

# Alexander Demin

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## Education

2019 – **Bachelor of Computer Science**, *Higher School of Economics*, GPA: 8.9/10.  
Present Major: Machine learning, Minor: Applied math

## Experience

Summer 2022 **Google Summer of Code**, *Participant*.

Mentors: Chris Elrod, Yingbo Ma

Jan 2022 – **Max Planck Institute for Informatics**, *Research Intern*.

Present Supervisor: Hamid Rahkooy, Automation of Logic group

- Developing effective computer algebra algorithms applied to systems biology
- Implemented the F5 algorithm, integrated it in Reduce, and submitted a conference paper

Sep 2021 – **Istituto Nazionale di Fisica Nucleare**, *Student Researcher*.

Jan 2022 Supervisor: Tommaso Dorigo

- Implemented a novel semi-supervised algorithm to search for rare  $B^0 \rightarrow \tau^+ \tau^-$  decays to be used at CERN
- Contributed to a confidential research report for a project supported by The European Commission

Summer 2021 **École polytechnique Computer Science Laboratory**, *Research Intern*.

Supervisor: Gleb Pogudin, Modélisation algébrique group

- Proposed an interpolation-based algorithm to solve symbolic ODE parameter identifiability problem

## Publications

1. Hevjin Yarar, Alexander Demin, Tommaso Dorigo, Luca Quagliarella, and Andrey Ustyuzhanin, *Report 2.1 of INSIGHTS ITN to European Commission: A Semi-supervised Learning Method for the Search of Rare Processes in LHC Data*, 2022

## Projects

2021 – **Gröbner bases and Symbolic root finding**, supervised by Shashi Gowda.

Present ○ Implemented Faugère's F4 algorithm for symbolic polynomial system solving that outperforms the state-of-the-art implementation on a standard well-established benchmark [github]

2020 – 2021 **Exact Reduction of ODE systems**.

- A team course project dedicated to study intuition behind ODE linear dimensionality reduction in application to systems biology models
- Released an algorithm that excels the current state-of-the-art approach by providing a wider range of possible solutions to ODE reduction [github]

## Teaching

2020 – **Teaching assistant**, *HSE, Faculty of Computer Science, Russia*.

Present ○ A teaching assistant for courses Matrix Computations, Numerical Linear Algebra, Algorithms and Data structures, and Linear algebra in different semesters at HSE university  
○ Some of my responsibilities were: managing course logistics for classes of 200+ students, designing homework problems, holding office hours, and mentoring a tiny course-project

## Awards

2021 – 2022 **The Ilya Segalovich Scholarship**, Awarded by HSE university and Yandex for excellence in teaching.

2022 **Best Student Scientific Talk**, Selected as the best student talk at HSE annual CS conference.

2021 **Erasmus+ KA107 Fellowship**, Granted with École polytechnique mobility stipend.