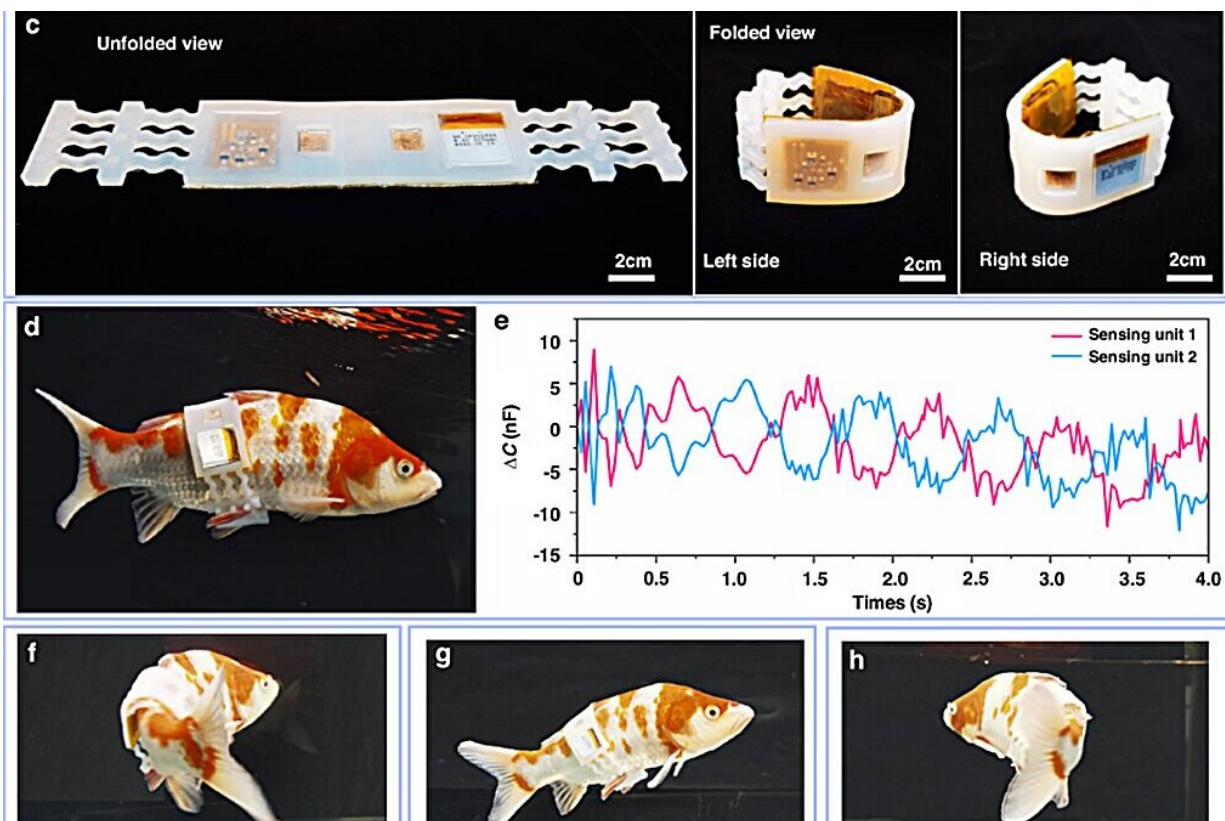


Smart vest turns fish into underwater spies, providing a glimpse into aquatic life like never before

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Structures and applications of the underwater vest. Credit: *Microsystems & Nanoengineering* (2024). DOI: 10.1038/s41378-024-00675-8

Traditional techniques for observing fish behavior, largely dependent on

vision-based systems, face substantial limitations, such as a confined range of observation and a limited duration of operation underwater. In response to these challenges, a research team from the National University of Defense Technology has pioneered a wearable electronic device that adeptly captures disturbances in the water flow caused by the movements of fish.

This innovative "smart vest" designed for fish, utilizes an advanced MXene hydrogel known for its remarkable sensitivity to changes in [water pressure](#). The device features a pair of pseudocapacitive pressure-sensing units, offering a robust and noninvasive approach for the in-depth study of aquatic behaviors. These smart vest is detailed in [an article](#) published in *Microsystems & Nanoengineering*.

This vest is designed to precisely capture the subtle nuances of fish movement, offering a window into their natural behaviors without interference. The heart of the vest's technology is its innovative hydrogel electrodes, which ingeniously combine MXene nanosheets with holey-reduced graphene oxide, further enhanced by ionic liquids.

This blend not only boosts the electrodes' sensitivity to minute movements but also ensures their longevity in [aquatic environments](#), overcoming traditional barriers of underwater research tools.

The breakthrough lies in the vest's ability to detect the flow field disturbances created by fish as they navigate their watery realms. Whether a fish turns, speeds up, or dips, the vest's pseudocapacitive pressure-sensing units register these actions with unparalleled precision.

Dr. Jiafei Hu, the lead researcher from the National University of Defense Technology, said, "This wearable device significantly advances aquatic research. It transcends the constraints of traditional systems and paves the way for comprehensive studies on fish behavior and their

ecological interactions."

The introduction of the underwater [vest](#) signifies a major advancement in research methodologies, enabling precise, real-time insights into fish behaviors and their environmental dynamics. Its implications for [environmental conservation](#), aquatic ecosystem studies, and the development of sophisticated monitoring technologies are profound and far-reaching.

More information: Chengxiu Yang et al, An underwater vest containing an antioxidant MXene hydrogel for sensitive recognition of fish locomotion, *Microsystems & Nanoengineering* (2024). [DOI: 10.1038/s41378-024-00675-8](#)

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