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 AI for code analysis. I am a private pilot and paramedic assistant in my free time. In software development, my priorities are systematism and clear communication.

- 6 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

- NLP for code analysis and search
- Computer vision for autonomous flight
- Object detection, collision avoidance
- Pipelines orchestration
- NN verification and certification
- Code review and documentation process
- Navigating regulatory standards
- MSc/BSc theses advisory

Operating programming languages

- C++
- Python
- Go

Software frameworks

- PyTorch, Tensorflow
- OpenCV
- Huggingface
- Pandas, Geopandas
- Scikit-learn, PyMC3
- Networkx, OSMnx
- Plotly, Dash, Folium
- Flask

Stacks & Tools

- CI/CD: Bazel, Pantsbuild, CircleCI/GH-actions
- Data and Orchestration: Luigi, Parquet/Arrow
- [No]SQL: Redis, MongoDB, MariaDB
- Cloud: GCP/AWS, Terraform, k8s, Docker
- Training: Determined AI, Weights&Biases
- Organizational: Phabricator, JIRA, UML/C4 diagrams

"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
- Typesetting: LaTeX

Working Experience

Apr'21–curr. **Senior software engineer, ML team lead**, Snyk (snyk.io), Zurich, Switzerland

- Conceived, developed and productionized several backend projects from Snyk Code product area.
- Working with adjacent teams on defining technical directions of the said projects.
- Organizing the infrastructure for training/evaluation of large NLP models for code analysis and search.
- Facilitating transition of internal computation pipelines to the cloud; implementing libraries that simplify/unify artifact storage and orchestration.
- Leading (Jan'22 onwards) a team of 4 FTEs, advising MSc thesis.
- Skills: C++17/20, Python, PyTorch, GCP/AWS, k8s, Docker, Terraform

Dec'20–Feb'21 **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.

Jun'18–Oct'20 **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. Defined 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.

May'17–Sep'17 **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.

Aug'12–Mar'18 **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.
- Supervised several MSc theses.
- Taught "Introduction to Machine Learning" and "Statistical Learning Theory" courses, created a script for the latter.

Apr'10–Aug'12 **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**

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

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, 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

2014–2021 **Ambulance assistant (Emergency Medical Technician, EMT)**, Zurich Fire & Rescue Service, Switzerland

- Regularly trained as an ambulance assistant.
- Participated in ambulance shifts during public events in the city of Zurich.
- Was a 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.