JACK GISBY

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RESEARCH INTERESTS

Biochemist with a keen interest in computational biology and programming. Developed my computational skills through online courses and self-directed projects; applied my knowledge to problems in bioinformatics, where I developed interests in data-driven research and the omics technologies. Excited to develop my skills as an independent scientist as part of a larger research project. I have the aspiration to pursue a career in biological research, exploiting the vast datasets produced by modern biology to answer fundamental research questions.

EDUCATION

University of Birmingham *September 2016 - July 2020*
Biochemistry with Professional Placement (MSci) Current Average: 74%

Key Modules: Gene Expression Analysis, Genetics, Research and Funding, Experimental Design and Analysis. Significantly improved my statistical and programming skills while gaining a background in molecular biology, physiology and genetics. Current coursework covers the processing of proteomic and transcriptomic datasets.

Dissertation project involves the development and validation of the freely-available computational workflow, *Metaboverse*.

RESEARCH EXPERIENCE

Dissertation: A Prior Knowledge-Based Computational Workflow for *de novo* Structural Elucidation of Small Molecules in Mass Spectrometry Metabolomics
Dr Ralf Weber *October 2019 - Present*

- Developing my understanding of databases, data structures and algorithms for the optimisation of *Metaboverse*; learning about NP-complete problems, graph theory and combinatorial optimisation for the representation and efficient generation of potential small molecules.
- Processed large, high-dimensional mass-spectrometry datasets for the validation of *Metaboverse*.
- Using Python, SQLite and Bash to implement the *Metaboverse* workflow on a Linux high-performance computing cluster for the generation of large structure databases.
- Investigating how machine learning models, based on structural properties, could be used to assign a "metabolite-likeness" score to limit generation of implausible molecules.

Summer Project: An Automated Tool for *de novo* Annotation of Pack-TYPE Non-Autonomous Transposable Elements
Dr Marco Catoni *August 2019 - Present*

- Designed and implemented a software package, written in R, to automatically detect Pack-TYPE transposable elements in *Arabidopsis thaliana* and related species.
- Learned to use version control (Git) for the management of programming projects.
- Adhered to Comprehensive R Archive Network (CRAN) and Bioconductor standard practices for the organisation, testing and documentation of packages.
- Used command line and Bioconductor tools to process sequence data for *Arabidopsis thaliana*, *Oryza sativa* and related organisms.
- Incorporated unsupervised machine learning approaches for the automated clustering of related transposable elements.

- The package is currently being used by geneticists at the University of Birmingham to understand how Pack-TYPE transposons may impact evolution; we are currently in the process of publishing the tool to Bioconductor.

Placement Project: Development of an Immunoturbidimetric Assay for Serum Amyloid A for an Automated Clinical Analyser
The Binding Site Group Ltd, Birmingham, UK *August 2018 - August 2019*

- Developed an assay for inflammatory biomarkers, such as Serum Amyloid A, for use in clinical laboratories.
- Took responsibility for a long term project that improved my interpersonal skills, allowed me to take ownership of a research project and developed my ability to work autonomously.
- Interacted with, and regularly delivered presentations to, researchers from diverse fields and non-scientific staff to ensure the timely completion of my development project.
- Routinely used Excel, and statistical packages such as Analyse-It/Minitab, to analyse and present data to co-workers and managers. Took responsibility for planning and carrying out experiments and statistical analyses in a research environment.
- Received training in scientific writing in order to routinely produce experimental write-ups for submission to regulatory bodies; this involved compliance to standard operating procedures.
- Produced an extended literature review and project report before delivering a presentation at the University of Birmingham.

SPECIFIC COMPUTATIONAL SKILLS

Operating Systems	Windows, Ubuntu
Programming Languages	Python, R, SQLite, Bash
Packages	Bioconductor, scikit-learn, matplotlib, ggplot2
Related Tools	Git, BLAST, Linux HPC
General Software	MS Office, Latex

ADDITIONAL COURSES

Lean Competency Level 1 Certification

The Biostars Handbook: Bioinformatics Data Analysis by Istvan Albert

Introduction to Computer Science and Programming Using Python by MITx

Introduction to Computational Thinking and Data Science by MITx

Data Analysis for Life Sciences and Genomics Data Analysis by HarvardX

Metabolomics: Understanding Metabolism in the 21st Century by University of Birmingham

Rosalind "Bioinformatics Stronghold" Problem Sets (Level 5 - Python)

Machine Learning, SQL and Competitions on Kaggle

ADDITIONAL SKILLS & INTERESTS

Regularly complete online courses and work on personal programming projects in my own time. Have applied my learning to teach others during after school "Code Clubs", developing my own teaching ability and providing help with coding skills to younger children.

Avid boulderer and beginner trad climber - climbing is excellent for fitness, very social and I enjoy supervising beginner climbers.

REFERENCES

Dr Klaus Fütterer (Tutor)
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