

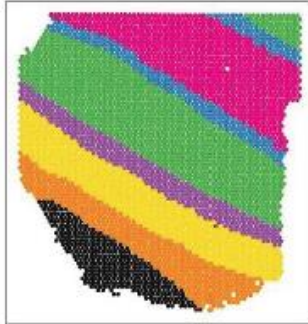
Analysis of Maynard et al., 2020 brain spatial transcriptomic data

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12 samples with layer annotation

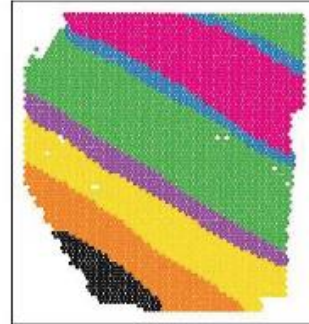
3 donors

Sample 151507: Ground truth



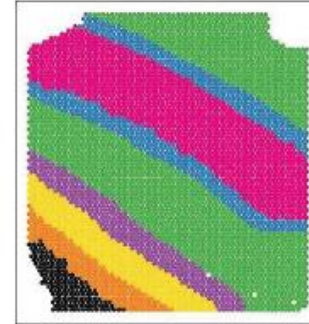
● Layer_1
● Layer_2
● Layer_3
● Layer_4
● Layer_5
● Layer_6
● WM

Sample 151508: Ground truth



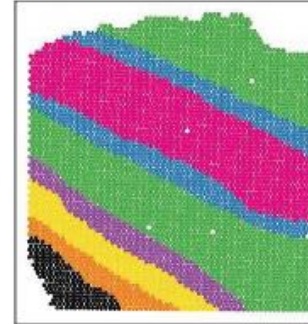
● Layer_1
● Layer_2
● Layer_3
● Layer_4
● Layer_5
● Layer_6
● WM

Sample 151509: Ground truth



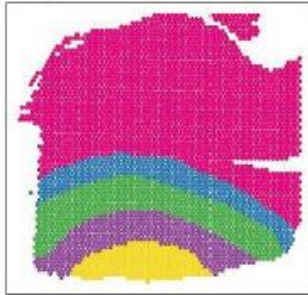
● Layer_1
● Layer_2
● Layer_3
● Layer_4
● Layer_5
● Layer_6
● WM

Sample 151510: Ground truth



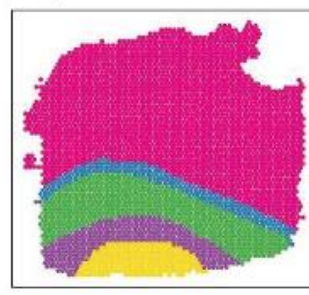
● Layer_1
● Layer_2
● Layer_3
● Layer_4
● Layer_5
● Layer_6
● WM

Sample 151669: Ground truth



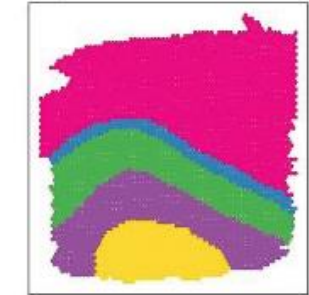
● Layer_3
● Layer_4
● Layer_5
● Layer_6
● WM

Sample 151670: Ground truth



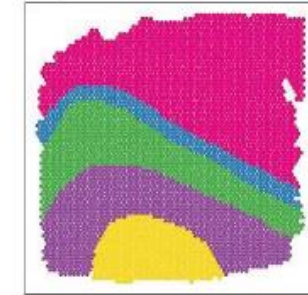
● Layer_3
● Layer_4
● Layer_5
● Layer_6
● WM

Sample 151671: Ground truth



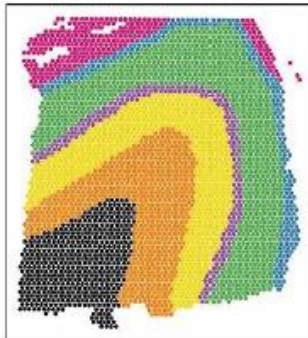
● Layer_3
● Layer_4
● Layer_5
● Layer_6
● WM

