



175

YEARS OF  
**IIT ROORKEE**  
Estd. 1847

# 2023 Annual Report



**ReSim Lab**  
Reservoir Simulation  
Laboratory

Department of Water Resources  
Development and Management

## Foreword

The Reservoir Simulation Laboratory (ReSim Lab) remains a prominent laboratory within WRDM, demonstrating dedicated involvement across a broad spectrum of research domains. The lab recorded remarkable progress through its active engagement with industry and academic institutions, demonstrating successful execution of challenging research projects, advancement of technology, and publication in esteemed journals and conferences. In 2023, the team showcased focused and consistent efforts by publishing a total of eight research papers in peer-reviewed journals, including two in the prestigious Water Resources Research Journal. The lab generates significant funds from various government and industrial projects that help several students receive financial support. This has made significant strides toward self-sustainability. Moreover, the laboratory plays a vital role in training engineers from Asian and African countries. It is gratifying to observe that ReSim Lab students have been selected for prestigious national and international scholarship programs, thereby enhancing the department's international collaborations. ReSim Lab's emphasis on developing novel frameworks, technology development, prototyping, and pursuit of patents with IPR filings has significantly elevated the department's standards and contributed to the attainment of high-quality research outcomes. I extend my best wishes to all members and encourage them to persist in their outstanding efforts, thereby facilitating the continued growth of the department.

**Prof. Thanga Raj Chelliah**  
**Head, Department of WRD&M**

ReSim Lab demonstrates a strong commitment to developing cutting-edge frameworks aimed at addressing key challenges in water resources management with generating significant research project grants. Several projects have been successfully concluded, focusing on developing web-based tools that will assist stakeholders and policymakers, the creation of low-cost IoT devices for river flow monitoring, and addressing the impacts of climate change on water security and agriculture. The team has been actively engaged in delivering real-time solutions to hydropower plants and optimizing reservoir operational policies. Their effective simulation of the pumped storage scheme has earned high praise from Tehri Hydropower Corporation Limited and Central Electricity Authority officials. The team is highly engaged in collaborative research activities with experts from all over the world. The ReSim Lab research community sincerely thanks the departmental head, Deans, and the Director of IIT Roorkee for their generous support.

**Prof. Kasiviswanathan KS**  
**Faculty-in-Charge, ReSim Lab**

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## About the Research Lab

The Reservoir Simulation (ReSIM) Lab functions as a part of the Department of Water Resources Development and Management, Indian Institute of Technology Roorkee, Roorkee, India. The lab's research activities focus on addressing research problems in the wider domain of water resources management. The research group was established with the goal of exploring solutions to address the societal needs related to the in-depth understanding and interaction of various hydrological processes and their impacts across different spatial and temporal scales. The research group is delving into various themes, such as enhancing flood forecasts with uncertainty quantification, managing droughts, developing decision support systems for hydropower generation, and integrating the knowledge of climate change impacts, especially extreme events analysis, in the hydrological modeling. In addition to computational modeling, the lab has actively engaged in developing low-cost instruments for measuring soil moisture and river discharge using sensors and IoT-based mechanisms.

The research team is dedicated to addressing high-priority research needs, fostering the training of qualified researchers, and offering solutions to real-world problems through collaborative research projects with numerous national and international academic institutes and industries. The laboratory is equipped with advanced high-performance computers, real-time simulators, and supervisory control and data acquisition (SCADA) to facilitate the modeling and simulation activities.

The lab members sincerely thank the Director, DEAN SRIC of IIT Roorkee, all Previous Heads, Present Head, faculties, and staff members of WRDM.



## Group Head



Prof. K.S. Kasiviswanathan currently serves as an Associate Professor at the Department of Water Resources Development and Management and also holds a Joint Faculty position at the Mehta Family School of Data Science and Artificial Intelligence, Indian Institute of Technology Roorkee (IITR), India. His research interests include reservoir operation, flood forecasting, geospatial data analysis, multi-objective optimization, uncertainty, and risk quantification. He pursued his Ph.D. in 'Quantification of uncertainty in hydrological models' from the Indian Institute of Technology Madras in 2014 and a Masters in Water Resources Development from the Indian Institute of Technology Roorkee in 2009. He worked as a Postdoctoral Research Associate at the School of Built Environment, Heriot-Watt University, Edinburgh, United Kingdom, and a Postdoctoral Research Scholar at Schulich School of Engineering, University of Calgary, Calgary, Canada, spending three years. Before joining IIT Roorkee, he served as an Assistant Professor in the School of Engineering, IIT Mandi, India from 2017 to 2019.

