

# FULL-WAVEFORM INVERSION FOR LEAK LOCALIZATION IN WATER PIPE NETWORKS

## Speaker

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## Abstract

Due to aging without timely renewal, hidden leaks continually occur in urban water supply pipes, which poses serious challenges to water and energy conservation as well as drinking water security. Inspired by echolocating animals, such as bats, that emit calls and use resulting echoes to locate and identify objects, transient waves have been successfully used for localizing leaks in water supply pipes. This talk covers several main aspects of the emerging and promising full-waveform inversion method for leak localization in water pipe networks, including: (1) clarify the physical mechanism of multipath wave propagation in both tree- and loop-type networks; (2) propose an alternative to the classic Tikhonov regularization for ill-conditioned inverse problems; and (3) modify the leak localization algorithm without the strict accessibility requirement of all boundary pipes.

## Biography

Dr Che is a Research Assistant Professor at the Department of Civil and Environmental Engineering, PolyU. He earned his Ph.D. from PolyU in 2019, subsequently serving as a Research Associate at HKUST (2019-2021). During 2021-2023, he was a faculty member at Hohai University. His research interests include fluid mechanics, wave physics, data assimilation, and inverse problems. He has successfully secured several grants from main funding agencies as PI, including RGC-General Research Fund, and NSFC-Young Scientist Fund. He has won several international awards and honours, including "Humboldt Research Fellowship" of Alexander von Humboldt Foundation, "Willi H. Hager JHR Best Reviewer Award" of IAHR, and "JHE Editor's Choice" of ASCE (twice). He is the Editorial Board Member of Engineering Applications of Computational Fluid Mechanics.



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Room 3574 (Lift 27/28)**

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