Robust autoencoder for training a transferable normalisation filter All Samples Stable Sample Pairwise Frobenius norm **Decoded Samples Cell Type Assignment** Training Transferable To New Samples Interpretable Classification Hierarchical group lasso exploits functionally similar cell subsets and markers **Feature Generation** Prediction **Group Lasso** Marker $Q(\beta|\mathbf{X}, \mathbf{y}) = \frac{1}{n}\mathcal{L}(\beta|\mathbf{X}, \mathbf{y}) + \lambda P(\beta)$ **Patient Classification Hierarchical Grouping**