Prof. Kasiviswanathan has published more than 40 papers in reputed high-impact factor international journals, including the Water Resources Research, Journal of Hydrology, Hydrological Sciences Journal, Stochastic Environmental Research and Risk Assessment, and many more. He has also presented papers at several National and International conferences. He has been the Guest Editor in reputed journals. He is the recipient of several prestigious awards such as the Berkner fellowship from the American Geophysical Union, USA, Sivapalan Young Scientist award from the International Association of Hydrological Sciences, United Kingdom, Early Career Research Award, Department of Science and Technology, India, and Eyes High Postdoctoral Fellowship, University of Calgary, Canada. He currently holds a research project worth half a million US dollars in collaboration with institutes from India and abroad.



# Collaborators

## International

















Photo	Collaborator	Designation	Country
	Prof. Adeloye J Adebayo	Professor Emeritus, School of Energy Geoscience, Infrastructure, and Society Heriot-Watt University	
	Prof. Jianxun He	Professor Department of Civil Engineering Associate Head of Undergraduate Studies University of Calgary	
	Prof. Claudia Teutschbein	Associate Professor Department of Earth Sciences, Program for Air, Water and Landscape Sciences; Hydrology Uppsala University	



Photo	Collaborator	Designation	Country
	Prof. Nicola Fohrer	Director Institute of Nature and Resource Conservation, Department of Hydrology and Water Management, Kiel University	 Germany
	Prof. Carsten Montzka	Senior Scientist Institute of Bio- and Geosciences: Agrosphere, Forschungszentrum Jülich GmbH	 Germany
	Prof. Sandhya Patidar	Associate Professor, School of Energy, Geoscience, Infrastructure and Society Heriot-Watt University	 United Kingdom - Scotland
	Prof. Mohanasundaram	Assistant Professor Water Engineering and Management Asian Institute of Technology	 Thailand

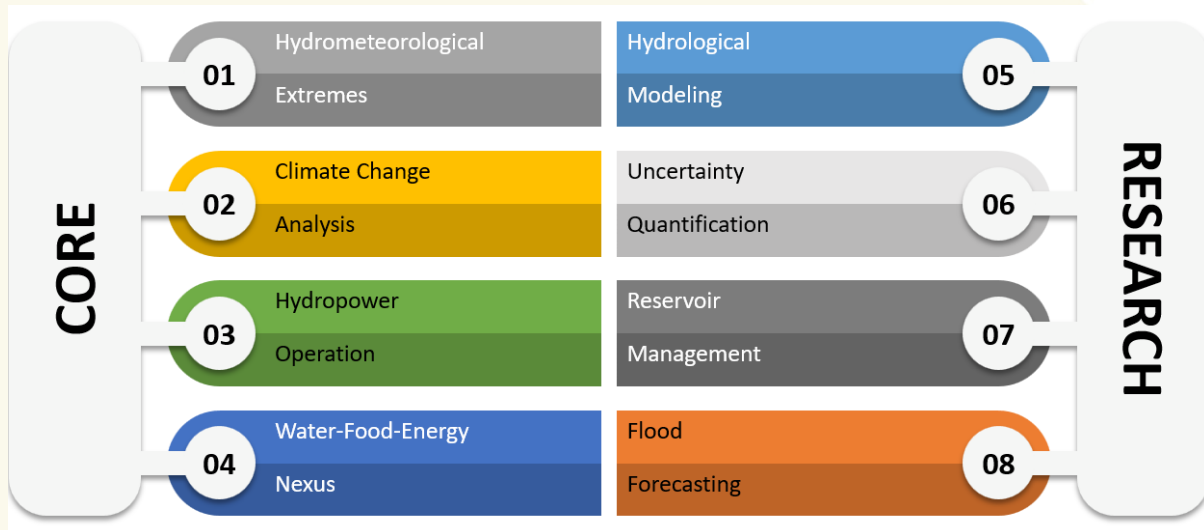


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## Research Team

### Research Interests



### Postdoctoral Researchers



#### Dr. Venkatesh Budamala

Ph.D. – Hydro-climatology and Data Science

##### Research Expertise:

Analytical Research in Hydrology, Climatology, Data Science and Machine learning, GIS



