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## PathoGFAIR: collection of Galaxy FAIR workflows for pathogen detection and samples comparison

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# PathoGFAIR



Collection of Galaxy FAIR Workflows  
for Pathogen Detection & Samples Comparison

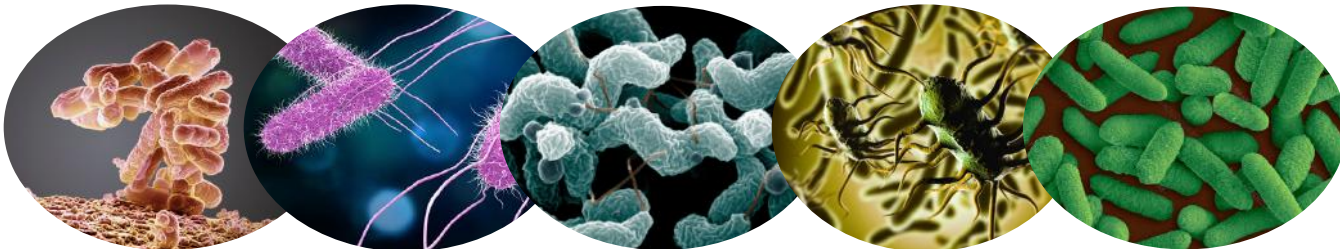
Presented by: **Engy Nasr** from the University of Freiburg

on behalf of all authors: Anna Henger, Björn Grüning, Paul Zierp and Bérénice Batut

# Food Contamination: A Global Health Threat

**Food pathogen:** A harmful microbe in food that can cause illness, including bacteria, viruses, parasites and fungi

Affects **600 million** people a year,  
causing illness and even death



# Pathogen Detection Challenges

## Traditional Methods

PCR (Polymerase Chain Reaction)

Limited to a specific small DNA region

Needs of prior knowledge of DNA

WGS (Whole Genome Sequencing)

Requires prior DNA isolation of a targeted pathogen

Time consuming

## Shotgun Metagenomics Approach: A Breakthrough

Analyzes all genetic material present in a complex sample, such as microbial communities in environmental or clinical samples.

Detects and identifies pathogens & studies interactions and functions between microbes.





**Nanopore sequencing enhances shotgun metagenomics for contamination investigations, offering real-time, long-read data for fast, accurate pathogen detection**

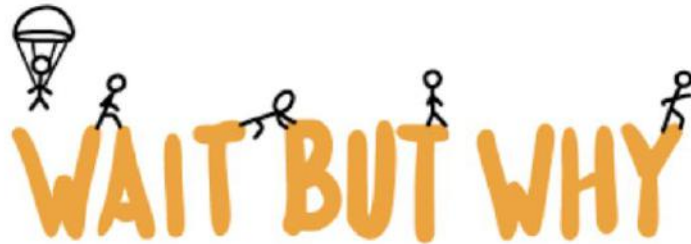
**Crucial for rapid responses**

# Limitations of Other Pathogen Detection Approaches

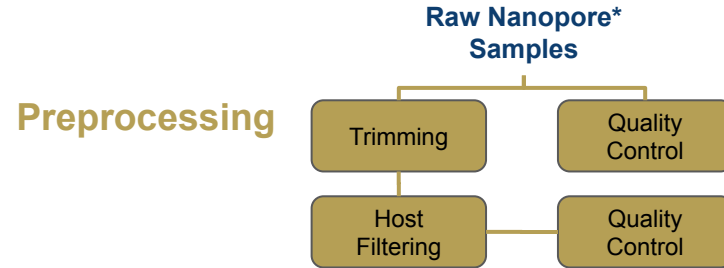
Lack of available, accessible, free or easy-to-use pipelines, e.g. OneCodex, SURPI, and Sunbeam

