EPFL

16th December 2025

AquaShield
Real-time protection against water leaks

In a nutshell

Billions are lost every year due to leaks in water pipes. These leaks often go unnoticed for months, leading to water waste, property damage, and costly insurance claims. Today, almost no buildings are continuously monitored for leaks. Detecting them typically requires manual inspections, specialized equipment, and intervention only after the damage has occurred.

AquaShield offers an **AI-driven, non-invasive leak detection and localization** system for building water networks. Using **clamp-on flow sensors** and **intelligent anomaly detection models**, AquaShield continuously monitors water usage, detects abnormal flow patterns, and localizes leaks with precision, enabling targeted maintenance before damage occurs.

Why is our technology important?

Water losses in buildings represent both an economic and environmental burden, yet current solutions focus mainly on municipal-scale networks. AquaShield bridges this gap by bringing **real-time leak intelligence** to **building-level infrastructure**.

Our system combines:

- Clamp-on sensors that can be deployed without pipe modification.
- Edge-connected data loggers with NB-IoT or LoRaWAN for long-range, low-power connectivity.
- Cloud-based AI processing using graph learning and transformer models to learn each building's unique hydraulic signature.
- Human-interpretable insights, translating model outputs into actionable recommendations for facility teams.

This integration of **hardware simplicity and AI intelligence** allows buildings to become self-monitoring and resilient to hidden water losses.

The benefits of our solution

- Plug-and-play installation: non-invasive, battery-powered, and maintenance-free for 10+ years.
- Up to 70% reduction in water damage related cost.
- Secure and scalable: encrypted data transmission, cloud dashboard, and BMS API integration.
- Building-specific learning: the AI model improves accuracy over time for each site.
- Cross-industry applicability: water, gas, air, steam, and process lines.

Keywords

Leak detection · Leak localization · AI anomaly detection · Digital twin · Non-invasive sensing · Smart infrastructure · Predictive maintenance · Sustainability · Low Power IoT

Founding Team

Marguerite Benoist - Robotics & AI Researcher (EPFL | Harvard)
Specialized in robotics software, computer vision, and machine learning applied to autonomous systems.
Leads AquaShield's AI modeling and digital-twin pipeline for anomaly detection and leak localization.

Paul Beckers - Robotics Researcher (MIT | RWTH | Tsinghua)
Specialized in robotics hardware, digital twins, and systems engineering.
Leads AquaShield's hardware development and business strategy.

Get in touch
We'd love to speak to you more about our project.
You can book some time with us here: mbenoist@aquashieldai.com