

# DEEP LEARNING

## Syllabus

EXPORT CONTROLLED - This technology or software is subject to the U.S. Export Administration Regulations (EAR), (15 C.F.R. Parts 730-774). No authorization from the U.S. Department of Commerce is required for export, re-export, in-country transfer, or access EXCEPT to country group E:1 or E:2 countries/persons per Supp.1 to Part 740 of the EAR. ECCN: EAR99

# Course Objectives

- Good understanding of different Deep Neural Networks (DNNs)
  - Concept and mathematical models
- Good understanding of DNN research and applications
  - Well-established papers
- Perspective of resolving problems in your own area using DNN
  - Applications to Computer Vision and Time Series
- Programming skills on using modern Deep Learning libraries

# Course Schedule

- Live & Virtual
  - meets once a week for 4 weeks
  - Via Webex

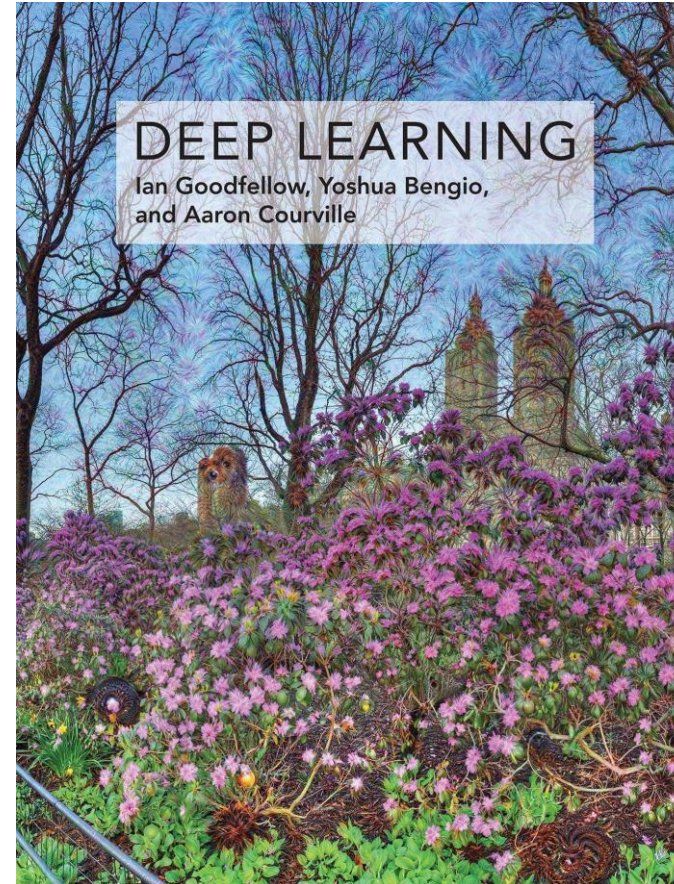
Day	Time

# GitLab for Artifacts

- <https://git.web.boeing.com/dl/introdl>
  - Code
  - Data
  - Homework (won't be graded)
    - Hands-on calculation
    - Coding
  - Presentations (Lectures)

# Textbook and Resources

- There is no required textbook.
- Optional textbook
  - Deep learning by Goodfellow, Bengio, and Courville
  - [Free online](#)
- Google
- Github



# Topics

- We will cover four main parts in this course
  1. Feedforward Neural Networks (FNN) and Multilayer Perceptrons (MP)
  2. Convolutional Neural Networks (CNN)
  3. Recurrent Neural Networks (RNN)
    - Gated Recurrent Unit (GRU)
    - Long Short-Term Memory (LSTM)
  4. Deep Generative Models
    - Generative Adversarial Networks (GAN)
    - Variational Autoencoders
    - Autoregressive Models

# Topics

- We will use Python in this course
  - You must have good Python programming skills
  - Unless you want to focus on concepts and not write code
- We will use various DL frameworks in this course (agnostic)
  - We will have examples in Tensorflow/Keras and PyTorch
  - Feel free to use any of the modern DL frameworks