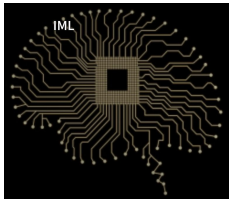


IML News

IML Coordinators:
Simon Akar (LHCb), Anja Butter (TH), Stefano Carrazza (TH), **Fabio Catalano (ALICE)**, Michael Kagan (ATLAS), Lorenzo Moneta (SFT), Pietro Vischia (CMS)

IML Working Group Monthly Meeting
October 11, 2022

UNIVERSITÀ DI TORINO
INFN Istituto Nazionale di Fisica Nucleare

IML Coordination

Riccardo Torre

TH

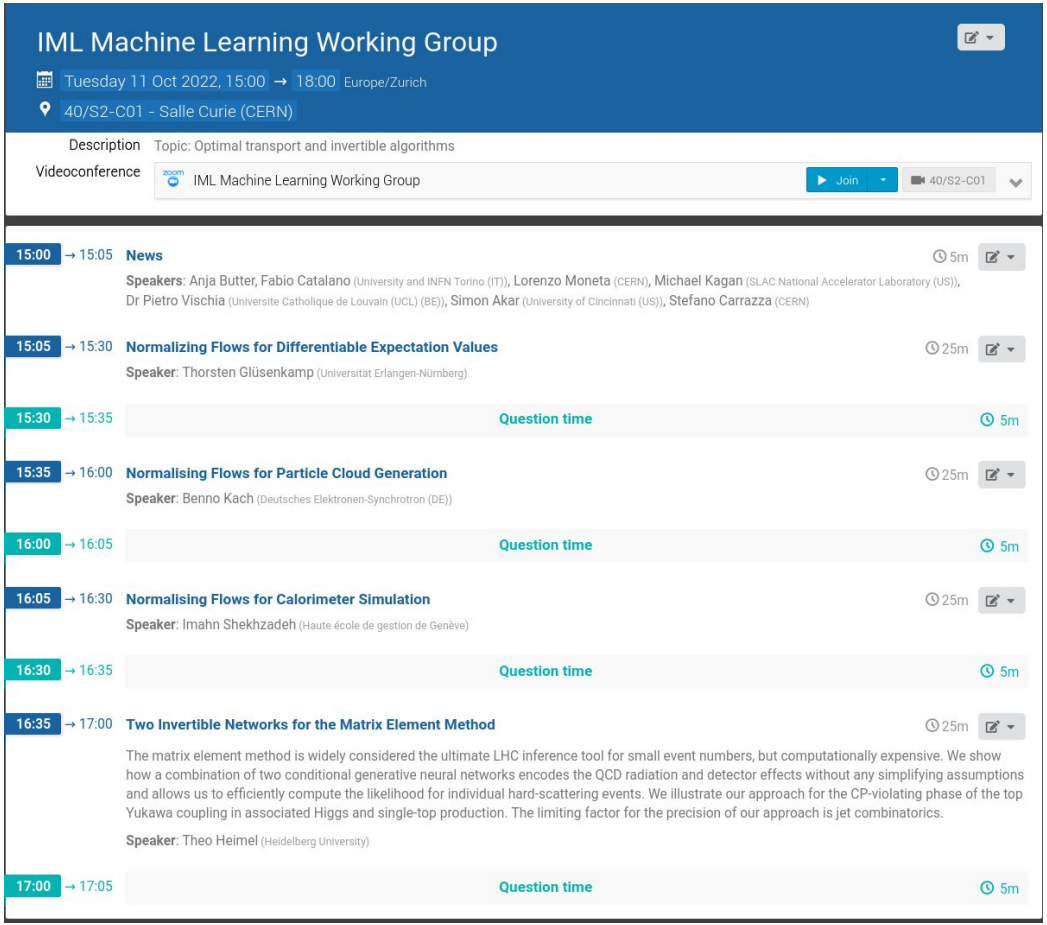
Stefano Carrazza
(University of Milano)

Advertisements — Next meetings/workshops

- Virtual PHYSTAT seminar
  - Tomorrow at 16:00 (CEST)
  - Topic: Optimal transport in HEP: theory and applications
  - See indico page: https://indico.cern.ch/event/1203474/

- MIAPbP workshop on "Differentiable and Probabilistic Programming in Fundamental Physics"
  - 5 June - 30 June 2023, Technical University of Munich
  - Registration deadline: October 16
  - See webpage: https://www.munich-iapbp.de/probabilistic-programming

Today's meeting



IML Machine Learning Working Group

Tuesday 11 Oct 2022, 15:00 → 18:00 Europe/Zurich

40/S2-C01 - Salle Curie (CERN)

Description Topic: Optimal transport and invertible algorithms

Videoconference IML Machine Learning Working Group — Join — 40/S2-C01

15:00 → 15:05 News — 5m

Speakers: Anja Butter, Fabio Catalano (University and INFN Torino (IT)), Lorenzo Moneta (CERN), Michael Kagan (SLAC National Accelerator Laboratory (US)), Dr Pietro Vischia (Universite Catholique de Louvain (UCL) (BE)), Simon Akar (University of Cincinnati (US)), Stefano Carrazza (CERN)

15:05 → 15:30 Normalizing Flows for Differentiable Expectation Values — 25m

Speaker: Thorsten Glüsenkamp (Universität Erlangen-Nürnberg)

15:30 → 15:35 Question time — 5m

15:35 → 16:00 Normalising Flows for Particle Cloud Generation — 25m

Speaker: Benno Kach (Deutsches Elektronen-Synchrotron (DE))

16:00 → 16:05 Question time — 5m

16:05 → 16:30 Normalising Flows for Calorimeter Simulation — 25m

Speaker: Imahn Shekhzadeh (Haute école de gestion de Genève)

16:30 → 16:35 Question time — 5m

16:35 → 17:00 Two Invertible Networks for the Matrix Element Method — 25m

The matrix element method is widely considered the ultimate LHC inference tool for small event numbers, but computationally expensive. We show how a combination of two conditional generative neural networks encodes the QCD radiation and detector effects without any simplifying assumptions and allows us to efficiently compute the likelihood for individual hard-scattering events. We illustrate our approach for the CP-violating phase of the top Yukawa coupling in associated Higgs and single-top production. The limiting factor for the precision of our approach is jet combinatorics.

Speaker: Theo Heimel (Heidelberg University)

17:00 → 17:05 Question time — 5m

- Topic of today: Optimal transport and invertible algorithms

Next IML meetings

- Date for next meeting:
  - Tuesday 15 November
  - Topic: ML model interpretability
  - Contact us at iml.coordinators@cern.ch if you are also interested in presenting!

- Additional meeting on same topic as today in December

- Useful links:
  - Meetings → https://iml.web.cern.ch/meetings
  - IML mailing list → https://iml.web.cern.ch/forum