

## Dr. Abhijith. G. R.

Assistant Professor

Department of Civil Engineering

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### PROFESSIONAL EXPERIENCE

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- **Assistant Professor:** Department of Civil Engineering, BITS Pilani Hyderabad Campus, Hyderabad, India (March 2023 – August 2023)
- **Post-Doctoral Researcher:** Faculty of Civil and Environmental Engineering, Technion – Israel Institute of Technology, Haifa, Israel (September 2020 – March 2023)
- **Pre-Post-Doctoral Researcher:** Department of Civil Engineering, Indian Institute of Technology Madras, Chennai, India (March 2020 – August 2020)

### PROFESSIONAL ACTIVITIES

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- **Life Member:** The Indian Society of Hydraulics (ISH) – From March 2024
- **Life Member:** Indian Water Works Association (IWWA) – From March 2024
- **Subject Expert Group Member:** Water Resources Management group, Unnat Bharat Abhiyan (Ministry of Education, GOI) – From February 2024
- **Lead Topic Editor:** Frontiers in Water Journal Special Collection: Artificial Intelligence Applications to Water Quality Modeling – From February 2024
- **Subject Expert Group Member:** Environment and Sustainable Resource Management group, Unnat Bharat Abhiyan (Ministry of Education, GOI) – From October 2023
- **Member:** Water Distribution Systems Analysis (WDSA) Committee, American Society of Civil Engineers (ASCE) – From May 2023
- **Guest Editor:** Water Journal Special Issue: Water Distribution System Quality Analysis and Control (February 2023 – February 2024)
- **Associate Editor:** Journal of Water Resources Planning and Management – From November 2022
- **Affiliated Member:** American Society of Civil Engineers (ASCE) – From November 2022

### EDUCATION

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- **Ph. D., Environmental Engineering:** Indian Institute of Technology Madras, Chennai, India (Graduated in 2020)
- **Master of Technology, Environmental Engineering:** Visvesvaraya National Institute of Technology, Nagpur, India (Graduated with **Gold Medal** in 2015)
- **Bachelor of Technology, Civil Engineering:** College of Engineering Trivandrum India under the University of Kerala, India (Graduated in 2013)

### SCHOLASTIC ACHIEVEMENTS

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- **Second Place in the Graduate Student Paper competition by the ASCE Environmental and Water Resources Institute:** Ivo D., Kadinski L., **Abhijith G. R.**,

Ostfeld A., and Cominola A. 2023. "A machine learning-based surrogate model for coupled hydraulic and water quality simulation in water distribution networks. EWRI Conference, Henderson Nevada, USA., May 21-24.

- Awarded the **Honors Fellowship** in 2022 for getting selected as an **Exceptional Post Doc student** from Faculty of Civil and Environmental Engineering of Technion – Israel Institute of Technology, Haifa, Israel.
- Awarded the **pre-post-Doctoral Fellowship** (for six months from March – August 2020) by the Indian Institute of Technology Madras for the academic/ research performance during Ph. D program.
- Selected as a **candidate from India** in attending the Government of Taiwan-sponsored international workshop on “Promoting Sustainable Protection and Restoration of Soil, Groundwater and Water Environment” at National Cheng Kung University (NCKU), Tainan City, Taiwan in January 2019.
- Awarded the **Institute medal** and **Shri Bhide Memorial Prize** for securing highest CGPA in M Tech Environmental Engineering from VNIT, Nagpur concluded in spring 2015.
- Received the **Purna Award-I** and **Academic Excellence Prize** for securing the first position in the order of merit in M Tech Environmental Engineering from VNIT, Nagpur concluded in spring 2015.
- Awarded the **Late. Prof. P. R. Bhawe Prize** for exhibiting the best performance in the subject “Environmental Systems Optimization” of M Tech 1<sup>st</sup> year Environmental Engineering program of VNIT Nagpur in the year 2013-14.

## RESEARCH INTERESTS

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- Monitoring and controlling water quality in drinking water supply systems.
- Developing advanced modelling tools for water distribution systems analysis.
- Managing water quality risks associated with intermittent water supply operation.
- Improving the reliability and equity of water supply in rural and urban settings.
- Developing cost-effective disinfection alternatives for drinking water.
- Designing water treatment technologies for natural organic matter removal.

