Konstantin **Burlachenko**

Ph.D. student in CS program, CEMSE division at KAUST

linkedin.com/in/burlachenkok
stackoverflow.com/bruziuz
bitbucket.org/bruziuz
facebook.com/100000187506333
skypeid : bruziuz
burlachenkok@gmail.com
konstantin.burlachenko@kaust.edu.sa
Homepage : **https://burlachenkok.github.io/**

I have created Systems for Machine Learning, AI, Computer Graphics, Computer Vision, Computational Physics via fully exploiting hardware via domain-specific languages via using contemporary areas of various fields of Applied Math and Computer Science. My current focus is Federated Learning, the area that my advisor proposed in 2016 with his peers in the paper *"Federated Learning : Strategies for Improving Communication Efficiency"*.

Education

2020-Now	Saudi Arabia : Ph.D. program in CS Program at King Abdullah University of Science and Technology under supervision of prof. P.Richtárik. *Awards :* Dean's Award 2019, KAUST. Transcript : Link-1. *GPA : 3.76*
2015-2019	USA (remote) : Graduate Non-Degree Program. Leland Stanford Jr. University, Stanford, USA. Transcript : Link-2. *GPA : 3.96*
2015-2018	USA (remote) : Leland Stanford Jr. University, Stanford, USA. Data, Models and Optimization Graduate Certificate : Link-3 (Program Description : Link-4)
2016 - 2019	USA (remote) : Leland Stanford Jr. University, Stanford, USA. Artificial Intelligence Graduate Certificate : Link-5 (Program Description : Link-6)
2003-2009	Russia : Master Degree (Bologn process equivalent) in Computer Science and Control Systems. Bauman Moscow State Technical University. *GPA : N/A.* (Original scans : Link-7)
Shools and Conferences	Regularization Methods for ML 2021 (Certificate); The PRAIRIE/MIAI AI summer school 2021 (Certificate); ICML-2021 (Certificate); Oxford ML Summer School-2021(Certificate)

Selected paper and notes

FL_PyTorch : Optimization Research Simulator for Federated Learning — 2021

https://dl.acm.org/doi/abs/10.1145/3488659.3493775/

Accepted for presentation and publication to 2nd Workshop on Distributed Machine Learning (co-located with CoNEXT 2021)

MARINA : Faster Non-Convex Distributed Learning with Compression — 2021

https://arxiv.org/abs/2102.07845

Accepted for presentation and publication to Thirty-eighth International Conference on Machine Learning (ICML 2021)

Personalized federated learning with communication compression — 2021

E. Bergou, A. Dutta, K. Burlachenko, P. Kalnis and P. Richtárik

Note : Main math models in area of interest of Machine Learning — 2018

https://sites.google.com/site/burlachenkok/articles/main-math-models-in-area-of-interest-of-machine-learning

Note : About book A.N.Kolomogorov, S.V.Fomin Introductory Real Analysis — 2020

https://sites.google.com/site/burlachenkok/articles/notes-about-the-book-of-ankolomogorovsvfomin

Notes about various aspects in ML, AI, CS, Optimization, Programming Languages, Physics, Applied Math — 2010-2021

https://sites.google.com/site/burlachenkok/articles

Presentations

DEC-2021	A session talk in DistributedML2021 : FL_PyTorch : Optimization Research Simulator for Federated Learning.
JULY-2021	Poster and spotlight for in ICML-2021 : MARINA Faster Non-Convex Distributed Learning with Compression
APR-2021	Poster presentation at Communication Efficient Distributed Optimization at NSF-TRIPODS Workshop.
FEB-2020	Moscow, Russia. Speaker in OpenTalks.AI conference : Huawei technologies for AI developers
JULY-2019	Sochi, Russia. Educational center Sirius : Deliver one month Deep Learning course with D.Kamzolov
DEC-2018	MIPT(Moscow Institure of Physics and Technologies). Deliver guest lectures about subtle things around Decision Trees. Slides : Slides in github. Presentions : Presentation 1 record, Presentation 2 record.
APR-2016	GTC 2016, San Hose, USA : Presenter in Driveworks NVIDIA Booth
AUG-2012	ACM SIGGRAPH 2012, LosAngeles, USA : Presenter in CentiLeo Booth.

