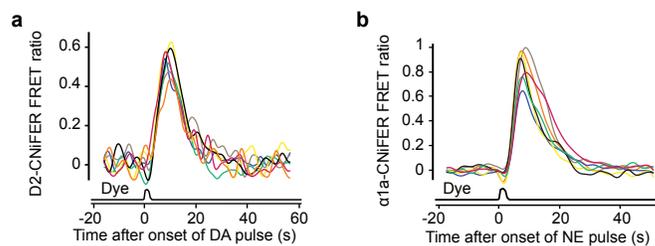


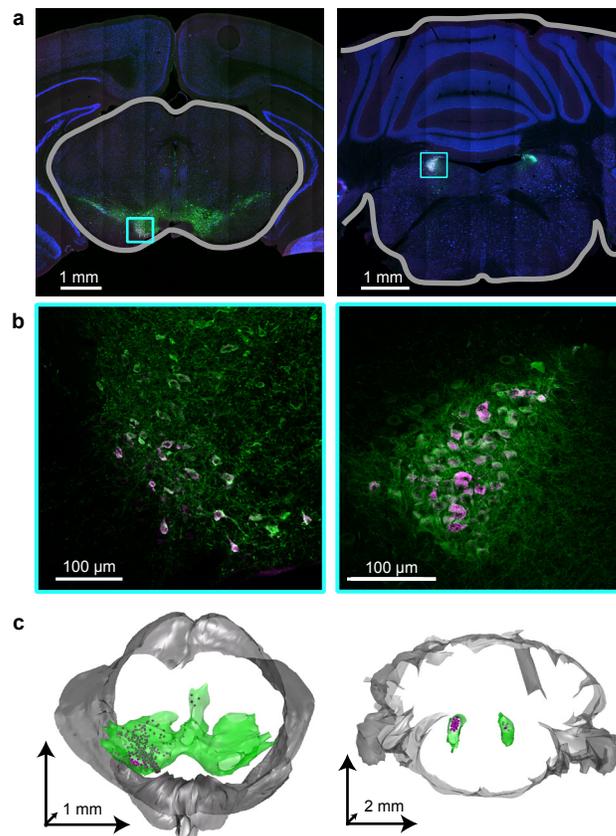
**Figure S1 of Muller\*, Joseph\*, Slesinger & Kleinfeld**

**Selectivity of D2- and  $\alpha$ 1a-CNiFERs characterized *in vitro*.** (a) D2 CNiFER FRET response to 20 nM DA alone or in the presence of D1-receptor antagonist SCH 23390 (100 nM, blue,  $n = 5$ ;  $p = 0.89$ , t-test) or D2-receptor antagonist eticlopride (50 nM, red,  $n = 5$ ,  $p = 0.0003$ , t-test). (b)  $\alpha$ 1a-CNiFER response to 50 nM NE alone or in the presence of  $\beta$ -adrenergic receptor antagonist sotatol (5  $\mu$ M, blue,  $n = 4$ ;  $p = 0.17$ , t-test), or  $\alpha$ 1a receptor antagonist WB4101 (50 nM, red,  $n = 4$ ,  $p = 0.0001$ , t-test). CNiFER response to agonist alone normalized to one, \*\*  $p < 0.001$ .



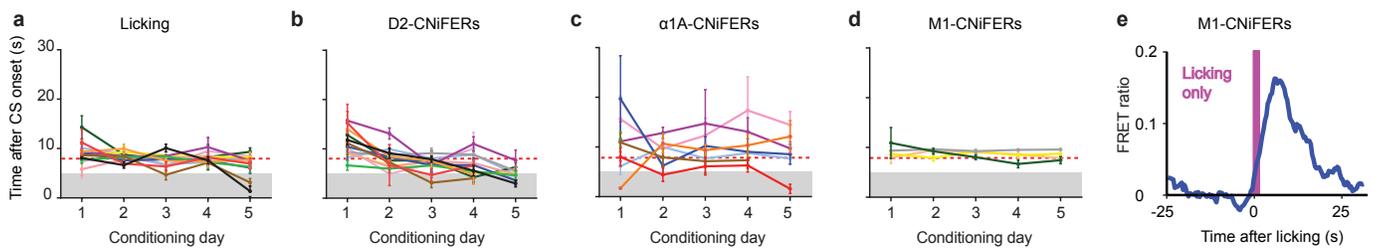
**Figure S2 of Muller\*, Joseph\*, Slesinger & Kleinfeld**

***In vitro* characterization of CNiFERS to a repeated pulses of agonist.**  
(a) Single-trial response of seven individual D2 CNiFERS and (b) seven individual  $\alpha$ 1a-CNiFERS to a single 2.5 s pulse of 100 nM DA (left) or 100 nM NE (right).



**Figure S3 of Muller\*, Joseph\*, Slesinger & Kleinfeld**

**Identification of dopaminergic and noradrenergic projections to frontal cortex.** (a) Immunostaining for tyrosine hydroxylase (green), Fluorogold™ tracer (magenta) injected ~ 200  $\mu$ m deep into frontal cortex (+1.5 mm A/P, +1.5 mm M/L), and NeuroTrace®, a Nissl stain that labels neurons (blue). Coronal sections including substantia nigra (SN) (left, A/P -3.5 mm) or locus coeruleus (LC) (right, A/P -5.6 mm). (b) Co-labeling of tyrosine hydroxylase (green) and Fluorogold™ (magenta) in SN (left) or LC (right), magnified from cyan boxes in (a). (c) Position of co-labeled cell bodies in SN (left) or LC (right) indicated by magenta dots imposed on three-dimensional reconstructions as outlined by grey in (a).



**Figure S4 of Muller\*, Joseph\*, Slesinger & Kleinfeld**

**Individual mouse FRET onset times plotted as a function of conditioning day. Error bars represent standard error (n = 13). (a)** Licking onset times during conditioning trials (CS, grey bar; US, dashed red line) across five days of conditioning. **(b)** D2 CNiFER FRET response onset times during conditioning. FRET onset times are measured relative to CS onset (n = 13). **(c)** α1a CNiFER onset times during conditioning (n = 7). **(d)** M1 CNiFER onset times during conditioning (n = 4). **(e)** Example of M1-CNiFER FRET response in a trial where the animal engaged in high frequency licking but there was no CS or US presentation.