

Daniil Emtsev

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EDUCATION

ETH Zurich

MS in Computational Science and Engineering D-MATH

Major - **Robotics**, *GPA: 5.50/6.00*

- *Courses:* CS & ML courses, Algorithms and Data Structures, Optimization, Numerical Methods

Moscow Institute of Physics and Technology (MIPT)

BS in Computer Science and Electrical Engineering; *GPA: 9.00/10.00*

Major - **Data Science**, with Honors and Distinction, rank - **5/200**

- *Courses:* Electrical Engineering, Physics, Machine Learning

Sep 2019 – present

Zurich, Switzerland

Aug 2015 – June 2019

Moscow, Russia

EXPERIENCE

Computer Vision Lab ETH Zurich & Toyota Research – Master Thesis student Apr. 2021 – Dec. 2021

- Master's thesis on 2D image and 3D point cloud matching, 3D geometry, and deep learning *Zurich, Switzerland*
- Implemented algorithms on images and point clouds
- Improved the accuracy of localization by 50%
- Patented the method with Toyota

Computer-Assisted Drug Design, Rethink – R&D Software Engineering Student Feb. 2020 – Nov. 2020

- Implemented Generative network models with self-attention for de novo drug design *Zurich, Switzerland*
- Implemented natural language models and improved the synthesis quality by 30%

Data Analytics in Science and Engineering – R&D Software Engineer June 2019 – Aug. 2019

- Implemented new methods and algorithms in topological data analysis and ML. *Moscow, Russia*
- Implemented a more efficient algorithm that allowed to solve problem instances 100 times bigger comparing to existing libraries.

Institute for Information Transmission Problems – Bachelor thesis student Feb 2019 – Jun. 2019

- Developed a pipeline for FMRI images classification *Moscow, Russia*
- Improved the classification accuracy by 10%

Amgen company – Research Intern, ETH Zurich Medical Imaging Group July 2018 – Aug. 2018

- Implemented neural networks (GAN) for processing MRI images. *Zurich, Switzerland*
- Predicted visual effects of Alzheimer's disease

PUBLICATIONS

1. **Emtsev D.**, Danda Pani Paudel, Vaishakh Patil, Anton Obukhov, Luc Van Gool. A Direct Registration of Images on Point Clouds *submitted to CVPR 2022*.
2. Lionar, S., **Emtsev, D.**, Svilarkovic, D., Peng, S. (2020). Dynamic Plane Convolutional Occupancy Networks. *Winter Conference on Applications of Computer Vision WACV 2021*. Available: <https://arxiv.org/abs/2011.05813>
3. Barannikov S., Korotin A., Oganessian D., **Emtsev D.**, Burnaev E. Barcodes as summary of objective function's topology. Available: <https://arxiv.org/abs/2011.05813>.
4. **Emtsev D.** Studying Alzheimer's Disease related brain deformations using Generative Adversarial Networks *Poster in Cambridge Amgen Scholars symposium* (2018). Available: [link](#)

AWARDS AND HONOURS

- Master Scholarship Program ETH Zurich *covers all necessary living and study costs* February 2019
- Singapore International Pre-Graduate Award in Bioinformatics 2019
- Abramov's Scholarship for Academic Achievements at MIPT 2016-2019
- Winner in the All-Russian Olympiad *Absolute Winner in Mathematics & Physics, 1/1000 participants* February-2013
- Winner in the international tournament *International mathematical Olympiad "The Tournament of Towns"* July-2013
- Silver Medal Award, International Olympiad in Mathematics and Physics, Belgrad July-2013

PROJECTS

Augmented Reality <i>C#, Unity</i> github.com/janwww/motion-instructor	Sep. 2020 – Dec. 2020 <i>Zurich, Switzerland</i>
<ul style="list-style-type: none">• Built Hololens2 application for virtual dancing movements (UI, kinematics)• Implemented and visualised score similarity between body postures	
Gesture Recognition <i>Python, Tensorflow</i> github.com/daniil-777/deep-gesture	May 2020 – Aug. 2020 <i>Zurich, Switzerland</i>
<ul style="list-style-type: none">• Implemented RNN with self-attention for gesture recognition• Implemented transformer network for gesture recognition	
3d vision <i>Python, Pytorch</i> github.com/daniil-777/dpco	Feb. 2020 – Sep. 2020 <i>Zurich, Switzerland</i>
<ul style="list-style-type: none">• Implemented algorithms for 3d point cloud reconstruction• Wrote a paper and published in the conference	
Fluid Simulation <i>C++, OpenMP</i> github.com/daniil-777/fluidsim	Sep. 2020 – Dec. 2019 <i>Zurich, Switzerland</i>
<ul style="list-style-type: none">• Implemented liquid simulation for computer graphics application• Achieved 1.5x speedup by optimizing cash locality	
Graph Matching <i>Python, Pytorch</i> github.com/daniil-777/graph-matching	Sep. 2019 – Jan. 2020 <i>Zurich, Switzerland</i>
<ul style="list-style-type: none">• Implemented a deep learning framework for Graph Based Semantic Matching	
Sales Prediction <i>python, R</i> github.com/daniil-777/salesprediction	June 2018 <i>Moscow, Russia</i>
<ul style="list-style-type: none">• Implemented a pipeline for the feature extraction from financial time series• Top-3 solution among all participants	
Time Series Anomaly Detection <i>python</i> github.com/daniil-777/Siburchallenge	December 2016 <i>Moscow, Russia</i>
<ul style="list-style-type: none">• Proposed a solution for time series anomaly detection for the company Sibur• Implemented a pipeline for statistics extraction from time series• Top-2 solution using xgboost classifier• Got the offer from the company	

TEACHING

Teacher & Organiser – MIPT, International Center of education	May 2016 – April 2018 <i>Moscow, Russia</i>
<ul style="list-style-type: none">• Organized summer international school and led lectures in olympiad physics and mathematics• Led own courses in electrostatics and olympiad geometry• Wrote a book "Problems and Solutions of the Olympiads at International Schools"	

TECHNICAL SKILLS

Languages: *Advanced:* Python *Intermediate:* C++, C#, C, R, MATLAB *Familiar:* Java
Libraries: Boost, Eigen, Libigl, OpenCV, PyTorch, TensorFlow, Scikit-Learn, Pandas, NumPy, Matplotlib
Software: Git, Unity, Visual Studio Code, Bash, Vim, Docker, Google Cloud
Parallel Programming: CUDA, OpenMP
Engineering: 3D CAD modelling (Solidworks), Electronic Design, Plate Soldering, Programming of Microcontrollers