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Easy Genomics Democratising Access to Genomic Sequencing

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01

Introduction

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02

Why Genomic Sequencing?

What is Genomic Sequencing?

→ All organisms carry a genome or blueprint composed of a sequence of nucleotides (A, C, G, and T/U) that are used to construct proteins that support a variety of functions.

→ Sequencing an organism's genome is a powerful step in understanding the potential characteristics or features an organism might have.

→ Genomics enhances public health outcomes by tailoring healthcare interventions, improving disease surveillance, and advancing our understanding of genetic factors affecting health and disease.

Why is it important?

→ Genomic Sequencing contributes to disease prevention, personalized healthcare, disease tracking, and the development of effective treatments.

→ During the Covid-19 pandemic Genomics played a critical role in tracking variants across populations and geographies

Revolutionary Technology

Next Generation Sequencing

→ massively parallel approach to sequencing a genome

→ 360 billion ATGC's per sequencing run

→ 40,000 - 150,000 words in a novel

→ average word length in English is 4.79

→ **one 72 hour sequencing run** would generate **791,121 novels** with **95,000 words each**

Revolutionary Challenges

→ **Cost -** Genomic sequencing can be expensive, making it inaccessible or challenging for areas of the healthcare system less resourced

→ **Training -** Healthcare professionals and public health workers require additional training to effectively use genomic sequencing data in their practice.

03

What is Easy Genomics?

Easy Genomics

Open source for all.

Easy Genomics is a no-code, open-source solution for genomic data analysis. If the past few years have taught us anything, it's that genomic sequencing will play a major part in the future of (public) health. But it's an intensive, complex and expensive process to set up and run.

We've changed that.

Simple to use.

Requires little to no technical expertise.

Seamless experience

Powered by NextFlow, we provide a faster, hassle-free workflow.

Secure data storage

Endless scalability as your needs grow.

Start small, scale fast

Encrypted security to keep your patient data locked and secure.

