The Electronic Supplement contains Five supplementary figures.

Fig. S1. Upper left diagram plots the p-value, for the null hypothesis that $V_1'(v)$ is uncorrelated with age, gender, age-gender interaction and BMI, against v HU, based on data from the normal group. Upper right diagram is a similar plot except that it is based on data from the ILD group. Lower two diagrams are similar to the upper diagrams except that it is for V_2'. The locations where the p-value is less than 5% indicate the values of HU over which the function contains signals from age, gender and/or BMI.

Fig. S2. Same plotting convention as in Fig. S1, except that the upper diagrams are for V_3' and the lower diagrams for V_4'.

Fig. S3. Plot of the coefficient estimates $\hat{\beta}$ as a function of HU; 15mm peel depth and modification = F. The leftmost figure in the upper panel shows the fussed-lasso estimate of β_j as a function of v_j in model (1) with V there being V_1 computed with data derived from lung images not modified by radiologists and peel depth equal to 15mm. Note that the function estimate is essentially a piecewise constant function that is non-zero over a small subset of [-1000 HU, 0 HU], as a result of the fussed-lasso penalty enforced in maximizing the objection function (3). Other figures in the upper panels, from left to right, are similar figures with V in (1) replaced by $V_i, i = 2,3,4$. Figures in the lower panel are counterparts of $V_i', i = 1,2,3,4$.

Fig. S4. Plot of the coefficient estimates $\hat{\beta}$ as a function of HU; 65mm peel depth and modification = T. Same convention as used in Fig. S1, except with data derived from lung images modified by radiologists and peel depth equal to 65mm.

Fig. S5. Plot of the coefficient estimates $\hat{\beta}$ as a function of HU; 65mm peel depth and modification =F. Same convention as used in Fig. S1, except with data derived from lung images not modified by radiologists and peel depth equal to 65mm.

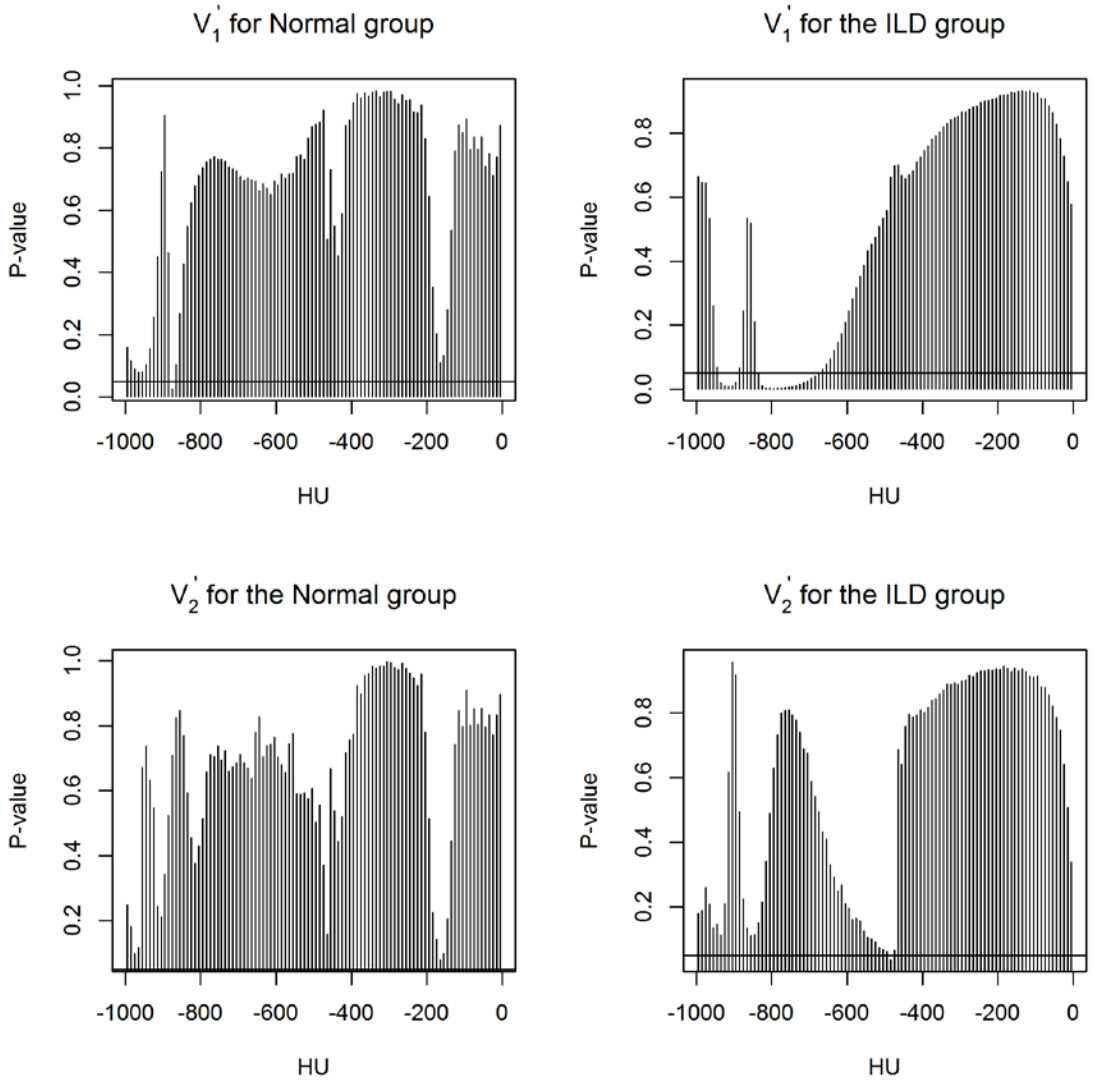
V1' for Normal group
V1' for the ILD group
V2' for the Normal group
V2' for the ILD group
P-value
HU
0.0
0.2
0.4
0.6
0.8
1.0
-1000
-800
-600
-400
-200
0

