DR GRISHA SZEP

PERSONAL INFORMATION

website gszep.com

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SUMMARY

Researcher with 10+ years of experience within biomedical and computational academic research groups and software industry. Expertise in geometric deep learning, differential equations, signal processing and performance optimisation for big data problems. Creative and passionate about building visually stunning tools for solving complex problems.

WORK EXPERIENCE

12/2024 - Present **Researcher & Director, International**

GSzep Research

Offering services as a freelance software engineer and researcher. I also offer AI project scoping and consultancy for start-ups well as commissioned computational art. My network is currently spread across London, Cambridge and Tokyo.

12/2024 - Present **Research Specialist, Tokyo**

Chiba Institute of Technology

Probabilistic computing researcher at the Henkaku Center for Radical Transformation. Setting up pilot projects for AI integrated healthcare systems for industry partners and hospitals. Data analysis and modelling of patient biometrics.

06/2022 - 05/2024 **Senior Machine Learning Engineer, Cambridge**

Synteny Biotechnology

Third employee at a biotechnology start-up that harnesses the adaptive immune system. Built MLOps with emphasis on prototyping speed. Applied large language and diffusion models to design 3D protein structures. Quantisation for deployment on mobile devices. Rendered proteins in Blender. Workshop at NeurIPS and 2nd place in IMMREP23 competition.

09/2017 - 09/2021 **Doctoral Researcher, Cambridge**

Microsoft Research Cambridge

Member of biological programming research team. Thesis on geometric deep learning for point clouds and implicitly defined meshes with focus on high-dimensional single cell datasets. Developed applications in WebGL and D3. Published works in NeurIPS Proceedings, Natural Computing, Nature Comms and presented at JuliaCon.

11/2019 - 12/2020 **Senior Data Scientist, London**

Flux

Delivering business intelligence and consumer analytics on receipt-level transaction data to merchant partners. Applied time series forecasting models in Scala, Python and PostgreSQL; built tools for A/B testing and actionable reports.

11/2016 - 11/2017 **Research Engineer, Delft**

Birds.ai

Development and maintenance of drone image analysis pipeline for agricultural surveillance and industrial inspection. Applied computer vision and computational photography techniques for object detection and segmentation on high-resolution satellite imagery. Deployed web applications using AWS.

09/2015 - 11/2016 **Graduate Researcher, Vienna**

Institute of Science and Technology Austria

Investigation of non-equilibrium responses of the cytoskeleton and protein filament vortexes. Used Kinetic Monte-Carlo and ODEs to model polymerisation and applied computer vision and signal processing methods to extract sparse representations from fluorescence microscopy videos. Published works in Cell Press and Nature Physics.

07/2014 - 09/2015 **Research Intern, NASA Ames Silicon Valley**

NASA Ames Research Centre

Applying unsupervised signal processing methods to classify sleep stages on high resolution single channel electroencephalogram (EEG) recordings. Extraction of biomarkers related to neurophysiological disorders and development of human-machine interfaces.

06/2013 - 08/2013 **Research Studentship, King's College London**

King's College London

Simulation of photon transport in random lasing process. Collection and analysis of data from optics experiments. Presentation of findings and evaluation as member of research team.

Sep-Dec 2012 **Market Stall Owner, Camden Market**

Camden Market

Managing market stall in tourist area of north London selling 3D IQ puzzles made of wood and bamboo. Creative presentation and sales to young and old audiences. Financial planning.

EDUCATION

09/2017 - 03/2022 **King's College London**

Computational Biology & Machine Learning

PhD · Randall Division of Cell & Molecular Biophysics
Submitted successful grant application to Microsoft Research Cambridge for industrial collaboration scholarship. Published novel geometric deep learning algorithm for the inference of state-space structures in dynamical systems, with applications in developmental and synthetic biology. Published works in NeurIPS Proceedings, Natural Computing, Nature Comms and presented at JuliaCon.

09/2011 - 05/2015 **King's College London**

Physics Masters

First Class · *Physics MSci* · School of Natural & Mathematical Science
Focused on non-equilibrium statistical mechanics, information theory and complex networks. Masters thesis on quantum effects in the angular dependence of molecular current-voltage characteristics using the Keldysh formalism.

08/2013 - 06/2014 **University of California, Berkeley**

Exchange Year

GPA: 3.7 · *Physics Major* · College of Letters & Science
Attended lectures at the Redwood Center for Theoretical Neuroscience. Expanded knowledge on analytical mechanics, special relativity, solid state physics and machine learning. Duration of stay motivated academic path towards machine learning.

COMPUTER SKILLS

Intermediate AWS, GCP, Next.js, C#, PostgreSQL, HLSL, NodeJs

Advanced PyTorch, JAX, Julia, WebGPU, Latex, Git, Linux, DevOps, MLOps, D3.js

Datasets Single-cell, Timeseries, 3D Protein Structure, Fluorescence Microscopy, Satellite Imagery

WORKS

Published

Caballero-Mancebo, S. et al. 2024. Nature Physics.
Friction forces determine shape changes of ascidian oocytes upon fertilization

Coppard, V. & Szep, G. et al. 2024. Front. Immunol.
FlowAtlas.jl : an interactive tool bridging FlowJo and computational tools in Julia.

Cornwall, L. & Szep, G. et al. 2023. NeurIPS Generative AI & Biology Workshop.
Fine-tuned protein language models capture T cell receptor stochasticity.

Szep, G. 2022. Thesis. King's College London
Inferring Bifurcations between Phenotypes.

Szep, G. et al. 2021. Advances in Neural Information Processing Systems
Parameter Inference with Bifurcation Diagrams.

Peruzzo, M., Hassani, F. & Szep, G. et al. 2021. Physical Review X: Quantum Geometric superinductance qubits.

Grant, P. & Szep, G. et al. 2020. Nature Communications 11 (1), 1-8 Interpretation of morphogen gradients by a synthetic bistable circuit.

Dalchau, N. & Szep, G. et al. 2018. Natural computing 17 (4), 761-779 Computing with biological switches and clocks.

Müller, J. & Szep, G. et al. 2016. Cell 171 (1), 188-200. e16 Load-adaptation of lamellipodial actin networks.

Conferences

FlowAtlas.jl : an interactive tool bridging FlowJo and computational tools in Julia. JuliaCon 2021. youtu.be/FeYrFKgP91s

Inference of Bifurcations with Differentiable Continuation. JuliaCon 2020. youtu.be/vp-206RgeVE

2019. Quantitative Systems Biology Workshop. London. Organisation Committee

2019. Bioinspired analysis of dynamical systems, Hungary. Talk

2018. EMBL Symposium: Biological Oscillators, Heidelberg. Poster

AWARDS & QUALIFICATIONS

Awards

2018 · Microsoft Research PhD Scholarship

2014 · Study Abroad Student Award – King's College London

2013 · The Gordon Rogers Scholarship - Top 5 Performing Students

2013 · Andrewes Prize - Best Examination Performance

2012 · Dillon Prize - Best Examination Performance

Qualifications

2016 · Electron Microscope Training - Institute of Science & Technology

2013 · Basic Laser Safety Certificate - King's College London

2012 · Kids Ski Instructor Certificate - Swiss Snowsports

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