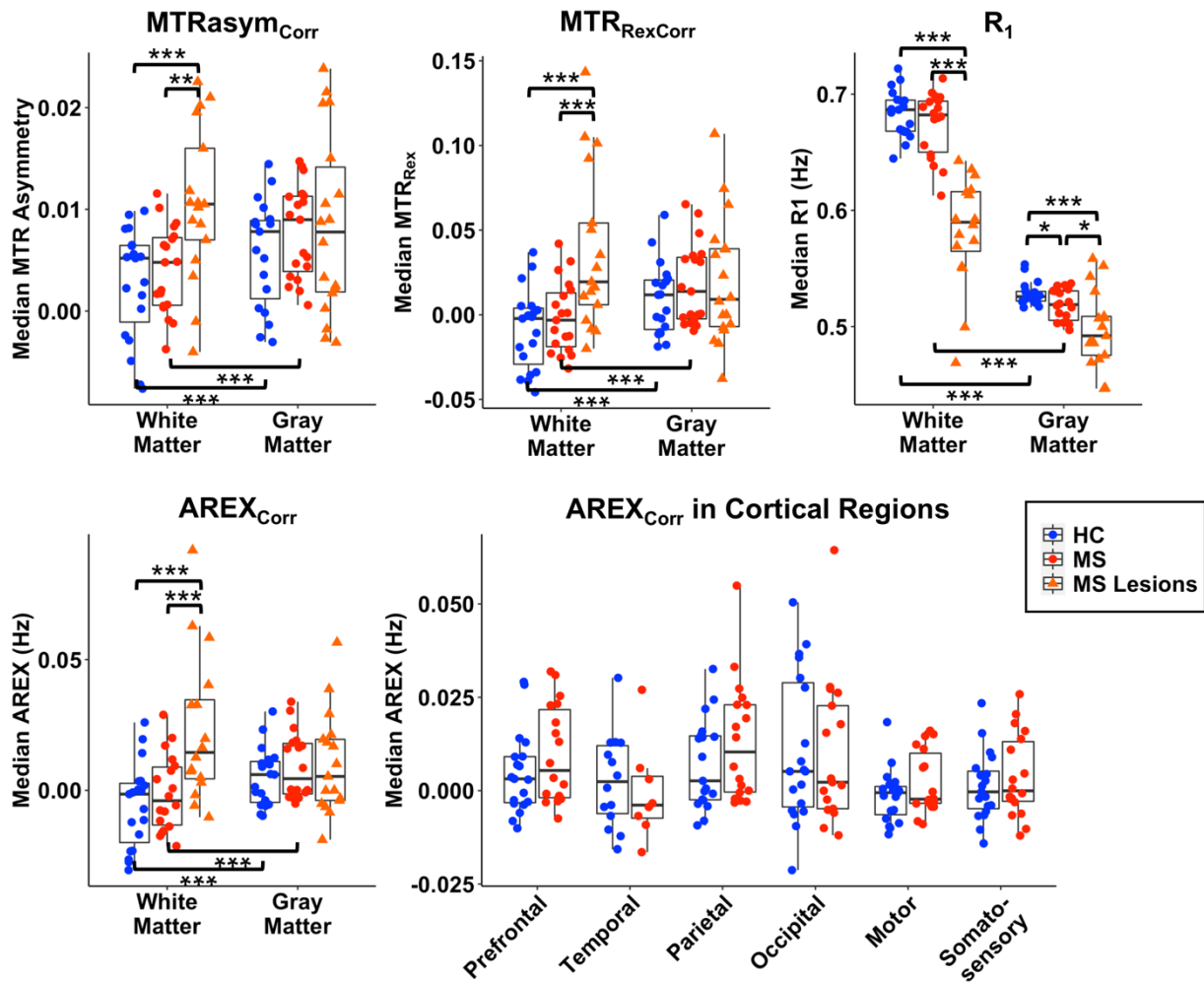
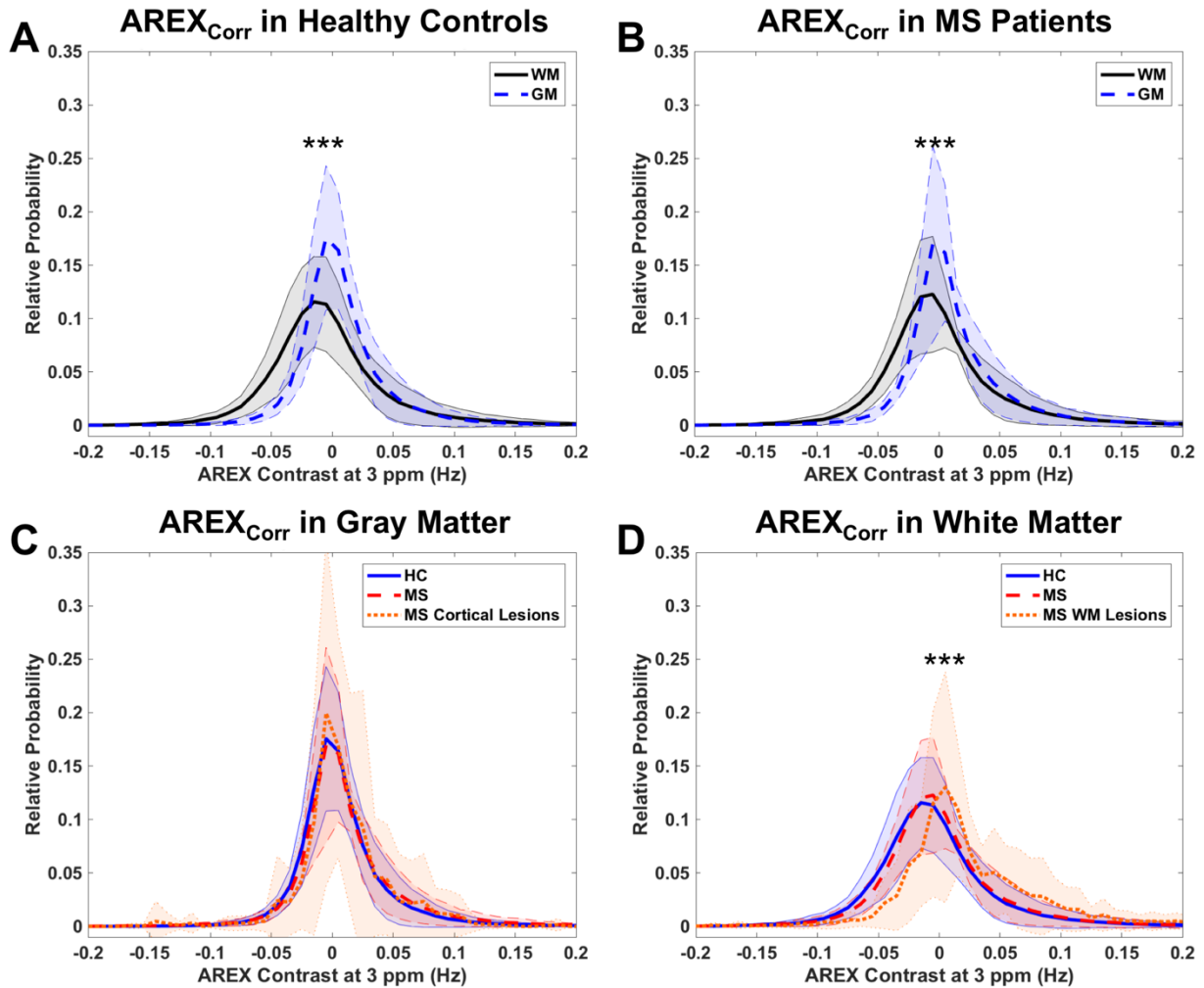


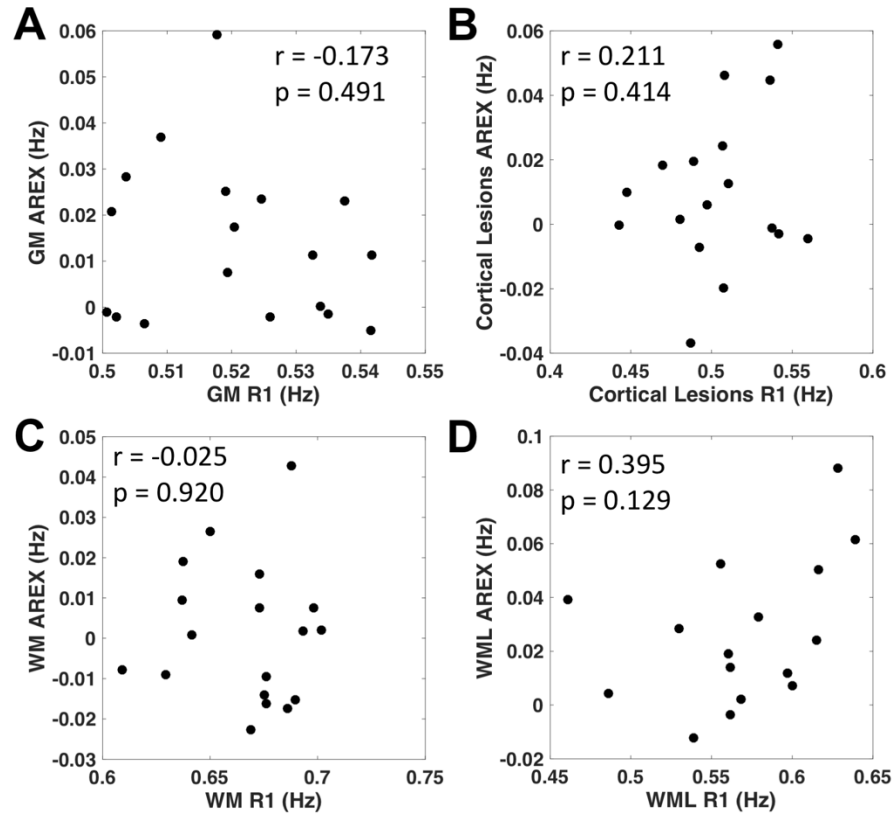
Supplementary Material



Supplementary Figure 1. Median values of $MTR_{AsymCorr}$, $MTR_{RexCorr}$, $AREX_{Corr}$, and R_1 are shown for WM, GM, WM lesions, and cortical lesions for group comparisons. $AREX_{Corr}$ values are also shown for each cortical GM region. WM lesion values differ significantly from normal-appearing WM in MS patients and from healthy control (HC) WM for all CEST-derived indices and for R_1 . Significant differences in GM and cortical lesions are only present in R_1 . No group differences are significant for $AREX_{Corr}$ within cortical regions. All indices differ significantly between GM and WM within each group. * $p<0.05$, ** $p<0.01$, *** $p<0.001$



Supplementary Figure 2. Average histograms of $AREX_{Corr}$ values are shown for WM, GM, WM lesions, and cortical lesions for within-group (**A**, **B**) and between-group (**C**, **D**) comparisons (shaded area represents standard deviation). $AREX_{Corr}$ values are significantly greater in GM than in WM within the healthy control (HC) and MS patient groups. $AREX_{Corr}$ is increased significantly in WM lesions compared to normal-appearing WM in MS patients and compared to WM in healthy volunteers. *** $p < 0.001$ for mean value comparison.



Supplementary Figure 3. Mean AREX_{Corr} values do not correlate with corresponding mean R₁ values in each tissue region of interest in patients with MS. Plots are shown for normal-appearing GM (**A**), cortical lesions (**B**), normal-appearing WM (**C**), and WM lesions (**D**) with the corresponding Pearson correlation coefficient r and p -value.