Elena Tuzhilina

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EDUCATION

Stanford University, Stanford, USA (2017 – present)
Department of Statistics
Ph.D. *in Statistics*
Research Interests: Applied Statistics, Data analysis, Machine learning, Computer linguistics
[Advisor: Trevor Hastie]

Yandex School of Analysis, Moscow, Russia (2015 – 2017)
Department of Data Analysis
Two-year program *in Data Science*
Research topic: "Dimension reduction methods in medical research"
[Advisors: Ilya Muchnik, Boris Polyak, Anatoliy Michalskiy]

Lomonosov Moscow State University, Moscow, Russia (2015 – left in 2017)
Department of Mathematics
Ph.D. *in Mathematics*
Research Interests: *Probability theory, Statistics, Combinatorics, Discrete Mathematics*
Research topic: "Properties of random hypergraphs"
[Advisors: Andrey Raigorodsky, Alexander Bulinski]

Lomonosov Moscow State University, Moscow, Russia (2010 – 2015)
Department of Mathematics
M.Sc. *in Mathematics* [with highest distinction]
Concentration: *Probability theory, Statistics and Applications*
GPA: 5.0 out of 5.0

EMPLOYMENT

June 2021 – August 2021, *Data Science*, **Microsoft**, Redmond, USA
Position: *DS Intern*
Developed Intelligent Rollout system.

October 2015 – September 2017, *Computer Linguistics*, **SmartCAT**, Moscow, Russia
Position: *Researcher*
Developed a framework for automatization of interactions between translators and customers in a marketplace.

PROJECTS

PhD projects

April 2021 – present, *collaboration with Delphi Research Group*, Carnegie Mellon University, USA
Topic: COVID-19 forecasting.

April 2020 – present, *Department of Statistics*, Stanford University, USA
Topic: Weighted Low Rank Matrix Approximation.

April 2020 – present, *Department of Statistics*, Stanford University, USA
Topic: Canonical Correlation Analysis in high dimensions with structured regularization.

September 2018 – present, *collaboration with Williams PanLab*, Stanford University, USA
Topic*:* Human Connectome Project.

September 2018 – present, *collaboration with School of Medicine,* UC San Francisco, USA
Topic: Reconstruction of 3D chromatin conformation.

Course projects

April 2020 – June 2020, *Data science and AI for COVID-19 final project,* Stanford University, USA
Topic: Early detection of COVID-19 from cough sound, symptoms, and context.

April 2020 – June 2020, *Convex Optimization final project,* Stanford University, USA
Topic: Weighted Low Rank Matrix Approximation.

October 2019 – December 2019, *Deep Learning final project,* Stanford University, USA
Topic: Art Nouveau style transfer.

October 2018 – December 2018, *Machine Learning final project,* Stanford University, USA
Topic: Monet is spot, Manet is people.

October 2018 – December 2018, *Deep Learning in genetics final project,* Stanford University, USA
Topic: Imputing chromatin landscape from a single essay.

Other projects

2016 – 2017, *Applied Mathematics in Medicine*, Yandex School of Analysis, Russia
Topic: Dimension reduction methods in myeloma studies.

2015 – 2017, *Computer Linguistics*, SmartCAT, Russia
Topic: Automatic organization of translation workflow.

2014 – 2017, *Applied Mathematics in Biology*, Moscow State University, Russia
Topic: Geometry of amino acids and polypeptides spatial structures.

PUBLICATIONS

2021+, "Chromatin conformation reconstruction with distribution-based principal curve methods", E.Tuzhilina, T.Hastie, M.Segal, *in preparation.*

2021+, "Multi-period forecasting with splines", E.Tuzhilina, T.Hastie, R.Tibshirani, *in preparation.*

2021, "Weighted Low Rank Matrix Approximation and acceleration", E.Tuzhilina, T.Hastie, *submitted to Journal of the American Statistical Association.*

2021, "An Open Repository of Real-Time COVID-19 Indicators", A. Reinhart, L. Brooks, M. Jahja, A.Rumack, J.Tang, W. Saeed, T.Arnold, A.Basu, J.Bien, A.Cabrera, A.Chin, E.Chua, B.Clark, N.DeFries, J.Forlizzi, S.Gratzl, A.Green, G.Haff, R.Han, A.Hu, S.Hyun, A.Joshi, J.Kim, A.Kuznetsov, W.Motte-Kerr, K.Lee, Y.Lee, Z.Lipton, M.Liu, L.Mackey, K.Mazaitis, D.McDonald, B.Narasimhan, N.Oliveira, P.Patil, A.Perer, C.Politsch, S.Rajanala, D.Rucker, N.Shah, V.Shankar, J.Sharpnack, D.Shemetov, N.Simon, V.Srivastava, S.Tan, R.Tibshirani, E.Tuzhilina, A.Nortwick, V.Ventura, L.Wasserman, J.Weiss, K.Williams, R.Rosenfeld, R.Tibshirani, *Proceedings of the National Academy of Sciences*.

2021, "Canonical Correlation Analysis in high dimensions with structured regularization", E.Tuzhilina, L.Tozzi, T.Hastie, *Statistical Modelling SAGE*.

2021, "Relating whole-brain functional connectivity to self-reported negative emotion in a large sample of young adults using group regularized canonical correlation analysis", L.Tozzi, E.Tuzhilina, M. Glasser, T.Hastie, L.Williams, *NeuroImage*, Vol. 237, pp. 118-137.

