Supplementary Information

Hyperbolic neural networks for biologically informed classification of white blood cells and hematopoietic cell states in peripheral blood smears

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Feature dim.	Batch size	Learning rate	Dropout
256	512	5e-4	0.2
128	512	0.001	0.2
256	512	1e-4	0.2
256	512	5e-4	0.1
128	512	5e-4	0.2
256	512	5e-5	0.2
128	512	1e-4	0.1
128	512	1e-4	0.2
256	512	5e-5	0.1
256	512	2e-4	0.2
128	512	5e-5	0.1
128	512	5e-5	0.2
128	512	2e-4	0.2
256	512	2e-4	0.1
256	512	0.001	0.2
256	512	0.001	0.1
128	512	2e-4	0.1
128	512	5e-4	0.1
256	512	1e-4	0.1
128	512	0.001	0.1

Table S1: Hyperparameters of the Euclidean baseline configurations reported in Table 1. Rows correspond directly to the metric rows and are ordered by test macro-F1. All runs used an input image size of 224, seed 42, and weight decay of 1e-4.

Feature clip	LR_b	LR_c	LR_h	LR_τ	Batch size
2.0	1e-4	0.003	0.005	0.003	256
3.0	5e-5	0.004	0.004	0.003	256
1.5	1e-4	0.004	0.003	0.003	256
2.0	1e-4	0.003	0.004	0.003	256
2.0	1e-4	0.004	0.004	0.003	256
2.0	1e-4	0.004	0.005	0.003	256
2.0	5e-5	0.004	0.003	0.003	256
2.0	5e-5	0.003	0.003	0.003	256
1.5	1e-4	0.004	0.005	0.003	256
3.0	1e-4	0.004	0.005	0.003	256
2.0	1e-4	0.003	0.003	0.003	256
2.0	5e-5	0.004	0.005	0.003	256
2.0	5e-5	0.004	0.004	0.003	256
3.0	1e-4	0.004	0.003	0.003	256
1.5	1e-4	0.004	0.004	0.003	256
3.0	1e-4	0.004	0.004	0.003	256
1.5	5e-5	0.004	0.004	0.003	256
2.0	1e-4	0.004	0.003	0.003	256
2.0	5e-5	0.003	0.004	0.003	256
2.0	5e-5	0.003	0.005	0.003	256

Table S2: Hyperparameters of the hyperbolic configurations reported in Table 2. Rows correspond directly to the metric rows and are ordered by test macro-F1. Feature clip denotes the feature-norm clipping threshold applied before the exponential map. LR_b, LR_c, LR_h, and LR_τ denote learning rates for the backbone, curvature, prototype head, and temperature parameters, respectively. All runs used feature dimension 256, input image size 224×224 pixels, seed 42, initial curvature 2.0, and initial temperature 1.0.