

**Table 1: MOCA performance when labeled data are available.** Each entry represents the mean AUC  $\pm$  S.E.M. from 5 fold cross validation using data from unique scientific challenges.

Challenge	Smoca-greedy	Smoca	Umoca	Woc	Best_BC
D2: BCL6 Transcription Factor Target Prediction	0.835 $\pm$ 0.029	0.906 $\pm$ 0.022	0.892 $\pm$ 0.025	0.733 $\pm$ 0.029	0.767 $\pm$ 0.047
D5: Epitope Prediction	0.898 $\pm$ 0.004	0.900 $\pm$ 0.003	0.874 $\pm$ 0.005	0.872 $\pm$ 0.003	0.892 $\pm$ 0.001
D_5_network_1	0.849 $\pm$ 0.005	0.856 $\pm$ 0.003	0.753 $\pm$ 0.002	0.763 $\pm$ 0.006	0.816 $\pm$ 0.002
D_5_network_3	0.731 $\pm$ 0.005	0.742 $\pm$ 0.004	0.582 $\pm$ 0.005	0.586 $\pm$ 0.007	0.669 $\pm$ 0.010
D_5_network_4	0.544 $\pm$ 0.005	0.563 $\pm$ 0.005	0.507 $\pm$ 0.005	0.517 $\pm$ 0.004	0.539 $\pm$ 0.007
D8: NIEHS-NCATS-UNC Toxicogenetics	0.904 $\pm$ 0.002	0.905 $\pm$ 0.001	0.904 $\pm$ 0.002	0.903 $\pm$ 0.002	0.904 $\pm$ 0.001
D8: HPN Network Inference SC1B	0.736 $\pm$ 0.021	0.793 $\pm$ 0.023	0.478 $\pm$ 0.023	0.535 $\pm$ 0.034	0.702 $\pm$ 0.021
D9.5: Prostate cancer prediction	0.643 $\pm$ 0.022	0.687 $\pm$ 0.017	0.685 $\pm$ 0.035	0.665 $\pm$ 0.032	0.559 $\pm$ 0.040