Easy Genomics

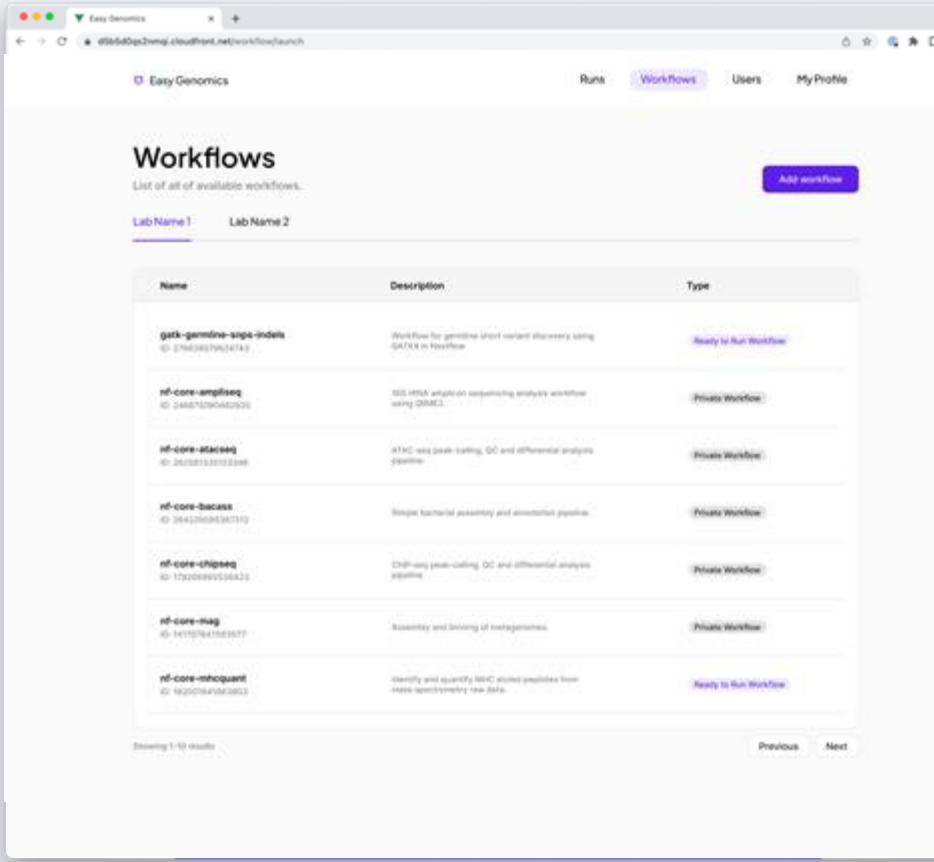
How it works

Run your genomic workload on a no-code front-end interface, that any non-technical user can operate in three easy steps:

Select a Workflow
Customise to your analytic requirements.

Upload your Data
Manage access to single & multiple samples.

Hit Submit
Monitor & receive your results via browser or email.



Easy Genomics

DEPT®/Health

Digital health product development with care.

Amazon Web Services

On-demand cloud computing web services.

Datapult, an APHL Company

A secure, cloud-based, Public Health sanctioned service.

Wisconsin State Laboratory of Hygiene

Wisconsin's Public, Environmental and Occupational Health Laboratory Since 1903

Easy Genomics V1

→ User accounts and authentication

→ Simple process for uploading and/or submitting genomic sequencing data for analysis

→ Allow users to select and easily configure analyses

→ Access to analytical workflow status and results

Easy Genomics: Democratising Access to Genomic Sequencing

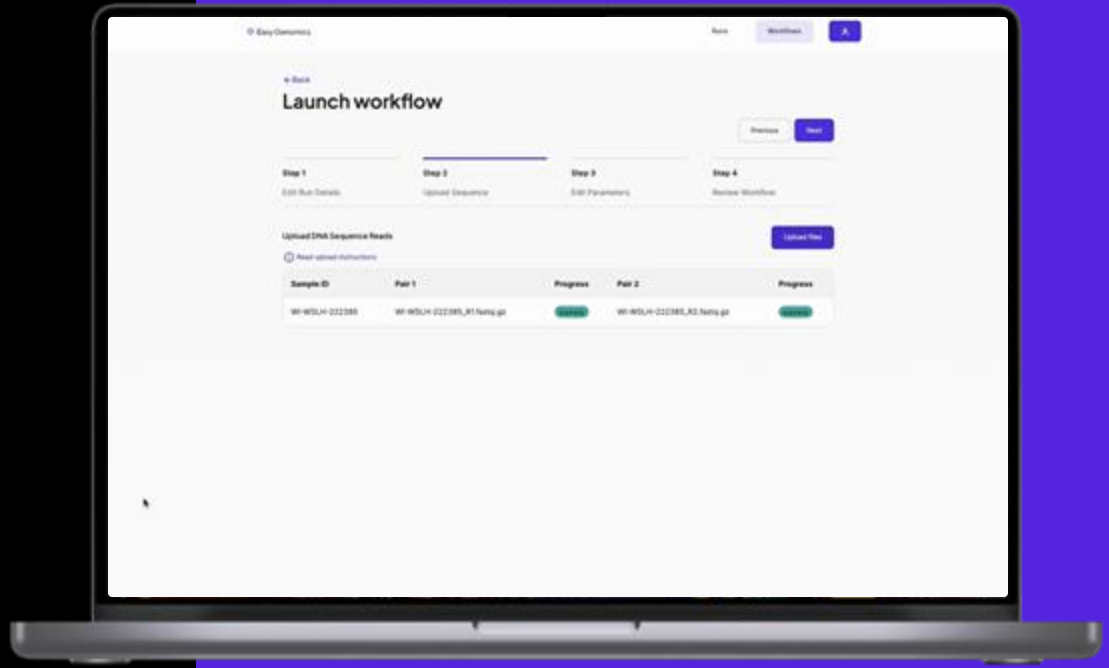
Easy Genomics V1

→ 3 user types: super admin, lab admin, user

→ Supports multiple "labs" with separate workflows and users

→ Enables data submission through web interface into AWS S3 and automated samplesheet generation

