

Aleksandr Petiushko, PhD

Industry and Academia



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Bio

Dr. Aleksandr Petiushko is a Vice President, Head of RnD at a FinTech Holding, an Adjunct Professor at [Sofia University](#) (Palo Alto, California) giving courses on ML and AI, and a lecturer at Lomonosov MSU and MIPT, giving lectures on the Theory of Deep Learning. Before FinTech, worked as Sr. Director, Head of AI Research at Gatik, Director, Head of ML Research at Nuro, as a Team Lead / Scientific Expert, Chief Scientist at Huawei, as a Managing Director / Leading Scientific Researcher at Artificial Intelligence Research Institute. The Ph.D. dissertation is at the intersection of Discrete Mathematics and Computer Linguistics. Research interests lie in the applications of empirical and theoretical robustness (publications at ECCV, IJCAI, AAAI, CVPR, NeurIPS).

Education

- PhD in Theoretical CS · 2016
- MSc in Mathematics · 2006

Interests

- Autonomous Driving
- Deep Learning
- Robustness Theory
- Discrete Mathematics

Skills

- Research
- Leadership
- Lecturing

Summary || Last Update: June 2025

Principal RnD Researcher (20 years of experience), RnD Technical Leader (15 years of experience), and RnD Manager (10 years of experience). Running and managing industrial research and academic collaboration (45 publications, 40 patents). Hiring and transforming AI/ML teams. Inspired by theoretical computer science and how it changes the world.

Experience

Present	Vice President, Head of RnD Responsibilities: <ul style="list-style-type: none">• Hiring the Research and Development team• Research Strategy for the whole FinTech Holding• Updating infrastructure for the State-of-the-Art ML Research Technical Directions: <ul style="list-style-type: none">• Predictive tasks (Credit Scoring and Risks, Churn Prediction)• Recommendation tasks (Personal Finance, Lead Generation)• Anomaly Detection tasks (Fraud Detection)	FinTech Holding, USA/CA, San Jose
Oct 2025		
Sep 2025	Head of AI Research Responsibilities: <ul style="list-style-type: none">• State-of-the-Art AI Approach to Medical Domain• Scaling ML infrastructure and environment Technical Direction: Analysis of ultra-dimensional (billions of pixels) pathology images from microscopy scans	Elea Health, USA/CA, Palo Alto
Apr 2025		
Apr 2025	Sr. Director, Head of AI Research Responsibilities: <ul style="list-style-type: none">• Hiring the AI Research team• AI Strategy• Scaling ML infrastructure and environment Technical Directions: <ul style="list-style-type: none">• Online Mapping• Prediction and Planning• End-to-end Autonomous Driving Systems• Uncertainty and Robustness	Gatik AI, USA/CA, Mountain View
Sep 2024		
Sep 2024	Director, Head of ML Research Responsibilities: <ul style="list-style-type: none">• Managing and hiring the team of highly skilled diverse talents in ML (10+ FTEs, dotted line reports, consultants, interns)• Internal cross-collaboration and ideas brainstorming with other Behavior and Perception teams• Technical Roadmaps• State-of-the-Art frontier research• Academia collaboration Technical Directions: <ul style="list-style-type: none">• Prediction (including conditional and joint), Planning (including Diffusion-based), and Motion Selection (RL-based)• Closed-loop Reasoning• Synthetic Data Generation• Reward and Issue Predictor models• Agent-centric and scene-centric encoders• Scaling laws in Behavior• Robustness and Uncertainty of Autonomy Stack• LLM, VLM, Perception-Behavior interface Other achievements: <ul style="list-style-type: none">• Internal ML education through a series of AI Theory lectures• Main ideologist and program owner of Nuro ML University (100+ FTEs involved)• Created Nuro Tech Talks series• Made SotA exploration a working internal pipeline• Constantly increasing Nuro's visibility (participation at conferences, workshops, seminars, etc)	Nuro, USA/CA, Mountain View
Feb 2022		