#### Dr. Suresh Devaraj

Ph.D. – Microwave Remote Sensing

##### Research Expertise:

Remote Sensing and GIS

### Doctoral Researchers



#### Mr. Ayano Hirbo Gelebo

##### Research Expertise:

Surface Ground Water Interaction, Hydrological Modeling



#### Mr. Wasu Manawko

##### Research Expertise:

Hydropower Planning and Assessment





**Mr. Koustav Nath**

**Research Expertise:**  
Modeling of Soil Moisture Dynamics



**Mr. Rahmatullah Dost**

**Research Expertise:**  
Drought Management



**Ms. Abhinanda Roy**

**Research Expertise:**  
Hydrological Modeling, Flood Forecasting, Uncertainty Quantification



**Ms. Chandni**

**Research Expertise:**  
Hydrological Modeling, Climate Models, Water-Energy-Food Nexus



**Mr. Pattabiraman B**

**Research Expertise:**  
Reservoir Operation & Optimization, Prediction in Ungauged Basin



**Mr. Vageshvar Yadav**

**Research Expertise:**  
ML models for Hydropower Management, IOT and Automation System



**Ms. Sruthakeerthi P**

**Research Expertise:**  
Catchment Scale Drought Assessment



**Mr. Siddig Mohammed Ali Berama**

**Research Expertise:**  
Flood Mitigation and Management



## Postgraduates



**Mr. Vinod Jogur**

**Research Expertise:**  
Remote Sensing, Machine Learning



**Mr. George Alphons**

**Research Expertise:**  
Flood Assessment



**Mr. Ararso Beshea Tekile**

**Research Expertise:**  
Water Quality Modeling and Assessment



**Mr. Natnael Melke**

**Research Expertise:**  
Hydrological Modeling



**Mr. Natnael Melke**

**Research Expertise:**  
Flood Mitigation and Management

## Undergraduates



**Ms. Harshini S**

**Research Expertise:**  
Hydrological Modeling, Flood forecasting

## Project Fellow



**Mr. Bhabesh Das**

**Research Expertise:**  
Water-Food-Energy Nexus



### Ms. Aiswarya S L

**Research Expertise:**  
Hydrological Modeling, Climate Change



### Mr. Vijaya Lakshmanan S

**Research Expertise:**  
IoT and Automated System

## Student Intern



### Mr. Pradeep Kumar G

M.Tech. – NIT Surathkal  
**Research Expertise:**  
Hydrological Modeling, Climate Change



### Mr. Kotla Sai Charan

B.Tech. – IIT Patna  
**Research Expertise:**  
Data science and ML models

## Courses Offered and Outreach Activities

### Courses Instructed

The courses offered to the master's and Ph.D. students include:

- WRN 597 ML Models in Water Resources Planning and Management
- WRN-532 Hydropower System Planning (HSP)
- WRN-505 Preparation of Water Resources Project Report
- WRN-503 Water Resources Planning and Management

### Outreach Activities

Delivered an invited keynote lecture on “Soft Computing in Water Resources” during a National Conference on Advances in Water Resources Management and Environment Research (AWRMER-23) at the Graphic Era University, India on 24 March 2023.

Delivered a Guest lecture on “Developing Rainfall IDF Curves including Non-stationarity” at the Vellore Institute of Technology, Chennai, India in June 2023.

Delivered a Guest lecture on “A Physics-Aware Machine-Learning Modeling Framework for Reliable Streamflow Forecasting” at the Indian Institute of Science, Bengaluru, India in June 2023.

Delivered a Guest lecture on “Physics-Aware Machine-Learning Models for Reducing Prediction Uncertainty in Streamflow Simulation” at Keil University, Germany in July 2023.

Delivered an invited talk on “What Role Does Machine Learning Play to Enhance the Physics of Hydrological Models” at the Department of Hydrology, Indian Institute of Technology Roorkee, as a part of the AI4 Water Workshop between 20 – 26 August 2023.

