



# NVIDIA DLI HANDS-ON TRAINING

CATALOG

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DEEP  
LEARNING  
INSTITUTE

To get started with DLI hands-on training, visit  
[\*\*www.nvidia.com/dli\*\*](http://www.nvidia.com/dli)

# INTRODUCTION

The NVIDIA Deep Learning Institute (DLI) trains developers, data scientists, and researchers on how to use deep learning and accelerated computing to solve real-world problems across a wide range of domains.

With access to GPU-accelerated workstations in the cloud, you'll learn how to train, optimize, and deploy neural networks using the latest deep learning tools, frameworks, and SDKs. You'll also learn how to assess, parallelize, optimize, and deploy GPU-accelerated computing applications.

DLI offers training in two formats:

## INSTRUCTOR-LED WORKSHOPS

In-person workshops teach you how to implement and deploy an end-to-end project in one day. Offered at customer sites, conferences, and universities, full-day workshops include hands-on training and lectures delivered by DLI-certified instructors. Workshops offer a certificate of competency upon completion of the built-in assessment.

## ONLINE COURSES

Online, self-paced courses teach you how to implement and deploy an end-to-end project in eight hours or how to apply a specific technology or development technique in two hours. Online courses can be taken anytime, anywhere with a laptop and an internet connection. Most eight-hour courses offer a certificate of competency upon completion of the built-in assessment.



### CERTIFICATE

Participants can earn a certificate to prove subject matter competency and support professional career growth. Certificates are offered for select instructor-led workshops and online courses.

# INSTRUCTOR-LED WORKSHOPS

## DEEP LEARNING FUNDAMENTALS

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### Fundamentals of Deep Learning for Computer Vision

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Learn how to build, train, and deploy a neural network for common deep learning workflows to solve real-world problems.

**PREREQUISITES:** Familiarity with basic programming fundamentals, such as functions and variables

**TOOLS AND FRAMEWORKS:** Caffe, DIGITS

**LANGUAGES:** English, Japanese, Korean, Simplified Chinese, Traditional Chinese

### Fundamentals of Deep Learning for Multiple Data Types

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Learn how to train convolutional neural networks (CNNs) and recurrent neural networks (RNNs) to generate captions from images and video using TensorFlow and the Microsoft Common Objects in Context (COCO) dataset.

**PREREQUISITES:** Familiarity with basic Python (functions and variables); prior experience training neural networks

**TOOLS AND FRAMEWORKS:** TensorFlow

**LANGUAGES:** English, Japanese, Korean, Traditional Chinese

### Fundamentals of Deep Learning for Natural Language Processing

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Explore how to convert text to machine-understandable representation and train machine translators from one language to another using natural language processing (NLP).

**PREREQUISITES:** Basic experience with neural networks and Python; familiarity with linguistics

**TOOLS AND FRAMEWORKS:** TensorFlow, Keras

**LANGUAGES:** English

### Fundamentals of Deep Learning for Multi-GPUs

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Learn how to use multiple GPUs to train neural networks and effectively parallelize training of deep neural networks using TensorFlow.

**PREREQUISITES:** Experience with stochastic-gradient-descent mechanics, network architecture, and parallel computing

**TOOLS AND FRAMEWORKS:** TensorFlow

**LANGUAGES:** English

# DEEP LEARNING BY INDUSTRY

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## Deep Learning for Autonomous Vehicles—Perception

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Learn how to design, train, and deploy deep neural networks and optimize perception components for autonomous vehicles using the NVIDIA DRIVE development platform.

**PREREQUISITES:** Experience with CNNs and C++

**TOOLS AND FRAMEWORKS:** TensorFlow, NVIDIA TensorRT, Python, CUDA C++, DIGITS

**LANGUAGES:** English, Simplified Chinese

## Deep Learning for Digital Content Creation with Autoencoders

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Learn how to animate characters with phase-function neural networks, explore techniques to make arbitrary photo and video style transfer, and train your own denoiser for rendered images.

