

## Chandranath Chatterjee

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### **EDUCATION** *(Details in Annexure-I)*

- Ph.D. - Indian Institute of Technology Kharagpur- India, 1999, Water Management
- M.Tech. - Indian Institute of Technology Kharagpur- India, 1994, Soil & Water Conservation Engineering
- B.Tech. - Orissa University of Agriculture and Technology Bhubaneswar – India, 1992, Agricultural Engineering

### **EXPERIENCE** *(Details of ‘Courses Taught’ in Annexure-I)*

Professor, Department of Agricultural and Food Engineering  
Indian Institute of Technology Kharagpur, India, 2014 - Present

Associate Professor, Department of Agricultural and Food Engineering  
Indian Institute of Technology Kharagpur, India, 2010 - 2014

Assistant Professor, Department of Agricultural and Food Engineering  
Indian Institute of Technology Kharagpur, India, 2004 - 2010

Alexander-von-Humboldt Research Fellow, Department of Geo-Ecology  
Potsdam University, Germany, 2005-2006 (Research Area: Flood Modeling)

Scientist ‘C’, Centre for Flood Management Studies, Patna  
National Institute of Hydrology, Roorkee, India, 2000-2004

Scientist ‘B’, Centre for Flood Management Studies, Patna  
National Institute of Hydrology, Roorkee, India, 1997-2000

### **RESEARCH INTERESTS**

- ✓ Flood inundation modeling, hazard and risk analysis
- ✓ Flood forecasting
- ✓ Impact of climate change on flood risk
- ✓ Design flood estimation using deterministic and probabilistic approaches
- ✓ Geo-informatics for hydrological/hydraulic modeling
- ✓ Application of Unmanned Aerial Vehicle (UAV) for crop condition monitoring

## **AWARDS AND HONORS**

- ✓ Alexander von Humboldt Foundation Fellowship, Germany, 2005.
- ✓ Union Ministry of Water Resources – Department of Irrigation Award of the Institution of Engineers (India), 2004.
- ✓ Certificate of Merit of the Institution of Engineers (India), 2002.
- ✓ DST SERC Fast Track Proposal for Young Scientists, 2002.
- ✓ Reddy award from Indian Society of Agricultural Engineers (ISAE) for best M.Tech. thesis, 1994.
- ✓ University gold medal in B.Tech. (Agricultural Engineering), OUAT, Bhubaneswar, 1992.

## **PUBLICATIONS** (*Details in Annexure-II*)

70 papers in Refereed journals

81 papers in Proceedings of seminars / conferences

3 Book chapters

15 Technical reports

## **SPONSORED RESEARCH and CONSULTANCY PROJECTS** (*Details in Annexure-III*)

5 Ongoing research projects and 15 completed research projects

7 completed consultancy projects

The total grant as PI/Co-PI till now amounts to more than Rs. 110 million. *Funding agencies include* European Commission, Europe; DFG, Germany; Department of Science and Technology, New Delhi; Ministry of Water Resources, New Delhi; Ministry of Human Resources Development, New Delhi; Ministry of Agriculture and Farmers' Welfare, New Delhi; Indian Space Research Organization, Bangalore; Space Application Centre, Ahmedabad; Indian Council of Agricultural Research, New Delhi; ITRA, Mumbai; DAAD, Germany; The World Bank, New Delhi; National Thermal Power Corporation, Kahalgaon; Soil Conservation Dept., Damodar Valley Corporation, Hazaribag; Govt. of Andhra Pradesh and Odisha, India.

## **RESEARCH GUIDANCE** (*Details in Annexure-IV*)

Guidance at doctoral level: 8 completed; 7 in progress

Guidance at master's level: 55 completed and 2 in progress

Guidance at bachelor's level: 25 completed

**(Chandranath Chatterjee)**

## Annexure-I

### Educational Qualifications:

Degree	Institution	Year	Specialization	Division	% Marks	Rank
Ph.D.	IIT Kharagpur	1999	Hydrometry	-	-	-
M.Tech.	IIT Kharagpur	1994	Soil & Water Cons. Engg.	-	9.52/ 10	First in Specialization
B.Tech.	CAET, OUAT, BBSR	1992	Agricultural Engg.	First (Hons)	8.65/ 10	Univ. Gold Medalist
H.S.	BJB College, BBSR	1988	PCM, English, Stats	First	88.9%	-
AISSE	D. M. School, BBSR	1986	Science, Engl., Maths	First	76.4%	-

### Subjects Taught:

#### *At the Undergraduate level:*

Land and Water Resources Engineering  
Land and Water Resources Engineering Laboratory  
Remote Sensing for Land & Water Resources  
GIS Principles & Applications

#### *At the Postgraduate level:*

Geo-informatics for Land & Water Resources  
Geo-informatics for Land & Water Resources Laboratory  
Mathematical Models in Hydrology  
Hydrology & Water Resources Engineering Laboratory  
River Basin Management  
Water Resources System Analysis  
Systems Approach in Agriculture

### E-Courses:

Developed the following e-courses for B. Tech. (Agricultural Engineering) under ICAR-NAIP (New Delhi)

- (i) Remote Sensing and GIS Application 3 (2 + 1)
- (ii) Watershed Hydrology 3 (2 + 1)

