Recent neuroimaging and neurophysiological evidence has revealed how the reading system successfully adapts when phonological codes are relatively coarse-grained due to reduced or distorted auditory input. New evidence suggests that the optimal end-state for the reading system may differ for deaf versus hearing adults and indicates that certain neural patterns that are maladaptive for hearing readers may be beneficial for deaf readers. This talk focuses on deaf adults who have achieved reading success (e.g., they are matched in reading level with their hearing peers) and who use sign language in their everyday lives. New research has shown that such deaf readers exhibit a more bilateral neural response to written words compared to hearing readers, as measured by evoked response potentials (ERPs; N170 component) and by functional magnetic resonance imaging (fMRI; rapid -adaptation within the visual word form area, VWFA). Further, better deaf readers (but poorer hearing readers) exhibit a larger right hemisphere N170 response. Results from the rapid adaption fMRI paradigm indicate that while skilled deaf readers demonstrate coarsely tuned phonological representations in temporoparietal cortex (TPC), they develop finely tuned orthographic representations in the VWFA, suggesting that phonological tuning in the TPC may have little impact on the neural network associated with skilled reading for deaf adults. Overall, the results suggest that the reading circuit may become differentially tuned in deaf readers.