**PREREQUISITES:** Basic familiarity with deep learning concepts such as CNNs; experience with Python

**TOOLS AND FRAMEWORKS:** TensorFlow, Torch

**LANGUAGES:** English

## Deep Learning for Healthcare Image Analysis

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Learn how to apply CNNs to MRI scans to perform a variety of medical tasks and calculations.

**PREREQUISITES:** Basic familiarity with deep neural networks; basic coding experience in Python or similar language

**TOOLS AND FRAMEWORKS:** R, MXNet, TensorFlow, Caffe, DIGITS

**LANGUAGES:** English

## Deep Learning for Industrial Inspection

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Learn how to design, train, test, and deploy building blocks of a hardware-accelerated industrial inspection pipeline.

**PREREQUISITES:** Familiarity with deep neural networks; experience with Python and deep learning frameworks such as TensorFlow, Keras, and PyTorch

**TOOLS AND FRAMEWORKS:** TensorFlow, TensorRT, Keras

**LANGUAGES:** English, Traditional Chinese

## Deep Learning for Intelligent Video Analytics

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Explore how to deploy object detection and tracking networks to evaluate real-time, large-scale video streams.

**PREREQUISITES:** Experience with deep networks (specifically variations of CNNs); intermediate-level experience with C++ and Python

**TOOLS AND FRAMEWORKS:** DeepStream 3.0, TensorFlow

**LANGUAGES:** English, Korean

## Deep Learning for Robotics

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Explore how to create robotic solutions on an NVIDIA Jetson for embedded applications.

**PREREQUISITES:** Basic familiarity with deep neural networks; basic coding experience in Python or similar language

**TOOLS AND FRAMEWORKS:** ROS, DIGITS, NVIDIA Jetson      **LANGUAGES:** English

## Applications of AI for Anomaly Detection

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Learn to detect anomalies in large datasets to identify network intrusions using supervised and unsupervised machine learning techniques such as accelerated XGBoost, autoencoders, and generative adversarial networks (GANs).

**PREREQUISITES:** Experience with CNNs and Python

**TOOLS AND FRAMEWORKS:** RAPIDS, Keras, GANs,      **LANGUAGES:** English  
XGBoost

## Applications of AI for Predictive Maintenance

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Learn how to identify anomalies and failures in time-series data, estimate the remaining useful life of the corresponding parts, and use this information to map anomalies to failure conditions.

**PREREQUISITES:** Experience with Python and deep networks

**TOOLS AND FRAMEWORKS:** TensorFlow, Keras      **LANGUAGES:** English

# ACCELERATED COMPUTING FUNDAMENTALS

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## Fundamentals of Accelerated Computing with CUDA C/C++

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Learn how to accelerate and optimize existing C/C++ CPU-only applications to leverage the power of GPUs using the most essential CUDA techniques and the Nsight Systems profiler.

**PREREQUISITES:** Basic C/C++ competency, including familiarity with variable types, loops, conditional statements, functions, and array manipulations

**LANGUAGES:** English, Korean, Traditional Chinese

## Fundamentals of Accelerated Computing with CUDA Python

---

Explore how to use Numba—the just-in-time, type-specializing Python function compiler—to accelerate Python programs to run on massively parallel NVIDIA GPUs.

**PREREQUISITES:** Basic Python competency, including familiarity with variable types, loops, conditional statements, functions, and array manipulations; NumPy competency, including the use of ndarrays and ufuncs

**LANGUAGES:** English

# ACCELERATED DATA SCIENCE FUNDAMENTALS

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## Fundamentals of Accelerated Data Science with RAPIDS

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Learn how to perform multiple analysis tasks on large datasets using RAPIDS, a collection of data science libraries that allows end-to-end GPU acceleration for data science workflows.

**PREREQUISITES:** Professional data science experience with Python, including proficiency in pandas and NumPy; familiarity with common machine learning algorithms, including XGBoost, linear regression, DBSCAN, K-Means, and SSSP

**LANGUAGES:** English

# ONLINE COURSES

## DEEP LEARNING FUNDAMENTALS

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### Fundamentals of Deep Learning for Computer Vision

Learn how to build, train, and deploy a neural network for common deep learning workflows to solve real-world problems.