Delivered an invited talk on “Building Rainfall-Runoff Model with Machine Learning” as a part of “Recent Advances in Satellite-based Technologies for Monitoring Hydroclimatological Extremes (RASTER – 2023) at IIT Roorkee, India (September 2023).

Delivered a Guest lecture on “Best Practices in Developing ML-based courses in Civil Engineering” at the Amrita Vishwa Vidyapeetham, Coimbatore, India, in September 2023.

Delivered a Guest lecture on “Satellite Precipitation Products, Processing, Evaluation, and Validation for Managing Climate Extremes” at the Indian Institute of Technology Bombay, Mumbai, India, in September 2023.

An invited talk on “How to Write a Successful Research Proposal for Funding” was delivered as a part of the workshop organized by AAA College of Engineering and Technology, Sivakasi, Tamil Nadu, in December 2023.

An invited talk on “Hands-on Training on Research Proposal Writing for Funding” was delivered as a part of the workshop organized by Dr. Mahalingam College of Engineering and Technology, Pollachi, Tamil Nadu in December 2023.





## New Research Projects

Sponsoring Agency	Title of Project	Amount of Grant In Lacs, INR
DST, STAR	Development of Adaptive Machine Learning-Based Approach for Robust Calibration of Hydrological Models in collaboration with IISc Bangalore	96.94
GISE Hub, IIT Bombay, DST	Development of Low-Cost Sensor-based Real-Time River Flow Monitoring System	22.11

## Ongoing Research Projects

Sponsoring Agency	Title of Project	Amount of Grant In Lacs, INR
Swedish Research Council - Sustainability and Resilience funding	Impacts of Recent El-Niño Southern Oscillation (ENSO) on the Water-Food-Energy Nexus in India in collaboration with Uppsala University, Sweden and Amrita Vishwa Vidyapeetham, India	59.20
Tehri Hydro Development Corporation Limited (THDC) India Ltd	Development of Decision Support System for Integrated Operation of Tehri Hydropower Complex	56.59

## Completed Research Projects

Sponsoring Agency	Title of Project	Amount of Grant In Lacs, INR
DST, IMPRINT	Water and Energy Efficient Reliable Irrigation System (WatEr-ERIS): Solar energy and Cloud-based Decision Support Systems for Automated Irrigation System	74.54
SPARC	Mitigation of Dam Induced Flood Disaster due to Hydrological Extremes	44.38
ASEAN-India STI Cooperation	Agricultural Crop Water Productivity and Adaptations to Climate Change and Climate Variability in South and Southeast Asian countries	26.54

**GISE**  
HUB

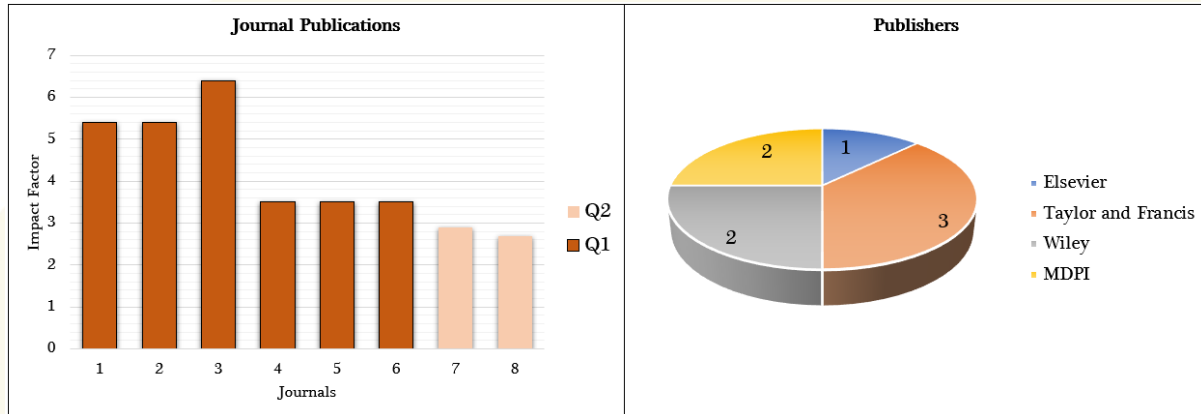


**Vetenskapsrådet**  
Swedish Research Council

## Completed Consultancy Projects

Sponsoring Agency	Title of Project	Amount of Grant In Lacs, INR
SN Survey	Comprehensive Evaluation of Designs of Stormwater Drains Proposed under Flood Relief Fund	19.50