Competences

General Programming Languages that I have used	C89/C99, C++14/11/03, C#, Python, Cython, Bash, Perl, x386/ARM, Java
DSL Programming Languages that I have used	Gl SL, TVM, Google Protobuf, CUDA, OpenCL, Matlab, R, SQL
Frameworks	Qt, CUDA, WinApi, Posix, OpenGL, OpenCL, PyTorch,TensorFlow
Selected open-source libraries	Numpy, CvxPy
Operating Systems	Windows, Linux based, Orbis, XBox, Android, NDA OS-es
Development Environments	QtCreator, Visual Studio, Eclipse, WinDbg, Android Studio, TexStudio, Nsight
General purpose development tools	SysInternals,AqTime, Cmake, GNU Toolchain, CppCheck,Valgrind,Git,QMake
Markup and Type Languages	Latex, HTML, XML, Markdown
Areas of interest	Federated Learning, Stochastic Distributed Math Optimization, Computer Science, Machine Learning, AI, Computer Vision, System Programming, GPU Programming, Distributed Systems, Convex Optimization, Non Convex Optimization
Examples of own Projects	Provided under request. I have personal projects from 100 lines to 100K lines.
Recomendations from co-workers on recent projects	Provided under request
Sport achievements	Candidate for master of sport in chess by FIDE.

Professional Experience

August 2020 – March 2019 | **Principal Lead Engineer | Foundation AI Lab, HUAWEI, Moscow**

- R&D in internal ML/DL middleware for HUAWEI HiSilicon
- R&D in internal projects in ML/DL middleware for HUAWEI Consumer Business Group
- Preseting HiSilicon solutions internally and externally.

Math Optimization · AI · Machine Learning · C++ · Python · TVM · Java · Google Protobuf · CMake · Qt · TensorFlow

March 2019 – July 2014 | **Senior Developer Technology Engineer, NVIDIA, Moscow**

I have created and supported different modules in the middleware software of NVIDIA.

- Driveworks SDK - computer vision, machine learning, calibration, egomotion
- PhysX/Apex SDK - physics simulation, graphical special effects .
- cuDNN/cuBLAS libraries - GPU computation, machine learning
- RAPIDS project - GPU based classical Machine Learning Framework

CUDA · GLSL · C++ · SSE2/ARM NEON · Linux · Windows · PS4 · XBox · OpenGL · Google Tests · GitLab · Perl · Python · CMake · Make · Qt · Git · TensorFlow · Computer Vision · Graphics · Deep Learning · CppCheck

July 2014 – May 2013 | **Senior Developer Engineer | Yandex Video Team, YANDEX, Moscow**

Yandex is one of the available general-purpose web search engines in the world. I worked in a video search.

- Text and statistical machine learning features for Yandex video search `http://video.yandex.ru`
- Infrastructure to store static aspects web document with embedded video
- Statistical analysis in several billions web documents with embedded video in MapReduce
- Infrastructure to show plots for internal team's processes

C++ · Google Protobuf · JavaScript · Bash · Python · Computer Science · HTML · SVN · MapReduce · Decision Trees

April 2013 – March 2012 | **Lead Physics Engine Developer, FITTING REALITY, Moscow**

CEO Inga Nakhmanson can prove that I brought big value to the project and company. I have left due to the stopped financial support of a startup company.

- Develop library for clothing simulation started with CUDA
- Migrate cloth simulation library to OpenCL
- Adapt to use this library for Ogre.
- Custom render engine for clothing visualizatio `https://yadi.sk/d/ytygxSIYP62Tr`
- Carry internal math/cs trainings

C++ · OpenGL · GLSL · Qt · Linux · Windows · QMake · CUDA · OpenCL · Physics · Computer Graphics · gDebugger

March 2012 – September 2010 | **Software Developer Engineer, ACRONIS, Moscow**

Acronis invited B.Stroustroup author of C++ to give an advanced series of lectures about C++ which gave me additional great knowledge on the subject.

