Alexey Tregubov, Ph.D.

Los Angeles, CA| alexeytregubov@gmail.com
Web: atregubov.com | www.linkedin.com/in/atregubov
Computer Scientist and ML engineer, US permanent resident, Extraordinary abilities green card holder

Work Experience

Computer Scientist | ML engineer **Information Sciences Institute (ISI) USC, Los Angeles** **01/2018 – present**

- **Engineered a high-accuracy information omission detection system** for the high-impact ARPA-H CARE program, developed data annotation tools.
- **Won multiple DARPA SocialSim challenges** by architecting and building a distributed, large-scale agent-based simulation framework capable of modeling 10+ million individual agents.
- Architected and deployed a suite of **top-performing ML models** (XGBoost, ARIMA, LSTM) for a high-impact DARPA program, forecasting online information spread and simulating complex human social media behavior. Achieved **top performance for 3 consecutive years**.
- Set up model deployment infrastructure and simulation test beds.
- **Published 10+ papers in top conferences** (AAMAS, PAMS), https://scholar.google.com/citations?user=cCTwbZgAAAAJ&hl

Research Assistant **University of Southern California Los Angeles** **08/2012 – 12/2017**

- Developed effort and schedule estimation models for software projects as part of M.S. and Ph.D. studies.

Lead Software Engineer **MSS-Holding Inc., Novosibirsk** **06/2009 – 06/2012**

- **Improved energy demand forecasting for oil and gas infrastructure** by designing predictive algorithms based on power consumption patterns in transportation hubs and **by doubling the size** of supported measuring equipment inventory.

Technical Skills

- **Programming Languages:** Python (expert, 10+ years), Java (expert, 10+), C/C++, SQL.
- **ML & Data Science:** TensorFlow, PyTorch, Keras, Scikit-learn, XGBoost, ARIMA; Time Series Forecasting, Gurobi, Feature Engineering, Pipeline Design, Model Evaluation and Fine-tuning, Datasets Processing and Information Retrieval.
- **LLMs & Infrastructure:** Open-source LLMs (LLaMA, Mistral NeMo, Gwen), Distributed Simulation, Large-Scale Data Processing.

Leadership

- Full-time project chief engineer (team leader, requirement engineer), 2011-2012
- Lead and collaborated with both fully remote and on-site teams
- Mentored junior engineers and researchers via DataFirst program at USC, 2023-present
- Taught a graduate-level class *Principles of programming for data science* at USC (DSC510), 2024-present

Education

Los Angeles, CA **University of Southern California** **2012 – 2017**

- Ph.D. in Computer Science, Software Engineering. GPA: 4.0/4.0
  Research topic: Quantitative methods of SW project effort and schedule estimation (adviser Dr. B.Boehm)

Novosibirsk, Russia **Novosibirsk State University** **2005 – 2011**

- M.S. in Computer Science, 2011. GPA: 4.96/5.0
- B.S. in Computer Science, 2009. GPA: 4.96/5.0

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Selected Publications

1. **Modeling cognitive workload in open-source communities via simulation. Tregubov, A.**; Abramson, J.; Hauser, C.; Hussain, A.; and Blythe, J. In AAMAS International Workshop on Multi-Agent-Based Simulation, 2023.

2. **Dynamic graph reduction optimization technique for interdiction games.** Blythe, J.; and **Tregubov, A.** In AAMAS Workshop on Optimization and Learning in Multiagent Systems, 2022.

3. **Large-scale agent-based simulations of online social networks.** Murić, G.; **Tregubov, A.**; Blythe, J.; Abeliuk, A.; Choudhary, D.; Lerman, K.; and Ferrara, E. Autonomous Agents and Multi-Agent Systems, 36(2): 38. 2022. *Top conference: Google Scholar H5-index: 25, acceptance rate 24%*

4. **Optimization of Large-scale Agent-based Simulations through Automated Abstraction and Simplification**, **Tregubov A.**, Blythe J., In Proceedings of International Conference on Autonomous Agents and Multi-Agent Systems, May 2020. *Top conference: Google Scholar H5-index: 25, acceptance rate 24%*

5. **The DARPA SocialSim Challenge: Cross-platform Multi-Agent Simulations**, Muric G., **Tregubov A.**, Blythe J., Ferrara E., In Proceedings of International Conference on Autonomous Agents and Multi-Agent Systems, May 2020. *Top conference: Google Scholar H5-index: 25, acceptance rate 24%*

6. **The DARPA SocialSim Challenge: Massive Multi-Agent Simulations of the Github Ecosystem**, Blythe J., Ferrara E., Lerman K., **Tregubov A.**, Muric G., In Proceedings of International Conference on Autonomous Agents and Multi-Agent Systems, 13th-17th of May 2019. *Top conference: Google Scholar H5-index: 25, acceptance rate 25%*

7. **Massive Multi-Agent Data-Driven Simulations of the GitHub Ecosystem**, Blythe J., Ferrara E., Lerman K., **Tregubov A.**, Muric G., In Proceedings of International Conference on Practical Applications of Agents and Multi-Agent Systems, 26th-28th June, 2019.

8. **FARM: Architecture for Distributed Agent-based Social Simulations**, Blythe J., **Tregubov A.**, In Proceedings of International Workshop on Massively Multi-Agent Systems, July 14th, 2018.

9. **Impact of Task Switching and Work Interruptions on Software Development Processes**, **Tregubov A.**, Boehm B., Rodchenko N., Lane, J.A.; In Proceedings of International Conference on Software and Systems Process (ICSSP'17), Paris, France, 5-7 July, 2017. *Top conference: Google Scholar H5-index: 15, acceptance rate 21.9%*

10. **Evaluation of cross-project multitasking in software projects, Tregubov A.**, Lane, J.A., Boehm B.; Conference on Systems Engineering Research (CSER'17), Los Angeles, CA, 23-25 March, 2017.

11. **What does it mean to be Lean in SoSE environment? Tregubov A.**, Lane, J.A.; 26th Annual INCOSE International Symposium (IS'16) Edinburgh, Scotland, UK, July 18-21, 2016.

12. **Simulation of Kanban-based scheduling for systems of systems: initial results, Tregubov A.**, Lane, J.A.; Conference on Systems Engineering Research (CSER'15), Hoboken, NJ, 17-19 March, 2015.