Sriman Pankaj Boindala, PhD

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SUMMARY

"Postdoctoral researcher with a Ph.D. from Technion, focused on Water distribution systems, water quality modeling and optimization and decision making under uncertainty"

EDUCATION

- **Ph.D. Civil and Environmental Engineering**, Technion-Israel Institute of Technology, Haifa, Israel (**2020**–**2023**).
  Thesis: Uncertainty Inclusion in Design-Optimization of Multi-Quality Water Distribution Systems
- **M.Eng. Structural Engineering**, Birla Institute of Technology and Science, Pilani, India (**2017–2019**).
  Thesis: Investigation of Crushed Concrete Aggregates as a Replacement for Natural Aggregates
- **B.Eng. Civil Engineering**, Birla Institute of Technology and Science, Pilani, India (**2013–2017**).
  Thesis: Understanding and Diagnosing Differences in Hydrological Model Structures

AWARDS

- **Alexander Von Humboldt Research Fellowship, 2025** -Alexander von Humboldt Foundation, Germany
- **Best Reviewer Award**, **2024** Journal of Water Resource Planning and Management
  (*Awarded at ASCE-EWRI Conference 2025)
- **Marie Skłodowska-Curie Actions – Seal of Excellence**, European Commission (**2024**)
  Awarded to top-ranked proposals in the MSCA Individual Postdoctoral Fellowship program
- **Best Paper Award**, **2021** First International Conference on Recent Advancements in Civil Engineering (ICRACE **2021**), NIT Silchar
- **Full Tuition Fee Waiver and Ph.D. Scholarship**, Technion-Israel Institute of Technology (**2020**–**2023**)
- **Best Oral Presentation Award**, 2018 National Symposium on Emerging Environmental Challenges (EEC 2018), CSIR-NEERI, Hyderabad Zonal Centre and BITS Pilani Hyderabad Campus

SKILLS

Technical Proficiency:

- **Tools:** AutoCAD, ArcGIS, EPANET, LINGO, GUROBI
- **Software:** Microsoft Word, Excel, PowerPoint
- **Programming:** Python, R, MATLAB

PROFESSIONAL SERVICE AND MEMBERSHIP

Membership

- Affiliate Member, American Society of Civil Engineers (ASCE)

Editorial Roles

- Associate Editor, *Journal of Water Resource Planning and Management*, ASCE
- Lead Guest Editor, Special Collection on Machine Learning and Artificial Intelligence in Water Distribution Systems *Journal of Water Resource Planning and Management*, ASCE
- Co-Guest Editor, Special Issue on Optimisation of Water Distribution System Design and Operation Under Uncertainty *Water Journal*, MDPI

Peer Review

- **Journals:** *Journal of Water Resources Planning and Management* (ASCE), *Water Resource Management* (Springer), *Structural and Multidisciplinary Optimization* (Springer), *Materials Today: Proceedings* (Elsevier), *Water* (MDPI), *Applied Sciences* (MDPI), *Mathematics* (MDPI), *Urban Water Journal* (Taylor & Francis), *Water Supply* (IWA), *Hydroinformatics* (IWA)
- **Conferences:** ASCE EWRI Conference (**2022**, **2023**, **2026**)

Activities

- **Chair**, Task Committee on Generative AI in Publishing – EWRI, ASCE
  Leading the formulation of best practices and ethical guidelines for the integration of generative AI in ASCE-JWRPM Publications.
- **Co-Chair**, Task Committee on Benchmarking Optimal Operation of Water Distribution Systems – EWRI, ASCE
  Coordinating the compilation of a standardized benchmark database for optimal operational strategies in water distribution systems to support reproducible research and future advancements in the field.

EMPLOYMENT HISTORY

2025 Postdoctoral Researcher, Technion-Israel Institute of Technology

- *Project: Israel-Germany Joint Research Grant - "StaySafe: Intermittent Agricultural Irrigation"*
- Collaborating with faculty from TU-Munich and Technion to develop numerical models for antimicrobial resistance gene (ARG) transfer in reclaimed wastewater storage for irrigation systems.

