

# Alexey Gronskiy

CV

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This CV (up to date): gron.sk/cv ↗

## Summary

Mathematician by training, computer science PhD, with experience in both corporations and startups, I worked in range of roles from software engineering to data and ML engineering, and in range of fields from computer vision for airborne collision avoidance to financial data analysis. I am a private pilot and paramedic assistant in my free time. In software development, my priorities are systematism and clear communication.

- 5 years industry (Software Engineering)
- Permanent Swiss residence permit ("C")
- 6 years academia (PhD, Computer Science)
- Married, two children

## Skills

Listed below are the skills split into "fresh" and "past" ("secondary") ones. The latter can be brushed up quickly.

### "Fresh" Areas of activity

- Machine learning, deep learning
- Computer vision for autonomous flying
- Object detection, collision avoidance
- Large scale data analysis, ETL pipelines
- Neural networks verification and certification
- Process development and documentation
- Navigating regulatory standards
- MSc/BSc theses advisory

### Operating programming languages

- C++
- Python
- Go

### Software frameworks

- Tensorflow, Keras
- gRPC/REST
- Scikit-learn, PyMC3
- Plotly, Dash, Folium
- OpenCV
- Pandas, Geopandas
- Networkx, OSMnx

### Stacks & Tools

- CI/CD: Bazel, Jenkins, Docker, Git
- Packages: Nix, JFrog Artifactory, Anaconda
- Data: Hadoop MapReduce, Spark, Parquet
- [No]SQL: Redis, MongoDB, MariaDB
- GCP: Storage, Computing, KubeFlow
- Azure: Databricks & DataLake, DevOps
- Training: Determined AI, CUDA
- Organizational: Phabricator, JIRA, Confluence

### "Past" and "Secondary" Areas of activity

- Natural Language Processing
- Question reformulation, morphological analysis
- Statistical Learning Theory
- Algorithmic robustness under uncertainty
- Teaching assistance
- External API design for SDK products
- Cross-platform UI development
- Database normalization analysis

### Programming languages & Software frameworks

- COM/COM+
- C#
- MATLAB
- HTML/JS/CSS
- WinAPI/MFC
- Qt4
- OpenMP
- Hugo/Jekyll

### Stacks & Tools

- CI/CD: Google's Blaze, Mercurial, Bazaar, SVN
- Cloud: Google's Borg
- Data: Apache Beam, RabbitMQ
- Organizational: UML
- Databases: MySQL, PostgreSQL
- Typesetting: L<sup>A</sup>T<sub>E</sub>X

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## Working Experience

2020–2021 **Senior data engineer**, SIX Banking Services, Zurich, Switzerland



- Organized technical stack, code review and other processes in a newly established data science unit.
- Performed analytical support of stakeholder business units, provided analysis and computed KPIs for ongoing projects in payment ecosystems.
- Participated in preparatory work for transition to cloud pipelines
- Skills: Python, Geospatial analysis, Microsoft Azure (Data Factory, DataLake, Databricks), JFrog Artifactory, data security and compliance.

2018–2020 **Machine learning & computer vision engineer**, Daedalean AI ([ddln.ai](https://ddln.ai)), Zurich, Switzerland



- Conceived and developed a prototype of a visual air-to-air object detection and tracking system (as part of autopilot collision avoidance).
- Researched, evaluated and made early technical decisions, shaped out data acquisition and annotation strategies. Developed evaluation metrics, navigated aviation industry standards on operational performance.
- As part of a 4-member team, worked with European Aviation Safety Agency on defining the concepts of safety assurance for neural networks (co-authored [gron.sk/codann](https://gron.sk/codann), see "Publications").
- Conceived, developed an extendable and modularized machine learning evaluation and reporting framework used across several projects.
- Co-supervised interns and joint MSc/semester students.
- Carried out flight tests as a fixed-wing aircraft pilot.
- Skills: C++14, Python, Tensorflow, Git, object detection and tracking, cloud computing and automation (GCP/GKE/KubeFlow/Jenkins), operational performance metrics, technical ownership, requirements design, product development cycle.

summer 2017 **Research intern**, Research and Machine Intelligence, Google Zurich, Switzerland



- Worked on answer ranking module for active question reformulation (see [Google AI blog post](#)).
- Developed several deep learning models for answer ranking.
- Presented at monthly meeting of Google Research.
- Approved for full-time conversion by the hiring committee.
- Skills: Python, C++11, Tensorflow, NLP, experimental design, MapReduce, communication.

2012–2018 **Doctoral research assistant, head teaching assistant**, Machine Learning Group, Department of Computer Science, ETH Zurich, Switzerland



- Conducted research in both theoretical and practical fields (see "Projects" below).
- Launched medical collaborations with University Hospital Zurich (see [www.cardioml.ch](http://www.cardioml.ch)).
- Supervised several MSc theses.
- Taught "Introduction to Machine Learning" and "Statistical Learning Theory" courses, created a script for the latter.

2010–2012 **C++ software engineer**, ABBYY Software, Moscow, Russia



- Worked on a framework for automated native language understanding and translation.
- Designed, developed SDK wrappers for language morphology analysis and text classification.
- Skills: C++03, C#, COM/COM+/WinAPI, SVN, interface design, internal libraries, UML.