So we introduce **PathoGFAIR**

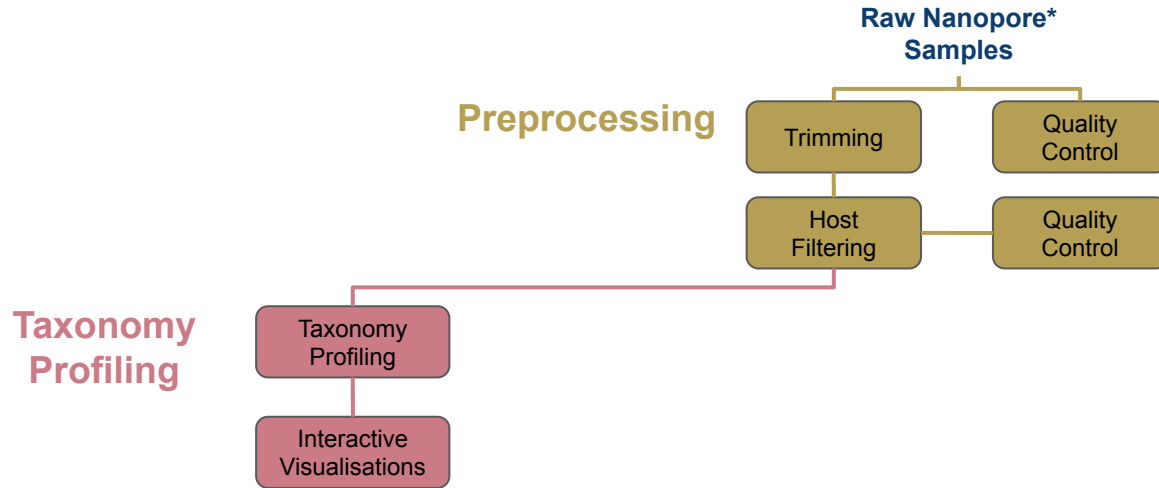
a very cool and awesome series of Galaxy-based **5 FAIR** workflows for  
Pathogen Detection



