

# Alexander Kagan

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## Research Interests

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My interests lie broadly in the intersection of **statistical network analysis** and **bioinformatics**, with primary focus on:

- Modeling shared and group latent structures in collections of networks with applications to neuroscience
- Modeling of information diffusion on networks with applications to epidemiology and influence maximization
- Cross-validation and model selection in network-assisted regression problems
- Hierarchical feature selection in supervised and semi-supervised settings with applications to biomarker discovery

## Education

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### University of Michigan

Ph.D. IN STATISTICS (CO-ADVISED BY PROF. ELIZAVETA LEVINA AND PROF. JI ZHU)

Ann Arbor, MI, USA

2021 - 2026 (expected)

### Skolkovo Institute of Science and Technology

M.S. IN COMPUTER SCIENCE

2020 - 2021

### Yandex School of Data Analysis

M.S. EQUIVALENT CERTIFICATE IN DATA SCIENCE

Moscow, Russia

2019 - 2021

### National Research University Higher School of Economics

B.S. IN MATHEMATICS (SUMMA CUM LAUDE)

Moscow, Russia

2016 - 2020

## Work Experience

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### Sanofi

R&D COMPUTATIONAL SCIENCE INTERN (ADVISED BY PROF. ZIV BAR-JOSEPH)

Cambridge, MA, USA

Summer 2024

- Developed statistical tools based on Temporal Graph Neural Networks for discovering new biomarkers governing the patient's recovery process, with applications to psoriasis and Crohn's disease

### Kirshner Lab, Harvard Medical School

RESEARCH ASSISTANT (ADVISED BY PROF. LEONID PESHKIN)

Cambridge, MA, USA

January 2021 - April 2024

- Developed a universal *Kinome Regularization* framework for detecting kinases governing a given phenotype
- Built a deep-learning framework for automatic detection and annotation of cell organelles in liver images
- Led a group of 3 MSc students developing supervised hierarchical variable selection methods for bulk & single-cell data

### MRM Proteomics

Montreal, QC, Canada

Summer 2021

- RESEARCH INTERN (ADVISED BY PROF. CHRISTOPH BORCHERS)
- Developed dimension reduction techniques allowing robust extraction of cancer biomarkers from patients' proteomics and metabolomics measurements

### Juicy Labs

JUNIOR DATA SCIENTIST

Moscow, Russia

July 2019 - February 2020

- Developed new credit scoring models using linear regression, random forest, and boosting

# Publications

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## Published

1. Noe, M., Parisi, E., Rifat, S., Navitskis, L., Conway, D., Deshmukh, A., Kagan, A., Millward, D., Chung, E. (2024) Comparison of 1st Year and 3rd Year ECGs in Collegiate Athletes. *Journal of the American College of Cardiology*

## Under Review

2. Kagan, A., Levina, E., Zhu, J. (2025+) Flexible Modeling of Influence Propagation through a Network with Statistical Guarantees. *Under review at JMLR, arXiv preprint* (Work received 4 poster awards in 2023)
3. Mathur, S., Kagan, A., Passaban, P., Mattoo, H., Hasanaj, E., Bar-Joseph, Z. (2025+) Temporal Foundation Models for Clinical Transcriptomics Data. *Under review at Bioinformatics, bioRxiv preprint*
4. Kagan, A., MacDonald, P., Levina, E., Zhu, J. (2025+) Latent Space Models for Grouped Multiplex Networks with Shared Structure. *Under review at JMLR, arXiv preprint* (Honorable mention for a poster at SNAB-2024)
5. Nano, M., Harwood, J., Kagan, A., Lukaszewicz, G., Kirschner, M., Peshkin, L., Montell, D. (2025+) Kinome Regression Identifies Critical Modulators of Cellular Resilience. *Under review at Frontiers in Pharmacology, bioRxiv preprint*

