Roman Kouznetsov

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EDUCATION

The University of Michigan - Ann Arbor | Ann Arbor, MI
Ph.D. in Statistics | **GPA:** 3.81/4.0   May 2025
The University of Michigan - Ann Arbor | Ann Arbor, MI
M.A. in Statistics | **GPA:** 3.81/4.0   May 2021
Case Western Reserve University | Cleveland, OH
B.S. in Statistics and Economics w/ Actuarial Science Concentration | **GPA:** 3.92/4.0
(Dean's List all 6 semesters, finished in 3 years)   May 2019

RELEVANT EXPERIENCE

University of Michigan | Ann Arbor, MI   June 2019 - May 2025
Probabilistic Machine Learning Researcher, PhD Candidate
- Developing innovative statistical methods for spatial transcriptomics data by combining variational inference and graph neural networks.
- Engineering scalable probabilistic models to capture intricate patterns in high-dimensional spatial transcriptomics data, expanding our understanding of spatial gene expression and cell (group) interactions.
- Developed hierarchical & empirical Bayesian models to incorporate customized prior spatial knowledge.

Skillet Labs/PlumberAI | New York, NY   November 2023 - May 2024
AI Engineer + Data Science Lead
- Led the generation, fine-tuning, and evaluation of LLMs used by management service providers (MSPs).
- Implemented an AI system that optimized MSP talent deployment, improving ticket resolution times by 20%.
- Developed and deployed a multi-agentic workflow that assigned specific sub-tasks to specialized agents, increasing query resolution efficiency and decreasing hallucinations by nearly 100%.
- Assistant author of structural equation models intended to report experiential learning of burgeoning IT talent.

Progressive Insurance | Mayfield, OH   May 2019 - August 2019
Data Science Intern
- Performed interactive network visualization and analysis for employment transitions in Claims Control.
- The analysis of these models helps Progressive's Claims Control department properly allocate new labor, decisions that cost the department about $3-4 million annually.

SELECTED TECHNICAL PROJECTS (Full list on website)

RAINDO | Generative AI Project (Actively Maintained)
- Developed a Discord AI bot that assists with technical setup for a randomized video game in 26 languages, deployed to a server with tens of thousands of members.
- Optimized the bot's architecture to achieve a 30-fold reduction in operational costs while maintaining relevance, correct file retrieval, and low hallucination rate.

statepopsmonthly.com | Data Science Project (On Hiatus)
- Developed an interactive U.S. map with downloadable CSVs of monthly population estimates, incorporating state-of-the-art interpolation methods.
- Designed to support Bayesian analysis of COVID-19 mask-wearing effectiveness, with a focus on user-friendly web development for fellow researchers.

PUBLICATIONS & TALKS

- "BayXenSmooth: Smooth and Spatial Bayesian Clustering for Xenium Data" (Preprint) – **Roman Kouznetsov**, Jackson Loper, Jeffrey Regier
- "A Graph Convolutional Network for Spatial Transcriptomics Modelling" (Preprint) – **Roman Kouznetsov**, Jackson Loper, Jeffrey Regier
- "Needs, Priorities, and Attitudes of Individuals with Spinal Cord Injury Toward Nerve Stimulation Devices for Bladder and Bowel Function: A Survey" *Nature*, Spinal Cord – **Co-Author**
- "Discovering Spatial Differential Expression with Graph Convolutional Network" – Talk at Machine Learning in Computational Biology (MLCB)
- "Statistical Inference for Spatial Transcriptomics in the Age of Deep Learning" – Talk at Joint Statistical Meetings (JSM)
- "deepST: A Graph Convolutional Autoencoder for Spatial Transcriptomics" – Talk at Michigan Student Symposium for Interdisciplinary Statistical Sciences (MSSISS)

TEACHING EXPERIENCE

University of Michigan | Ann Arbor, MI   August 2020 - May 2025
Graduate Student Instructor (GSI)
- Instructor, grader, and administrator for statistics courses during my PhD at the University of Michigan.
    - STATS 507: Data Science and Analytics using Python (Master's Level) (taught 3 semesters)
    - STATS 250: Introduction to Statistics and Data Analysis (taught 3 semesters)
    - STATS 306: Introduction to Statistical Computing using R

Veritas AI | Cambridge, Massachusetts   July 2023 - July 2024
Lead Mentor
- Lecturer of data science and artificial intelligence for gifted high school students.
- Mentor of student project development in applied AI in medicine, real estate, computer vision, and sports analysis.

Hermiona Education | Cambridge, Massachusetts   August 2020 - August 2021
Academic Tutor/Coach
- Assisted aspiring international college students with their applications to U.S. universities.
- Academic tutor for computer science and mathematics ranging from Algebra I to Calculus III.

Case Western Reserve University | Cleveland, OH   December 2017 - December 2018
Undergraduate Tutor
- Student peer tutor in economics, chemistry, mathematics, and statistics. [Tutor Rating: 2.98/3.00 (55 sessions)]

SKILLS & CERTIFICATIONS

- **Programming Languages:** Python, R, SQL, C#, Stata, Javascript, Matlab
- **Web Development:** Django, Reflex, Flask, React
- **Tools and Technologies:** Tableau, Git, Github Actions, Hadoop, W&B, PostgreSQL, Docker
- **Proficient Packages**: Pytorch, Tensorflow, Numpy, Scipy, Pandas, PyMC3, PyG, OpenCV, OpenAI, Scanpy
- **Machine Learning:** LLMs, deep neural nets, generative models, decision trees, clustering, graphical models, regression, computer vision, NLP, time series
- **Math**: Bayesian statistics, theoretical statistics, graph theory, stochastics, linear algebra, differential equations
- **Affiliations**: American Statistical Association (ASA), Society of Actuaries (SOA)
- **Certifications**: Exam P (Score: 9)