






# Sergei VOLODIN

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Regensbergstrasse 192, 8050 Zurich, Switzerland

Birth date: 3rd October 1994 (25 years), Russian

## EDUCATION

### Swiss Federal Institute of Technology in Lausanne (EPFL)

Lausanne, Switzerland

Sep 2017 – 2021

- Master's degree in **Computer Science**, GPA: **5.67/6**
- Minor in Computational **Neurosciences**
- Research Assistant position (2017–2019)

### Moscow Institute of Physics and Technology

Moscow, Russia

June 2017

Bachelor's degree in **Applied Mathematics**, GPA: **4.84/5**

## SKILLS

**Relevant courses:** **Machine Learning**, **Software Engineering**, Unsupervised and Reinforcement Learning, Convex Optimization, Distributed Algorithms, Algorithms, Random graph theory, Functional Programming, Set Theory, Random Processes, Functional Analysis, Biological modeling of neural networks, Complexity theory, Learning theory, Neuroscience: behavior and cognition, Neuroprosthetics, Theory and methods for Reinforcement Learning, Optimization for Machine Learning, Computer Vision

**Scientific programming:** **Keras**, **TensorFlow**, ray/tune/rllib, tf-agents, scikit-learn, PyTorch, Brian 2, MATLAB, Mathematica, R

**Programming languages:** Python, C/C++, Java, Scala, nasm, C#, AVR C++

**Frameworks:** Qt/QML, Django, Android Studio, OpenGL/GLSL, Unity 3D, Blender

**Environment:** Git, L<sup>A</sup>T<sub>E</sub>X, Bash, Debian/Ubuntu Linux

**Scientific skills:** **experimental** sections of research papers, working on **theoretical** problems, scientific presentation, data analysis

**Software development:** **agile** software development (Scrum), debugging, design patterns, concurrent and distributed systems, TCP/IP networking, AVR microcontrollers, Arduino platform, team and project management in small startups

**Languages:** English: TOEFL iBT **113/120**, French: A1, Russian: native


## RESEARCH EXPERIENCE

### Center for Human-Compatible AI (CHAI), Berkeley

Berkeley, CA, United States (remote due to COVID-19, from Zurich, Switzerland)

Summer Intern

June 2020 – Sep 2020



- Designed  better defenses against adversarial policies
- Ran hyperparameter sweeps on multiple machines with ray and rllib
- Converted legacy code using stable baselines and Tensorflow 1.0 to rllib and Tensorflow 2.0

### Google Brain

Mountain View, CA, United States

Software Engineering Intern

Nov 2019 – Feb 2020


- Designed  an algorithm to uncover the **Causal Model** of a **Reinforcement Learning** environment using interventions
- Used TensorFlow and tf-agents to conduct the experiments with large hyperparameter sweeps
- Results  published as an ICLR CLDM workshop paper

### EPFL, Distributed Computing Laboratory

Lausanne, Switzerland

Research Assistant

Sep 2018 – Oct 2019



- Investigated fault tolerance of a neural network using **Taylor approximation**
- Conducted  experiments to test the theory using Keras including the **implementation** of custom layers and regularizers

### EPFL, Computer-Human Interaction in Learning and Instruction laboratory

Lausanne, Switzerland

Research Assistant

Sep 2017 – Aug 2018

- Created  a **library** QML-AR for seamless **augmented reality** using OpenCV with competitive performance on Android and small visual negative impact
- Designed an  activity for kids for learning math using AR, tested the application in a classroom setting, analyzed the obtained data


### Skolkovo Institute of Science and Technology,

Center for Energy Systems

Moscow, Russia

Research Intern

Sep 2016 – Jul 2017

- Characterized using **numerical optimization** and **theoretically** the structure of the set of boundary non-convexities of an image of a quadratic map in case the number of non-convexities is infinite
- Designed and implemented  the Convexity Analysis of Quadratic Maps **library** which gives approximate solutions to a number of problems involving quadratic maps

## RESEARCH INTERESTS

Artificial Intelligence, Machine Learning, Artificial Intelligence Safety, Causal Reasoning, Adversarial policies, Mathematical Optimization, Robotics

## SCHOLARSHIPS

- ✍ Research Scholars, a paid **Research Assistant** position, Swiss Federal Institute of Technology in Lausanne (EPFL), 2017 – 2019
- ✍ Abramov Fund's scholarship for excellent **grades**, 2014

## PUBLICATIONS

- Sergei Volodin**, Nevan Wichers, Jeremy Nixon. ✍ Resolving Spurious Correlations in Causal Models of Environments via Interventions, 2020. Topic choice, experiments, theory, writing. Submitted.
- El-M. El-Mhamdi, R. Guerraoui, A. Kucharavy, **S. Volodin**. ✍ The Probabilistic Fault Tolerance of Neural Networks in the Continuous Limit, 2019. Experiments, theory, writing.
- A. Dymarsky, E. Gryazina, B. Polyak, **S. Volodin**. ✍ Geometry of quadratic maps via convex relaxation, 2018. Exp-s, theory, writing.
- A. Petrov, **S. Volodin** ✍ Janibekov's effect and the laws of mechanics. Doklady Akademii Nauk, 2013. Graphics for the article, experiments, **first year** of my BSc