- Low-level debugging in a big codebase
- Key member of GUI team for Acronis Backup and Recovery 2011 Enterprise

C++ · C · Windows · WinDbg · VmWare · Specialized GUI library · SVN · SysInternals Suite · AppVerifer · CppCheck

September 2010 – March 2009 | **Senior Software Developer Engineer, CAPITAL RESEARCH, Moscow**
Left company due to that financial support of startup have starts be problematical. CEO Kirill Garanzha can prove that I was up to last moments.
- Developed Firefox plugin to create the three-dimensional HTML view for basics HTML elements

Firefox | C++ | Windows | HTML | CSS | Windows | OpenGL | GLSL

June 2009 – December 2006 | **C++ Programming Engineer, FLINT AND CO, Moscow**
- Created several computer games with computer vision and graphics part, hardware drivers
- Trips to customers

C++ | SDL | Linux | Windows | Development Image Library | Low level programming | Computer Vision | OpenGL | SVN

November 2006 – March 2006 | **C++ Programming Engineer, ASTRASOFT TECHNOLOGY, Moscow**
Left company due no interconnection with my education in 2006
- Developed visual elements of management system based on Qt and OpenGL

C++ | Qt | Windows | OpenGL | SVN

Some own projects

Math Optimization Research Studio — 2020
https://bitbucket.org/konstantin_burlachenko/opt_studio Project report Math Optimizaiton Research Studio
CS380 : Math Optimization Research Studio.
C++ | Linux | Windows | CUDA | CMake

Experimental Neural Net Framework — 2019
https://sites.google.com/site/burlachenkok/stanford-cs230-experimental-neural-net-framework
Poster Presentation Session, CS230 - 2019 4 minute presentation bitbucket repo
CS230 : Experimental Neural Net Framework done under mentoring of Steven Ziqiu Chen (stevenzc@stanford.edu)
C++ | Linux | Windows | CUDA | Python | CMake

Convex optimization solvers with leveraging into GPU/CPU power for AI/ML — 2018
https://sites.google.com/site/burlachenkok/convex-optimization-solvers-with-leveraging-into-gpucpu-power-for-aiml
Poster Presentation Session, CS221 - 2018 bitbucket repo
CS221 : Convex optimization solvers with leveraging into GPU/CPU power for AI/ML under mentoring of Steven Diamond `http://web.stanford.edu/~stevend2/`
C++ | Linux | Windows | CUDA | Python | CMake | Convex Optimization

Convex Optimization for Machine Learning — 2017
https://sites.google.com/site/burlachenkok/articles/cvx4ml Poster Presentation Session, CS229 - 2017
4 minute presentation
Stanford, CS229 : Convex Optimization for Machine Learning
C++ | Visual Studio | Numerical Linear Algebra | Convex Optimization | Python | CMake

Advacned tool to plot data — 2017
40 minute presentation github.com/burlachenkok/plotter_plusplus
This is an advanced plotter tool which receives commands over the network TCP connection. Goal of this program is to assist debugging and development process. It have been written in C++ and it use Qt Framework 5.7.* as only one external library.
C++ | Linux | Windows | Embeded Systems | Qt | Python

Lane detection using Fourier based line detector — 2016
http://web.stanford.edu/class/cs231a/prev_projects_2016/final_konstantin_burlachenko.pdf
10 minute presentation
Lane detection from several image input videostream.
Matlab

References

Andrew Ng
Assistant Professor, Stanford, Letter
@ ang@cs.stanford.edu
+1 (650)725-2593

Timout Paltashev
AMD and Core faculty, Northwestern Polytechnic University, Letter
@ timpal@mail.npu.edu
+1 (510) 468-3764

Brad Osgood
Professor, Stanford, Under request
@ osgood@stanford.edu
+1 (650) 387-1287 (cell)