ALEXEY MEDVEDEV

Ph.D. in Mathematics and Physics // researcher in Network Science

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🎓 Career objective

Professional in graphs, probability and network science with solid experience in big data analysis, machine learning and predictive models. Looking for new challenges in working with large-scale data science projects. My passion is extracting the hidden truth from arrays of data and presenting results using neat and easy-to-read visualisations.

💼 Professional experience

now – 2016

Universite de Namur and Universite Catholique de Louvain, Belgium
experienced researcher

- Analysed and processed large-scale datasets (maintained database > 1 Tb of raw data)
- Developed theoretical model for predicting structure and dynamics of online discussion threads, which was successfully applied to the Reddit posts
- Developed algorithm for extraction of external influence from time stamped data, which showed outstanding performance in predicting the future tweet and retweet activity
- Working on application of machine learning for relating sentiment with discussion flow in online platforms
- Presented the research on leading network science conferences (e.g. NetSci, Complex Networks)
- Writing scientific manuscripts

2015

Aalto University, Finland
visiting researcher

- Performed analysis of information spreading in the mobile phone network of one European country on the basis of dataset of phone call records (~3 bln. entries, 1 year period)
- Developed and optimized multithreaded simulation algorithms
- Using graphic visualization software to output the results

2016 – 2012

Central European University / Sobolev Institute of Mathematics
early stage researcher / teaching assistant

- Theoretical research in spreading models on networks and cyclic structure of graphs
- Course supervision: Graph Theory, Probability theory, Statistics, Operations Research
- Leading practical sessions with students in groups and in private
- Conference organization with more than 100 participants

💎 Skills

- *Software development* and *data science* skills developed through working with big datasets of unstructured data
- Exprience in *data visualisation* obtained through presentation of the research results to a wide audience
- Strong *presentation skills* developed through giving talks on international conferences
- Solid *communication* and *management skills* acquired through organization of conferences and curation of cross-country research projects
- *Ability and willingness to apply and learn in practice* the cutting-edge methods and techniques in working with Big Data

Education 🏛

2016: Ph.D. in Applied Mathematics,
magna cum laude
Central European University,
Budapest, Hungary

2016: Ph.D. in Physics and Mathematics,
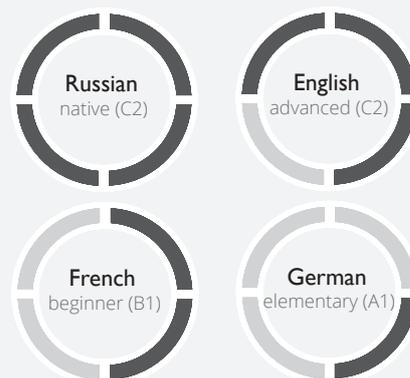*Sobolev Institute of Mathematics,*
Novosibirsk, Russia

2012: M.Sc in Applied Mathematics,
Novosibisk State University,
Novosibirsk, Russia

Programming 🖥

SciPy, scikit-learn ●●●●●   C++, Boost ●●●●●

NetworkX, graph-tool ●●●●○   Python ●●●●●

D3.js, Sigma.js ●●●○○   Java ●○●●●

Keras, Tensorflow ○●●●●   Matlab ○○●●●

Languages 💬

Russian
native (C2)

English
advanced (C2)

French
beginner (B1)

German
elementary (A1)

ADDITIONAL INFORMATION

📑 Publications:

1. **A. Medvedev,** J. C. Delvenne, R. Lambiotte (2018) *The anatomy of Reddit: An overview of academic research,* submitted as a book chapter (Springer)

2. K. Fujita, **A. Medvedev,** S. Koyama, R. Lambiotte, S. Shinomoto (2018) *Identifying external and internal origins of event occurrences*, Physical Review E (American Physical Society)

3. **A. Medvedev,** J. C. Delvenne, R. Lambiotte (2018) *Modelling structure and predicting dynamics of discussion threads in online boards*, Journal of Complex Networks (Oxford University Press)

4. **A. Medvedev,** J. Kertesz (2017) *Empirical study of the role of the topology in spreading on communication networks*, Physica A: Statistical Mechanics and its Applications (Elsevier)

5. **A. Medvedev**, G. Pete (2017) *Speeding up non-Markovian First Passage Percolation with a single extra edge,* accepted to Advances in Applied Probability (Cambridge University Press)

6. **A. Medvedev** (2016) *The number of small cycles in the Star graph*, Siberian Electronic Mathematical Reports (Sobolev Institute of Mathematics)

7. E. Konstantinova, **A. Medvedev** (2016) *Independent even cycles in the Pancake graph and greedy Prefix–reversal Gray codes*, Graphs and Combinatorics (Springer)

8. E. Konstantinova, **A. Medvedev** (2014) *Small cycles in the Pancake graph,* Ars Mathematica Contemporanea (DMFA, Slovenia)

9. E. Konstantinova, **A. Medvedev** (2014) *Small cycles in the Star graph*, Siberian Electronic Mathematical Reports (Sobolev Institute of Mathematics)

10. E. Konstantinova, **A. Medvedev** (2011) *Cycles of length nine in the Pancake graph (in Russian)*, Journal of Applied and Industrial Mathematics (Sobolev Institute of Mathematics)

11. E. Konstantinova, **A. Medvedev** (2010) *Cycles of length seven in the Pancake graph (in Russian),* Journal of Applied and Industrial Mathematics (Sobolev Institute of Mathematics)

📖 PhD thesis:

- title: «The role of the topology in non-Poissonian spreading dynamics on temporal networks»

  supervisors: Janos Kertesz, Ph.D. (BME; Center of Network Sceince, CEU, Budapest), Gabor Pete, Ph.D. (BME; Renyi Institute, Budapest)

  received: June, 2016

  «In current thesis we study the SI spreading model on graphs with transmission times following power-law distribution with infinite mean. We derive the results both for deterministic graphs and for specific models of random graphs. We study how the introduction of one extra edge to a tree severely accelerates SI spreading on it. Empirically we study how the introduction of bridges influences the speed of the SI spreading on the real large dataset of mobile phone calls. It turns out that the key factor governing the spreading speed is average degree and the introduction of topological bridges significantly boosts the spreading. The observed phenomena is replicated on a network null model.»

- title: «Analysis of the structure of cycles in some families of Cayley graphs on symmetric group»

  supervisor: Elena Konstantinova, Ph.D. (NSU; Sobolev Institute of Mathematics, Novosibirsk)

  expected date: September, 2016

  «In current dissertation we establish the approach for describing all small cycles in Pancake graphs, the Cayley graph on symmetric group generated by prefix-reversals, and apply this approach to the Star graphs, the Cayley graph on the same group generated by prefix-transpositions. We show the existence of families of maximal cycle covers in these graphs and introduce a new concept of Hamiltonian cycles, which is directly related to Prefix-Reversal Gray Codes. Finally, we study the distribution of cycles of length $O(n)$ in the Star graph using the shortest-path routing algorithm, which can be used further for studying the First Passage Percolation problem on Star graph.»