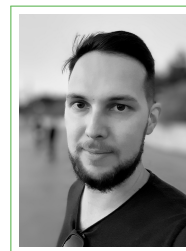


Inar Timiryasov

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My academic background is in theoretical physics, where I applied advanced numerical tools to solve complex problems. Initially, I employed machine learning and neural networks as tools to analyze physical phenomena. Now, my focus has shifted to a deep interest in comprehending the intricacies of AI. I am particularly drawn to the challenges of interpreting and responsibly improving Large Language Models. I aspire to leverage my unique blend of skills to contribute to Kyutai's mission of advancing multimodal AI models and democratizing AI technology.

AI/ML Experience

Training Large Language Models

Participated in the [BabyLM challenge](#), focusing on training LLMs on a small dataset. I proposed, implemented, and trained models featuring various architectural choices (local attention, RopE, SwiGLU nonlinearity), and used techniques like sharpness-aware minimization and knowledge distillation. The [model](#) I developed ranked in the top 5% and was the best decoder model in the "small-strict" task.

Deep-learning for Physics

- Leading the development of a Bert-style foundational model on particle physics data, focusing on fine-tuning for specific tasks.
- Mentoring students and heading the ML components in “*New Physics searches with automated anomaly detection*”. Two ongoing projects involving gravitational wave data and particle collider data from CERN.

Kaggle Expert

Participated in two Kaggle Competitions, where I initiated and led the teams

- [G2Net Detecting Continuous Gravitational Waves](#): Gold Medal, ranking in the top 1%.
- [IceCube – Neutrinos in Deep Ice](#): Silver Medal, ranking in the top 2%.

Academic Experience

- | | |
|--------------|--|
| 2021–present | Senior Postdoctoral Researcher, Niels Bohr Institute, University of Copenhagen
Developing AI models for applications in particle physics. Implemented an effective method to reinterpret LHC data analysis pipelines, extending them to new phenomena. |
| 2016–present | Visiting Researcher, CERN
An active member of the Search for Hidden Particles (SHiP) collaboration that pioneered application of <i>Generative Adversarial Networks</i> to particle physics modeling. |
| 2016–2021 | Postdoctoral Researcher, École Polytechnique Fédérale de Lausanne
Transformed complex theoretical problems into computable models and used advanced numerical tools to analyze them. Taught <i>group theory</i> and <i>classical field theory</i> courses to Masters's students. Supervised and co-supervised 8 Master's students, guiding thesis projects and research. |

Technical Skills

Languages: Python, Julia, Wolfram Mathematica, C/C++
AI/ML: PyTorch, Transformers, scikit-learn, PyTorch Lightning, Keras, JAX
Data Science: Pandas, NumPy, Matplotlib, PyArrow
Tools: Linux, bash/zsh, Git, HPC (Slurm, Lustre)
Numerical Methods: Markov Chain Monte Carlo, Stiff ODEs, Computer Algebra, Lattice Methods for PDEs
Mathematics: Statistics, Tensor Algebra, Real and Complex Analysis, Differential Geometry, Field Theory, Group Theory, Differential Equations, Information Theory

Education

2013 – 2016 **PhD in Theoretical Physics**, *Lomonosov Moscow State University*
Developed numerical methods for searches for new particles. My results became a part of the physics program of the planned SHiP experiment at CERN. Assisted in teaching courses on *Group Theory*, *Quantum Field Theory*, and *Advanced Numerical Methods*.
2007 – 2013 **Master's Degree in Physics**, *Lomonosov Moscow State University*
Graduated Summa Cum Laude. Average grade: 4.96 / 5.0.

Academic Service

Conference organization: 1-2 February 2024, organizing a session on *Geometric Deep Learning* at the “Danish Digitalization, Data Science and AI” conference.
23 February 2023, organized *SCIENCE Postdoc Day 2023* at the University of Copenhagen, with 150 attendees.
13-17 June 2022, organized an online workshop *Physics of the Early Universe*, with 1005 registered participants.
Peer Review: Referee for top high-energy physics journals: Phys.Rev.Lett.; Phys.Rev.D.; JCAP; JHEP; Int.J.Mod.Phys.A.; JEPT

Publications

- 41 papers (13 as a member of the SHiP collaboration) in the [high-energy physics database inSPIRE-hep](#).
- 1500+ citations, H-index is 26 according to [Google Scholar](#).
- Selected papers
 - Inar Timiryasov, Jean-Loup Tastet, “*Baby Llama: knowledge distillation from an ensemble of teachers trained on a small dataset*”, [arXiv:2308.02019](#), Accepted to **CoNLL–CMCL 2023, BabyLM Challenge** Shared Task.
 - Juraj Klarić, Mikhail Shaposhnikov, Inar Timiryasov, “*Uniting Low-Scale Leptogenesis Mechanisms*”, [arXiv:2008.13771](#), **Phys. Rev. Lett.** **127** no. **11**, (2021) 111802.
 - SHiP Collaboration, “Fast simulation of muons produced at the SHiP experiment using Generative Adversarial Networks,”, [arXiv:1909.04451](#), **JINST** **14** (2019)**P11028**.