiglietti (2017). Groundwater rejuvenation in parts of India influenced by water-policy change implementation. *Scientific Reports*, 7, 7453. [**I. F.: 5.00; Citations: 112**]
22. M. Giroto, G. J. De Lannoy, R. H. Reichle, M. Rodell, C. Draper, **S. N. Bhanja**, and A. Mukherjee (2017). Benefits and pitfalls of GRACE data assimilation: A case study of terrestrial water storage depletion in India. *Geophysical Research Letters*, 44(9), 4107-4115. [**I. F.: 5.58; Citations: 81**]
23. **S. N. Bhanja**, M. Rodell, B. Li, D. Saha, A. Mukherjee (2017). Spatio-temporal variability of groundwater storage in India. *Journal of Hydrology*, 544, 428-437. [**I. F.: 6.71; Citations: 36**]
24. **S. N. Bhanja**, A. Mukherjee, D. Saha, I. Velicogna, and J. Famiglietti (2016). Validation of GRACE based groundwater storage anomaly using in-situ groundwater level measurements in India. *Journal of Hydrology*, 543(B), 729-738. [**I. F.: 6.71; Citations: 105**]

25. A. Mukherjee, D. Saha, C. F. Harvey, R. G. Taylor, K. M. Ahmed and **S. N. Bhanja** (2015). Groundwater systems of the Indian Sub-Continent. *Journal of Hydrology: Regional Studies*, 4, 1-14. [**I. F.: 5.44; Citations: 207**]

#### Remote sensing applications in earth sciences

26. S. Sarkar, A. Mukherjee, S. Duttagupta, **S. N. Bhanja**, A. Bhattacharya. Predicting Regional-Scale Elevated Groundwater Nitrate Contamination Risk Using Machine Learning on Natural and Human-Induced Factors (2022). *ACS ES&T Engineering*.
27. S. Sarkar, A. Mukherjee, S. Duttagupta, **S. N. Bhanja**, A. Bhattacharya, S. Chakraborty (2021). Emerging spatiotemporal trends of groundwater nitrate pollution across India. *Journal of Contaminant Hydrology*. [**I. F.: 4.18; Citations: 2**]
28. S. Duttagupta\*, **S. N. Bhanja\***, A. Dutta\*, S. Sarkar, M. Chakraborty, A. Ghosh, A. Mukherjee (2021). Impact of Covid-19 lockdown on river and groundwater-sourced drinking water sustainability in the arsenic-affected Ganges river basin. *International Journal of Environmental Research and Public Health*, 18(6), 2832. [**I. F.: 4.61; Citations: 10**] [\*Joint first author]
29. A. Singhal, S. Sahu, S. Chattopadhyay, A. Mukherjee, **S. N. Bhanja** (2020). Using night time lights to find regional inequality in India and its relationship with economic development. *PLOS One*, 15 (11), e0241907. [**I. F.: 3.75; Citations: 13**]
30. S. Duttagupta, A. Mukherjee, **S. N. Bhanja**, S. Chattopadhyay, S. Sarkar, K. Das, S. Chakraborty, D. Mondal (2020). Achieving sustainable development goal for clean water in India: influence of natural and anthropogenic factors on groundwater microbial pollution. *Environmental Management*, 66, 742–755, <https://doi.org/10.1007/s00267-020-01358-6> [**I. F.: 3.64; Citations: 9**]
31. A. Mukherjee, S. Dutta Gupta, S. Chattopadhyay, **S. N. Bhanja**, A. Bhattachayra, S. Chakraborty, S. Sarkar, T. Ghosh, J. Bhattacharya, S. Sahu (2019). Impact of sanitation and socio-economy on groundwater fecal pollution and human health towards achieving sustainable development goals across India from ground-observations and satellite-derived nightlight. *Scientific Reports*, 9, 15193 [**I. F.: 5.00; Citations: 15**]
32. Y. Yoon, S. V. Kumar, B. A. Forman, B. Zaitchik, Y. Kwon, Y. Qian, S. Rupper, V. Maggioni, P. Houser, D. Kirschbaum, A. Richey, A. Arendt, D. Mocko, J. Jacob, **S. N. Bhanja**, A. Mukherjee (2019). Evaluating the uncertainty of terrestrial water budget components over High Mountain Asia. *Frontiers of Earth Science*, 7, 120. [**I. F.: 3.66; Citations: 34**]
33. S. Dutta Gupta, A. Bhattacharya, A. Mukherjee, S. Chattopadhyay, **S. N. Bhanja**, S. Sarkar, P. Malakar, J. Bhattacharya (2019). Groundwater faecal pollution observation in parts of Indo-Ganges-Brahmaputra river basin from in-situ measurements and satellite-based observations. *Journal of Earth System Science*, 128. [**I. F.: 1.91; Citations: 9**]