**PREREQUISITES:** Familiarity with basic programming fundamentals, such as functions and variables

**LANGUAGES:** English, Japanese, Korean, Simplified Chinese, Traditional Chinese

**TOOLS AND FRAMEWORKS:** Caffe, DIGITS

**DURATION:** 8 hours

**PRICE:** \$90 (excludes tax, if applicable)

### Getting Started with Deep Learning on Jetson Nano

Explore how to build a deep learning classification project with computer vision models using the NVIDIA Jetson Nano Developer Kit.

**PREREQUISITES:** Basic familiarity with Python (helpful, not required)

**TOOLS AND FRAMEWORKS:** PyTorch, Jetson Nano

**LANGUAGES:** English

**DURATION:** 8 hours

**PRICE:** Free (hardware required)

### Image Classification with DIGITS

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Learn how to train a deep neural network to recognize handwritten digits by loading image data into a training environment, choosing and training a network, testing with new data, and iterating to improve performance.

**PREREQUISITES:** None

**LANGUAGES:** English, Japanese, Simplified Chinese

**TOOLS AND FRAMEWORKS:** Caffe (with DIGITS interface)

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

### Object Detection with DIGITS

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Learn how to detect objects using computer vision and deep learning by identifying a purpose-built network and using end-to-end labeled data.

**PREREQUISITES:** Basic experience with neural networks

**TOOLS AND FRAMEWORKS:** Caffe (with DIGITS interface)

**LANGUAGES:** English, Simplified Chinese

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)



## Optimization and Deployment of TensorFlow Models with TensorRT

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Learn how to optimize TensorFlow models to generate fast inference engines in the deployment stage.

**PREREQUISITES:** Experience with TensorFlow and Python

**TOOLS AND FRAMEWORKS:** TensorFlow, Python, TensorRT (TF-TRT)

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## Deep Learning at Scale with Horovod

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Learn how to scale deep learning training to multiple GPUs with Horovod, the open-source distributed training framework originally built by Uber and hosted by the LF AI Foundation.

**PREREQUISITES:** Competency in Python; professional experience training deep learning models in Python

**TOOLS AND FRAMEWORKS:** Horovod, TensorFlow, Keras

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## Image Segmentation with TensorFlow

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Learn how to combine computer vision and natural language processing to describe scenes using deep learning.

**PREREQUISITES:** Basic experience with neural networks

**TOOLS AND FRAMEWORKS:** TensorFlow

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## Signal Processing with DIGITS

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Learn how to classify both image and image-like data using deep learning by converting radio frequency (RF) signals into images to detect a weak signal corrupted by noise.

**PREREQUISITES:** Basic experience training neural networks

**TOOLS AND FRAMEWORKS:** Caffe, DIGITS

**LANGUAGES:** English, Simplified Chinese

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

# DEEP LEARNING BY INDUSTRY

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## GAME DEVELOPMENT AND DIGITAL CONTENT

### Image Style Transfer with Torch

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Learn how to transfer the look and feel of one image to another image by extracting distinct visual features using CNNs.

**PREREQUISITES:** Experience with CNNs

**TOOLS AND FRAMEWORKS:** Torch

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

### Rendered Image Denoising Using Autoencoders

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Explore how a neural network with an autoencoder can be used to dramatically speed up the removal of noise in ray-traced images.

**PREREQUISITES:** Experience with CNNs

**TOOLS AND FRAMEWORKS:** TensorFlow

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

### Image Super Resolution Using Autoencoders

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Leverage the power of a neural network with autoencoders to create high-quality images from low-quality source images.

**PREREQUISITES:** Experience with CNNs

**TOOLS AND FRAMEWORKS:** Keras

**LANGUAGES:** English,  
Simplified Chinese

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## HEALTHCARE

### Modeling Time-Series Data with Recurrent Neural Networks in Keras

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Explore how to classify and forecast time-series data using RNNs, such as modeling a patient's health over time.

