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 eningeering 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)
- 6 years academia (PhD, Computer Science)
- Permanent Swiss residence permit ("C")
- 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 flight
- Object detection, collision avoidance
- Simulation and real data fusion
- Large scale data analysis, ETL pipelines
- Neural networks verification and certification
- Code review and documentation process
- Navigating regulatory standards
- MSc/BSc theses advisory

Operating programming languages

- C++
- Python
- Go

Software frameworks

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

Stacks & Tools

- CI/CD: Bazel, Jenkins, Docker, Git, Arcanist
- 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+
- WinAPI/MFC
- C#
- Qt4
- MATLAB
- OpenMP
- HTML/JS/CSS
- Hugo/Jekyll

Stacks & Tools

- CI/CD: Google's Blaze, Mercurial, Bazaar, SVN, various internal code review tools
- Data: Apache Beam, RabbitMQ
- Databases: MySQL, PostgreSQL
- Cloud: Google's Borg
- Organizational: UML
- Typesetting: LaTeX

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, Mircosoft Azure (Data Factory, DataLake, Databricks), JFrog Artifactory, data security and compliance.

2018–2020 **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, 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).
- 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.

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

Winter Computer Camp

- 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

SWISS Flying Club

- 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)

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

Blog **Author**, Personal blog on range of topics (gron.sk/posts)

- Topics: aviation, tech, programming.