#### Aerosols and climate change

34. S. Verma, B. Priyadarshini, S. K. Pani, D. Bharath Kumar, A. R. Faruqi, **S. N. Bhanja**, M. Mandal (2016). Aerosol extinction properties over coastal West Bengal Gangetic plain under inter-seasonal and sea breeze influenced transport processes. *Atmospheric Research*, 167, 224-236. [**I. F.: 5.97; Citations: 21**]
35. S. Verma, **S. N. Bhanja**, A. Misra and S. K. Pani (2014). Aerosol optical and physical properties during winter monsoon pollution transport in an urban environment. *Environmental science and pollution research*, 21 (7), 4977-4994. [**I. F.: 5.19; Citations: 22**]
36. S. Verma, S. K. Pani and **S. N. Bhanja** (2013). Sources and Radiative Effects of Wintertime Black Carbon Aerosols in an urban atmosphere in east India. *Chemosphere*, 90, 260–269. [**I. F.: 8.94; Citations: 41**]

In review/submitted:

1. **S. N. Bhanja**, E. T. Coon, S. L. Painter. Evaluation of distributed process-based hydrologic model performance in diverse catchments using only a priori information. *Journal of Hydrology*.
2. A. Chakraborty, M. Sekhar, **S. N. Bhanja**, L. Rao. Assessment of the Role of Seasonal Cycle-Water Table Depth Interplay on the Water and Carbon Fluxes of India's Terrestrial Ecosystems. *Agriculture and Forest Methodology*.

#### Book chapters (peer reviewed)

1. **S. N. Bhanja** and J. Wang (2021). Emerging groundwater and surface water trends in Alberta, Canada. In: A. Mukherjee Eds. *Global Groundwater*. Elsevier, Netherlands, 73-80. [**Citations: 3**]
2. **S.N. Bhanja** and A. Mukherjee (2021). Groundwater sustainability and security in South Asia. In: A. Mukherjee Eds. *Global Groundwater*. Elsevier, Netherlands, 469-476. [**Citations: 1**]
3. P. Malakar, S. Sarkar, A. Mukherjee, **S. N. Bhanja**, A. Sun (2021). Use of machine learning and deep learning methods in groundwater. In: A. Mukherjee Eds. *Global Groundwater*. Elsevier, Netherlands, 545-558. [**Citations: 5**]
4. A. Mukherjee and **S. N. Bhanja** (2019). An Untold Story of Groundwater Replenishment in India: Impact of Long-Term Policy Interventions. In: A. Singh et al. Eds. *Water Governance: Challenges and Prospects*. Springer Nature Singapore Pte Ltd, 205-218. [**Citations: 8**]
5. **S. N. Bhanja**, A. Mukherjee and M. Rodell (2018). Groundwater storage variations in India. In: A. Mukherjee Ed. *Groundwater of South Asia*. Springer Nature Singapore Pte Ltd, 49-59. [**Citations: 22**]
6. A. Mukherjee and **S.N. Bhanja** (2018). Estimating Present-Day Groundwater Recharge Rates in India. In: A. Mukherjee Ed. *Groundwater of South Asia*. Springer Nature Singapore Pte Ltd, 37-47. [**Citations: 2**]
7. S. A. Hussain, K. Das, **S. N. Bhanja**, and A. Mukherjee (2018). Potential Impact of Climate Change on Surface Water and Groundwater Interactions in lower reaches of Ganges river, India. In: A. Mukherjee Ed. *Groundwater of South Asia*. Springer Nature Singapore Pte Ltd, 583-591. [**Citations: 1**]

