RUSTAM LATYPOV

Doctoral Candidate, Theoretical Computer Science Group

My academic interests lie in the field of distributed systems and parallel computing, with an emphasis on the Massively Parallel Computation (MPC) model. Current research revolves around charting the complexity landscape of fundamental graph problems (Locally checkable labeling problems), and exploring the algorithmic applications of powerful probabilistic tools (e.g., Lovász local lemma) in the context of MPC.

Other interests: graph algorithms, graph theory, optimization, linear algebra, inverse problems, scientific computing

Helsinki, Finland
users.aalto.fi/latypor1
rustam.latypov@aalto.fi

EDUCATION

○ **Doctoral Candidate** · Aalto University   Jun 2021 –
Theoretical Computer Science Group
Advisor: Prof. Jara Uitto
Funded by the CS department's competitive funding grant

○ **Master of Science** · Aalto University · GPA 4.9/5   2019 – 2021
Mathematics and Operations Research
Major: Applied Mathematics   **Minor**: Computer Science
github.com/rustamlatypov/masters-thesis

○ **Bachelor of Science** · Aalto University · GPA 4.9/5   2016 – 2019
Engineering Physics and Mathematics
Major: Mathematics and Systems Analysis   **Minor**: Computer Science
github.com/rustamlatypov/bachelors-thesis

EXPERIENCE

○ **Doctoral candidate** · Aalto University   Jun 2021 –
Charting the complexity landscape of fundamental graph problems, and exploring the algorithmic applications of powerful probabilistic tools in the context of Massively Parallel Computation.

○ **Research assistant** · Aalto University   Mar 2020 – May 2021
Worked on distributed graph algorithms in low-space Massively Parallel Computation. Developed a deterministic, state-of-the-art 3-coloring algorithm for trees (Master's thesis, see manuscript below).

○ **Giant Leap Intern** · Vaisala Oyj   Jun – Aug 2019
Developed software for forecasting 20% of the test failures in large scale radiosonde production using data mining, feature engineering and machine learning (XGBoost, Python).

○ **Research assistant** · Aalto University   Jun – Aug 2018
Solved non-linear, ill-posed inverse problems for resistor networks both symbolically and numerically using the Gauss-Newton algorithm and Tikhonov regularization (Bachelor's thesis, see project below).

AWARDS (2021-2022)

- Granted 24-month funding for my doctoral studies (out of 20 applicants) – Dept. of CS, Aalto [link]
- Awarded 1000€ for academic success in mathematics – Professor E. J. Nyström Fund [link]
- Awarded 500€ + 2 × 500€ for general academic success – School of Science, Aalto [link] [link]

ACADEMIC ACTIVITY

Publications (authors in alphabetical order, as is standard in the field)

- Exponential Speedup Over Locality in MPC with Optimal Memory
  Alkida Balliu, Sebastian Brandt, Manuela Fischer, Rustam Latypov, Yannic Maus, Dennis Olivetti, Jara Uitto
  International Symposium on Distributed Computing (DISC) 2022.
- Brief Announcement: Memory Efficient Massively Parallel Algorithms for LCL Problems on Trees
  Sebastian Brandt, Rustam Latypov, Jara Uitto
  International Symposium on Distributed Computing (DISC) 2021. [arXiv] [doi] [video]
- Coloring Trees in Massively Parallel Computation
  Rustam Latypov, Jara Uitto
  Manuscript 2021. [arXiv]

Teaching

- Advanced Course in Algorithms – Aalto University, Fall 2022 (Head TA) [link]
- Principles of Algorithmic Techniques – Aalto University, Fall 2021 (TA) [link]

Reviewer (at) DISC'22, PODC'22, DISC'21, OPODIS'20

PROGRAMMING

Languages

- Proficient in C/C++, Python, Scala, MATLAB
- Intermediate in Julia, R, SQL

Projects – github.com/rustamlatypov

- **Parallel matrix multiplication**   C++
  Parallel (CPU) matrix multiplication achieving 500-fold speedup w.r.t. sequential

- **Tile-matching game**   C++
  Tournament grade Tetris and Pentis with controls in accordance with the Super Rotation System

- **Parallel radix sort**   Scala
  Sequential and parallel (CPU) LSD radix sorts achieving 5- and 15-fold speedups w.r.t. scala.quickSort

- **Inverse problem for resistor networks**   MATLAB
  Solving non-linear, ill-posed inverse problems for resistor networks both symbolically and numerically

- **Machine learning classifier for music genres** Python
  Solving a skewed, multiclass music genre classification problem with supervised PCA and SVM

- **Parallel password cracker** Python
  A command-line tool for cracking passwords in parallel (CPU) using dictionary and hybrid attacks