2020, "Principal curve approaches for inferring 3D chromatin architecture", E.Tuzhilina, T.Hastie, M.Segal, *Biostatistics*.

2017, "Analyzing the Data Bank of Proteins Space Structures (PDB); A Geometrical Approach", E.Vilkul, A.Ivanov, A.Mishchenko, F.Popelensky, A.Tuzhilin, K.Shaitan, *Springer*, *Journal of mathematical Sciences*, Vol. 225, number 4, pp. 555–564.

2015, Addendum to the article "Critical analysis of amino acids and polypeptides geometry", A.Ivanov, A.Mishchenko, A.Tuzhilin*, Springer*, *Continuous and Distributed Systems: Theory and Applications*, Vol. 2, pp. 29–74.

2015, **"**A geometric approach to the analysis of the data bank of the three-dimensional structures of proteins (PDB)", E.Vilkul, A.Ivanov, A.Mishchenko, F.Popelensky, A.Tuzhilin, K.Shaitan, *Intuit*, *Pure and Applied Mathematics*, Vol. 20, number 3, pp. 33-46.

2015, **"**Conformations of swivel chain as a model of protein folding", E.Vilkul, A.Ivanov, A.Tuzhilin, *The Journal of Nanostructures, Mathematical physics and modelling*, Vol. 13, number 2, pp. 25-42.

2014, **"**Geometry of amino acids and polypeptides: the case of X-ray analysis", E.Vilkul, A.Tuzhilin, *The Journal of Nanostructures, Mathematical physics and modelling*, Vol. 11, number 2, pp. 5-27.

PATENTS

2019, “Data-driven automated selection of profiles of translation professionals for translation tasks”, A.Ukrainets, V.Gusakov, I.Smolnikov, E.Tuzhilina, patent number *US20190065463*.

2018, “System and method of intellectual automatic selection of performers of translation”, A.Ukrainets, E.Tuzhilina, V.Gusakov, I.Smolnikov, patent number *RU2667030*.

CONFERENCES

November 2021, “Intelligent Rollouts for Office”, *The Microsoft Machine Learning & Data Sciences Conference*, Virtual

August 2021, “Canonical Correlation Analysis in high dimensions with structured regularization”, *Joint Statistical Meeting 2021*, Virtual

June 2021, “Canonical Correlation Analysis in high dimensions with structured regularization”, *DBDS Scientific Retreat*, Stanford, CA, USA

October 2020, “Canonical Correlation Analysis in high dimensions with structured regularization”, *Industrial Affiliates Annual Conference*, Virtual

August 2020, “Principal curve approaches for inferring 3D chromatin architecture”, Summer School of Machine Learning at Skoltech, Virtual

August 2020, “Principal curve approaches for inferring 3D chromatin architecture”, *Joint Statistical Meeting 2020*, Virtual

November 2019, “A weighted principal curve approach to inferring 3D chromatin architecture”, *Industrial Affiliates Annual Conference*, Stanford, USA

September 2019, “Chromatin reconstruction via Weighted Principal Curves”, *Machine Learning Summer School Community day (Poster Session)*, Moscow, Russia

September 2016, “The geometry of iterations defined on measure metric”, *19th meeting of the Geometrical Seminar*, Zlatibor, Serbia.

April 2014, “The continuous case of cancer spread problem”, *Lomonosov Conference*, Moscow, Russia.

September 2013, “Mathematical model of cancer spread”, *Probability, Analysis and Geometry*, Ulm, Geometry.

SUMMER SCHOOLS

August 2020, Summer School of Machine Learning at Skoltech, Skolkovo Institute of Science & Technology, Virtual

August 2019, Machine learning Summer School, Skolkovo Institute of Science & Technology, Moscow, Russia

July 2016, Advanced Statistics and Data Mining Summer School, Polytechnic University of Madrid, Madrid, Spain

FUNDING AND ACADEMIC AWARDS

June 2021, Stanford Teaching Assistant Award

2020 – 2022, Stanford Data Science Scholarship

2016 – 2018, Grant sponsored by Skolkovo to support the SmartCAT project

2014 – 2017, Russian Science Foundation grant, research on amino acids conformations

2011 – 2015, A special stipend provided to the best students of Lomonosov MSU (for 5 years)

TEACHING

Instructor

September 2021, Introduction to R for UGs (STATS 32) at Stanford.

September 2016 – June 2017, Probability Theory and Statistical Practicum at Moscow State University.

Teaching Assistant

September 2017 – present, Data Science (STATS 101), Statistical Methods in Engineering and the Physical Sciences (STATS 110), Biostatistics (STATS 141), Data Mining and Analysis (STATS 202), Introduction to Regression Models and Analysis of Variance (STATS 203, STATS 203V), Theory of Statistics II (STATS 300B), Modern Applied Statistics: Data Science (STATS 315B), Applied Statistics I (STATS 305A) at Stanford.

QUALIFICATIONS

Computing Skills: R, Python.

Languages: English (fluent), Russian (native), French (intermediate).

ADDITIONAL INFORMATION

- Member of the varsity athletics team of the Moscow State University.
- Graduated from the Edward Grieg piano school (with distinctions); participated in various musical competitions as a single pianist and as a part of a trio.
- Member and a soloist of the Loktev Choir (the premier children's choir of Russia); won several singing competitions and awards.