# Alexey Gronskiy

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# 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 technological development, I value systematism together with efficient communication.

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

# Skills

Listed below are the skills split into "fresh" and "past" 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
- Data analysis, ETL pipeline engineering
- Neural networks verification and certification
- Navigating regulatory standards (e.g. aviation)
- MSc/BSc theses advisory

### **Programming languages**

○ C++ (strong) Python (strong) Go (confident) SQL (confident)

### Software frameworks

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

### Stacks & Tools

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

# "Past" Areas of activity

- Natural Language Processing
- Question reformulation, morphological analysis
- Statistical Learning Theory
- Research on algorithmic robustness
- Teaching assistance
- SDK development
- Cross-platform programming

### Programming languages & Software frameworks

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

## Stacks & Tools

- o CI/CD: Google's Blaze
- Data: Google's Flume MapReduce
- Databases: MySQL, PostgreSQL
- Cloud: Google's Borg

- o Organizational: UML, Database normalization analysis
- Presentation: LATEX

# Working Experience

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



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

### 2018–2020 Machine learning & computer vision engineer, Daedalean Al (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 (coauthored 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 ♂).
- o Developed several deep learning models for answer ranking.
- o Presented at monthly meeting of Google Research.
- Approved for full-time conversion by the hiring
- o Skills: Python, C++11, Tensorflow, NLP, experimental design, MapReduce, communication.

# **ETH** zürich

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

- o 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.
- o Taught "Introduction to Machine Learning" and "Statistical Learning Theory" courses, created a script for the latter.

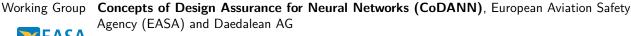
# 2010–2012 C++ software engineer, ABBYY Software, Moscow, Russia

- 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





- Participated in a working group (gron.sk/easa ☑) Co-authored a report "Concepts of Design Assurwhich aimed at establishing methods and concepts for ensuring operational safety of machine learning models in aviation.
  - ance for Neural Networks", whose official summary (gron.sk/codann ♂) was published by EASA.

Research Projects Statistical Mechanical Analysis of Combinatorial Free Energy, ETH Zurich with Center of & Publications Science of Information, Purdue University



- natorics"
  - International Conference on Analysis of Algorithms (AofA) 2017, Princeton
- "Phase Transitions in Parameter Rich Optimization Problems"
- Analytic Combinatorics (SODA-ANALCO) 2017, Barcelona
- o "On Phase Transitions of Free Energy in Combi- o "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

- rithms"
  - Joint ETH & Google Workshop, Google, Zurich, 2016
- o "On Informativeness and Robustness of Algo- o "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 be Launched and co-led the project initially, supertween key factors of Acute Coronary and Takotsubo syndromes.
  - vised BSc and MSc theses.

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

o "Robust Optimization in the Presence of Uncertainty: a Generic Approach" J. of Computer and System Sciences (JCSS) 2018

## Education

# **ETH** zürich

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 ♂).

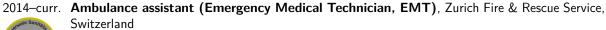
2006–2011 BSc + MSc, Department of Mathematics and Mechanics, Chair of Discrete Mathematics, Moscow State University of M.V. Lomonosov (MSU), Russia

- 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

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

# Volunteer Work





- Regularly training as an ambulance assistant.
- o Participating in ambulance shifts during public events in the city of Zurich.
- o 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
- o 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.



- o 120+ hours flight time.
- contests
- Programming O II prize team, All-Russia Programming Contest II prize team, Moscow Programming Contest (2005).

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

  - Playing flute, guitar.

Pilot blog **Author**, Telegram channel "CrossWind Landing" (in Russian) (gron.sk/x-wind 다)



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