Sample 151672: Ground truth



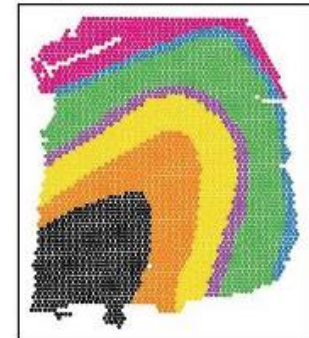
● Layer_3
● Layer_4
● Layer_5
● Layer_6
● WM

Sample 151673: Ground truth



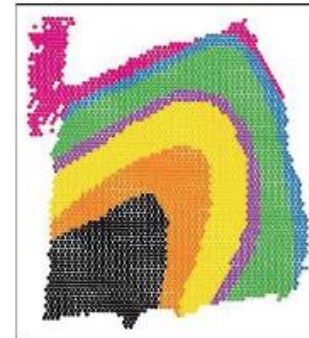
● Layer_1
● Layer_2
● Layer_3
● Layer_4
● Layer_5
● Layer_6
● WM

Sample 151674: Ground truth



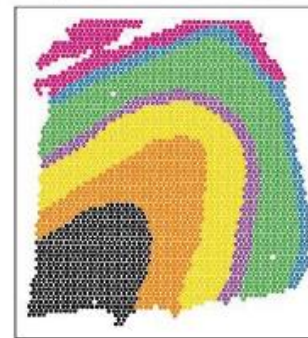
● Layer_1
● Layer_2
● Layer_3
● Layer_4
● Layer_5
● Layer_6
● WM

Sample 151675: Ground truth



● Layer_1
● Layer_2
● Layer_3
● Layer_4
● Layer_5
● Layer_6
● WM

Sample 151676: Ground truth



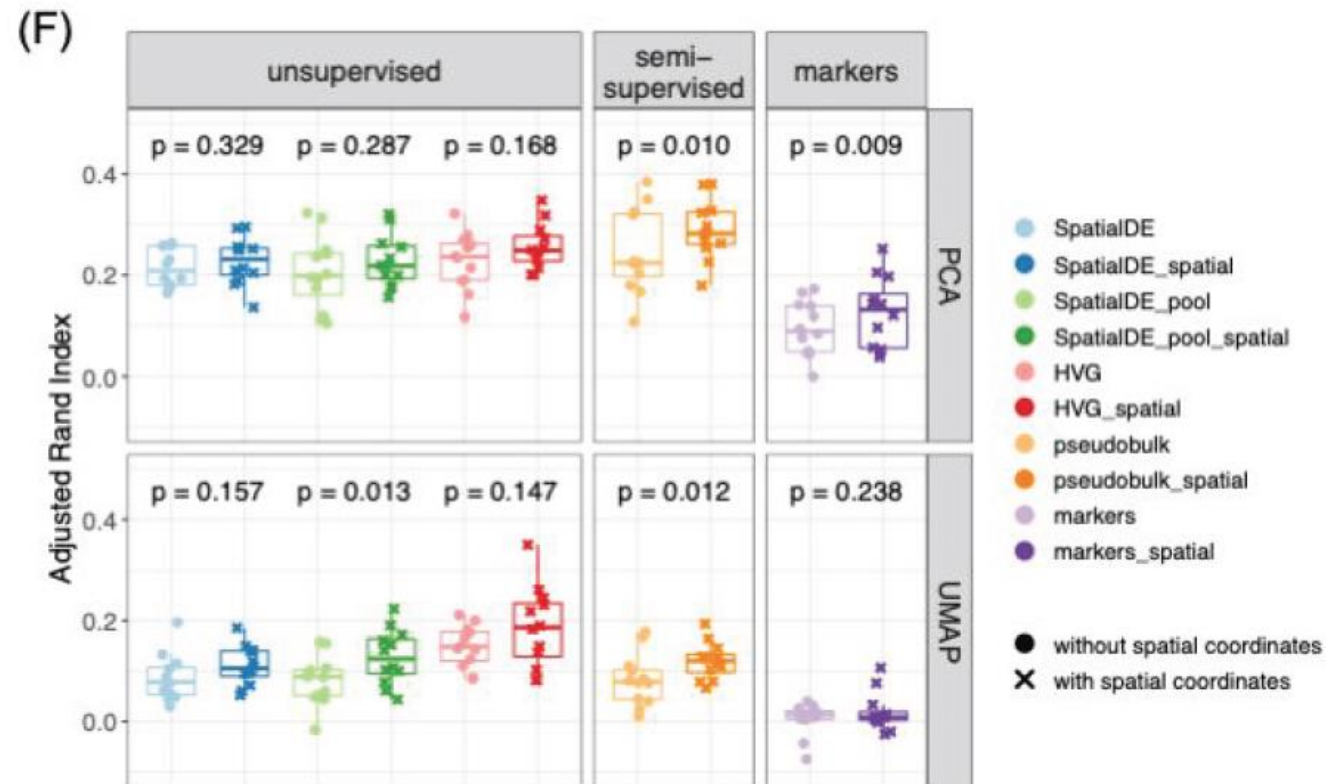
● Layer_1
● Layer_2
● Layer_3
● Layer_4
● Layer_5
● Layer_6
● WM