→ Runs analytical workflows through Nextflow Tower API



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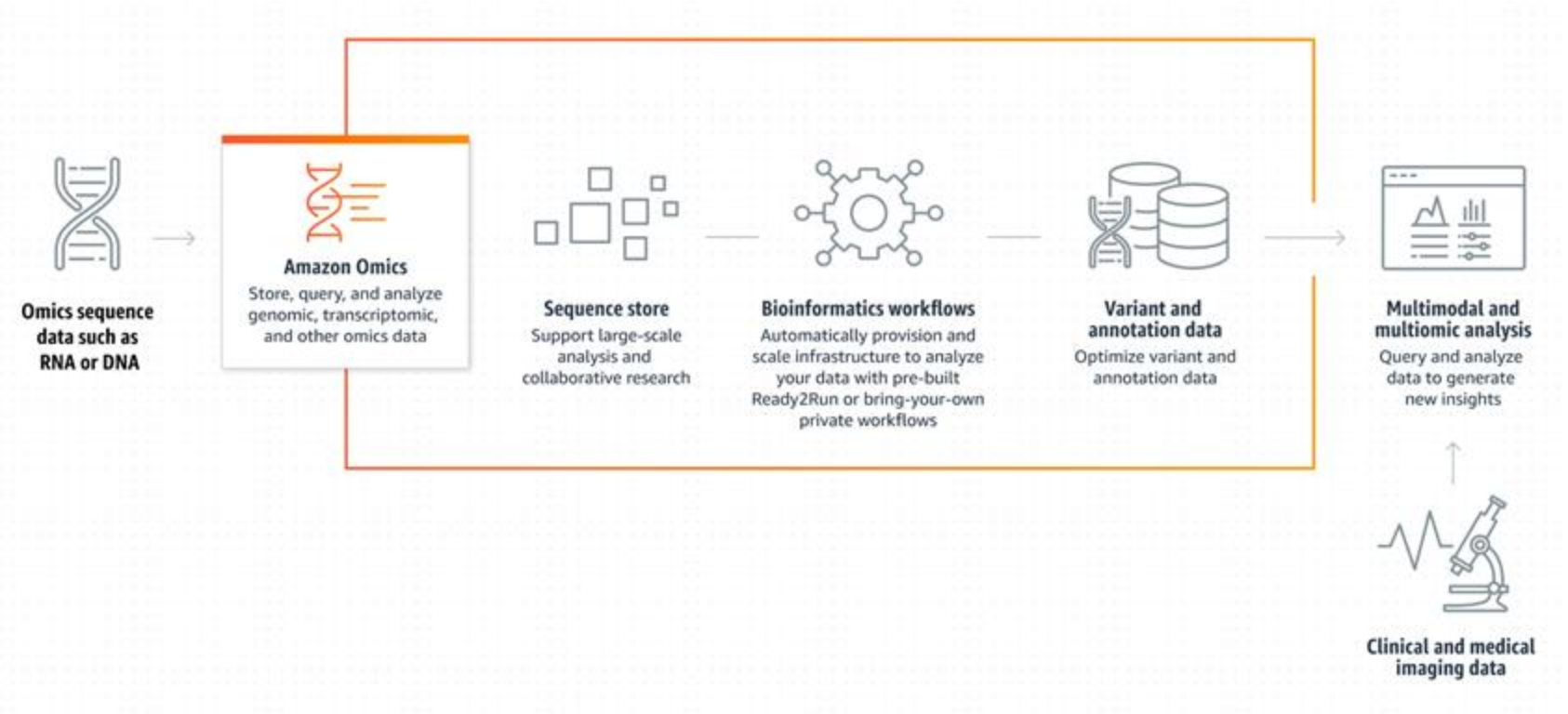
AWS Health Omics

AWS Health Omics



AWS Health Omics

→ Removes the need to configure and manage complex cloud infrastructure involving AWS Batch / EC2