## Annexure-II

### Publications

#### (A) Refereed Journals: 70

1. Gusain, A., Mohanty, M. P., Ghosh, S., **Chatterjee, C.**, Karmakar, S. (2020) “Capturing transformation of flood hazard over a large river basin under changing climate using a top-down approach”, *Science of The Total Environment*, Elsevier, 726, 1-17; DOI: 10.1016/j.scitotenv.2020.138600 (Impact factor: 5.589)
2. Mishra, A., Waghaye, A., **Chatterjee, C.**, Rautaray, S. K. (2020) “Rain water resource management in mango orchards through micro-catchments”, *Sustainable Water Resources Management*, Springer Nature, DOI: 10.1007/s40899-020-00404-9
3. Bera, A., Misra, S., **Chatterjee, C.** (2020) "QoE analysis in cache-enabled multi-UAV networks", *IEEE Transactions on Vehicular Technology*, DOI: 10.1109/TVT.2020.2985933 (Impact factor: 5.33)
4. Jacob, X. V., Bisht, D. S., **Chatterjee, C.**, Raghuwanshi, N. S. (2020) “Hydrodynamic modeling for flood hazard assessment in a data scarce region: a case study of Bharathapuzha river basin”, *Environmental Modeling and Assessment*, Springer International Publishing, 25, 97–114; DOI: 10.1007/s10666-019-09664-y (Impact Factor: 1.253)
5. Nanda, T., Sahoo, B., **Chatterjee, C.** (2019) “Enhancing real-time streamflow forecasts with wavelet-neural network based error-updating schemes and ECMWF meteorological predictions in Variable Infiltration Capacity model”, *Journal of Hydrology*, Elsevier, 575, 890-910; DOI: 10.1016/j.jhydrol.2019.05.051 (Impact Factor: 3.727)
6. Bisht, D. S., Sridhar, V., Mishra, A., **Chatterjee, C.**, Raghuwanshi, N. S. (2019) “Drought characterization over India under projected climate scenario”, *International Journal of Climatology*, Royal Meteorological Society, 39(4), 1889-1911; DOI: 10.1002/joc.5922 (Impact Factor: 3.601)
7. Ganguli, P., Nandamuri, Y.R., **Chatterjee, C.** (2019) “Analysis of persistence in the flood timing and the role of catchment wetness on flood generation in a large river basin in India”, *Theoretical and Applied Climatology*, Springer Vienna; <https://doi.org/10.1007/s00704-019-02964-z> (Impact Factor: 2.72)
8. Sarivastava, A., Sahoo, B., Raghuwanshi, N. S., **Chatterjee, C.**, (2018) “Modelling the dynamics of evapotranspiration using Variable Infiltration Capacity model and regionally calibrated Hargreaves approach”, *Irrigation Science*, Springer, DOI: 10.1007/s00271-018-0583-y (Impact Factor: 1.65)

9. Bisht, D. S., **Chatterjee, C.**, Raghuwanshi, N. S., Sridhar, V. (2018) “Spatio-temporal trends of rainfall across Indian river basins”, *Theoretical and Applied Climatology*, Springer, 132(1-2), 419-436, DOI: 10.1007/s00704-017-2095-8. (Impact Factor: 2.32)
10. Beria, H., Nanda, T., Bisht, D. S., **Chatterjee, C.** (2017) “Does the GPM mission improve the systematic error component in satellite rainfall estimates over TRMM? An evaluation at a pan-India scale”, *Hydrology and Earth System Sciences*, European Geosciences Union, 21:6117-6134. doi: 10.5194/hess-21-6117-2017. (Impact Factor: 5.064)
11. Bisht, D. S., **Chatterjee, C.**, Raghuwanshi, N. S., Sridhar, V. (2017) “An analysis of precipitation climatology over Indian urban agglomeration”, *Theoretical and Applied Climatology*, DOI 10.1007/s00704-017-2200-z (Impact Factor: 2.32)
12. Nanda, T., Sahoo, B., **Chatterjee, C.** (2017). “Enhancing the applicability of Kohonen Self-Organizing Map (KSOM) estimator for gap-filling in hydrometeorological timeseries data”, *Journal of Hydrology*, DOI: 10.1016/j.jhydrol.2017.03.072 (Impact Factor: 3.73)
13. Kumar, R., Mani, P., **Chatterjee, C.**, Patra, J. P. (2017) “Flood disaster risk management for a project site in India under the changing climate”, *Journal of Indian Water resources Society*, 37(3), 37-41.
14. Bisht, D. S., **Chatterjee, C.**, Kalakoti, S., Upadhyay, P., Sahoo, M., and Panda, A. (2016). “Modeling urban floods and drainage using SWMM and MIKE URBAN: a case study”, *Natural Hazards*, Springer, 1-28 DOI 10.1007/s11069-016-2455-1. (Impact Factor: 1.72)
15. Nanda, T., Sahoo, B., Beria, H., **Chatterjee, C.** (2016). “A wavelet-based non-linear autoregressive with exogenous inputs (WNARX) dynamic neural network model for real-time flood forecasting using satellite-based rainfall products”, *Journal of Hydrology*, Elsevier, 539, 57-73. (Impact Factor: 3.05)
16. Jena, P. P., Panigrahi, P., and **Chatterjee, C.** (2016). “Assessment of Cartosat-1 DEM for modeling floods in data scarce regions”, *Water Resources Management*, 30(3), 1293-1309. (Impact Factor: 2.6)
17. Samantaray, D., **Chatterjee, C.**, Singh, R., Kumar, P., and Panigrahy, S. (2015), “Flood risk modeling for optimal rice planning for delta region of Mahanadi river basin in India”, *Natural Hazards*, Springer, 76(1), 347-372. (Impact Factor: 1.72)
18. Kumar, S., Tiwari, M. K., **Chatterjee, C.**, and Mishra, A. (2015), “Reservoir inflow forecasting using ensemble models based on neural networks, wavelet analysis and bootstrap method”, *Water Resources Management*, Springer, 29(13), 4863–4883. (Impact Factor: 2.6)

