Samia Mohinta, Data Scientist

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RESEARCH EXPERIENCE

Data Scientist, Dept. of Physiology, Development & Neuroscience, University of Cambridge, UK (Jan 2022 – Present)

- Developing and implementing Machine/Deep learning models (3D CNN/Transformer-based), in PyTorch and TensorFlow for automated reconstruction of Drosophila larval brain connectomes from terabytes of Electron Microscopy (EM) imaging data in Dr. Albert Cardona's Lab at the MRC LMB.
- Investigating mechanisms to build a template that allows ML models to simultaneously train on isotropic Focused Ion Beam Scanning Electron Microscopy (FIBSEM) and anisotropic Serial Section Transmission Electron Microscopy (ssTEM) imaging volumes of varied resolutions.
- Developed an 8× more efficient model for generalized synapse detection from EM data across multiple invertebrate species (arXiv).
- Established standardized criteria for synaptic annotations in EM datasets by designing and deploying a crowd-sourced proofreading protocol (bioRxiv).

Visiting Research Assistant, Neural & Machine Learning Group, University of Bristol, UK (Sep 2019 – Dec 2024)

- Building and modifying Deep Reinforcement and Continual Learning models for spatial navigation tasks in Dr. Rui Ponte Costa's Neural & ML group.
- Implementing in-silico versions of neuroscientific maze navigation experiments to analyze the importance of spatiotemporal features in lifelong learning.
- Customizing state-of-the-art dimensionality reduction techniques to analyze influences of environmental factors in artificial and biological neural encodings.
- Regular attendance and presentation of results at national and international meetings.

Research Assistant, Queen Square Institute of Neurology, University College London, UK (Jan 2020 – Dec 2021)

- Created and maintained a latest XNAT imaging informatics platform instance to store multi-modal imaging, clinical, pathological, and genetic information of 100K patients with brain cancer in Prof. Parashkev Nachev's High Dimensional Neurology Lab.
- Developed a Python-based migration workflow to extract, transform and load data from an old XNAT instance to a latest dockerised XNAT container.
- Invented a variety of data curation techniques for hospital-grade images to support parallel ML projects in the lab.
- Built a 99% accurate hierarchical deep learning model to detect in-house 3D Magnetic Resonance Imaging (MRI) sequences automatically.
- Assisted 2 PhD students and 2 Postdocs in building a range of ML tools for their independent projects.
- Collaborated with Artificial Intelligence Center, Kings College London to develop python-based image processing tools for biomedical image processing and visualization.
- Reviewed abstracts and papers for conferences and journals.

Research Associate, Bristol Robotics Laboratory, University of the West of England, UK (Sep 2019 – Dec 2019)

- Worked to construct a neuromorphic spiking neural network version of the head direction cell system of the rodent brain-inspired simultaneous localization and mapping (RatSLAM) system in Dr. Martin Pearson's lab.
- Gained experience in Robot Operating System, the Nengo simulation environment and SPINNAKER (neuromorphic hardware) toolchain.

INDUSTRIAL EXPERIENCE

Vice President – Innovation, LinkMood Limited (Startup), UK

(May 2020 – Dec 2020; part-time)

- Served as the technical and innovation lead.
- **Led the technical development of an NLP-driven recommendation system** for a social-interaction platform, translating product concepts into an end-to-end data and machine-learning solution.

Senior Systems Engineer, Infosys Limited, Bhubaneswar, Orissa, India Domain: Business Intelligence and Data Analytics; Client – Apple Inc., USA (Aug 2015 – Aug 2018)

- **Lead backend developer for 1.5 years** after first production deployment cycle.
- Analyzed and executed business requirements in database design and data modelling.
- Designed data induction, replication pipelines and job management via Autosys Workload Automation for structured and streaming data in Teradata and Vertica.
- Innovated solutions to provide technical support for data management and visualization.
- Developed SQL queries on Vertica for End User Dashboards and created Teradata stored procedures for data manipulation and processing.
- 100% success rate in deploying project and enhancements to production within deadlines and defect resolution during development, user acceptance testing and production phases.