→ Provides tailored storage for sequence and variant data

→ Supports Nextflow & WDL workflows

→ Requires staging workflow containers and data

→ Challenging workflow configuration

→ Accessible through API

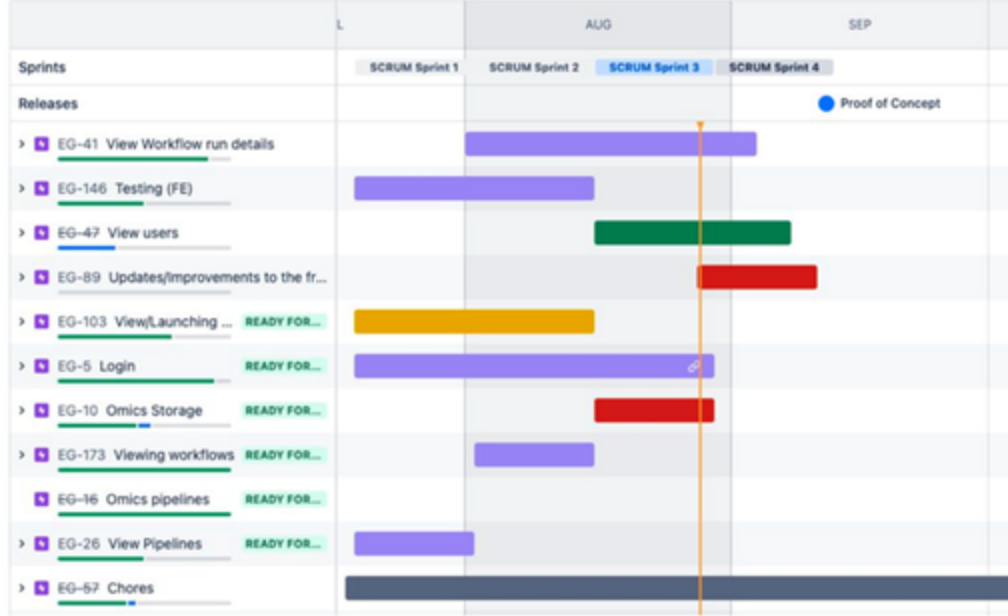
Now we have Health Omics, let's upgrade Easy Genomics!

→ Develop an open sourced solution powered by AWS' HealthOmics

→ Provide an easy-to-use, web-based interface that will facilitate access to key genomic sequencing pipelines for all lab technicians

