Avetik KARAGULYAN

PERSONAL DATA

E-MAIL	avetik.karagulyan@cnrs.fr
WEBSITE	avetx.github.io
RESEARCH INTERESTS	Sampling theory, Optimization theory, Statistics
TEACHING INTERESTS	Calculus, Linear Algebra, Probability theory, Optimization, Statistics, Sampling theory, Federated Learning

WORK EXPERIENCE

RESEARCH SCIENTIST	Centre Nationale de la Recherche Scientifique (CNRS) *Based at Laboratoire des Signaux et Systèmes (L2S) at Centrale Supélec* Since Nov 2024
POSTDOC	King Abdullah University of Science and Technology *Optimization and Machine Learning Lab supervised by Peter Richtárik* Since Nov 2021
TEACHING ASSOCIATE	École nationale de la statistique et de l'administration économique *Teaching Associate of Probability theory, Statistics, Functional analysis, Measure theory and Intro to ML courses* Sept 2018 - May 2021
RESEARCH INTERN	Center for Research in Economy and Statistics *Supervised by Arnak Dalalyan* Apr - Sept 2018
MATH TRAINER	Innovative Solutions and Technologies Center *Math trainer for high-school students* June - Aug 2017
TEACHING ASSOCIATE	American University of Armenia *Teaching Associate of Probability theory and Statistics courses* Sept 2016 - May 2017

EDUCATION

PH.D.	Applied Mathematics Institut Polytéchnique de Paris *Supervised by Arnak Dalalyan* June 2021
MASTER	MVA (Mathematics, Vision, Learning) École normale supérieure Paris-Saclay *Mention: Très bien* Sept 2018
BACHELOR	Mathematics Yerevan State University *GPA: 20/20* July 2017

PUBLICATIONS

PREPRINT	"SPAM: Stochastic Proximal Point Method with Momentum Variance Reduction for Non-convex Cross-Device Federated Learning", Avetik Karagulyan, Egor Shulgin, Abdurakhmon Sadiev and Peter Richtárik | arXiv preprint arXiv:2405.20127
PREPRINT	"MARINA Meets Matrix Stepsizes: Variance Reduced Distributed Non-convex Optimization", Hanmin Li, Avetik Karagulyan and Peter Richtárik | arXiv preprint arXiv:2310.04614
CONFERENCE	"Langevin Monte Carlo for Strongly Log-concave Distributions: Randomized Midpoint Revisited", Lu Yu, Avetik Karagulyan and Arnak Dalalyan | Accepted to the International Conference on Learning Representations, 2024
CONFERENCE	"Det-CGD: Compressed Gradient Descent with Matrix Stepsizes for Non-Convex Optimization", Hanmin Li, Avetik Karagulyan and Peter Richtárik | Accepted to the International Conference on Learning Representations, 2024
CONFERENCE	"ELF: Federated Langevin Algorithms with Primal, Dual and Bidirectional Compression", Avetik Karagulyan and Peter Richtárik | Accepted to Uncertainty in Artificial Intelligence, 2025
CONFERENCE	"Convergence of Stein Variational Gradient Descent under a Weaker Smoothness Condition", Lukang Sun, Avetik Karagulyan and Peter Richtárik | In International Conference on Artificial Intelligence and Statistics, pp. 3693-3717. PMLR, 2023.
THESIS	"Sampling with the Langevin Monte-Carlo", Avetik Karagulyan | Ph.D. thesis defended in Institut Polytéchnique de Paris
CONFERENCE	"Penalized Langevin Dynamics with Vanishing Penalty for Smooth and Log-concave targets", Avetik Karagulyan, Arnak Dalalyan | Advances in Neural Information Processing Systems 33 (2020): 17594-17604.
JOURNAL	"Bounding the Error of Discretized Langevin Algorithms for Non-strongly Log-concave Targets", Arnak Dalalyan, Avetik Karagulyan and Lionel Riou-Durand | The Journal of Machine Learning Research 23.1 (2022): 10720-10757.
JOURNAL	"Non-Asymptotic Guarantees For Sampling by Stochastic Gradient Descent", Avetik Karagulyan, Journal of Contemporary Mathematical Analysis (Armenian Academy of Sciences) 54.2 (2019): 71-78
JOURNAL	"User-friendly Guarantees for the Langevin Monte Carlo with Inaccurate Gradient ", Arnak S. Dalalyan, Avetik G. Karagulyan | Stochastic Processes and their Applications 129.12 (2019): 5278-5311.
JOURNAL	"Existence of Positive Solutions for an Approximation of Stationary Mean-Field Games", Diogo Gomes et al. | Involve, a Journal of Mathematics Vol. 10 (2017), No. 3, 473–493