SKILLS

Programming: Python (Proficient and preferred), Java, C, C++, SQL

Databases: PostgreSQL, MongoDB, Vertica, Teradata, MySQL, Google Firebase Realtime Database

Platforms/APIs/libraries (ML/Data Science): PyTorch, TensorFlow, Keras, Scikit-learn, MATLAB, Pandas, NumPy, SciPy, Matplotlib, Seaborn, Plotly, Jupyter

Tools: Git (version control), docker (virtualisation), PyCharm, Eclipse, Microsoft Visual Studio, LaTex, IBM Cognos, Informatica Powercenter, Heroku (cloud)

Distributed Computing: Nvidia-DGX systems

Open-source contributions: PlantSeg, nnUNet, HiddenLayer, Micron, Gunpowder (Github)

EDUCATION

University of Cambridge, UK (April 2022 – Present)

PhD Candidate, Final Year – Computational Neuroscience and Machine Learning

Project: Automate connectome mapping from volumetric Electron Microscopy of Drosophila larval brains

Supervisor: Dr. Albert Cardona

University of Bristol, UK (2018-2019)

MSc: Advanced Computing - Machine learning, Data mining and High-Performance Computing, 76% (Distinction; Top 10%)

Relevant Coursework: Machine Learning, Applied Data Science, High-Performance Computing, Uncertainty Modelling for Intelligent Systems, Image Processing and Computer Vision, Bio-inspired AI, Computational Neuroscience, Robotics Systems, Cloud Computing, Web Technologies, Research Skills

Dissertation: Extracting low dimensional representations from hippocampal data (81%)

Supervisor: Dr. Rui Ponte Costa

West Bengal University of Technology, India (2011-2015)

Bachelor of Technology (BTech): Computer Science and Engineering, 8.89/10 (First, Rank: 1/60)

Relevant Modules: Engineering and Discrete Mathematics, Data structure and Algorithm, Computer Programming, Object Oriented Programming, Computer Organisation, Formal Language and Automata Theory, Compiler Design, Computer Architecture, Database Management Systems, Operating System, Software Engineering, Image Processing, Computer Graphics, Distributed Operating System, Computer Networks

Dissertation: Deducing the Band Gap of Porous Silicon using MATLAB through interpolation and extrapolation of experimental data and Image Analysis (> 9/10, Outstanding)

Supervisor: Dr. Madhumita Das Sarkar

Holy Home School, ISC Std. 12, India (2009-2011)

A Levels (UK equivalent) in English (A*), Bengali (A), Mathematics (A*), Chemistry (A*), Physics (A*), Biology (A), Environmental Education (A)

Gospel Home School, ICSE Std. 10, India (1999-2009)

GCSE Levels (UK equivalent) in English (A*), Bengali (B), Mathematics (A*), Science – Physics, Chemistry and Biology (A*), Computer Applications (A*), History, Civics and Geography (A*)

FELLOWSHIPS/INTERNSHIPS

RisingWISE Fellow, Oxford and Cambridge University, UK (Feb 2023 – Mar 2023)

- Engaged in a fully funded entrepreneurial programme fostering career development for postgraduate women researchers in STEM.
- Conceptualized and pitched a startup idea within a dynamic team of 7 before a panel of distinguished women in the Dragon's Den forum.

Student Fellow, Bristol Institute for Learning and Teaching, University of Bristol, UK (Jun 2019 – Jul 2019)

- Discussed, implemented, and presented design thinking methods to solve challenges in imparting education at Higher Education Institutes (HEIs), particularly the University of Bristol.
- Collaborated with 7 other undergraduate and master's students.
- Presented ideas for change and to improve integration of student voice with high-ranking stakeholders at the University.

Bharat Petroleum Corporation Limited (Fortune 500), Kolkata, India (Jun 2014 – Jul 2014)

- Developed a Security Incidents Management and Monitoring application for the Central Network Security Management (CNSM) Unit of the organisation.
- Designed an Online Transaction Processing (OLTP) MySQL database to track generation of CNSM reports in wake of security breaches, status of pending calls, priority and response monitoring of teams resolving security incidents.
- Created dashboards for key metrics of incident resolution performances of security monitoring teams.

