Electronic Supplementary Material (ESI) for Digital Discovery.

Supporting Information

Semi-supervised machine learning workflow for analysis of nanowire morphologies from transmission electron microscopy images

Shizhao Lu, Brian Montz, Todd Emrick, Arthi Jayaraman*

Correspondence to: arthij@udel.edu

This PDF file includes:

Figs. S1 to S8

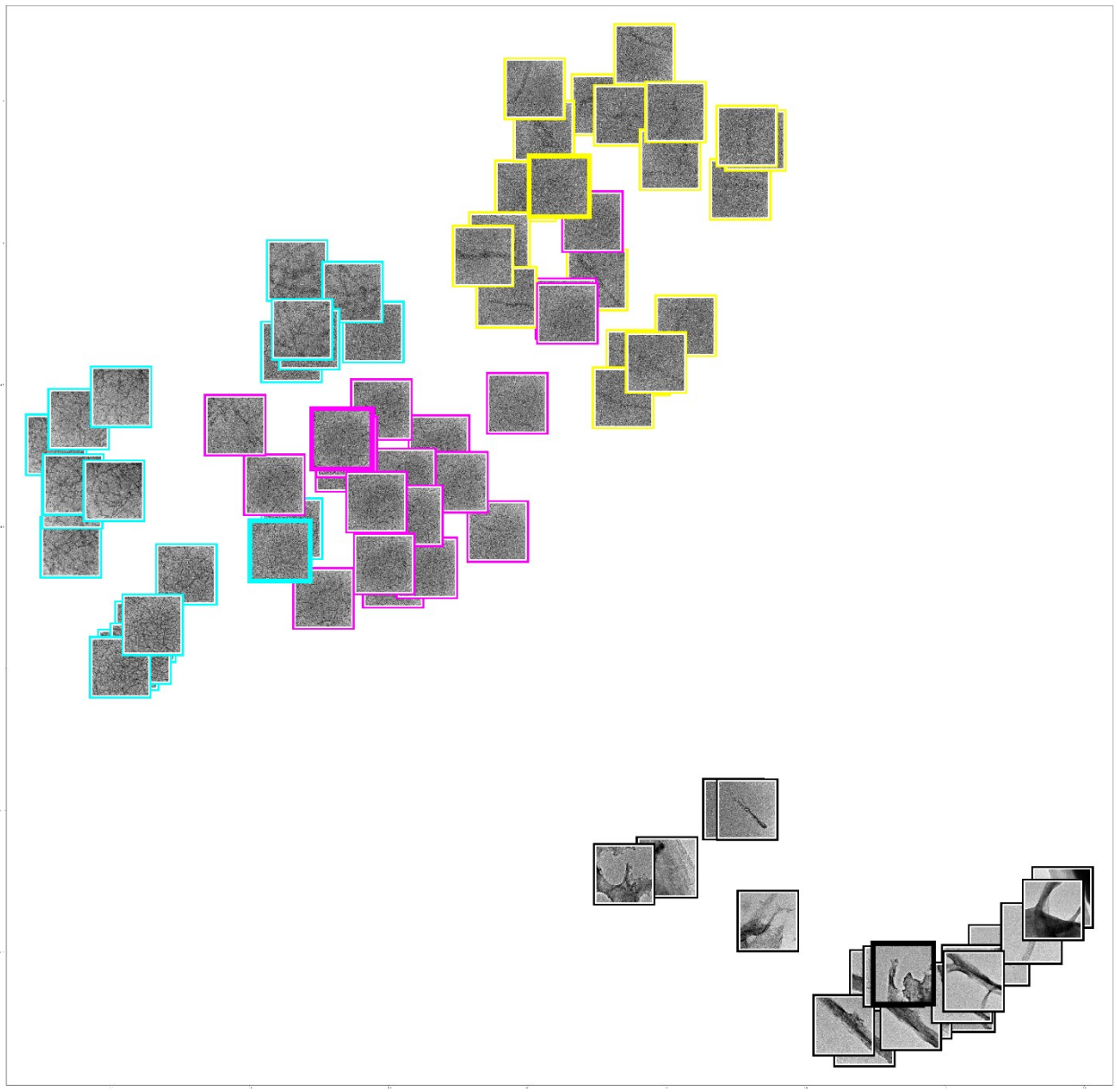

Fig. S1.

t-SNE representations of the test set images and labeled anchor images colored by their **true** labels with "**good anchor**" images as training set. The anchor images belonging to each of the four morphologies are distinguished with thicker border. Morphology color coding: black—bundle, yellow—singular, pink—dispersed, teal—percolated.