19. Kumar, A., Singh, R., Jena, P. P., **Chatterjee, C.**, and Mishra, A. (2015). "Identification of the best multi-model combination for simulating river discharge", *Journal of Hydrology*, 525, 313-325. (Impact Factor: 3.05)
20. Kumar, R., Goel, N. K., **Chatterjee, C.**, and Nayak, P. C. (2015), "Regional flood frequency analysis using soft computing techniques", *Water Resources Management*, Springer, 29(6), 1965-1978. (Impact Factor: 2.6)
21. Kneis, D., **Chatterjee, C.**, and Singh, R. (2014), "Evaluation of TRMM rainfall estimates over a large Indian river basin (Mahanadi)", *Hydrology and Earth System Sciences*, European Geosciences Union, 18(7), 2493-2502. DOI: 10.5194/hess-18-2493-2014. (Impact factor: 3.59)
22. Jena, P. P., **Chatterjee, C.**, Pradhan, G., and Mishra, A. (2014), "Are recent frequent high floods in Mahanadi basin in eastern India due to increase in extreme rainfalls?", *Journal of Hydrology*, Elsevier, 517, 847-862. DOI: 10.1016/j.jhydrol.2014.06.021. (Impact factor: 2.96)
23. Sehgal, V., Tiwari, M. K., and **Chatterjee, C.** (2014), "Wavelet bootstrap multiple linear regression based hybrid modeling for daily river discharge forecasting", *Water Resources Management*, Springer, 28(10), 2793–2811. DOI 10.1007/s11269-014-0638-7. (Impact factor: 2.46)
24. Sehgal, V., Sahay, R. R., and **Chatterjee, C.** (2014), "Effect of utilization of discrete wavelet components on flood forecasting performance of wavelet based ANFIS models", *Water Resources Management*, Springer, 28(6), 1733–1749. DOI 10.1007/s11269-014-0584-4. (Impact factor: 2.46)
25. Sehgal, V., and **Chatterjee, C.** (2014), "Auto updating wavelet based MLR models for monsoonal river discharge forecasting", *International Journal of Civil Engineering Research*, Research India Publications, 5(4), 401-406.
26. Mani, P., **Chatterjee, C.**, and Kumar, R. (2014), "Flood hazard assessment with multi-parameter approach derived from coupled 1D and 2D hydrodynamic flow model", *Natural Hazards*, Springer, 70(2):1553–1574. DOI 10.1007/s11069-013-0891-8. (Impact factor: 1.64)
27. Sardar, B., Singh, A. K., Raghuwanshi, N. S., and **Chatterjee, C.** (2014), "Hydrological modeling to identify and manage critical erosion prone areas for improving reservoir life: A case study of Barakar basin", *Journal of Hydrologic Engineering*, American Society of Civil Engineers, 19(1), 196-204. DOI:10.1061/(ASCE)HE.1943-5584.0000749. (Impact factor: 1.38)
28. Kant, A., Suman, P. K., Giri, B. K., Tiwari, M. K., **Chatterjee, C.**, Nayak, P. C., and Kumar, S. (2013), "Comparison of multi-objective evolutionary neural network, adaptive

- neuro-fuzzy inference system and bootstrap-based neural network for flood forecasting”, *Neural Computing and Applications*, Springer, 23(1), S231–S246. DOI 10.1007/s00521-013-1344-8. (Impact factor: 1.76)
29. Rath, S., Nayak, P. C., and **Chatterjee, C.** (2013), “Hierarchical neuro-fuzzy model for real time flood forecasting”, *International Journal of River Basin Management*, Taylor & Francis, 11(3), 253-268. DOI:10.1080/15715124.2013.798329.
  30. Tiwari, M. K., Song, K. Y., **Chatterjee, C.**, and Gupta, M. M. (2013), “Improving reliability of river flow forecasting using neural networks, wavelets and self-organising maps”, *Journal of Hydroinformatics*, IWA Publishing, 15(2), 486-502. (Impact factor: 1.15)
  31. Mishra, A., Singh, R., Raghuwanshi, N. S., **Chatterjee, C.**, and Froebrich, J. (2013), “Spatial variability of climate change impacts on yield of rice and wheat in the Indian Ganga Basin”, *Science of the Total Environment*, Elsevier, 468–469, S132-S138. DOI.org/10.1016/j.scitotenv.2013.05.080. (Impact factor: 3.26)
  32. Tiwari, M. K., Song, K. Y., **Chatterjee, C.**, and Gupta, M. M. (2012), “River-flow forecasting using higher-order neural networks”, *Journal of Hydrologic Engineering*, American Society of Civil Engineers, 17 (5), 655-666. (Impact factor: 1.38)
  33. Tiwari, M. K., and **Chatterjee, C.** (2011), “A new wavelet—bootstrap—ANN hybrid model for daily discharge forecasting”, *Journal of Hydroinformatics*, IWA Publishing, 13(3), 500-519. (Impact factor: 1.15)
  34. Tiwari, M. K., **Chatterjee, C.** (2010), “Development of an accurate and reliable hourly flood forecasting model using wavelet–bootstrap–ANN (WBANN) hybrid approach”, *Journal of Hydrology*, Elsevier, 394(3), 458-470. (Impact factor: 2.96)
  35. Tiwari, M. K. and **Chatterjee, C.** (2010), “Uncertainty assessment and ensemble flood forecasting using bootstrap based artificial neural networks (BANNs)”, *Journal of Hydrology*, Elsevier, 382(1), 20-33. (Impact factor: 2.96)
  36. Patro, S., **Chatterjee, C.**, Singh, R., and Raghuwanshi, N. S. (2009), “Hydrodynamic modelling of a large flood prone river system in India with limited data”, *Hydrological Processes*, Wiley Interscience, 23(19), 2774-2791. (Impact factor: 2.50)
  37. Patro, S., **Chatterjee, C.**, Mohanty, S, Singh, R., and Raghuwanshi, N. S. (2009), “Flood inundation modeling using MIKE FLOOD and remote sensing data”, *Journal of ISRS*, Springer, 37, 107-118. (Impact factor: 0.53)
  38. Lohani, A. K., **Chatterjee, C.**, Kumar, R., and Singh, R. D. (2009), “Management model for waterlogging and drainage congestion problem of Mokama tal area”, *Journal of IE(I)*, Springer, 90, 28-32.

