

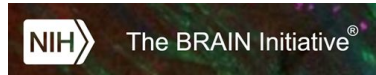
Improved learning in a cerebellar mouse model of autism

Marlies Oostland, Mikhail Kislin, Yuhang Chen, Tiffany Chen, Ben Deverett, Samuel S.-H. Wang

Princeton Neuroscience Institute

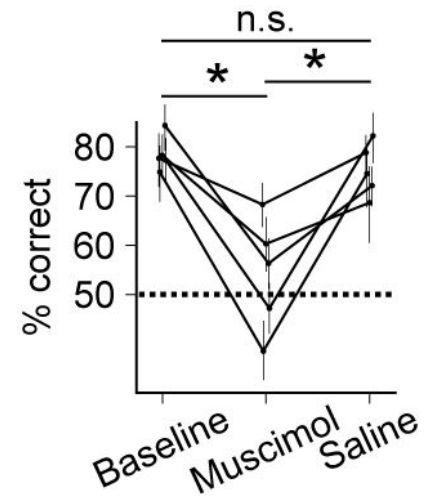
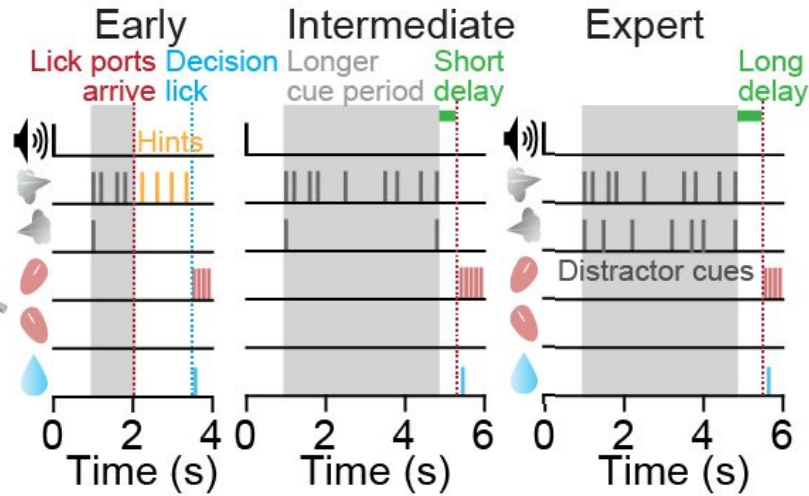
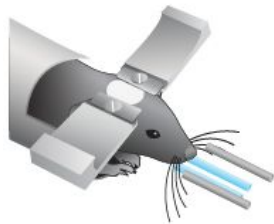
marlies.oostland@princeton.edu

(Present address: UCL, m.oostland@ucl.ac.uk)



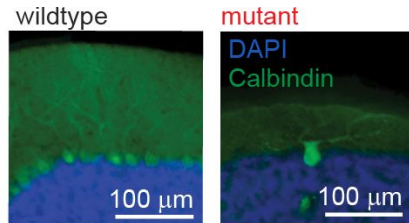
Cerebellar perturbation leads to impaired performance in trained mice

(Deverett et al., 2018, 2019)

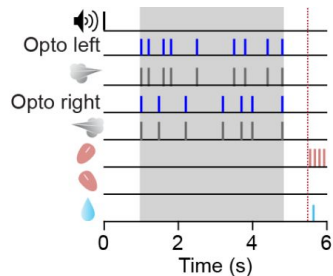


Pcp2-Tsc1 mutants have improved learning of a cognitive task, but not a motor task

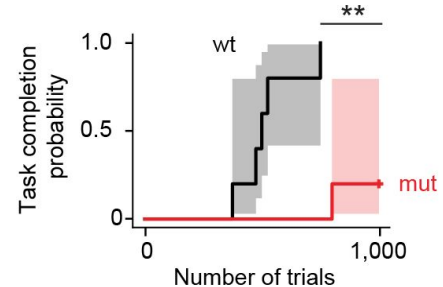
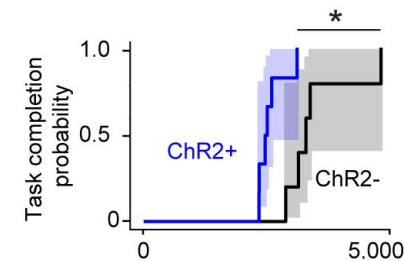
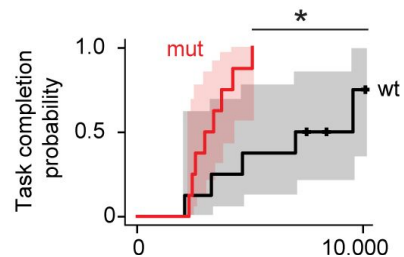
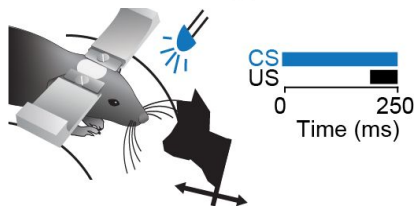
Pcp2-Tsc1 mice



