

# Software tool can show when a city's wastewater treatment will fail

June 6 2018, by Laura Otto

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Urban populations and mega-cities are on the rise and so is the amount of wastewater pouring into treatment facilities that cannot adequately handle the load.

What if you had a tool that could tell whether a large [wastewater treatment plant](#) was capable of reliably meeting the demand?

"It could avert a public health disaster caused by harmful water quality," said UWM electrical engineer Lingfeng Wang, who has devised such a [software tool](#).

"For most public systems, there is no quantitative way to know whether operations are working until the output is insufficient," said Wang, an associate professor of electrical engineering.

Instead of real-time monitoring of the equipment conditions, Wang's software is based on the historical data on equipment reliability to decide if the existing plant facilities are able to meet the safety requirement on wastewater [treatment](#).

His tool is unique because it rates the reliability of a treatment plant holistically, incorporating a swath of dynamic uncertainties including mechanical malfunctions, software and sensor [failure](#), or an interrupted electric power supply.

It defines water-quality risk metrics and offers a long-term profile of the

water released after treatment, assessing individual pollutants separately. Three main conditions are considered for each pollutant: the treatment process failure, the facility monitoring system failure and the effluent quality sensor failure.

The [software](#) can even determine a plant's resilience in the face of adverse events such as a cyberattack.

"The tool is very timely for deciding how to invest on our crumbling wastewater infrastructure," Wang said, "which receives the grade of D+ in the most recent report card by the American Society of Civil Engineers."

Provided by University of Wisconsin - Milwaukee

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