→ With limited training and no technical skills

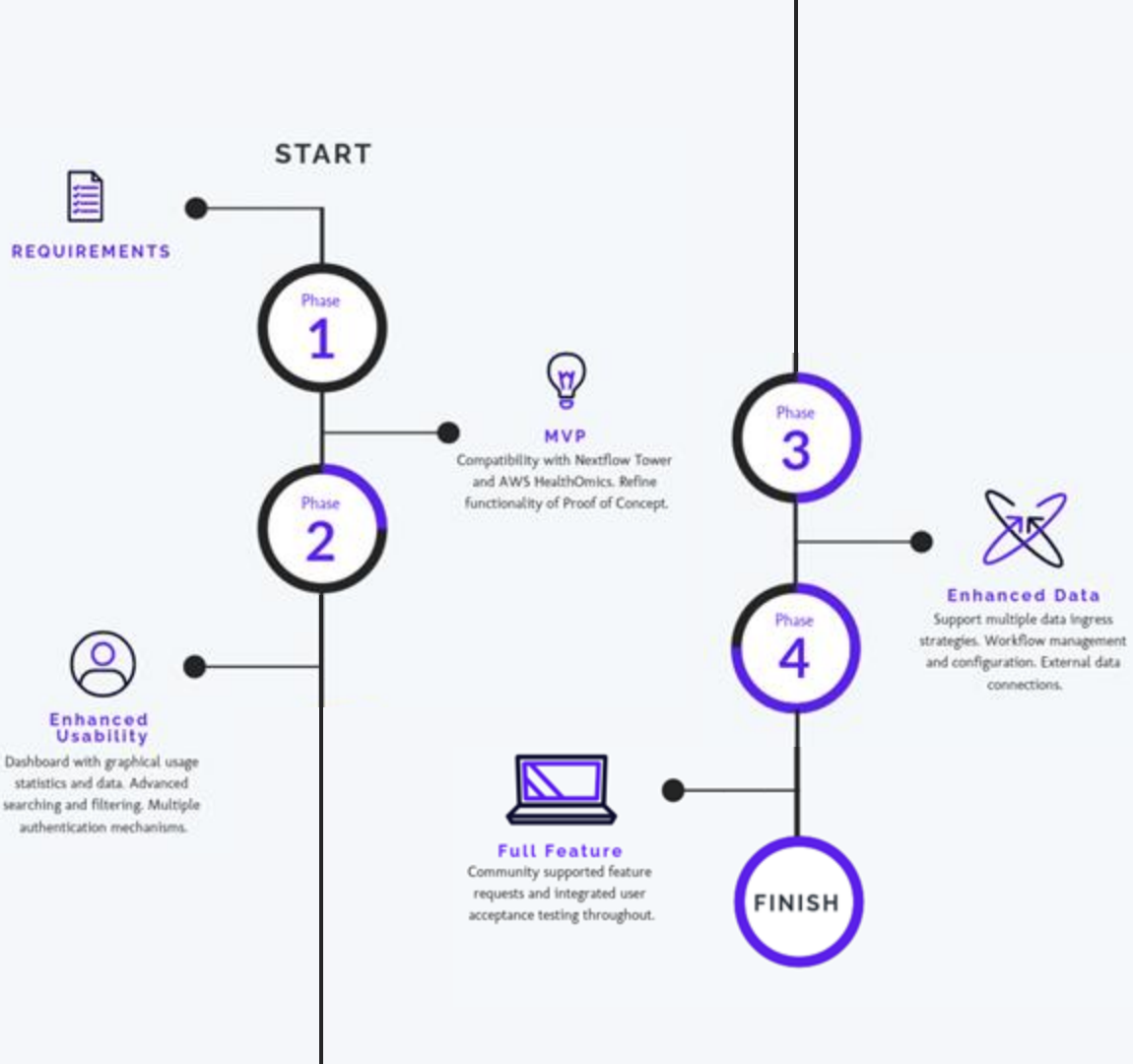
Easy Genomics v2



Easy Genomics v2 Roadmap

→ August 2023 - POC Launched

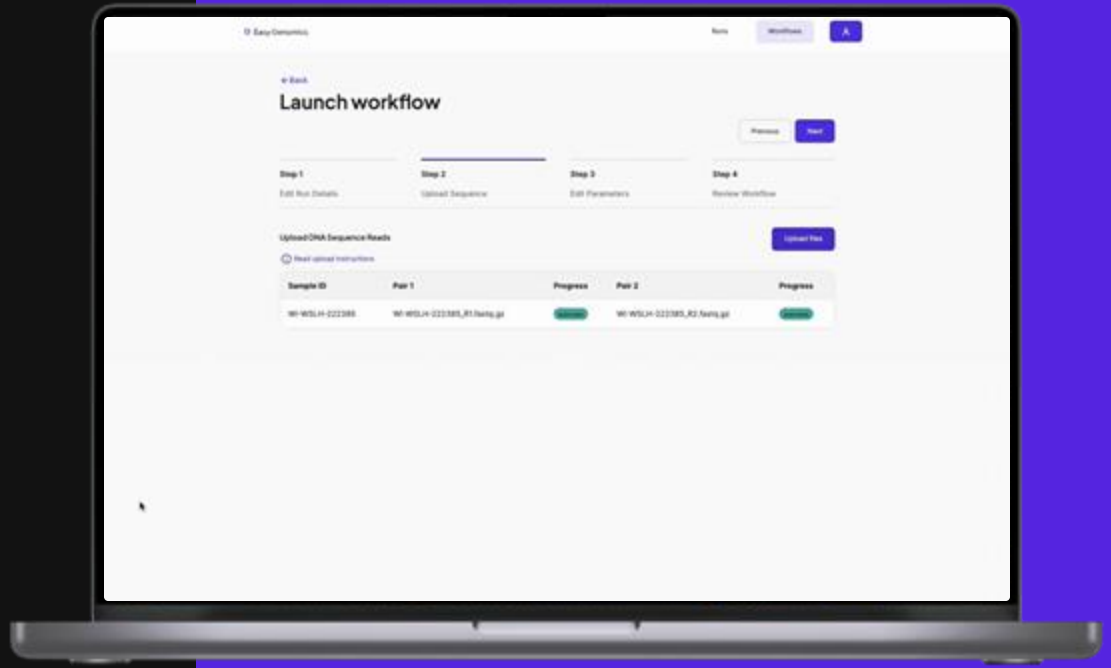
→ Q1 2024 - Initial Release



Open source + community driven

→ **Open Source**
Easy Genomics is built for a field that is fundamentally built on open source projects. Genomic software and workflows are community efforts to improve our understanding of the biological world that we exist in.

→ **Community Driven**
Easy Genomics is a solution designed for a community of public health laboratories and is charged with meeting their unique needs.



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Demonstration

Easy Genomics

Log in to your account

You will need an account created by your Lab Administrator.