#### Conference and Workshop Participations

1. S. N. Bhanja. Approaches to high-resolution, regional-scale groundwater storage quantification. NSF-sponsored workshop on groundwater security at the University of Alabama, Tuscaloosa, USA (to be held in October, 2022). [**Invited talk**]
2. S. N. Bhanja, S. L. Painter, E. T. Coon. Evaluating a high-resolution integrated hydrological model on multiple diverse catchments. AGU Frontiers in Hydrology meeting, San Juan, USA (June, 2022).
3. S. N. Bhanja, S. L. Painter, E. T. Coon. Evaluating the performance of a high-resolution integrated hydrological model with and without catchment-specific subsurface structure information. MODFLOW and More at the Princeton University, New Jersey, USA (June, 2022).
4. S. N. Bhanja, J. Wang, R. Bol. Estimating ecosystem respiration and its components through a new modeling approach in the Soil and Water Assessment Tool (SWAT). *AGU Fall meeting*, New Orleans, USA (December, 2021).
5. S. N. Bhanja. 11th INDOGFOE-Symposium on "Groundwater storage quantification in India and its influence in food security" organized by DST, India and Alexander von Humboldt Foundation, Germany (February, 2021). [**Invited poster** in virtual mode]
6. S. N. Bhanja. Brainstorming session on Satellite Observations and Modelling of GRACE Data for Terrestrial Applications on "Improving spatial resolution of GRACE products in India" organized by NGRI Hyderabad, India (February, 2021). [**Invited talk** in virtual mode]