Fig. S1

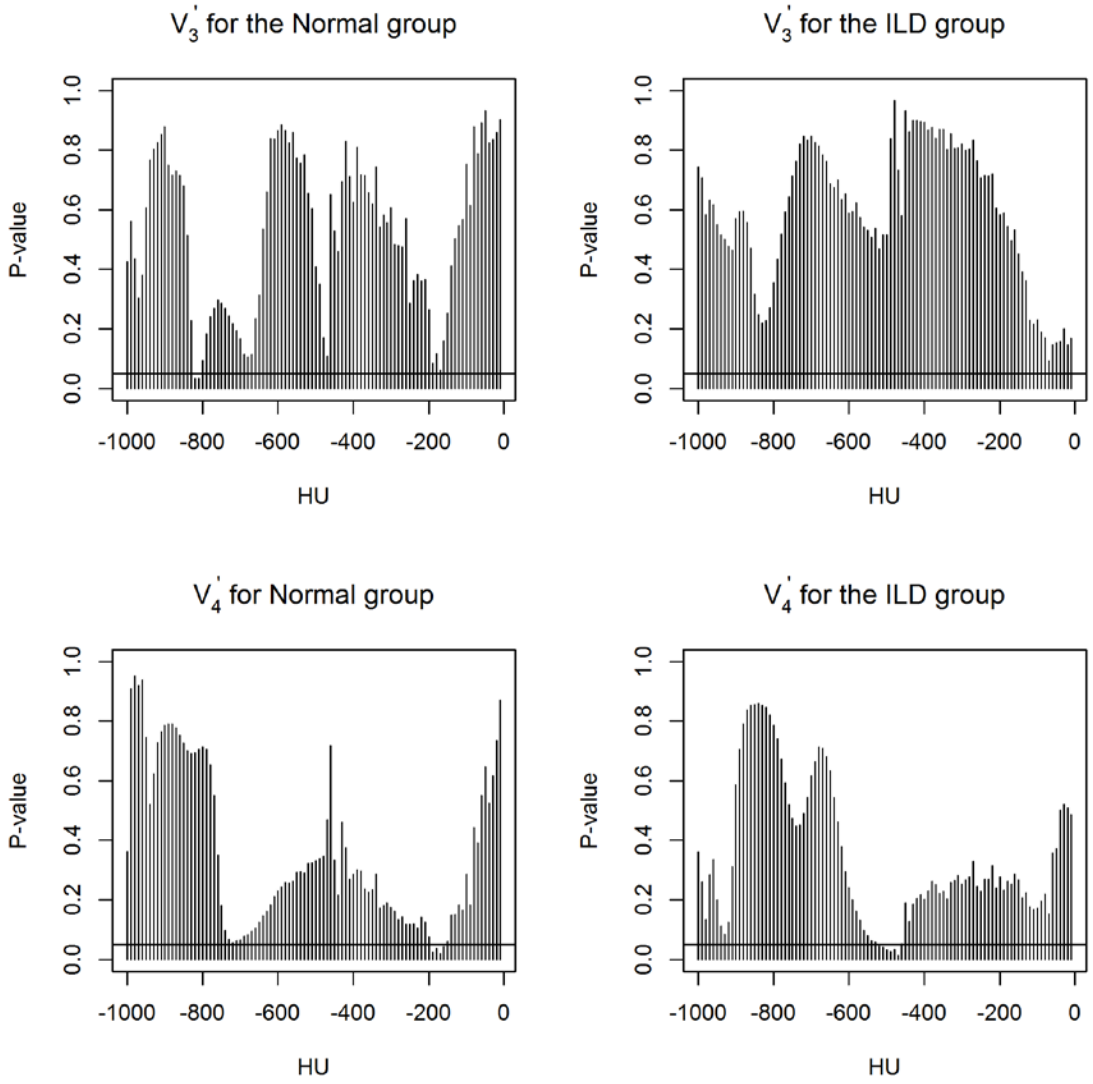
V3' for the Normal group
V3' for the ILD group
V4' for Normal group
V4' for the ILD group
P-value
HU
0.0
0.2
0.4
0.6
0.8
1.0
-1000
-800
-600
-400
-200
0

