Modified STDP triplet rule significantly increases neuron training stability in the learning of spatial patterns. Supplementary Materials

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Table S1. Optimized parameters for the 64Hz/39Hz setup.

	n	T_{pre}	T_{post}	η	A_{pre}	ϑ	w_{min}	W_0	T_{pre3}	T_{post3}	A_{pre3}	A_{post3}
Triplet	1	0.211	12.249	0.662	0.600	21.69	0.104	0.273	59.907	92.49	-0.794	0.134
	2	0.277	11.195	0.715	0.602	24.64	0.117	0.319	58.070	90.55	-0.793	0.051
	4	0.307	17.548	0.718	0.652	14.23	0.087	0.377	62.423	89.44	-0.825	0.122
	8	0.362	29.608	0.748	0.666	8.88	0.003	0.282	71.900	94.94	-0.840	0.082
	12	0.594	34.965	0.610	0.671	13.76	0.023	0.275	67.782	70.72	-0.887	-0.017
	24	0.593	44.271	0.740	0.731	20.39	0.001	0.428	72.343	62.48	-0.973	0.042
All-to-all	1	2.336	4.577	-0.081	0.493	63.37	0.000	0.580				
	2	1.603	3.370	-0.090	0.451	65.29	0.015	0.594				
	4	1.720	3.316	-0.106	0.497	65.16	0.004	0.599				
	8	14.217	18.630	0.075	0.842	18.57	0.057	0.261				
	12	9.274	14.282	0.121	0.941	21.12	0.081	0.255				
	24	4.005	7.701	0.031	0.677	23.76	0.031	0.206				
Nearest	8	16.983	35.286	0.230	0.876	15.57	0.010	0.204				
	12	17.390	42.780	0.244	0.852	18.66	0.041	0.240				
	24	1.213	30.425	0.166	0.112	21.83	0.007	0.195				

Table S2. Optimized parameters for the 64Hz/64Hz setup.

	n	T_{pre}	T_{post}	η	A_{pre}	ϑ	w_{min}	W_0	T_{pre3}	T_{post3}	A_{pre3}	A_{post3}
Triplet	4	6.655	94.650	0.636	0.635	54.31	0.006	0.732	213.04	198.39	-1.392	-0.788
	8	11.986	49.929	0.308	0.773	21.25	0.007	0.794	197.47	157.43	-1.144	-0.851
	12	20.270	51.055	0.286	0.978	13.25	0.002	0.318	153.34	183.43	-1.081	-0.942
	15	17.829	49.783	0.305	0.693	18.02	0.002	0.344	105.877	96.65	-1.214	-0.703
	19	9.221	11.449	0.465	0.992	19.63	0.005	0.416	134.265	88.52	-1.219	-1.048
All-to-all	8	80.048	50.041	0.005	0.969	86.00	0.027	0.729				
	12	40.919	33.332	0.011	0.836	43.63	0.024	0.368				
	15	16.517	18.075	0.049	0.947	26.94	0.047	0.266				
	19	19.358	20.188	0.040	0.964	33.70	0.080	0.319				
Nearest	15	12.525	22.102	0.246	1.000	26.96	0.046	0.214				
	19	7.506	17.024	0.341	0.897	31.37	0.054	0.239				

Table S3. Optimized parameters for the 39Hz/39Hz and 25Hz/39Hz setup.

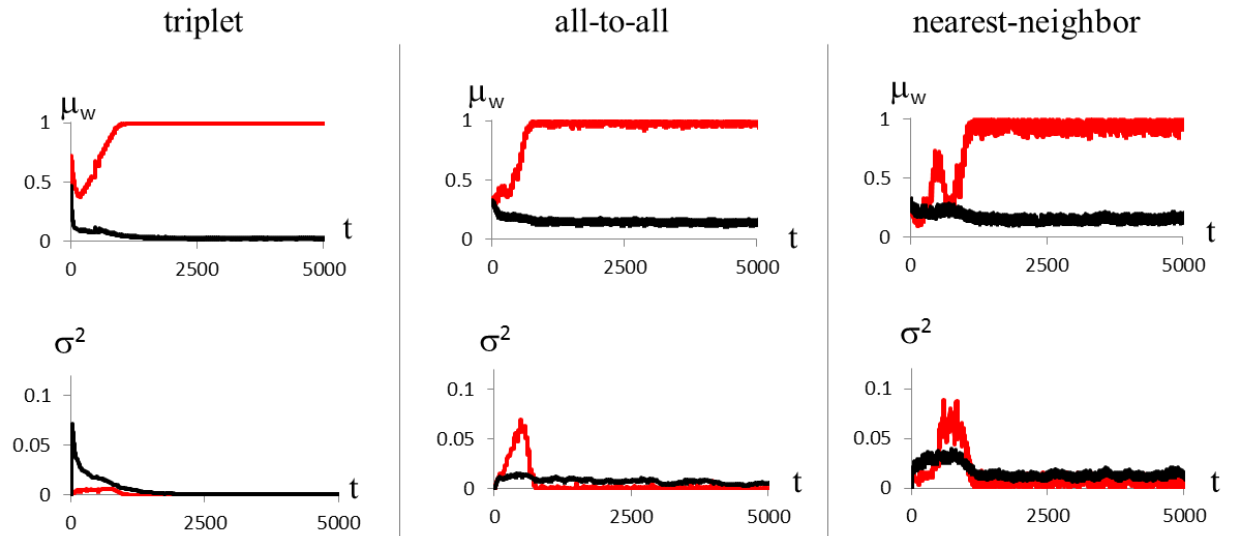|	f (Hz)	T_{pre}	T_{post}	η	A_{pre}	ϑ	w_{min}	W_0	T_{pre3}	T_{post3}	A_{pre3}	A_{post3}
Triplet	25	15.894	11.198	0.272	0.981	8.176	0.010	0.164	45.71	72.113	-1.183	0.393
	39	14.271	15.447	0.353	0.733	10.360	0.013	0.197	28.76	88.54	-1.428	0.389
All-to-all	25	29.731	28.077	0.018	0.935	12.073	0.051	0.159				
	39	48.598	37.593	0.006	0.999	12.965	0.056	0.169				
Nearest	25	13.831	27.551	0.154	0.989	8.749	0.016	0.134				
	39	8.188	19.835	0.232	0.912	11.895	0.030	0.178				

Figure S1. Evolution of synaptic strengths in the 64Hz setup. Results were taken from singular successful trainings when pattern size was n=19. The top rows are means of synaptic strengths; the bottom rows show variances. Red denotes synapses associated to the pattern, black denotes synapses not associated to the pattern.