39. Mukerji, A., **Chatterjee, C.** and Raghuwanshi, N. S. (2009), "Flood forecasting using ANN, Neuro-Fuzzy and Neuro-GA models", *Journal of Hydrologic Engineering*, American Society of Civil Engineers, 14(6), 647-652. (Impact factor: 1.38)
40. Mishra, A., and **Chatterjee, C.** (2009), "Temporal changes in rainfall occurrence and distribution in West Midnapore district of West Bengal", *Journal of Indian Water Resources Society*, 29(1), 38-48.
41. **Chatterjee, C.**, Förster, S., and Bronstert, A., (2008), "Comparison of hydrodynamic models of different complexities to model floods with emergency storage areas", *Hydrological Processes*, Wiley InterScience, 22(24), 4695-4709. (Impact factor: 2.50)
42. Förster, S., **Chatterjee, C.**, and Bronstert, A., (2008), "Hydrodynamic simulation of the operational management of a proposed flood emergency storage area at the middle Elbe River using MIKE 11", *River Research Applications*, Wiley InterScience, 24(7), 900-913. (Impact factor: 2.43)
43. Kumar, R., **Chatterjee, C.**, Singh, R. D., Lohani, A. K., and Kumar, S., (2007), "Runoff estimation for an ungauged catchment using geomorphological instantaneous unit hydrograph (GIUH)", *Hydrological Processes*, Wiley InterScience, 21, 1829-1840. (Impact factor: 2.50)
44. Kumar, R., Singh, R. D., **Chatterjee, C.**, Mani, P., and Panigrahy, N., (2007), "Advance deterministic and probabilistic modeling for design flood estimation", *Journal of IE(I)*, Springer, 88, 13-19.
45. Sahoo, B., **Chatterjee, C.**, Raghuwanshi, N. S., Singh, R., and Kumar, R., (2006), "Flood estimation by GIUH based Clark and Nash models", *Journal of Hydrologic Engineering*, American Society of Civil Engineers, 11(6), 515-525. (Impact factor: 1.38)
46. Kumar R. and **Chatterjee C.**, (2006), Closure to discussion on "Regional flood frequency analysis using L-moments for North Brahmaputra region of India" by V. V. Srinivas and A. Ramachandra Rao, *Journal of Hydrologic Engineering*, American Society of Civil Engineers, 11(4), 380-382. (Impact factor: 1.38)
47. **Chatterjee C.**, Kumar R., Chakravorty B, Lohani A.K. and Kumar S., (2005), "Integrating remote sensing and GIS techniques with groundwater flow modeling for assessment of waterlogged areas" *Water Resources Management*, Springer, 19, 539-554. (Impact factor: 2.46)
48. Kumar R. and **Chatterjee C.**, (2005), "Regional flood frequency analysis using L-moments for North Brahmaputra region of India", *Journal of Hydrologic Engineering*, American Society of Civil Engineers, 10(1), 1-7. (Impact factor: 1.38)



49. Sahoo B., **Chatterjee C.** and Raghuwanshi N. S., (2005), "Runoff prediction in ungauged basins at different basin map scales", *Hydrology Journal of IAH, Roorkee*, 28(3-4), 45-58.
50. Kumar R., **Chatterjee C.**, Singh R. D., Lohani A. K. and Kumar, S., (2004), "GIUH based Clark and Nash models for runoff estimation for an ungauged basin and their uncertainty analysis", *International Journal of River Basin Management, Taylor & Francis*, 2(4), 281-290.
51. Lohani A. K, Ghosh N. C. and **Chatterjee C.**, (2004), "Development of a management model for a surface waterlogged and drainage congested area", *Water Resources Management, Springer*, 18(5), 497-518. (Impact factor: 2.46)
52. Kumar, R., **Chatterjee, C.**, Kumar, S., Lohani, A. K., and Singh, R. D. (2003). "Development of regional flood frequency relationships using L-moments for Middle Ganga Plains (Subzone 1-f) of India". *Water Resources Management, Springer*, 17(4), 243-257. (Impact factor: 2.46)
53. Kumar, R., **Chatterjee, C.**, and Kumar, S. (2003). "Regional flood formulas using L-moments for small watersheds of Sone subzone of India". *Journal of Applied Engineering in Agriculture, American Society of Agricultural Engineers*, 19(1), 47-53. (Impact factor: 0.57)
54. **Chatterjee, C.**, Kumar, R., and Mani, P. (2003). "Delineation of surface waterlogged areas in parts of Bihar using IRS-1C LISS-III data". *Journal of ISRS, Springer*, 31(1), 57-65. (Impact factor: 0.53)
55. Kumar, R., **Chatterjee, C.**, Panigrahi, N., Patwari, B. C., and Singh, R. D. (2003). "Development of regional flood formula using L-moments for North Brahmaputra river system". *Journal of IE(I), Springer*, 84, 57-63.
56. Kumar, R., **Chatterjee, C.**, Kumar, S., and Lohani, A. K. (2003). "Use of L-moments in development of regional flood frequency relationships for gauged and ungauged catchments", *Indian Journal of Power and River Valley Development*, 53(5/6), 86-92.
57. Mani, P., Kumar, R., and **Chatterjee, C.** (2003). "Erosion study of a part of Majuli river-island using remote sensing data". *Journal of ISRS, Springer*, 31(1), 11-18. (Impact factor: 0.53)
58. Kumar, S., Kumar, R., Chakravorty, B., **Chatterjee, C.**, and Pandey, N. G. (2003). "An artificial neural network approach for flood forecasting". *Journal of IE(I), Springer*, 84, 52-55.
59. Kumar, R., **Chatterjee, C.**, Singh, R. D., Lohani, A. K., and Nema, R. K. (2002). "Flood estimation for ungauged catchments using GIS and GIUH-based Nash model". *Asian-*

Pacific Remote Sensing and GIS Journal, Economic and Social Commission for Asia and the Pacific, United Nations, New York, 15, December, 11-20.

60. **Chatterjee, C.**, Singh, R., Kar, S. K. (2002). "Discharge characteristics of chimney weir under free-flow conditions". Journal of Irrigation and Drainage Engineering, American Society of Civil Engineers, 128(3), 175-179. (Impact factor: 0.80)
61. Kumar, R., **Chatterjee, C.**, Lohani, A. K., Kumar, S., and Singh, R. D. (2002). "Sensitivity analysis of the GIUH based Clark model for a catchment". Water Resources Management, Springer, 16, 263-278. (Impact factor: 2.46)
62. **Chatterjee, C.**, Jha, R., Lohani, A. K., Kumar, R., and Singh, R. (2002). "Estimation of SCS curve numbers for a basin using rainfall-runoff data". ISH Journal of Hydraulic Engineering, Taylor & Francis, 8(1), 40-49.
63. Kumar, R., **Chatterjee, C.**, Kumar, S., Lohani, A. K., and Singh, R. D. (2002). "Estimation of direct surface runoff hydrograph for a basin using HEC-1 Package and Nash model". Journal of IE(I), Springer, 82, 181-185.
64. Kumar, R., **Chatterjee, C.**, Kumar, S., and Upadhyay, P. (2002). "Development of regional flood formulae using L-moments for gauged and ungauged catchments of South Bihar and Jharkhand". Water and Energy International Journal, Central Board of Irrigation and Power, 59(2), April-June, 52-69.
65. Lohani, A. K., **Chatterjee, C.**, and Kumar, R. (2002). "Estimation of waterlogging and water storage capacity of Mokama Tal area in Bihar using remote sensing and GIS". GIS India, Hyderabad, May, pp. 10-14.
66. Kumar, R., **Chatterjee, C.**, Kumar, S., Jain, S. K., Lohani, A. K., and Singh, R. D. (2001). "Intercomparison of responses of HEC-1 package and Nash model". Hydrology Journal of IAH, Roorkee, 24(3), September, pp. 13-24.
67. **Chatterjee, C.**, Jha, R., Lohani, A. K., Kumar, R., and Singh, R. (2001). "Runoff curve number estimation for a basin using remote sensing and GIS". Asian-Pacific Remote Sensing and GIS Journal, Bangkok, 14, December, 1-7.
68. Kumar, R., Lohani, A. K., Kumar, S., **Chatterjee, C.**, and Nema, R. K. (2001). "GIS based morphometric analysis of Ajay river basin upto Sarath gauging site of South Bihar". Journal of Applied Hydrology, Association of Hydrologists of India, XIV(4), pp. 45-54.
69. **Chatterjee, C.**, Singh, R., Kar, S. K., Panda, S. N., and Bohara, S. L. (1998). "Flow characteristics of chimney weir under submergence". Journal of Irrigation and Drainage Engineering, American Society of Civil Engineers, 124(2), 96-101. (Impact factor: 0.80)
70. **Chatterjee, C.**, Singh, R., and Satyanarayana, T. (1997). "Discharge characteristics of chimney weir". Journal of IE(I), Springer, 77, 190-194.