## JOURNAL PUBLICATIONS

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22. **Abhijith, G. R.** and Mohan, S. 2024. Discussion of “Analysis of Intermittent Water Distribution Networks Using a Dummy Emitter Device at Each Demand Node”. ASCE Journal of Pipeline Systems Engineering and Practice, 15(3), 07024003.
21. **Abhijith, G. R.** and Ostfeld, A. 2024. Assessing uncertainties in mechanistic modeling of quality fluctuations in drinking water distribution systems. ASCE Journal of Environmental Engineering, 150(1), 04023091.
20. **Abhijith, G. R.**, Naidu, M. N., Boindala, S. P., Vasan, A., and Ostfeld, A. 2023. Analyzing the role of consumer behavior in coping with intermittent supply in water distribution systems. Journal of Hydroinformatics, 25(5), 1766–1787.
19. **Abhijith, G. R.**, Salomons, E., and Ostfeld, A. 2023. Developing a simplified practical approach for analyzing the criticality of isolation valves. ASCE Journal of Water Resources Planning and Management, 149(11), 06023005.
18. Ostfeld, A. and **Abhijith, G. R.** 2023. Digital Twin for Water Distribution Systems Management—Towards a Paradigm Shift. ASCE Journal of Pipeline Systems Engineering and Practice Forum, 14(3), 02523001.
17. Raimondi, A., Quinn, R., **Abhijith, G. R.**, Becciu, G., and Ostfeld, A. 2023. Rainwater Harvesting and Treatment: state of the art and perspectives. Water, SI Rainwater Harvesting and Treatment, 15(8), 1518.

16. **Abhijith, G. R.**, Salomons, E., and Ostfeld, A. 2022. Reliability of a Contamination-Detection Sensor Network in Water Distribution Systems during a Cyber-Physical Attack. *Water*, 14(22), 3669.
15. Price, E., **Abhijith, G. R.**, and Ostfeld, A. 2022. Pressure management in water distribution systems through PRVs optimal placement and settings. *Water Research*, 226, 119236.
14. **Abhijith, G. R.** and Ostfeld, A. 2022. Flexible decision-making framework for developing operation protocol for water distribution systems. *Journal of Environmental Management*, 320, 115817.
13. **Abhijith, G. R.** and Ostfeld, A. 2022. Contaminant Fate and Transport Modeling in Distribution Systems: EPANET-C. *Water*, 14(10), 1665.
12. **Abhijith, G. R.** and Ostfeld, A. 2022. Making Waves: Applying Systems Biology Principles in Water Distribution Systems Engineering. *Water Research*, 219, 118527.
11. **Abhijith, G. R.** and Ostfeld, A. 2022. Examining the longitudinal dispersion of solutes inside water distribution systems. *ASCE Journal of Water Resources Planning and Management*, 148(6), 04022022
10. Mohan, S. and **Abhijith, G. R.** 2021. Closure to “Hydraulic Analysis of Intermittent Water-Distribution Networks Considering Partial-Flow Regimes” by S. Mohan and G. R. Abhijith. *ASCE Journal of Water Resources Planning and Management*, 147(11), 07021019.
9. **Abhijith, G. R.** and Ostfeld, A. 2021. Model-based investigation of the formation, transmission, and health risk of perfluorooctanoic acid, a member of PFASs group, in drinking water distribution systems. *Water Research*, 204, 117626.
8. **Abhijith, G. R.** and Ostfeld, A. 2021. Modeling the response of non-chlorinated, chlorinated, and chloraminated water distribution systems towards arsenic contamination. *ASCE Journal of Environmental Engineering*, 147(10), 04021045.
7. **Abhijith, G. R.** and Ostfeld, A. 2021. Modeling the Formation and Propagation of 2,4,6-trichloroanisole, a Dominant Taste and Odor Compound, in Water Distribution Systems. *Water*, 13(5), 638.
6. **Abhijith, G. R.**, Kadinski, L., and Ostfeld, A. 2021. Modeling Bacterial Regrowth and Trihalomethane Formation in Water Distribution Systems. *Water*, 13(4), 463.
5. **Abhijith, G. R.** and Mohan, S. 2021. Cellular Automata-based Mechanistic Model for Analyzing Microbial Regrowth and Trihalomethanes Formation in Water Distribution Systems. *ASCE Journal of Environmental Engineering*, 147(1), 04020145.
4. Mohan, S. and **Abhijith, G. R.** 2020. Hydraulic Analysis of Intermittent Water Distribution Networks considering Partial Flow Regimes. *ASCE Journal of Water Resources Planning and Management*, 146(8), 04020071.
3. **Abhijith, G. R.** and Mohan, S. 2020. Random Walk Particle Tracking embedded Cellular Automata model for predicting temporospatial variations of chlorine in water distribution systems. *Environmental Processes*, 7(1), 271-296.
2. Mohan, S., **Abhijith, G. R.**, and Aneesh, B. 2018. Modeling chlorine response to uncontrolled contamination events in drinking water distribution systems. *Journal of Water Supply Research and Technology – AQUA*, 67(8), 834-845.
1. Gupta, R., **Abhijith, G. R.**, and Ormsbee, L. 2016. Leakage as Pressure-Driven Demand in Design of Water Distribution Networks. *ASCE Journal of Water Resources Planning and Management*, 142(6), 1-14.