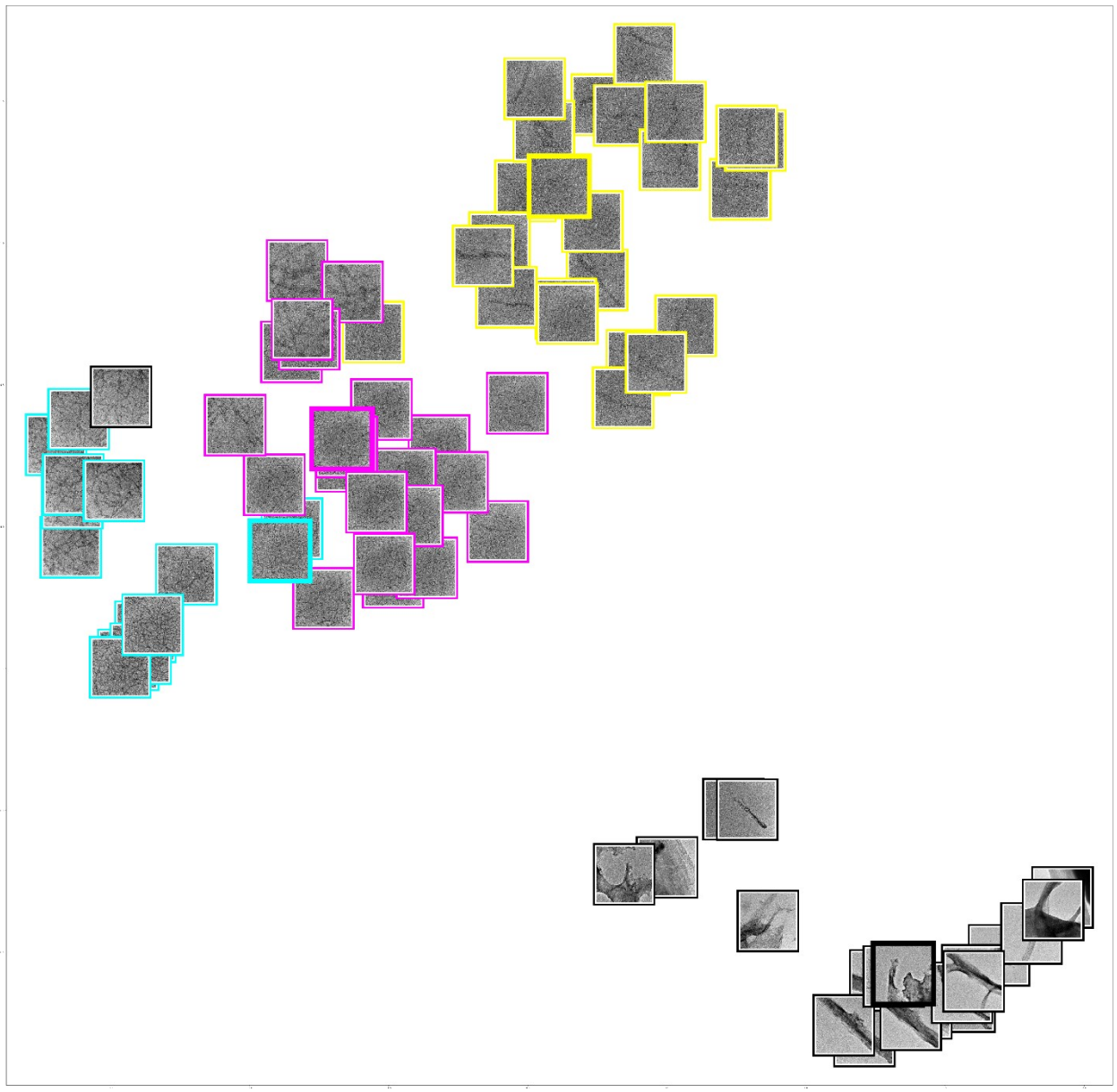

Fig. S2.

t-SNE representations of the test set images and labeled anchor images colored by their **predicted** labels with **"good anchor"** images as training set. The anchor images belonging to each of the four morphologies are distinguished with thicker border. Morphology color coding: black—bundle, yellow—singular, pink—dispersed, teal—percolated.