2024 Postdoctoral Researcher, KIOS Research and Innovation Center of Excellence

- *Project: ERC Synergy Grant Water-Futures*
- Collaborating with KIOS, KWR Water Research Institute, Athens University, and Bielefeld University to develop optimal booster chlorination schedules for fair water distribution in water distribution systems (WDS).

2019 Project Associate, Indian Institute of Technology (IIT), Madras

- *Project 1: Conditional Assessment of Railway Bridges* - Conducted bridge inspections and structural integrity assessments, contributing to infrastructure maintenance strategies.
- *Project 2: Solar Shading Techniques for Passive Cooling* - Evaluated shading techniques for energy-efficient building cooling using EnergyPlus, providing recommendations for optimal passive cooling solutions.

RESEARCH EXPERIENCE

Current Research Activities

Israel-Germany Joint Research Grant - "Stay Safe for Intermittent Agricultural Irrigation"
Full-time Researcher
Focus: Water Quality Modeling - Bacterial Growth in Storage and Distribution

- Studying bacterial regrowth and antimicrobial resistance gene transfer in bulk water and biofilms.
- Developing numerical approximations to understand the fate of antimicrobial resistance genes in storage systems for recycled wastewater in irrigation.
- Scheduled to present at 21st CCWI conference in Sheffield, UK

ERC-Synergy Grant Water Futures Project – KIOS Research Team
Part-time Researcher
Focus: Fairness in Water Distribution Systems

- Collaborating with experts, including Prof. Dragan Savic, Prof. Marios Polycarpou, Prof. Phoebe Koundouri, and Prof. Barbara Hammer.
- Developing a framework for integrating fairness in the optimal operation of water distribution systems.
- Presented findings at EWRI 2025 and have submitted an article to *Water Resource Management*.

Collaboration with INRS Canada and Technion
Self-initiated Collaboration
Focus: Optimal Water Quality Management Considering Incomplete Mixing at Cross-Junctions

- Collaborating with Prof. Avi Ostfeld and Prof. Sophie Duchesne.
- Designing an optimal booster disinfection scheduling framework to balance disinfectant levels at demand nodes.
- Enhanced water quality models to account for incomplete mixing at cross-junctions (EPANET-IMX), improving prediction accuracy.
- Presented preliminary results at CCWI-WDSA **2024** and EWRI **2024**; journal publication in preparation.

Collaboration with IIT Kanpur, Technion, and KSCSTE-CWRDM Kerala
Self-initiated Collaboration
Focus: Optimal Operation of Intermittent Water Supply Systems Considering Consumer Behavior

- Collaborating with Prof. Avi Ostfeld, Prof. GR Abhijith, and Scientist K. Ihjas.
- Developing an optimization framework for pump scheduling to improve equitable demand distribution in intermittent water supply systems.
- Applied this methodology to a case study in Kerala, India.
- Presented findings at CCWI-WDSA; journal publication in progress.

Ph.D. Research - Technion-Israel Institute of Technology

Uncertainty Inclusion in Design-Optimization of Multi-Quality Water Distribution Systems (WDS)

- Developed computational techniques to optimize water distribution systems under real-world uncertainties, enhancing hydraulic performance and resilience.
- Applied Evolutionary Algorithms and MILP in MATLAB to optimize large-scale WDS, focusing on pressure management, reliability maximization, and cost minimization under uncertainty.
- Investigated hydraulic behavior under demand variability, solute mixing, and disinfectant decay, contributing to more efficient and secure water delivery systems.
- Implemented an Incomplete Mixing Model at cross junctions for enhanced water quality modeling in multi-quality WDS.
- Published research in leading journals and presented at international conferences.
- Acquired expertise in Robust Optimization and Info-Gap Decision Theory for improved decision-making in hydraulic infrastructure design.

