This talk presents Selective-Backprop: a mechanism for adaptively selecting high-value training examples. Selective-Backprop makes a decision on the basis of the output of a forward pass of a candidate training example as to whether to compute gradients and update parameters or to skip immediately to the next candidate. Selective-Backprop is self-paced, training examples with a probability proportional to the Euclidean distance between the current model output for the training example and the intended output. Through evaluation on MNIST, CIFAR10, CIFAR100 and SVHN, across a variety of modern image models, we show that this mechanism results in convergence to higher accuracy and faster convergence-per-trained-example. Selective-Backprop a simple, lightweight, and generally applicable technique for sampling training examples that both accelerates learning and reduces final error.