2008–2011 **Independent (freelance) C++ developer**

- Conceived and developed a cross-platform (Mac/Linux/Windows) tool for photo management, sold and maintained it.
- Skills: C++03, Qt 4, MercurialHg, PostgreSQL, selling and presentation.

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## Research Projects, Working Groups, Publications and Talks

### Working Group



**Concepts of Design Assurance for Neural Networks (CoDANN)**, European Aviation Safety Agency (EASA) and Daedalean AG

- Participated in a working group ([gron.sk/easa](http://gron.sk/easa)) which aimed at establishing methods and concepts for ensuring operational safety of machine learning models in aviation.
- Co-authored a report “Concepts of Design Assurance for Neural Networks”, whose official summary ([gron.sk/codann](http://gron.sk/codann)) was published by EASA.

### Research Projects & Publications



**Statistical Mechanical Analysis of Combinatorial Free Energy**, ETH Zurich with Center of Science of Information, Purdue University

- “On Phase Transitions of Free Energy in Combinatorics”  
*International Conference on Analysis of Algorithms (AofA) 2017, Princeton*
- “Phase Transitions in Parameter Rich Optimization Problems”  
*Analytic Combinatorics (SODA-ANALCO) 2017, Barcelona*
- “Free Energy Rates for a Class of Optimization Problems”  
*International Conference on Analysis of Algorithms (AofA) 2014, Paris*
- “Asymptotic Evaluation of Posterior Agreement for some Optimization Problems”  
*J. of Theor. Comp. Sci. (TCS) 2018*

**Robustness and Informativeness of Minimum Spanning Tree Algorithm**, ETH Zurich

- “On Informativeness and Robustness of Algorithms”  
*Joint ETH & Google Workshop, Google, Zurich, 2016*
- “How Informative are Minimum Spanning Tree Algorithms”  
*International Symposium on Information Theory (ISIT) 2014, Hawaii*



**Machine Learning for Cardiological Diseases ([www.cardioml.ch](http://www.cardioml.ch))**, ETH Zurich with University Hospital Zurich and MPI Tübingen, Germany

- Detecting causal and statistical dependencies between key factors of Acute Coronary and Takotsubo syndromes.
- Launched and co-led the project initially, supervised BSc and MSc theses.

**Robust Solving of Algorithmic Problems**, ETH Zurich with Institute of Theoretical Informatics, Zurich

- “Robust Optimization in the Presence of Uncertainty: a Generic Approach”  
*J. of Computer and System Sciences (JCSS) 2018*

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## Education

2012–2018



**Doctoral degree (Dr. Sci. ETH)**, Machine Learning Group, Department of Computer Science, ETH Zurich, Switzerland

- Ph.D. Thesis “Statistical Mechanics and Information Theory for Approximate Robust Inference” ([gron.sk/thesis](http://gron.sk/thesis)).

2006–2011



**BSc + MSc**, Department of Mathematics and Mechanics, Chair of Discrete Mathematics, Moscow State University of M.V. Lomonosov (MSU), Russia

- Specialist (equiv. BSc + MSc) degree in Pure and Applied Mathematics, with Honors.
- Thesis “On some metrical properties of Boolean functions” ([gron.sk/msc-thesis](http://gron.sk/msc-thesis)).

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## Languages

- Russian . . . . . native
- English . . . . . fluent
- German . . . . . fluent (C2 Goethe, 2016)
- French . . . . . fluent (C1 DALF, 2011)

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## Volunteer Work

2014–curr. **Ambulance assistant (Emergency Medical Technician, EMT)**, Zurich Fire & Rescue Service, Switzerland



- Regularly training as an ambulance assistant.
- Participating in ambulance shifts during public events in the city of Zurich.
- First responder to alarms from large-scale emergencies.

2007–2012 **Lecturer/Teacher**, MSU-/MIPT-based summer and winter schools [↗](#) for mathematics and programming, Russia



- Created original lecture/seminar materials.
- Conducted lectures and seminars for high school students.
- Topics: mathematical analysis, discrete mathematics, programming.

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## Hobbies and Other Activities

Aviation **Pilot**, SWISS Flying Club ([www.swissflyingclub.ch](http://www.swissflyingclub.ch) [↗](#)), Hausen am Albis, Switzerland



- Private Pilot License (PPL(A)), single engine piston (SEP) class rating.
- 120+ hours flight time.

Programming contests ◦ II prize team, All-Russia Programming Contest (2005). ◦ II prize team, Moscow Programming Contest (2005).

Sports & Music ◦ Karate (gold medal in Swiss Spring Kyu-tournament, 2014). ◦ Alpine skiing and snowboarding. ◦ Playing flute, guitar.

Pilot blog **Author**, Telegram channel “CrossWind Landing” (in Russian) ([gron.sk/x-wind](https://t.me/crosswindlanding) [↗](#))



- Telling the story of learning for private pilot license in Switzerland.
- Topics about aerodynamics, meteorology, and the fun of flying.