M.Eng Research - BITS Pilani, Hyderabad Campus

Optimization of Water Distribution Systems and Water Resource Management

- Developed a self-adaptive evolutionary algorithm for optimizing non-convex problems to near-global optimum solutions.
- Applied a simulation-optimization framework combining EPANET, MATLAB, and optimization tools for WDS design.

- Created optimization algorithms for multi-purpose reservoir management to enhance hydropower, water supply, and irrigation.
- Led a project for a water distribution system in Pamapur, Telangana, using a self-adaptive Cuckoo Search Algorithm, improving system efficiency and resilience.

Professional Skills:

- ***Computational Hydraulics and Water Distribution Systems Analysis:*** Expertise in modeling and optimizing water distribution systems, with a focus on efficiency and resilience.
- ***Multi-disciplinary Research:*** Strong capability to integrate water resource engineering with advanced computational techniques for holistic problem-solving.
- ***Independent and Collaborative Research:*** Proven ability to lead independent research initiatives and collaborate effectively within interdisciplinary teams.
- ***Effective Communication:*** Skilled at presenting complex concepts in a clear and concise manner, promoting effective teamwork and knowledge sharing.

PUBLICATIONS

JOURNAL PUBLICATIONS

1. **Boindala, S. P.**, Vrachimis, S. G., Eliades, D. G., & Polycarpou, M. (2025). Fairness in the distribution of water quality in drinking water supply systems. *Water Resource Management*. (Manuscript submitted for publication). **Journal Rank: Q1**, **Indexing: SCIE**.
2. Salfety, O., Sarne, O., **Boindala, S. P.**, Abhijith, G. R., & Ostfeld, A. (2025). A Cell Model for Pollutant Transport Quantification in Rainfall–Runoff Watershed Events. *Water*, 17(11), 1693. **Journal Rank: Q2**, **Indexing: SCIE**.
3. **Boindala, S. P.**, Jaykrishnan, G., & Ostfeld, A. (**2025**). Booster Disinfection Scheduling under Uncertainty in Water Distribution Systems: Approximate Robust Reformulation Approach. *Journal of Water Resources Planning and Management*. **Journal Rank: Q1**, **Indexing: SCIE**.
4. **Sriman Pankaj, B.**, Vasan, A., & Jabez Christopher, J. (**2024**). Bio-inspired mix design optimization of self-compacting concrete using machine learning algorithms. *International Journal of Mathematical Modelling and Numerical Optimisation*. Article in Press. **Journal Rank: Q4**, **Indexing: Scopus**.
5. Abhijith, G. R., Naidu, M. N., **Boindala, S. P.**, Vasan, A., & 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. Publisher: IWA Publishing. **Journal Rank: Q2**, **Indexing: Scopus, SCIE**.
6. Chundi, V., Raju, S., **Boindala, S. P.**, & Swain, S. S. (**2023**). A Non-Destructive Pavement Evaluation for the Development of a Multi Distress Regression Model Integrated with the BACKCSA Model. *International Journal of Pavement Research and Technology*, 16(4), 873–887. Publisher: Springer. **Journal Rank: Q3**, **Indexing: Scopus, Emerging SCI**.
7. **Boindala, S. P**., Jaykrishnan, G., & Ostfeld, A. (**2023**). Robust Optimal Booster Disinfectant Injection in Water Systems under Uncertainty. *Water*, 15(9), 1777. Publisher: MDPI. **Journal Rank: Q2**, **Indexing: Scopus, SCIE**.
8. Vogeti, R. K., **Boindala, S. P.**, Kumar, D. N., & Raju, K. S. (**2022**). Streamflow forecasting in a climate change perspective using E-FUSE. *Journal of Water and Climate Change*, 13(11), 3934–3950. Publisher: IWA Publishing. **Journal Rank: Q2**, **Indexing: Scopus, SCIE**.
9. **Pankaj, B. S.**, Jaykrishnan, G., & Ostfeld, A. (**2022**). Optimizing water quality treatment levels for water distribution systems under mixing uncertainty at junctions. *Journal of Water Resources Planning and Management*, 148(5), 04022013. Publisher: American Society of Civil Engineers. **Journal Rank: Q1**, **Indexing: Scopus, SCIE**.