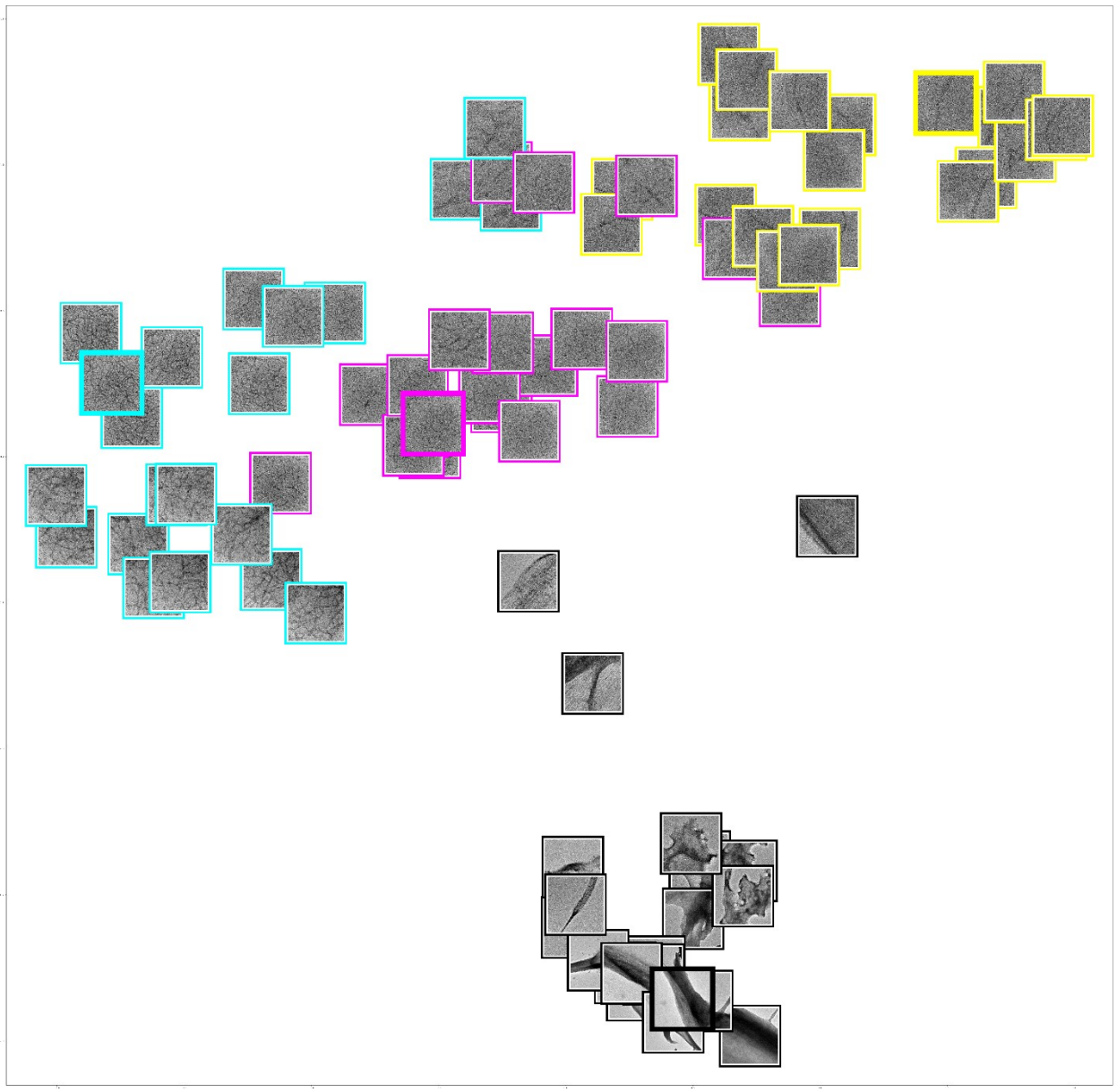

Fig. S3.

t-SNE representations of the test set images and labeled anchor images colored by their **true** labels with **"bad anchor"** images as training set. The anchor images belonging to each of the four morphologies are distinguished with thicker border. Morphology color coding: black—bundle, yellow—singular, pink—dispersed, teal—percolated.

Fig. S4.

t-SNE representations of the test set images and labeled anchor images colored by their **predicted** labels with "**bad anchor**" images as training set. The anchor images belonging to each of the four morphologies are distinguished with thicker border. Morphology color coding: black—bundle, yellow—singular, pink—dispersed, teal—percolated.

