

Zhenisbek Assylbekov

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<https://scholar.google.com/citations?user=MmrygZEAAAAJ>



EDUCATION

Hiroshima University

Ph.D. in Mathematics, Advisor: Hirofumi Wakaki

Hiroshima, Japan

2007–2008

M. V. Lomonosov Moscow State University

Specialist Degree in Applied Mathematics and Computer Science

Moscow, Russia

2002–2007

EXPERIENCE

Purdue University Fort Wayne

Assistant Professor, Department of Mathematical Sciences

Fort Wayne, IN, USA

2023–present

Nazarbayev University

Adjunct Professor, Department of Mathematics

Assistant Professor, Department of Mathematics

Instructor, Department of Mathematics

Teaching Assistant, Department of Mathematics

Astana, Kazakhstan

2023–present

2017–2023

2013–2017

2011–2013

KazMunayGas

Senior Manager, Oil Transportation Projects Management Department

Manager, KMG-Transcaspian (subs. of KazMunayGas), Projects Management Department

Coordinator, KMG-Transcaspian, Projects Management Department

Astana, Kazakhstan

2011

2010–2011

2009–2010

RESEARCH INTERESTS

Machine Learning, Natural Language Processing, Statistics

SELECTED PUBLICATIONS (STUDENT CO-AUTHORS ARE IN BOLD)

- [1] A. **Bolatov**, M. Tezekbayev, I. Melnykov, A. **Pak**, V. Nikoulina, and Z. Assylbekov, “Long-tail theory under gaussian mixtures”, in *Proceedings of ECAI*, 2023.
- [2] A. **Pak**, S. Nurmukhamedov, R. Takhanov, and Z. Assylbekov, “Hardness of learning AES key (student abstract)”, *Proceedings of AAAI*, vol. 37, no. 13, pp. 16 296–16 297, 2023.
- [3] M. **Tezekbayev**, V. Nikoulina, M. Gallé, and Z. Assylbekov, “Speeding up entmax”, in *Findings of NAACL*, 2022.
- [4] V. Nikoulina, M. **Tezekbayev**, N. **Kozhakhmet**, M. Babazhanova, M. Gallé, and Z. Assylbekov, “The rediscovery hypothesis: Language models need to meet linguistics”, *J. Artif. Intell. Res.*, vol. 72, pp. 1343–1384, 2021.
- [5] A. **Zhumekenov**, R. Takhanov, A. J. Castro, and Z. Assylbekov, “Approximation error of fourier neural networks”, *Stat. Anal. Data Min.*, vol. 14, no. 3, pp. 258–270, 2021.

- [6] A. **Karipbayeva**, A. **Sorokina**, and Z. Assylbekov, “A critique of the smooth inverse frequency sentence embeddings (student abstract)”, in *Proceedings of AAAI*, 2020.
- [7] M. **Tezekbayev**, Z. Assylbekov, and R. Takhanov, “Semantics- and syntax-related subvectors in the skip-gram embeddings (student abstract)”, in *Proceedings of AAAI*, 2020.
- [8] M. **Uteuliyeva**, A. **Zhumekenov**, R. Takhanov, Z. Assylbekov, A. J. Castro, and O. **Kabdolov**, “Fourier neural networks: A comparative study”, *Intelligent Data Analysis*, vol. 24, no. 5, pp. 1107–1120, 2020.
- [9] Z. Assylbekov and R. Takhanov, “Context vectors are reflections of word vectors in half the dimensions”, *J. Artif. Intell. Res.*, vol. 66, pp. 225–242, 2019.
- [10] A. Myngbay, Y. Bexeitov, A. Adilbayeva, Z. Assylbekov, B. P. Yevstratenko, R. M. Aitzhanova, B. Matkarimov, V. A. Adarichev, and J. Kunz, “CTHRC1: A new candidate serum biomarker for improved rheumatoid arthritis diagnosis.”, *Frontiers in immunology*, vol. 10, p. 1353, 2019.
- [11] Z. Assylbekov and R. Takhanov, “Reusing weights in subword-aware neural language models”, in *Proceedings of NAACL-HLT*, 2018.
- [12] O. **Kabdolov**, Z. Assylbekov, and R. Takhanov, “Reproducing and regularizing the SCRN model”, in *Proceedings of COLING*, 2018.
- [13] Z. Assylbekov, R. Takhanov, B. **Myrzakhmetov**, and J. N. Washington, “Syllable-aware neural language models: A failure to beat character-aware ones”, in *Proceedings of EMNLP*, 2017.