## **(B) Proceedings of Seminars/Conferences: 81**

1. Bisht, D. S., **Chatterjee, C.** and Raghuwanshi, N. S. (2020) “A novel technique of rainfall bias correction using monthly hybrid approach”, Roorkee Water Conclave, An International Conference, IIT Roorkee, Roorkee, India, 26-28 February 2020.
2. Khatun, A., Ganguli, P., **Chatterjee, C.** and Sahoo, B. (2020) “Effect of catchment wetness on flood generation of a medium-sized catchment with tropical pluvial regime”, Roorkee Water Conclave, An International Conference, IIT Roorkee, Roorkee, India, 26-28 February 2020.
3. Barbetta, S., Sahoo, B., **Chatterjee, C.**, Nanda, T., Todini, E. and Moramarco, T. (2020) “Addressing effective real-time flood forecasting through predictive uncertainty estimate in Indian rivers”, Roorkee Water Conclave, An International Conference, IIT Roorkee, Roorkee, India, 26-28 February 2020.
4. Mohite, A. R., **Chatterjee, C.** and Singh, R. (2020) “Development of flood forecasting system for middle Mahanadi basin”, Roorkee Water Conclave, An International Conference, IIT Roorkee, Roorkee, India, 26-28 February 2020.
5. Bera, A., Misra, S. and **Chatterjee, C.** (2020) "Energy-Aware Multi-UAV Networks for On-Demand Task Execution", IEEE International Conference on Communications Workshops, Dublin, Ireland, 7-11 June 2020.
6. Khose, S. B., Mailapalli, D. R., **Chatterjee, C.**, Biswal, S., Mishra, A., Singh, R. and Raghuwanshi, N. S. (2020) “Development of crop coefficient maps for Paddy under alternate wetting and drying irrigation practice using Unmanned Aerial Vehicle (UAV) multispectral imagery”, 54<sup>th</sup> Annual Convention of ISAE and International Symposium on “Artificial Intelligence Based Future Technologies in Agriculture”, Pune, 7-9 January 2020.
7. Bisht, D. S., **Chatterjee, C.**, Raghuwanshi, N. S. and Mishra, A. (2019) “Exacerbating drought situation in India under changing climate”, National Water Conference on Water Resources and Environment, NIH Roorkee, Roorkee, India, 16-17 December 2019.
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### Annexure-III

#### (Sponsored Research and Consultancy Projects)

#### (A) Sponsored Research Projects:

No.	PI/ Co-PI	Project Name	Sponsored by	Date & Period	Funds (Rs. Lakh)
<b>On-going: 5 Nos.</b>					
1	PI	Impact of climate change on flood risk	DST, Min of Science and Tech., New Delhi	30-03-2017 to 29-03-2022	58.51
2	PI	An Integrated Autonomous UAV and WSN - Based System for Crop Management and Crop Condition Monitoring	MHRD and MoA&FW, New Delhi	08-02-2017 to 31-03-2021	195
3	Co-PI	Development and testing of a large scale conceptual hydrological model	NIH, Min. of Water Res., Roorkee	29-03-2018 to 28-03-2021	55.548
4	Co-PI	Climate change impact and adaptation options for sustaining rice-wheat crop production in India	DST, Min of Science and Tech., New Delhi	30-03-2017 to 29-03-2022	37.248
5	Co-PI	Effect of climate change & land use/land cover changes on spatial and temporal water availability in Subarnarekha basin	Min. of Water Res., New Delhi	23-03-2018 to 22-03-2021	25.256
<b>Completed: 15 Nos.</b>					
6	PI	Development of optimal crop planning model based on flood risk	ICAR, Min of Agril., New Delhi	13-01-2016 to 31-03-2017 (1 year)	34.925
7	PI	Flood inundation zoning for different return periods in Mahanadi river basin	INCSW, Min. of Water Res., New Delhi	01-04-2011 to 31-03-2017 (6 years)	36
8	PI	Estimation of crop coefficients from remotely sensed data to improve irrigation scheduling in India	MHRD, New Delhi	01-04-2014 to 01-04-2017 (3 years)	43.22

