SIMEON SPASOV

(+44)7761282322 ⋄ simeon.spsv@gmail.com

ABOUT ME

I am passionate about the intersection of ML and health and biology. I have experience in causal methods, graph representation learning, compute and data efficiency. In my previous employment I led a research project in Amazon Alexa, and now I am working on scalable causal models for biology.

EDUCATION

Department of Computer Science, University of Cambridge, UK
PhD in Artificial Intelligence (Oct 2016 - Dec 2020)
MRes in Sensor Technologies (Oct 2015 - Sep 2016) *Grade:* 73%

University of Manchester, Manchester, UK *Sep 2012 - June 2015*
BEng Electrical and Electronic Engineering First Class: 81% (**top 5% ranking**)

ML EXPERIENCE AND INTERNSHIPS

Postdoc - DZNE, Bonn, Germany *April 2023 - present*
Leading research on scalable causal methods and co-supervising 5 PhD students.

ML Consultant - sea.dev (London, remote) *Feb - March 2024*
Integrated temporal graph embeddings to enhance context retrieval from knowledge graphs in LLM applications.

Applied Scientist II/Tech Lead - Amazon Alexa *April 2021 - Nov 2022*
Tech lead of a team of 3 working on automatic voice evaluation. I led the creation of a PoC deep learning system which reduced the need for manual voice evaluation by 2×-5× for several languages.

ML Research Intern - Amazon Alexa *June 2020 - Oct 2020*
Offered a conversion to a full time position. Developed and validated a method to integrate long-range interactions in node representation learning for graph neural networks.

Research Intern - Montreal Institute for Learning Algorithms *July 2019 - Sep 2019*
Developed a probabilistic generative model for joint community detection and dynamic representation learning on graphs. Resulted in paper GRADE: Graph Dynamic Embedding and several spinout papers in *ICML* and *MIDL*.

Software Engineering Intern - HSBC GBM, Technology (London) *June 2014 - Sep 2014*
Created an app to automate performance tracking of software teams in Forex IT. Pushed to production.

Software Engineering Intern - iFD Engineering Joint Venture (Sofia) *June 2015 - Aug 2015*
Researched and implemented a vehicle routing system for Deutsche Bundesbank.

AWARDS

HPC-Europa3 Transnational Access programme: £2,500 project funding for modelling the dynamic interactions of brain networks from fMRI data (Oct - Dec 2020).

Research Studentship by the Cambridge Philosophical Society: March - June 2020

Full EPSRC studentship: 4-year funding for fees and stipend

BP Achievement Awards 2014, 2015: £2,000 given to 3 people in a class of 160 at the School of Electrical Engineering at the University of Manchester for academic achievement.

SUPERVISION WORK

Master's projects: *"Graph coarsening from substructures using spatial information"* (2020-2021, co-supervised), *"Training high-performing compact neural networks"* (2019-2020), *"Mean-field infinite-Restricted Boltzmann Machines"* (2018-2019)

Undergraduate projects: *"Exploring Variational Autoencoders and Their Latent Space"* (2017-2018), *"Design Choices in Neural Style Transfer"* (2018-2019), *"Intelligent Navigation of Text Adventure Games"* (2018-2019, co-supervised)

Undergraduate Courses: *Machine Learning and Bayesian Inference* (Lent terms in academic years 2016, 2017, 2018), *Scientific Computing* (Michaelmas terms in academic years 2017, 2018).

TECHNICAL SKILLS

Deep Learning APIs	Keras, TensorFlow, PyTorch, MXNet
Programming Languages	Python, Java, C, LaTeX

PREVIOUS ACHIEVEMENTS

National Competition in Physics: 4^{th} place *Bulgaria, 2011*
National English Language Olympiad: 2^{nd}, 6^{th}, 7^{th} places *Bulgaria, years 2009-2011*

LANGUAGES

English (proficient), Bulgarian (native)

SELECTED RESEARCH PUBLICATIONS

DBGDGM: Dynamic Brain Graph Deep Generative Model
Published in *ICML Workshop on Interpretable Machine Learning in Healthcare (IMLH)*, 2023 and *Medical Imaging with Deep Learning (MIDL), 2023* as an Oral talk.

TG-DGM: Clustering Brain Activity using a Temporal Graph Deep Generative Model
Published in *Medical Imaging with Deep Learning (MIDL), 2021*

RicciNets: Curvature-guided Pruning of High-performance Neural Networks Using Ricci Flow
Presented at *ICML 2020 AutoML Workshop*.

Dynamic Neural Network Channel Execution for Efficient Training
Published in *BMVC, 2019*. Presented at *NeurIPS 2019 EMC^2 Workshop*.
Proposed a bandit-based algorithm for NN sparsification during training by dynamically identifying and running highly salient channels. Method reduces parameter count by up to $\times 9$ and FLOPs $\times 4$.

Co-Attentive Cross-Modal Deep Learning for Medical Evidence Synthesis and Decision Making
Presented at *NeurIPS 2019 ML4H Workshop*.
An attention-based model to combine 3D MRI and methylation data for predictive healthcare applications. Outperforms benchmarks by 2.5% with 50% fewer parameters.

A Parameter-efficient Deep Learning Approach to Predict Conversion from Mild Cognitive Impairment to Alzheimers Disease within Three Years
Published in *NeuroImage*. Published (oral talk) at *EMBC 2018* and *OHBM 2019*.
A parameter-efficient cross-modal NN architecture for 3D structural MRI and clinical data. Outperforms all existing benchmarks on early Alzheimer's disease diagnosis.