2. **Vatche Baboyan, Alexandra Basilakos, Grigori Yourganov, Chris Rorden, Leonardo Bonilha, Julius Fridriksson, Gregory Hickok (2021) Isolating the white matter circuitry of the dorsal language stream: Connectome-Symptom Mapping in stroke induced aphasia https://doi.org/10.1002/hbm.25647**

The application of ℓ1-regularized machine learning models to high-dimensional connectomes offers a promising methodology to assess clinical-anatomical correlations in humans. Here, we integrate the connectome-based lesion-symptom mapping framework with sparse partial least squares regression (sPLS-R) to isolate elements of the connectome associated with speech repetition deficits. By mapping over 2,500 connections of the structural connectome in a cohort of 71 stroke-induced cases of aphasia presenting with varying left-hemisphere lesions and repetition impairment, sPLS-R was trained on 50 subjects to algorithmically identify connectomic features on the basis of their predictive value. The highest ranking features were subsequently used to generate a parsimonious predictive model for speech repetition whose predictions were evaluated on a held-out set of 21 subjects. A set of 10 short- and long-range parieto-temporal connections were identified, collectively delineating the broader circuitry of the dorsal white matter network of the language system. The strongest contributing feature was a short-range connection in the supramarginal gyrus, approximating the cortical localization of area Spt, with parallel long-range pathways interconnecting posterior nodes in supramarginal and superior temporal cortex with anterior nodes in both ventral and—notably—in dorsal premotor cortex, respectively. The collective disruption of these pathways indexed repetition performance in the held-out set of participants, suggesting that these impairments might be characterized as a parietotemporal disconnection syndrome impacting cortical area Spt and its associated white matter circuits of the frontal lobe as opposed to being purely a disconnection of the arcuate fasciculus.