

Alena Shilova

[My website](#) | [GitHub](#)

Location: Lille, France
Email: alena.shilova@inria.fr

EDUCATION

University of Bordeaux

PhD student in Computer Science

Thesis Advisor: Olivier Beaumont

Thesis Title: Memory Saving Strategies for Deep Neural Network Training

Defense Date: Dec 7 2021

Bordeaux, France

Oct 2018 - Dec 2021

Skolkovo Institute of Science and Technology (DDP)

Master of Science

Program: Data Science

Degree: Master of Science. GPA 4.0/4.0

Thesis Advisor: Yury Maximov

Thesis Title: Proximal Adaptive Importance Sampling to Estimate Power Grid Reliability

Moscow, Russia

Sep 2016 - June 2018,

Moscow Institute of Physics and Technology (DDP)

Master of Science

Department: Control and Applied Mathematics

Sub-faculty: Computer Science and Computational Mathematics

Specialization: Applied Physics and Mathematics

Degree: Master of Science. GPA 4.84/5.00 (8.8 / 10.0)

Thesis Advisor: Ivan Menshikov

Moscow, Russia

Sep 2016 - July 2018

Moscow Institute of Physics and Technology

Bachelor of Science

Department: Control and Applied Mathematics

Sub-faculty: Mathematical Modeling of Complex Processes and Systems

Specialization: Applied Physics and Mathematics

Degree: Bachelor of Science. GPA 4.89/5.00

Thesis Advisor: Ivan Menshikov

Thesis Title: The study of the game "Principal-Director-Agent"

Moscow, Russia

Sep 2012 - July 2016

EXPERIENCE

Postdoctoral researcher

Inria centre at the University of Lille, team Scool

Jan 2022 – Present

Lille, France

- Working on numerical and neural network methods applied to Continuous Time Reinforcement Learning
- Working on Entropy Regularized Reinforcement Learning
- Contributing to the development of `rlberry`

PhD student

Inria Bordeaux, team Realopt (until Feb 2019) and HiePacs (from Feb 2019)

Oct 2018 - Dec 2021

Bordeaux, France

- Designing and implementing memory saving techniques for training deep neural networks
- Co-developing `rotor` package
- Collaboration with `Pl@ntNet`

Teaching Assistant

ENSEIRB-MATMECA

Mar 2020 - Dec 2021

Bordeaux, France

- Artificial Intelligence
- Data Analysis
- Tools for Learning (co-authored the course together with Olivier Beaumont)

Developer - Analyst (internship)

Rostelecom

Jun 2017-Aug 2017

Moscow, Russia

- Analysing and developing methods for automating recruitment processes

SKILLS

TECHNICAL SKILLS

- Languages** : Python, C, C++, R
- Libraries** : numpy, scikit-learn, matplotlib, pandas, tensorflow, pytorch (preferred), CPLEX
- Databases** : MsSQL
- Dev Tools** : Visual Studio Code, vim, Git, Gitlab

SCIENTIFIC SKILLS

- machine learning, deep learning, reinforcement learning: theory, algorithms
- optimization: theory, algorithms and their complexities (convex optimization, discrete optimization)
- parallel computing
- numerical linear algebra, tensors
- game theory

LANGUAGES

- Russian (native), English (fluent), French (advanced)

PUBLICATIONS

JOURNALS

- O. Beaumont, J. Herrmann, G. Pallez (Aupy) and **A. Shilova** // Optimal memory-aware backpropagation of deep join networks // Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, 2020

CONFERENCES

- J. Gusak, D. Cherniuk, **A. Shilova**, A. Katrutsa, D. Bershatsky, X. Zhao, ... and O. Beaumont // Survey on efficient training of large neural networks // 31st International Joint Conference on Artificial Intelligence IJCAI-22, July 2022 Vienna, Austria
- O. Beaumont, L. Eyraud-Dubois, and **A. Shilova** // Efficient Combination of Rematerialization and Offloading for Training DNNs // NeurIPS 2021 Thirty-fifth Conference on Neural Information Processing Systems, 2021.
- O. Beaumont, L. Eyraud-Dubois, and **A. Shilova** // Pipelined Model Parallelism: Complexity Results and Memory Considerations // European Conference on Parallel Processing, 2021
- O. Beaumont, J. Langou, W. Quach and **A. Shilova** // A Makespan Lower Bound for the Scheduling of the Tiled Cholesky Factorization based on ALAP Schedule // European Conference on Parallel Processing, 2020
- O. Beaumont, L. Eyraud-Dubois and **A. Shilova** // Optimal GPU-CPU Offloading Strategies for Deep Neural Network Training // European Conference on Parallel Processing, 2020

