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# Engineers design new lead detector for water

New sensor offers continuous monitoring, immediate detection of lead

Mechanical engineer Junhong Chen and a team at the University of Wisconsin, Milwaukee (UWM), have developed what you might think of as a "canary in the coal mine" for lead in water.

With support from the National Science Foundation (NSF), they designed a sensor with a graphene-based nanomaterial that can immediately detect lead and other heavy metals. The new platform technology can be used for one-time testing of lead in tap water through a handheld device.

The small sensors also can be integrated into water meters and purifiers, with the goal of continuous monitoring to prevent exposure to lead that could be introduced between the water treatment plant and the home.

The team is now working with manufacturers, including A.O. Smith Corporation, Badger Meter Inc., Baker Manufacturing Company LLC and NanoAffix Science LLC, to put the sensors into use. In addition to real-time detection and continuous monitoring, this lead sensor system is a low cost way to mitigate lead contamination in water.

This research is supported by the NSF Industry-University Cooperative Research Centers <https://www.nsf.gov/eng/iip/iucrc/home.jsp> (I/UCRC), specifically the Water Equipment and Policy I/UCRC at UWM <https://www.nsf.gov/cgi-bin/good-bye?http://www4.uwm.edu/wep/>, as well as the NSF Partnerships for Innovation: Accelerating Innovation Research <https://www.nsf.gov/eng/iip/pfi/air-ra.jsp> (PFI:AIR) programs, which help translate discoveries from academic labs into new products and services.

The award abstracts are: PFI:AIR - Research Alliance: Enabling Low-cost, Real-time Monitoring of Heavy Metal Ions in Drinking Water <http://www.nsf.gov/awardsearch/showAward?AWD_ID=1434059&HistoricalAwards=false> , I/UCRC Phase II: Collaborative Research: Water Equipment and Policy Center <http://www.nsf.gov/awardsearch/showAward?AWD_ID=1540032&HistoricalAwards=false> and Collaborative Research: I/UCRC for Water Equipment and Policy <http://www.nsf.gov/awardsearch/showAward?AWD_ID=0968887&HistoricalAwards=false>

Miles O'Brien (producers/obrien.jsp), Science Nation Correspondent
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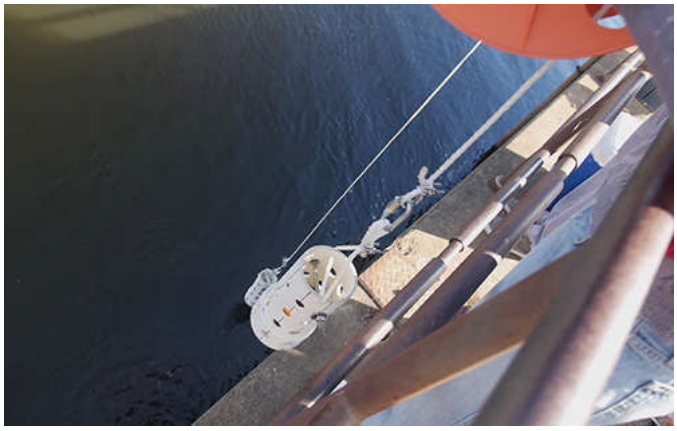
## Related Multimedia

Clean water is vital for generating energy, growing food and sustaining life itself. As demands on limited water resources continue to increase, engineers are creating efficient new systems for water treatment, distribution, reuse and recovery. In the future, new water technologies and systems will make "wastewater" a dirty word. Find out more in this Special Report (/eng/special/water/).

*Credit: FloDesign Sonics Inc.*



It was an email from a colleague that tipped off environmental engineer Detlef Knappe of possible 1,4-dioxane contamination in the Cape Fear River Basin, North Carolina's largest watershed and a source of drinking water for communities across the state. Find out more in this Science Nation video (/news/special_reports/science_nation/capefearwatershed.jsp).

*Credit: Science Nation, National Science Foundation*

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The Industrial Innovation and Partnerships Division of the Directorate for Engineering fosters partnerships to advance technological innovation and public-private partnerships. The division invests in high-tech small businesses and collaborations between academia and industry to transform discoveries into innovative commercial technologies with societal benefits.

**Flint water crisis: For young engineers, a lesson on the importance of listening** (/discoveries/disc_summ.jsp?cntn_id=138060)
Marc Edwards, a civil engineering professor, and Yanna Lambrinidou, a medical ethnographer, taught a course that enabled students to become active protagonists in one of the greatest drinking water emergencies in recent history. Edwards has recent widespread name recognition due in part to his leadership role in the 2015 studies that uncovered high amounts of lead in the Flint, Michigan, drinking water. In the early 2000s, Edwards, an expert in water treatment and corrosion, uncovered elevated lead levels in the Washington, D.C., drinking water.

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