ILLINOIS Water Environment Association

Enhancing the Illinois Water Environment through Education and Collaboration.

IWS Challenge 2024

Guidance for Solution Submission

The IWS Challenge by IWS Committee/IWEA

An Opportunity for High School, Undergraduate, and Graduate Students

Whether you call it digital water, smart water, intelligent water, digital twins, or smart infrastructure, the water industry is progressing towards the digital utility of the future, and the way we do business will change as well. Applying advanced data and analytics solutions through machine learning (ML) and artificial intelligence (AI) to make more informed decisions is emerging across water, wastewater, and stormwater industries. Today's water industry operates complex treatment, collection, and distribution systems to protect public and ecological health. These systems are increasingly instrumented to monitor key process indicators and other parameters to facilitate operations.

The 3rd Annual IWEA Intelligent Water Systems (IWS) Challenge will be hosted in conjunction with the 2024 IWPC Conference (March 18-20, 2024). The purpose of the challenge is to encourage high school and college students (both undergraduate and graduate) to develop solutions for real-world environmental problems with the use of advanced data analytics via artificial intelligence and machine learning (AI/ML). The goal of this challenge is to promote the use of advanced tools and predictive analytics for common problems in the water and environmental sector.

Solution Goals:

- Demonstrate the value of intelligent water systems
- Leverage the best available tools to better understand data and make decisions.

Finalists will be invited to present their solution at the 2024 Illinois Wastewater Professionals Conference (IWPC) conference. The Challenge will recognize the best solutions developed by Challenge participants, offering a top prize of $1,300, second price of $800, and third prize of $400.

Teams will work to address individual challenges through innovative analytics applied to data from the water and environmental system (e.g., data from utilities and/or university research project(s)).

Eligibility

Developing a relationship and collaborating with high school/university students is essential as new technologies are evolving and aging workforces are retiring. As such, the competition will be geared toward students. As workforces become more technologically advanced, so will the water and environmental utilities. By introducing IWS to younger generations, the water and environmental sectors can benefit from IT savvy students while exposing them to both the widely-adopted and cutting-edge technologies as well as best practices of IWS applications.

Teams must contain between 1 and 6 participants. All members must be high school or college students (undergraduate and/or graduate) at the time of registration. Each team shall include at least one member who meets either of the following criteria:

(a) Student from Illinois, but attending university in another state,
(b) Student attending a high school/university in Illinois.

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2024 Challenge Timeline

Friday, September 15, 2023	Challenge Launch
Friday, October 27, 2023	Team Registration Deadline
Friday, December 1, 2023	Challenge Plan Deadline
Friday, February 9, 2024	Challenge Solution Deadline
Friday, February 23, 2024	Finalists notified
Monday, March 18, 2024	Finalist presentations and awards ceremony at IWPC 2024

Requirements

Individuals without a team may register separately and join a team prior to the Team Registration deadline.

Links for registration, challenge plan upload, and challenge solution upload can be found here:

IWS Challenge

Each team will have one identified Team Lead. The Team Lead will be in charge of registering all the team members (contact information is required) by 11:59 PM CST on the associated deadline using the registration link. If an individual is on multiple teams, they must disclose to all teams their participation and role in each team for transparency and clarify participation expectations.

Submission of Challenge Plan will be accomplished via the IWEA online platform by 11:59 PM CST on the associated deadline. No additions or modifications to the submitted materials will be accepted after the deadline.

Submission of Challenge Solution will be accomplished via the IWEA online platform by 11:59 PM CST on the associated deadline. No additions or modifications to the submitted materials will be accepted after the deadline.

We welcome students to participate in this event as part of an existing course or graduate project. If previous work has been done on the proposed problem, teams must clearly articulate the existing work and the intended scope of work to be done under this Challenge period in the Challenge Plan.

If a proprietary technology or software is part of the Challenge Solution, teams must indicate in the submission materials and request signed non-disclosure agreement (NDA) forms from steering committee members and judges. The Challenge is not responsible for managing intellectual property rights.

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Challenge Plan Submission

Each team should submit a Challenge Plan that will be provided to the Steering Committee and judges. The Challenge Plan must be submitted via IWEA's online platform by 11:59 PM CST on the associated deadline.

The team can select a topic from sample topics provided in this document or use its own topic to participate (e.g., your course project or graduate project).

The Challenge Plan must include, but is not limited to:

Title

Team Members

- Identify the Team Lead, who will serve as the primary point of contact for the Challenge
- For each team member, include name, major/department, school, email, and skill set/area of expertise
- Describe each team member's role and responsibilities

Problem Background and Objective

- Describe problem to be solved
- Describe any work carried out prior to the challenge, if any
- Clearly state the objective (desired outcome) of the challenge

Methods

- Describe the data to be used
- Describe method(s) to be used and explain why it(they) was(were) selected
- Describe metrics to be used to evaluate performance
- Provide a realistic timeline and approach for achieving the intended solution

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Challenge Solution Submission

Each team should submit a Challenge Solution that will be provided to the Steering Committee and judges. The Challenge Solution must be submitted via IWEA's online platform by 11:59 PM CST on the associated deadline.

The Challenge Solution must include, but is not limited to:

Title

Team

- For each team member, include name, major/department, school, email, and skill set/area of expertise
- Description of each team member's role and responsibilities
- Identify if any changes to the team have occurred during the duration of the Challenge

Problem Background and Objective

- Describe problem to be solved and work carried out prior to the challenge
- Clearly state the objective of the challenge

Methods

- Describe the data used (source, parameters, frequency)
- Provide name of software(s) used
- Describe QA/QC and data preprocessing
- Describe method(s) used and explain why it(they) was(were) selected
- Describe metrics used to evaluate performance
- Clearly state all assumptions made
- Provide a realistic timeline and approach for achieving the intended solution

Results and Discussion

- Show and interpret/discuss results
- Discuss the advantages and disadvantages of the proposed solution
- Description of any difficulties faced and how the team mitigated them
- Considerations of replication by others to address a similar problem
- Outline financial support needs, if any

Implementation/Next Steps

- Explain how the results will be communicated and used by the utility, university, or other organization(s)
- Discuss next steps for the solution beyond the Challenge

Disclosures

- Disclose name of mentor(s) in the professional or academic field, if any was consulted
- Disclose financial support received, if any

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Judging Criteria

The following criteria will be used by the judges to evaluate materials submitted by teams.

TEAM NAME				
JUDGE NAME				
SCORE				OUT OF 100
	Raw (0-5)	Weight	Score	
Team				
1. Teams include necessary skills to solve the problem		1		out of 5
Problem Background				
2. Describe problem to be solved and work carried out prior to the challenge		2		out of 10
Objective				
3. Clearly state the objective of the challenge to be solved using data analytics		1		out of 5
Methods				
4. Describe the data used		1		out of 5
5. Describe QA/QC and data preprocessing		1		out of 5
6. Describe methods used and explain why it(they) was(were) selected		2		out of 10
7. Describe metrics used to evaluate performance		1		out of 5
8. Provide a realistic timeline and approach for achieving the intended solution		1		out of 5
Results and Discussion				
9. Show and interpret/discuss results		3		out of 15
10. Discuss the advantages and disadvantages of the proposed solution		2		out of 10
11. Does the solution meet objective using appropriate tools? Is solution innovative?		2		out of 10
Implementation/Next Steps				
12. Does the solution provide a user-friendly interface for data input and result output?		2		out of 10
13. Discuss next steps		1		out of 5

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Questions

If you have any questions, please contact Brian Shoener (shoenerb@bv.com).