



Hevjin Yasar

INSIGHTS ITN ESR #3

Marie Curie Fellow at INFN Padova

PhD Student at University of Padova

INSIGHTS Mid-term Review Meeting
21 January 2019, CERN

Outline

Personal Presentation
Research Project
Trainings
Secondments
Current Project
CMS Service Task
Outreach



Personal Presentation



Born in Istanbul, Turkey

Graduated from a German High School

Bachelor and Master Degrees in Physics at ETH Zürich (CH)

Projects in several experimental physics groups:

- Analysis of Alpha Centauri background sources, microlensing effect

- Study of type II superconductors at Paul Scherrer Institute

- Experiment on Positronium Invisible Channels

Teaching:

- Advanced Calculus

- Mathematical Methods for Physics



Research Project

Project Title: “Searches for new physics with Bayesian techniques”

Objective: “The search for new physics phenomena in collider data is considered here as a statistical problem (indeed, the Ph.D thesis of this ESR will be in Statistics).”

—► Ph.D thesis in Physics, whilst keeping the Statistics trainings/courses and the supervision by Prof. Scarpa.

Supervisor: Dr. Tommaso Dorigo

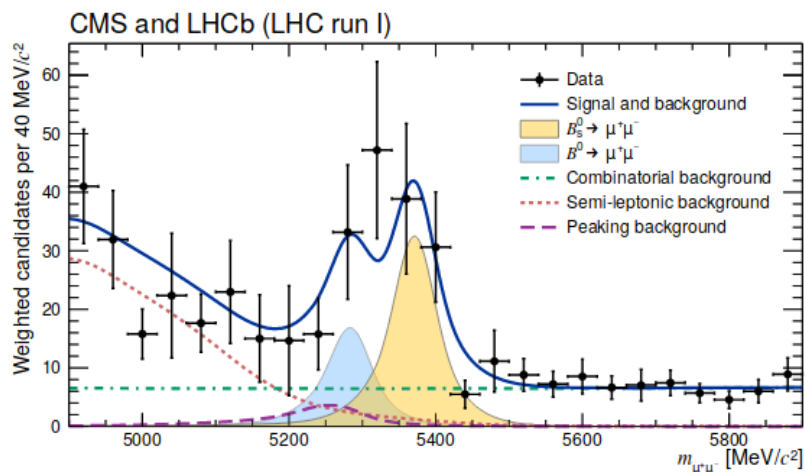
Co- Supervisor: Prof. Bruno Scarpa

Co- Supervisor: Prof. Franco Simonetto

Co- Supervisor: Prof. Martino Margoni



Study of rare B hadron decays by CMS data analysis in collaboration with INFN – Padova B Physics working group using advanced statistical learning tools.



Why is this study important?
 —► represents a unique probe to challenge Standard Model and to test models for New Physics



Trainings – Statistics & Physics



Courses in my program from **Statistics** Department at University of Padova:

Computational Statistics with R (10-12/2018)

Data Mining (2-4/2019)

Theory and Methods of Inference (2-4/2020)

Trainings so far:

NIKHEF Training on statistical model building, Roostats (12-14/12/2018)

Planned training:

INFN School of Statistics (3-7/6/2019)

Courses in my program from **Physics** Department at University of Padova

Statistics for Physics and Data Analysis (3-5/2019)

Standard Model and Flavor (4-5/2019)

Planned training:

CMS Data Analysis School (28/1-1/2/2019)

Trainings – Machine Learning



Trainings so far:

INSIGHTS Workshop on Machine Learning and Statistics at CERN
(17-21/9/2018)

1st Terascale School of Machine Learning at DESY (22-26/10/2018)

Planned training:

5th Machine Learning in HEP Summer School at DESY (1-10/7/2019)