## CONFERENCE PROCEEDINGS

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19. Balireddy, R., Chakravorty, A., Kuiry, S. N., **Abhijith, G. R.**, Ostfeld, A. 2024. Calculation of Water Age Using Electrical Simulators. *World Environmental and Water Resources Congress 2024*, Milwaukee, Wisconsin, May 19–22, 2024.
18. **Abhijith, G. R.**, Ivo, D., Cominola, A., and Ostfeld, A. 2023. Hybrid mechanistic and machine learning-based modeling approach for predicting quality fluctuations in drinking

- water distribution systems. 19th International Computing & Control for the Water Industry Conference, Leicester, UK., September 4-7.
17. **Abhijith, G. R.** and Ostfeld, A. 2023. Introducing EPyT-C: An independent Python-based water quality modeling extension for EPANET. 19th International Computing & Control for the Water Industry Conference, Leicester, UK., September 4-7.
  16. **Abhijith, G. R.**, Leonidou, N., Dräger, A., and Ostfeld, A. 2023. Exploring the cause-effects of quality fluctuations in drinking water distribution systems by applying systems biology approaches. 19th International Computing & Control for the Water Industry Conference, Leicester, UK., September 4-7.
  15. **Abhijith, G. R.** and Ostfeld, A. 2023. Redefined entropy index for water distribution systems analysis. 19th International Computing & Control for the Water Industry Conference, Leicester, UK., September 4-7.
  14. **Abhijith, G. R.**, Naidu, M. N., Boindala, S. P., Vasan, A., and Ostfeld, A. 2023. Exploring the consumer behaviour in water supply systems with uncertain and irregular intermittency. 19th International Computing & Control for the Water Industry Conference, Leicester, UK., September 4-7.
  13. **Abhijith, G.R.** and Ostfeld, A. 2023. Inferring the stochasticity associated with modeling the biological stability of drinking water within distribution networks. In: World Environmental and Water Resources Congress 2023: Adaptive Planning and Design in an Age of Risk and Uncertainty, Henderson Nevada, USA., May 21-24.
  12. **Abhijith, G. R.**, Salomons, E., and Ostfeld, A. 2023. Enhancing the reliability of a contamination detection sensors network in water distribution systems during a cyber-attack. In: World Environmental and Water Resources Congress 2023: Adaptive Planning and Design in an Age of Risk and Uncertainty, Henderson Nevada, USA., May 21-24.
  11. **Abhijith, G. R.**, Steffelbauer, D., and Ostfeld, A. 2023. Towards digital twins for emerging contaminants in water distribution systems. In: World Environmental and Water Resources Congress 2023: Adaptive Planning and Design in an Age of Risk and Uncertainty, Henderson Nevada, USA., May 21-24.
  10. Ivo, D., Kadinski, L., **Abhijith, G. R.**, Ostfeld, A., and Cominola, A. 2023. A machine learning-based surrogate model for coupled hydraulic and water quality simulation in water distribution networks. In: World Environmental and Water Resources Congress 2023: Adaptive Planning and Design in an Age of Risk and Uncertainty, Henderson Nevada, USA., May 21-24.
  9. Schuster, J., Kadinski, L., Hao, C., **Abhijith, G. R.**, Grieb, A., Pu, L., Ostfeld, A., and Ernst, M. 2022. Online monitoring and digital control in drinking water distribution systems. In: German Israeli Cooperation in Water Technology Research Status Seminar, Ashdod, Israel, October 25-27.
  8. Kadinski, L., Schuster, J., **Abhijith, G. R.**, Hao, C., Grieb, A., Pu, L., Ernst, M., and Ostfeld, A. 2022. Machine learning methodologies to predict possible water quality anomalies as a support tool for online monitoring of organic parameters. WDSA/CCWI Joint Conference, Valencia, Spain, July 18-22.
  7. **Abhijith, G. R.** and Ostfeld, A. 2022. Appraisal of the Position of Water Distribution Systems as a PFAS Exposure Pathway. In: World Environmental and Water Resources Congress 2022, Atlanta, GA, USA.
  6. **Abhijith, G. R.** and Ostfeld, A. 2022. EPANET-C—An Umbrella Simulation Tool for Water Distribution System Quality Analysis. In: World Environmental and Water Resources Congress 2022, Atlanta, GA, USA.
  5. Kadinski, L., Schuster, J., **Abhijith, G. R.**, Hao, C., Grieb, A., Pu, L., Ernst, M., and Ostfeld, A. 2022. Establishing an Experimental and Simulation Interface for Online Monitoring and Modeling of Bacterial Growth in Water Distribution Systems. In: World Environmental and Water Resources Congress 2022, Atlanta, GA, USA.