# PathoGFAIR Workflows



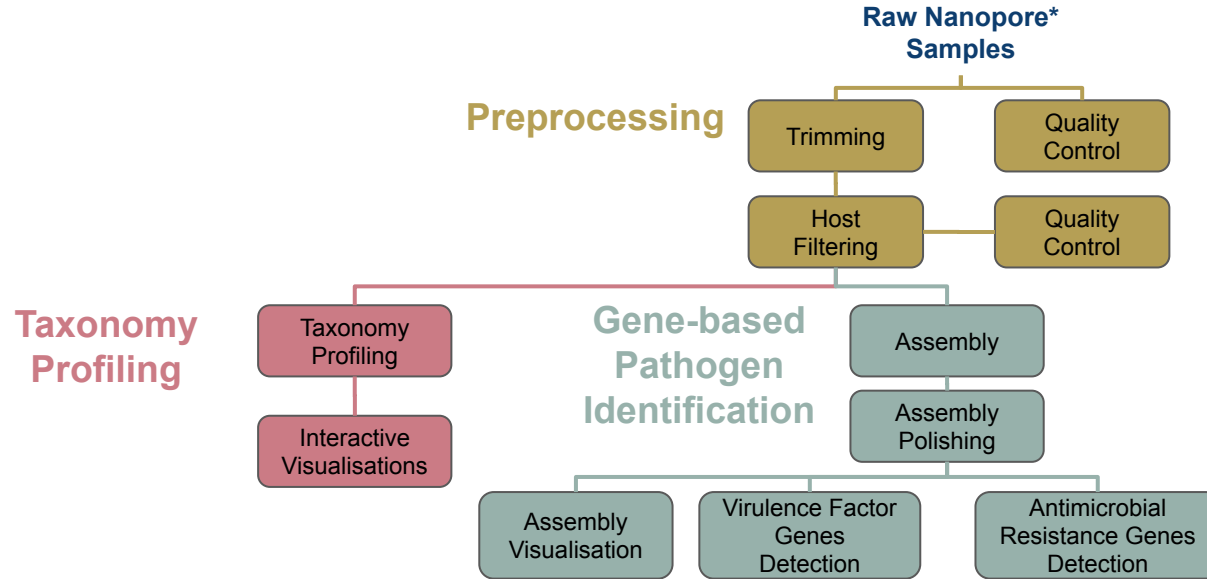
# PathoGFAIR Workflows



\* Easily adaptable to any other type of sequencing technique

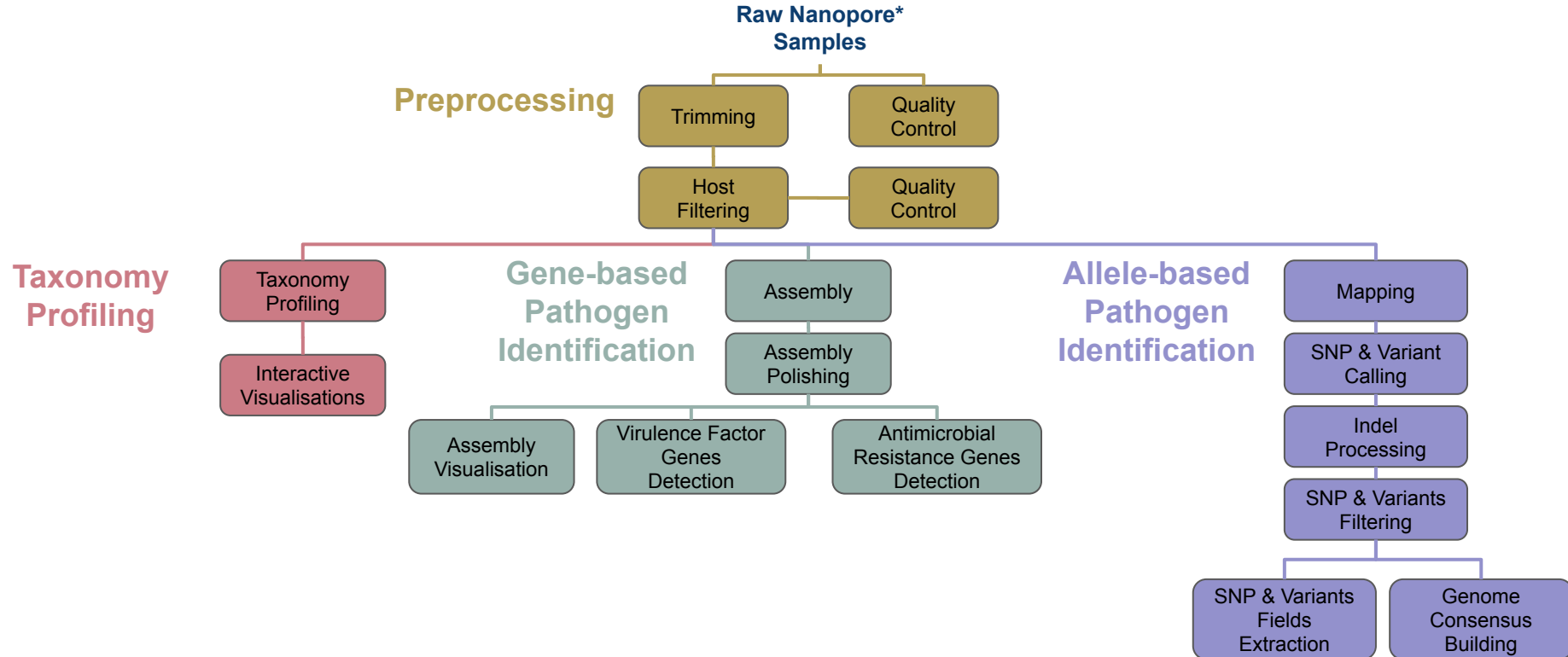