AWARDS

Winner CRUK COLDATATHON 2025 (£25000)

Avrith Travel Grant (£300) 2025
Award to be used to attend upcoming HHMI Janelia conferences

Dr Teresa Tiffert Research Innovation Award (£1250) 2024

Second prize (£2K) in ThinkLab Cambridge Google BBC-CAPE "Envisioning the Future of Work" Hackathon 2023.

Hugh Paton – JPMorgan Bursaries (£1000) 2023
Award used attend conferences to present research progress at University of Cambridge.

Symons MCR Conference Fund (£198) 2023
Award used to attend conferences to present research progress at University of Cambridge.

Best Speaker (2nd) Department of Physiology, Neuroscience and Development (Certificate) 2023 *Showcased exceptional research progress in a 10-minute talk during Annual PDN Symposium.*

Single contribution award, School of Biological Sciences (3% of base salary) 2023 *Demonstrated excellent research progress at University of Cambridge.*

Avrith Travel Grant (£400) 2023
Award used to attend the Computational and Systems Neuroscience Conference 'COSYNE' in Montreal, Canada

Computational and Systems Neuroscience 'COSYNE' Mentorship Travel Grant ($1000) 2022 *Award used to attend and present at the main meeting of the conference in Lisbon, Portugal*

Champalimaud Research Symposium Travel Grant (€300) 2021
Award used to attend and present at the 3-day symposium in Lisbon, Portugal

Computational and Systems Neuroscience 'COSYNE' New Attendees Travel Grant ($1000) 2020 *Award used to attend and present at the main meeting of the conference in Denver, USA*

Bristol Plus Award (Certificate) 2019
Demonstrated excellent employability skills during MSc programme

British Council India 70th Anniversary Scholarship (£23,800) 2018
Scholarship waived tuition fees for MSc at the University of Bristol

Infosys 'Insta Award' (INR 500 & Certificate) 2016
Demonstrated remarkable Requirement Analysis and Development

Infosys Training Top Performance Incentive (INR 30,000) 2015

MENTORING EXPERIENCE

Mentor, University of Bristol (2022, 2023)

• Mentored a group of 5, Year 1 Mathematics and Computer Science undergraduate students to help them navigate their careers better.

Mentor/Supervisor, University of Bristol, UK (2020)

• Supervised and guided 1 undergraduate computer science student's final year dissertation on continual learning models for spatial navigation.

Mentor/Lead, Infosys Limited, India (2017-2018)

- Conducted knowledge transfer sessions to train freshers in practical knowledge of working in business intelligence and data analytics for client Apple Inc., USA
- Delegated tasks to fresher groups during development and monitored performance during production deployment.

LEADERSHIP & MARKETING EXPERIENCE

Wellcome Data Science Ideathon 2023 – semi-finalists in the mental health challenge for long-term patient, tech-leading a team of 5 researchers from University of Cambridge and University College London (prototype).

Communications Coordinator – promotional campaigns run via a Facebook page helped at least 3 Indian postgraduate students (1 woman in STEM) to choose Bristol for higher studies (Bristol University, Jan 2019 – Aug 2019)

SCEEM Outreach Ambassador for DigiMakers – conducted hands-on electronic and computing workshops for children aged 7-18 to inspire them into studying science and engineering (Bristol University, Oct 2018 – Sep 2019)

Postgraduate Student Ambassador – promoted the University's positives, strengths, best practices, and opportunities during open day events to prospective postgraduate students (Bristol University, Oct 2018 – Sep 2019)

Course Representative for MSc Advanced Computing – served as an official link between the student body, academic staff, and the Bristol Students' Union; worked towards building an inclusive student environment by representing any academic or student concerns in front of higher authorities (Bristol University, Oct 2018 – Sep 2019)

Faculty of Engineering PGT Representative - worked towards improving students' academic experience while being an active member of the Bristol Education Network committee (Bristol University, Oct 2018 – Sep 2019)

REVIEWING, LANGUAGE SKILLS & INTERESTS

Conference Reviewer - Advanced Course and Symposium on Artificial Intelligence and Neuroscience 'ACAIN' 2021, 2022

