

Alexey Gronskiy

CV

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This CV (up to date): gron.sk/cv



Highlights

Mathematician by training, computer science PhD, with experience in both corporations and startups, I am currently working on developing a vision-based certifiable collision avoidance system for autonomous aircraft control. I am a private pilot and paramedic assistant in my free time. In technological development, I value systematism together with efficient communication.

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

Working Experience

Jul 2018–curr. **Machine learning & computer vision engineer**, Daedalean AI (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, 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, 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, experimental design, data processing, 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).
- Supervised several MSc theses.
- Launched medical collaborations with University Hospital Zurich (see www.cardioml.ch).
- 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.
- Morphology analysis and text classification.
- Designed, developed SDK wrappers for language
- 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.

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) 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) 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), 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

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).

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).

Languages

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

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.

Hobbies and Other Activities

Aviation **Pilot**, SWISS Flying Club (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.