

Stanislav Minsker

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updated in August 2023

Professional experience

- April 2021 – present Associate Professor, Department of Mathematics, University of Southern California.
- August 2015 – March 2021 Assistant Professor, Department of Mathematics, University of Southern California.
- June 2014 – August 2015 Quantitative Analytics team, Wells Fargo Securities.
- August 2012 – August 2014 Visiting Assistant Professor, Department of Mathematics, Duke University.

Education

- 2007 - 2012 **Ph.D. in Mathematics**, *Georgia Institute of Technology*, Atlanta, Georgia.
Thesis title: *Non-asymptotic bounds for prediction problems and density estimation*. Advisor: Dr. V. I. Koltchinskii.
- 2002-2007 **B.S. in Mathematics**, *Novosibirsk State University*, Novosibirsk, Russia, *With Honors*.
Thesis title: *Invariance principle for the sequence of time series*. Advisor: Dr. I.S. Borisov.

Professional interests

Statistical Learning Theory: estimation under structural constraints, scalable algorithms, robust estimation, active learning, manifold learning.

Nonparametric statistics: functional data analysis, nonparametric Bayesian analysis.

Probability theory: concentration inequalities, limit theorems for empirical processes.

Mathematical finance.

Publications and preprints

Unless the publication is marked with (*), the order of authors is alphabetical. For publications marked with (*), the order of authors reflects the order in the published version. Student authors are highlighted with **bold** font.

Peer reviewed publications

- [29] S. Minsker and N. Strawn. *The Geometric Median and Applications to Robust Mean Estimation (2023)*. Under review. [ArXiv:2307.03111](https://arxiv.org/abs/2307.03111).
- [28] S. Minsker. *Efficient median of means estimator (2023)*. In Proceedings of COLT 2023, the 36th Conference on Learning Theory. [ArXiv:2305.18681](https://arxiv.org/abs/2305.18681).

- [27] S. Minsker. *U-statistics of growing order and sub-Gaussian mean estimators with sharp constants (2023)*. To appear in *Mathematical Statistics and Learning*. [ArXiv:2202.11842](#).
- [26] S. Minsker, M. Ndaoud and **L. Wang**. *Robust and tuning-free sparse linear regression via square-root Slope (2022)*. Under review. [ArXiv:2210.16808](#).
- [25] S. Minsker, **S. Yao**. *Median of means principle for Bayesian inference (2022)*. Under review. [ArXiv:2203.06617](#).
- [24] S. Minsker and **L. Wang**. *Robust estimation of covariance matrices: adversarial contamination and beyond (2022)*. To appear in *Statistica Sinica*. [ArXiv:2203.02880](#).
- [23] S. Minsker, M. Ndaoud and **Y. Shen**. *Minimax supervised clustering in the anisotropic Gaussian mixture model: a new take on robust interpolation*. [ArXiv:2111.07041](#).
- [22] S. Minsker and M. Ndaoud. *Robust and efficient mean estimation: approach based on the properties of self-normalized sums (2021)*. *Electronic Journal of Statistics*, vol. 15(2), 6036-6070. [ArXiv:2006.01986](#).
- [21] **T. Mathieu** and S. Minsker. *Excess risk bounds in robust empirical risk minimization (2021)*. *Information and Inference: A Journal of the IMA*, Volume 10, Issue 4, p. 1423-1490. [ArXiv:1910.07485](#).
- [20] S. Minsker. *Asymptotic normality of robust risk minimizers (2020)*. Under review. [ArXiv:2004.02328](#).
- [19] S. Minsker and **X. Wei**. *Robust modifications of U-statistics and applications to covariance estimation problems (2020)*. *Bernoulli*, Vol. 26(1), 694-727. [ArXiv:1801.05565](#).
- [18] S. Minsker. *Uniform bounds for robust mean estimators (2019)*. Under review. [ArXiv:1812.03523](#).
- [17] Y. Ke, S. Minsker, Z. Ren, Q. Sun and W.-X. Zhou. *User-Friendly Covariance Estimation for Heavy-Tailed Distributions: A Survey and Recent Results (2019)*. *Statistical Science*, Vol. 34(3), p. 454-471. [ArXiv:1811.01520](#).
- [16] S. Minsker and **X. Wei**. *Moment inequalities for matrix-valued U-statistics of order 2 (2019)*. *Electronic Journal of Probability*, Vol. 24. [ArXiv:1801.05921](#).
- [15] S. Minsker. *Distributed statistical estimation and rates of convergence in normal approximation (2019)*. *Electronic Journal of Statistics*, Vol. 13(2), p. 5213-5252. [ArXiv:1704.02658](#).
- [14] S. Minsker. *Sub-Gaussian estimators of the mean of a random matrix with heavy-tailed entries (2018)*. *Annals of Statistics*, Vol. 46, Num. 6A, p. 2871-2903. [ArXiv:1605.07129](#).
- [13] L. Goldstein, S. Minsker and **X. Wei**. *Structured signal recovery from non-linear and heavy-tailed measurements (2018)*. *IEEE Transactions on Information Theory*, Vol. 64, Iss. 8, p. 5513 - 5530. [ArXiv:1609.01025](#).
- [12] S. Minsker and **X. Wei**. *Estimation of the covariance structure of heavy-tailed distributions (2017)*. *Conference on Neural Information Processing Systems (NeurIPS) 2017*; accepted for a spotlight presentation. [ArXiv:1708.00502](#).
- [11] S. Minsker. *On some extensions of Bernstein's inequality for self-adjoint-operators. (2017)* *Statistics & Probability Letters*, 127. p. 111-119. [ArXiv:1112.5448](#).

