# Machine Learning

{How, Why} ML works and how to get started

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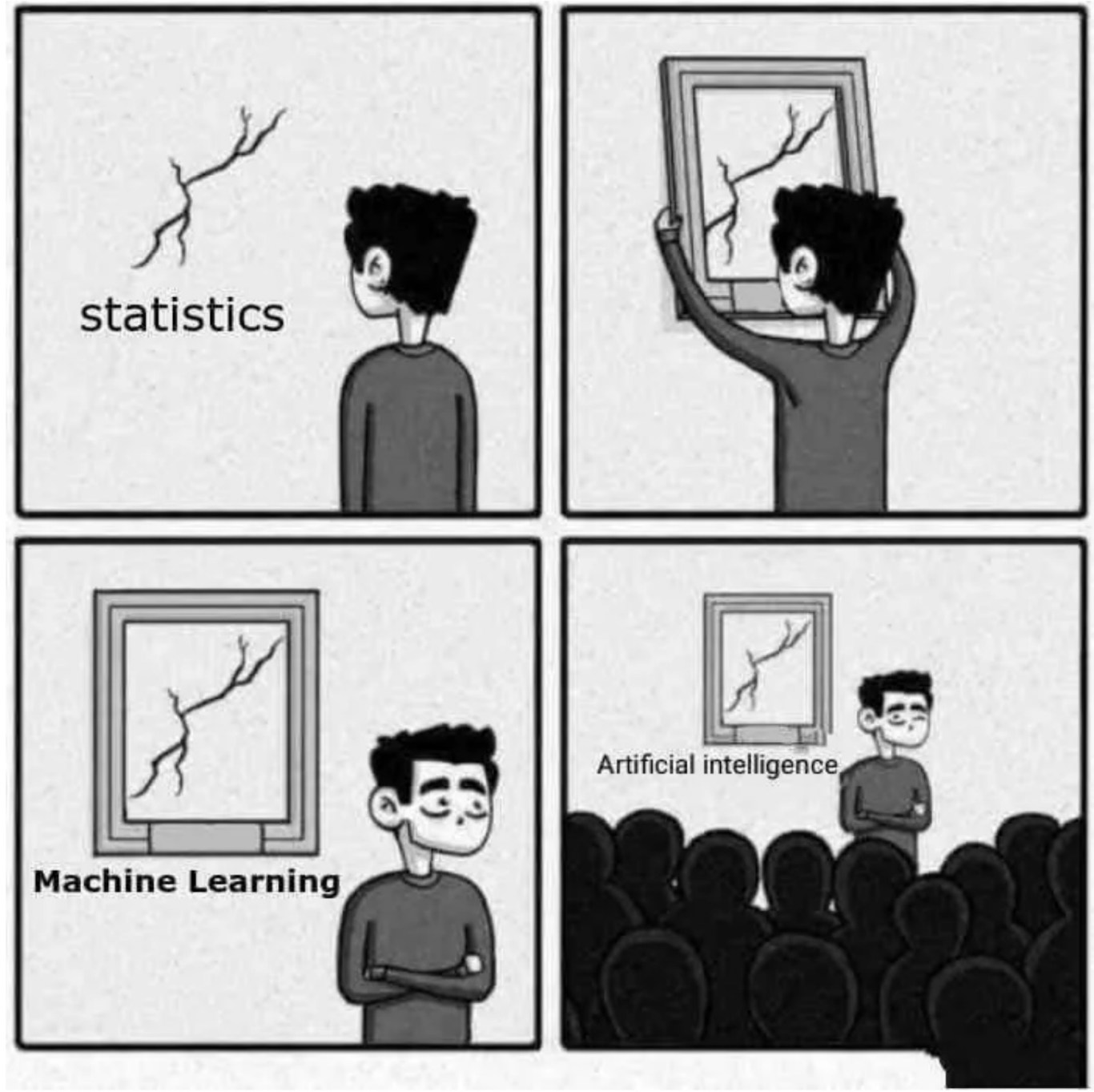
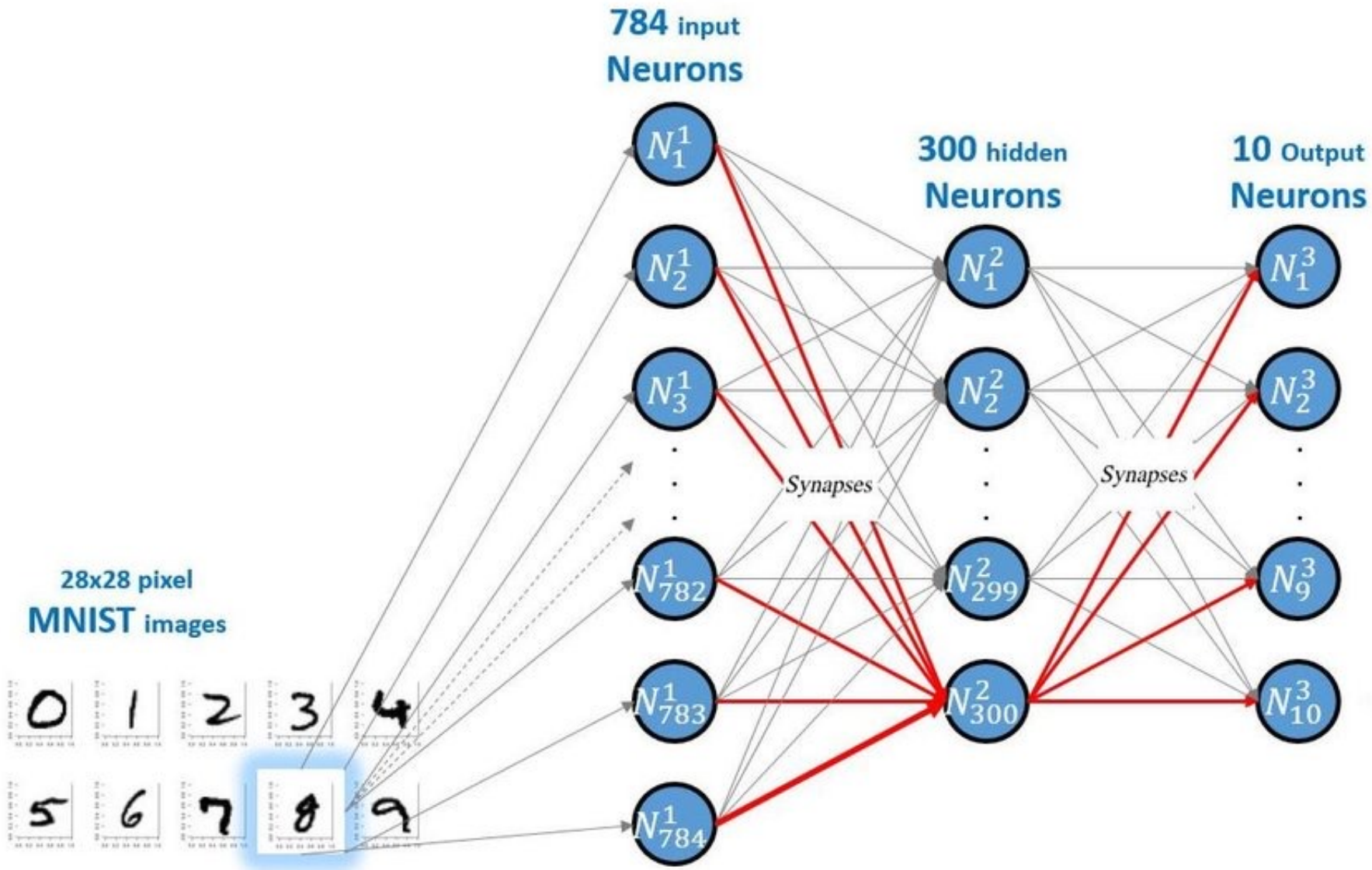