Pcp2Cre x ChR2

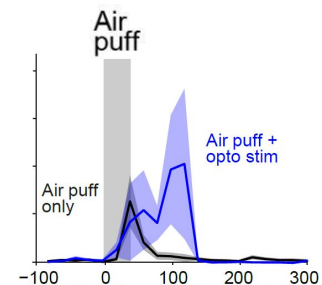
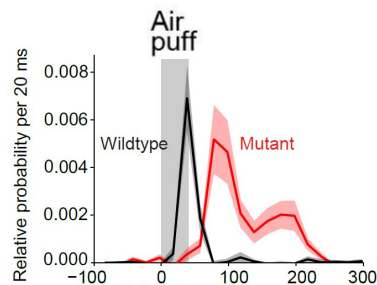
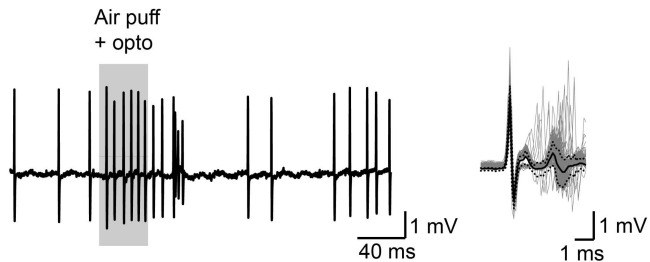


Pcp2-Tsc1 mice
Associative learning

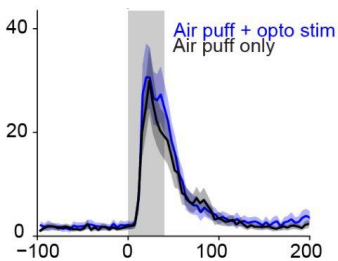
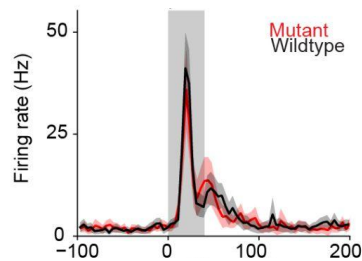


Whisker puff responses in ACC, but not S1, match complex spike firing in faster-learning mice

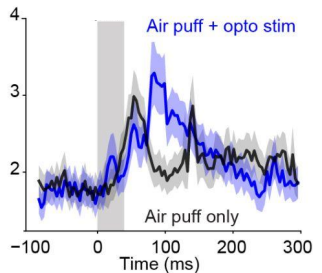
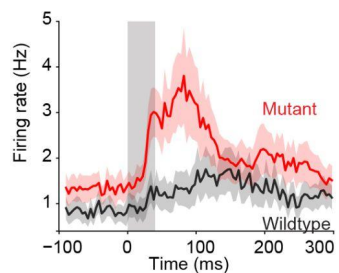
Cerebellum - example recording



**Cerebellum
Complex spikes**



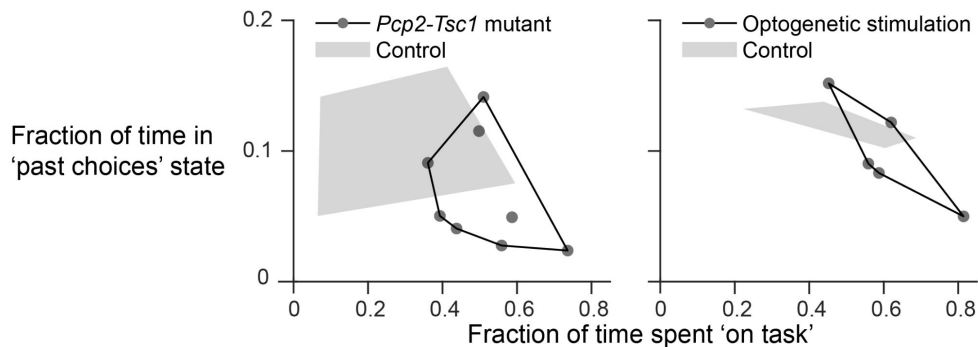
**Somatosensory
cortex**



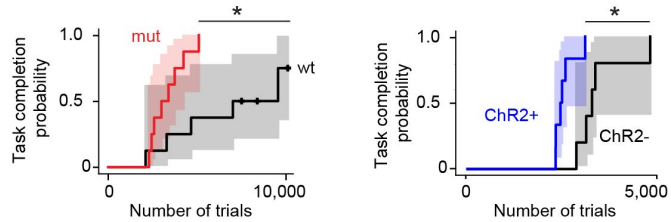
**Anterior cingulate
cortex**

Faster-learning mice are less biased by past choices

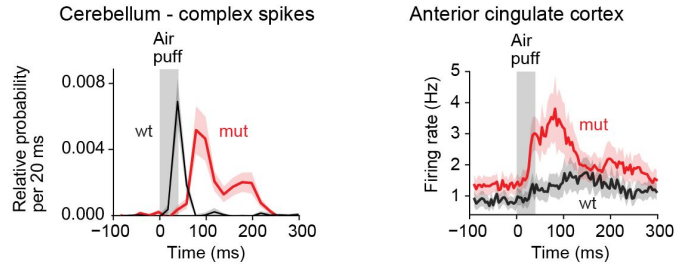
	Performance	GLM-HMM weights				
State 1 'On task'	0.76	1.53	0.63	0.27	0.23	0.14
State 2 'Past choices'	0.33	-0.16	3.11	2.73	-1.87	-0.04
State 3 'Disengaged'	0.55	0.29	0.43	0.27	0.11	-0.04
	Fraction correct	Δ Cues	Previous choice (n-1)	Previous choice (n-2)	Previous reward	Bias



Improved learning with cerebellar perturbation



Enhanced whisker puff response in cerebellum and forebrain



Seeking postdocs in Wang
lab at Princeton University.
Email:
sswang@princeton.edu

More focus on current evidence, less on past choices

