# Brain and Mind Institute-led research team wins coveted Human Brain Mapping Hackathon

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A team of researchers fueled predominantly by Western's Brain and Mind Institute won a top prize in the Hackathon this past week at the 19th annual meeting of the Organization for Human Brain Mapping in Seattle, Washington.

The team of Western researchers, which was led by Western neuroscientist Rhodri Cusack and also included a collaborator from Washington University, developed a novel approach to better understand how the human brain processes sounds.

For the winning entry, titled "No sound consensus," Cusack and his Brain and Mind Institute colleagues successfully mined terabytes (one terabyte equals one trillion bytes) of high-definition images showing connections in the brain from the Human Connectome Project and combined these samples with gene expression data from the Allen Brain Atlas to identify distinct parts of the brain's auditory cortex (the functions in the brain, which permit us to hear).

According to Cusack, while there is consensus among scientists on how the visual cortex should be parceled up, such a clear structure has never before been demonstrated with the human auditory cortex.

"Moving forward, the structure we developed for the Hackathon will provide a framework for understanding how the human brain processes

sounds, such as speech, music or environmental noises," explains Cusack. "This in turn will help us understand how this system can become disrupted, in developmental disorders like dyslexia, following brain injury due to disturbances like aphasia or amusia or even psychiatric conditions like hallucinations."

Any single type of data is subject to biases, so three types were fused by this international and multidisciplinary team of scientists using a diverse range of analytical approaches, software packages and programming languages. The team estimates that their entry used approximately one year's worth of processing time of the fastest processing cores in Amazon Web Services's cloud and followed more than 3.6 billion connections through the brain.

To present the results in an easily accessible way, the team developed a web-based interface that can be used to browse the parcellations and connectivity of each module, which can be found at cusacklab.org/nsc/

For more information on No sound consensus, please visit www.cusacklab.org/?page_id=1264

Provided by University of Western Ontario