Alexander V. Belikov

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EDUCATION

Ph.D. in Physics, University of Chicago, IL, 2011
M.S. in Applied Mathematics and Physics (summa cum laude),
Moscow Institute of Physics and Technology, Russia, 2005
B.S. in Applied Mathematics and Physics (summa cum laude),
Moscow Institute of Physics and Technology, Russia, 2003

EXPERIENCE

Head of Data Science Nov. 2019 - present
Hello Watt, Paris, France

- Founded the data science team at Hello Watt, set up the tech stack, infrastructure and communication practices. Currently managing a team of 4 data scientists.
- Developed novel energy disaggregation models using supervised and upsupervised approaches (graphical models), Google Ads optimization model based on portfolio optimization theory, a pipeline for text-extraction from forms. Some of these models were staged in production and became the core of Hello Watt customer experience. Energy disaggregation paper published ACM.

Postdoctoral fellow Jan. 2016 - Oct. 2019
University of Chicago, Knowledge Lab

- Developed a model of agent evolution on a graph using Seq2Seq methods (LSTM, pytorch), that predicts the state of the graph, the evolution of individual agents and can be used to identify clusters of agents and events.
- Developed a model of the validity of claims in biological literature (with its AUCs up to 0.8), and subsequently a model for prediction of the gene-gene interaction sign up to AUC of 0.76. Most important features are the absolute and the relative community sizes within the networks of claims per interaction where the weights of the edges are defined through associations with affiliations, citations etc.

Quantitative researcher Aug. 2015 - Jan. 2016
Barclays Capital, Equity Derivatives Group, New York

- Introduced an effective method for estimating portfolio sensitivities between trading days that accounts for the change of the volatility surface (C++, deployed in production).
- Implemented new types of contracts such as options on volatility control indexes (Haskell, deployed in production).

Quantitative researcher Jun. 2014 - Aug. 2015
JP Morgan Chase, Model Review and Development, New York

- Developed proof of concept models for mortgage defaults using regularized logistic regression and decision trees (python, scikit-learn).
- Implemented the rating migration model (loan default estimation) used for the Comprehensive Capital Analysis and Review (CCAR) of the wholesale portfolio (python, deployed in production).

Postdoctoral researcher Oct. 2011 - Nov. 2013
Institut d'Astrophysique de Paris

- Predicted the cosmological annihilating signal for a contracted (due to supermassive black holes) dark matter density. Demonstrated that the spectral properties of the annihilation signal can be used to differentiate dark matter from astrophysical signals.

PhD candidate/Research Assistant Oct. 2005 - Sept. 2011
University of Chicago

- Discovered the connection between the winding angle of random curves appearing in the scaling limit of critical two-dimensional systems and the properties of local operators of conformal field theory.
- Predicted the diffuse gamma-ray background from annihilating leptohilic dark matter and estimated the impact of annihilating dark matter during the reonization epoch (developed a C++ library for estimating cosmological dark matter signals).
- Found semi-analytical solutions for a non-linear PDE in the DGP modified gravity theory.

RELEVANT SKILLS Linear models, graphical models, decision trees, ensemble methods, random forest, SVM, regularization, optimal transport.
Neural nets: RNN, LSTM, RL, Q-learning, graph neural nets
Python (pandas, scikit-learn, pytorch, nltk, spacy, pymc3, networkx, igraph, pyro), C++, R, Spark, Haskell, Java. SQL, mongoDB, ArangoDB, Grakn. Git, bash.

PUBLIC SPEAKING More than 30 presentations at conferences and seminars.
Organizer of the "Initiative in Cosmology and AstroParticle Physics" journal club at the Institute of Astrophysics in Paris.
Organizer of the journal club at the Knowledge Lab at the University of Chicago.

PROFESSIONAL INTERESTS Natural language processing: NER, relation extraction, embedding, summarization. Graph neural networks, message passing, variational methods.

LANGUAGES English, Russian (native), French (upper intermediate), Italian (beginner)

PUBLICATIONS A co-author of more than 20 publications in refereed journals.
600+ citations as of 2020.