4. Hao, C., Schuster, J., Kadinski, L., **Abhijith, G. R.**, Grieb, A., Ernst, M., Ostfeld, A., and Pu, L. 2022. Optimal control of chlorine concentration in water distribution system. In: World Environmental and Water Resources Congress 2022, Atlanta, GA, USA.
3. Schuster, J., Kadinski, L., Hao, C., **Abhijith, G. R.**, Grieb, A., Pu, L., Ostfeld, A., and Ernst, M. 2022. Real-time monitoring and controlling of water quality in water distribution networks based on flow cytometry and fluorescence spectroscopy. In: World Environmental and Water Resources Congress 2022, Atlanta, GA, USA.
2. Mohan, S. and **Abhijith, G. R.** 2019. Modelling the effects of intermittent water supply on quality deterioration in terms of disinfection by-products formation. In: 11th World Congress on Water Resources and Environment, Madrid, Spain.
1. Gupta, R., **Abhijith, G. R.**, and Ormsbee, L. 2015. Including Leakage as Pressure Driven Demands in Optimal Design of Water Distribution Networks. In: Water Resources Management in a Changing World: Challenges and opportunities. Istanbul, Turkey.

### **CONFERENCE PRESENTATIONS (WITH ABSTRACT ONLY)**

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4. **Abhijith G. R.** and Ostfeld A. 2022. Post-treatment PFAS contamination of drinking water. WDSA/CCWI22 WDSA/CCWI Joint Conference, Valencia, 18-22 July 2022 Spain.
3. Mohan, S. and **Abhijith, G. R.** 2019. Microbial Regrowth Dynamics in Intermittent Water Supply systems – A Modeling Investigation. In: Water and Development Congress and Exhibition, Colombo, Sri Lanka.
2. **Abhijith. G. R.** and Mohan, S. 2018. An Innovative Protocol for Chlorine Sensors to monitor the Biological Quality of Drinking Water Distribution Systems. In: Sustainable Technologies for Intelligent Water Management, Roorkee, India.
1. **Abhijith, G. R.**, Aneesh, B., and Mohan, S. 2016. Modeling Microbial Contaminant Transport in Water Distribution Systems. In: National Conf. on Energy and Environment. Coimbatore, India.

### **SUBMITTED PAPERS TO JOURNALS**

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3. Zeidan, M., Nemeth, M., **Abhijith, G. R.**, Weber, R., and Ostfeld, A. Insights into transient flow dynamics in tesla valve configurations through computational fluid dynamics simulations. In: ASCE Journal of Hydraulic Engineering (**Under Review**).
2. Tariq, H., Zvulonov, Y., Gates, T. K., Evett, S. R., Chi, J., VanderRoest, J. P., Kinnebrew, E., Radian, A., **Abhijith, G. R.**, Mueller, N. D., Ostfeld, A., Fang, L., and Borch, T. Advancing Sustainable Water Use in Agriculture through a Multifaceted Technological, Management, and Social Approach. In: Nature Water (**Under Review**).
1. **Abhijith, G. R.**, Jaykrishnan, G., and Ostfeld, A. EPyT-C: A Python package for water quality modeling in water distribution systems. In: Journal of Open Source Software (**Under Review**).

### **SEMINARS, WORKSHOPS AND COLLOQUIUMS**

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- Delivered a guest Lecture on "Artificial Intelligence in Environmental Engineering: trends and Perspectives", in the Faculty Development Program, Department of Civil Engineering, VIT Vellore on 08 December 2023.
- Delivered a guest Lecture on "Purification of drinking water on a large scale", in the Suchitra Academy International School, Hyderabad on 19 April 2023.
- Participated and presented a paper on "An Investigation on to the Effects of Intermittent Supply Operation on Urban Water Quality", in the International Water Association supported International Conference on "Industrial water, energy and Environment" from 25 - 26 January 2019, organized by CODISSIA, Coimbatore, India.

