LEA BRODY-HEINE

lea_brody-heine@alumni.brown.edu | AI/ML & Full Stack Software Engineer | MSc
[Personal Website](#) | [LinkedIn](#) | [GitHub](#)

EDUCATION

University of St Andrews   St Andrews, Scotland
MSc Computer Science, Concentration in AI | GPA: First Class Honors   *Graduated: 2024*

Brown University   Providence, RI
Bachelor of Arts | GPA: 4.0   *Graduated: 2023*

TECHNICAL SKILLS

Programming Languages and Frameworks: Python, Java, JavaScript, HTML, C++, CSS, Bootstrap, Node.js, Express, RESTful APIs, Open APIs, MongoDB, Vue.js, React, Angular, SAT4J, LogicNG, Anaconda

Tools and Technologies: pandas, scikit-learn, TensorFlow, PyTorch, Azure, AWS, data pipelines, Data Visualization, Data Analytics, Artificial Intelligence, Machine Learning, LLMs, CNN, GAN, UX/UI Design, Git, GitHub, D3.js, Bash, Jupyter Notebook, Miro, Jira, Asana, Tableau, Figma, Docker, containers, Kubernetes

Methodologies and Other Skills: Object-Oriented Programming, Agile, Scrum, Kanban, DevOps, UML, Data Structures, Microservices, Cross-Functional Collaboration, DevOps, Product lifecycle management, continuous integration (CI/CD), unit testing

MASTER'S DISSERTATION

Machine Learning for Pathology in Mast Cell Diseases   Jan 2024 – Aug 2024
University of St Andrews

- Developed machine learning models to analyze tabular data and intestinal biopsy stains for mast cell disease research, employing generative AI to augment data and improve model training.
- Leveraged a GPU PC, Docker, and containers to process complex programs efficiently.
- Employed YOLO v8 and computer vision to employ object detection for identifying and counting mast cells, spindle-shaped mast cells, and mast cell clusters in biopsy images.
- Constructed over 20,000 augmented CSV files from microbiome data, representing normal and i-MCAS microbiomes, then used K-means clustering to identify key bacterial differences. This model can be used for further research in idiopathic mast cell activation syndrome.
- Designed tools for researchers and clinicians to input their data and derive meaningful insights, facilitating further studies and discoveries.

EXPERIENCE & PROJECTS

Software Engineer, Independent Contractor   May 2024 – Current
GSI Water Solutions, Inc   *Bend, OR*

- Develop a comprehensive document search system to access project proposals stored on the company's server, reducing search time by at least 60%.
- Conduct requirements analysis and system design, ensuring the architecture meets stakeholder needs.
- Execute document indexing and search functionality using Python and relevant libraries, enabling faster document retrieval.
- Design an intuitive user interface and integrate the system with existing server infrastructure.
- Perform iterative testing, feedback sessions, and secure access controls to enhance system reliability and security.
- Lead entire product lifecycle from initial requirements gathering to final deployment and user training.

Scrum Master, Agile Methodology   Sept 2023 – Nov 2023
MSc Project, University of St Andrews   *Scotland*

- Led the end-to-end development of a product, ensuring a user-centric design throughout the software development lifecycle.
- Managed cross-functional Agile sub-teams to deliver iterative feature enhancements, driving project success and user satisfaction.

Game Development   Mar 2023 – Apr 2024
MSc & BA Projects, University of St Andrews, Brown University   *Scotland, Providence, RI*

- Designed a Java-based game server for "Woodland Diplomacy," enforcing game mechanics, HTTP server functionality, and JSON communication.
- Constructed "Prospector," an online multiplayer game using JavaScript, Node.js, and Express, with RESTful API integration.
- Produced the front end for a game called Superhero Escape in Brown University's teaching language, Pyret.

Artificial Intelligence & Machine Learning Development   Jan 2024 – May 2024
MSc Projects, University of St Andrews   *Scotland*

- Designed and constructed 5 logical agents using the LogicNG and SAT4J java libraries, employing strategies such as (SPS), (SATS), and (PROBS).
- Developed a machine learning model to forecast water pump status in Tanzania, utilizing scikit-learn, pandas, numpy, and Optuna for hyperparameter optimization.
- Implemented AI search algorithms for a flight route planner, optimizing paths using uninformed search (DFS, BFS, Iterative Deepening) and informed search (A*, Best-first search, SMA*) based on Euclidean distance heuristics.
- Built and evaluated machine learning models to predict flight disruptions using Python, Jupyter Notebook, and scikit-learn classifiers. Performed data cleaning, feature engineering, and model fine-tuning on a large-scale Kaggle dataset.
- Developed multiclass classification models to anticipate patient outcomes, focusing on data imputation and handling unbalanced data in Python, emphasizing practical application and client presentation.

Full Stack Web Development   Jan 2024 – May 2024
MSc Projects, University of St Andrews   *Scotland*

- Programmed a full stack web application using MongoDB, Node.js, Express, and Vue.js. Integrated RESTful APIs, chart.js, and open APIs .
- Built a single-page web application for trivia quizzes using JavaScript, HTML, CSS, and open APIs for dynamic question fetching and score tracking.