Commercializing hearing technology: From people to pipelines

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Engineering student Brian Wang co-founded Cogni-Wave with alumnus Michael Shen.

Imagine sitting at your granddaughter's wedding at a table filled with family yet, despite your hearing aids, all you hear is an undifferentiated roar.

It's a problem people with hearing loss encounter every day.

"Hearing aids give you louder sounds, but they don't help you with noise impressions. People have enormous difficulty with filtering out sounds," says Willy Wong, associate professor in the University of Toronto's Institute of Biomaterials and Biomedical Engineering (IBBME) and the Edward S Rogers Sr. Department of Electrical and Computer Engineering (ECE).

He adds, "There are no good solutions out there to help people like that."

Enter Cogni-Wave, designers of what is called social hearing.

Cogni-Wave is developing a hearing aid that uses rotating microphones designed to filter environmental sounds, so that the person using the hearing aids hears exactly like someone with functional hearing—one voice at a time.

"We investigated the processes that enable a normal hearing person to converse in crowded environments, and modeled these processes automatically so that hearing-loss patients would be able to receive a desired signal without performing these processes themselves," says Brian Wang, a second-year masters student with ECE and one of the company's co-founders.

Wang focuses on auditory scene analysis or, "the human selective hearing process and its application in different scenarios."

Wang founded Cogni-Wave, a brand new spin-off company, with Michael Shen, a recent U of T graduate in mechanical engineering. Their company grew out of a recent Techno Workshop held by U of T's Institute for Optical Science (IOS), which offers students the opportunity to meet with entrepreneurs, business people, investors, and intellectual property lawyers.

The summer-long workshop is intended to guide students towards turning their research into commercially viable start-up companies - several of which exhibited ingenious products at the IBBME Tomorrow's Technologies biomedical device showcase Oct. 10, 2012.

Professor Wong, Wang's supervisor and chief scientific officer for Cogni-Wave, says an entire industry has evolved around hearing loss

with the goal of "restoring or improving 'hearability' without having to invade privacy or basic natural functions."

While this goal is far from being achieved, Wong is hopeful his student's research and entrepreneurial spirit will make social hearing aids a reality.

Cogni-Wave may have other benefits, as well.

"Sometimes in academia we don't necessarily know what the market needs," says Wong, adding that the process of getting involved with commercialization helps improve and guide academics towards socially relevant concerns.

"Brian goes to talk to entrepreneurs," Wong says. "He comes back and says I'm going to change my thesis question. The IOS Techno workshop is really great that way."

Cogni-Wave hopes to have a small, portable beta version of their device ready by November before applying for a patent. Although the company is still in its initial start-up phase and applying for grant money, several investors have expressed interest in the project, says Wang.

And the technology offers further potential. Cogni-Wave recently signed a contract to serve as acoustic consultants on a pipeline leak detection project for Xi'an Petroleum University in China.

"The pipeline leak detection project is still in its preliminary form, since we just recently handed in the proposal and signed the contract," Wang. "However, it involves using acoustics measure to try to detect leakage in pipelines, and these measures are intended to function both independently as well as along with other traditional pipeline leak detection measurement method (such as pressure)."

Wang is hopeful Cogni-Wave will join the ranks of other successful companies which began in the labs and coffee shops of the University of Toronto, such as medical device developers Conceus, Vivosonic Inc. and Interface Biologics, Inc.

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