10. **Boindala, S. P.**, & Ostfeld, A. (**2022**). Robust Multi-Objective Design Optimization of Water Distribution System under Uncertainty. *Water*, 14(14), 2199. Publisher: MDPI. **Journal Rank: Q2**, **Indexing: Scopus, SCIE**.

11. Vasan, A., Srinivasa Raju, K., & **Sriman Pankaj, B.** (**2022**). Fuzzy optimization-based water distribution network design using self-adaptive cuckoo search algorithm. *Water Supply*, 22(3), 3178–3194. Publisher: IWA Publishing. **Journal Rank: Q2**, **Indexing: Scopus, SCIE**.

12. **Pankaj, B. S.**, Naidu, M. N., Vasan, A., & Varma, M. R. R. (**2020**). Self-adaptive cuckoo search algorithm for optimal design of water distribution systems. *Water Resources Management*, 34(10), 3129–3146. Publisher: Springer Netherlands Dordrecht. **Journal Rank: Q1**, **Indexing: Scopus, SCIE**.

13. Raychoudhury, T., **Boindala, S. P**., & Kalidindi, S. (2017). Performance evaluation of metal impregnated activated carbon composite for removal of fluoride under varying solution chemistry. *Water Science and Technology: Water Supply*, 17(5), 1377–1385. Publisher: IWA Publishing. **Journal Rank: Q2**, **Indexing: Scopus, SCIE**.

14. **Pankaj, B. S.**, & Anmala, J. (2019). Investigation of latest techniques in carbon sequestration with emphasis on geological sequestration and its effects. *MOJ Eco Environ Sci*, 4(1), 7–12. **Journal Rank: NA**, **Indexing: NA**.

CONFERENCE PROCEEDINGS

1. **Boindala, S. P.**, Vrachimis, S. G., Eliades, D. G., & Polycarpou, M. (2025). Optimal Chlorine Dosage Scheduling in Drinking Water Distribution Systems Considering Fairness Objectives. *Proceedings of the World Environmental and Water Resources Congress 2025*, 987–1000. **Indexed in Scopus.**.

2. **Boindala, S. P.**, Perelman, G., & Ostfeld, A. (2025). Robust Sample Average Approximation for Optimal Chlorine Disinfection under Multiple Uncertainties. *Proceedings of the World Environmental and Water Resources Congress 2025*, 1001–1009. **Indexed in Scopus.S**

3. **Boindala, Sriman Pankaj**, Yousefian, Reza, Duchesne, Sophie, Ostfeld, Avi. *Robust Booster Disinfection Scheduling Using Incomplete Mixing Water Quality Model (EPANET-IMX)*. In: *World Environmental and Water Resources Congress **2024***, **2024**, pp. 1367–1379. **Indexed in Scopus.**

4. **Boindala, Sriman Pankaj**, Abhijith, Gopinathan R, Ihjas, K, Ostfeld, Avi. *Towards Optimal Scheduling of Intermittent Water Supply Systems Incorporating Consumer Behavior*. *Engineering Proceedings*, **2024**, Volume 69, Number 1, pp. 168. **Indexed in Scopus.**

5. Vizanko, Brent, Shmaya, Tomer, **Boindala, Sriman Pankaj**, Ostfeld, Avi, Berglund, Emily. *Operating Water Distribution Systems for Equitable Access to Clean Water*. In: *World Environmental and Water Resources Congress **2024***, **2024**, pp. 1229–1235. **Indexed in Scopus.**

