

Developmental stuttering is a speech motor disorder associated with differences in how the brain controls speech. My work uses a range of methods to capture these differences between people who stutter and people who are typically fluent at the brain and kinematic levels. Firstly, I will focus on work using vocal tract MRI to measure the precise movements of the articulators during speech at good temporal and spatial resolution. I will present data that reveals weaker speech motor control in people who stutter compared with people who are typically fluent during a simple nonword production task before introducing some next steps for optimising the analysis of this high-dimensional data. Next, I turn to the neural control of speech inhibition. I will present a functional MRI study that measures the brain's response during the inhibition of speech and non-speech movements. Here, we show greater activity in people who stutter compared to people who are typically fluent in brain regions that are associated with inhibitory control of movements. Activity was strikingly similar between the speech and non-speech tasks suggesting shared control of speech and non-speech inhibition. Finally, I will describe our attempts to modulate speech motor control using non-invasive brain stimulation in a typically speaking population.