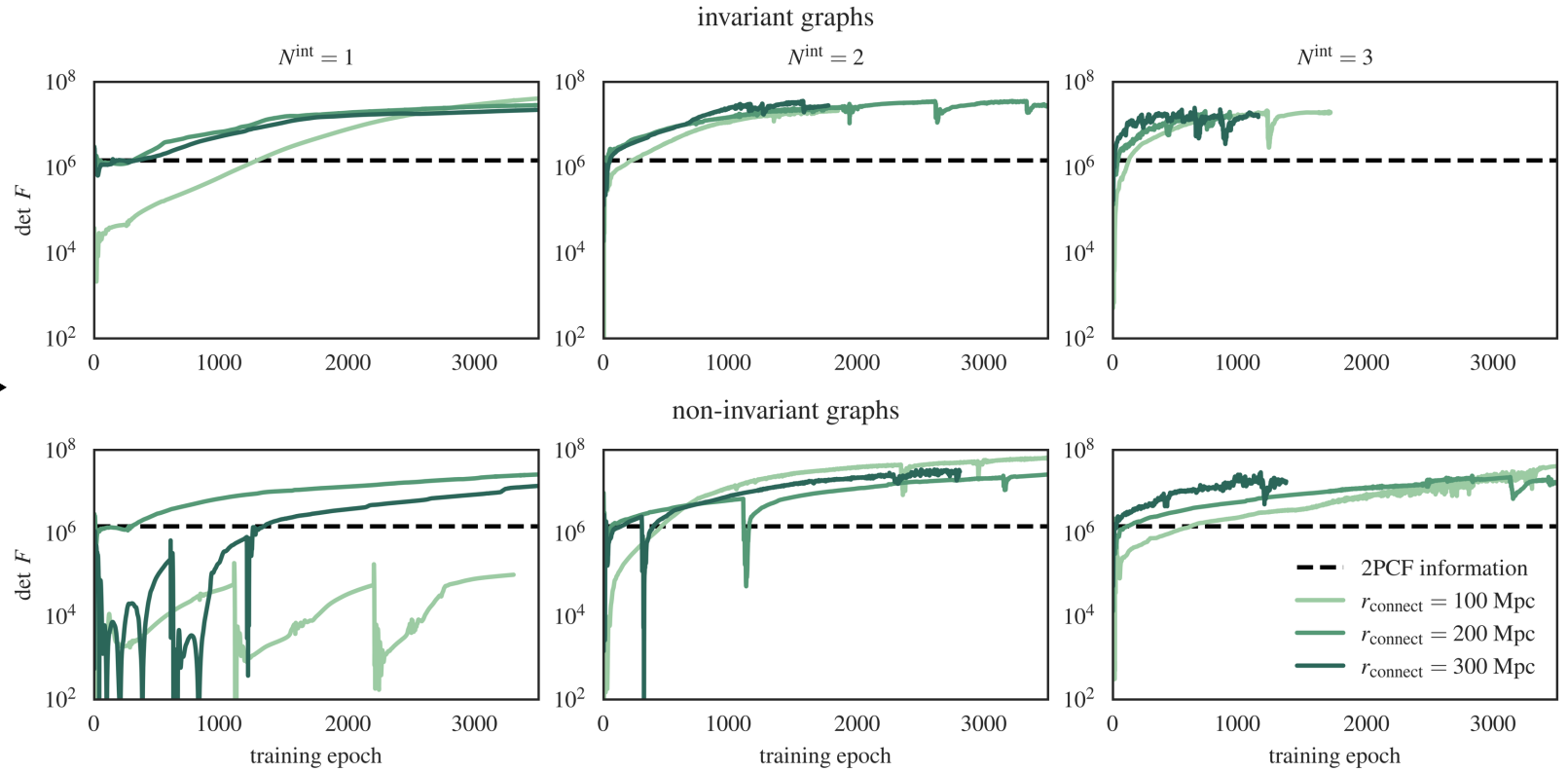

original comic by sandserif

# {How} ML works


784 input
Neurons
300 hidden
Neurons
10 Output
Neurons
28x28 pixel
MNIST images
Synapses
Synapses
$N_1^1$
$N_2^1$
$N_3^1$
$N_{782}^1$
$N_{783}^1$
$N_{784}^1$
$N_1^2$
$N_2^2$
$N_{299}^2$
$N_{300}^2$
$N_1^3$
$N_2^3$
$N_9^3$
$N_{10}^3$