Feb 2022	Director, Leading Scientific Researcher Fusion Brain Research Director. Responsibilities: <ul style="list-style-type: none">• Research roadmap formulation• Research team hiring• Leading the research team (6 people)• Academia collaboration Technical Directions: <ul style="list-style-type: none">• Multi-modality• Multi-tasking• Retrieval-based systems	AIRI, Russia, Moscow
Sep 2021		
Sep 2021	Chief Scientist, Technical Leader, Research Manager Responsibilities: <ul style="list-style-type: none">• Video Intelligence direct management (~15 people, plus interns)• Fundamental Research (~25 experts from different groups) team leadership• Academia collaboration projects on Fundamental Research in AI• Interviewing young talents• Mentoring interns• Remote work coordination Technical Directions: <ul style="list-style-type: none">• Video Recognition and Retrieval (MML, MDMMT, top place on smth2smth)• Trajectory Prediction (top places on Argoverse and Apolloscape benchmarks)• Face Recognition (Detection and Identification)• Domain Adaptation (computer vision)• Multi-task end2end (keypoints, detection, segmentation)• Storage (cold storage, erasure coding, object distribution, file type recognition with ML)• NeuralNets for Computer Vision (Super Resolution, DeBlur, Compression)• Robustness in DL• Geometrical DL Other achievements: <ul style="list-style-type: none">• Organized and maintained the Fundamental Research team (with publishing activity)• Organized and initially led the first Neural Net direction at Huawei MRC• Proposed and prepared the multi-year funded project "Fundamental Research in AI"	Huawei Research, Russia, Moscow
Sep 2014		
May 2014	Senior Software Engineer Engineering responsibilities: <ul style="list-style-type: none">• Media gateway (DSP for audio)• WCDMA protocol (preamble detection)• LDPC (trapping set analysis)• Gesture recognition (classical ML in CV)• Flash controller (wear leveler, garbage collector) Other achievements: <ul style="list-style-type: none">• 30+ patents on storage systems, ML and Computer Vision• Some demo videos: 1, 2, 3	LSI Corporation (now Broadcom), USA/CA, San Jose (remote)
Nov 2008		
Nov 2008	Software Engineer Creating and supporting of a large DB (~1-10M records) on Oracle, implementing its functionality using PL/SQL; a number of client interfaces (Perl – CGI/Tk, AJAX (prototype, jQuery), Delphi) for interconnection with DB; Windows SVN server administration.	RIRC of Briansk region, Russia, Briansk
Feb 2007		
Apr 2007	Software Engineer Creating and supporting of bundled software to automate Internet provider tasks (accounting systems, billings, client and server-side for payment systems CyberPlat and OSMP using MySQL, PostgreSQL and Perl); implementing different web-interfaces and admin scripts (Perl, bash + sed, grep, awk) on demands for the administration department.	Computer Technologies, Russia, Briansk
Sep 2006		
Jun 2006	Integration and testing department specialist RTOS lynxOS testing in different environments, different scripts for testing (Perl, bash + sed, grep, awk); participating in porting utilities, OS code bug fixing (C); using CVS, RCS.	Auriga, Russia, Moscow
Feb 2006		
Jun 2006	Software Engineer Speech experiments, algorithms development (Matlab, C) and speech recognition in noisy conditions.	Neurocom, Russia, Moscow
Dec 2003		

Education

Mar 2016

Doctor of Philosophy (Ph.D.) Lomonosov Moscow State University, Russia, Moscow
Russian name - "Candidate of Physical and Mathematical Sciences", defended at Lomonosov MSU, Department of Mechanics and Mathematics.
Dissertation "[Bigram Languages](#)", major 01.01.09 - Discrete Mathematics and Mathematical Cybernetics. [Abstract](#). [Youtube recording](#) (all links are in Russian).

Nov 2012

Postgraduate Student Lomonosov Moscow State University, Russia, Moscow
Postgraduate study at Lomonosov MSU, Department of Mechanics and Mathematics. Major 01.01.09 - Discrete Mathematics and Mathematical Cybernetics.

Sep 2009

Master of Science (M.Sc.) Lomonosov Moscow State University, Russia, Moscow
Russian name - "specialist" (theoretical and applied mathematics), major in the discrete mathematics at Lomonosov MSU, Department of Mechanics and Mathematics.
Thesis "Dynamic adjustment of signals". Incomplete (but the best that I could find) [text](#) (in Russian).
GPA 4.89/5, Diploma with honors.

Jul 2006

High School Briansk Pushkin's Lycee, Russia, Briansk
High School, Briansk Pushkin's Lycee, Physics and Mathematics major.
Gold medal.

Sep 2000

Jul 2000

Jan 1997

Academia

Jul 2023 - ...

Adjunct Professor Sofia University, USA/CA, Palo Alto
Machine Learning and Artificial Intelligence courses.

Feb 2023 - ...

Visiting Professor Moscow Institute of Physics and Technology, Russia, Moscow
Theory of Deep Learning courses.

Feb 2019 - ...

Visiting Professor Lomonosov Moscow State University, Russia, Moscow
Python, Computer Vision, Machine Learning, Theory of Deep Learning courses.

Publications

Selected conference/journal/patent publications. For the full list (35+ publications, 30+ patents, about 70 in total), please refer either to the [Google Scholar](#) or [Personal Webpage](#).