RESEARCH SUPERVISION

BSc Capstone Projects

- Sultan Nurmukhamedov, Constructing Word Embeddings from a Random Hyperbolic Graph 2020
Student at Yandex School of Data Analysis, Moscow, Russia
- Damilya Saduakhas, Protein Family Classification Using Embedding Methods 2020
PhD candidate in Statistics at KAUST, Thuwal, Saudi Arabia
- Alena Sorokina, Low-Rank Approximation of Matrices for PMI-based Word Embeddings 2019
Data and Applied Scientist II at Microsoft, Redmond, WA, US
- Aidana Karipbayeva 2019
Analysis of SGNS and Low-Rank Approximation of Matrices for PMI-based Word Embeddings
Data Analyst at Cherre, New York, NY, US
- Olzhas Kabdolov, Initial explorations on regularizing SCRN model 2018
Computer Vision Engineer at Arria NLG, Remote
- Alibi Jangeldin, Simple and accurate method for parallel webpages detection 2017
MSc in Statistics from KAUST. Now Financial Data Scientist at Quantum Capital, Almaty, Kazakhstan
- Daiana Azamat, Statistical morphological disambiguation for Kazakh 2016
Research Assistant at Nazarbayev University, Astana, Kazakhstan

MSc Theses

- Maxat Tezekbayev, The Rediscovery Hypothesis: Language Models Need to Meet Linguistics 2022
Senior Data Scientist at Magnum Cash&Carry, Astana, Kazakhstan
- Temirlan Auyespek, Hyperbolic Embedding for Finding Syntax in BERT 2021
Data Scientist at First Heartland Jusan Bank, Almaty, Kazakhstan

- Abylay Zhumekenov, Convergence Rate of Fourier Neural Networks 2019
PhD candidate in Statistics at KAUST, Thuwal, Saudi Arabia
- Bagdat Myrzakhmetov, Explorations of Chaotic Behavior of Recurrent Neural Networks 2019
Data Scientist at Aitu Dala, Astana, Kazakhstan

TEACHING EXPERIENCE

Calculus, Applied Statistical Methods, Probability, Mathematical Statistics, Regression Analysis, Design of Experiments, Time Series Analysis, Statistical Programming, Statistical Learning

GRANTS

- Analysis of Benign Overfitting in Retrieval Augmented Models 2023–2025
Collaborator, NU Faculty Development Competitive Research Grants Program, \$124,421
- Intelligent cryptographic systems: development of hardware and software complex 2021–2023
PI, Program of Targeted Funding “Economy of the Future”, KZT 1,039,568,560 (\$2.2M)
- Multimedia Corpus of Modern Spoken Kazakh Language 2021–2023
Co-PI, Nazarbayev University (NU) Collaborative Research Grants Program, \$212,699
- Probabilistic analysis of word and sentence embeddings with applications to Kazakh language processing 2020–2022
PI, NU Collaborative Research Grants Program, \$162,000
- Hyperbolic geometry of word vectors 2020–2022
PI, NU Faculty Development Competitive Research Grants Program, \$75,000
- Deep learning for sequential models in natural language processing with applications to Kazakh 2018–2020
PI, Ministry of Education and Science of the Republic of Kazakhstan — Grant Funding
KZT 30,000,000 (\$93K as of Jan 2018)
- Kazakh to English statistical machine translation 2014–2015
PI, NU Seed Grant, KZT 673,000 (\$4K as of Jan 2014)

AWARDS

- Professor of the Year Award 2018
Nazarbayev University Student Awards
- Verifiability, Reproducibility, and Working Description Award 2016
17th International Conference on Intelligent Text Processing and Computational Linguistics, Konya, Turkey

REFERENCES

- Dr. Matthias Gallé, Senior Manager, Machine Learning, Cohere.ai,
email: matthias@cohere.com, phone: +33 6 48 09 98 02
- Dr. Kira Adaricheva, Professor of Mathematics, Hofstra University,
e-mail: kira.adaricheva@hofstra.edu, phone: +1 516 463 5597
- Dr. Igor Melnykov, Associate Professor of Statistics, University of Minnesota Duluth,
e-mail: imelnyko@d.umn.edu, phone: +1 218 726 7229
- Dr. Alejandro J. Castro, Associate Professor of Mathematics, Nazarbayev University,
e-mail: alejandro.castilla@nu.edu.kz, phone: +7 778 740 65 92