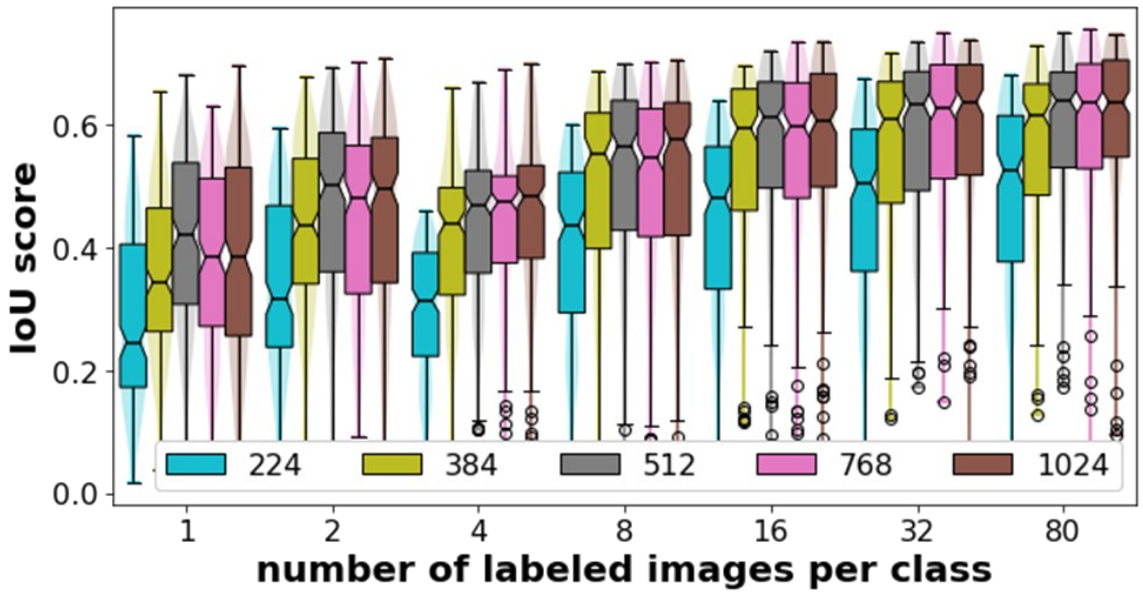

Fig. S5.

IoU scores for the nanowire segmentation task with encoder trained with Barlow-Twins method and on generic TEM images of resolution 512 × 512. Legend indicates the resolution of the input images for the segmentation task. Sample size is 200 for each boxplot. Notch of the boxplots indicates 95% confidence interval around the median.

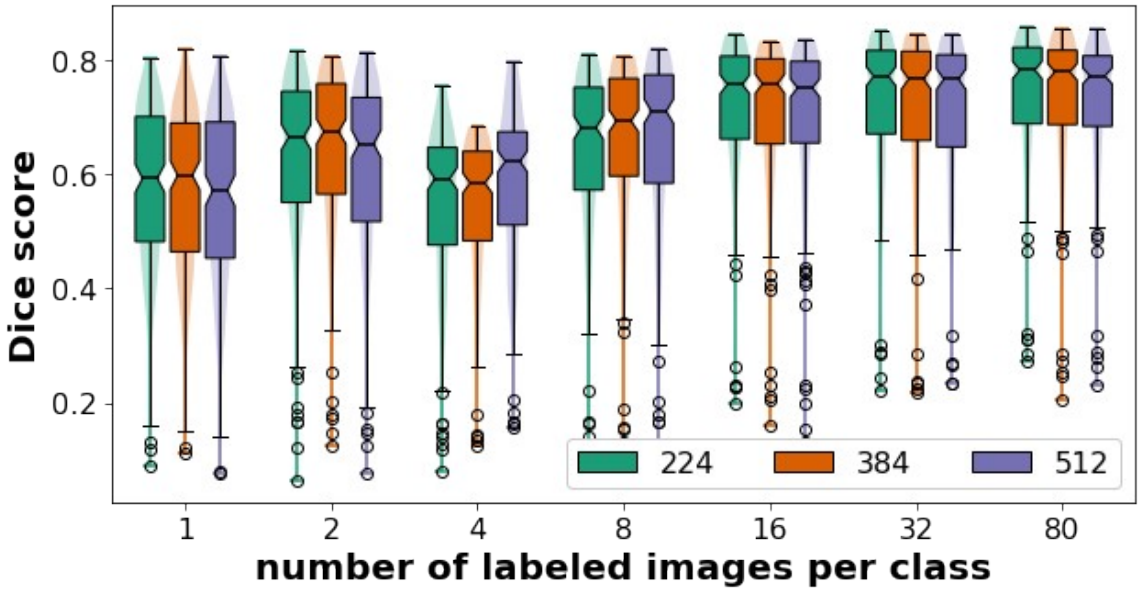

Fig. S6.