Talks and Conferences

Invited Talk	*EUROPT 2025* Southampton, UK – June 26 – July 3, 2025
Poster	*Uncertainty in Artificial Intelligence* Brazil – July 21–25, 2025
Talk	*Séminaire d'Automatique du Plateau de Saclay* L2S, France – March 13, 2025
Talk	*The Paris-Saclay Signal Seminar (Scube)* L2S, France – February 7, 2025
2 Posters	*International Conference on Learning Representations* Vienna, Austria - May 2024
Invited Talk	*Research Seminar* FGV EMAp, Rio de Janeiro, Brazil - October 2023
Poster	*Federated Learning and Analytics in Practice: Algorithms, Systems, Applications, and Opportunities* workshop at ICML, Honolulu, Hawaii - July 2023
Invited Talk	Summer School *Statistics and Learning Theory*, Tsaghkadzor, Armenia - July 2023
Talk	3rd conference *Mathematics in Armenia*, Yerevan, Armenia - June 2023
Organizer/Talk	Mini-symposium *Wasserstein Gradient Flows and Applications* SIAM OP23, Seattle, USA - May 2023
Poster	*International Conference on Artificial Intelligence and Statistics* Valencia, Spain - April 2023
Talk	*Rising Stars in AI symposium* - February 2023
Invited Talk	*Quantitative Methods Area Seminar* Purdue University - February 2023
Poster	Summer school in *Statistical Physics and Machine Learning* Les Houches, France - June 2022
Poster	*Conference on the Mathematics for Complex Data* Stockholm, Sweden - June 2022
Poster	*International Symposium on Non-parametric Statistics* Pharos, Cyprus - June 2022
Talk	*Journées MAS 2020* - November 2021
Talk	*Ph.D. defense in ENSAE* - June 2021
Talk	Virtual *Meeting in Mathematical Statistics* - December 2020
Poster	*33-rd Neural Information Processing Systems* Vancouver, Canada - December 2020
Poster	*Joint Structures and Common Foundations of Statistical Physics* Information Geometry, and Inference for Learning (SPIGL'20) Les Houches, France - July 2020
Talk	*Optimization for Machine Learning*, Luminy, France - March 2020
Talk	*Meetings in Mathematical Statistics*, Luminy, France - December 2019
Invited Talk	*Seminar at Télécom ParisTech*, Paris, France - April 2019
Talk	*8èmes Rencontres des Jeunes Statisticiens (RJS 2019)* Porquerolles, France - April 2019

Poster	*YES X: Understanding Deep Learning: Generalization, Approximation, and Optimization,* Eindhoven, Netherlands - March 2019
Participant	*3rd Summer school Mathematics and Applications* Tsaghkadzor, Armenia - 2016 July
Participant	*Visiting Student Research Program Applied Differential Equations* KAUST, Saudi Arabia - 2015 Aug
Participant	*2nd Summer school Mathematics and Applications* Tsaghkadzor, Armenia - 2015 July
Participant	*1st Summer school Mathematics and Applications* Tsaghkadzor, Armenia - 2014 July

Reviewing services

Conferences	AISTATS, NeurIPS, ICML, ICLR
Journals	Stochastic Processes and their Applications, Bernoulli, Annals of Applied Probability, Statistics and Computing, Journal of Machine Learning Research, Electronic Journal of Probability, Transactions on Signal Processing, Transactions on Machine Learning Research, SIAM journal on uncertainty quantification, Optimization Methods and Software.

Organization

Symposium	Member of the organizing committee of the third "Rising Stars in AI" symposium at KAUST AI Initiative.
Symposium	Mini-symposium at SIAM OP23 on "Wasserstein gradient flows and applications", co-organized with Anna Korba and Adil Salim.
Group seminars	Organized weekly group seminars during the Spring semester of 2023.

Professional development

Teaching	Higher Education Teaching Certificate Harvard's Derek Bok Center for Teaching and Learning *Final grade: 97.5/100*

Languages

Armenian	Native
Russian	Full professional
English	Full professional
French	Full professional .

Awards and prizes

Silver Medal	International Mathematical Competition, Bulgaria, 2017
Gold Medal	Awarded by Yerevan State University, 2017
Bronze Medal	International Mathematical Competition, Bulgaria, 2016
2nd Prize	Mirror of William Lowell Putnam Mathematical Competition, 2016
Silver Medal	International Mathematical Competition, Bulgaria, 2017
Best Student award	Awarded by Yerevan State University, 2016
Semi-finalist	ACM-ICPC, Georgia, 2015
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Semi-finalist	ACM-ICPC, Georgia, 2013
2nd Prize	Mirror of William Lowell Putnam Mathematical Competition 2013
Honourable Mention	International Mathematical Olympiad, Colombia, 2013
Honourable Mention	International Mathematical Olympiad, Argentina, 2012