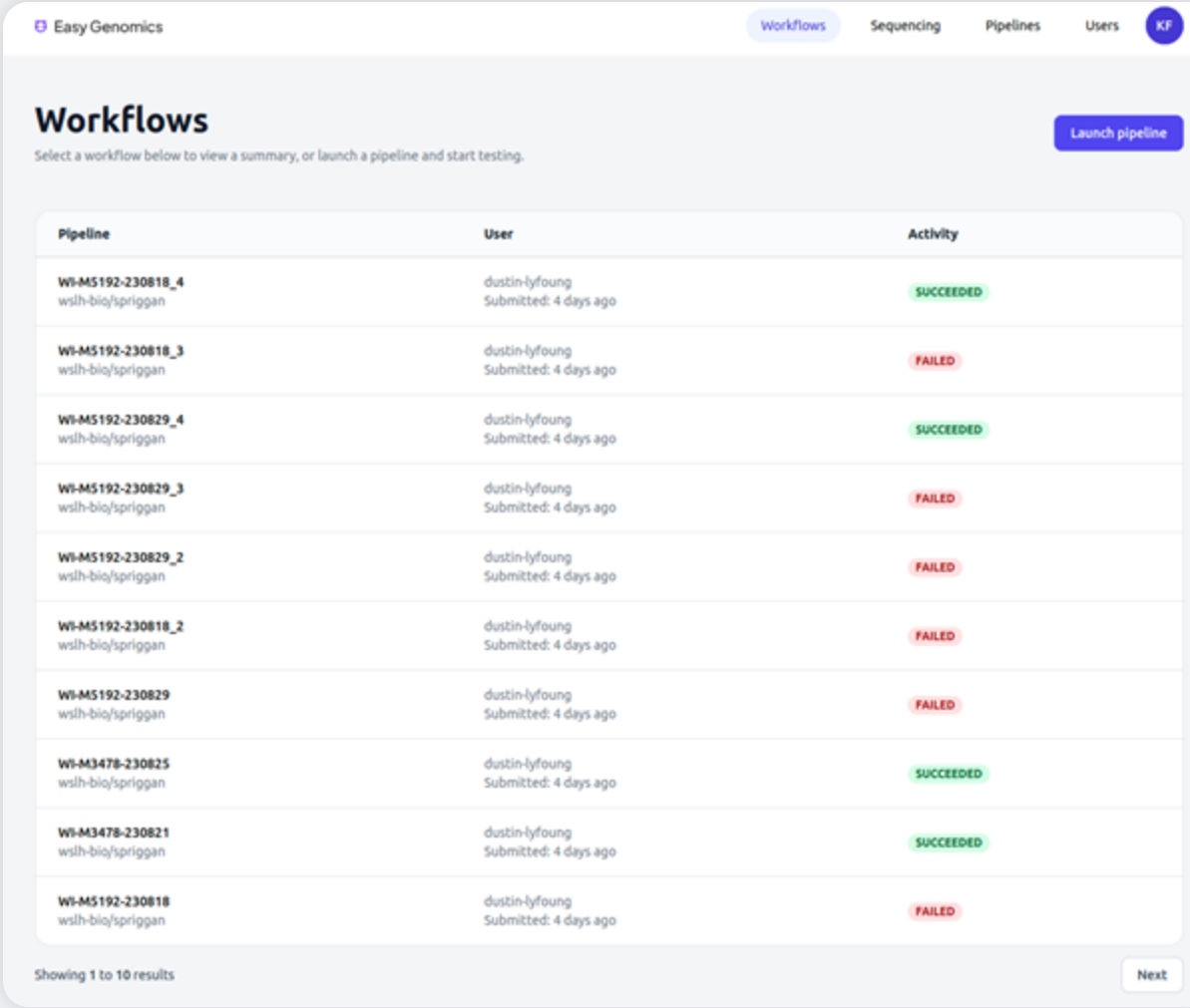
Email address

kelsey.florek@slh.wisc.edu

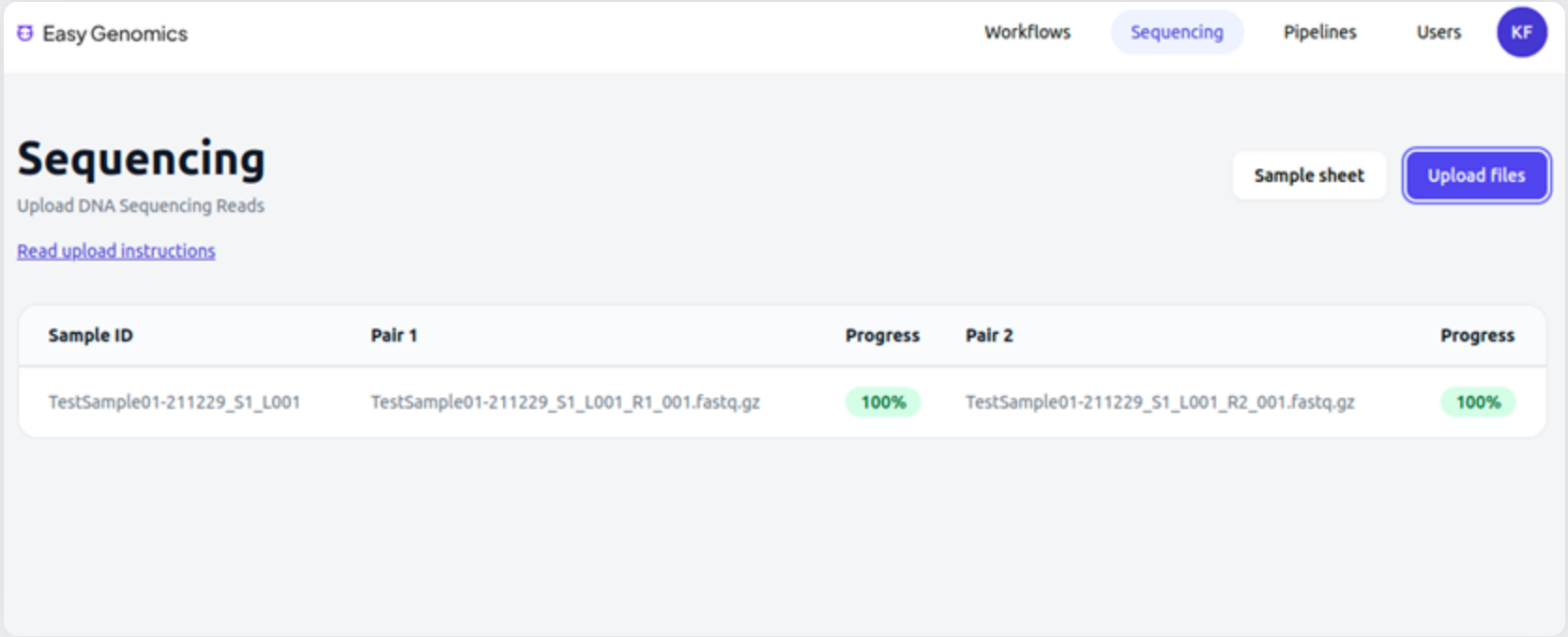
Password

••••••••••••

Log in



Easy Genomics



Easy Genomics

Workflows | Sequencing | Pipelines | Users | KF

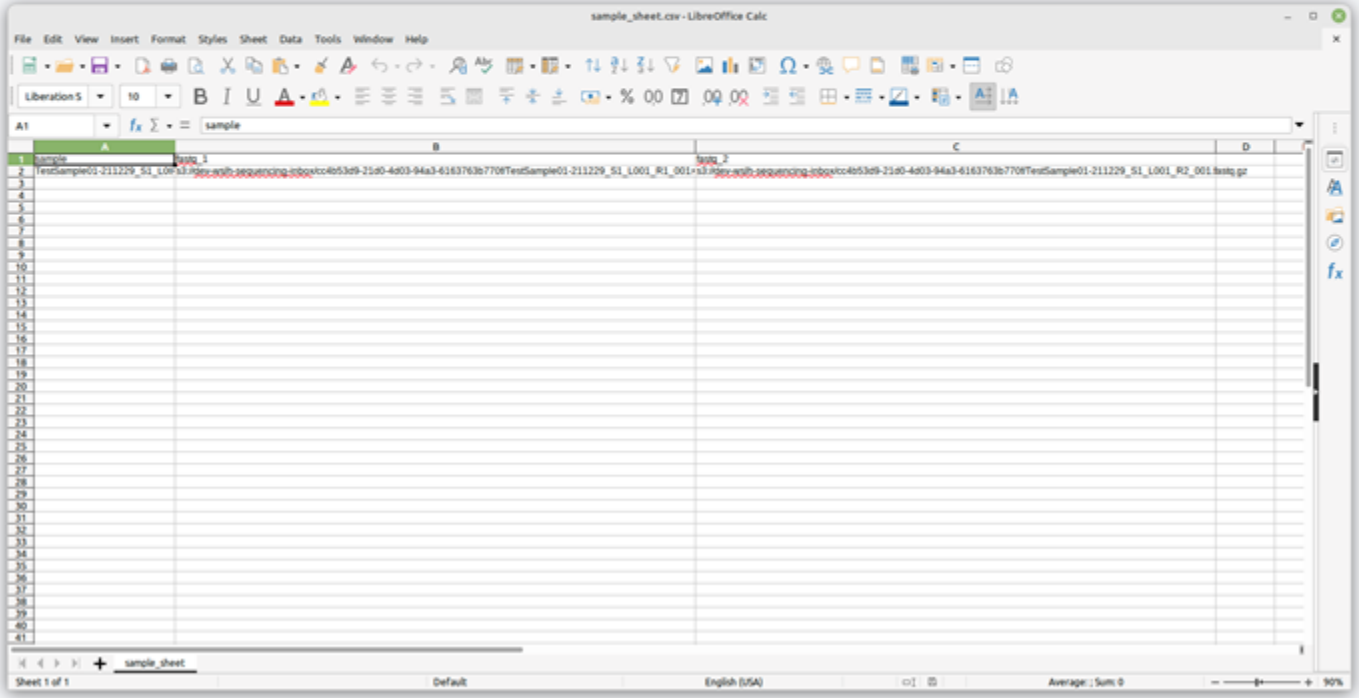
Sequencing

Upload DNA Sequencing Reads

Read upload instructions

Sample sheet | Upload files

Sample ID	Pair 1	Progress	Pair 2	Progress
TestSample01-211229_S1_L001	TestSample01-211229_S1_L001_R1_001.fastq.gz	100%	TestSample01-211229_S1_L001_R2_001.fastq.gz	100%



Easy Genomics

easygenomics.org

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deptagency.com/health

Thank you.

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