Dmitry Kovalev, PhD

For 15 years, I've led R&D in advanced perception systems (radar, lidar, computer vision), creating innovative signal processing algorithms and sensor fusion solutions. My work spans from boosting solid-state SPAD LiDAR accuracy by 5×, and building an AI pipeline that turns satellite data into 3-D cloud maps for Asia's busiest airport, to shipping a scaleable Golang/Vue weather app now trusted by 50 000+ users

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Professional experience

2019-Present **Senior System Engineer**, *Sony Depthsensing Solutions (Sony Semiconductor Solutions Group)*, Brussels, Belgium.

- Developed signal-processing pipelines that improved system-level accuracy of dToF SPAD LiDARs by 5×, driving histogram-based calibration upgrades and their adoption into the production library.
- Developed a proof-of-concept fusion of imaging radar, iToF and RGB cameras data to reconstruct low-SNR point clouds.
- Engineered synchronized radar-camera fusion prototypes to enhance low-angular-resolution Doppler radar data with high-lateral-resolution imagery for safety-critical applications.
- Customer support, translating R&D breakthroughs into industrial-grade LiDAR systems.

2015–2019 **Doctoral researcher**, *Université catholique de Louvain*, Louvain-la-Neuve, Belgium.
Research on the scattering of electromagnetic waves on the atmospheric turbulence and wake vortex; radar signal processing (FP7-UFO, SESAR 12.2.2 JU); data collection and processing system for the Alphasat TDP5 Ka/Q band propagation experiment (European Space Agency project) *Supervisor: Prof. Danielle Vanhoenacker-Janvier*

2012–2014 **Engineer**, *Department of Radio Electronic Facilities; RI "Prognoz", Saint Petersburg State Electrotechnical University (ETU) "LETI"* , Saint Petersburg, Russia.
Proof of concept of a DVB-T2 based passive radar; radio measurements; development of signal processing algorithms and its implementation for parallel processing (Matlab, Python, C, OpenCL); building and testing the architecture of the processing unit for the passive radar: GPU/CPU based solution working in near real-time.

2011–2012 **Research Internship**, *Institute of Neural Information Processing, University of Ulm*, Ulm, Germany.
Project: Human-computer-interaction: development of speech recognition algorithms based on Hidden Markov Models

2009–2011 **Engineer, Research Assistant**, *Department of Radio Engineering and Telecommunications, ETU "LETI"*.
Projects: Target tracking based on Kalman filtering and Neural Networks, Multi-position decameter-wave radar simulation

2007–2009 **Software developer**, *CJSC "Pikar"*, Saint Petersburg.

- Built a web application to integrate pass-request workflows into enterprise access-control systems (C, ASP.NET, SQL).
- Managed project administration and migrated legacy databases to SQL Server.

2006-2007 **Software developer**, *Motorola laboratory at Saint Petersburg State Electrotechnical University "LETI"*.
Developed a network protocols analyzer (C, C++) for an automatic transformation of network protocols description to the classes library

Selected Projects & Consulting

2021–2022 **Back-/Front-End Developer (Freelance)**, *UniFish Weather @ Pescamotion*, The Netherlands.

- Architected & implemented the Golang backend and Vue.js front-end for UniFish Weather App, growing the app to 50 000 active anglers (with more than 4000 paid subscriptions).
- Designed real-time weather polling and caching system to guarantee sub-second rain tile loads under heavy traffic.

2025 **AI Consultant (Freelance)**, *3D Cloud Reconstruction @ SkyEcho*, Rotterdam, NL.

- Neural-network pipeline to reconstruct 3D cloud structures from multispectral satellite imagery and radar, tailored for one of Asia's largest international airports.

2018–2020 **Software Developer (Freelance)**, *Radar Forecast Monitoring @ SkyEcho*, Rotterdam, NL.

- Built a monitoring system for SkyEcho's high-resolution radar-based rain-forecast (Golang, Vue.js, Python & PyQT).

Education

2015–2019 **Ph.D. in Engineering and Technology**, *Université catholique de Louvain*, Louvain-la-Neuve, Belgium.
Thesis: Wake Vortex Radar Signatures Simulator Based on Large Eddy Simulation of Turbulent Stratified Atmospheres: Clear Air and Rain. *Supervisor: Prof. Danielle Vanhoenacker-Janvier*

2003–2009 **Engineer's Degree in Radio Engineering**, *Saint Petersburg State Electrotechnical University "LETI", Department of Radio Engineering and Telecommunications*, Saint Petersburg, Russia, *4.61 out of 5 (92.2%)*.
Diploma thesis: The study of radar tracking algorithms based on neural network solutions. *Supervisor: Dr. V.I. Veremyev*

Software skills

- Python, Golang, JavaScript, Matlab, Julia, C, C++, SQL, NoSQL (MongoDB), Prometheus, Redis

Honors and awards

2017 **The FSR reserve fund of Université catholique de Louvain (funding 1 year of Ph.D. research)**.

2011 **The German Academic Exchange Service "DAAD" (6-month scholarship)**.

Additional courses and degrees

2021 **Computer vision nanodegree**, *Udacity*.

2021 **Natural Language Processing nanodegree**, *Udacity*.

2020 **Sensor Fusion Engineer nanodegree**, *Udacity*.

2019 **Neural Networks and Deep Learning**, *deeplearning.ai*, Coursera.

May 2016 **Radars 2020 - Future Radar Systems (MIMO, automotive, ground-penetrating radars, SAR)**, *Karlsruhe Institute of Technology*, Germany.

Teaching experience

2019 **Labs for the Telecommunications course**, *Université catholique de Louvain*, Louvain-la-Neuve, Belgium.

2019–2020 **Math and developmental education teacher at the center of additional education**, *Russian Gymnasium*, Brussels, Belgium.

2017–2018 **Supporting the course on Antennas and Propagation**, *Université catholique de Louvain*, Louvain-la-Neuve, Belgium.

2013–2014 **Co-supervision of bachelor and master students diploma works**, *Saint Petersburg State Electrotechnical University "LETI"*, Saint Petersburg, Russia.

Invited talks

2018 **Collision avoidance system based on airborne passive radar**, *KU Leuven*, Belgium.

2019 **Passive and Active Radars Applications**, *University of Luxembourg*, Luxembourg.

Selected Publications & Patents

- D. Kovalev et al., **Histogram based LiDAR calibration**, Sony, 2025.
- D. Kovalev, **Cyclic error correction in SPAD-array lidars**, Sony, 2024.
- Kovalev & Vanhoenacker-Janvier, **Wake vortex radar detection via LES**, J. Atmos. Oceanic Technol., 2019.

See full list online - https://dmitrykovalev.pro/research.html