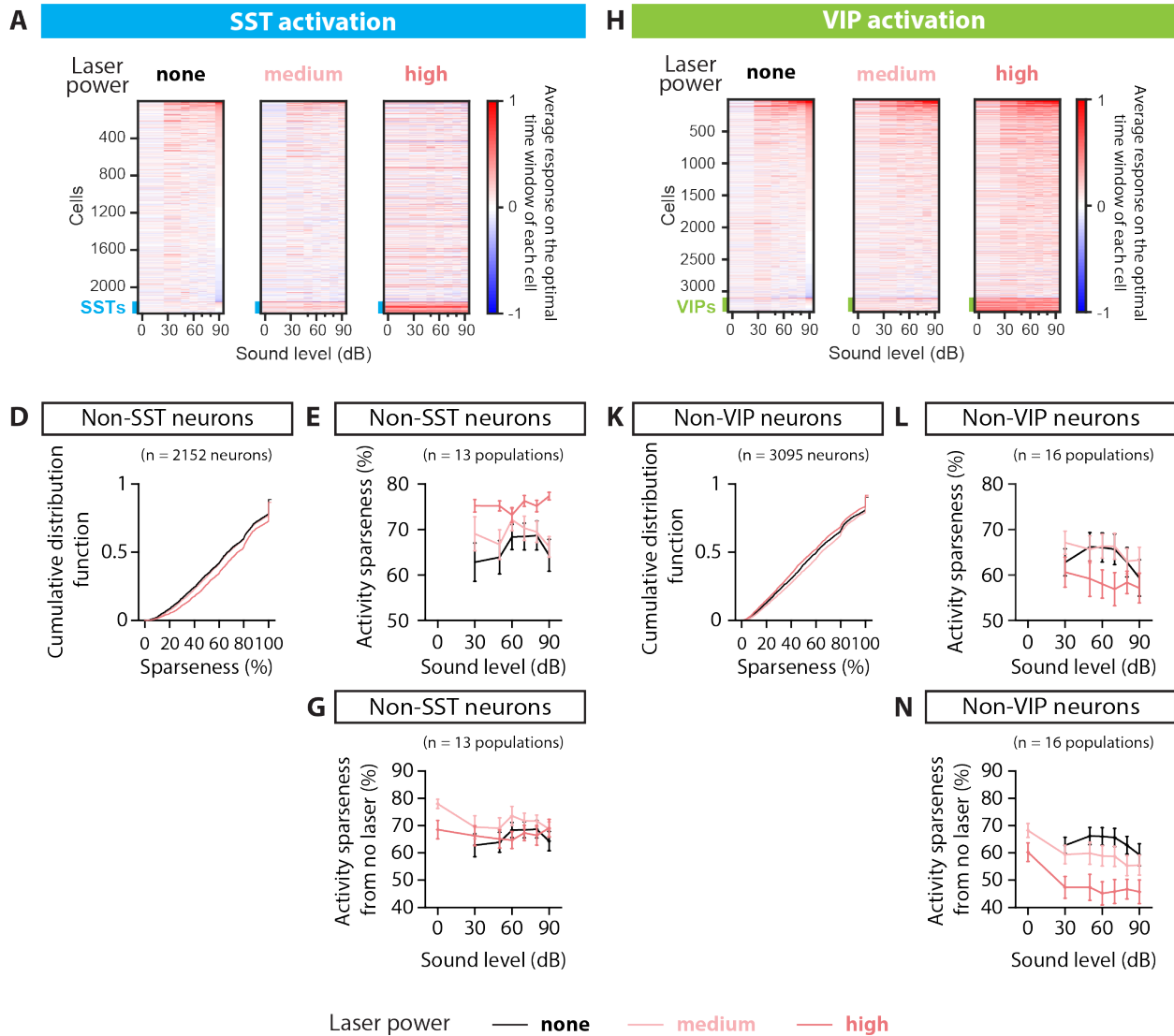


## Extended Figures: Legends and statistics

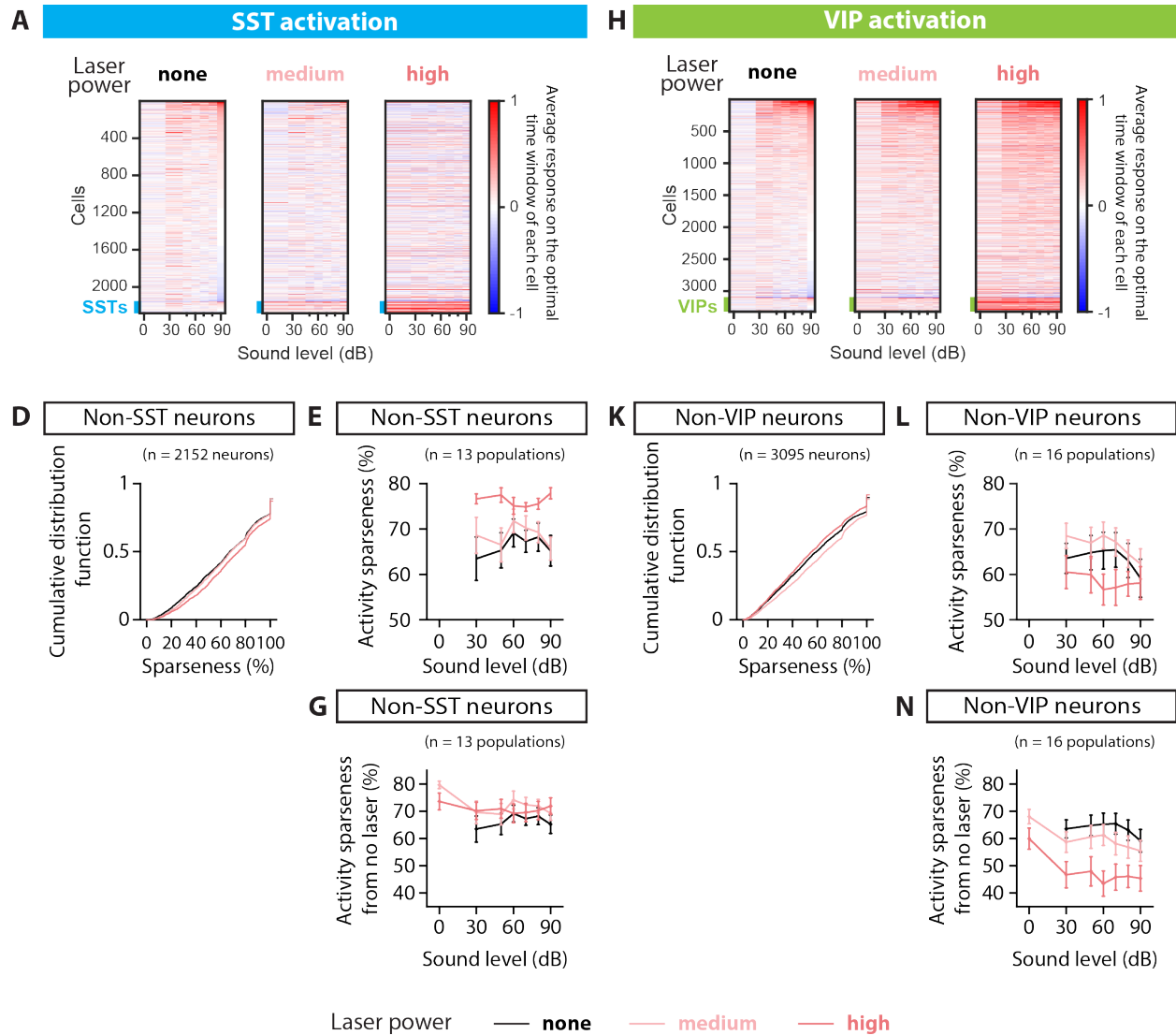


Extended Figure 2.1. Panels A, D, E, G, H, K, L, N of Figure 2 computed on a fixed [0 1] sec window instead of the optimal window.

EXTENDED FIGURE 2.1						
Sparseness with SST activation	Ext. Fig 2.2 D	None: 2020 Med: 2019 High: 1980	GLME	$t_{\text{laser}}=6.01$  DF = 5676	*** $p_{\text{laser}}=1.9e-9$	$h_{\text{laser}}^2=5.9e-3$

