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The heart of the matter

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By Elizabeth Howell

Turn your palm up, place two fingers on your wrist and hold them there. If you hit the right spot, you will be able to feel your heartbeat.

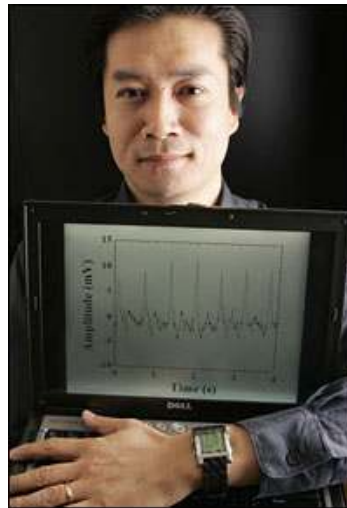
Measuring heartbeats is an essential diagnostic tool because the strength of each beat and the length of time between them shows how healthy your heart is. But the sensors used to measure it are usually large, expensive and are not sensitive enough to measure heartbeats in great detail.

This is why Yuu Ono, a Systems and Computer Engineering professor who just joined Carleton in July, made a sensor small enough to fit in a wristwatch. "The best way for doctors to help you is if you wear the sensor all the time, but unless it's light enough, you won't want to do that," says Ono.

In conjunction with the National Research Council (NRC), Ono developed a light, postage-stamp sized sensor that is cheap to make and easy to wear. His team presented the sensor in October at the Institute of Electrical and Electronics Engineers international ultrasonics symposium.

Ono's thin, flexible sensor uses a unique spray-on transducer that converts the heart's physical energy into an electrical signal computers can understand. "I'm now tailoring the sensor and will develop a transmitter to send data to a computer in a doctor's office or a hospital," Ono says. "Then you would only have to visit the doctor if they determine something was wrong."

Ono's fascination for biomedical devices comes from his family, where his grandfather, father, and brother are all medical doctors. After earning his Ph.D. at Tohoku University in Japan, he moved to the NRC's Industrial Materials Institute, which uses ultrasound to evaluate manufacturing processes and to investigate defects in manufacturers' products.



Dr. Yuu Ono is researching a wristwatch that will save lives.

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In fact, using the same techniques he honed at the NRC, he has now adapted the sensor to probe for tumours.

We often use sound to find out how dense a material is. For example, if we're hanging a heavy picture, we might knock our hand against the wall to find the stud underneath. Ultrasound uses the same principle, but uses sound at a frequency too high for humans to hear. Biomedical devices, such as Ono's sensor, translate the ultrasound waves into visual waves so humans can see what their ears are not equipped to hear.

"I'm glad I can use my experience to help others," says Ono. "I hope in the near future, people can use my technology to stay healthy. It may even save lives."

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