## Research Publications



### Journal Publications

- Roy A, **Kasiviswanathan KS**, Patidar S, Adeloye AJ, Soundharajan BS, Ojha CSP (2023) A physics-aware machine learning-based framework for minimizing prediction uncertainty of hydrological models. *Water Resources Research*. DOI: <https://doi.org/10.1029/2023WR034630>
- Roy A, **Kasiviswanathan KS**, Patidar S, Adeloye AJ, Soundharajan BS, Ojha CSP (2023) A novel physics-aware machine learning-based dynamic error correction model for improving streamflow forecast accuracy. *Water Resources Research* 59(2), e2022WR033318 DOI: <https://doi.org/10.1029/2022WR033318>
- Budamala V, Wadhwa A, Bhowmik RD, Mahindrakar A, Yellamelli RSR, **Kasiviswanathan KS** (2023) Multi-Temporal Downscaling of Daily to Sub-Daily Streamflow for Flash Flood Watersheds at Ungauged Stations Using a Hybrid Framework. *Journal of Hydrology*. DOI: <https://doi.org/10.1016/j.jhydrol.2023.130110>
- Manawko W, **Kasiviswanathan KS** (2023) Potential assessment of calibration approaches in SWAT hydrological model for streamflow and sediment yield for large-scale catchment. *Hydrological Sciences Journal*. DOI: <https://doi.org/10.1080/02626667.2023.2243463>
- Wadhwa A, Budamala V, Kummuru PK, **Kasiviswanathan KS**, Srimuruganandam B (2023) Low Impact Development (LID) Control Feasibility in a Small-Scale Urban Catchment for Altered Climate Change Scenarios. *Hydrological Sciences Journal*. DOI: <https://doi.org/10.1080/02626667.2023.2239797>
- Zelalem T, **Kasiviswanathan KS** (2023) A Bayesian modelling approach for assessing the non-stationarity in annual maximum rainfall under a changing climate. *Hydrological Sciences Journal*. DOI: <https://doi.org/10.1080/02626667.2023.2218550>
- Sidiqi M, **Kasiviswanathan KS**, Scheytt T, Devaraj S (2023) Assessment of Meteorological Drought under the Climate Change in the Kabul River Basin, Afghanistan. *Atmosphere* 14(3):570. DOI: <https://doi.org/10.3390/atmos14030570>

8. Dost R, Soundharajan BS, **Kasiviswanathan KS**, Patidar S (2023) Quantifying Drought Characteristics in Complex Climate and Scarce Data Regions of Afghanistan. Geosciences. DOI: <https://doi.org/10.3390/geosciences13120355>

## Conferences

1. Devaraj S, **Kasiviswanathan KS**, Budamala V, Pattabiraman B, Ahamed K. Mapping and assessing the spatial extent of floods using Sentinel 1 SAR Data-An approach based on Flood Index Estimation. EGU General Assembly 2023, Vienna, Austria, 2023.
2. **Kasiviswanathan KS**, Thakur C. An adaptive surrogate modeling approach for enhancing the calibration of the Variable Infiltration Capacity model. IUGG 2023, Berlin, Germany, 2023.
3. Purnanjali C, **Kasiviswanathan KS**. Environmental Flow Assessment for Sustainable Ecosystem and Livelihood Practices: A case study of Lower Damodar River Basin, IUGG 2023, Berlin, Germany, 2023.

