

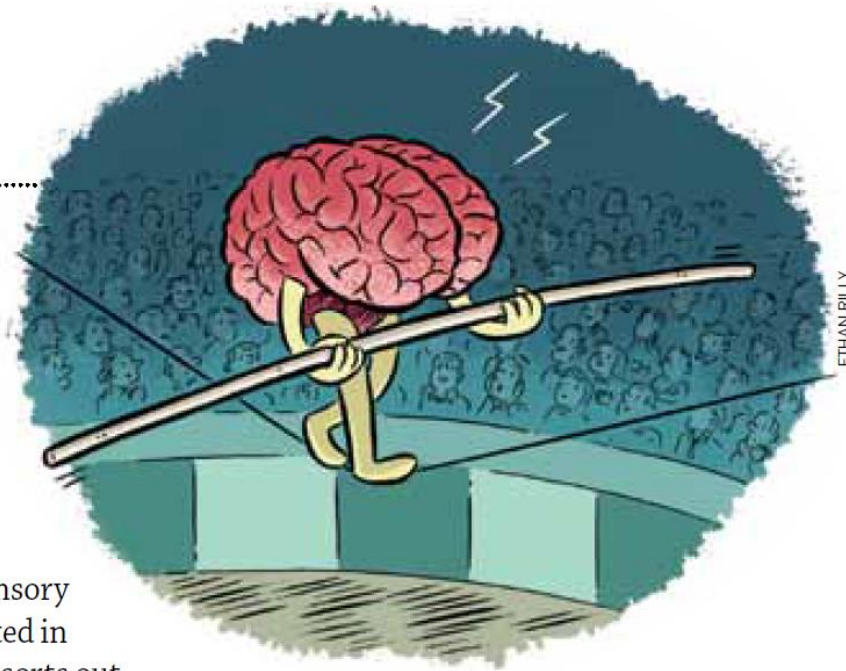
A BRAINY BALANCING ACT

Hundreds of times a day, a little cluster of neurons deep in your brain helps you keep your balance. If you slip on some ice or stumble over a crack in the sidewalk, these brain cells quickly complete a calculation: total body motion, minus intended motion, equals motion due to an external cause.

“It’s a beautiful computation,” says physiology professor **KATHLEEN CULLEN**. It’s also precise, lightning-fast, and, surprisingly, measurable. Cullen and her team reported in *Current Biology* that they had discovered, and been able to observe, the portion of the brain where this unique bit of algebra unfolds thanks to the efforts of a specific group of neurons.

The calculation occurs in the cerebellum, the part of the brain that controls motion. When unexpected motion occurs during a routine action — while stepping onto a wobbly boat, for instance — this causes a sensory conflict. Cullen was interested in exactly how the cerebellum sorts out the conflict.

Together with former doctoral student **JESS BROOKS**, BSc’04, PhD’12, Cullen devised an experiment that placed macaque monkeys inside a device similar to a flight-simulator. The researchers monitored the brain activity of their test subjects as they coped with unexpected movement. They discovered that activity from one specific cluster in the cerebellum



ETHAN RILLY

reflected the unanticipated motion that they were creating with the simulator.

Next, Cullen is exploring how the brain formulates the other part of the computation — specifically, how the brain knows what motion to anticipate during routine actions.

SHANNON PALUS, BSc’13