WORKSHOPS

- O. Beaumont, L. Eyraud-Dubois, and **A. Shilova** // MadPipe: Memory Aware Dynamic Programming Algorithm for Pipelined Model Parallelism // IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW). IEEE, 2022.
- N. Kukreja, **A. Shilova**, O. Beaumont, J. Huckelheim, N. Ferrier, et al... // Training on the Edge: The why and the how // PAISE2019 - 1st Workshop on Parallel AI and Systems for the Edge, May 2019, Rio de Janeiro, Brazil

RESEARCH REPORTS

- R. Della Vecchia, **A. Shilova**, P. Preux, and R. Akroun // Entropy Regularized Reinforcement Learning with Cascading Networks // Research report 2022, arXiv preprint arXiv:2210.08503.
- O. Beaumont, L. Eyraud-Dubois, **A. Shilova**, and X. Zhao // Weight Offloading Strategies for Training Large DNN Models // Research Report 2022
- O. Beaumont, L. Eyraud-Dubois, and **A. Shilova** // An Integer Linear Programming Approach for Pipelined Model Parallelism // Research Report 2022
- O. Beaumont, L. Eyraud-Dubois, J. Herrmann, A. Joly and **A. Shilova** // Optimal checkpointing for heterogeneous chains: how to train deep neural networks with limited memory // Research Report (hal-02352969), Inria Bordeaux Sud-Ouest, 2019
- **A. Shilova**, I. Menshilov // The study of the game "Principal-Director-Agent" // Sbornik nauchnykh trudov «Informacionnoe obespechenie matematicheskikh modelej», M., MIPT, 2017, p. 42-51. (In Russian)

CONFERENCES AND TALKS

- R. Della Vecchia, **A. Shilova**, P. Preux, and R. Akroun // Entropy Regularized Reinforcement Learning with Cascading Networks // EWRL 2022, Milan, Italy (poster)
- A. Shilova // Survey on efficient training of large neural networks // IJCAI-ECAI 2022, 23 - 29 Jul, 2022, Vienna, Austria
- A. Shilova // Efficient Combination of Rematerialization and Offloading for Training DNNs // NeurIPS 2021, 6 - 14 Dec, 2021, (visio-conference)
- A. Shilova // Pipelined model parallelism: Complexity results and memory considerations // Euro-Par 2021, 30 Aug - 3 Sep, 2021, Lisbon, Portugal (visio-conference)
- A. Shilova // Optimal GPU-CPU Offloading Strategies for Deep Neural Network Training // Euro-Par 2020, 24-28 August, 2020, Warsaw, Poland (visio-conference)
- A. Shilova // Memory constrained Deep Learning // HPC - AI - BigData Convergence Days (Conv'2019), 6-7 January, 2019, Paris, France
- A. Shilova // Optimization of Deep Learning for Pl@ntnet: compute more, store less // Per3S (Performance and Scalability of Storage Systems), 14 January, 2018, Bordeaux, France
- A. Shilova // Checking the theory of the game "Principal-Director-Agent" on the basis of an experiment: what qualities should the principal have for the further development of the firm // 58th Scientific Conference of Moscow Institute of Physics and Technology, 23 - 28 Nov, 2015, Moscow, Russia. (In Russian)
- A. Shilova // Experimental study of the game "Principal-Director-Agent" // 59th Scientific Conference of Moscow Institute of Physics and Technology, 21 - 26 Nov, 2016, Moscow, Russia. (In Russian)
- A. Shilova // The game "Principal-Director-Agent". Finding potential Nash Equilibria in the case of a repeated game using neural networks // 60th Scientific Conference of Moscow Institute of Physics and Technology, 20 - 25 Nov, 2017, Moscow, Russia. (In Russian)

AWARDS

- June 2018, Best Research Thesis "Proximal Adaptive Importance Sampling to Estimate Power Grid Reliability" at Skolkovo Institute of Science and Technology
- June 2018, Academic Excellence at Skolkovo Institute of Science and Technology
- Nov 2017, best research work among young scientists at the 60th Scientific Conference of MIPT
- Nov 2015, best research work among young scientists at the 58th Scientific Conference of MIPT
- Feb 2013 - May 2015, Abramov's scholarship for talented students. Distributed every semester among best 1-3 year students of the university based on their academic and research achievements.