## Books Chapters

1. Zelalem T, **Kasiviswanathan KS** (2023) Non-stationarity analyses of design rainfall using Bayesian approaches, Modeling and Mitigation Measures for Managing Extreme Hydrometeorological Events Under a Warming Climate, Developments in Environmental Science, DOI: <https://doi.org/10.1016/B978-0-443-18640-0.00006-7>
2. Roy A, **Kasiviswanathan KS** (2023) Exploring the potential of data-driven models for streamflow simulation in Himalayan region, Modeling and Mitigation Measures for Managing Extreme Hydrometeorological Events Under a Warming Climate, Developments in Environmental Science, DOI: <https://doi.org/10.1016/B978-0-443-18640-0.00010-9>
3. Dost R, **Kasiviswanathan KS** (2023) Analyses of drought severity and frequency in Afghanistan, Modeling and Mitigation Measures for Managing Extreme Hydrometeorological Events Under a Warming Climate, Developments in Environmental Science, DOI: <https://doi.org/10.1016/B978-0-443-18640-0.00014-6>
4. Jena P, **Kasiviswanathan KS**, Soundharajan BS (2023) An optimization approach for reducing the bias in standard plotting position methods, Modeling and Mitigation Measures for Managing Extreme Hydrometeorological Events Under a Warming Climate, Developments in Environmental Science, DOI: <https://doi.org/10.1016/B978-0-443-18640-0.00001-8>





## Books Edited

1. **Kasiviswanathan KS**, Soundharajan BS, Patidar S, Jianxun He, Ojha CSP (2023) Modeling and Mitigation Measures for Managing Extreme Hydrometeorological Events under a Warming Climate, Elsevier

## Patent Published

1. **Kasiviswanathan KS**, Tummuru TR, Sen S, Soundharajan BS (2022) Water and Energy Efficient Reliable Irrigation System (WatEr-ERIS). Application Ref Number-202211070518, Journal Date-25/08/2023 -Indian Patent Office

## Workshops/Short-Term Courses Organized

### One-day Workshop on Applications of Machine Learning Models in Water Resources Management

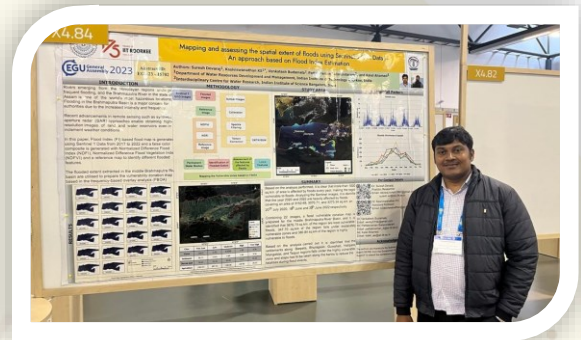
The workshop was organized and supported under the Aegis of the Indian Water Resources Society. The workshop aimed to disseminate knowledge on the basics of machine learning tools and their applications in water resources management. The workshop covered theoretical concepts, basic coding in MATLAB, and hands-on practical sessions using real-world data. The workshop included three keynote talks from experts and a hands-on session. The morning session began with Prof. Deepak Khare's lecture on "Applications of Artificial Intelligence in Water Resources Planning and Management." Subsequently, Prof. Basant Yadav presented "Remediation System Design Utilizing Physical and Data-Based Models," and Prof. Kasiviswanathan KS discussed "Development of Machine Learning Models for Predicting Water Resource Variables."

The workshop concluded with a basic hydrological model simulation by the participants. The workshop was attended by 40 participants (both online and offline) from various academic backgrounds and areas of expertise across the country.



## Awards and Abroad Visits

Dr. Suresh Devaraj, Research Associate received SERB-International Travel Support to present his research titled “Mapping and assessing the spatial extent of floods using Sentinel 1 SAR Data-An approach based on Flood Index Estimation” in the European Geosciences Union (EGU) General Assembly 2023 held at the Austria Center Vienna (ACV) in Vienna, Austria from 23–28 April 2023.



Ms. Harshini, B.Tech. student, visited the University of Calgary, Canada as a research intern sponsored by DAAD under the MITACS Program. She carried out research on “Characterization of extreme flow for enhancing its prediction and forecasting” under Prof. Jianxun He. (Period: 01/05/2023 – 31/07/2023).



Ms. Chandni, a Research Scholar, visited Uppsala University, Sweden, to perform research activity under the collaborative project titled “Impacts of Recent El-Niño Southern Oscillation (ENSO) on the Water-Food-Energy Nexus in India”, sponsored by “The Swedish Research Council - Vetenskapsrådet, VR. (Period: 09/05/2023 - 31/07/2023).

Prof. KS Kasiviswanathan visited Uppsala University as a part of the Indo-Swedish research project. During the visit, a meeting was held with Prof. Claudia Teutschbein to discuss the progress of the research project. During the visit, he attended a two-day seminar on “Sustainability and resilience – Tackling consequences of climate and environmental changes” in Stockholm [24 - 25 May 2023].