7. S. N. Bhanja, A. Mukherjee. Meteorological drought and groundwater storage: Insights from the Indian river basins. Indo-US bilateral symposium on “The study of decadal scale droughts and mega-droughts in semi-arid tracts of India and North America” at IISER Mohali, India (January, 2020). **[Invited talk]**
8. S. Werth, S. F. Sherpa, M. Shirzaei, K. X. Whipple, S. N. Bhanja, A. Mukherjee. Climate Sensitivity of the Glacier Mass Budget of High Mountain Asia Based on Satellite Gravimetry. *AGU Fall meeting*, San Francisco, USA (December, 2019).
9. S. N. Bhanja, J. Wang, N. Shrestha, X. Zheng. Soil CO<sub>2</sub> emission quantification – A new modelling approach. *EGU General Assembly*, Vienna, Austria (April, 2019).
10. P. Malakar, A. Mukherjee, S. N. Bhanja, A. Ganguly, D. Saha, R. Ray, S. Sarkar, A. Zahid. Groundwater-Climate variability link in the transboundary aquifer system of south Asia. *EGU General Assembly*, Vienna, Austria (April, 2019).
11. S. N. Bhanja, J. Wang, N. Shrestha, X. Zheng. Modelling microbial kinetics and thermodynamic (MKT) processes for soil organic matter decomposition and its application to soil N<sub>2</sub>O emission. *AGU Fall meeting*, Washington D.C., USA (December, 2018).
12. B. Li, M. Rodell, S. Kumar, H. Beaudoin, A. Getirana, B. Zaitchik, L. DeGoncalves, C. Cossetin, S. N. Bhanja, A. Mukherjee, S. Tian, N. Tangdamrongsub, Di Long, J. Nanteza, J. Lee, F. Policelli, I. Goni, D. Daira, M. Bila, G. Delannoy, D. Mocko, S. Steele-Dunne, H. Save, S. Bettadpur. Global groundwater storage estimates through assimilation of GRACE data into a land surface model. *AGU Fall meeting*, Washington D.C., USA (December, 2018).
13. S. N. Bhanja, M. Rodell, A. Mukherjee, and B. Li. Variability of groundwater storage in India: Spatial and temporal aspects. *AGU Fall meeting*, New Orleans, USA (December, 2017).
14. P. Malakar, A. Mukherjee and S. N. Bhanja. Groundwater Recharge under varied land use regions in the semi-arid parts of western West Bengal, India. *AGU Fall meeting*, San Francisco, USA (December, 2016).
15. M. Giroto, G. J. M. De Lannoy, R. H. Reichle, M. Rodell, C. Draper, S. Bhanja, A. Mukherjee. Changes in India's land surface water balance during the GRACE mission years: A data assimilation perspective. *AGU Fall meeting*, San Francisco, USA (December, 2016).
16. S. N. Bhanja, A. Mukherjee, M. Rodell, J. Famiglietti. Estimating the performance of GRACE based groundwater storage anomaly using in-situ groundwater level measurements in India. *Indo-US workshop*, Hyderabad, India (November, 2016). **[Invited talk]**
17. S. N. Bhanja, A. Mukherjee. Groundwater recharge estimation in India. Geological Society of India annual meeting (September, 2016).
18. S. N. Bhanja, A. Mukherjee, Y. Wada, B. Scanlon, R. Taylor, M. Rodell, P. Malakar. Present-day groundwater recharge estimation in parts of the Indian Sub-Continent. *AGU Fall meeting*, San Francisco, USA (December, 2015).
19. S. N. Bhanja, A. Mukherjee, M. Rodell, I. Velicogna, K. Pangaluru and J. S. Famiglietti. Groundwater storage changes over Indian Sub-Continent, A quantitative approach. *NSF Workshop on Development and Application of Analytical Tools in Support of Food-Energy-Water Nexus Planning*, Washington D. C. (October, 2015).
20. S. N. Bhanja, A. Mukherjee, M. Rodell, I. Velicogna, K. Pangaluru and J. S. Famiglietti. Regional groundwater storage changes in the Indian subcontinent: The role of anthropogenic activities. *AGU Fall meeting*, San Francisco, USA (December, 2014).
21. S. N. Bhanja, A. Mukherjee and M. Rodell. Potential delineation of groundwater storage using satellite-based vegetation index over parts of the Indian subcontinent. *GSA Annual Meeting*, Vancouver, Canada (October, 2014).

