# Supplementary Information for
## *Predicting the fluid behavior of random microfluidic mixers using convolutional neural networks*

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Please find all the following files in github.com/junchaolab/randomCNN.

# 1 Supplementary files for quantitative analysis of the CNN library

- *qAnalysis.m* is the MATLAB script we used for quantitative analysis of the CNN library.

- *cnnBenchmark.csv* is the raw matching data of 1,000 benchmarks by using the CNN library.

- *randomBenchmark.csv* is the raw matching data of 1,000 benchmarks by using the random library.

- *cnnLibrary.mat* is the MATLAB data file containing the outflow rates and concentrations of 41,270 candidate designs in the CNN library.

- *randomLibrary.mat* is the MATLAB data file containing the outflow rates and concentrations of 10,513 candidate designs in the Random library.

# 2 Supplementary files for training of neural networks

- *randomAll.csv* is the dataset of all 10,513 pre-simulated random microfluidic mixers, which is used in all the following script.

- *gridInfo.pkl* is the 15x15 matrix/grid information in numpy format of all 10,513 pre-simulated random microfluidic mixers, which is used in all the following CNN training scripts.

- *flowCNN.py* is the Python script we used for training of flowCNN.

- *cCNN.py* is the Python script we used for training of cCNN.

- *ANNVelocity.py* is the Python script we used for training of ANN model to predict three outflow rates. (Described in Section 3.4.1.)

- *ANNConcentration.py* is the Python script we used for training of ANN model to predict three outflow concentrations. (Described in Section 3.4.1.)

- *oneCNNmodel.py* is the Python script we used for training of the single CNN model to predict three outflow rates and concentrations. (Described in Section 3.4.2.)

- *cnnConcentrationThreeOutlets.py* and *cnnConcentrationThreeOutletsNormalized.py* are two Python scripts we used in investigation of necessity of using law of conservation of mass. (Described in Section 3.4.3.)