Prof. KS Kasiviswanathan visited Kiel University [July 2023] and discussed the possibility of collaborating with Prof. Nicola Fohrer. Based on the discussion, a research proposal has been drafted and communicated for an exchange visit to carry out research on flood modeling. Additionally, a proposal has been submitted to organize a workshop in collaboration with Kiel University.

Abhinanda Roy presented her research work (Oral Presentation) at the 13th International Workshop on Statistical Hydrology (STAHY2023), hosted by Northeastern University in Boston, Massachusetts, USA, from 8 - 10 November 2023. Her work discussed a novel physics-aware machine learning-based modeling framework that reduces the prediction uncertainty in the hydrological models. She was awarded the prestigious Sivapalan Young Scientists Travel Award (SYSTA) funded by the International Association of Hydrological Sciences (IAHS). The opportunity to present her work on a prestigious international platform and interact with experts and peers in the domain have helped her improve her knowledge domain and establish networks for her long-term career.



## R&D Meetings Organized and Attended

On March 28<sup>th</sup>, 2023, an APEX meeting convened with THDC officials to review advancements in the project titled "Development of Decision Support System for Integrated Operation of Tehri Hydropower Complex," which is sponsored by Tehri Hydropower Development Corporation (THDC), India Ltd.

On August 18<sup>th</sup>, 2023, a meeting took place addressing the difficulties in implementing a Pumped Storage Plant and formulating policies. This discussion involved the Central Electricity Authority (CEA) under the Ministry of Power, Government of India, THDC officials, and IIT Roorkee experts.

On December 18<sup>th</sup>, 2023, an APEX meeting convened with THDC officials to review advancements in the project titled "Development of Decision Support System for

Integrated Operation of Tehri Hydropower Complex," which is sponsored by Tehri Hydropower Development Corporation (THDC), India Ltd.

On December 29<sup>th</sup>, 2023, a progress meeting regarding the Indo-Swedish collaborative project took place at Amrita Vishwa Vidyapeetham in Coimbatore, India. Subsequent to the meeting, an idea emerged, leading to the proposal for organizing a workshop at the Indian Institute of Technology Roorkee in June 2024 with possible support from IGSTE-DST.



## Distinguished Collaborator Visit and Activities

In April 2023, the team visited the ATAL Tunnel to gain insights about the construction of the tunnel, and safety measures adopted.

Details regarding the emergency exit, ventilation, and road safety measures are explained by the official in the ATAL tunnel and the need for IoT-enabled safety equipment in the tunnels is discussed.



In April 2023, as a part of a research project focusing on modeling snowmelt runoff, a field excursion was conducted along the Solang Valley. The primary objective was to ascertain the density of snow and gather ground truth data essential for mapping the snow's extent in the region. The field visit involved traversing the terrain of the Solang Valley to observe and document various aspects related to snow accumulation and distribution. This included measuring snow density at different locations and collecting empirical data to validate and refine the accuracy of snow extent mapping techniques.

In October 2023, a visit was conducted in and around Mandi City to assess the impact of cloud bursts and floods in the region that occurred in July-August 2023. Throughout the visit, meetings were held with various government officials from the Bhakra Beas Management Board, State Electricity Board, Primary Health Center, as well as local residents. Information was gathered regarding the areas affected by floods and the challenges encountered by the communities during these events.



### Visit to Sonny Fireworks

In December 2023, our research team visited Sonny Fireworks in Sivakasi to assess the safety protocols implemented within the factory and determine the necessity for IoT-enabled safety measures within the industry. Throughout the visit, discussions were held with management, technicians, and workers to gather real-time insights into their safety needs. Additionally, detailed information was collected regarding reported fire accidents in the Sivakasi fireworks industry.



## Internship Opportunities

During the summer 2023, Mr. Kotla Sai Charan, B Tech Student from IIT Patna was offered an internship to work in the lab on research concerning streamflow prediction using advanced machine learning models. He conducted an extensive review of pertinent literature and crafted foundational models. The collaborative efforts led to the integration of novel elements into the models, yielding outstanding outcomes. As a result, the work has garnered recognition as a promising research paper within the field.