inductive biases <=>
simplifying your problem

graph neural network compression




Makinen et al (2022) arXiv:2207.05202

# {Why} ML works

# ML via Kolmogorov Complexity

Goldblum et al (2024): https://arxiv.org/abs/2304.05366

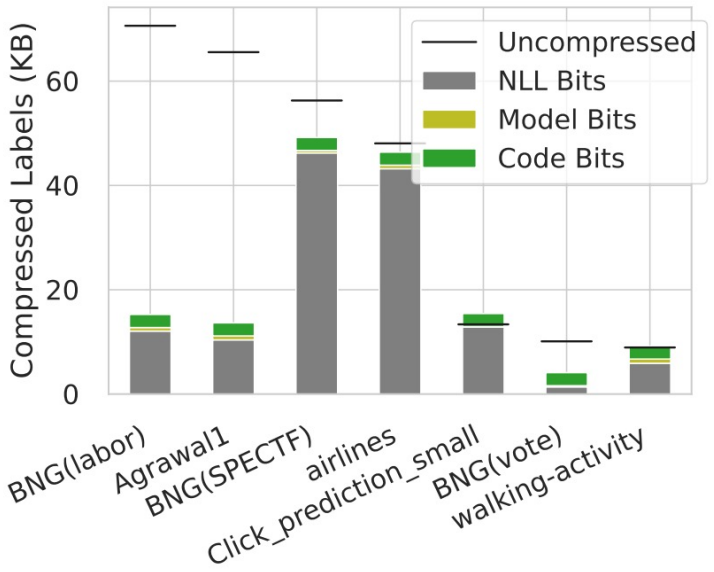
# ML via Kolmogorov Complexity

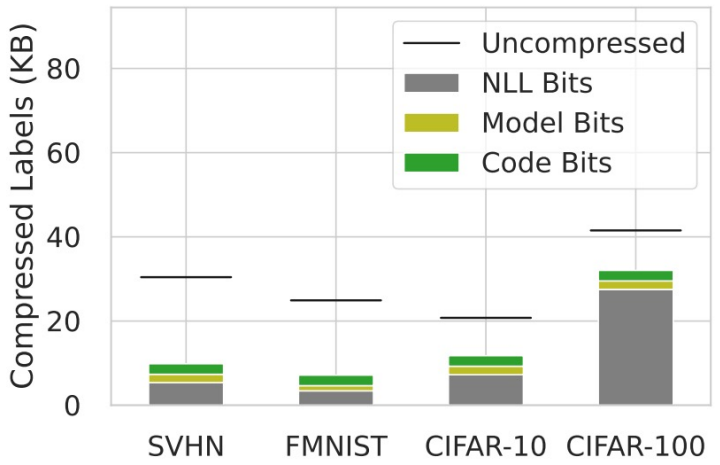
$K(x)$: complexity of the shortest programme that outputs $x$ (in bits)

