Graduate Summer School: Deep Learning, Feature Learning

Monday July 9, 2012

8:00–8:45 *Check-In/Light Breakfast (Hosted by IPAM)*

8:45–9:00 *Welcome and Opening Remarks*

9:00–10:00 **Geoffrey Hinton** (University of Toronto)
PART 1: Introduction to Deep Learning & Deep Belief Nets (PDF Parts 1 & 2)

10:00–10:30 *Break*

10:30–11:30 **Geoffrey Hinton** (University of Toronto)
PART 2: Using backpropagation for fine-tuning a generative model to be better at discrimination

11:30–12:00 *Break*

12:00–1:00 *Joint talk: James Bergstra (Harvard), Clement Farabet (NYU)*

1:00–2:30 *Lunch (on your own)*

2:30–3:30 **Yann LeCun** (New York University)
Deep Learning, Graphical Models, Energy-Based Models, Structured Prediction

3:30–4:00 *Break*

4:00–5:00 **Yann LeCun** (New York University)
Deep Learning, Graphical Models, EnergyBased Models, Structured Prediction (Part 2)

5:00–6:30 *Reception (Location: IPAM Lobby)*

Tuesday July 10, 2012

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Andrew Ng** (Stanford University)
Deep Learning, Self-Taught Learning and Unsupervised Feature Learning (Part 1 Slides1-68; Part 2 Slides 69-109)

10:00–10:30 *Break*

10:30–11:30 **Andrew Ng** (Stanford University)
Advanced topics + Research philosophy / Neural Networks: Representation

11:30–12:00 *Break*

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12:00–1:00 **Andrew Ng** (Stanford University)
Non-linear hypotheses

1:00–2:30 *Lunch (on your own)*

2:30–3:30 **Andrew Ng** (Stanford University)
Non-linear hypotheses (Part 2)

3:30–4:00 *Break*

4:00–5:00 *Joint talk: James Bergstra (Harvard), Clement Farabet (NYU)*

Wednesday July 11, 2012

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Yann LeCun** (New York University)
Learning Hierarchies of Invariant Features (Parts 1 & 2)

10:00–10:30 *Break*

10:30–11:30 **Yann LeCun** (New York University)
Deep Learning, Graphical Models, EnergyBased Models, Structured Prediction (Part 3)

11:30–12:00 *Break*

12:00–1:00 *Joint talk: James Bergstra (Harvard), Clement Farabet (NYU)*

1:00–2:30 *Lunch (on your own)*

2:30–3:30 **Geoffrey Hinton** (University of Toronto)
PART 3: Some applications of deep learning (Slides 1-38)

3:30–4:00 *Break*

4:00–5:00 **Geoffrey Hinton** (University of Toronto)
PART 4: A computational principle that explains sex, the brain, and sparse coding (Slides 39-92)

Thursday July 12, 2012

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Rob Fergus** (New York University)
Deep Learning Methods for Vision

10:00–10:30 *Break*

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10:30–11:30 **Rob Fergus** (New York University)
Deep Learning Methods for Vision (Part 2)

11:30–12:00 *Break*

12:00–1:00 **Geoffrey Hinton** (University of Toronto)

1:00–2:30 *Lunch (on your own)*

2:30–3:30 **Alan Yuille** (University of California, Los Angeles (UCLA))
Part 1

3:30–4:00 *Break*

4:00–5:00 *Joint talk: James Bergstra (Harvard), Clement Farabet (NYU)*

Friday July 13, 2012

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Graham Taylor** (University of Guelph)

10:00–10:30 *Break*

10:30–11:30 **Graham Taylor** (University of Guelph)

11:30–12:00 *Break*

12:00–1:00 **Alan Yuille** (University of California, Los Angeles (UCLA))
Part 2

1:00–2:30 *Lunch (on your own)*

2:30–3:30 **Alan Yuille** (University of California, Los Angeles (UCLA))
Part 3

3:30–4:00 *Break*

4:00–5:00 **Yann LeCun** (New York University)
Deep Learning, Graphical Models, EnergyBased Models, Structured Prediction (Part 4)

Monday July 16, 2012

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Yoshua Bengio** (University of Montreal)
Part 1

10:00–10:30 *Break*

10:30–11:30 **Yoshua Bengio** (University of Montreal)
Part 2

11:30–12:00 *Break*

12:00–1:00 **Stephen Wright** (University of Wisconsin-Madison)
Some Relevant Topics in Optimization (Part 1) - (Slides Cover Parts 1 & 2)

1:00–2:30 *Lunch (on your own)*

2:30–3:30 **Stephen Wright** (University of Wisconsin-Madison)
Some Relevant Topics in Optimization (Part 2)

3:30–4:00 *Break*

4:00–5:00 **Arthur Szlam** (New York University)
A tutorial on sparse modeling.