9	PI	Design of drainage system and multi-purpose detention pond for storm water management of IIT Kharagpur campus	IIT Kharagpur	24-12-2013 to 23-12-2016 (3 years)	45
10	Co-PI	Ensemble modeling of rainfall-runoff transformation process	INCSW, Min. of Water Res., New Delhi	01-04-2012 to 31-12-2016 (4 years)	26
11	Co-PI	Development of a conceptual water balance model for various ecosystems of India	SAC, Ahmedabad	01-01-2014 to 31-12-2016 (2 years)	20.3
12	Co-PI	Measurement to management (M2M): improved water use efficiency and agricultural productivity through experimental sensor network	ITRA, Mumbai	21-10-2013 to 20-10-2016 (3 years)	156
13	Co-PI	Development of a GIS based decision support system for irrigation system management	INCSW, Min. of Water Res., New Delhi	2012-2016 (4 years)	42
14	Co-PI	Adaptation to changing water resources availability in northern India with Himalayan glacier retreat and changing monsoon pattern.	European Commission	2009-2012 (3 years)	155
15	Co-PI	Distributed hydrological modeling to analyse sediment and nutrient status of Brahmani-Baitrani delta	SAC, Ahmedabad	2008-2011 (3 years)	20.83
16	Co-PI	Hydrological modeling of a watershed to evaluate impacts of watershed structures on surface flow & groundwater recharge	DST, New Delhi	2007-2010 (3 years)	19.33
17	PI	Flood risk modelling using satellite remote sensing data for optimal crop planning	ISRO, Bangalore	2008-2011 (3 years)	10.78
18	Co-PI	Geo-spatial resources management with computer simulation of flood inundation for Mayurakshi and Ajoy river basins Jharkhand and West Bengal using RS & GIS	DST, New Delhi	2006-2009 (3 years)	13.77
19	PI	Flood hazard mapping & flood risk zoning for a river reach	SRIC, IIT Kharagpur	2004-2009 (5 years)	3



20	PI	Remote Sensing and GIS based management model for waterlogging and drainage congestion problem of Mokama group of Tals in Central Bihar	DST, New Delhi	2002-2004 (3 years)	7.72
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### (B) Consultancy Projects:

No.	PI/ Co-PI	Project Name	Sponsored by	Date & Period	Funds (Rs. Lakh)
<b>Completed: 7 Nos.</b>					
1	PI	Probable maximum flood estimation for Nagarjunasagar Dam	Govt. of Andhra Pradesh	2009-2011 (2 years)	29.10
2	Co-PI	Setting-up RiverWare model for operational management and climate change impact assessment of Damodar river basin reservoirs	The World Bank, New Delhi	16-02-2018 to 31-07-2018 (1.5 years)	5.46
3	Co-PI	Testing and evaluation of the Internet of Things (IOT) based prototype designed for water management in Alternate Wetting and Drying (AWD) rice	The World Bank, New Delhi	14-02-2018 to 31-07-2018 (1.5 years)	9.13
4	Co-PI	Intervention analysis of the IGB basin focal project	IWMI, Sri Lanka	2008-2009 (1.5 years)	6
5	Co-PI	Evaluation study on the activities of Soil Conservation Department of DVC	DVC, SCD, Hazaribagh	2007-2009 (2 years)	31.5
6	Co-PI	Preparation of Perspective Plan under NFFWP	DRDA, Mayurbhanj, Orissa	2005-2005 (6 months)	7
7	Co-PI	Hydrological study of NTPC Kahalgaon power station area	NTPC	2000-2000 (4 months)	10

## Annexure-IV

### Details of Research Guidance

#### (a) Guidance at Doctoral Level:

**Number Completed: 8 (Single: 1 and Joint: 7)**

Sl. No.	Title of Project	Name of Student & Roll. No.	Name of Co-Supervisor	Year
1	Flood inundation modeling and hazard assessment for lower Bharathapuzha basin	Xavier K Jacob 05AG9502	Prof. N. S. Raghuwanshi	Degree awarded in July, 2009.
2	River flow forecasting using wavelet transformation and bootstrap based neural networks	Mukesh Kumar Tiwari 07AG9402		Degree awarded in Aug, 2011.
3	Flood risk modeling using MIKE FLOOD and remote sensing data for optimal rice planning	Dibyendu Samantaray 08AG9708	Prof. R. Singh	Degree awarded in Dec, 2014
4	Ensemble modeling of rainfall-runoff transformation process	Arun Kumar 12AG91P03	Prof. R. Singh	Degree awarded in 2017
5	Flood risk management of nuclear power plant site using coupled 1D-2D hydrodynamic model	Pankaj Mani 10AG9501	Dr. Rakesh Kumar, NIH	PhD Viva completed in Dec, 2018
6	Real-time flood forecasting using variable infiltration capacity model and neural networks	Trushnamayee Nanda 13AG90J01	Prof. B. Sahoo	PhD Viva completed in Dec, 2018
7	Assessing the impacts of conservation measures on watershed hydrology using MIKE SHE	Gajanan K. Ramteke 08AG9701	Prof. R. Singh	PhD Viva completed in July, 2019
8	Development of flood forecasting system for Mahanadi river basin using a coupled rainfall-runoff hydrodynamic model	Mohite Archana Ramchandra 11AG91R06	Prof. R. Singh	PhD Viva completed in Nov, 2019

**Number in Progress: 7 (Single: 1 and Joint: 6)**

Sl. No.	Title of Project	Name of Student & Roll. No.	Name of Co-Supervisor	Year
1	Flood hazard assessment using high resolution DEM for changing trends of flood	Prachi Pratyasha Jena 11AG92P01		Ongoing
2	Hydrological modeling for the Kangsabati river basin	Deepak Singh Bisht 14AG91P02	Prof. N. S. Raghuwanshi	Ongoing

3	Application of UAV in agriculture	Abhishek Bera 16AT91R01	Prof. S. Misra	Ongoing
4	Impact of climate change on floods in Mahanadi river basin	Amina Khatun 17AG92P02	Prof. B. Sahoo	Ongoing
5	Impact of climate change on catchment response in Brahmani-Baitarani river basin	Sushree Swagatika Swain 17WM91R03	Prof. A. Mishra	Ongoing
6	Application of UAV for crop condition monitoring	Rituparna Saha 17AT92P07	Prof. S. Misra	Ongoing
7	Development of UAV image based analytics for crop water management	Sudarsan Biswal 18AG91R08	Prof. D. R. Mailapalli	Ongoing

