

Miroslav Šimko, PhD

Computer vision / Python / C++ developer
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- Education**
- 2013–2021, Ph.D.**, Experimental Nuclear and Particle Physics
Czech Technical University
Faculty of Nuclear Sciences and Physical Engineering
Thesis: Study of Heavy Flavor at the STAR Experiment
- 2011–2013, M.Sc.**, Experimental Nuclear and Particle Physics
Czech Technical University
Faculty of Nuclear Sciences and Physical Engineering
Thesis: Design and Optimization of the Optical Readout System for Electromagnetic Calorimeter FOCAL for the ALICE Experiment
- 2008–2011, B.Sc.**, Experimental Nuclear and Particle Physics
Czech Technical University
Faculty of Nuclear Sciences and Physical Engineering
Thesis: Detector Control System for the ALICE Experiment
- Experience**
- 2022–present: ioLabs AG: 3D-computer vision on meshes** Trained model for 3D object recognition and segmentation of 3D models of buildings. Written in Python using the Pytorch framework and Mesh-CNN model.
- 2021–present: ioLabs AG: Computer-vision object detection on technical documents** Developed object detection and automatic placement of a stamp in documents, including automatic orientation detection. Used Pytorch and Mask-RCNN. The model was pruned and quantized for deployment.
- 2019–2020: ioLabs AG: Geometry engine for collision detection**, written in C++ and Python, using Open CASCADE and VTK
- 2014–2021: Analysis:** Reconstruction of the Λ_c baryon at the STAR experiment Brookhaven National Laboratory, USA; Collaboration between Lawrence Berkeley National Laboratory, USA, and Czech Technical University; Analysis, using “big-data” techniques on computing clusters; Code written in C++ and Root, using machine learning from the TMVA package (Boosted-Decision Trees)
- 2015–2019: STAR Zero-Degree-Calorimeter on-call expert** at Brookhaven National Laboratory, USA; Responsible for calibration, checks, maintenance, and upgrades of crucial detector components; Calibration code written in C++ and Root
- 2013–2014: Lawrence Berkeley National Laboratory, USA: Simulations for the Pixel sensors** at the STAR experiment; Written in C++ and Root
- 2011–2013: Detector-Control-System expert for the Silicon-Drift Detector** for the ALICE experiment, LHC, CERN, Switzerland; Responsible for maintenance and smooth operation of the detector, written upgrades to the system in PVSS.

Languages and Skills	<p>Czech/Slovak (native), English (fluent), Japanese (advanced intermediate), French (intermediate)</p> <p>Statistical analysis, machine learning, programming for computing clusters, Docker, Jenkins, git</p> <p>Programming in C, C++, Python, Root, Pytorch, BASH, PVSS, National Instruments LabView</p> <p>Driver's license B</p>
Teaching	<p>Czech Technical University Faculty of Nuclear Sciences and Physical Engineering Student Physics Laboratory Practice, 2014–2019</p>
Interests	Physics, informatics, photography, hiking, sport (bicycle, ski, canoeing), literature
Paper	J. Adam et al., “ <i>First Measurement of Λ_c Baryon Production in Au+Au Collisions at $s_{NN} = 200$ GeV</i> ”, Phys. Rev. Lett. 124 , 172301 (2020)
Conferences	<p>Quark Matter 2018, Venice, Italy May 13–19, 2018 Poster: Measurement of $\bar{\Lambda}_c^-/\Lambda_c^+$ ratio in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV with the STAR experiment</p> <p>3-Kings Conference 2018, Košice, Slovakia Jan 5, 2018 Talk: Measurement of open charm in relativistic-heavy-ion collisions</p> <p>19th Conference of Czech and Slovak Physicists, Prešov, Slovakia Sep 4–7, 2017 Talk: Measurement of the Λ_c baryon at $\sqrt{s_{NN}} = 200$ GeV with the STAR experiment</p> <p>EPS Conference on High Energy Physics, Venice, Italy Jul 5–12, 2017 Talk: Measurements of open charm hadron production in Au+Au collisions by the STAR experiment</p> <p>Hot Quarks, South Padre Island, Texas, USA Sep 12–17, 2016 Talk: Measurements of open charm hadrons at the STAR experiment</p> <p>Quark Matter 2015, Kobe, Japan Sep 27–Oct 3, 2015 Poster: Λ_c baryon production at $\sqrt{s_{NN}} = 200$ GeV</p> <p>ICPAQGP2015, Kolkata, India Feb 2–6, 2015 Talk: Heavy Flavor Tracker at the STAR Experiment</p> <p>18th Conference of Czech and Slovak Physicists, Olomouc, Czech Republic Sep 16–19 2014 Talk: Simulations for the HFT–Pixel detector at the STAR experiment</p> <p>Workshop VERTEX2014, Mácha Lake, Czech Republic Sep 15–19, 2014 Poster: Simulations for the HFT–Pixel detector at the STAR experiment</p>
References	<p>Github page: https://github.com/mirsimko</p> <p>PhD-analysis code https://github.com/mirsimko/auau200GeVLambdaCAna</p> <p>ioLabs AG https://iolabs.ch</p>