

Introduction to the 3rd CERN IML workshop

Steven Schramm

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Markus Stoye (CMS), Paul Seyfert (LHCb),

Lorenzo Moneta (LPCCEP-SFT)

The logo for the International Meeting on Large Hadron Collider (IML) is displayed in a large, bold, blue, sans-serif font.

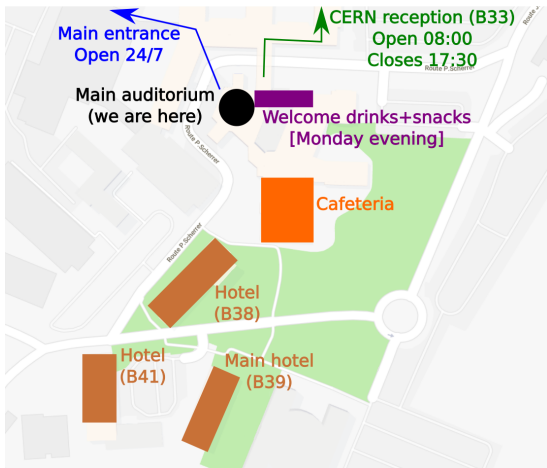
3rd CERN IML workshop

April 15, 2019



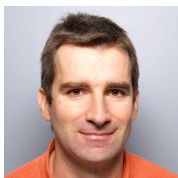
- Welcome to the 2019 iteration of the CERN IML workshop!
 - 2017 workshop: [link](#)
 - 2018 workshop: [link](#)
- Thanks to those who filled out the post-workshop survey last year
 - We have made some changes this year in response to that feedback
- This is going to be a busy and exciting week for ML in HEP!
 - Invited plenary talks, seminars, and a colloquium
 - Invited industry talks and panel
 - Many submitted user contributions
 - Full day of hands-on ML tutorials
- We invite you to participate and take advantage of the opportunities!

- For those who are not familiar with CERN, check out [CERN maps](#)
- Here's a Google annotated map with the most important locations



- Wifi: CERN and eduroam networks are generally available
 - In some areas (such as here), there is a CERN Public network too
 - If you don't have CERN or eduroam, you can request temporary access
 - Connect to the CERN network and follow the instructions
 - List "Steven Schramm" or "Lorenzo Moneta" as your CERN guarantor
 - This is not automatic; you will have to wait for one of us to approve it
- Coffee breaks:
 - They will always be located immediately outside of the room
- Meals:
 - Breakfast, lunch, and dinner are available at the CERN cafeteria
 - There is a bank and ATMs downstairs from the main auditorium
- If you have any questions, contact us at iml.coordinators@cern.ch or ask us before/after each session or during coffee breaks

In case of questions, you are welcome to find one of us



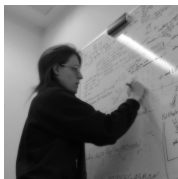
David Rousseau
(ATLAS)



Lorenzo Moneta
(LPCC/EP-SFT)



Markus Stoye
(CMS)



Paul Seyfert
(LHCb)



Ruediger Haake
(ALICE)



Steven Schramm
(ex-coordinator)

- We received a very large number of requests (~ 100)
 - These have to be made individually by hand
 - We suspect that most of the requests are not strictly needed
- If you really do need a certificate, please contact Cinzia Pinzoni
 - cinzia.pinzoni@cern.ch
 - Note you will have to pick it up in person

- This afternoon, we will have an industry session
- Invited speakers:
 - Priya Ponnappalli, Amazon AI
 - Tim Genewein, Google DeepMind
 - Michel Herquet, B12 Consulting
- The industry session will consist of dedicated talks from each speaker, followed by an open industry panel
 - Come and ask leading industry experts your burning ML questions!

We have organized five talks by key HEP and ML experts this week

- Monday at 09:20: **Sergei Gleyzer [HEP]**, [website](#)
 - Conceptual overview of ML in HEP
- Monday at 10:00: **Kyle Cranmer [HEP]**, [website](#)
 - Future areas of focus for ML in particle physics
- Monday at 11:15: **Naftali Tishby [ML]**, [website](#)
 - Statistical Mechanics and Information Theory of Deep Learning
 - Jointly announced with PHYSTAT and CERN-EP/IT DS Seminars
- Tuesday at 11:15: **Naftali Tishby [ML]**, [website](#)
 - The information theory of Deep Learning
- Tuesday at 16:30: **Max Welling [ML]**, [website](#)
 - Gauge Fields in Deep Learning
 - Officially announced as the CERN Colloquium

- By popular request, we have allocated more time for tutorials this year
- The entire day on Thursday will be dedicated to tutorials:
 - Introduction to the basics of deep learning [1.5 hours]
 - Physics inspired Autonomous Feature Engineering [1 hour]
 - Traditional approach to network architecture optimisation [30 min]
 - Differentiable architecture search [40 min]
 - Bayesian approach to network design [30 min]
 - Bayesian dropout explanation and examples [40 min]
 - Advanced Generative Adversarial Network Techniques [1 hour]
- Thank you very much to Yannik Rath, Marcel Rieger, Andrey Ustyuzhanin, and Jonas Glombitza for agreeing to give these tutorials!

- All talks are planned to be recorded, with few exceptions
 - Includes talks, plenaries, tutorials, etc
 - Recordings will be linked to the indico agenda when ready
- Speakers will receive a request for recording permission
 - If you have a CERN account, you should have received the request
 - For non-CERN account speakers, please confirm with us directly

- We believe that it is important to participate in the workshop
 - Speakers, please stay within your specified time to allow for questions
- The schedule has been planned accordingly
 - 20 minute slots are expected to **leave 3 minutes** for questions
 - 30 minute slots are expected to **leave 5 minutes** for questions
- We will do our best to stick on time and also support your questions
 - Take advantage of this opportunity to learn from the community!
- Please use the microphones!
 - Important for both remote participants and recordings

- The Inter-experimental Machine Learning (IML) working group was formed in October 2015, and was officially recognized by all four LHC collaborations and CERN in October 2016
- Goal: foster communication both between the HEP and ML communities, and within the HEP-ML community across experiments
 - More details can be found [in the mandate](#)
- We hold \sim monthly meetings and an annual workshop
 - Everyone interested in ML for HEP is invited to participate
 - We have frequent talks from both LHC and non-LHC speakers
- Follow our meetings by signing up: lhc-machinelearning-wg@cern.ch
 - Currently over 800 members and growing
 - If you are unable to sign up yourself, [contact the IML coordinators](#)

- 5th ML in HEP Summer School: **July 1-10** at DESY (Germany)
 - Registration deadline has passed (March 17)
 - Agenda: <https://indico.cern.ch/event/768915/overview>
- BOOST: **July 21-26** in Boston (USA)
 - Major conference on hadronic physics, with a large ML component
 - Abstracts until [May 1](#), registration until [June 1](#)
 - Agenda: <https://indico.cern.ch/event/753914/>
- AI for Science, Industry, and Society: **October 21-25** in Mexico City
 - Planning major invited keynotes as well as contributed parallel talks
 - CERN, CERN OpenLab, and OECD are key organizers
 - Registration: reduced fee until [May 31](#)
 - Agenda: <http://epistemia.nucleares.unam.mx/web?name=AISIS2019>

- LPCC: LHC Physics Center at CERN
 - Sponsorship, coffee breaks, and the reception
 - Michelangelo Mangano
 - Angela Ricci
- The LHC experiments, for their support of the IML
 - ALICE, ATLAS, CMS, and LHCb (via the LPCC)
- Wolfgang Lerche for help with the CERN Colloquium organization
- The CERN Webcast team for their support and recordings
- The industry and ML researchers who are joining us
- The tutorial leaders who will be helping us all learn more about ML
- The entire HEP-ML community, for your interest and support
 - Regardless of your affiliation and field, we appreciate your involvement!

Welcome to the 3rd CERN IML workshop!