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UW Researcher Awarded Major Grant for Biosensing

ARPA-H awards a multi-institutional team to develop a tiny wireless sensor in the tear duct to monitor important biomarkers for health

(SEATTLE, WA)---The Advanced Research Projects Agency for Health (ARPA-H) has announced a significant award to the University of Washington to develop and validate an ultra-miniaturized wireless biosensor designed for placement in the tear duct, as part of a multi-institutional team including Massachusetts Institute of Technology (lead institute), the University of Washington, and Northwestern University. Dr. Tueng T. Shen, a clinician-engineer, is the UW lead investigator of the project.

The purpose of the tiny sensor is to continuously measure health biomarkers on the surface of the eye—pioneering a new way to access molecular health information non-invasively. “Monitoring health with a device in the tear duct could have major implications for future health monitoring in other parts of the body,” says Dr. Shen, who is also an investigator in the newly established Kren Engineering-based Medicine Initiative (KEMi) at UW. “This is precisely the type of collaborative model that KEMi seeks to catalyze for the future of health innovation.”

Dr. Shen notes that if this technology succeeds, it could pave the way for a new class of miniature biosensing devices. “A sensor doesn’t have to be in the tear duct,” she explains. “This platform could eventually expand to measure other critical biosensors.”

Over the four-year award period, the teams aim to collaborate to design and fabricate the sensor, validate its performance in animal models, and ultimately prepare for human studies. Dr. Shen emphasizes that the project’s vision is ambitious because the technological requirements for an implantable, wireless sensor of this scale are “mind-boggling.” The device is less than one millimeter in diameter --much smaller than a grain of rice-- and can be implanted in the tear duct with minimal discomfort.

This award arrives at a particularly timely moment for University of Washington, as KEMI works to position UW as a global leader in engineering-based medicine. The project exemplifies KEMI’s core principles: high-impact translational engineering, multi-institutional collaboration, and the creation of scalable platforms that can transform health care. The ARPA-H award not only accelerates cutting-edge biosensor development but also signals the type of collaborative ecosystem KEMI aims to foster nationally and globally. Hopeful about the technology and energized by its alignment with KEMI’s mission, Dr. Shen says, “The future is bright.”

ARPA-H is a new mechanism from the federal government to fund “high-risk, high-reward" projects in an efficient way, and is different from conventional funding mechanisms: the risk is financial, the reward is the ability to drive medical breakthroughs with high impact potential. The Institute of Translational Health Sciences (ITHS) supported Dr. Shen in pursuit of this award.

More from the Massachusetts Governor’s Office here. Read the ARPA-H announcement here.

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