Egor Pluzhnikov

CV

Education

2017–2019 School №2086, Moscow
- Science class program with MSU Department of Mathematics and Mechanics.

2019–now Department of Space Research, Moscow State University
- Bachelor in Fundamental and Applied Mathematics (3rd year out of 6).

2019–now Independent University Of Moscow, IUM MCCME
- Mathematical courses auditor

2021–2022 Scientific and Educational Center at Steklov Mathematical Institute
- Participant of the «Quantum mathematical physics» seminar

2021–2022 Moscow Institute of Physics and Technology
- Participant of the «Algebro-geometrical methods in integrable systems and quantum physics» seminar

Skills

- Expertise in mathematics: from numerical methods and to the modern differential geometry and mathematical physics.
- Expertise in C++: STL, metaprogramming, Boost, Eigen, OpenCV and Qt. Hate C-style code. Had an experience with Java and Matlab.
- Knowledge of design patterns and code refactoring experience.
- In pals with data analysis, ML and Python.
- Environments: Linux, vim+make, Qt Creator, git, valgrind, cmake, VS Code.

Contacts: GitHub — InjectiveSheaf
+7 (915) 196 04 22 • ✉ pluzhnikov.egor@student.msu.ru
telegram: @nullpage

Commercial and speaking experience

- Lecturer and assistant at mathematical schools and olympiad circles («Malyy MechMath» of MSU, School of the Young Space Researcher at MSU Department of Space Research).
- Speaking: «Equilibrium states of open quantum systems in the strong coupling regime» at «Quantum mathematical physics» seminar in Steklov Institute - February 2021.
- Working as a Software Engineer at pho.to. I was doing tasks from the classical software-engineering tasks to research tasks in the field of ML and implementation of new algorithms. September-december 2021.
- Speaking: «BRST complex of gauge theories. Longitudinal differential. Koszul differential.» on ITMP MSU winter school — February 2022.
- Working as an Algorithm Developer at PurpleGaze. May 2022 — now. Development of computer vision algorithms for an eyetracking system, as well as work on its components and system architecture.

Scientific and practical interests

Computer vision:	Image analysis and processing algorithms: image segmentation, Poisson blending and other numerical PDE applications, spectral analysis etc.
Physics:	Mathematical and theoretical physics: gauge field theory, quantization, BRST and AKSZ-formalisms, cohomological physics, General Relativity.
Maths:	Differential geometry and differential topology: vector and principal bundles, transitive Lie algebroids, noncommutative geometry and supergeometry.

Scientific experience

may 2020	Image segmentation: An application with a graphical interface on QT that performs median filtering and image segmentation based on the use of graph algorithms. The result was tested on space and x-ray images, and showed accuracy comparable to currently existing solutions.
august 21	Poisson blending: Implementation of seamless blending of photos using a numerical solution of the problem of restoring an image from a gradient field.
sep-dec 21	Wavelet analysis: Participation in the project on wavelet analysis of telemetry of satellites, space modules, and ISS. An application in Matlab that visualizes the presence of anomalies in the telemetry of spacecrafts.
december 21	Raytracing and mathematical modeling: C++ application that models an interaction of systems of orbital satellite constellations using self-written CPU ray tracing as the graphical shell, Qt as the interface and the comparison with SGP4 model predictions by energy norm.
august 22	Gravitational-inspired stateful high-speed (3000 FPS) pupil tracking algorithm with high blink robustness.
mar-jun 23	Research on gauge field theory in terms of transitive Lie algebroids.

Contacts: GitHub — InjectiveSheaf
+7 (915) 196 04 22 • pluzhnikov.egor@student.msu.ru
telegram: @nullpage

Other skills

- English language — C1. Fluent reading of technical literature, which therefore means fluent understanding. Experience in translating scientific articles and books (on my research subject).
- Excellent layout skills in LaTeX.
- Very quick learning, unproblematic informational search, thorough consideration of problems from different angles.
- Poet and musician, inspired by nature, space and mathematics!

Contacts: GitHub — InjectiveSheaf
+7 (915) 196 04 22 • pluzhnikov.egor@student.msu.ru
telegram: @nullpage