- Participated as a **selected candidate from India** in the International workshop on “Promoting Sustainable Protection and Restoration of Soil, Groundwater and Water Environment” from January 13 to 20, 2019 at National Cheng Kung University (NCKU), Tainan City, Taiwan.
- Participated and presented a paper on “Increasing the Operational Reliability of Intermittent Drinking Water Distribution Systems through Intelligent Source Point Management”, in the National Conference on “Sustainable Technologies for Intelligent Water and Environmental Management” 22 - 23 March, 2018, organized by Annamalai University, India.
- Participated and presented a paper on “An Innovative Protocol for Chlorine Sensors to monitor the Biological Quality of Drinking Water Distribution Systems”, in the International Conference on “Sustainable Technologies for Intelligent Water Management” 16 - 19 February 2018, organized by IIT Roorkee, India.
- Participated in the ‘Training Program on Flood Inundation Modelling and Water quality prediction Modelling for Chennai, India’ organized by United Nations University – institute for the Advanced Studies of Sustainability, Tokyo and IIT Madras, Chennai on 6-8 December 2017.
- Participated and delivered an expert talk in “Research Colloquium on Environmental and Water Resources Engineering” November 2017, organized by Department of Civil Engineering, NIT Calicut, Calicut, India.
- Attended the National Workshop on “Water and Wastewater- Sustainable Management.” 27-28 March, 2017, organized by CSIR-NEERI, Nagpur and CSIR-NEERI, Chennai, Tamil Nādu, India.
- Participated in the National Workshop on “Water Resources System Modeling.” 9-10 March, 2017, organized by the Centre for Water Resources, Anna University, Chennai, Tamil Nādu, India.
- Participated and delivered an expert talk in “Research Colloquium on Environmental and Water Resources Engineering” 22 October 2016, organized under TEQIP-II by Department of Civil Engineering, Rajiv Gandhi Institute of Technology, Kottayam, Kerala, India.
- Attended Workshop on “Environmental Systems Modeling.” 8-10 January 2015, organized under TEQIP-II by Visvesvaraya National Institute of Technology, Nagpur.

## **TECHNICAL EXPERIENCES**

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- German Israeli collaborative project (MoDiCon) aiming to develop technologies for digital monitoring and control of water quality in water distribution systems from September 2020.
- UNDP supported project on “National Inventory of Mercury releases in India” from November 2018 to August 2020.
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) supported project on the setting up of 3.5 MLD Capacity Common Wastewater Treatment Plant at Patparganj Industrial Area of Delhi from July 2018 to February 2019.
- Technical feasibility study of constructing a ‘Dedicated water supply scheme for Madurai corporation from the Lower Camp of Mullaiperiyar river’ from September 2018.
- Feasibility study of ‘Disposal of textile waste salt in the hazardous waste management facility of TamilNadu Waste Management Ltd., Gummidipoondi, India’ from April 2018 to August 2020.
- Gap analysis and Environmental audit of the altered effluent discharge system of Daimler India Commercial Vehicles Pvt. Ltd., Oragadam, India from April 2018 to July 2018.
- Environmental auditing at Sterling Biotech Limited, Ooty, India from February 2018 to March 2018.

- Designing a new water distribution system for the campus of Visvesvaraya National Institute of Technology, Nagpur, India from October 2014 to January 2015.

## STUDENTS

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- #**Ms. Raghad Shamaly** (from July 2023): M. Sc, Primary advisor - Prof. Avi Ostfeld (Technion Israel Institute of Technology, Haifa, Israel)
- **Mr. Vikas Singh Narwariya** (from November 2023): M. Tech.
- **Ms. Upasna** (from December 2023): Ph.D.

# Co-advisor

## PERSONAL INFORMATION

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- Date of Birth 20<sup>th</sup> May 1992
- Marital status Married (**Renju S Francis**) with a daughter (**Jala R Abhijith**)
- Permanent address Chandramangalathu Puthen Veedu, Assemblimukku, Kudavoor PO, Trivandrum - 695 313, Kerala, India.
- Office address Room 302A, Western Lab Extension (WLE), IIT Kanpur, Kalyanpur, Kanpur – 208016, UP, India.