5:00–6:30 *Reception (Location: IPAM Lobby)*

Tuesday July 17, 2012

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Stephen Wright** (University of Wisconsin-Madison)
Sparse and Regularized Optimization Part 1 (Slides Cover Parts 1 & 2)

10:00–10:30 *Break*

10:30–11:30 **Stephen Wright** (University of Wisconsin-Madison)
Sparse and Regularized Optimization Part 2

11:30–12:00 *Break*

12:00–1:00 **Arthur Szlam** (New York University)

1:00–2:30 *Lunch (on your own)*

2:30–3:30 **Yoshua Bengio** (University of Montreal)
Part 3

3:30–4:00 *Break*

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4:00–5:00 **Yoshua Bengio** (University of Montreal)
Part 4

Wednesday July 18, 2012

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Stéphane Mallat** (École Polytechnique)
Scattering Invariant Deep Networks for Classification

10:00–10:30 *Break*

10:30–11:30 **Stéphane Mallat** (École Polytechnique)
Scattering Invariant Deep Networks for Classification (Part 2)

11:30–12:00 *Break*

12:00–1:00 **Kai Yu** (Baidu Inc.)
Part 1

1:00–2:30 *Lunch (on your own)*

2:30–3:30 **Kai Yu** (Baidu Inc.)
Part 2

3:30–4:00 *Break*

4:00–5:00 **Jorge Nocedal** (Northwestern University)
Tutorial on Optimization methods for machine learning

Thursday July 19, 2012

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Jorge Nocedal** (Northwestern University)
Tutorial on Optimization methods for machine learning (Part 2)

10:00–10:30 *Break*

10:30–11:30 **Jorge Nocedal** (Northwestern University)
Tutorial on Optimization methods for machine learning (Part 3)

11:30–2:00 *Lunch (on your own)*

2:00–3:30 **Stéphane Mallat** (École Polytechnique)
Scattering Invariant Deep Networks for Classification (Part 3)

3:30–4:00 *Break*

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4:00–5:00 **Jason Morton** (Pennsylvania State University)
An Algebraic Perspective on Deep Learning

Friday July 20, 2012

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Jason Morton** (Pennsylvania State University)
An Algebraic Perspective on Deep Learning (Part 2)

10:00–10:30 *Break*

10:30–11:30 **Jason Morton** (Pennsylvania State University)
An Algebraic Perspective on Deep Learning (Part 3)

11:30–12:00 *Break*

12:00–1:00 **Yoshua Bengio** (University of Montreal)

1:00–2:30 *Lunch (on your own)*

2:30–3:30 **Stanley Osher** (University of California, Los Angeles (UCLA))

3:30–4:00 *Break*

4:00–5:00 **Stanley Osher** (University of California, Los Angeles (UCLA))

Monday July 23, 2012

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Ruslan Salakhutdinov** (University of Toronto)

10:00–10:30 *Break*

10:30–11:30 **Ruslan Salakhutdinov** (University of Toronto)

11:30–12:00 *Break*

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12:00–1:00 **Marc'Aurelio Ranzato** (Google Inc.)
Deep Gated MRF's - part 1

1:00–2:30 *Lunch (on your own)*

2:30–3:30 **Marc'Aurelio Ranzato** (Google Inc.)
Deep Gated MRF's - part 2

3:30–4:00 *Break*

4:00–5:00 **Jason Weston** (Google Research)
Part 1

5:00–6:30 *Reception (Location: IPAM Lobby)*

6:30–7:30 **Brian Milch** (Google Inc.)
From Text to Concepts at Google

Tuesday July 24, 2012

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Jason Weston** (Google Research)
Part 2

10:00–10:30 *Break*

10:30–11:30 **Jason Weston** (Google Research)
Part 3

11:30–12:00 *Break*

12:00–1:00 **Ruslan Salakhutdinov** (University of Toronto)

1:00–2:30 *Lunch (on your own)*

2:30–3:30 **Bruno Olshausen** (University of California, Berkeley (UC Berkeley))
From natural scene statistics to models of neural coding and representation (part 1)

3:30–4:00 *Break*

4:00–5:00 **Marc'Aurelio Ranzato** (Google Inc.)
Large Scale Deep Learning

Wednesday July 25, 2012

8:00–9:00	*Continental Breakfast*
9:00–10:00	**Thomas Serre** (Brown University) *Deep learning in the visual cortex - Part 1*
10:00–10:30	*Break*
10:30–11:30	**Thomas Serre** (Brown University) *Deep learning in the visual cortex - Part 2*
11:30–12:00	*Break*
12:00–1:00	**Roland Memisevic** (Johann Wolfgang Goethe-Universität Frankfurt) *Multiview Feature Learning - Part 1*
1:00–2:30	*Lunch (on your own)*
2:30–3:30	**Roland Memisevic** (Johann Wolfgang Goethe-Universität Frankfurt) *Multiview Feature Learning - Part 2*
3:30–4:00	*Break*
4:00–5:00	**Bruno Olshausen** (University of California, Berkeley (UC Berkeley)) *From natural scene statistics to models of neural coding and representation (part 2)*

Thursday July 26, 2012

8:00–9:00	*Continental Breakfast*
9:00–10:00	**Iain Murray** (University of Edinburgh) *Introduction to MCMC for deep learning*
10:00–10:30	*Break*
10:30–11:30	**Iain Murray** (University of Edinburgh) *Density estimation*
11:30–12:00	*Break*
12:00–1:00	**Nando de Freitas** (University of British Columbia) *Part 1*
1:00–2:30	*Lunch (on your own)*
2:30–3:30	**Nando de Freitas** (University of British Columbia) *Part 2*
3:30–4:00	*Break*

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4:00–5:00 **Thomas Serre** (Brown University)
Deep learning in the visual cortex - Part 3

Friday July 27, 2012

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Nando de Freitas** (University of British Columbia)
An Informal Mathematical Tour of Feature Learning

10:00–10:30 *Break*

10:30–11:30 **Nando de Freitas** (University of British Columbia)
Part 3

12:00–1:30 *Lunch (on your own)*

1:30–2:30 *Panel Discussion: Nando de Freitas, Iain Murray, Bruno Olshausen, Ruslan Salakhutdinov, Roland Memisevic*

2:30–3:00 *Closing Remarks by Russ Caflisch (IPAM Director)*