Fig. S2

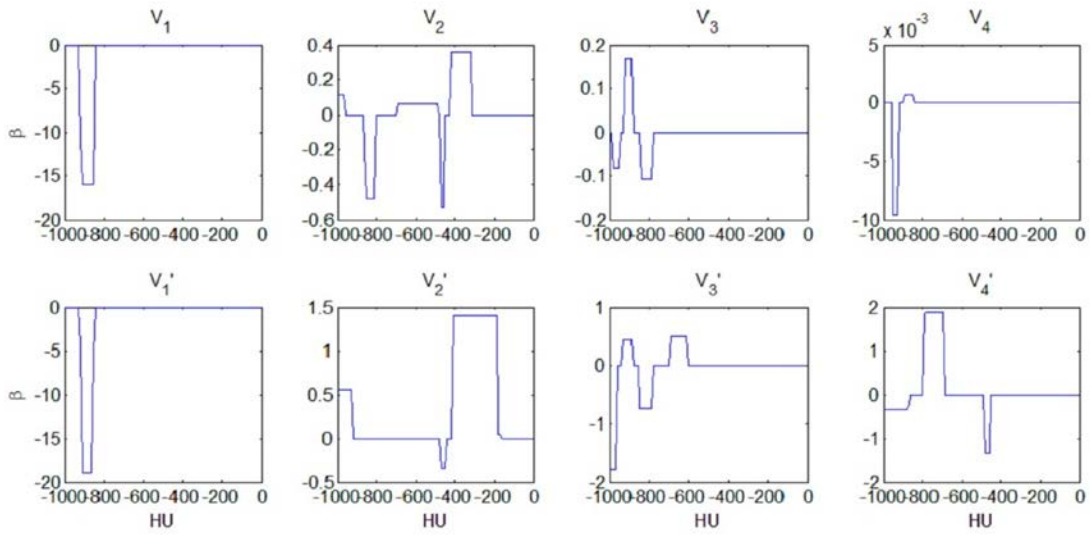

Fig. S3