Student Quality Reviewer – reviewed feedback reports and teaching methods to ascertain maintenance of academic quality and standards (Bristol University, Nov 2018 – Aug 2019)

Languages – English (Fluent), Hindi (Native), Bengali (Native), French & German (Beginner)

Interests - Reading, Travelling, Blogging

Volunteering – Student volunteer at the NeurIPS 2019 and COSYNE 2020; LHA London hostel staff volunteer (Jan - Feb 2020)

SELECTED PUBLICATIONS

- D. Pedamonti*, **S. Mohinta***, M. Dimitrov, H. Malagon Vina, S. Ciocchi, R. Ponte Costa. Hippocampus supports multi-task reinforcement learning under partial observability, Nature Communications 2025. * Equal Contribution
- **S. Mohinta**, D. Franco-Barranco, SY. Lee, A. Cardona. Towards Generalized Synapse Detection Across Invertebrate Species, arXiv 2025
- SY. Lee, A. Correia, N. Ceffa, M. Robbins, D. Franco-Barranco, M. Zlatic, A. Cardona, **S. Mohinta**. Beyond Agreement: Standardizing Crowdsourced Synapse Annotations through Proofreading in EM Connectomics, bioRxiv 2025
- J. Ruffle, R. Gray**, S. Mohinta**, G. Pombo, C. Kaul, H. Hyare, G. Rees, P. Nachev. Computational limits to the legibility of the imaged human brain, NeuroImage, 2024
- J. Ruffle, **S. Mohinta**, K. Baruteau, R. Rajiah, F. Lee, S. Brandner, P. Nachev, H. Hyare, VASARI-auto: equitable, efficient, and economical featurisation of glioma MRI, NeuroImage 2024
- J. Ruffle, **S. Mohinta**, R. Gray, H. Hyare, P. Nachev. Brain tumour segmentation with incomplete imaging data, Brain Communications, 2023
- J. Ruffle, **S. Mohinta**, R. Gray, H. Hyare, P. Nachev. Brain tumour genetic network signatures of survival, Brain 2023