- [10*] S. Minsker, S. Srivastava, L. Lin, and D. Dunson. *Robust and scalable Bayes via a median of subset posterior measures*. (2017). Journal of Machine Learning Research, 18(124):1-40. [ArXiv:1403.2660](#).
- [9] M. Maggioni, S. Minsker and N. Strawn. *Multiscale dictionary learning: non-asymptotic bounds and robustness* (2016). Journal of Machine Learning Research, 17(2):1-51. [ArXiv:1401.5833](#).
- [8] S. Minsker. *Geometric median and robust estimation in Banach spaces* (2015). Bernoulli, Vol. 21(4), p. 2308-2335. [ArXiv:1308.1334](#).
- [7*] S. Minsker, Y. Zhao and G. Cheng. *Active clinical trials for personalized medicine* (2015). Journal of the American Statistical Association, vol. 111, number 514, p. 875-887. [ArXiv:1404.2971](#).
- [6] V. Koltchinskii and S. Minsker. *L_1 - penalization in functional linear regression with Subgaussian design* (2014). Journal de l'École Polytechnique – Mathématiques, 1 (2014), p. 269-330. [*.pdf](#).
- [5] M. Maggioni, S. Minsker and N. Strawn. *Multiscale dictionary and manifold learning: non-asymptotic bounds for the Geometric Multi-Resolution Analysis* (2014). In Proceedings of the International Traveling Workshop on Interactions between Sparse Models and Technology (iTWist 2014).
- [4*] S. Minsker, S. Srivastava, L. Lin, and D. Dunson. *Scalable and robust Bayesian inference via the median posterior* (2014). Proceedings of the International Conference on Machine Learning (ICML 2014).
- [3] S. Minsker. *Learning extreme values and associated level sets of a regression function via selective sampling* (2013). In Proceedings of the Conference on Learning Theory (COLT 2013), p. 105-121.
- [2] S. Minsker. *Plug-in approach to Active Learning* (2012). Journal of Machine Learning Research 13, p. 67-90.
- [1] V. Koltchinskii and S. Minsker. *Sparse recovery in convex hulls of infinite dictionaries* (2010). In Proceedings of the Conference on Learning Theory (COLT 2010), p. 420-432.

USC funding

Aug 2020 Zumberge mentor award (primary recipient – Dr. Mohamed Ndaoud). Amount: \$2,000.

External Funding

- July 2021 - June 2026 **NSF CAREER DMS-2045068**, “*Robust and efficient algorithms for statistical estimation and inference*,” Division of Mathematical Sciences. **PI: Stanislav Minsker**. Amount: \$400,000.
- Oct 2019 - Sep 2022 **NSF CIF-1908905**, “*Towards Robust Statistical Learning: Theory and Algorithms*,” Communications and Information Foundations. **PI: Stanislav Minsker**. Amount: \$351,330.
- Feb 2018 ICM Travel grant from the American Mathematical Society. Amount: \$3,300.