10 μ m apart

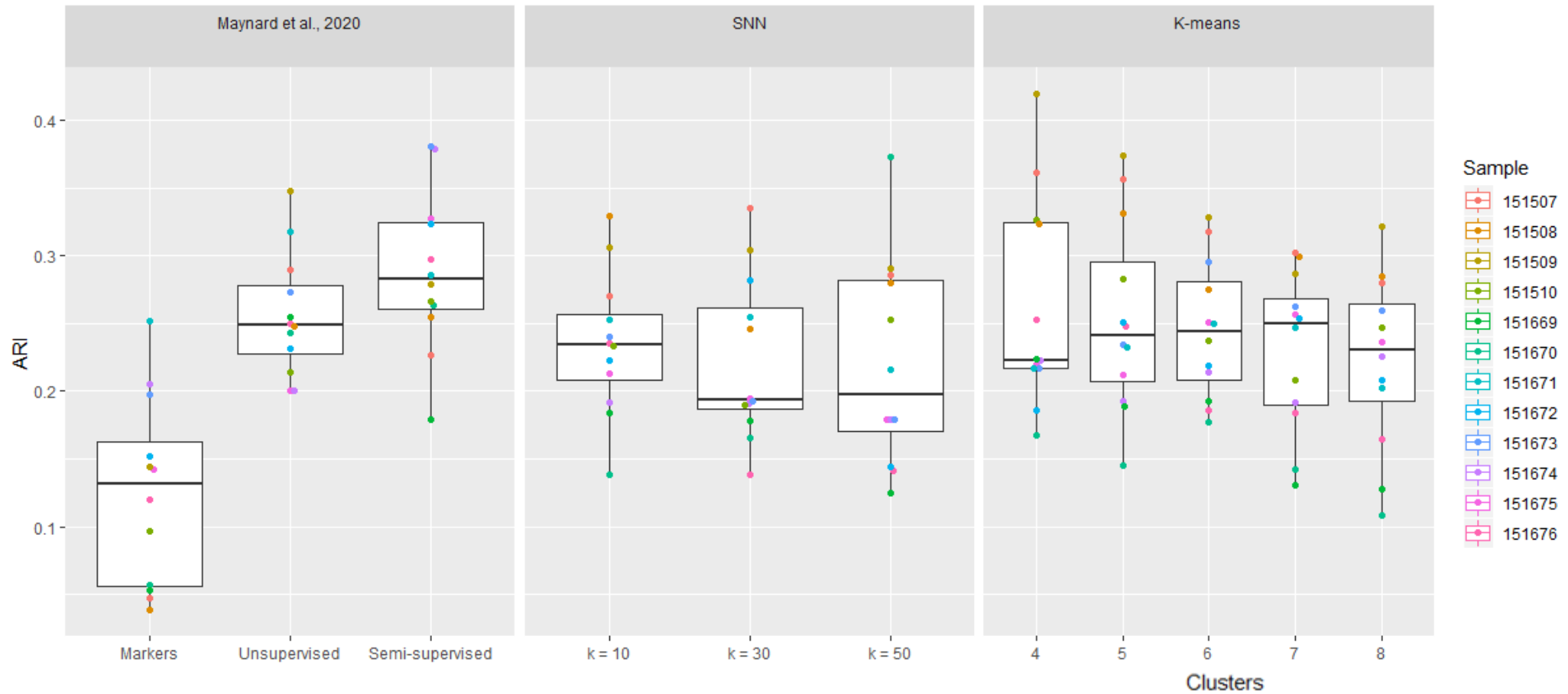
300 μ m apart

10 μ m apart

Maynard et al., 2020 clustering analysis



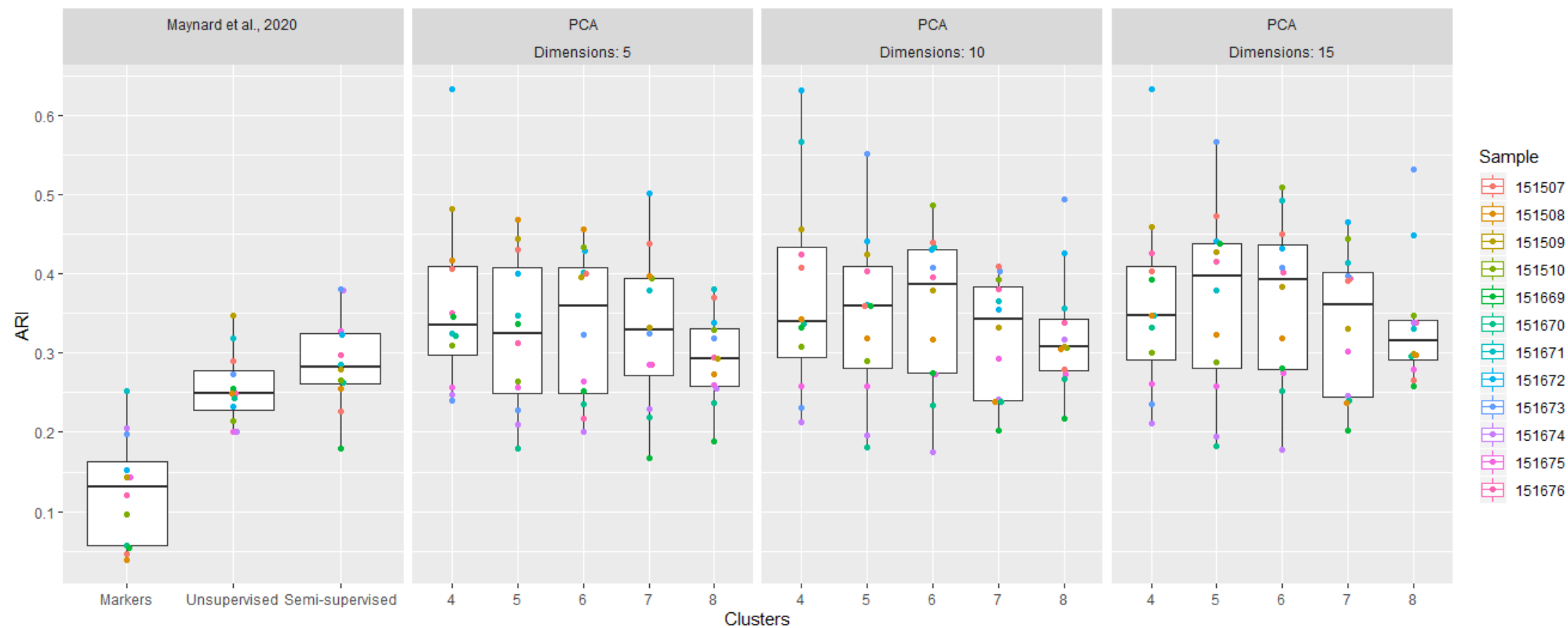
SNN and K-means clustering performance



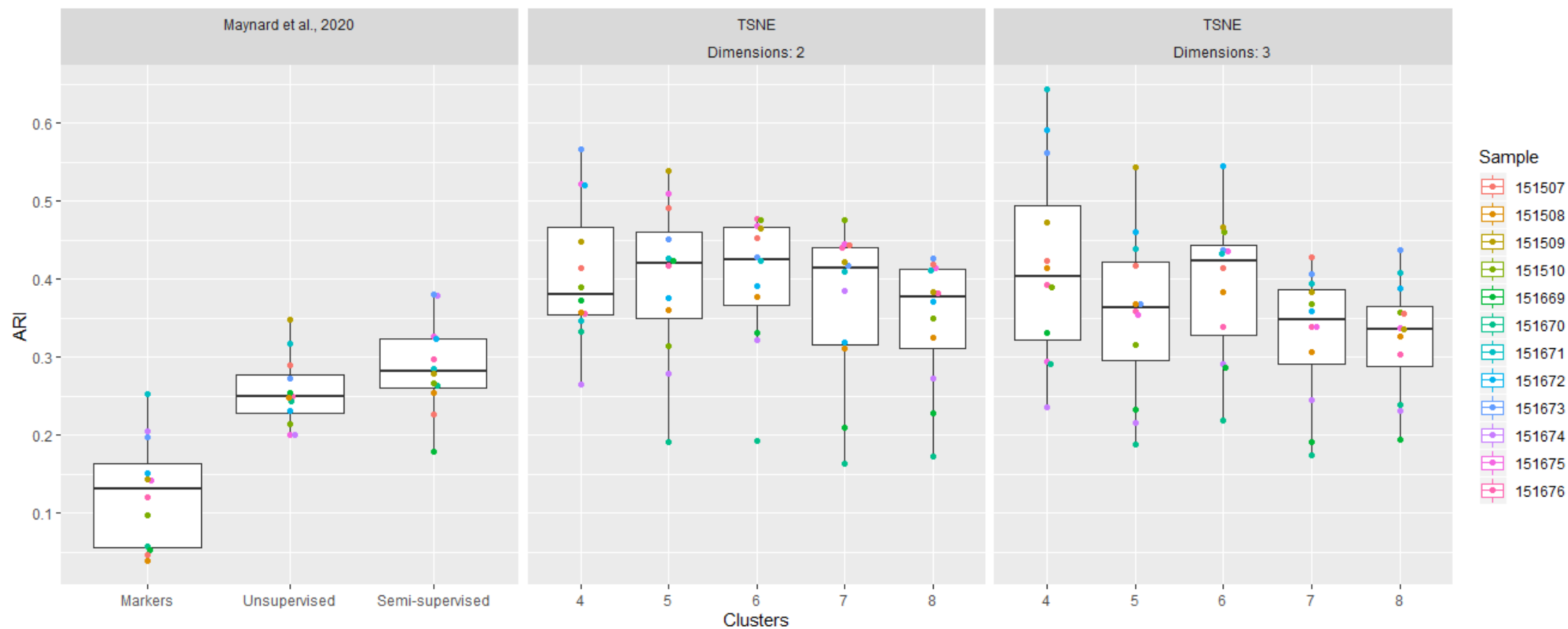
Spatial clustering method

- Each spot $i \in \{1, \dots, n\}$ has a latent state z (i.e. cell type) where $z \in \{1, \dots, q\}$
 - Potts model prior encourages neighboring spots to have the same state:
$$\pi(z) = \sum_{\langle i, j \rangle} I(z_i = z_j)$$
- Model low d -dimensional representation of expression Y (i.e. top PCs, t-SNE) as $\text{MVN}(\mu_z, \Lambda^{-1})$
- Estimate parameters $\mathbf{z}_{n \times 1}, \boldsymbol{\mu}_{1, d \times 1}, \dots, \boldsymbol{\mu}_{q, d \times 1}, \boldsymbol{\Sigma}_{d \times d}$ using MCMC
 - Initialize with k-means clustering
 - Update z using Metropolis-Hastings
 - Take predicted cluster of each spot to be modal state of chain

PCA spatial clustering performance



t-SNE spatial clustering performance



Model comparison