CONFERENCES

- **S. Mohinta**, S. Lee, P. Galvez, A. Correia, M. Corrales, A. Cardona. Catena: Bridging Performance, Scalability, and Reproducibility in Connectome Reconstruction, Analysis and Modeling of Connectomes Conference, HHMI Janelia USA, June 2025
- **S. Mohinta**, S. Lee, P. Galvez, A. Correia, M. Corrales, A. Cardona. Advancing Synapse-Level Connectomics with an Open-Source AI Ecosystem, AI Revolution Meets 4D Cellular Physiology, HHMI Janelia USA, March 2025
- **S. Mohinta**, P. Galvez, A. Correia, M. Corrales, A. Cardona. CATENA: An Open-Source AI Ecosystem for Synaptic-resolution Connectomics, Images to Knowledge, Milan Italy, 2024
- **S. Mohinta**, P. Galvez, A. Correia, M. Corrales, A. Cardona. Overcoming Connectome Reconstruction Challenges with Image-toImage Translation of Electron Micrographs, UCL NeuroAI, 2024
- **S. Mohinta**, P. Galvez, A. Correia, M. Corrales, A. Cardona. Overcoming Connectome Reconstruction Challenges with Image-toImage Translation of Electron Micrographs, UK Neural Computation, 2024
- **S. Mohinta**, P. Galvez, A. Correia, M. Corrales, A. Cardona. Catena: Open-source and reproducible software toolkit for connectomics, Berlin Connectomics Meeting, MPI-Berlin, 2024
- M. Tariq, J. Ruffle, **S. Mohinta**, M. Brothwell, S. Brandner, P. Nachev, H. Hyare. Modelling GBM Recurrence – The Influence of Perilesional Oedema and the disconnectome, Artificial intelligence/Machine learning/Computational Neuro-oncology 2024
- J. Ruffle, **S. Mohinta**, K. Baruteau, R. Rajiah, F. Lee, S. Brandner, P. Nachev, H. Hyare. VASARI-AUTO: Performant, Equitable, Efficient, Economic, and Survival Predictive Featurisation of Glioma MRI, BNOS 2024
- L. Tan, J. Ruffle, **S. Mohinta**, J. Rees, S. Brandner, P. Nachev, H. Hyare. Mathematical Modelling of Survival in Low Grade Gliomas at Malignant Transformation with XGBOOST, BNOS 2024.
- J. Ruffle**, S. Mohinta**, S. Brandner, H. Hyare, P. Nachev. Demographics, genetics, and epigenetics influence the lesion distribution of glioma, British Neuro-Oncology Society Meeting, 2023
- J. Ruffle, **S. Mohinta**, G. Pombo, R. Gray, V. Kopanitsa, F. Lee, S. Brandner, H. Hyare, P. Nachev. Brain tumour genetic network signatures superiorly forecast survival, British Neuro-Oncology Society Meeting, 2023
- F. Lee*, V. Kopanitsa*, J. Ruffle, **S. Mohinta**, P. Nachev, H. Hyare. Automated VASARI feature set reporting for gliomas is efficient and effective, Radiological Society of North America 'RSNA' 2023 (POSTER)
- J. Ruffle, **S. Mohinta**, S. Brandner, H. Hyare, P. Nachev**.** The deep topology of gliomas, Society for Neuro-Oncology 2022 (POSTER)
- J. Ruffle, **S. Mohinta**, G. Pombo, R. Gray, V. Kopanitsa, F. Lee, S. Brandner, H. Hyare, P. Nachev. Network Signatures of Survival in Brain Tumour Genetics, Society for Neuro-Oncology 2022 (POSTER)
- J. Ruffle, **S. Mohinta**, R. Gray, H. Hyare, P. Nachev. Identifying enhancing tumour without contrast-enhanced imaging, British Neuro-Oncology Society Meeting 2022 (TALK)
- J. Ruffle, **S. Mohinta**, R. Gray, H. Hyare, P. Nachev. Deep learning for tumour segmentation with missing data, British NeuroOncology Society Meeting 2022 (POSTER)
- **S. Mohinta***, D. Pedamonti*, M. Dimitrov, H. Malagon Vina, S. Ciocchi, R. Ponte Costa. Hippocampal networks support continual learning and generalisation, From Neuroscience to Artificially Intelligent Systems 'NAISYS' 2022 (POSTER)
- J. Ruffle**, S. Mohinta**, R. Gray, H. Hyare, P. Nachev. Brain tumour segmentation with incomplete data, Brain Conference 2022 (TALK)
- **S. Mohinta***, D. Pedamonti*, M. Dimitrov, H. Malagon Vina, S. Ciocchi, R. Ponte Costa. Hippocampal networks support continual learning and generalisation, Computational and Systems Neuroscience 'COSYNE' 2022 (POSTER)
- **S. Mohinta***, D. Pedamonti*, M. Dimitrov, H. Malagon Vina, S. Ciocchi, R. Ponte Costa. Continual deep reinforcement learning in hippocampal networks, Champalimaud Research Symposium 2021 (POSTER)
- **S. Mohinta***, D. Pedamonti*, M. Dimitrov, H. Malagon Vina, S. Ciocchi, R. Ponte Costa. Hippocampal encoding of continual reinforcement learning features, Advanced Course and Symposium on Artificial Intelligence & Neuroscience 'ACAIN' 2021 (TALK)
- **S. Mohinta**, D. Pedamonti, M. Dimitrov, H. Malagon Vina, S. Ciocchi, R. Ponte Costa. Hippocampal encoding of continual reinforcement learning features ", COSYNE 2021 (POSTER)
- **S. Mohinta**, S. Ciocchi, R. Ponte Costa. Hippocampal population representations in reinforced continual learning, COSYNE 2020 (POSTER)
- **S. Mohinta**, S. Ciocchi, R. Ponte Costa. Hippocampal population representations in reinforced continual learning, Biological and Artificial Reinforcement Learning workshop, Neural Information Processing Systems 'NeurIPS' 2019 (POSTER)