**PREREQUISITES:** Basic experience with deep learning

**TOOLS AND FRAMEWORKS:** Keras

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

### Medical Image Classification Using the MedNIST Dataset

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Get an introduction to deep learning for radiology and medical imaging by classifying images in a medical imaging dataset using CNNs.

**PREREQUISITES:** Basic experience in Python

**TOOLS AND FRAMEWORKS:** PyTorch

**LANGUAGES:** English,  
Simplified Chinese

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## Data Science Workflows for Deep Learning in Medical Applications

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Learn how to apply data augmentation and standardization techniques to a medical imaging dataset and validate your techniques by training a CNN on the dataset.

**PREREQUISITES:** Basic experience with Python and CNNs

**TOOLS AND FRAMEWORKS:** PyTorch

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## Medical Image Segmentation with DIGITS

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Explore how to segment MRI images to measure parts of the heart by experimenting with TensorFlow tools, such as TensorBoard and the TensorFlow Python API.

**PREREQUISITES:** Basic experience with CNNs and Python

**TOOLS AND FRAMEWORKS:** DIGITS, Caffe

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## Image Classification with TensorFlow: Radiomics—1p19q Chromosome Status Classification

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Learn how to train CNNs to detect radiomics from MRI imaging.

**PREREQUISITES:** Basic experience with CNNs and Python

**LANGUAGES:** English, Simplified Chinese

**TOOLS AND FRAMEWORKS:** TensorFlow

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## Medical Image Analysis with R and MXNet

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Learn how to train a CNN to infer the volume of the left ventricle of the human heart from time-series MRI data.

**PREREQUISITES:** Basic experience with CNNs and Python

**TOOLS AND FRAMEWORKS:** MXNet

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## Data Augmentation and Segmentation with Generative Networks for Medical Imaging

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Learn how to use GANs for medical imaging by applying them to the creation and segmentation of brain MRIs.

**PREREQUISITES:** Experience with CNNs

**TOOLS AND FRAMEWORKS:** TensorFlow

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## Coarse-to-Fine Contextual Memory for Medical Imaging

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Learn how to use coarse-to-fine context memory (CFCM) to improve traditional architectures for medical image segmentation and classification tasks.

**PREREQUISITES:** Experience with CNNs and long short-term memory (LSTM)

**TOOLS AND FRAMEWORKS:** TensorFlow

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## INTELLIGENT VIDEO ANALYTICS

### AI Workflows for Intelligent Video Analytics with DeepStream

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Learn how to build hardware-accelerated applications for intelligent video analytics (IVA) with DeepStream and deploy them at scale to transform video streams into insights.

**PREREQUISITES:** Experience with C++ and GStreamer

**TOOLS AND FRAMEWORKS:** DeepStream 3.0

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

### Getting Started with DeepStream for Video Analytics on Jetson Nano

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Learn how to build DeepStream applications to annotate video streams using object detection and classification networks.

**PREREQUISITES:** Basic familiarity with C

**LANGUAGES:** English

**TOOLS AND FRAMEWORKS:** DeepStream, TensorRT, Jetson Nano

**DURATION:** 8 hours; Self-paced

**PRICE:** Free

## ACCELERATED COMPUTING FUNDAMENTALS

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### Fundamentals of Accelerated Computing with CUDA C/C++

---

Learn how to accelerate and optimize existing C/C++ CPU-only applications to leverage the power of GPUs using the most essential CUDA techniques and the Nsight Systems profiler.

**PREREQUISITES:** Basic C/C++ competency, including familiarity with variable types, loops, conditional statements, functions, and array manipulations

**LANGUAGES:** English, Japanese, Korean, Simplified Chinese, Traditional Chinese

**PRICE:** \$90 (excludes tax, if applicable)

**DURATION:** 8 hours

### Fundamentals of Accelerated Computing with CUDA Python

---

Explore how to use Numba—the just-in-time, type-specializing Python function compiler—to create and launch CUDA kernels to accelerate Python programs on massively parallel NVIDIA GPUs.