- Sep 2017 - Aug 2020 **NSF DMS-1712956**, "*Bridging the Gap Between Theory and Applications: Robust and Scalable Statistical Estimation*," Division of Mathematical Sciences. **PI: Stanislav Minsker**. Amount: \$99,987.
- Dec 2016 (awarded) - July 2017 Borchard Foundation, conference grant: "*A French/American Collaborative Colloquium on Probability and Statistics: Concentration Inequalities, High Dimensional Statistics, and Stein's Method*," Co-PIs: J. Bartroff, L. Goldstein, S. Minsker. Amount: \$30,000.
- Dec 2016 (awarded) - Aug 2018 American Institute of Mathematics, conference grant: "*Stein's Method and Applications in High-dimensional Statistics*," Co-PIs: J. Bartroff, L. Goldstein, S. Minsker, G. Reinert. Amount: \$30,000 (approximately).

Other Honors and Awards

- Fall 2010 Algorithms and Randomness Center Fellowship, Georgia Institute of Technology.

Past and Upcoming Conferences and Presentations

Events marked with (*) have been postponed until 2021

- June 2023 Hong Kong University of Science and Technology (HKUST), **Invited talk**.
- May 2023 Neyman Seminar, UC Berkeley (**Invited talk**).
- July 2022 ICORS (International Conference on Robust Statistics) 2022, **Invited talk**.
- June 2022 WIAS research seminar "Mathematical Statistics" (**Invited talk**).
- September 2021 Wilks Seminar Series, Princeton University (**Invited talk**).
- September 2021 Probability and Statistics seminar, Georgia Institute of Technology (**Invited talk**).
- September 2021 Séminaire de Statistique CREST-CMAP, École Polytechnique, France (**Invited talk**).
- July 2021 International Conference on Statistics and Related Fields, Luxembourg (**Invited talk**).
- December 2020 Mathematical Methods of Statistics, Lumini, France (**Co-organizer**).
- August 2020* 10th World Congress in Probability and Statistics, Seoul, South Korea (**organizer of the Invited session on High-dimensional Robustness**).
- June 2020* WNAR (Western North American Region of the international biometric society) meeting 2020, Anchorage, Alaska (**Invited talk**).
- May 2020* Workshop on High-Dimensional Covariance Matrices, Networks and Concentration Inequalities, Texas A&M University (**Invited Lecturer for the mini-course on "Concentration inequalities for the sums of random matrices and their applications"**).
- March 2020* 2020 Conference on Information Sciences and Systems (CISS), Princeton, NJ (**Invited talk**).
- December 2019 Meetings in Mathematical Statistics, Lumini, France.
- October 2019 Stochastics and Statistics Seminar at MIT (**Invited talk**).
- September 2019 Workshop on High-Dimensional Covariance Operators and their Applications, Humboldt University of Berlin (**Invited talk**).
- April 2019 SOCAMS 2019, Caltech (**Invited Plenary talk**).
- February 2019 Information Theory and Applications Workshop, San Diego (**Invited talk**).