## WORK EXPERIENCE

- ✍ **Tournesol** May 2020 – Sep 2020  
*Startup designing better recommender systems, Lausanne, Switzerland*
- **Co-created a startup** working on expert-driven recommender systems
  - **Responsible** for back-end Machine Learning engineering and the API server
  - **Responsible** as well for system administration, (partially) front-end development
- ✍ **EscapeControl** Jul 2015 – Feb 2016  
*Own b2b startup for escape rooms, Moscow, Russia*
- **Created a startup** selling software and hardware for real-world escape room games which allows to speed up the construction and reduce maintenance costs
  - **Responsible** for back-end software engineering, servers administration, sales and customer support
  - **Managed** a team of two web developers until a successful launch of the web interface
  - Sold more than forty solutions which are currently running in different countries across the globe and provided remote support
- ITBrat** Jul 2015 – Feb 2016  
*Algorithmic trading startup, Moscow, Russia*
- **Developed** algorithmic trading application from initial discussion with the team to deployment and supporting
  - Added low-level user-space networking to the project which allowed to decrease latency and increase profit
  - **Responsible** for the performance of the code

## PROJECTS

- Safe Proximal Policy Optimization** 2019  
*EPFL EE-618 course project, advised by Dr. Kamalaruban Parameswaran and Prof. Volkan Cevher*
- ✍ Added a projection step to the **Proximal Policy Optimization** algorithm to comply with requirements of **Constrained Markov Decision Processes**
  - ✍ Implemented code in Tensorflow and tested it in simple environments
  - Presented the project at the RLSS 2019 summer school (Lille, France)
- Learning Interpretable Abstract Representations in Reinforcement Learning via Model Sparsity** 2020  
*EPFL semester project, advised by Dr. Johanni Brea and Prof. Wulfram Gerstner*
- ✍ Designed an algorithm to learn **Abstract Representations** for **Causal Models** of **Reinforcement Learning** environments via **Model Sparsity Constraint**
  - ✍ Implemented the proposed algorithm in Tensorflow and tested it on a proof-of-concept setting
  - Presented the project at the MLSS 2020 summer school (remote due to COVID-19)
- Quadcopter drone from scratch project** 2012 – 2014
- Developed ✍ an algorithm in C++ for stabilization of a quadcopter drone from scratch using AVR microcontrollers, IMU sensors and PID regulators
  - **Managed** the project consisting of 2-5 developers
  - Conducted the analysis of launches to improve flying quality
  - Results were **published** as a ✍ popular science article (*in Russian*)

## CONFERENCES AND SUMMER SCHOOLS

- ✍ Machine Learning Summer School, 2020 (virtual due to COVID-19), **poster presenter**
- ✍ Reinforcement Learning Summer School, 2019 (Lille, France), **poster presenter**, *selected to receive financial help*
- ✍ Data science summer school, 2019 (Paris, France), **poster presenter**
- ✍ QtDay 2019 (Firenze, Italy), **speaker**, *one hour session on qml-ar*
- ✍ P.A.I.S.S. (AI Summer School) (INRIA Grenoble, 2018), *participant in tutorials given by top experts*; ✍ *selected to receive financial help*
- ✍ Information Technologies and Systems (Saint-Petersburg, Repino, 2016), **speaker**, *poster presenter*

## COMPETITIONS

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🔗 Google HashCode Qualification round coding contest, **top 6%** (team EPFL\_Noobs), managed the team, developed algorithms and did the coding, 2019

🔗 DeepHack.RL hackathon on Deep **Reinforcement** Learning for Atari games, managed the team and developed an 🔗 evolutionary algorithm with an autoencoder, MIPT, Moscow, Russia, 2017

## INTERESTS

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**Effective Altruism**, Philosophy, Running (1/2 marathon 2018), Snowboarding, Swimming, Dancing Rock'n'Roll

## VOLUNTEERING

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**Effective Altruism Lausanne** 2019  
*Local 🔗 EA community* Lausanne, Switzerland

Co-founding the group, 🔗 introduction workshop speaker, running a 🔗 discussion group on AI safety and theory, newsletter management and writing, Facebook events announcements, managing open discussions

**Artificial Intelligence Governance Forum** 2019, 2020  
🔗 *AI governance conference* Geneva, Switzerland (2019), virtual due to COVID-19 (2020)  
Time-keeping, technical support, small tutorial on neural networks

**Applied Machine Learning Days** 2019  
*Machine learning 🔗 conference* Lausanne, Switzerland  
Technical help for presenters, badge check

**Anti-corruption foundation (A. Navalny)** 2017  
*A 🔗 non-profit aimed at investigating corruption* Moscow, Russia  
Conveyed the results of the investigations by talking to people on the streets as a volunteer