Activity sparseness with SST activation	Ext. Fig 2.2 E	13 populations	GLME	$t_{\text{laser}}=3.06$ $t_{\text{sound}}=0.93$ $t_{\text{laser:sound}}=-0.56$  DF = 230	<b>**<math>p_{\text{laser}}=2.5e-3</math></b> $p_{\text{sound}}=0.35$ $p_{\text{laser:sound}}=0.57$	$h_{\text{laser}}^2=0.19$ $h_{\text{sound}}^2=1.4e-2$ $h_{\text{laser:sound}}^2=1.2e-2$
Activity sparseness from 0dB and no laser power with SST activation	Ext. Fig 2.2 G	13 populations	GLME	$t_{\text{laser}}=0.31$ $t_{\text{sound}}=0.74$ $t_{\text{laser:sound}}=-0.23$  DF = 230	$p_{\text{laser}}=0.76$ $p_{\text{sound}}=0.46$ $p_{\text{laser:sound}}=0.82$	$h_{\text{laser}}^2=2.4e-3$ $h_{\text{sound}}^2=8.3e-3$ $h_{\text{laser:sound}}^2=2.1e-3$
Sparseness with VIP activation	Ext. Fig 2.2 K	None: 2997 Med: 3002 High: 3023	GLME	$t_{\text{laser}}=-3.11$  DF = 8442	<b>**<math>p_{\text{laser}}=1.8e-3</math></b>	$h_{\text{laser}}^2=9.3e-4$
Activity sparseness with VIP activation	Ext. Fig 2.2 L	16 populations	GLME	$t_{\text{laser}}=-1.46$ $t_{\text{sound}}=-0.97$ $t_{\text{laser:sound}}=5.1e-4$  DF = 284	$p_{\text{laser}}=0.14$ $p_{\text{sound}}=0.33$ $p_{\text{laser:sound}}=0.99$	$h_{\text{laser}}^2=3.1e-2$ $h_{\text{sound}}^2=8.6e-3$ $h_{\text{laser:sound}}^2=6.0e-9$
Activity sparseness from 0dB and no laser power with VIP activation	Ext. Fig 2.2 N	16 populations	GLME	$t_{\text{laser}}=-5.54$ $t_{\text{sound}}=-1.45$ $t_{\text{laser:sound}}=0.58$  DF = 284	<b>***<math>p_{\text{laser}}=7.0e-8</math></b> $p_{\text{sound}}=0.15$ $p_{\text{laser:sound}}=0.56$	$h_{\text{laser}}^2=0.22$ $h_{\text{sound}}^2=1.2e-2$ $h_{\text{laser:sound}}^2=4.7e-3$

Extended Table 2.1: Statistics table for extended figure panels 2.2, with the average response computed on a fixed [0-1] sec window instead of the optimal window (as in Figure 2 D, E, G, K, L, N).



Extended Figure 2.2 : Panels A, D, E, G, H, K, L, N of Figure 2 computed on the fixed sec window as described in the Methods instead of the optimal window.

EXTENDED FIGURE 2.2						
Sparseness with SST activation	Ext. Fig 2.1 D	None: 2033 Med: 2029 High: 1994	GLME	$t_{\text{laser}}=5.21$  DF = 5702	*** $p_{\text{laser}}=2.0e-7$	$h_{\text{laser}}^2=4.5e-3$
Activity sparseness with SST activation	Ext. Fig 2.1 E	13 populations	GLME	$t_{\text{laser}}=3.20$ $t_{\text{sound}}=0.87$ $t_{\text{laser:sound}}=-0.79$	** $p_{\text{laser}}=1.6e-3$ $p_{\text{sound}}=0.38$ $p_{\text{laser:sound}}=0.43$	$h_{\text{laser}}^2=0.22$ $h_{\text{sound}}^2=1.3e-2$ $h_{\text{laser:sound}}^2=2.5e-2$

				DF = 230		
Activity sparseness from 0dB and no laser power with SST activation	Ext. Fig 2.1 G	13 populations	GLME	$t_{\text{laser}}=1.39$ $t_{\text{sound}}=0.84$ $t_{\text{laser:sound}}=-0.48$  DF = 230	$p_{\text{laser}}=0.17$ $p_{\text{sound}}=0.40$ $p_{\text{laser:sound}}=0.63$	$h_{\text{laser}}^2=3.9e-2$ $h_{\text{sound}}^2=9.0e-3$ $h_{\text{laser:sound}}^2=7.3e-3$
Sparseness with VIP activation	Ext. Fig 2.1 K	None: 2979 Med: 2921 High: 3020	GLME	$t_{\text{laser}}=-2.78$  DF = 8350	<b>**<math>p_{\text{laser}}=5.5e-3</math></b>	$h_{\text{laser}}^2=7.0e-4$
Activity sparseness with VIP activation	Ext. Fig 2.1 L	16 populations	GLME	$t_{\text{laser}}=-1.46$ $t_{\text{sound}}=-1.18$ $t_{\text{laser:sound}}=0.17$  DF = 284	$p_{\text{laser}}=0.15$ $p_{\text{sound}}=0.24$ $p_{\text{laser:sound}}=0.86$	$h_{\text{laser}}^2=2.8e-2$ $h_{\text{sound}}^2=1.2e-2$ $h_{\text{laser:sound}}^2=6.4e-4$
Activity sparseness from 0dB and no laser power with VIP activation	Ext. Fig 2.1 N	16 populations	GLME	$t_{\text{laser}}=-5.37$ $t_{\text{sound}}=-1.38$ $t_{\text{laser:sound}}=0.60$  DF = 284	<b>***<math>p_{\text{laser}}=1.7e-7</math></b> $p_{\text{sound}}=0.17$ $p_{\text{laser:sound}}=0.55$	$h_{\text{laser}}^2=0.19$ $h_{\text{sound}}^2=9.7e-3$ $h_{\text{laser:sound}}^2=4.6e-3$

Extended Table 2.2: Statistics table for extended figure panels 2.1, with the average response computed on the fixed window as described in the Methods instead of the optimal window (as in Figure 2 D, E, G, K, L, N).