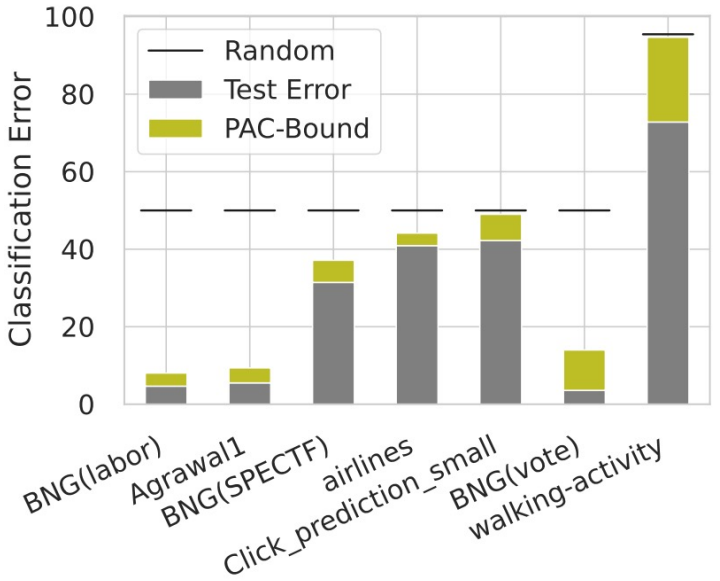
$K(y|x)$: complexity of the shortest programme that outputs $x$ given $y$

