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EDUCATION

- **PhD in Computational Chemistry**
Vendruscolo Lab at the University of Cambridge
October 2023 - Present
Focus on advancing computational approaches to drug discovery (primarily of small molecules) with an emphasis on neurodegenerative disorders, such as Alzheimer's and Parkinson's disease. This includes building on an active learning pipeline that leverages deep neural networks to efficiently screen vast chemical libraries for potential therapeutic compounds with a desired property (binding affinity to a target). See *Publications* section.
Technical Skills and Tools: *Python, TensorFlow, Bash, HPC (Slurm workload manager), AutoDock Vina, Chimera (X), OpenEye Suite, RDKit, Open Babel*
- **MPhil in Computational Biology (Distinction)**
The University of Cambridge, Cambridge
October 2021 - November 2022
Relevant Coursework: *Genomics I/II, Biological Imaging and Analysis, Deep Learning, Genome Sequence Analysis, Population Genetics Analysis*
Dissertation Project: *Deep Docking: Pipeline optimization and case study on β -amyloid peptide - cost-effective screening of drug-like small molecules that bind to β -amyloid peptide involved in Alzheimer's disease using deep learning*
- **BSc Honours in Mathematics and Computer Science (First Class)**
The University of Edinburgh, Edinburgh
September 2016 - June 2020
Relevant Coursework: *Functional Programming, Computer Security, Data and Analysis, Processing Formal and Natural Languages, Algorithms and Data Structures, Machine Learning Practical, Quantum Information, Bayesian Theory, Honours Algebra, Probability*
Dissertation Project: *Representation of Body Shapes - a new approach on body shape representation that extends a current Dynamic Skinned Multi-Person Linear Model (DMPL) with LSTM layers that learn positions of points using sequentiality of mesh data*

WORK EXPERIENCE

- **UNIVERSITY OF CAMBRIDGE, Research Assistant - Cambridge, United Kingdom**
May 2023 - October 2023
Worked in the Vendruscolo Lab as a part of the global Aligning Science Across Parkinson's initiative (Team Wood). The main focus was unsupervised learning analysis of DAB staining microscopy images of large alpha-synuclein aggregates from Parkinson's patients and developing a kinetic model of aggregate growth.
Technical Skills and Tools: *Python, TensorFlow, FIJI (ImageJ)*
- **ILLUMINA, Bioinformatics Intern - Cambridge, United Kingdom**
August 2022 - November 2022
Worked as a part of Genome Quality Group, focused on data analysis of large amounts of genomic data to maximize the quality and breadth of information that can be learnt from a genome and in turn improve the output of the DRAGEN platform (a platform that enables analysis of next-generation sequencing data)
Technical Skills and Tools: *Nextflow, Make, Bash, BCFTools, R*
- **GOOGLE, Software Engineer at Google Health - London, United Kingdom**
September 2020 - October 2021
Worked on Care Studio, clinical software to unify healthcare data, with focus on desktop features and front-end latency optimizations
Technical Skills and Tools: *Soy (Closure templates), TypeScript, Java, C++*
 - Delivering new features to the platform that optimise the data shown to clinicians (required full stack work)
 - Collaborating with clinicians, product managers as well as UX designers to make sure the features work exactly as intended and are improving the customer experience
 - Designing (under supervision), implementing and delivering the first version of a critical latency feature required to meet the release latency requirements
- **CERN, Remote Summer Collaboration - Geneva, Switzerland (Remote)**
June 2020 - August 2020
Replacement of a Summer Student Programme (cancelled due to COVID-19), worked on a profile customisation for ALICE (A Large Ion Collider Experiment) O2 InfoLogger (<https://cds.cern.ch/record/2728718>)
Technical Skills and Tools: *HyperScript, JavaScript, NodeJS, SQLite*
 - Planning and delivering a new profile customisation for ALICE O2 InfoLogger taking software robustness and durability (10+ years) into account (once the experiment resumes, the program has to be functioning for 10+ years)