22. S. N. Bhanja and A. Mukherjee. Climate change impact on groundwater storage over parts of Indian subcontinent. *AGU Fall meeting*, San Francisco, USA (December, 2013).
23. S. N. Bhanja, A. Mukherjee and M. Rodell. Abstraction-triggered long term groundwater storage depletion in parts of the Ganges basin of the Indian subcontinent. *GSA Annual Meeting* in Denver, USA: 125th Anniversary of GSA (October 27-30, 2013).
24. S. N. Bhanja and A. Mukherjee. Satellite based estimates of groundwater storage depletion and its connection to climate change over Indian region. *Fourth National Research Conference on Climate Change*, presented in IIT Madras on October 26 and 27, 2013.
25. S. N. Bhanja, S. K. Pani and S. Verma. Wintertime Variability of Aerosol Properties over an Urban Location in east India: Implications for Shortwave Aerosol Radiative Forcing. *Conference of Indian Aerosol Science and Technology Association*, BARC, Mumbai, Dec 11-13 (2012).
26. S. Das Khan, D. Dutta, S. N. Bhanja and S. Verma. Seasonal Variation of Carbonaceous Aerosols at an Urban Region (Kolkata) in east India. *Conference of Indian Aerosol Science and Technology Association*, BARC, Mumbai, Dec 11-13 (2012).
27. S. K. Pani, S. Verma and S.N. Bhanja. Contribution of black carbon to the composite aerosol radiative forcing in an urban atmosphere in east India. *Conference of Indian Aerosol Science and Technology Association*, BARC, Mumbai, Dec 11-13 (2012).
28. S. K. Pani, S.N. Bhanja and S. Verma. Aerosol optical properties over Kolkata. *National Conference on Recent Advances in Chemical and Environmental Engineering* at NIT Rourkela, January 20-21 (2012).
29. S. N. Bhanja. Impact of natural and anthropogenic aerosols on hydrological cycle and climate change. *Workshop cum seminar series on "Challenges and opportunities in Air Pollution and Climate Change" (CHOP-C) under Germany-India-2012, "Infinite Opportunities" programme* at IITM Pune, January 16-18 (2012).
30. S. N. Bhanja, S. Verma and S. K. Pani. Wintertime aerosol properties and their implications to radiative forcing over Eastern India. *European Aerosol Conference*, Manchester, September 04-09 (2011).
31. S. Verma, S. N. Bhanja, M. Schulz and Y. Balkanski. Source evaluation of aerosols measured over the Indian subcontinent and ocean from combined measurement and modeling platforms. *European Aerosol Conference*, Manchester, September 04-09 (2011).
32. S. Verma, M. Schulz, Y. Balkanski, S. N. Bhanja and S. K. Pani. Source evaluation of the seasonal variation in aerosol optical depth distribution over the Indian subcontinent from combined measurement and modeling platforms. *Asian Aerosol Conference*, Xi'an (China), August 17-20 (2011).
33. S. K. Pani, S. Verma, and S. N. Bhanja. Variation in Wintertime Black Carbon Aerosols at an Urban Center in the Eastern India. *Asian Aerosol Conference*, Xi'an (China), August 17-20 (2011).
34. S. N. Bhanja and S. Verma. Seasonal Variation of aerosol Radiative forcing over the east coast of India. *Conference of Indian Aerosol Science and Technology Association, Aerosol and Clouds: Climate change perspective*, Darjeeling, Mar 24-26 (2010).
35. S. Nayak, M. Mandal, and S. Bhanja. Regional warming or cooling over India due to land use and land cover changes. *TROPMET, Advances in Weather and Climate Services*, Kolkata, May 19-21 (2010).

### **Other Academic Activities**

1. **Associate Editor for *Frontiers in Water*** journal (<https://www.frontiersin.org/journals/water>)
2. **Associate Editor for *Journal of Coastal and Riverine Flood Risk*** (<https://journals.open.tudelft.nl/jcrfr>)



3. Edited a journal volume on topic "**Water Supply Sustainability and Challenges in Asian Mega-deltas under Global Change**" for *Frontiers in Water* journal.
4. Editing a journal volume on topic "**The Role of Coupled Biogeochemical Processes in Contaminant Cycling in the Environment**" for *Frontiers in Environmental Science* journal.
5. Reviewer for journals (Publons profile: <https://publons.com/researcher/1350698/soumendra-n-bhanja/>):
  - Nature Geoscience (1)
  - Nature Communications (2)
  - Geophysical Research Letters (4)
  - Journal of Hydrology (26)
  - Water Resource Research (3)
  - Hydrology and Earth System Sciences (1)
  - Journal of Hydrology: Regional Studies (10)
  - Advances in Water Resources (3)
  - Journal of Hydrometeorology (4)
  - Environmental Research Letters (4)
  - Science of the Total Environment (9)
  - Earth System Dynamics (2)
  - Remote Sensing (10)
  - Advances in Space Research (1)
  - Hydrogeology Journal (3)
  - Water Resource Management (1)
  - International Soil and Water Conservation Research (2)
  - Environmental Development (1)
  - Hydrological Sciences Journal (3)
  - Scientific Reports (4)
  - ASCE Journal of Hydrologic Engineering (4)
  - Journal of Earth System Science (3)
  - Applied Water Science (1)
  - Current Science (6)
  - Groundwater for Sustainable Development (4)
6. Played key role to set up the **Environmental Sciences Laboratory**, School of Environmental Sciences and Engineering, IIT Kharagpur. The lab has high-end analytical instruments worth over INR 28 crores (~USD 4 million). I was involved in specifications, tendering to procurement of multiple high-end instruments.
7. Reviewed an article on GRACE satellite mission for **National Academy of Sciences, USA**. Weblink: [https://www.nap.edu/read/25754/pdf/frtr\\_annotated\\_amazinggrace.pdf](https://www.nap.edu/read/25754/pdf/frtr_annotated_amazinggrace.pdf)
8. Experience in **supervising >10 Master's and Doctoral level** students.
9. Completed American Language Training program (2-22 August, 2015) from **American Language Institute, San Diego State University, California**.
10. Completed a workshop on borehole geophysics by **USGS at Indian Institute of Technology Kharagpur** in November 11-21, 2014.
11. Completed SERB school on "Weather and Climate in the Tropics" at **Centre for Atmospheric Sciences, Indian Institute of Technology Delhi** from 3<sup>rd</sup> to 26<sup>th</sup> June, 2013.

