Emma Rousseau

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Summary

Bioinformatics MSc graduate seeking opportunities in London to contribute to data-driven innovations in clinical and healthcare applications. Experienced in NGS, mass spectrometry, and translational oncology research. Adept at developing scalable data pipelines and clinical reporting dashboards. Passionate about leveraging data science for therapeutic development and personalized medicine in the pharmaceutical industry.

Work and Research

Graduate Researcher - Desmedt Lab, KU Leuven September 2024 - June 2025

- Investigated resistance mechanisms of lobular triple-negative metastatic breast cancer using genomic data and phylogenetic modeling, uncovering patterns that informed treatment strategy development.
- Optimized NGS variant analysis pipelines using HPC clusters and Nextflow, reducing runtime and increasing reproducibility of results across datasets.
- Created interactive dashboards for database QC and clinical data sharing, facilitating collaboration across research and clinical teams and improving data accessibility for 10+ team members.

Bioinformatics Developer Intern - Data-Intuitive March 2024 - October 2024

- Developed and maintained modular pipeline components for Viash Hub's Biobox tool library, contributing to open-source tools for scalable sequence data analysis.
- Expanded core analysis framework by building Docker-based modules using R, Python, and Bash, increasing flexibility and reusability of pipeline components.
- Collaborated with cross-functional teams to enforce robust code quality practices and version control workflows.

Data Science and Web Development Intern - Sight Consulting June 2023 - December 2024

- Delivered customized data solutions by gathering client requirements and iteratively developing prototypes.
- Built interactive dashboards using Flask, Python, and JavaScript to visualize forecasting models and improve accessibility of real-time data insights.

Research Assistant - Vogel Lab, McGill University May 2021 - August 2023

- Developed MS data analysis pipelines in KNIME and Bash to study spindle pole protein dynamics in yeast, improving data throughput and reproducibility.
- Conducted high-resolution fluorescence microscopy and image analysis to examine mitotic progression and growth dynamics in yeast cells.
- Applied Monte Carlo simulations to model 3D conformational changes in proteins and assess structural impact of mutational variants.

Bioinformatics Intern - Côté Lab, Clinical Research Institute of Montreal Summer 2020

- Built a parallelized pipeline for tandem-MS data analysis, improving processing speed and enhancing sensitivity for detecting protein interactions.
- Leveraged HPC clusters and batch processing to analyze protein-protein interactions involved in cancer pathways, supporting large-scale MS experiments.

Education

MSc Bioinformatics, *KU Leuven*

Relevant Coursework

Mathematics and Statistics: Longitudinal Data Analysis, Fundamentals of Artificial Intelligence, Statistical Methods for Bioinformatics, Dynamical Systems, Bayesian Modeling, Machine Learning and Inductive Inference, Applied Multivariate Statistical Analysis, Artificial Neural Networks and Deep Learning.

Bioinformatics: Management of Large-Scale Omics Data, Structural Bioinformatics, Comparative and Regulatory Genomics, Evolutionary and Quantitative Genetics.

BSc Computer Science and Biology, *McGill University*

Awards and Bursaries

IRCM Foundation Scholarship for Young Researchers (2020)

Scholarship for Women in Technology (2020-2021)

Relevant Coursework

Mathematics and Statistics: Calculus 3, Discrete Structures, Linear Algebra, Probability, Ordinary Differential Equations, Statistics, Applied Regression.

Computer Science: Algorithms and Data Structures, Programming Languages and Paradigms, Computational Biology Methods, Computational Methods in Biomolecular Engineering, Applied Machine Learning.

Projects

Patient Clinical Course Interactive Dashboard Demo

Interactive dashboard for automatic reporting of patient diagnostic and treatment course used to facilitate quality control of the database and visualization of patients' medical history.

Climate policy dashboard - LSTAT Datathon 2025 Demo

Interactive dashboard summarizing and visualizing climate policy data across the world along with longitudinal environmental statistics using large language models and the R-shiny framework.

"Am I OK?" - Recipient of 2 prizes at MAIS Hacks 2022 Devpost project

AI-powered web-based app that connects patients' medical records and appointment history to provide fast and accessible information on their current health condition and prescribed treatments.

Damaged Aircraft Fuselage Dimensioning - Air Canada Hackathon Pitch deck

Augmented reality tool and iOS app that takes precise measurements of aircraft damage within seconds, as well as providing a reliable decision aid tool for maintenance crews.

Skills

Bioinformatics	NGS (RNA-seq, variant calling), MS data analysis, statistical analysis and modeling, machine learning applications, data visualization.
Research	Scientific writing and research communication, cellular biology laboratory methods, experimental design.
Programming	Python, Java, R, bash, SQL, high-performance computing (HPC) clusters, workflow management (Nextflow, Snakemake), dashboard and web development (R-shiny, Flask, Streamlit), containerization (Docker, Apptainer/Singularity), version control.