### (b) Guidance at Masters Level:

**Number Completed: 55 (Single: 29 and Joint: 26)**

Sl. No.	Title of Project	Name of Student, Specialization & Roll. No.	Name of Co-Supervisor	Year
1	Assessment of crop nitrogen using UAV with multispectral camera	Pralipta Pani (LWRE) 18AG62R03		2020
2	Development of flood forecasting model in upper Mahanadi, Jaldhaka and Torsa basins using MIKE 11 model	Bajitborlang L Chyne (LWRE) 18AG62R01	Mr. A. K. Kharya, CE, CWC (NWA, Pune)	2020
3	Development of crop coefficient (Kc) maps for paddy using UAV based multispectral imagery	Khose Suyog Balasaheb (LWRE) 18AG62R16	Prof. D. R. Mailapalli	2020
4	Crop Condition Monitoring using Unmanned Aerial Vehicle (UAV)	Suraj Goswami (LWRE) 17AG62R08		2019
5	Crop damage assessment using Unmanned Aerial Vehicle (UAV)	Peeta Govinda Lakshmi Priya (WM) 17WM60R04		2019
6	Trends and shifts in the timing of flood peaks across Mahanadi river basin, India	Nandamuri Yamini Rama (LWRE) 17AG62R07	Prof. P. Ganguly	2019
7	Impact of climate change on streamflow in Mahanadi basin using HEC-HMS model	Sushant Kumar (LWRE) 17AG62R10	Prof. A. Pathak	2019
8	Impact of climate change on streamflow in upper Mahanadi river basin	Gavit Purnima Vithoba (16AG62R04)	Prof. Renji Ramessan	2018
9	Development of cartosat-1 DEM for flood inundation modeling & optimal rice planning in Mahanadi delta	Abhishek Patel (16AG62R09)		2018
10	Crop condition monitoring using unmanned aerial vehicle (UAV)	Sudesh Singh Choudhary (16AG62R11)		2018

11	Statistical downscaling of Global Circulation Model generated precipitation data using machine learning algorithms	Hitesh Prasad Thakur (13AG38004)	Prof. Bhabagrahi Sahoo	2018
12	Flood inundation modelling using MIKE FLOOD and CARTOSAT-1 derived DEM	Jyoti Ranjan Swain (LWRE) (15AG62R14)		2017
13	Estimation of actual evapotranspiration using satellite remote sensing data	Utkarsh Kumar (LWRE) (15AG62R11)		2017
14	Flood forecasting in the upper reaches of Mahanadi river basin using MIKE 11 models	Amit Kumar Behera (LWRE) (14AG62R17)		2016
15	Statistical and hydrologic evaluation of satellite precipitation estimates and numerical weather forecasts at a pan-India scale	Harsh Beria (LWRE) (11AG38001)		2016
16	Hydrological modeling of IIT Kharagpur campus using MIKE URBAN model	Shivani Kalakoti (LWRE) (Roll No. 13AG62R18)		2015
17	Hydrological modeling of IIT Kharagpur campus using SWMM model	Ambarnil Panda (LWRE) (Roll No. 13AG62R14)		2015
18	Design of surface drainage system and retention cum detention pond for southern region of IIT Kharagpur campus using SWMM	Deepak Singh Bisht (LWRE), 12AG62R07		2014
19	Flood inundation modelling and design of surface drainage system of a part of IIT Kharagpur campus using MIKE FLOOD and SWMM	Pawan Upadhyay (LWRE), 12AG62R12		2014
20	Flood inundation modeling of the watershed of IIT Kharagpur using Mike 21	Manaswinee Sahoo (LWRE), 12AG62R13	Prof. R. Singh	2014
21	Evaluation of shifting characteristics of river Brahmaputra between Guwahati to Goalpara using LandSat and IRS-P6 LISS-III data	Sanjay Kumar (WM), 12WM60R04	Dr. Ranjit Galappatti, DHI	2014
22	Determination of appropriate irrigation schedule to maximize the yield and water use efficiency of Maize using CERES-Maize model	Swayam Prava Singh (LWRE), 12AG62R11	Prof. R. K. Panda	2014
23	Flood forecasting in the Mahanadi river basin using artificial neural networks	Trushnamayee Nanda (LWRE), 11AG62R13	Prof. B. Sahoo	2013
24	Effect of DEMs generated from different sources on flood inundation modeling	Banamali Panigrahi (LWRE), 11AG62R16		2013

25	PMF estimation of Nagarjunasagar dam and effect of upstream dam break on PMF	Samyadeep Ghosh (LWRE), 10AG62R11		2012
26	Trend analysis of annual extreme rainfall and flood events over Mahanadi river basin	Gouri Rani Pradhan (LWRE), 10AG62R05	Prof. A. Mishra	2012
27	Flood forecasting in Mahanadi river basin using ANFIS and bootstrap based ANFIS models	Pranmohan Kr. Suman (LWRE), 09AG6511	Dr. P. C. Nayak	2011
28	Dam break analysis of Hirakud dam using 1D and coupled 1D-2D models	Mohite Archana Ramchandra (LWRE), 09AG6508		2011
29	Probable maximum flood estimation for Nagarjunasagar Dam	Rajeev Roushan (WRDM), 08AG6509		2010
30	Flood risk modelling for optimal crop planning for delta region of Mahanadi river basin	Natkar Suraj Rajaram (SWCE), 08AG6203		2010
31	Runoff estimation using bootstrap based artificial neural networks (BANNS) and HEC-HMS model	Rucha Rajivkumar Dakave (WM), 08WM6003		2010
32	Hydrological modelling of catchments in Mahanadi river basin using ArcSWAT	Sagar Pachpande (SWCE), 08AG6207	Prof. A. Mishra	2010
33	Design flood estimation using HEC-HMS and L-Moment based regional flood frequency analysis	Siddhartha Biswas (SWCE), 07AG6212		2009
34	Development of a hybrid intelligence system combining ANN and FIS for flood forecasting	Piyush Kumar Singh (WRDM), 07AG6508	Dr. P.C. Nayak	2009
35	Flood inundation modelling and hazard assessment using satellite remote sensing and MIKE FLOOD for the delta region of Mahanadi river basin	Shete Yogesh B (SWCE), 07AG6211		2009
36	Hydrological modelling of a watershed using MIKE SHE	Vinod Sharma (SWCE), 06AG6210	Prof. R. Singh	2008
37	Flood inundation modeling using MIKEFLOOD for the Delta region of Mahanadi River basin	Shivananda Patro (SWCE), 06AG6209		2008
38	Design flood estimation using HEC-HMS	Dibyendu Samantrai (WRDM), 06AG6505		2008
39	Flood forecasting using soft computing techniques	Sagarika Rath (SWCE) 06AG6207	Dr. P. C. Nayak	2008
40	Hydrological modelling of Barakar catchment using AVSWAT-X	Bidhan Sardar (SWCE), 06AG6201	Prof. N. S. Raghuvanshi	2008
41	Hydrological modelling of Damodar catchment using AVSWAT-X	Sane Girish Achyut (SWCE), 06AG6208	Prof. N. S. Raghuvanshi	2008