During the sametime, Mr. Pradeep, M Tech student from NIT Surathkal was offered an internship which involved applying state of the art machine learning models for flood forecasting for the Himalayan River Bains. The models include Random Forest Regression (RFR), XGBoost (XGB), Long Short Term Memory (LSTM), and Gated Recurrent Unit (GRU).

## Outstanding Recognition of Students

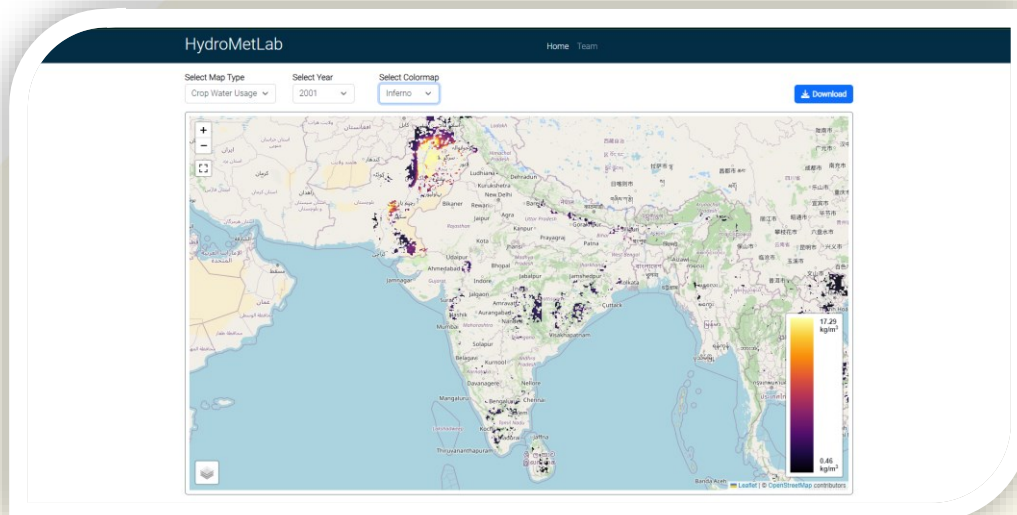
Ms. Sruthakeerthi P received the Best JAEI Research Paper Award 2023 by the Indian Society of Agricultural Engineers.

## Web-GIS based Decision Support Tool

The Web-GIS based decision support tool was developed to inform about the optimized crop calendars, irrigation water requirement, crop water productivity, and other best agricultural practices and adaptation techniques to cope with the erratic climate change and climatic variability conditions in the near future times.

The immediate benefits of the project outcome will improve crop productivity based on the DSSAT model's ability to synthesis the actual process reasonably. The long-term benefits will be to propose a crop calendar according to changes in the climate parameters and resilience of the crops, and adaptation of measures for improving the crop water productivity under the climate change.





## Group Activities

Visit to Uppsala University, Sweden as a part of Indo-Swedish Collaboration.



Visit to IUGG, Germany to present the research outcome.



Adieu to Mr. Wasu Manawko as he successfully submits his thesis and relocates to Ethiopia.



Celebrating the graduation of Master's Degree recipients [2021-23 batch].



## 2022 Highlights

- Nine research papers were published in peer-reviewed journals including Hydrological Sciences Journal, Stochastic Environmental Research and Risk Assessment, Groundwater for Sustainable Development, etc.
- Completion of the project entitled “Development of rainfall intensity duration frequency (IDF) curves over India under non-stationary climatic conditions - Early Career Research Award, SERB”.

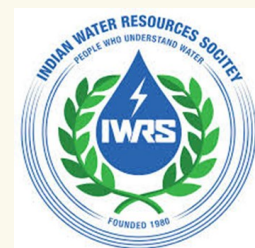


- Developed a “Web-based Rainfall Intensity Duration Frequency Curves” for India
- MoU signed between THDC and IIT Roorkee to initiate a research project on “Development of Decision Support System for Integrated Operation of Tehri Hydropower Complex”

## Acknowledgments



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## Contact Us

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URL: [https://www.iitr.ac.in/~WR/K\\_S\\_Kasiviswanathan](https://www.iitr.ac.in/~WR/K_S_Kasiviswanathan)

Report Edited by: Dr Suresh D, Postdoctoral Fellow, WRDM

Date of Release of Report: February 5, 2024