Goldblum et al (2024): https://arxiv.org/abs/2304.05366

# ML via Kolmogorov Complexity

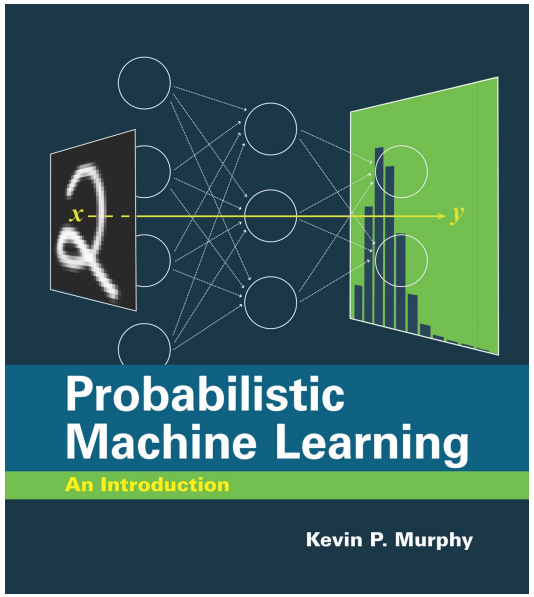


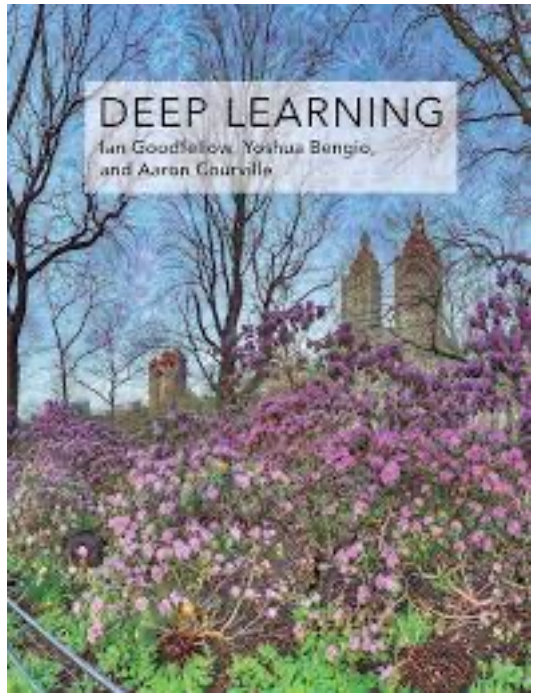

Goldblum et al (2024): https://arxiv.org/abs/2304.05366

# Getting Started




**“Probabilistic Machine Learning”,** Kevin P. Murphy
https://probml.github.io/pml-book/book1.html

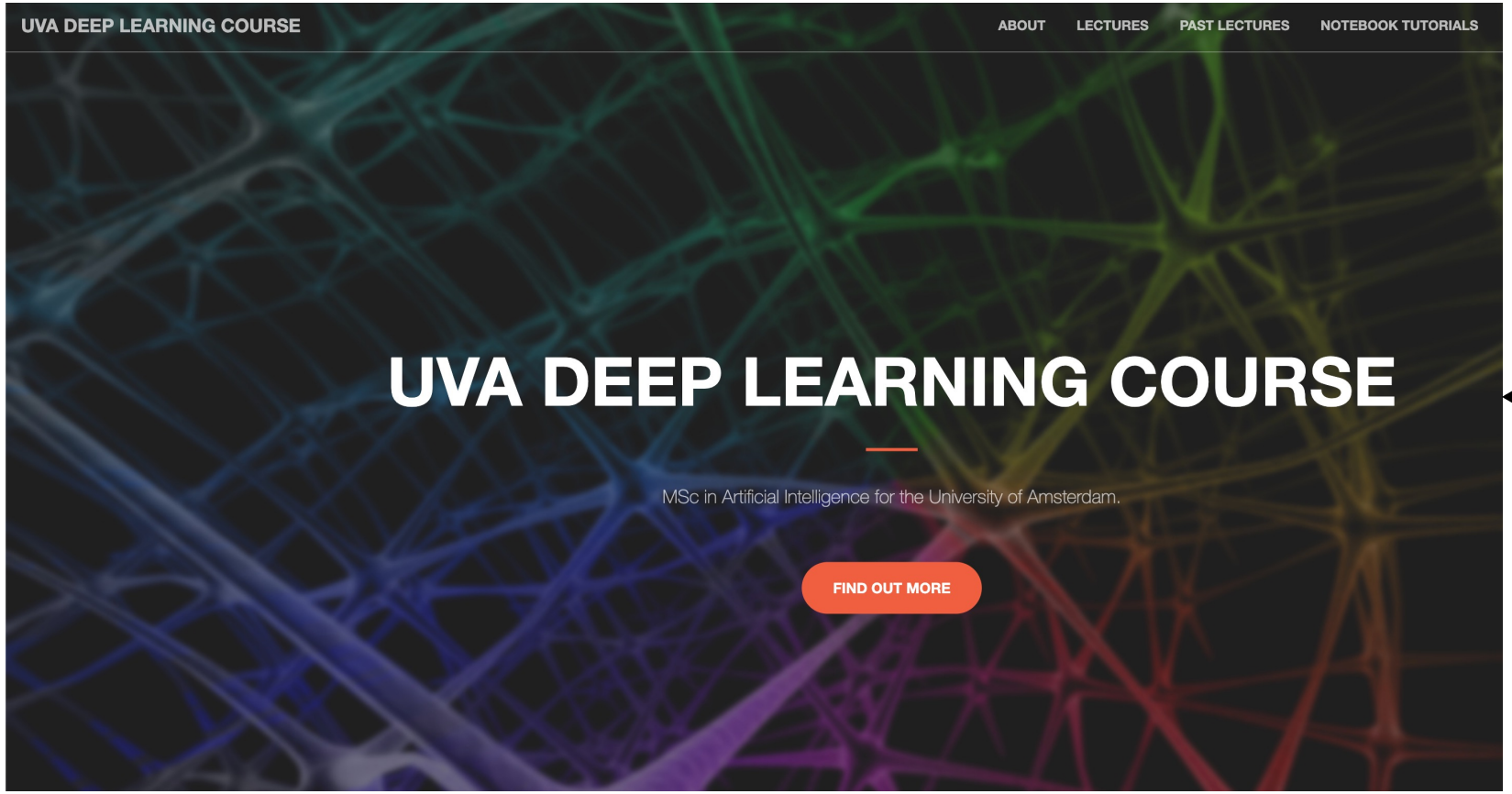
**“Deep Learning”,** Ian Goodfellow
https://www.deeplearningbook.org/



# Getting Started


# Getting Started

https://uvadlc.github.io/




try breaking their code !

# THANKS !


https://tlmakinen.github.io/


https://github.com/tlmakinen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