

WEDNESDAY, JULY 10TH

18:00 – 20:00 Early Bird Registration and Meet-up at Centro de Congressos

THURSDAY, JULY 11TH

08:00 – 09:00 Registration at Centro de Congressos

09:00 – 10:30 Morning Session 1: **BASIC TUTORIALS ON PROBABILITY THEORY AND LINEAR ALGEBRA** (MARIO FIGUEIREDO)

10:30 – 11:00 Coffee Break

11:00 – 12:30 Morning Session 2

INTRODUCTION TO PYTHON (RAMON ASTUDILLO)

12:30 – 14:00 Lunch

14:00 – 17:00 Afternoon session: Introduction to the Labs and Python

17:00 – Welcome reception

FRIDAY, JULY 12TH

09:00 – 12:30 Morning Lecture (30 min coffee break at 10:30 with Poster Session): **LECTURE 1: INTRODUCTION TO MACHINE LEARNING: LINEAR LEARNERS** (ANDRE MARTINS): - Feature representations and linear decision boundaries; - Naive Bayes, logistic regression, perceptron, SVMs - Online learning; - Linear learning of non-linear models

12:30 – 14:00 Lunch

14:00 – 17:00 Afternoon Labs: Linear Classifiers

17:00 – 17:30 Coffee Break

17:30 – 18:30 Evening Talk: **PRACTICAL TALK: TBD** (TARA SAINATH)

SATURDAY, JULY 13TH

09:00 – 12:30 Morning Lecture (30 min coffee break at 10:30 with Poster Session) **LECTURE 2: INTRODUCTION TO NEURAL NETWORKS** (BHIKSHA RAJ): - Multi-layer perceptrons (Feed Forward networks); - Training with Backpropagation; -Connectionist Computational Models;-Universal Boolean Machines

12:30 – 14:00 Lunch

14:00 – 17:00 Afternoon Labs: Sequence Models

17:00 – 17:30 Coffee Break

17:30 – 18:30 Evening Talk: **PRACTICAL TALK: TBD** (SLAV PETROV)

20:00 Summer School Banquet at TBD

SUNDAY, JULY 14TH Free Day!

MONDAY, JULY 15TH

09:00 – 12:30 Morning Lecture (with 30 min coffee break at 10:30)

LECTURE 3: SEQUENCE MODELS (NOAH SMITH): - Markov models and hidden Markov models (HMMs); - Dynamic programming algorithms (Viterbi and sum-product); - Parameter learning (MLE and Baum-Welch/EM); s- Finite state machines and finite state transducers

12:30 – 14:00 Lunch

14:00 – 17:00 Afternoon Labs: Introduction to Deep Learning and Pytorch

17:00 – 20:00 LxMLS Demo Day

TUESDAY, JULY 16TH

09:00 – 12:30 Morning Lecture (30 min break at 10:30 with Poster Session)

LECTURE 4: LEARNING STRUCTURED PREDICTORS (XAVIER CARRERAS)

From HMMs to CRFs: discriminative learning and features

Structured perceptron, structured SVMs and max-margin Markov networks; Training and optimization

Iterative scaling, L-BFGS, perceptron, MIRA, stochastic and batch gradient descent

12:30 – 14:00 Lunch

14:00 – 17:00 Afternoon Labs: Structured Predictors

17:30 – 18:30 Evening Talk: **PRACTICAL TALK: TBD** (CLARE CARDIE)

WEDNESDAY, JULY 17th

09:00 – 12:30 Morning Lecture (30 min break at 10:30 with Poster Session): **L5: MODELING SEQUENTIAL DATA WITH RECURRENT**

NETWORKS (CHRIS DYER): Recurrent Neural Networks; Conditional sequence models; Learning with attention

12:30 – 14:00 Lunch

14:00 – 17:00 Afternoon Labs: Sequence models in deep learning

17:00 – 17:30 Coffee Break

17:30 – 18:30 Evening Talk: **PRACTICAL TALK: TBD** (KYUNGHYUN CHO)

THURSDAY, JULY 18th

09:00 – 12:30 Morning Lecture (with 30 min coffee break at 10:30):

LECTURE 6: REINFORCEMENT LEARNING (STEFAN RIEZLER)

12:30 – 14:00 Lunch

14:00 – 17:00 Afternoon Labs: Reinforcement Learning

17:30 – 18:30 Evening Talk: **PRACTICAL TALK: WHAT DO OUR MODELS LEARN? TRYING TO UNDERSTAND NEURAL MODELS** (YOAV GOLBERG)

18:30 – 19:00 Closing Remarks