Aleksei Kalinov

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EDUCATION

Institute of Science and Technology Austria *2021 – Present*
PhD in Computer Graphics and Physics Simulation

Skolkovo Institute of Science and Technology *2019 – 2021, GPA:* 5.0/5.0
MSc in Mathematics and Computer Science, Data Science concentration

National Research University Higher School of Economics *2015 – 2019, GPA:* 9.08/10.0
BSc in Applied Mathematics and Informatics with Honors, Machine Learning track, Minor in Physics

INDUSTRY EXPERIENCE

Deep Learning Research Intern, NVIDIA *USA (Remote), February – August 2021*
Proposed CarneliNet, a new speech recognition model with adjustable inference resource requirements. Sped up training of flagship model by 30% with efficient masking and automatic mixed precision tweaks.

Software Engineering Intern, Google *UK (Remote), June – August 2020*
Designed and launched a pipeline to perform a continuous static code analysis of 2 Million Play Store apps, which detects usage of Android non-SDK interfaces. *Java, C++, MapReduce*

Software Engineering Intern, Google *USA, July – October 2019*
Increased relevance of recommendations in the internal marketing tool by 6% by inferring missing metadata of hundreds of documents with deep learning approaches. *Go, Python, TensorFlow, SQL, App Engine*

Software Engineering Intern, Google *USA, June – September 2018*
Designed and implemented a library to transform 3D data into format suitable for existing Street View Deep Learning models. Increased throughput of a distributed 3D rendering pipeline by 11%. *C++, OpenGL*

SWE Intern in R&D deparment, CGF Studio *Russia, December 2017 – May 2018*
Compared physically based skin deformation simulation models for 3D characters. *Houdini, Python*

Software Engineering Intern, Google *USA, July – September 2017*
Developed a classification model for the YouTube content rating system based on text and sound features. Launched the model as a real-time production microservice. *Python, TensorFlow, C++*

Software Engineering Intern, Google *Switzerland, July – September 2016*
Designed experiments and implemented YouTube-scale distributed pipelines to quantify importance of graph features for YouTube language classifiers. *C++, MapReduce, TensorFlow, SQL*

ACADEMIA EXPERIENCE

Graduate Researcher, ISTA *Austria, September 2021 – Present*
Devising approaches to increase the fidelity of coarse simulations by relying on deforming topology-changing triangle meshes. Inventing mesh surface tracking algorithms to robustly simulate foams at large scales.

MSc Student, Skoltech HPC & Big Data Lab *Russia, November 2019 – June 2021*
Designed a distributed numerical algorithm to simulate Compton scattering on the Zhores supercomputer. Optimized for narrow-band scattering radiation via a differentiable laser pulse phase optimization.

BSc Thesis Research Intern, MSU Graphics and Media Lab *Russia, November 2018 – May 2019*
Designed a GAN-based model to enhance traffic sign datasets with generated images.

PUBLICATIONS

Peter Heiss-Synak*, **Aleksei Kalinov***, Malina Strugaru, Arian Etemadi, Huidong Yang, Chris Wojtan. Multi-Material Mesh-Based Surface Tracking with Implicit Topology Changes. 2024. *ACM Transactions on Graphics (SIGGRAPH North America).*

Ionut-Vlad Modoranu, **Aleksei Kalinov**, Eldar Kurtic, Elias Frantar, Dan Alistarh. Error Feedback Can Accurately Compress Preconditioners. 2024. *International Conference on Machine Learning (ICML).*

Kalinov A, Osinsky A, Matveev S A, Otieno W, Brilliantov N V. Direct Simulation Monte Carlo for New Regimes in Aggregation-Fragmentation Kinetics. 2022. *Journal of Computational Physics*

Kalinov A, Bychkov R, Ivanov A, Osinsky A, Yarotsky D. Machine Learning-Assisted PAPR Reduction in Massive MIMO. 2020. *IEEE Wireless Communications Letters.*

PREPRINTS

Kalinov A, Majumdar S, Balam J, Ginsburg B. CarneliNet: Neural Mixture Model for Automatic Speech Recognition. 2021. `https://arxiv.org/abs/2107.10708`

TALKS & PRESENTATIONS

Aleksei Kalinov. Multi-Material Mesh-Based Surface Tracking with Implicit Topology Changes. 2024. *New York University*

Peter Heiss-Synak*, **Aleksei Kalinov***. Multi-Material Mesh-Based Surface Tracking with Implicit Topology Changes. 2024. *ACM Transactions on Graphics (SIGGRAPH North America).*

Ionut-Vlad Modoranu, **Aleksei Kalinov**, Dan Alistarh. Error Feedback Can Accurately Compress Preconditioners. 2024. Poster presented at: *International Conference on Machine Learning (ICML).*

Aleksei Kalinov. Bubble Up: Simulating Large-Scale Dynamic Foams and Fluids. 2024. *Eurographics Doctoral Consortium.*

Kalinov A. Direct Simulation Monte Carlo and Oscillations in Aggregation-Fragmentation Kinetics. 2022. *Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing (MCQMC).*

Kalinov A, Kharin V Yu, Rykovanov S G. Caustics in Non-linear Compton Scattering. 2020. Poster presented at: *IX Conference for Young Researchers "Elementary Particle Physics and Cosmology".*

Kalinov A, Konushin A. CNN-based Post-Processing of Synthetic Objects For Data Augmentation. 2019. Poster presented at: *Travelling Seminar on Machine Learning at HSE.*

TEACHING EXPERIENCE

Teaching Assistant, Higher School of Economics *Russia, October 2018 – March 2019*
Reviewed problem sets, graded homework and gave recitations for Natural Language Processing course.

Teaching Assistant, Higher School of Economics *Russia, October 2016 – March 2017*
Reviewed problem sets, graded homework and gave recitation classes for Discrete Math course.

AWARDS

The Ilya Segalovich Scholarship 2018. Yandex and HSE Faculty of Computer Science Scholarship for achievements in academics and research. Awarded to 16 out of 1500 students.

The Ilya Segalovich Scholarship 2017. Yandex and HSE Faculty of Computer Science Scholarship for achievements in academics and research.

CS department award The Best Computer Science Freshmen Project. 2016.

ADDITIONAL ACTIVITIES

Alternate Captain of Skoltech ice-hockey team. Led the team to Moscow Amateur Cup victory in 2019.

World Record holder for fastest completion of Hack'n'Slash game(`www.speedrun.com/hack_n_slash`).

"We Are Not Alone" 3D dynamic scene implemented completely in a fragment shader, including ray-marching engine with SDF support, procedurally generated terrain and lighting with soft-shadows. `www.shadertoy.com/view/WllyDn` *OpenGL shading language*

Kaggle Freesound General-Purpose Audio Tagging Challenge Designed a classification model to label 9400 audio samples recorded in various conditions. Top 20% out of 583 participants. *Python, PyTorch*