

# Machine learning and deep learning

CISL provides several libraries for users' machine learning and deep learning (ML/DL) work **on Casper nodes**.

These libraries have been compiled from source to use native CUDA (GPU) and MPI libraries, increasing the capabilities over downloadable distributions that are available online. The ML/DL library installations can be found in NPL versions for Python 3.7.9.

Users load them by activating the NCAR Python Library ([NPL](#)).

The libraries available are:

- [TensorFlow](#) machine learning library v2.3.1
  - [PyTorch](#) machine learning library v1.7.1
  - [scikit-learn](#) machine learning library v0.5.3
  - [Horovod](#) deep learning framework v0.21.0
  - [Keras](#) deep learning library v2.4.3
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## Starting a job

ML/DL workloads are most likely targeted toward NVIDIA's Tesla V100 hardware. To start an interactive job on a Casper node using a V100 GPU, run the **execcasper** command with the **ngpus=#** and **gpu\_type=v100** resources set as shown in [this documentation](#).

Then load the modules you need, including Python version 3.7.9, and [activate the NPL](#).