ANNA PAULISH

Curriculum Vitae

Date of birth: December 26, 1999
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EDUCATION

École Polytechnique Fédérale de Lausanne (EPFL) *09/2021 – 02/2024*
Master in Computational Science and Engineering *Lausanne, Switzerland*

Novosibirsk State University (NSU) *09/2017 – 07/2021*
B.S., Mechanics and Mathematics Department, diploma with honors *Novosibirsk, Russia*

- Specialization: Mathematics and Computer Science
- Ranking top 10% among the students of the department
- State-funded student

RESEARCH AND WORK EXPERIENCE

Theory and Simulation of Materials (THEOS) (Master thesis) *08/2023 – 02/2024, Lausanne*
- Developing generative models to predict atomic arrangements in amorphous structures (using JAX)

Theory and Simulation of Materials (THEOS) (semester project) *09 – 12/2022, Lausanne*
- Contributed to the development of Variational Autoencoder for predicting plausible but novel amorphous Silicon structures (using PyTorch)

Scientific Visual (internship) *08/2022, Renens*
- Developed algorithm for detecting defects inside the crystal using deep learning on a set of images

Johnson Electric International SA (internship) *02 – 07/2022, Murten*
- Developed production quality root-cause analysis tools using ML and DL methods
- Developed a ML-based testing method for reducing the cycle time of production that can be resulted in significant savings for the company; feasibility of the developed approach and potential benefits were presented to the C-level management of the company and were received with great interest

Group of Computational Neuroscience and AI at EPFL (semester project) *09 – 12/2021 Lausanne*
- Developed algorithms for detecting outliers using unsupervised ML methods in labeled data: images of mice and horses, where each label corresponds to a specific part of the body, e. g. nose, ears and etc.
- Contributed to the development of DeepLabCut – a software package for animal pose estimation

Sobolev Institute of Mathematics (undergraduate practice) *10/2018 – 06/2021 Novosibirsk*
- Developed algorithms for approximating measurement data by Gauss and Cauchy surfaces for more precise description of X-Ray diffraction peaks profile, which is crucial for characterization of non-perfect atomic structures in perspective composite and nano-defected materials

Mathematical Center in Akademgorodok (summer internship program) *07 – 09/2020 Novosibirsk*
- Developed algorithms to predict the type of ploidy of wheat spikes using ML methods (see publication section)

The Laboratory of Crystal Chemistry (research laboratory assistant) *10/2017 – 11/2020 Novosibirsk*
Nikolaev Institute of Inorganic Chemistry
- Conducted experimental data analysis using unsupervised Machine Learning methods for localization and characterization of mineral admixtures in impact diamonds
- Developed a program using C++ to model X-Ray intensity distribution over collimated beam

TEACHING EXPERIENCE

Teaching assistant for the Bachelor's course in Python programming at EPFL *09 – 12/2021*
Mathematics teacher (probability theory, geometry) at the summer school of the Specialized Educational Scientific Center on physics, mathematics, chemistry and biology of Novosibirsk State University *08/2019*

SKILLS AND INTERESTS

Programming: Python, C++, Scilab, R, LaTeX
Interests: computational material science, applied and computational mathematics, machine learning
Languages: English (advanced), French (beginner), Russian (native)

CONFERENCES

International Workshop on Advances Ceramics (IWAC) *Limoges, France 09/2023*
- Presented a poster: «Generative model for predicting atomic arrangements in amorphous structures»
- Won a travel-grant from the organizing committee

International Scientific Student Conference (ISSC) (section: *theoretical cybernetics*) *Novosibirsk 04/2021*
- Presented an oral presentation: «Algorithms for approximating measurement data by Gauss and Cauchy surfaces»

The 16th Conference of the Asian Crystallographic Association *Singapore 12/2019*
- Co-author of the poster: «Micro- and mesoscale characterization of impact diamonds: development of investigation methods»: https://rb.gy/cxdc0

AWARDS

- **Inspire Potentials – MARVEL Master's Fellowship**: aim to empower excellent women students to conduct their Master's thesis research in a laboratory belonging to the NCCR MARVEL *06/2023*
- **Alfa Bank scholarship:** awarded very selectively on the basis of academic merit *03/2021*
- **Increased state academic scholarship** for achievements in scientific research *09/2020*
- **Third place diploma** for the (online) oral presentation «Determination of homogeneous impact diamonds using cluster analysis of synchrotron radiation microbeam scanning data» at ISSC (section: *physical methods in natural sciences*) *04/2020*
- **Increased state academic scholarship** for excellent academic results *02/2019*
- Received a **travel grant** from NSU to participate in the hackathon «HackZurich 2019» *09/2019*
- **Third place diploma** for the oral presentation «Construction and verification of a parametric model of a collimated X-Ray beam» at ISSC (section: *physical methods in natural sciences*) *04/2019*

HACKATHONS

«HackZurich 2022» *Zurich 09/2022*
- Finalists of the hackathon: top 20%, ~150 submitted projects in total
- In a team of five people developed a proof-of-concept dashboard for giving early alerts about supply chain disruptions by connecting open data about labor actions and natural disasters with Migros supply chain order information

«HackZurich 2021» *Zurich 09/2021*
- Developed an application to extract information from sensor data to detect anomalies
- Ranked top 3 by Siemens who provided the challenge
- Link to our project: https://devpost.com/software/tracksdebugs

«HackZurich 2019» *Zurich 09/2019*
- Developed a website to analyze GitHub projects of an applicant
- Link to our project: https://devpost.com/software/rexama

HOBBIES

Running, hiking, cycling, skiing, singing, drawing

Member of the EPFL running club *2022 – now*
Member of the youth choir «Blagovest» *2019 – 2021*
Member of Novosibirsk State University track and field team *2017 – 2019*
Music school diploma in piano and choir (*with honors*) *2014*

PUBLICATIONS

- Pronozin A., Paulish A., Zavarzin E. et al. Automatic morphology phenotyping of tetra- and hexaploidy wheat spike using computer vision methods. *Vavilov Journal of Genetics and Breeding.* 2021;25(1):71-81. DOI 10.18699/VJ21.009; https://bit.ly/3zQKcXE
- Paulish A., Komyshev E., Genaev M. Analysis of wheat spikes using Computer Vision methods. Determination of ploidy; https://habr.com/ru/post/515604/ (popular scientific article)
- Paulish A., Pronozin A., Komyshev E., Genaev M. Recognition of the genotype of wheat spikes using Computer Vision methods. DOI 10.18699/SBB-2020-78

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