# PathoGFAIR Workflows



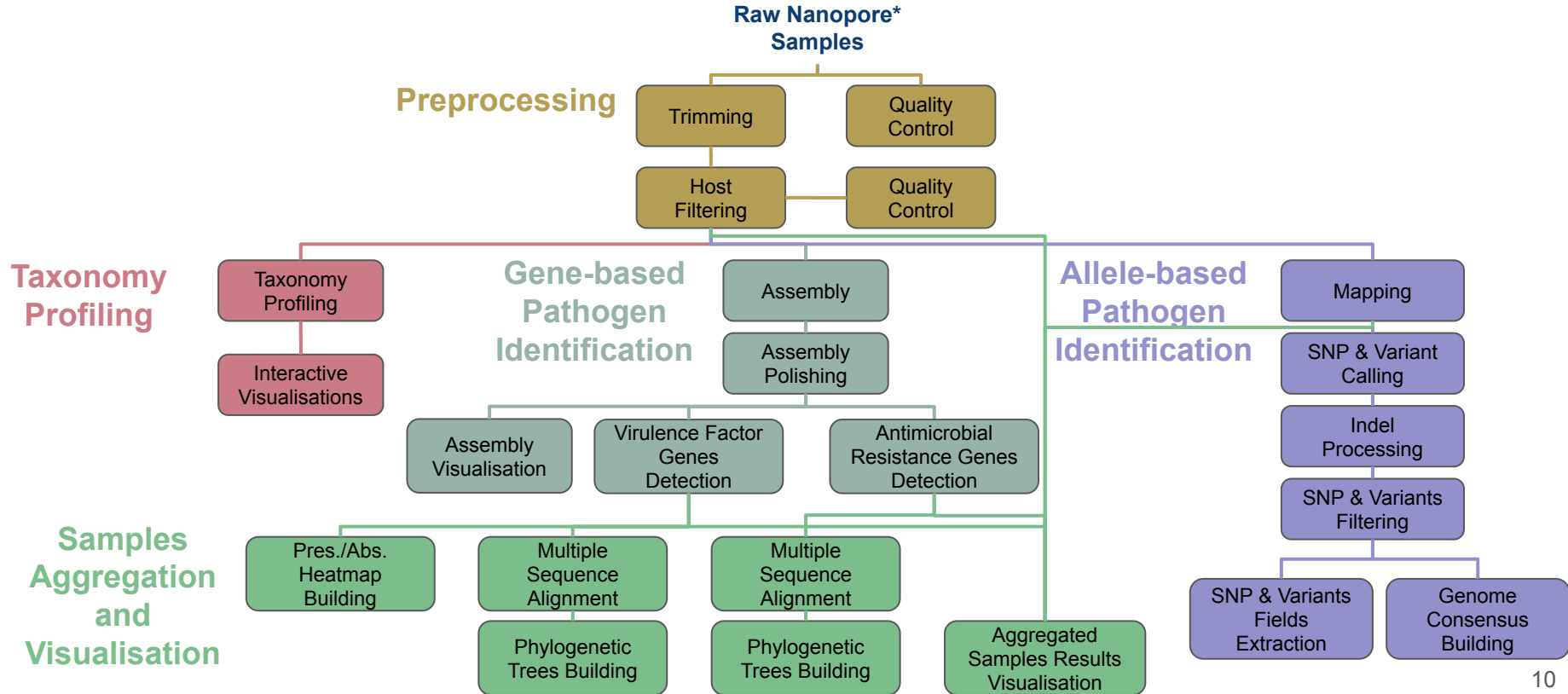
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# PathoGFAIR Workflows



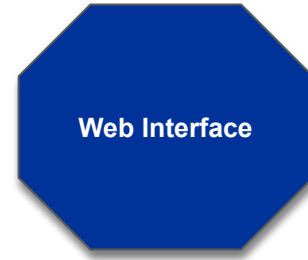
\* Easily adaptable to any other type of sequencing technique