- 2025 J. Zhang, X. Yang, T. Wang, Y. Yao, A. Petiushko, and B. Li. "SafeAuto: Knowledge-Enhanced Safe Autonomous Driving with Multimodal Foundation Models". In: *International Conference on Machine Learning (ICML)*. 2025
- 2025 C. Xu, A. Petiushko, D. Zhao, and B. Li. "Diffscene: Diffusion-based safety-critical scenario generation for autonomous vehicles". In: *The 39th Annual AAAI Conference on Artificial Intelligence*. 2025
- 2024 J. Booher, K. Rohanimanesh, J. Xu, and A. Petiushko. *CIMRL: Combining IMitation and Reinforcement Learning for Safe Autonomous Driving*. 2024. arXiv Preprint: [2406.08878](#)
- 2023 Z. Zhou, J. Booher, W. Liu, A. Petiushko, and A. Garg. "Multi-Constraint Safe RL with Objective Suppression for Safety-Critical Applications". In: *Symposium Machine Learning for Autonomous Driving (ML4AD)*. 2023
- 2022 M. Pautov, O. Kuznetsova, N. Tursynbek, A. Petiushko, and I. Oseledets. "Smoothed Embeddings for Certified Few-Shot Learning". In: *Advances in Neural Information Processing Systems (NeurIPS)*. vol. 35. 2022, pp. 24367–24379
- 2022 N. Muravev and A. Petiushko. "Certified Robustness via Randomized Smoothing over Multiplicative Parameters of Input Transformations". In: *Proceedings of the Thirty-First International Joint Conference on Artificial Intelligence, (IJCAI)*. 2022, pp. 3366–3372
- 2021 M. Dzabraev, M. Kalashnikov, S. Komkov, and A. Petiushko. "MDMMT: Multidomain Multimodal Transformer for Video Retrieval". In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*. 2021, pp. 3354–3363
- 2021 S. Komkov and A. Petiushko. "AdvHat: Real-World Adversarial Attack on ArcFace Face ID System". In: *2020 25th International Conference on Pattern Recognition (ICPR)*. 2021, pp. 819–826
- 2016 A. Petiushko, D. Parfenov, I. Mazurenko, and A. Kholodenko. *Methods and apparatus for merging depth images generated using distinct depth imaging techniques*. US Patent App. 14/233,943. 2016
- 2015 A. Petiushko. "On context-free bigram languages". In: *Intelligent Systems* 19.2 (2015), pp. 187–208
- 2010 A. Petiushko. "On Markov Random Fields and Their Relationship with Markov Chains". In: *Intelligent Systems* 14.1-4 (2010), pp. 225–236

Public Tech Talks

Selected technical talks. For the full list (35+ talks in total), please refer to the [Personal Webpage](#).

Jun 2025	<i>Uncertainty and Safety In Autonomous Driving</i>	
	Invited speaker at 2025 CVPR UCQV Workshop	
Mar 2025	<i>ML4AD Award Ceremony</i>	
	Invited speaker and sponsor at 2025 ML4AD Workshop	
Jun 2024	<i>Combining IMitation and Reinforcement Learning for Safe Autonomous Driving</i>	
	Invited speaker at 2024 DDADS Workshop	
Dec 2023	<i>Scaling Laws for Autonomous Driving Models</i>	
	Invited speaker at 2023 ML4AD Symposium	
Jun 2023	<i>Behavior Modeling and Learned Motion Selection for Safe Driving</i>	
	Invited speaker at 2023 CVPR SSAD Workshop	
Oct 2022	<i>Autonomy Challenges</i>	
	A Berkeley Deep Drive Lecture	
Oct 2021	<i>Certified Robustness, High Dimensions and Computer Vision</i>	
	Invited speaker at SAMPLE - Statistics, Artificial Intelligence, Machine Learning, Probability, Learning Theory Event	

Projects

Some projects that I'm proud of.

Jul 2023 - Nov 2023	Nuro ML University (NMLU)	Nuro, USA/CA, Mountain View
	The main ideologist and the program owner of Nuro ML University : 100+ full-time employees involved, 3 parallel tracks (novice, average, and SotA).	
Apr 2023 - ...	Nuro Tech Talks	Nuro, USA/CA, Mountain View
	The creator of Nuro Tech Talks series where top robotics researchers share their research ideas for Nuro: 20+ talks with speakers from multiple countries, universities, and companies.	
Sep 2019 - Dec 2021	School of Huawei Advanced Research Education (SHARE)	Huawei Research, Russia, Moscow
	The main technical coordinator and the owner of Machine Learning and Computer Vision specialization of the School of Huawei Advanced Research Education (briefly SHARE) at Lomonosov Moscow State University, the biggest Russian University.	
Jul 2019	Hackathon: Metric Learning for facial descriptors	Huawei Research, Russia, Moscow
	I was invited by the Russian Association for Artificial Intelligence to organize and run a hackathon to find the best similarity metric for the FaceID system.	
Jan 2017	Python's imresize()	Russia, Moscow
	I wrote a Python code mimicking the MatLab imresize() function which is often used for super-resolution challenges. Project has apprx 150 stars on github.	
Jan 2008	FTP Search Engine	Russia, Briansk
	I wrote two versions of the ftpsearch engine: one running on the ftp server itself, another for scanning ftp servers remotely; both include an indexer and a web-interface for the search itself. These two versions were deployed on two main Briansk Internet providers of that time: BrianskTel and BKS-TV.	

Professional Awards

Moscow Institute of Physics and Technology, Russia, Moscow

2022	Top-10 MIPT Publishing Scientists
Huawei Research, Russia, Moscow	
2020	Best Mentor, Fundamental Research Incentive, Team Golden Medal, Future Star
2019	Outstanding Individual, Future Star, Team Golden Medal, Top Selling Point Delivery
2018	Tech Innovation and Breakthrough, Quality Star, Golden Luban, Excellent Delivery, Customer Success
2017	Outstanding Contractor

Hobbies

Traveling, biking, modern physics, math puzzles, adventure games, family.