Matthew Berkeley

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Profile

Software Developer at the Swiss Institute of Bioinformatics with extensive experience in back-end and front-end development. Lead developer for BUSCO, an award-winning genomic quality control software tool with over 23,000 citations. Prior experience at NASA working on computational image processing. Keen to build ground-breaking software solutions for challenges in other domains.

Experience

Swiss Institute of Bioinformatics **2018 - present**

Software Developer

- Lead developer for BUSCO (https://busco.ezlab.org), the world-leading software for assessing the completeness of genome assemblies
- Implementing CI/CD pipelines, unit testing infrastructure and managing distribution channels on GitLab, Conda and Docker
- Managing dataset creation, benchmarking and distribution using publicly accessible AWS endpoints
- Analysing BUSCO usage statistics posted to a PostgreSQL DB and managing user feedback on the GitLab issue board
- Presenting BUSCO at international conferences, including to industry partners
- Front-end developer for LEMMI (https://lemmi.ezlab.org/), a metagenomics benchmarking tool, using Vue.js and Plotly
- University lecturer in Python at the University of Geneva

The Catholic University of America / NASA Goddard Space Flight Center **2013 - 2018**

Graduate Research Assistant

- Extensive experience developing efficient Python software, incorporating parallelisation, image processing, Bayesian analysis techniques such as Markov Chain Monte Carlo, and deep learning neural networks
- Collaborating with a team of world-renowned scientists, driving experimental data analysis for testing cutting-edge detector technology
- Project managing a significant research effort, obtaining scientific results through detailed quality testing
- Successfully managing and analysing a large (>60 TB) dataset from a NASA satellite to create new data products

Academics

2015-2018	PhD in Physics, The Catholic University of America in conjunction with NASA Goddard Space Flight Center. *Dissertation title*: Testing the association of the anomalous microwave emission with PAHs in the diffuse ISM.
2013-2015	MS in Physics, The Catholic University of America.
2012-2013	MSc in Space Studies, International Space University.
2008-2012	BA in Physics and Astrophysics, Trinity College Dublin.

Skills

- Python (NumPy, SciPy, etc.)
- Vue3.js
- Version Control (Git)
- CI/CD
- Docker/containerisation
- PostgreSQL
- AWS
- Conda package management
- Deep Learning
- Reactive debugging
- Full-stack development
- Image Processing

Certifications

Coursera certificates in

- Neural Networks and Deep Learning
- Convolutional Neural Networks
- Sequence Models
- Organising Machine Learning Projects

LinkedIn Learning certificates in

- Functional Programming with Java
- Docker Compose
- Redis
- NoSQL
- MLOps
- Microsoft Azure
- LLMs
- Kubernetes

Selected Presentations (*) and Publications

OrthoDB and BUSCO update: annotation of orthologs with wider sampling of genomes (2025)
F. Tegenfeldt, D, Kuznetsov, M. Manni, M. Berkeley, E. Zdobnov, E. Kriventseva

BUSCO: from Quality Control to Gene Prediction and Phylogenomics (2024) *
M. Berkeley; Biodiversity Genomics Academy, (https://www.youtube.com/watch?v=9SjVY3BT8JU)

Quality Control using Orthology: A Guide to BUSCO and OrthoDB (2023) *
M. Berkeley; EMBL/EBI Industry Partners Workshop

BUSCO: Assessing Genomic Data Quality and Beyond (2021)
M. Manni, M. Berkeley, M. Seppey, E. Zdobnov

BUSCO update: novel and streamlined workflows along with broader and deeper phylogenetic coverage for scoring of eukaryotic, prokaryotic and viral genomes (2021)
M. Manni, M. Berkeley, M. Seppey, F. Simão, E. Zdobnov

OrthoDB in 2020: evolutionary and functional annotations of orthologs (2020)
E. Zdobnov, D. Kuznetsov, F. Tegenfeldt, M. Manni, M. Berkeley, E. Kriventseva

Testing the Association Between Anomalous Microwave Emission and Polycyclic Aromatic Hydrocarbons in the Diffuse Interstellar Medium (2019)
M. Berkeley

The X-ray Luminosity Functions of Field Low Mass X-ray Binaries in Early-Type Galaxies: Evidence for a Stellar Age Dependence (2014)
B. Lehmer, M. Berkeley, et al