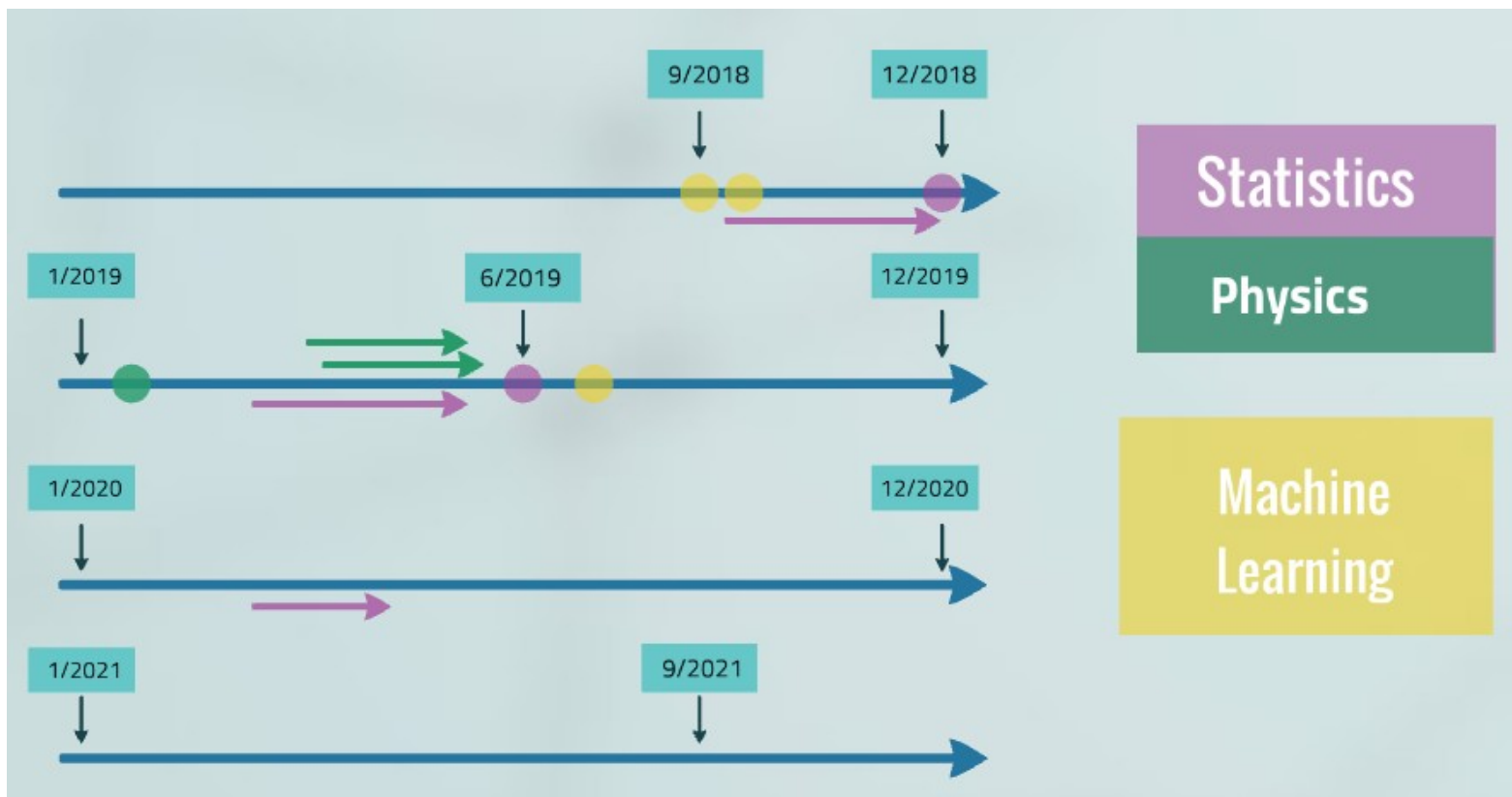
Workshops:

19th International Workshop on Advanced Computing and Analysis
Techniques in Physics Research (11-15/3/2019)

Advanced Workshop on Accelerating the Search for Dark Matter
with Machine Learning at ICTP (8-12/4/2019)



Timeline for Trainings



Secondments

Academic Secondment at CERN:

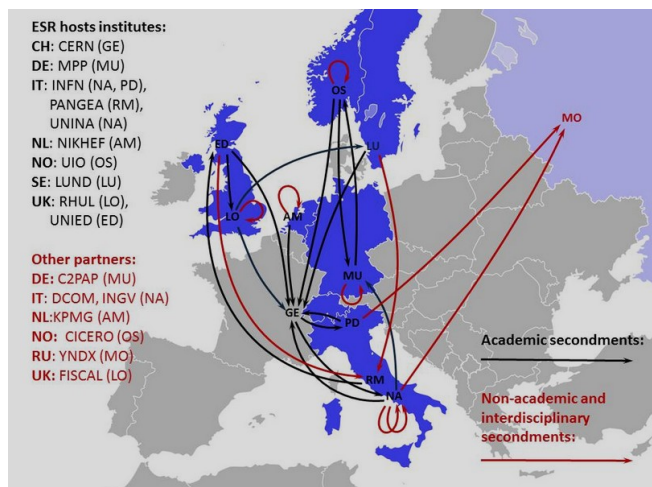
Physics Training and Interaction with Physics Groups

Planned dates: 7-8/2019 and 2-4/2021

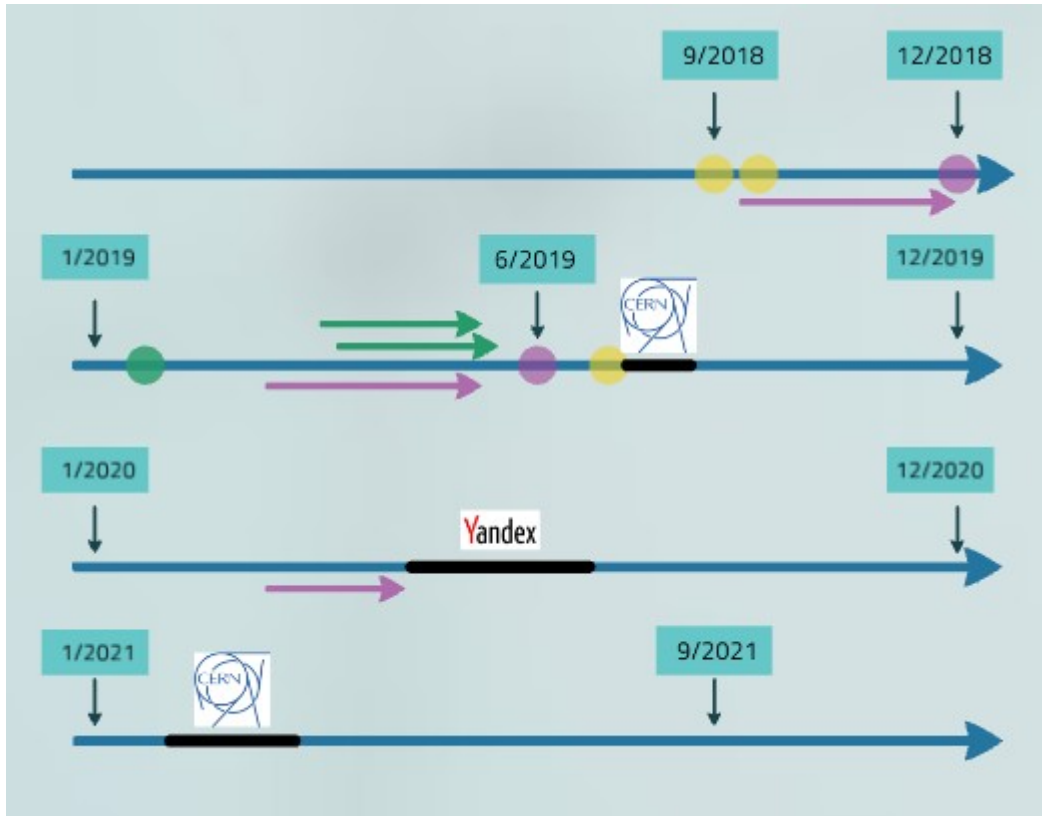
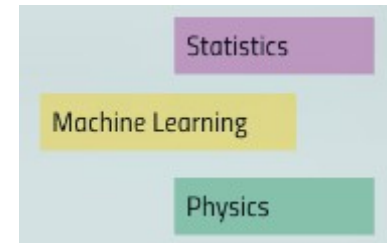
Secondment at Industry Partner YANDEX:

Study of semi-supervised learning methods for anomaly detection

Planned date: 4-7/2020



Timeline with Secondments



Current Project



Flavor-tagging at low energies:

Challenges:

- Contamination in jets
- low p_T , sparser tracks
- B-Bbar mixing

→ Work in collaboration with Prof. Menardi to apply clustering techniques
→ Supervising Master thesis' student.

