

# Miroslav Šimko, PhD

Computer vision / Python / C++ developer  
Currently based in Kyoto, Japan

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**Education**    **2013–2021, Ph.D.**, Experimental Nuclear and Particle Physics  
Czech Technical University in Prague (CTU)  
Faculty of Nuclear Sciences and Physical Engineering (FNSPE)  
**Thesis:** Study of Heavy Flavor at the STAR Experiment

**2011–2013, M.Sc.**, Experimental Nuclear and Particle Physics  
CTU – FNSPE  
**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  
CTU – FNSPE  
**Thesis:** Detector Control System for the ALICE Experiment

**Experience**    **2021–present: ioLabs AG: Computer-vision developer**, training  
and development of 2D and 3D computer-vision models for engineering projects.  
Utilized and trained state-of-the-art models Mask RCNN and Mesh CNN.  
Used advanced pruning and quantization techniques. Written in Python,  
using the Pytorch framework, deployed as API on Flask.

**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  $\Lambda_c$  baryon at the STAR  
experiment Brookhaven National Laboratory (BNL), USA; Collaboration between  
Lawrence Berkeley National Laboratory (LBNL), USA, and CTU, Czech Republic;  
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 BNL, USA;  
Responsible for control, calibration, maintenance, and upgrades of crucial detector  
components; Calibration code written in C++ and Root

**2013–2014: LBNL, USA: Simulations for the Pixel sensors at the STAR  
experiment;** Written in C++ and Root

**2012–2013: Development of the Prague prototype (scintillator version)  
of the electromagnetic-forward calorimeter FoCal** for ALICE, LHC, CERN,  
Switzerland; R&D of optical readout; Built an automated optical testing bench;  
Used NIM LabView, analysis, using C++, Root, and Matlab

**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 (intermediate), French (beginner)</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><b>CTU – FNSPE:</b> Student Physics Laboratory Practice, 2014–2019</p> <p>Supervised 3 undergraduate students</p>
Interests	<p>Physics, automation, photography, sport (bicycle, ski, canoeing), hiking, reading</p>
Publications and Conferences	<p>Analysis published in the journal Physical Review Letters</p> <p>Author on more than 95 collaboration papers</p> <p>Presented results at 9 international conferences with 3 proceedings papers</p>

## References

<p>Martin Loučka (current employer)</p> <p>ioLabs AG</p> <p>CEO</p> <p>ml@iolabs.ch</p>	<p>Zhangbu Xu (Work on STAR ZDC)</p> <p>BNL, USA</p> <p>STAR Spokesperson</p> <p>xzb@bnl.gov</p>
<p>Jaroslav Bielčík (Former supervisor)</p> <p>FNSPE – CTU</p> <p>Head of the Experimental Particle Physics Department</p> <p>jaroslav.bielcik@fjfi.cvut.cz</p>	<p>Xin Dong (Supervisor at LBNL)</p> <p>LBNL, USA</p> <p>Senior researcher</p> <p>xdong@lbl.gov</p>
<p>Jana Bielčíková (Former employer)</p> <p>Nuclear Physics Institute, Czech Academy of Sciences</p> <p>Director of the Nuclear Spectroscopy Department</p> <p>jana.bielcikova@ujf.cas.cz</p>	<p>Vojtěch Petráček (Former supervisor)</p> <p>CTU</p> <p>University director</p> <p>vojtech.petracek@fjfi.cvut.cz</p>

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### Github page:

<https://github.com/mirsimko>

### ioLabs AG

<https://iolabs.ch>