## In Preparation

6. Kagan, A., Tang, T., Levina, E., Zhu, J. (2025+) Cross Validation for Network Regression. (Work will be presented at ICSDS-2025)
7. Kagan, A., Rata, S., Gruver, J. S., Trikoz, N., Lukyanov, A., Vultaggio, J., Ceribelli, M., Thomas, C., Gujral, T. S., Kirschner, M. W., Peshkin, L. (2025+) An Optimal Set of Inhibitors for Reverse Engineering via Kinase Regularization.
8. Kriukov, D., Efimov, E., Kagan, A., Peshkin, L. (2025+) On Universal Approach to Biological Age Estimation

# Software

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1. [InfluenceDiffusion](#) (2024)  
PYPI Python package for estimation and uncertainty quantification of influence diffusion models on networks
2. [GroupMultiNeSS](#) (2025)  
PYPI Python package for extraction of shared and group latent structures from a collection of multiplex networks

# Presentations

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## CONTRIBUTED TALKS

- 2025 **ICSDS (International Conference on Statistics and Data Science)**, Seville, Spain  
2024 **CMStatistics (Conference on Computational and Methodological Statistics)**, London, UK  
2024 **JSM (Joint Statistical Meetings)**, Portland, OR, USA  
2023 **JSM (Joint Statistical Meetings)**, Toronto, ON, Canada

## POSTERS

- 2024 **SNAB workshop** (*Honorable mention*), Nassau, Bahamas  
2023 **Michael Woodroffe Memorial Conference** (*Honorable mention*), Ann Arbor, MI, USA  
2023 **SNAB workshop** (*Best poster award*), Anchorage, AK, USA  
2023 **ICSA Applied Statistics Symposium** (*Honorable mention*), Ann Arbor, MI, USA  
2023 **MSSIIS Statistics Symposium** (*Best poster award*), Ann Arbor, MI, USA

## Teaching Experience

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GRADUATE STUDENT INSTRUCTOR, UNIVERSITY OF MICHIGAN

- **Data Science 415: Data Mining and Statistical Learning** (upper undergraduate level) Fall 2025  
Taught and prepared Python notebooks for lab sections (~20 students), graded homework and exams
- **Stats 485: Capstone Seminar** (upper undergraduate level) Fall 2022  
Held office hours, graded data analysis reports.
- **Stats 250: Introduction to Statistics and Data Analysis** (lower undergraduate level) Winter 2022  
Taught weekly lab sections (~40 students), held office hours, graded homework and exams.
- **Stats 426: Introduction to Theoretical Statistics** (upper undergraduate level) Fall 2021  
Held office hours, graded homework and exams.

TEACHING ASSISTANT, HIGHER SCHOOL OF ECONOMICS, MOSCOW, RUSSIA

- **Machine Learning** (upper undergraduate level) Winter 2020  
Designed and taught weekly lab sections (~30 students), graded homeworks.
- **Real Analysis** (lower undergraduate level) 2018 - 2019  
Held office hours, graded homeworks and exams.

## Professional Service

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- **Organizing Committee Chair of MSSISS Statistics Symposium** 2024-2025  
Received an [Outstanding Graduate Student Service Award](#) for chairing the organizing committee of [MSSISS](#), an annual statistics symposium for ~150 people at UMichigan. My responsibilities included: student and keynote speaker invitations, funding requests, catering, website maintenance, and booklet printing.
- **Levina-Zhu Research Group Admin** 2022-2025  
Responsible for the logistics of my advisors' research group: scheduled weekly reading group presentations, curated group's Google Drive, website, and networks literature database.
- **Organizing Volunteer at ICSA Statistics Symposium** June 2023  
Helped participants with conference logistics and registration.

## Computing Skills

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Proficient in Python (Numpy, Pandas, Sklearn, Matplotlib, PyTorch, Scipy, NetworkX, JAX, CVXPY), R, and Matlab

## Languages

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English (fluent), Russian (native), German (upper-intermediate), French (intermediate), Hebrew (intermediate)