Importance:

- Improve tagging efficiency for physics studies
- Understanding of CP violation which sheds light to matter-antimatter asymmetry in the universe.

CMS Service Task



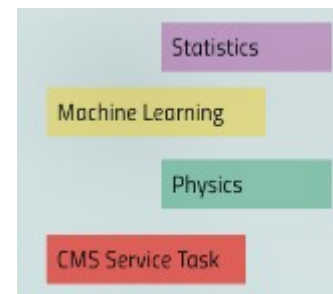
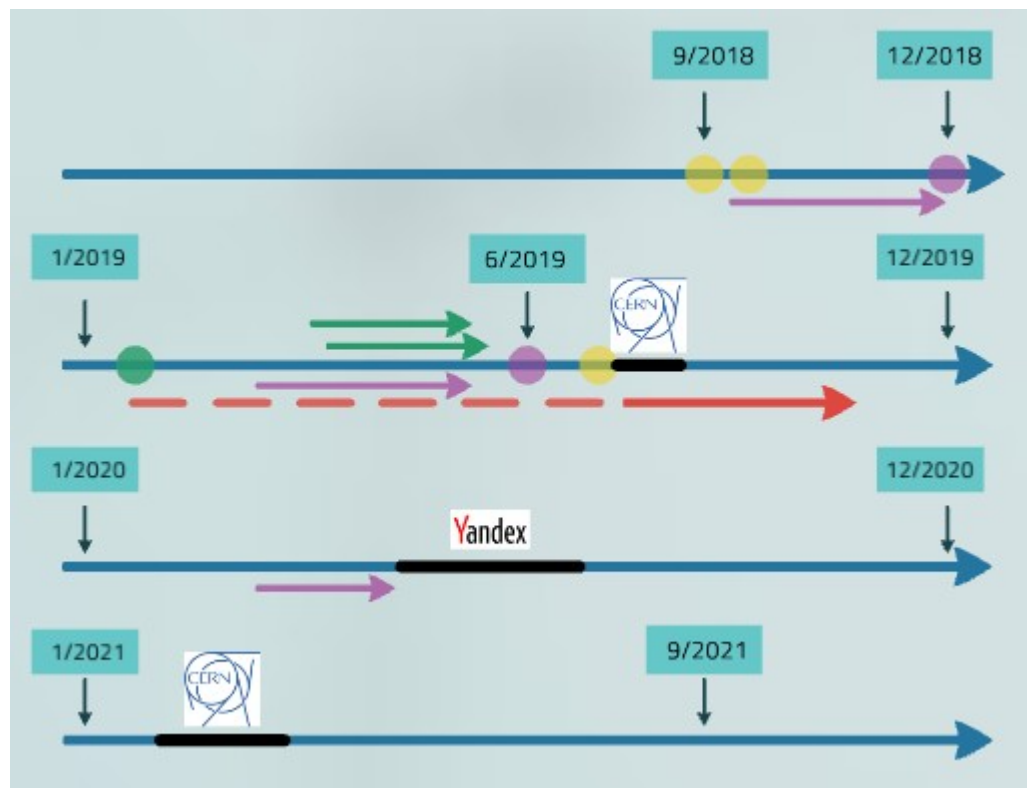
Track reconstruction of charged particles with the Phase2 tracker, designed for HL-LHC data taking → selection of interesting events by the CMS trigger system

The result of this work will be described in the CMS HLT/DAQ TDR planned to be published in 2021.

Work with Dr. Tosi, the current convener of the CMS tracking group and an expert of the CMS trigger system



Timeline with Service Task



Outreach

Outreach Events So Far:

Festivaletteratura - Scienceground, Mantova, IT (4-8/9/2018)

Machine Learning Lab

Games on Logical Thinking, Cognitive Biases

Web Interviews with Science Writers



Non è magia, è scienza, Padova, IT (28/9/2018)

Machine Learning Lab for High School Students



Language class taken so far:

Italian A2 (10-12/2018)

