

# Carleton Opens Innovative Language and Brain Lab

Today, Carleton University is showcasing a new state-of-the-art language and brain lab that will conduct unique research on how people acquire and process language.

“Languages are essential for communicating with each other,” notes Dr. Masako Hirotani, director of the new Centre for Cognitive Neuroscience: Language and Brain (CCN.LaB). “So if we can better understand how we learn to speak and understand a language, then we will be able to do all kinds of things like help stroke victims or children who are struggling to learn a language. Eventually, we might even be able to help government workers who are learning how to speak a second language.”

The lab features three small rooms. One contains an EEG machine that will allow researchers to study brainwave patterns when people use language. A second room is equipped with an EyeLink 1000 eye-tracker that records readers’ eye movements every millisecond. The eye-tracker is hooked up to two computers that will read and analyze the data. In a third room, researchers will record conversations that will allow them to study the acoustic nature of human speech, as well as conduct behavioural experiments using both conversations and auditory stimuli.

Hirotani, an assistant professor of linguistics and cognitive science based in the School of Linguistics and Language Studies (SLaLS), says: “We’ll be playing detective using different techniques and sensitive equipment that marry the fields of linguistics, psychology and neuroscience in order to help solve the real-world problem of how we acquire and process language. This could lead to breakthroughs in speech audiology and pathology, which could result in more effective reading intervention programs to help people with dyslexia and other reading disorders.”

“The Language and Brain lab will add an important and exciting dimension to a school already known for its impressive variety of research into the nature of language and its use,” says Randall Gess, director of SLaLS. “The new work on language processing and language development will complement leading work on structural properties of language ranging from the semantics of Cree to the phonetics of Inari Saami, and functional aspects of language ranging from blogging and virtual community in the Kurdish diaspora to the use of language by major powers in the climate change debates.”

The lab cost just over \$344,000 and was funded by grants from the Canada Foundation for Innovation (CFI), the Ministry of Research and Innovation and four “in-kind” contributors.

“This new laboratory will enable researchers to perform their cutting-edge research into the relationship between language and brain function right here at Carleton,” says Dr. Eliot Phillipson, president and CEO of the CFI. “The CFI is a proud partner in this project that will bring to life innovative ideas on how people acquire and process language.”

“Ontario is the largest hub of biomedical activity in Canada and the fourth largest biomedical research centre in North America,” says Minister of Research and Innovation, John Milloy. “Our government has made growing this sector a priority because we know it is good for Ontario families and for our economy. That’s why we’re proud to invest in the work of researchers like Dr. Hirotani and Carleton University’s new Centre for Cognitive Neuroscience.”

Dr. Hirotani is affiliated with Carleton’s School of Linguistics and Language Studies and the Institute of Cognitive Science. Last year, she was appointed a research associate at the highly regarded Max Planck Institute for Human Cognitive and Brain Sciences. She often visits her native Japan, where she researches speech patterns unique to the Japanese. “I will also be researching Japanese words and sentences in the new lab,” she says. When she travels to Germany, she uses brain scans to test how people respond to

various cues in speech. In the classroom, she encourages her students to examine interesting questions that make her lectures anything but textbook.

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