- January 2019 Statistics and Data Science Symposium, UC San Diego **(Invited talk)**.
- December 2018 Séminaire de Statistique CREST-CMAP, École Polytechnique, France **(Invited talk)**.
- December 2018 CMStatistics Conference, Pisa, Italy **(Invited talk)**.
- August 2018 TTI-Chicago Summer Workshop: Computational Efficiency & High-Dimensional Robust Statistics.
- August 2018 International Congress of Mathematicians, Rio de Janeiro, Brazil **(Short oral communication)**.
- August 2018 Stein's method and applications in high-dimensional statistics, American Institute of Mathematics, San Jose, California **(Serve as one of the organizers + talk)**.
- June 2018 Stochastic Processes and Applications, Gothenburg, Sweden **(Invited talk)**.
- May 2018 Workshop on the Recent Developments in Statistical Theory and Methods Based on Distributed Computing, BIRS, Oaxaca, Mexico **(Invited talk)**.
- March 2018 Workshop on Statistical Inference for Structured High-dimensional Models, Oberwolfach, Germany **(Invited talk)**.
- March 2018 Workshop on Structural Inference in Statistics: Adaptation and Efficiency, Berlin, Germany **(Invited talk)**.
- February 2018 Graduate student seminar at the CSU Channel Islands **(Invited expository talk)**.
- December 2017 Conference on Neural Information Processing Systems (NeurIPS 2017), Long Beach, CA **(Poster presentation)**.
- December 2017 Meeting in Mathematical Statistics. Lumini, France **(Invited to attend/abstract selected for presentation)**.
- December 2017 Probability and Statistics seminar, University of Nice, France **(Invited talk)**.
- August 2017 Joint Statistical Meetings (JSM 2017), Baltimore, MD **(Invited talk)**.
- July 2017 Colloquium on Concentration Inequalities, High Dimensional Statistics, and Stein's Method. Missillac, France **(Served as one of the organizers + talk)**.
- July 2017 University of Grenoble, Statistics seminar, Grenoble, France **(Invited talk)**.
- June 2017 SOCAMS 2017, UC Irvine **(Abstract selected for presentation)**.
- May 2017 High Dimensional Probability Conference (HDP 8), BIRS, Oaxaca, Mexico (talk).
- March 2017 Georgia Institute of Technology, Stochastics Seminar **(Invited talk)**.
- February 2017 UCLA, Department of Statistics Seminar **(Invited talk)**.
- February 2017 SAMSI, Workshop on the Interface of Statistics and Optimization **(Invited talk)**.
- February 2017 Claremont Center for the Mathematical Sciences, Colloquium Series **(Invited talk)**.
- November 2016 USC Marshall School of Business, **(Invited talk)**.
- September 2016 SAMSI, Workshop on Distributed and Parallel Data Analysis **(Invited talk)**.
- September 2016 IMA Workshop "Transdisciplinary Foundations of Data Science" **(Poster session)**.
- July 2016 ICERM Workshop on Stochastic Numerical Algorithms **(Invited talk)**.
- June 2016 Workshop on generic chaining, Harvard University.
- May 2016 UCLA, department of Biostatistics **(Invited talk)**.
- April 2016 University of Texas at Austin **(Invited talk)**.
- February 2016 Texas A&M University **(Invited talk)**.
- November 2015 Johns Hopkins University **(Invited talk)**.

- May 2014 The National Consortium for Data Science (NCDS) Data Innovation Showcase.
- March 2014 SAMSI-CRM Workshop on Geometric Aspects of High-dimensional Inference.
- February 2014 University of Maryland, College Park, Statistics Seminar **(Invited talk)**.
- October 2013 Purdue University, Machine Learning Seminar **(Invited talk)**.
- October 2013 Purdue University, Mathematical Statistics Seminar **(Invited talk)**.
- October 2013 University of Central Florida **(Invited Colloquium Talk)**.
- September 2013 Duke University iiD (Information Initiative at Duke) seminar.
- July 2013 Duke University Workshop on Sensing and Analysis of High-Dimensional Data.
- June 2013 2013 Conference on Learning Theory, Princeton University **(Abstract selected for presentation)**.
- May 2012 High-dimensional data analysis Workshop, Oberwolfach, Germany **(Abstract selected for presentation)**.
- August 2011 Limit Theorems in Probability Theory and Their Applications, Novosibirsk, Russia.
- April 2011 ARC 4 (Algorithms and Randomness Center) workshop.
- December 2010 2010 Meeting on Mathematical Statistics, Lumini, France.
- April 2010 SIAM Student Seminar, Georgia Institute of Technology.

Teaching

- Fall 2023 Instructor for the undergraduate-level course “Mathematics of Machine Learning” (Math 447), USC.
- Fall 2020 Instructor for the undergraduate-level course “Elementary Probability and Statistics” (Math 208), USC.
- Fall 2020, Spring 2019, Fall 2017 Instructor for the undergraduate-level course “Mathematical Statistics” (Math 408), USC.
- Spring 2016, 2017, 2019, 2023 Instructor for the graduate-level course “Introduction to Time Series” (Math 545), USC.
- Fall 2019, Fall 2016 Instructor for the graduate-level course “Introduction to Mathematical Statistics” (Math 541b), USC.
- Spring 2018 Instructor for the graduate-level course “Analysis of Variance and Design” (Math 542), USC.
- Fall 2015, 2017, 2022 Instructor for the graduate-level course “Mathematical Foundations of Statistical Learning Theory” (Math 547), USC.
- Fall 2013 Instructor for the mini-course “Introduction to Statistical Learning Theory”, Duke University.
- Summer 2011 Instructor for “Introduction to Probability and Statistics” course, Georgia Inst. of Technology.
- Summer 2009 Instructor for “Introductory Statistics and Applications” course, Georgia Inst. of Technology.

