MICHAELA BREZINOVA

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EDUCATION

- **UNIVERSITY OF CAMBRIDGE,** PhD in Computational Chemistry (Vendruscolo Lab) **Oct 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. See *Publications* section.
  - **Technical Skills and Tools:** *Python, TensorFlow, PyTorch, Bash, HPC (Slurm workload manager), AutoDock Vina, Chimera (X), OpenEye Suite, RDKit, Open Babel*

- **UNIVERSITY OF CAMBRIDGE,** MPhil in Computational Biology (**Distinction**) **Oct 2021 - Nov 2022**
  - **Relevant Coursework:** *Genomics I/II, Biological Imaging and Analysis, Deep Learning, Genome Sequence Analysis, Population Genetics Analysis*

- **UNIVERSITY OF EDINBURGH,** BSc Honours in Mathematics and Computer Science (**First Class**) **Sep 2016 - Jun 2020**
  - **Relevant Coursework:** *Honours Algebra, Probability, Bayesian Theory, Algorithms and Data Structures, Data and Analysis, Machine Learning Practical, Processing Formal and Natural Languages, Quantum Information*

WORK EXPERIENCE

- **UNIVERSITY OF CAMBRIDGE,** Research Assistant **(Cambridge, UK) May 2023 - Oct 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, UK) Aug 2022 - Nov 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, UK) Sep 2020 - Oct 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 **(Remote) Jun 2020 - Aug 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) Jul 2019 - Sep 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) Jul 2018 - Sep 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*

PATENTS

- Andrews, D.J., **Brezinova, M.**, 2024. Detecting variants in nucleotide sequences based on haplotype diversity (https://patents.google.com/patent/WO2025090883A1/)

PUBLICATIONS

- **Brezinova, M.**, Fuxreiter, M. and Vendruscolo, M., 2025. DropFit: Determination of the Critical Concentration for Protein Liquid-Liquid Phase Separation. *Journal of Molecular Biology*, p.169294. Server website: https://www-cohsoftware.ch.cam.ac.uk/index.php/dropfit

- (To be published in *EMBO Molecular Systems Biology*) **Brezinova, M.**, Brotzakis, 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 Aβ42 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

TALKS

- **Talk at In Silico #001 event series (https://luma.com/dw9ijcrm)** **(London, UK) Jul 2025**
- **Short Talk at AI in Drug Discovery and IRB Barcelona Biomedicine Conference** **(Barcelona, Spain) Apr 2025**
- **Talk at Bio2Brain Network's (https://bio2brain.eu/) AI Workshop** **(Online) Jun 2024**

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)*

VOLUNTEERING AND EXTRACURRICULAR - ACADEMIC

- **Lab Demonstrator at the University of Cambridge** **(Cambridge, UK) Jan 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** **(Edinburgh, UK) Jan 2020 - Mar 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** **(Edinburgh, UK) May 2017 - Jun 2018**
  - Organising Women in Tech Conference in Edinburgh, focusing on media and graphic design

- **MathPALS Student Leader at the University of Edinburgh** **(Edinburgh, UK) Sep 2017 - Dec 2017**
  - Facilitator at Mathematics Peer Assisted Learning program, holding study groups for first-year Mathematics students

VOLUNTEERING AND EXTRACURRICULAR - OTHER

- **Secretary at the Cambridge University Massage Society** **Jun 2024 - Present**

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*