# PathoGFAIR Workflows



\* Easily adaptable to any other type of sequencing technique

# PathoGFAIR is Awesome

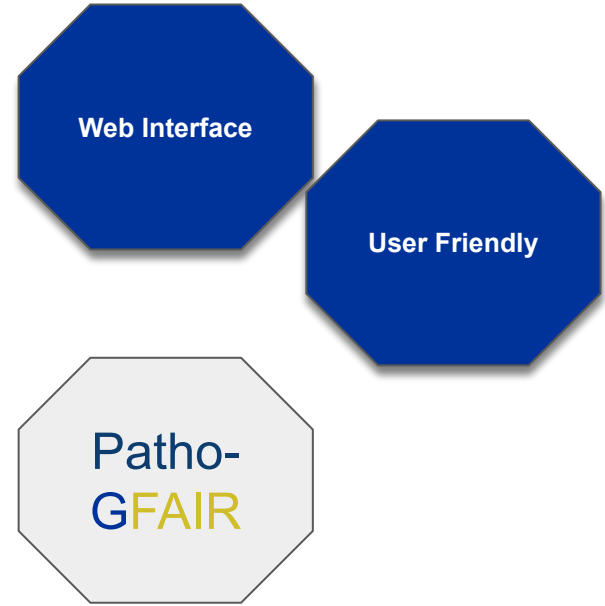


PathoGFAIR workflows are deployable on **all Galaxy servers**, which have a wonderful user friendly web interface



# PathoGFAIR is Awesome

PathoGFAIR is very easy to use, it requires **zero** computer science background, with a simple one mouse click, all analyses, results, visualisations and reports are out



# PathoGFAIR is Awesome

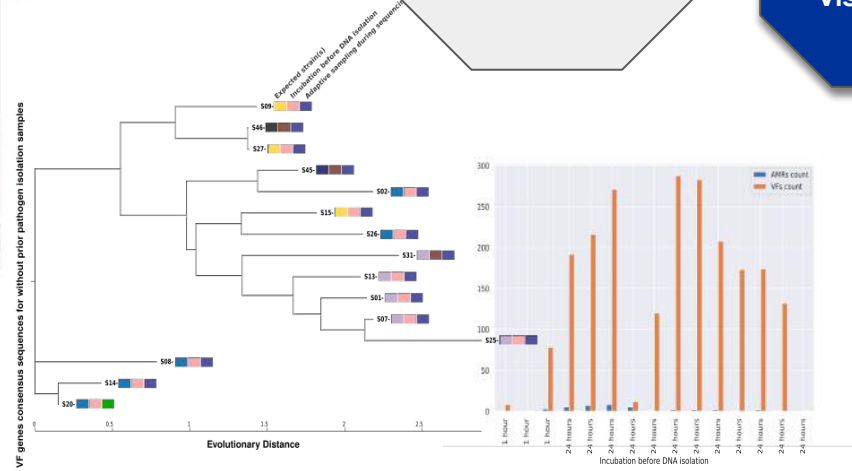
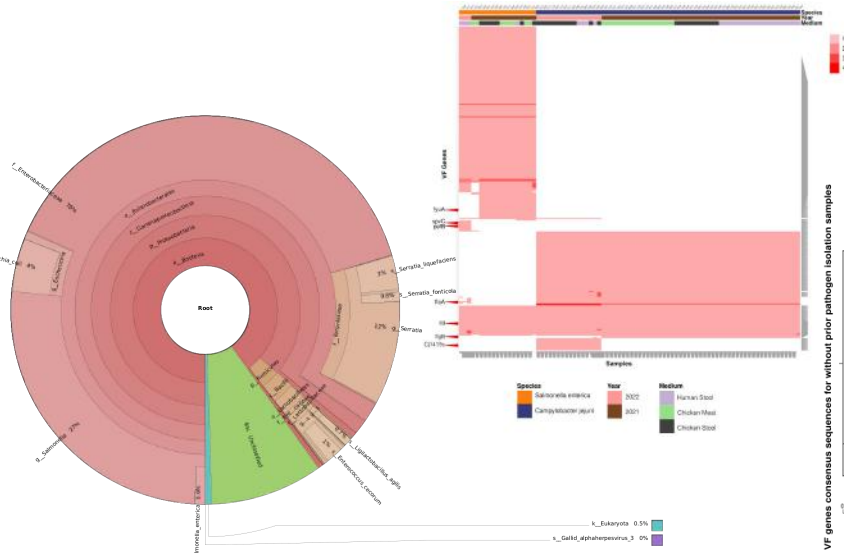
PathoGFAIR provides **reports** highlighting all findings from the performed analyses, which includes multiple interactive and non-interactive visualisations