42	Development of user friendly software for at-site and regional flood frequency analysis using L-moments	Pardeep Kumar (WRDM) 05AG6508		2007
43	Development of optimal water allocation scheduling using OptAll	Chandrashekhar D. Shirwadkar (WRDM) 05AG6502	Prof. R. Singh	2007
44	Performance evaluation and comparison of canal hydraulic models	Shishu Pal Kumar (SWCE), 05AG6208	Prof. R. Singh	2007
45	River flow simulation using MIKE11 and SRTM data	Manoranjan Kumar (WRDM), 05AG6507		2007
46	River flow modeling using HEC-RAS	Rajesh Meena (WRDM) 05AG6510		2007
47	Flood Inundation modeling using MIKE FLOOD and remote sensing data	Biplov Kumar Dan (WRDM), 04AG6503	Prof. N. S. Raghuwanshi	2006
48	Flood inundation simulation for the Mahanadi Delta region using HEC-RAS and GIS	Shifa T. D. (WRDM) 04AG6510	Prof. N. S. Raghuwanshi	2006
49	Flood Forecasting using Neuro-Fuzzy and Neuro-GA Models	Aditya Mukherjee (WRDM-Dual Degree) 01AG3007	Prof. N.S. Raghuwanshi	2006
50	Flood inundation simulation for the delta region of Mahanadi river basin using MIKEFLOOD	Niranjan Pramanik (SWCE), 03AG6202		2005
51	Sensitivity and uncertainty analysis of GIUH based Clark and Nash models	Mahendra Singh Lodhi (WRDM), 03AG6506		2005
52	Development of DSS for design of hydraulic ram using algebraic modeling and transient analysis	Madhav Kumar Mishra (WRDM), 03AG6202	Prof. R.K. Panda	2005
53	Development of a software for regional flood frequency analysis using L-moments	Yavarna Chandrasekhar (WRDM-Dual Degree) 00AG3007		2005
54	Some applications of the Artificial Neural Networks in the fields of hydraulics and hydrology	Manoj Raghuwanshi (WRDM), 02AG6502	Prof. N.S. Raghuwanshi	2004
55	Flood estimation using GIUH based Clark & Nash models	Bhabagrahi Sahoo (WRDM), 01AG6502	Prof. N.S. Raghuwanshi	2003

**Number in Progress: 2 (Single: 2 and Joint: 0)**

Sl. No.	Title of Project	Name of Student, Specialization & Roll. No.	Name of Co-Supervisor	Year
1	Crop Condition Monitoring using Unmanned Aerial Vehicle (UAV)	Korat Ankitkumar Ratilal (LWRE) 19AG62R16		On-going
2	Flood Forecasting using MIKE MODEL and Wavelet based Neural Networks	Manbhalang Dakermi Shylla (LWRE) 19AG62R02		On-going

**(c) Guidance at B.Tech Level:****Number Completed: 25**

Sl. No.	Title of Project	Name of Student, Specialization & Roll. No.	Name of Co-Supervisor	Year
1	A comparative analysis between extreme gradient boosting and light gradient boosting for real time flood forecasting	Monica Marmit (16AG36006)		2020
2	Real time flood and temperature forecasting using ensemble learning and prophet model	Shubham Patidar (16AG36008)		2020
3	Dynamic neural network model integrated with DWT and MODWT algorithms for real time flood forecasting using different rainfall products	Devjyoti Chandra (15AG36009)		2019
4	Flood forecasting using Recurrent Neural Networks and Gradient Boosting Regressor	Tanay Jagani (15AG36017)		2019
5	Flood forecasting using Support Vector Regression (SVR) and Recurrent Neural Network (RNN)	Prem Shankar (14AG10020)		2018
6	Flood forecasting using seasonal autoregressive integrated moving average model with exogenous inputs	Sudhanshu Vashisht (14AG10030)		2018
7	Flood forecasting using random forest and gradient boosting algorithm	Shubham Sonu (05AG1011)		2018
8	Analysis and simulation of water distribution piping system of IIT Kharagpur campus	Rachit Madhukar (13AG3FP05)		2017
9	Analysis and simulation of water distribution piping system of IIT Kharagpur campus	Vardhman Chhajed (13AG36011)		2017
10	Comparison of random forest and artificial neural network approach for flood forecasting	Vikas Kumar (12AG32002)		2016
11	Flood forecasting using support vector machines	Anil Kumar Jangid (12AG10007)		2016
12	Bivariate flood frequency analysis using copula method	Yash Singh Chauhan (11AG32017)		2015
13	Flood frequency analysis using copula	C R Sandeep (11AG10013)		2015
14	Estimation of crop coefficient from remotely sensed images to improve irrigation scheduling in India	Nayan Mallick (11AG32008)		2015

15	Regional flood frequency analysis of Mahanadi subzone by L-moments and ANN	Ashutosh Kumar Agarwal (11AG10009)		2015
16	Development of a GUI based software for real time flood estimation using TRMM precipitation data	Pranjal Kumar Raut (11AG32007)		2015
17	Development of software for climate change studies using ANN-based coupled VIC model	Sameer Ranjan Rana (11AG32009)		2015
18	Development of a mobile application for flood forecasting in India	Ramendra Prasad (11AG10026)		2015
19	Temporal and spatial trend analysis of rainfall for Mahanadi basin	Kumar Raj (10AG10016)		2014
20	Temporal trends in rainfall in Kharagpur and surrounding areas	Bipasha (10AG1000)		2014
21	Development of a GIS database for Mahanadi river basin	Rohan Jain (08AG1016)		2012
22	Comparison of MOENN, ANFIS and BNN for flood forecasting	Amal Kant (07AG3304)		2011
23	Bivariate flood frequency analysis using Gumbel Hougaard method for copula computation	Akshay Sogani (06AG1020)		2010
24	Bivariate flood frequency analysis using Ali-Mikhail-Haq copula method	Rohit Singh (06AG3809)		2010
25	Development of software for at-site flood frequency analysis using method of MOM and MML	Biranchi Prasad Sahoo (05AG1011)		2009