

# Konstantin BURLACHENKO

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

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During my career I created Systems for Machine Learning, AI, Computer Graphics, Computer Vision, Computational Physics via full exploiting hardware via DSL languages and contemporary areas of Applied Math and Computer Science.

## EDUCATION

2020-Now	Ph.D. program in <a href="#">CS Program at King Abdullah University of Science and Technology</a> under supervision of prof. <a href="#">P.Richtarik</a> . Awards : Dean's Award 2019, KAUST. Transcript : <a href="#">Link</a>
2015-2019	Graduate Non-Degree Program. Leland Stanford Jr. University, Stanford, USA. Transcript : <a href="#">Link</a>
2015-2018	Leland Stanford Jr. University, Stanford, USA. Data, Models and Optimization Graduate Certificate : <a href="#">Link</a> . <a href="#">Program Description</a>
2016 - 2019	Leland Stanford Jr. University, Stanford, USA. Artificial Intelligence Graduate Certificate : <a href="#">Link</a> . <a href="#">Program Description</a>
2003-2009	Master Degree in Computer Science. Bauman Moscow State Technical University, Russia. Transcript evaluated by <a href="#">World Education Service</a> : <a href="#">Link</a>
	Summer Shools : <a href="#">Regularization Methods for Machine Learning 2021</a> , <a href="#">The PRAIRIE/MIAI AI summer school 2021</a> (Certificate : <a href="#">Link</a> )

## SELECTED PAPER AND NOTES

MARINA : FASTER NON-CONVEX DISTRIBUTED LEARNING WITH COMPRESSION"	2021
<a href="https://arxiv.org/abs/2102.07845">https://arxiv.org/abs/2102.07845</a>	
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. Richtarik	
NOTE ABOUT MAIN MATH MODELS IN AREA OF INTEREST OF MACHINE LEARNING	2018
<a href="https://sites.google.com/site/burlachenkok/articles/main-math-models-in-area-of-interest-of-machine-learning">https://sites.google.com/site/burlachenkok/articles/main-math-models-in-area-of-interest-of-machine-learning</a>	
NOTES ABOUT BOOK A.N.KOLOMOGOROV, S.V.FOMIN INTRODUCTORY REAL ANALYSIS	2020
<a href="https://sites.google.com/site/burlachenkok/articles/notes-about-the-book-of-ankolomogorovsvfomin">https://sites.google.com/site/burlachenkok/articles/notes-about-the-book-of-ankolomogorovsvfomin</a>	
NOTES ABOUT THE BOOK OF AMIR BECK, FIRST-ORDER METHODS IN OPTIMIZATION, 2017	2020
<a href="https://sites.google.com/site/burlachenkok/abeck_notes">https://sites.google.com/site/burlachenkok/abeck_notes</a>	
NOTES ABOUT VARIOUS ASPECTS IN ML, AI, CS, OPTIMIZATION, PROGRAMMING LANGUAGES, PHYSICS, APPLIED MATH	2010-2021
<a href="https://sites.google.com/site/burlachenkok/articles">https://sites.google.com/site/burlachenkok/articles</a>	

## PRESENTATIONS

APR-2021	Poster presentation at <a href="#">Communication Efficient Distributed Optimization at NSF-TRIPODS Workshop</a> .
FEB-2020	OpenTalks.AI, Huawei technologies for AI developers. <a href="https://www.huawei.com/ru/news/ru/2020/huawei_ai_development_in_russia">https://www.huawei.com/ru/news/ru/2020/huawei_ai_development_in_russia</a>
JULY-2019	Teach one month Deep Learning Course with Dmitry Kamzolov. Russia, Sochi, Srus
DEC-2018	Guest Lectures in Moscow Institute of Physics and Technologies. Subtle things around decision trees. ▶ <a href="https://github.com/burlachenkok/presentations_bruizuz/tree/master">https://github.com/burlachenkok/presentations_bruizuz/tree/master</a> ▶ <a href="https://www.youtube.com/watch?v=r4ZTy90233w">https://www.youtube.com/watch?v=r4ZTy90233w</a> ▶ <a href="https://www.youtube.com/watch?v=evkzN6AZTnc">https://www.youtube.com/watch?v=evkzN6AZTnc</a>
APR-2016	GTC 2016, San Hose. <a href="http://www.gputechconf.com/">http://www.gputechconf.com/</a> . Presenter in <a href="#">Driveworks</a> NVIDIA Booth
AUG-2012	SIGGRAPH 2012, LosAngeles. ACM Siggraph <a href="http://s2012.siggraph.org">http://s2012.siggraph.org</a> . Presenter in <a href="#">CentiLeo</a> Booth.