6. **Boindala, Sriman Pankaj**, Jaykrishnan, G, Ostfeld, Avi. *Optimal Booster Chlorination Scheduling in WDS under Uncertainty: A Robust Counterpart Approach*. In: *World Environmental and Water Resources Congress **2023***, **2023**, pp. 952–962. **Indexed in Scopus.**

7. **Pankaj Boindala, Sriman**, Jaykrishnan, G, Ostfeld, Avi. *Robust Multi-Objective Optimization of Water Distribution Systems*. In: *World Environmental and Water Resources Congress **2022***, **2022**, pp. 1066–1075. **Indexed in Scopus.**

8. **Pankaj Boindala, Sriman**, Jaykrishnan, G, Ostfeld, Avi. *Source Treatment Level Optimization in Water Distribution Networks Considering Mixing Uncertainty at Cross Junctions: A Robust Counterpart Approach*. In: *World Environmental and Water Resources Congress **2022***, **2022**, pp. 1085–1095. **Indexed in Scopus.**

9. **Boindala, Sriman Pankaj**, Ramagiri, Kruthi Kiran, Kar, Arkamitra. *Investigation of Crushed Concrete Aggregates as a Replacement for Natural Aggregates in AAB Concrete*. In: *Recent Trends in Civil Engineering: Select Proceedings of ICRACE **2021***, **2022**, pp. 55–63. **Indexed in Scopus.**

10. Kar, Arkamitra, Ramagiri, Kruthi Kiran, **Boindala, Sriman Pankaj**, Ray, Indrajit, Halabe, Udaya B, Unnikrishnan, Avinash. *Investigations on Chemical, Mechanical, and Long-Term Characteristics of Alkali-Activated Concrete*. In: *Advances in Sustainable Materials and Resilient Infrastructure*, **2022**, pp. 133–144. **Indexed in Scopus.**

11. Ramagiri, Kruthi Kiran, **Boindala, Sriman Pankaj**, Zaid, Md, Kar, Arkamitra. *Random forest-based algorithms for prediction of compressive strength of ambient-cured AAB concrete—a comparison study*. In: *International Conference on Structural Engineering and Construction Management*, **2021**, pp. 717–725. **Indexed in Scopus.**

12. **Boindala, Sriman Pankaj**, Arunachalam, Vasan. *Concrete mix design optimization using a multi-objective cuckoo search algorithm*. In: *Soft Computing: Theories and Applications: Proceedings of SoCTA 2018*, **2020**, pp. 119–126. **Indexed in Scopus.**

13. **Boindala, Sriman Pankaj**, Ramagiri, Kruthi Kiran, Alex, Anju, Kar, Arkamitra. *Step-Wise Multiple Linear Regression Model Development for Shrinkage Strain Prediction of Alkali Activated Binder Concrete*. In: *Proceedings of SECON'19: Structural Engineering and Construction Management 3*, **2020**, pp. 91–98. **Indexed in Scopus.**

14. Naveen Naidu, Maduukuri, **Boindala, Pankaj Sriman**, Vasan, A, Varma, Murari RR. *Optimization of water distribution networks using cuckoo search algorithm*. In: *Advanced Engineering Optimization Through Intelligent Techniques: Select Proceedings of AEOTIT 2018*, **2020**, pp. 67–74. **Indexed in Scopus.**

CONFERENCE ACTIVITY

- **2025**: ASCE-EWRI World Water and Water Resources Congress, Anchorage, Alaska, USA
- **2023**: 19th Computing and Control for the Water Industry Conference, Leicester, UK
- **2022**: 2nd International Joint Conference on WDSA/CCWI, Valencia, Spain
- **2021**: ICRACE, NIT Silchar, India
- **2018**: SCOTA 2018, NIT Jalandhar, India
- **2018**: EEC 2018, BITS Pilani Hyderabad, India

REFERENCES

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