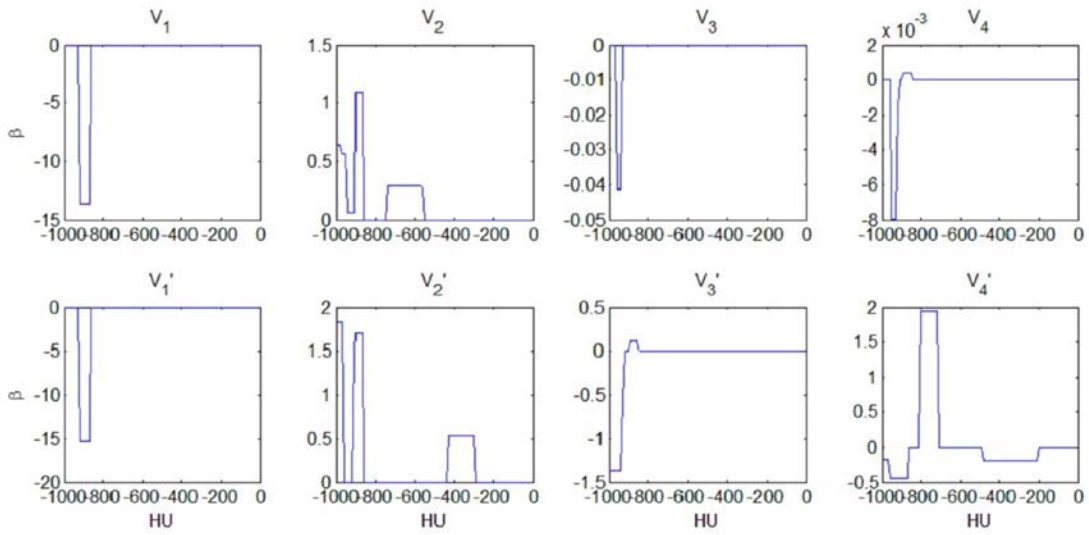

Fig. S4

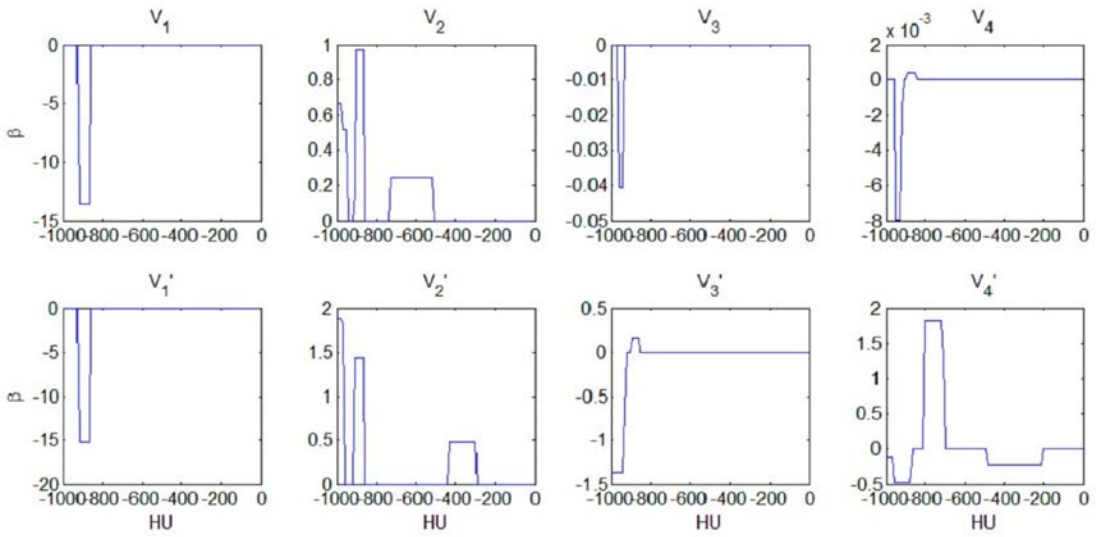

Fig. S5