**PREREQUISITES:** Basic Python competency, including familiarity with variable types, loops, conditional statements, functions, and array manipulations; NumPy competency, including the use of ndarrays and ufuncs

**LANGUAGES:** English

**PRICE:** \$90 (excludes tax, if applicable)

**DURATION:** 8 hours

## Fundamentals of Accelerated Computing with OpenACC

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Explore how to build and optimize accelerated heterogeneous applications on multiple GPU clusters using a combination of OpenACC, CUDA-aware MPI, and NVIDIA profiling tools.

**PREREQUISITES:** Basic experience with C/C++

**LANGUAGES:** English

**DURATION:** 8 hours

**PRICE:** \$90 (excludes tax, if applicable)

## High-Performance Computing with Containers

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Learn how to reduce complexity and improve portability and efficiency of your code by using a containerized environment for high-performance computing (HPC) application development.

**PREREQUISITES:** Proficiency programming in C/C++; professional experience working on HPC applications

**TOOLS AND FRAMEWORKS:** Docker, Singularity, HPC Container Maker (HPCCM)

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## Accelerating Applications with CUDA C/C++

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Learn how to accelerate your C/C++ application using CUDA to harness the massively parallel power of NVIDIA GPUs.

**PREREQUISITES:** Basic experience with C/C++

**LANGUAGES:** English, Japanese

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## OpenACC—2X in 4 Steps

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Learn how to accelerate C/C++ or Fortran applications using OpenACC to harness the massively parallel power of NVIDIA GPUs.

**PREREQUISITES:** Basic experience with C/C++

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## GPU Memory Optimizations with CUDA C/C++

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Learn useful memory optimization techniques for programming with CUDA C/C++ on an NVIDIA GPU and how to use the NVIDIA Visual Profiler (NVVP) to support these optimizations.

**PREREQUISITES:** Basic experience accelerating applications with CUDA C/C++

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## Accelerating Applications with GPU-Accelerated Libraries in C/C++

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Learn how to accelerate your C/C++ application using CUDA-optimized libraries to harness the massively parallel power of NVIDIA GPUs.

**PREREQUISITES:** Basic experience accelerating applications with CUDA C/C++

**LANGUAGES:** English, Japanese

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## Using Thrust to Accelerate C++

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Discover how to build GPU-accelerated applications in C/C++ that utilize the powerful Thrust library.

**PREREQUISITES:** Basic experience accelerating applications with CUDA C/C++

**LANGUAGES:** English

**DURATION:** 2 hours

**PRICE:** \$30 (excludes tax, if applicable)

## ACCELERATED DATA SCIENCE FUNDAMENTALS

---

### Fundamentals of Accelerated Data Science with RAPIDS

---

Learn how to perform multiple analysis tasks on large datasets using RAPIDS, a collection of data science libraries that allows end-to-end GPU acceleration for data science workflows.

**PREREQUISITES:** Professional data science experience with Python, including proficiency in pandas and NumPy; familiarity with common machine learning algorithms, including XGBoost, linear regression, DBSCAN, K-Means, and SSSP

**LANGUAGES:** English

**PRICE:** \$90 (excludes tax, if applicable)

**DURATION:** 8 hours

### Accelerating Data Science Workflows with RAPIDS

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Learn to build a GPU-accelerated, end-to-end data science workflow using RAPIDS open-source libraries for massive performance gains.

**PREREQUISITES:** Advanced competency in pandas, NumPy, and scikit-learn

**LANGUAGES:** English

**PRICE:** \$30 (excludes tax, if applicable)

**DURATION:** 2 hours

## GPU COMPUTING IN THE DATA CENTER

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### Introduction to AI in the Data Center

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Designed for enterprise IT professionals, this course explores an introduction to AI, GPU computing, NVIDIA AI software architecture, and how to implement and scale AI workloads in the data center.

**PREREQUISITES:** Basic knowledge of enterprise networking, storage, and data center operations

**LANGUAGES:** English

**PRICE:** \$30 (excludes tax, if applicable)

**DURATION:** 4 hours

For full workshop details or to enroll in online training, visit  
**[www.nvidia.com/dli](http://www.nvidia.com/dli)**