- **GOOGLE, SWE Intern at Google Travel NBU (Next Billion Users) - Zurich, Switzerland**
July 2019 - September 2019
Worked on a new flexible dates feature for India Rail Travel App
Technical Skills and Tools: *Soy (Closure templates), TypeScript, Java*
- **GOOGLE, STEP Intern at Google Account - Munich, Germany**
July 2018 - September 2018
Worked on the redesign of the Takeout page (takeout.google.com). The new design is currently in production.
Technical Skills and Tools: *Soy (Closure templates), TypeScript, Java*

PUBLICATIONS

- (Currently in review in *Nature Machine Intelligence*) **Brezinova, M.**, Brotzakakis, Z.F., Horne, R.I., Chowdhury, V.R., Gregory, R.C., Gentile, F. and Vendruscolo, M., (2024). 'Identification of high-affinity secondary nucleation inhibitors of A β 42 aggregation from an ultra-large chemical library using Deep Docking'. (<https://www.researchsquare.com/article/rs-4512167/v1>). GitHub link: https://github.com/MichaelaBrezinova/open_source_deep_docking_protocol
- Amico, T., Dada, S., Lazzari, A., **Brezinova, M.**, Trovato, A., Vendruscolo, M., Fuxreiter, M., & Maritan, A. (2024) 'A scale-invariant log-normal droplet size distribution below the critical concentration for protein phase separation', *eLife*, 13, RP94214. doi: 10.7554/eLife.94214.2

SKILLS

- **Programming Languages:** *Python (experienced), Bash (experienced), TypeScript (experienced), Soy (Closure Templates) (experienced), HTML (experienced), CSS (experienced), Java (skilful), R (skilful), C++ (skilful), Haskell (familiar)*
- **Cheminformatics:** *RDKit (skilful), Open Babel (Obabel) (skilful), Chimera (skilful), AutoDock Vina (skilful), OpenEye Suite (skilful)*
- **Machine Learning and Data Science:** *TensorFlow (skilful), PyTorch (familiar)*
- **Computational Tools and Frameworks:** *Slurm (experienced), Nextflow (skilful), Make (skilful)*
- **Spoken languages:** *Slovak (native proficiency), Czech (native proficiency), English (full professional proficiency), German (limited working proficiency), Mandarin Chinese (elementary proficiency)*

WORKSHOPS, CONFERENCES, SUMMER SCHOOLS

- **Eastern European Machine Learning Summer School (EEML) - Novi Sad, Serbia**
July 2024
Attended EEML - a week-long summer school on core machine learning and artificial intelligence topics
- **Talk at Bio2Brain Network's (<https://bio2brain.eu/>) AI Online Workshop**
June 2024
Gave a talk on my work on the *Identification of high-affinity secondary nucleation inhibitors of A β 42 aggregation from an ultra-large chemical library using Deep Docking*

VOLUNTEERING AND EXTRACURRICULAR

- **Lab Demonstrator at the University of Cambridge**
January 2024 - Present
Lab demonstrator for computational practicals of Chemistry Part IB course. The main focus is the use of Python, Google CoLab, Avogadro and Orca
- **Code First: Girls, Introduction to Web Development course instructor**
January 2020 - March 2020
Teaching female students about the front end-development: HTML, CSS, Bootstrap, Git and GitHub
- **Director of Media for the Women in Tech Conference in Edinburgh**
May 2017-June 2018
Organising Women in Tech Conference in Edinburgh, focusing on media and graphic design
- **MathPALS Student Leader at the University of Edinburgh**
September 2017-December 2017
Facilitator at Mathematics Peer Assisted Learning program, holding study groups for first-year Mathematics students

COMPETITION ACHIEVEMENTS

- 3rd place at International Team High School Internet Mathematical Olympiad
- 3rd place at National Scientific Research Paper's Competition for high school students in Mathematics and Physics category with paper on topic *Mathematics and Music*