Dice scores for the nanowire segmentation task with encoder trained with Barlow-Twins method on generic TEM images of resolution 224 × 224, 384 × 384 or 512 × 512 as the legend indicates. The resolution of the input images for the segmentation task is 512 × 512. Sample size is 200 for each boxplot. Notch of the boxplots indicates 95% confidence interval around the median.

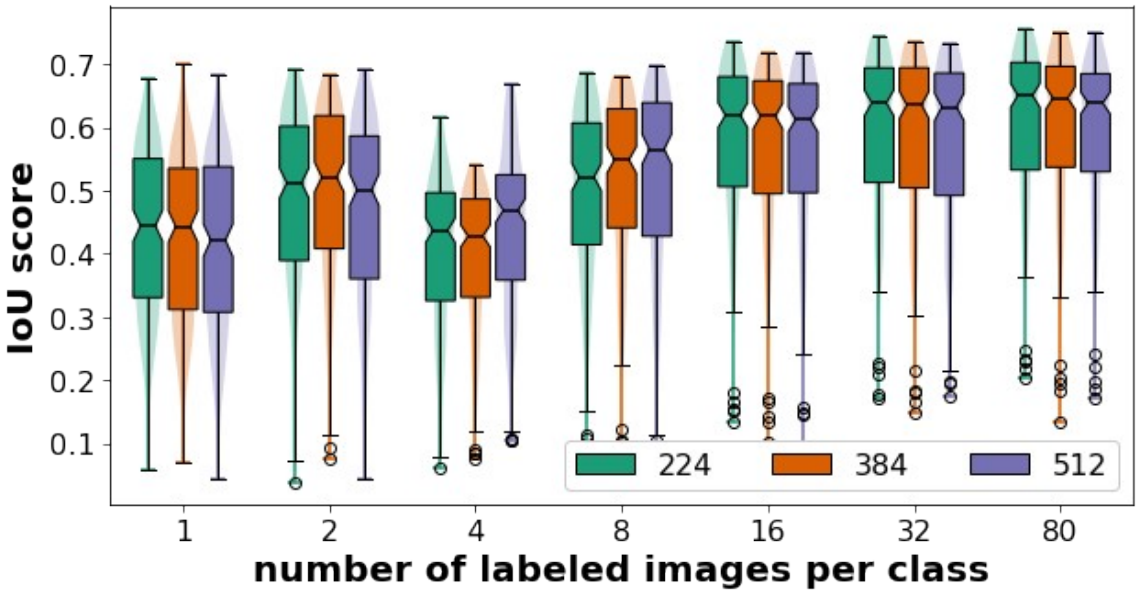

Fig. S7.

IoU scores for the nanowire segmentation task with encoder trained with Barlow-Twins method on generic TEM images of resolution 224 × 224, 384 × 384 or 512 × 512 as the legend indicates. The resolution of the input images for the segmentation task is 512 × 512. Sample size is 200 for each boxplot. Notch of the boxplots indicates 95% confidence interval around the median.

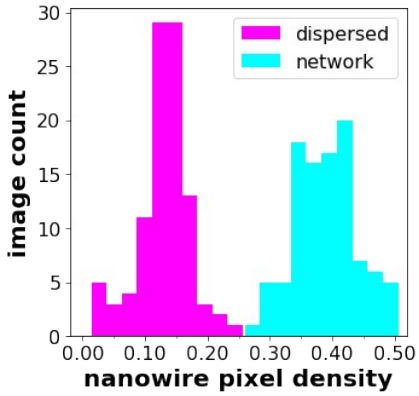

Fig. S8.

The distribution of nanowire pixel density i.e., percentage of "nanowire pixels" over all pixels in a segmentation ground truth binary map, of both dispersed and network morphologies images (100 images for each morphology) obtained from ground truth binary maps of resolution 224 × 224.