Students and Postdocs supervised

Postdocs

Dmitrii Ostrovskii, since August 2021 Postdoc, Department of Mathematics, USC.

Mohamed (Simo) Ndaoud, since August 2019 Postdoc, Department of Mathematics, USC.

Graduate students

Oleksandra Lyamar, since January 2022 Ph.D., Mathematics, USC (in progress).

Yiqiu Shen, since January 2021 Ph.D., Data Sciences and Operations, USC (in progress).

Shunan Yao, graduated in August 2023 Ph.D., Mathematics, USC (co-supervised by X. Tong). Currently an Assistant Professor at Hong Kong Baptist University.

Lang Wang, graduated in June 2021 Ph.D., Mathematics, USC.

Currently a Data Scientist at MobilityWare. Xiaohan Wei, Ph.D., Electrical Engineering, USC (co-supervised by M. Scientist at Facebook. graduated in August 2019

Jianwei Xiao, graduated in Fall 2016 Master's, Applied Mathematics. Currently is a Programming Analyst at Sears Holding.

Ranran Chen, since October 2017 Master's, Applied Mathematics.

Undergraduate students

Summer 2019 Summer research program for 8 USC undergraduate students (jointly with N. Tiruvilumala). The team of students worked on the analysis of a large database of tennis data, developed the machine learning tools to analyze it in Python, and trained models used to predict results of the games based on the logistic regression and neural networks.

Ally Liu, Spring 2017 Math 490 Directed research; project title: "Artificial Neural Networks and Applications to the Body Fat concentration dataset."

Service on the Qualifying Exams and Ph.D. Thesis Committees

2020 Lijia Wang, USC Math (oral exam).

2020 Bowen Gang, USC Math (thesis committee co-chair).

- 2019 Lang Wang, USC Math (oral exam committee chair).
- 2019 Jinting Liu, USC Math (oral exam).
- 2019 Jiajun Luo, USC Math (oral exam).
- 2019 Frank Hong, USC School of Philosophy (oral exam committee).
- 2019 Xiaohan Wei, USC Department of Electrical Engineering (thesis committee co-chair).
- 2018 Chao Deng, USC Computational Biology and Bioinformatics (thesis committee member; advisor: Andrew D. Smith).
- 2018 Jie Ruan, USC Math (oral exam).
- 2018 Bowen Gang, USC Math (oral exam).
- 2017 Emre Demirkaya, USC Math (oral exam).
- 2017 Narae Lee, USC Math (oral exam).
- 2016 Jian Wang, USC Math (oral exam).
- 2016 Michael Hankin, USC Math (oral exam).

Professional Service Record

USC Math Department

Organizer of the USC Probability and Statistics seminar, Spring 2016 - Fall 2018; co-organizer since Fall 2018.

Co-organizer of the Machine Learning reading group, Spring 2018, Fall 2019 and Spring 2020.

External

Organizer of the Invited session on High-dimensional Robustness at the 10th World Congress in Probability and Statistics. Seoul, South Korea, July 2021.

Organizing committee member (jointly with C. Butucea, V. Spokoiny and C. Pouet) for the 2020-2022 program "Meetings in Mathematical Statistics," a sequence of 3 conferences in CIRM, France.

Co-organizer of SOCAMS (Southern California Applied Mathematics Symposium) conference: 2016 – organizing committee member, 2018 – scientific committee member.

Co-organizer of the AIM workshop on Stein's method and applications in high-dimensional statistics. San Jose, CA, August 2018.

Co-organizer of the Colloquium on Concentration Inequalities, High Dimensional Statistics, and Stein's Method. France, July 2017).

Program Committee member for AISTATS conference (2016).

Co-organizer of the Statistical and Applied Mathematical Sciences Institute (SAMSI) working group: "Statistical Inference for Large Matrices under Complexity Constraints" (Fall – Spring 2013).

Reviewer for the peer review publications, including the Journal of Machine Learning Research, the Annals of Statistics, Electronic Journal of Statistics, Machine Learning (Springer), Bernoulli Journal, Statistics and Probability Letters (Elsevier), Applied and Computational Harmonic Analysis, European Journal of Statistics, Neural Networks, Nature, and others.

Review panel member for the National Science Foundation (Statistics); reviewer for the National Science Foundation Economics Program.

External reviewer for the Israel Science Foundation (ISF).