## COMPETENCES

General Programming Languages	C89/C99, C++14/11/03, C#, Python, Cython, Bash, Perl, x86/x386/ARM, Java
DSL Programming Languages	GL Shader Language, TVM, Google Protobuf, CUDA, OpenCL, Matlab
Frameworks	Qt, CUDA, PyTorch, TensorFlow, WinApi, Posix, OpenGL, OpenCL, PhysX
Libraries	Numpy, CUDA, TensorFlow, cvxpy, cuda toolkit
Operating Systems	Windows, Linux based, Orbis, Xbox, Windows CE, Android, NDA OS-es
Development Environments	QtCreator, Visual Studio, Eclipse, WinDbg, Android Studio, TexStudio, Nsight
Development Tools	SysInternals, AqTime, Cmake, GNU Toolchain, CppCheck, Valgrind, Git
Markup and Type Languages	Latex, HTML, XML
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 80K lines.
Recommendations from co-workers on recent projects	Can be Provided under request

## PROFESSIONAL EXPERIENCE

August 2020 March 2019	<b>Principal Lead Engineer   Foundation AI Lab, HUAWEI, Moscow</b> <ul style="list-style-type: none"><li>▶ R&amp;D in internal ML/DL middleware for HUAWEI HiSilicon</li><li>▶ R&amp;D in internal projects in ML/DL middleware for HUAWEI Consumer Business Group</li><li>▶ Preseting HiSilicon solutions in Russian AI Conferences</li></ul> <div>Math Optimization AI Machine Learning C++ Python TVM Java Google Protobuf CMake Qt TensorFlow</div>
March 2019 July 2014	<b>Senior Developer Technology Engineer, NVIDIA, Moscow</b> <ul style="list-style-type: none"><li>▶ Contribute into Driveworks SDK - computer vision, machine learning</li><li>▶ Contribute into PhysX/Apex SDK - physics simulation, graphical special effects development</li><li>▶ Contribute into cuDNN/cuBLAS libraries - GPU computation, machine learning.</li><li>▶ Contribute into RAPIDS project - GPU based Machine Learning Framework</li></ul> <div>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</div>
July 2014 May 2013	<b>Senior Developer Engineer   Yandex Video Team, YANDEX, Moscow</b> <ul style="list-style-type: none"><li>▶ Text and statistical machine learning features for video search <a href="http://video.yandex.ru">http://video.yandex.ru</a></li><li>▶ Infrastructure to store static aspects web document with embedded video</li><li>▶ Statistical analysis in several billions web documents with embedded video in MapReduce</li><li>▶ Infrastructure to show plots for internal team's processes</li></ul> <div>C++ Google Protobuf JavaScript Bash Python Computer Science HTML SVN MapReduce Decision Trees</div>
April 2013 March 2012	<b>Lead Physics Engine Developer, FITTING REALITY, Moscow</b> <p>CEO Inga Nakhmanson can prove that I brought big value for the project and company. I have left due to that stopped financial support of a startup company.</p> <ul style="list-style-type: none"><li>▶ Develop library for clothing simulation started with CUDA</li><li>▶ Migrate cloth simulation library to OpenCL</li><li>▶ Adapt to use this library for Ogre.</li><li>▶ Custom render engine for clothing visualizatio <a href="https://yadi.sk/d/ytygxSIYP62Tr">https://yadi.sk/d/ytygxSIYP62Tr</a></li><li>▶ Carry internal math/cs trainings</li></ul> <div>C++ OpenGL GLSL Qt Linux Windows QMake CUDA OpenCL Physics Computer Graphics gDebugger</div>
March 2012 September 2010	<b>Software Developer Engineer, ACRONIS, Moscow</b> <p>Acronis invited B.Stroustrup author of C++ to give an advanced series of lectures about C++ which gave me additional great knowledge on the subject.</p> <ul style="list-style-type: none"><li>▶ Low-level debugging in a big codebase</li><li>▶ Key member of GUI team for <a href="#">Acronis Backup and Recovery 2011 Enterprise</a></li></ul> <div>C++ C Windows WinDbg VmWare Specialized GUI library SVN SysInternals Suite AppVerifier CppCheck</div>
September 2010 March 2009	<b>Senior Software Developer Engineer, CAPITAL RESEARCH, Moscow</b> <p>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.</p> <ul style="list-style-type: none"><li>▶ Developed Firefox plugin to create the three-dimensional HTML view for basics HTML elements</li></ul> <div>Firefox C++ Windows HTML CSS Windows OpenGL GLSL</div>

June 2009 December 2006	<b>C++ Programming Engineer, FLINT AND CO, Moscow</b> ► Created several computer games, write drivers to custom equipment, implement computer vision and computer graphics part ► Trips to customers C++ SDL Linux Windows Development Image Library Low level programming Computer Vision OpenGL SVN
November 2006 March 2006	<b>C++ Programming Engineer, ASTRASOFT TECHNOLOGY, Moscow</b> <i>Left company due no interconnection with my courses in 2006</i> ► 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](https://bitbucket.org/konstantin_burlachenko/opt_studio) [Project report Math Optimizaiton Research Studio](#)

CS380 : Math Optimization Research Studio. Enviroment which try partially get rid of Python for research in optimization algorithms

C++ Linux Windows CUDA CMake

### EXPERIMENTAL NEURAL NET FRAMEWORK

2019

<https://sites.google.com/site/burlachenkoc/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 Ziqu 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/burlachenkoc/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/burlachenkoc/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/burlachenkoc/plotter\\_plusplus](https://github.com/burlachenkoc/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 Embedded Systems Qt Python

### LANE DETECTION USING FOURIER BASED LINE DETECTOR

2016

[http://web.stanford.edu/class/cs231a/prev\\_projects\\_2016/final\\_konstantin\\_burlachenko.pdf](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

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#### Timout Paltashev

AMD and Core faculty, NORTHWESTERN POLYTECHNIC UNIVERSITY, [LETTER](#)

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