## **Skills**

1. Team work and interdisciplinary studies
2. Machine learning (including deep learning) applications using PyTorch, TensorFlow in both CPUs and GPUs

3. Geo-spatial statistics, remote sensing and GIS applications, and code development using Python, R, Ferret (NOAA), FORTRAN, C/C++, Microsoft Visual Studio, QGIS, ArcGIS, Surfer
4. Integrated hydrological model: Advanced Terrestrial Simulator (ATS)
5. Watershed to global scale hydrological models development and operation: SWAT, CLSM; automated input file creation: Watershed Workflow
6. Experience in working/handling/reprocessing/creating the large global/regional gridded data files
7. Experience in working with global-scale models on various US (DoE, NASA), French, and Indian high performance computing (HPC) platforms
8. Plot creation and graphics software: Adobe Photoshop, Corel DRAW, Origin Pro, Inkscape, GIMP, Python
9. CFD-based software: Paraview and Visit
10. Operating Systems- MacOS, LINUX (Fedora, Redhat, Ubuntu), Windows

### **Instruments Operated**

1. Ion Chromatograph (models 761 and 883, Metrohm, Switzerland).
2. Electromagnetic Profiler (Geophysical Survey Systems Inc., USA).
3. Microtops II Sunphotometer (Solar Light Co., USA).
4. Optical particle counter (OPC, model 1.108, Grimm Aerosol Technik, GmbH, Germany).
5. Aethalometer (model AE-42, Magee Scientific, USA).
6. Submicron Aerosol sampler (fabricated at the Indian Institute of Technology Kharagpur).
7. Other instruments like: High Volume sampler, Atomic absorption Spectrophotometer (AAS), Laser Ablation Inductively Coupled Plasma Mass Spectrometer (LA ICP MS), X-Ray Fluorescence (XRF), X-Ray Diffraction (XRD), Electron Probe Micro-Analyzer (EPMA), Geiger Mueler (GM) counters, AC and DC resistivity meter.

### **Co-curricular Activities**

1. Volunteer, Fulbright National Capital Area Chapter (NCAC), Washington D. C.
2. President of Earth Science Study Circle (ESSC)- The official student organization of the Department of Geology and Geophysics, Indian Institute of Technology Kharagpur in the academic session 2013-14.

### **Member of Scientific/Professional Organizations**

1. Geological Society of America (GSA); Membership no: 9160925
2. American Geophysical Union (AGU); Membership no: 283246
3. European Geophysical Union (EGU)
4. International Association of Hydrogeologists (IAH); Membership no: 137810
5. Life member of the Indian Science Congress; Membership no: L19995
6. Life member of the Indian Aerosol Science and Technology Association (IASTA)