

DR GRISHA SZEPE

PERSONAL INFORMATION

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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

<i>Synteny Biotechnology</i>	06/2022 - 05/2024 Senior Machine Learning Engineer, CAMBRIDGE 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. Chief Research Officer: Neil DALCHAU · neil@synteny.ai
<i>Microsoft Research Cambridge</i>	09/2017 - 09/2021 Doctoral Researcher, 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. Supervisor: Neil DALCHAU · ndalchau@microsoft.com
<i>Flux</i>	11/2019 - 12/2020 Senior Data Scientist, LONDON 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. Chief Executive Officer: Matty CUSDON-ROSS · matty@tryflux.com
<i>Birds.ai</i>	11/2016 - 11/2017 Research Engineer, DELFT 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. Chief Executive Officer: Camiel VERSCHOOR · camiel@birds.ai
<i>Institute of Science and Technology Austria</i>	09/2015 - 11/2016 Graduate Researcher, VIENNA Investigation of non-equilibrium responses of the cytoskeleton and protein filament vortices. 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. Dr. Med. Michael SIXT · msixt@ist.ac.at Prof. Karsten KRUSE · k.kruse@physik.uni-saarland.de
<i>NASA Ames Research Centre</i>	07/2014 - 09/2015 Research Intern, NASA AMES SILICON VALLEY 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. Chief Executive Officer: Dr Philip Low · philip@neurovigil.com

<i>King's College London</i>	06/2013 - 08/2013	Research Studentship, 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. Research Supervisor: Dr Riccardo SAPIENZA · riccardo.sapienza@kcl.ac.uk
<i>Camden Market</i>	Sep-Dec 2012	Market Stall Owner, 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. Supplier Contact: Ben MELDRUM · ben@professorpuzzle.com

EDUCATION

<i>Computational Biology & Machine Learning</i>	09/2017 - 03/2022	King's College London
		PhD · Randall Division of Cell & Molecular Biophysics Published novel geometric deep learning algorithm for the inference of state-space structures in dynamical systems, with applications in developmental and synthetic biology. Writing software in Python and Julia in collaboration with Microsoft Research Cambridge. Published works in NeurIPS Proceedings, Natural Computing, Nature Comms and JuliaCon. Attila CSIKÁSZ-NAGY · attila.csikasz-nagy@kcl.ac.uk Neil DALCHAU · ndalchau@microsoft.com
<i>Physics Masters</i>	09/2011 - 05/2015	King's College London
		First Class · <i>Physics MSci</i> · School of Natural & Mathematical Science Focus on non-equilibrium statistical mechanics, information theory and complex networks. Masters project involved using the Keldysh formalism in quantum mechanics to investigate angular dependence of molecular current-voltage characteristics. Project Supervisor: Prof. Lev KANTOROVICH · lev.kantorovich@kcl.ac.uk
<i>Exchange Year</i>	08/2013 - 06/2014	University of California, Berkeley
		GPA: 3.7 · <i>Physics Major</i> · 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. Study Abroad Tutor: Nicola BONINI · nicola.bonini@kcl.ac.uk

COMPUTER SKILLS

<i>Intermediate</i>	AWS, GCP, Next.js, C++, C#, PostgreSQL, HLSL, NodeJs
<i>Advanced</i>	PyTorch, JAX, Julia, WebGL, Flux.jl, Latex, Git, Linux, DevOps, MLOps, D3.js
<i>Datasets</i>	Single-cell, 3D Protein Structure, Fluorescence Microscopy, Satellite Imagery

WORKS

<i>Published</i>	Caballero-Mancebo, S. et al. 2024. Nature Physics. Friction forces determine cytoplasmic reorganization and shape changes of ascidian oocytes upon fertilization
	Cornwall, L. & Szep, G. et al. 2023. NeurIPS Generative AI & Biology Workshop. Fine-tuned protein language models capture T cell receptor stochasticity.
	Coppard, V. & Szep, G. et al. 2023. bioRxiv, 2023.12. 21.572741 FlowAtlas.jl : an interactive tool bridging FlowJo and computational tools in Julia.
	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

July 9, 2024