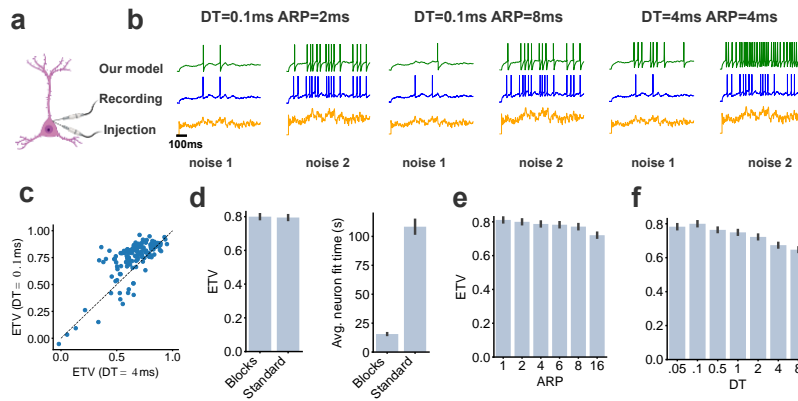


**Figure 4: Performance of our model on spiking datasets.** **a.** Classification accuracy of our model and the standard ALIF SNN on the N-MNIST and SHD datasets over different (non-biological) ARPs (N-MNIST 1ms=1 sim. step; SHD 2ms=1 sim. step). **b.** Training durations of our model and the standard ALIF SNN on the N-MNIST and SHD datasets. Gray lines plot the standard model's performance (using no ARP) and bars plot the mean and s.e. over three runs.



**Figure 5: Fitting cortical electrophysiological recordings.** **a.** An illustration of a cortical neuron in mouse V1 being recorded whilst stimulated with a noisy current. **b.** Example current injection (bottom) and recorded membrane potential (middle) (neither used for fitting) with corresponding model predictions (top). **c.** Comparison of neuron fit accuracy of our model for DT=0.1ms (y-axis) against DT=4ms (x-axis). Explained temporal variance (ETV) measures the goodness-of-fit (one is a perfect fit and zero is a chance-level fit). **d.** Comparing our model's fit accuracy (left) and duration (right) to the standard model (both using DT=0.1ms and ARP=2ms). **e.** Our model's fit accuracy for increasing ARP (with DT=0.1ms). **f.** Our model's fit accuracy for increasing DT (with ARP=max(2, DT)ms). **d-f** plot the median and 1 s.e. over neurons, except **d.** (right) plots the mean.

Zoomed-in subplots from Figure 5b:

