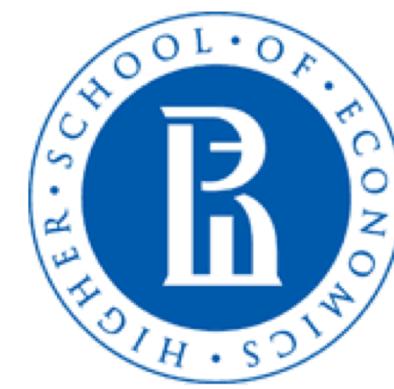


**Yandex**



SCHOOL OF DATA ANALYSIS



# Highlights and Closing remarks

2019-07-10, DESY

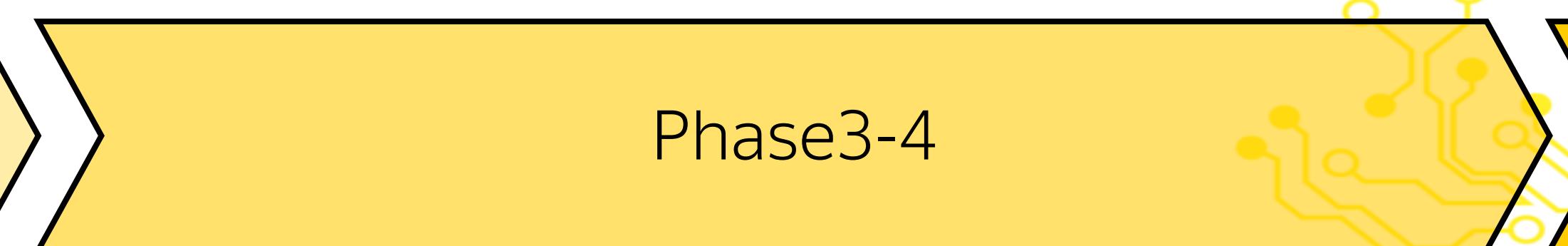
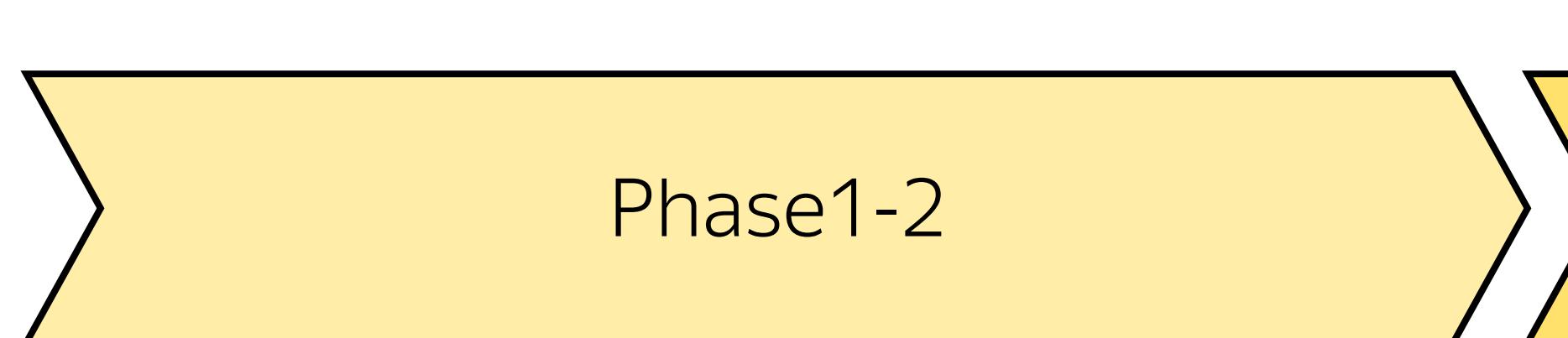
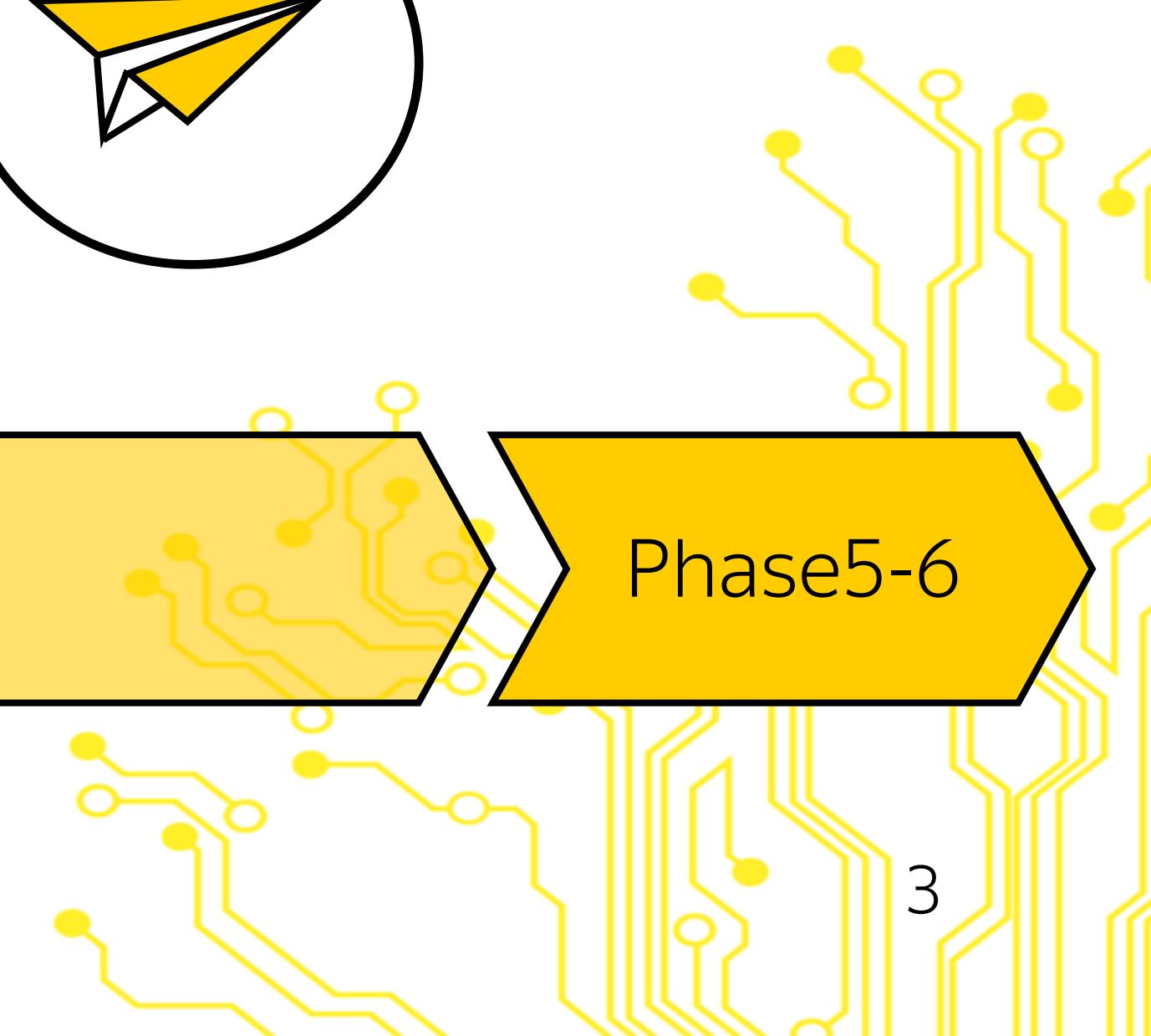
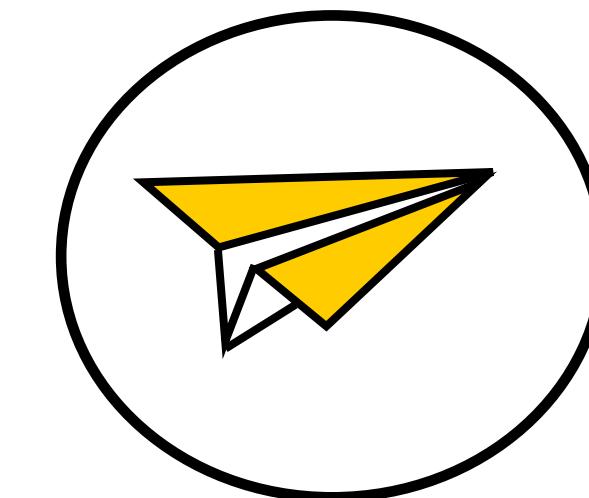
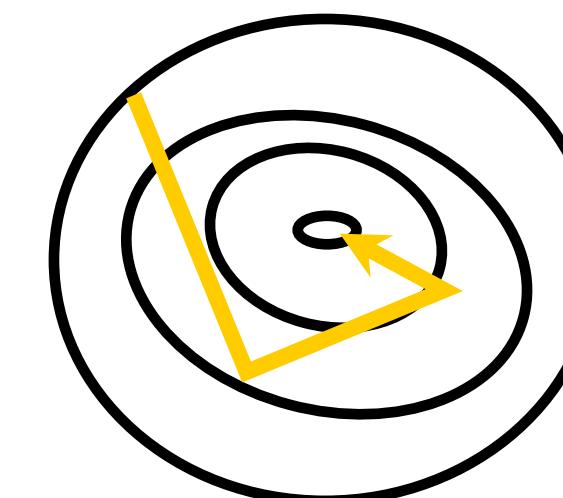
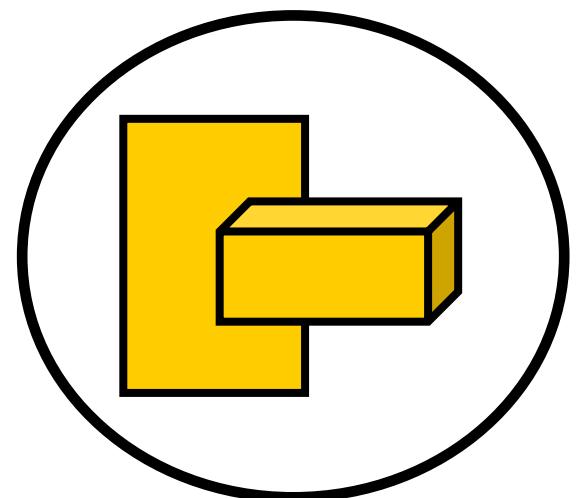
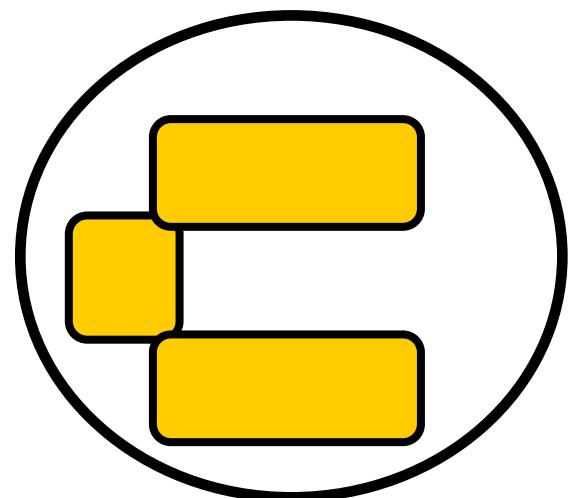
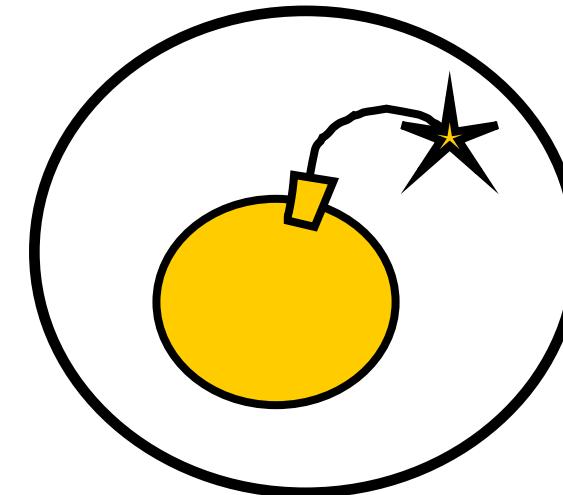
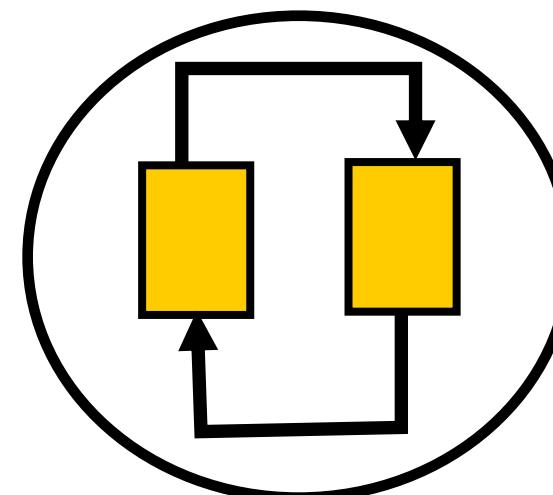
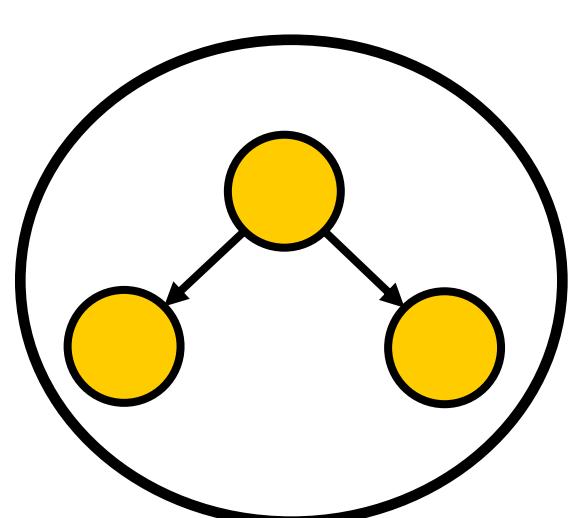
Andrey Ustyuzhanin

NRU HSE

YSDA

ICL

# MLHEP 2019 timeline



# Core agenda

Linear Models, Decision Trees, Ensembles

Unsupervised-learning algorithms (anomalies, clustering)

Convolution Neural Networks, PyTorch

Generative models (KDE, GMM, GANS, VAE)

Optimization techniques (BO, AVO)

Extra topics

- › Bayesian Inference and Deep NN
- › NN interpretation
- › Hyperparameter optimisation

# Invited talks

Likelihood-free inference, Gilles Louppe

RNN: GRU + LSTM + Transformers, Katya Artemova

Causal inference, Evgeniy Riabenko

Dark Machines, Sascha Caron

Independence of NN classifier from a continuous parameter, Miha Zgubic

Graph Network in High Energy Physics, Jean-Roch Vlimant

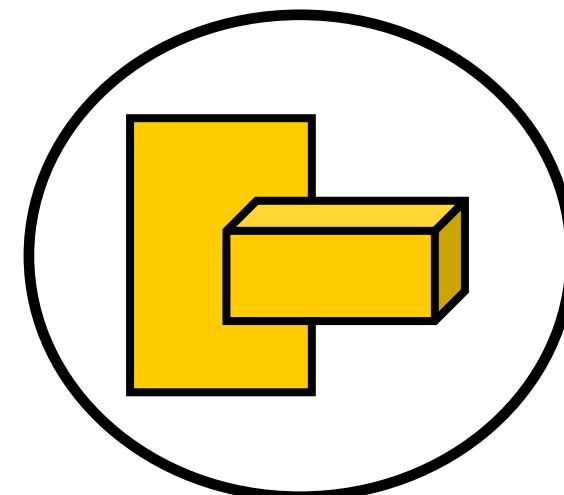
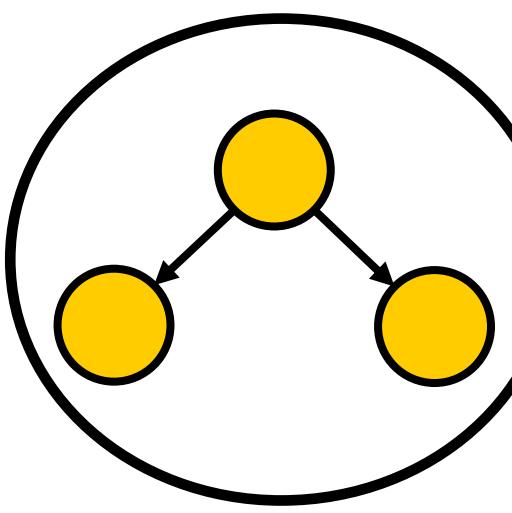
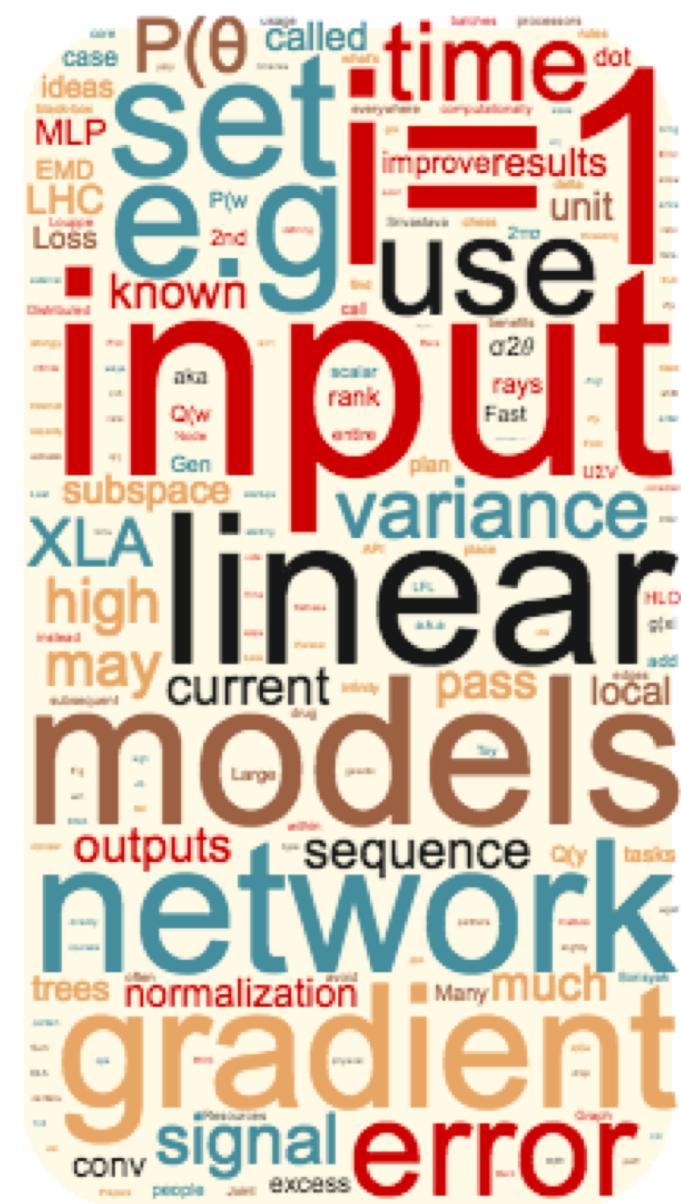
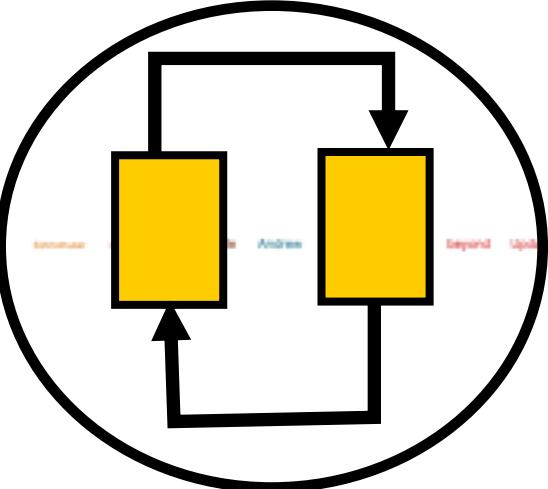
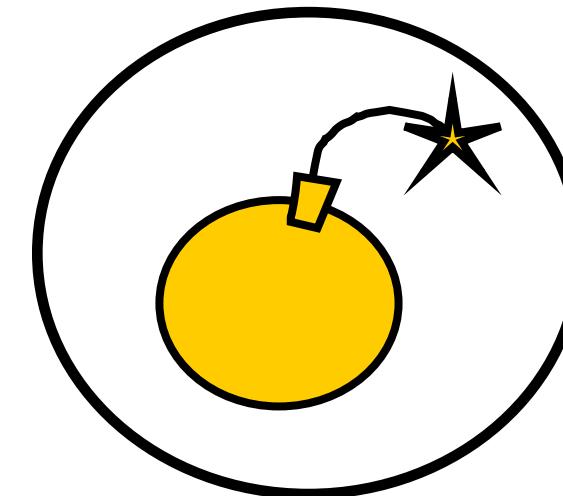
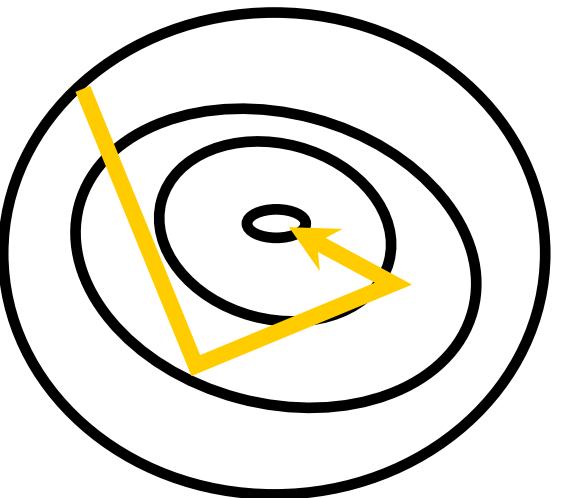
Machine Learning and Computer Vision for Particle Imaging Detectors in Neutrino Experiments, Kazuhiro Terao

Probabilistic programming intro, Lukas Heinrich

Bayesian Framework to identify Risks in Project Management, Sanjay Basu

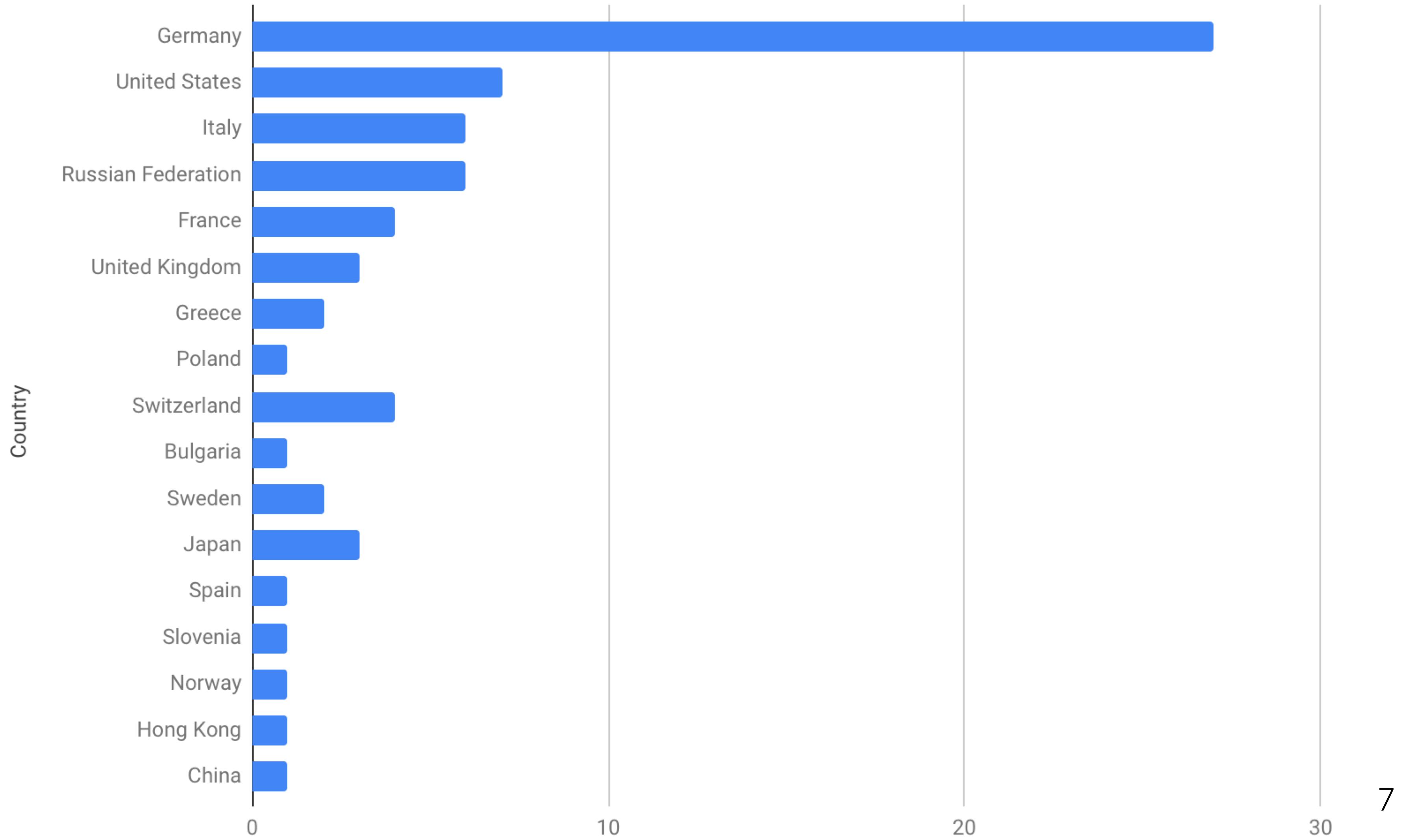
ML with Multiscale Dataflow Computing for High Energy, Nils Voss

# Topic cloud



# MLHEP 2019 world map

71 student  
54 universities  
17 countries



# MLHEP 2020



EPFL, Lausanne  
Team experiment: volunteers

# Coopetiton (external slides)



# LHCb calorimeter challenge

## Source code Submission

Folly92

mg294

ntadej

fcostanza

Anton

Satoru

ledidukh

freiss

huebner-m

SWuchterl

akahn1213

## Submissions

RinaOnda

Folly92

mg294

ntadej

Masashi

mferrill

fcostanza

denis.surin2011

pjiang

Satoru

Anton

golovart

ledidukh

cardinia

belfkir

alexzwang

mgrippo

himanshu

freiss

qwerasd903

boyda

vbelavin

huebner-m

akahn1213

SWuchterl

Abtin\_Narimani

# Future

## Coopetition on LHCb calorimetry GAN

- › Runs till October this year
- › Talk at LHCb workshop
- › MLHEP Volunteering & paper

## Feedback wanted

- › <https://forms.gle/5mjDApik9vg8WtdWA>

# Useful references

[mlhep2019@yandex.ru](mailto:mlhep2019@yandex.ru) - mailing list

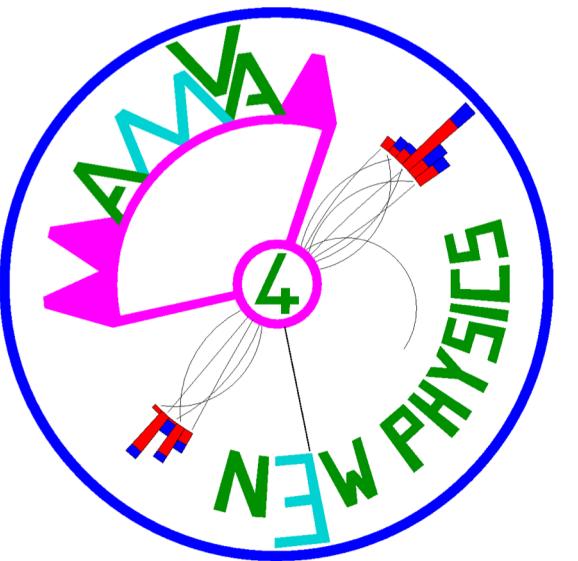
<https://github.com/yandexdataschool/mlhep2019>

<https://cs.hse.ru/lambda/>

- › PhD studies on topics of Machine Learning and Natural Sciences
- › Internships
- › Joint PhD programs

**Telegram Chat**

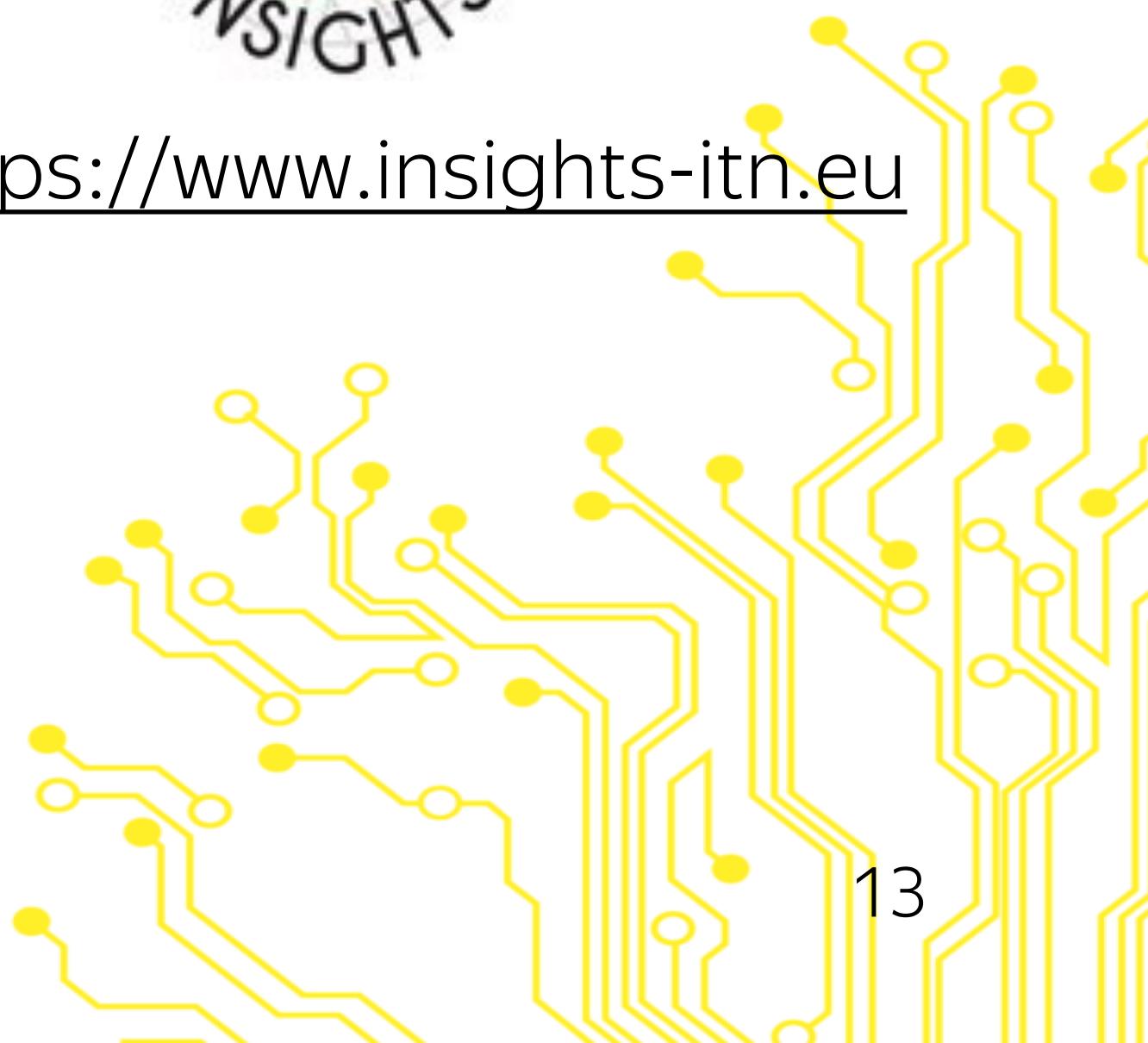
# Many thanks to our sponsors



<https://amva4newphysics.wordpress.com>



<https://www.insights-itn.eu>



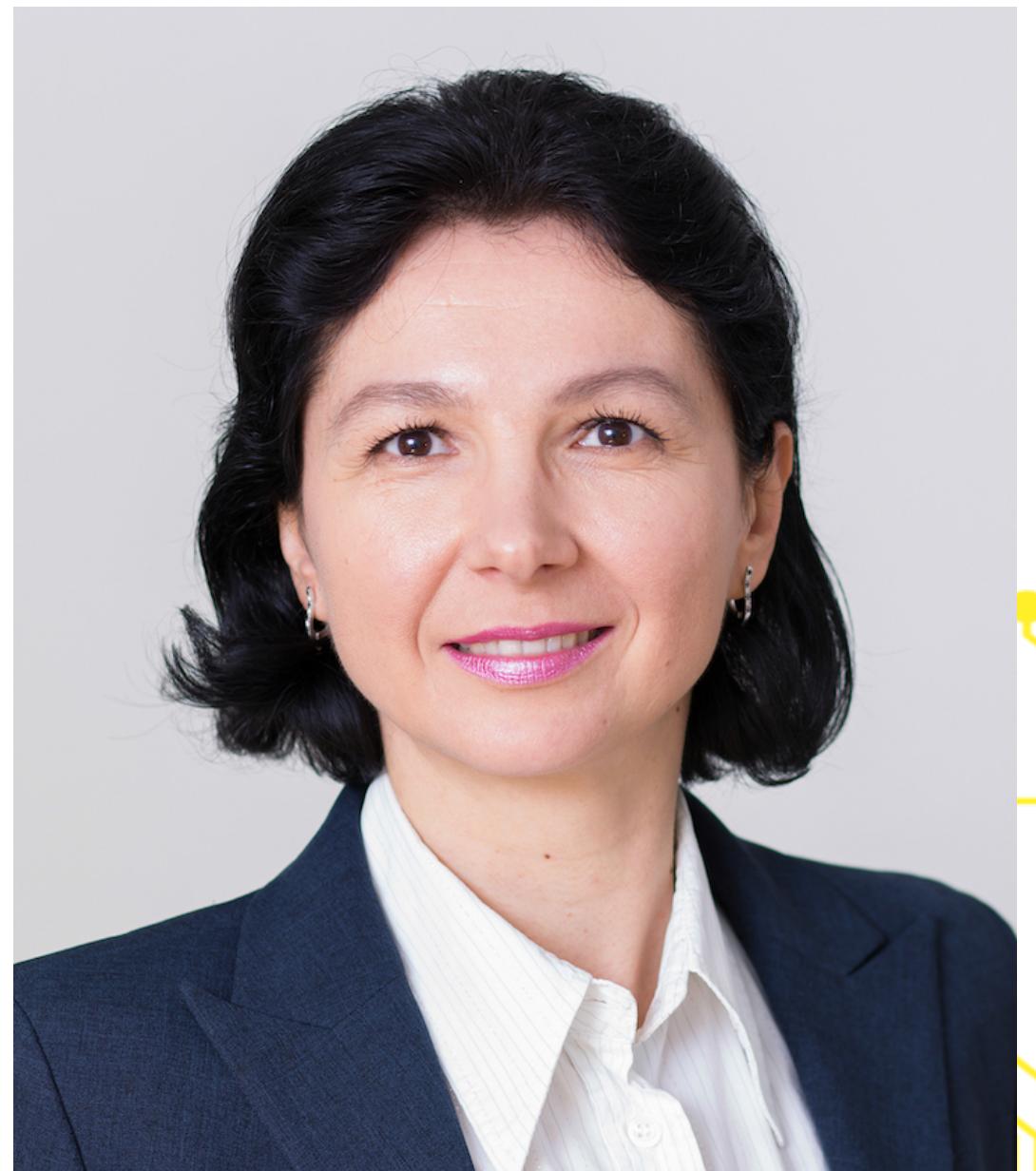
# Numerous kudos to DESY Team



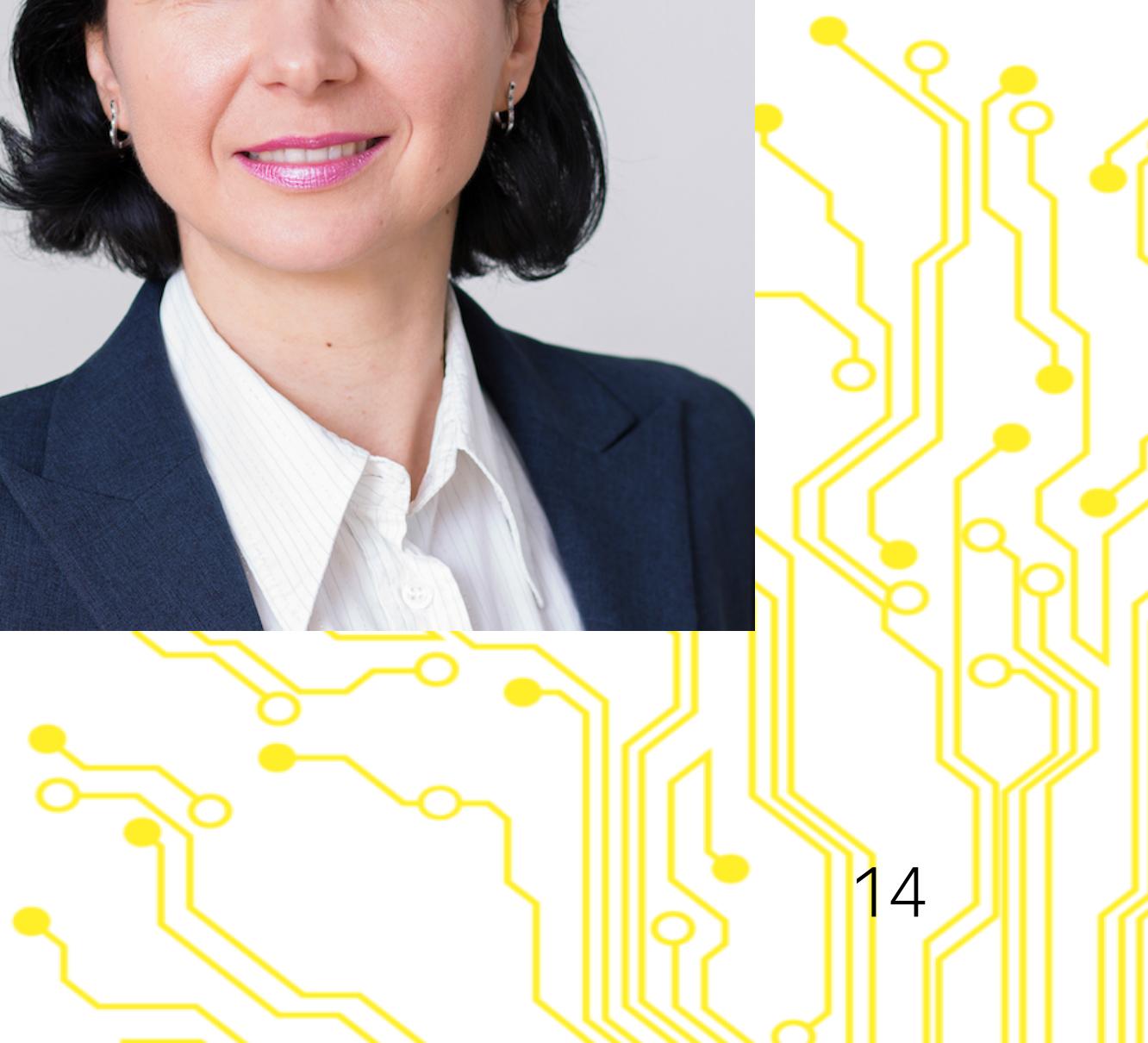
Dr. Isabell Melzer-Pellmann



Inna Henning

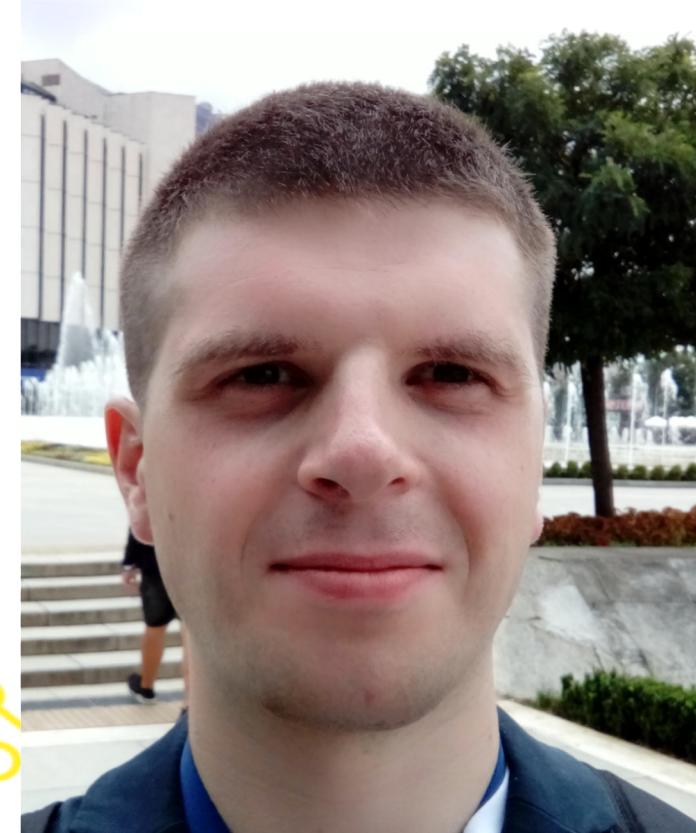


Andrey Ustyuzhanin



# Huge thanks to the core team

Alexander Panin, Yandex



Dr. Alexey Artemov, Skoltech, HSE



Dr. Artem Maevskiy, HSE

Maxim Borisyak, YSDA



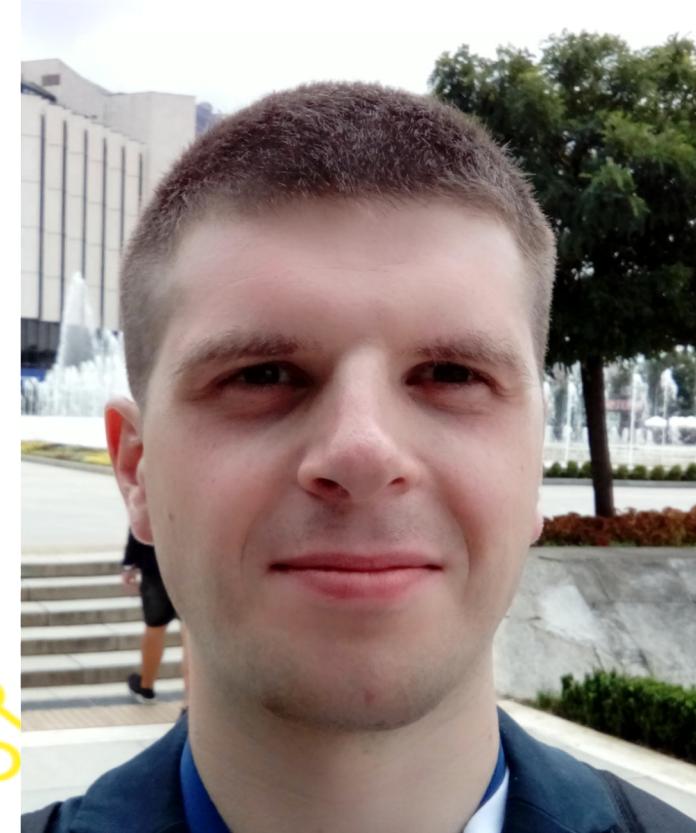
Mikhail Hushchyn, HSE, YSDA



Nikita Kazeev, YSDA, HSE

Vladislav Belavin, HSE

Andrey Ustyuzhanin



# Let's keep it going!

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austyuzhanin@hse.ru

#MLHEP, #MLHEP2019

<https://forms.gle/5mjDApik9vg8WtdWA>

Andrey Ustyuzhanin

