

Maxim Fedotov

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Research Interests

High-dimensional inference and computation; theoretical statistics and machine learning; variable selection and sparse estimation; overparameterized models; statistical limits in inference.

Education

Universitat Pompeu Fabra (Barcelona, Spain) Oct 2023–Expected Jul 2027
Ph.D. candidate. Statistics, Probability and Machine Learning Research Group.
Thesis: “Approximate L0 Criteria for Variable Selection”.
Advisors: Gábor Lugosi, David Rossell.

Universitat Pompeu Fabra (Barcelona, Spain) Sep 2022–Jul 2023
Master of Research in Economics, Finance and Management.
Thesis: “Approximate L0 Criteria for Variable Screening”.
Advisors: Gábor Lugosi, David Rossell.

Barcelona School of Economics (Barcelona, Spain) Sep 2021–Jul 2022
Master’s Degree in Data Science Methodology.
Degree awarded by Universitat Pompeu Fabra and Universitat Autònoma de Barcelona.
Thesis: “Sequential Monte Carlo for Approximate Variable Selection in GLMs”.
Advisors: Jack Jewson, David Rossell.

Lomonosov Moscow State University (Moscow, Russia) Sep 2017–Jun 2021
Bachelor’s Degree in Economics (*with honors*).
Selected for the Advanced Academic Studies Group.

Preprints

- Fedotov, M. Best Subset Selection in Linear Regression: Fixed-Design Error Bounds and Insights for Random Designs. *arXiv preprint arXiv:2607.06835* (2026).

Research in Progress

Projected Information Criteria (joint with Gábor Lugosi and David Rossell)

We develop variable selection criteria for regression and classification with computational advantages over classical (exact) information criteria. We establish selection consistency for a wide class of locally L1-continuous losses and non-asymptotic error probability bounds for additive regression. Simulations show that the projected criteria exhibit competitive performance relative to benchmark methods and sometimes can even perform better than the exact criteria.

Contextual sparsity in linear regression

Introduces a framework inspired by recent developments in large language models, in which observations from a linear model depend on a latent context. Establishes sufficient conditions under which context-dependent masking of a pre-trained, highly overparameterized context-agnostic model improves prediction. Develops a method that recovers and uses context information from data to enhance predictive performance.

Research Experience

Universitat Pompeu Fabra (Barcelona, Spain) Mar 2024–Feb 2027
Predoctoral Research Fellow (FI SDUR 2023).

Universitat Pompeu Fabra (Barcelona, Spain) May 2023–Feb 2024
Research Assistant. Project: “Econometrics for Macroeconomic Policy Evaluation.”
Supervisor: Geert Mesters.

- Implemented Python data structures for panel data and routines for factor models, autoregressive forecasting, impulse response estimation, bootstrap inference for the optimal policy perturbation, and visualization.

Universitat Pompeu Fabra (Barcelona, Spain) Jul–Aug, 2021–2022
Research Assistant. Project: “Approximate L0 Criteria and Benign Overfitting.”
Supervisors: David Rossell, Gábor Lugosi.

- Implemented a variable selection procedure for logistic regression based on approximate BIC, investigated aspects of its asymptotic behavior, and carried out simulation experiments.

Grants and Fellowships

- EBES Grants 2025 and 2026 from the Department of Economics and Business at Universitat Pompeu Fabra to cover conference attendance expenses.
- FI SDUR 2023 Predoctoral Grant, Department of Research and Universities of the Generalitat de Catalunya and European Social Fund Plus, Mar 2024–Feb 2027.
- Advanced Academic Studies Fellowship from the Faculty of Economics at Lomonosov Moscow State University, Sep 2017–Jun 2021.

Presentations

Invited Talks

- “Feature selection via projected criteria.”
2026 ISBA World Meeting. Nagoya, Japan. Jun 28–Jul 3, 2026.
- “Projected L0 Criteria for Variable Selection in Regression Models.”
Lomonosov Moscow State University, Faculty of Economics. Moscow, Russia. Jun 2025.

Contributed Talks

- “Contextual sparsity in linear regression.”
The 35th European Meeting of Statisticians 2026. Lugano, Switzerland. Aug 24–28, 2026.
- “Projected Information Criteria.”
IMS Annual Meeting 2026. Salzburg, Austria. Jul 6–9, 2026.
- “Projected Information Criteria for Variable Selection.”
ICSDS 2025. Seville, Spain. Dec 15–18, 2025.
- “Projected Information Criteria for Variable Selection.”
INRC 2025. University of Seville, Institute of Mathematics. Seville, Spain. Dec 11–12, 2025.

Seminars

- “Classical Analysis of Optimization Algorithms for Smooth Non-linear Problems.”
Stats Student Seminar. Universitat Pompeu Fabra. Barcelona, Spain. Oct 2022.
- “Sequential Monte Carlo for Approximate Variable Selection in Generalized Linear Models.”
Stats Student Seminar. Universitat Pompeu Fabra. Barcelona, Spain. May 2022.

Posters

- “Projected Criteria for Feature Selection.”
Princeton ML Theory Summer School 2026. Princeton University. Princeton, NJ, USA. Aug 3–14, 2026.
- “Projected and Updated L0 Criteria for Variable Selection in High-Dimensional and Large-Sample Regression Models.”
Bayes Comp 2025. National University of Singapore. Singapore. Jun 16–20, 2025.
- “Projected-L0 Decoder for Variable Selection in Linear Regression.”
Mathematical Aspects of Learning Theory. Barcelona, Spain. Sep 9–13, 2024.
- “Projected and One-Step L0 Criteria for Variable Selection.”
2024 ISBA World Meeting. Ca’ Foscari University of Venice. Venice, Italy. Jul 1–7, 2024.
- “Projected and One-Step L0 Criteria for Variable Selection.”
BAYSM 2024. Ca’ Foscari University of Venice. Venice, Italy. Jun 29–30, 2024.
- “Sequential Monte Carlo for Approximate Variable Selection in Generalized Linear Models.”
Bayes Comp 2023. Levi, Finland. Mar 15–17, 2023.

Teaching Experience

Barcelona School of Economics	Barcelona, Spain
• Instructor, “Introductory and Intermediate Computing for Data Science.”	Sep, 2022–2026
• Teaching Assistant, “Statistical Modeling and Inference.”	Sep–Dec 2024
• Teaching Assistant, “Computational Learning and Deep Learning.”	Jan–Mar, 2023–2024
Universitat Pompeu Fabra, Dept. of Economics and Business	Barcelona, Spain
• Teaching Assistant, “Microeconomics I.”	Apr–Jun 2023
• Teaching Assistant, “Econometrics II.”	Sep–Dec 2022
Lomonosov Moscow State University, Faculty of Economics	Moscow, Russia
• Author and Instructor, “Introduction to Non-asymptotic Statistics.”	Jun 2024
• Teaching Assistant, “Methodology of Mathematical Proofs in Econ.”	Sep 2020–May 2021

Selected Schools and Workshops

- Princeton Machine Learning Theory Summer School.
Princeton University. Princeton, NJ, USA. Aug 3–14, 2026.
- High-dimensional statistics, applications, and distributional shifts.
ETH Zürich. Zürich, Switzerland. Jun 25–27, 2025.