Web Interface

User Friendly

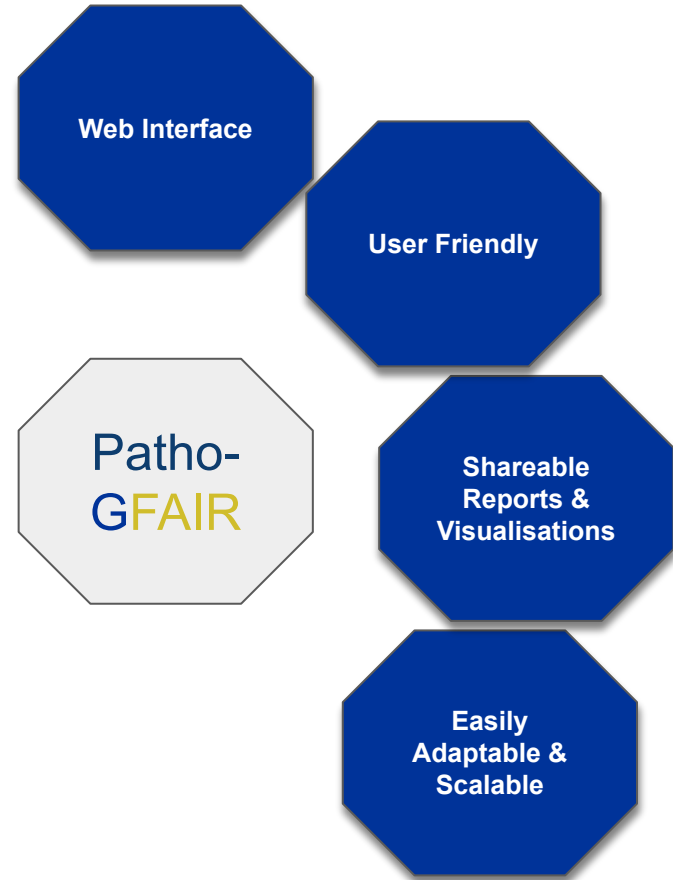
Patho-  
GFAIR

Shareable  
Reports &  
Visualisations



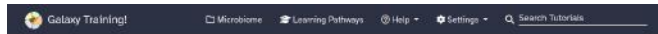
# PathoGFAIR is Awesome

PathoGFAIR is easily **adaptable** to any other type of sequencing technique, and **scalable** to thousands of datasets



# PathoGFAIR is Awesome

PathoGFAIR has a training material on our awesome Galaxy Training Network ([GTN](#)),



Pathogen detection from (direct Nanopore) sequencing data using Galaxy - Foodborne Edition

Author(s)  Berénice Batus  Enay Nasr  Paul Zierop

Editor(s)  Hans-Rudolf Hotz  Wolfgang Maier



Web Interface

User Friendly

Patho-  
GFAIR

Shareable  
Reports &  
Visualisations

Training  
Material &  
Documentation

Easily  
Adaptable &  
Scalable



# PathoGFAIR is Awesome

PathoGFAIR has a training material on our awesome Galaxy Training Network ([GTN](#)), and a full documentation on PathoGFAIR [GitHub](#) repository

 PathoGFAIR-FAIR-Workflows-for-Pathogen-Detection-and-Samples-Comparison Public

 Pin  Unwatch





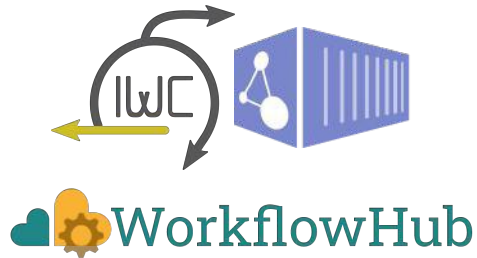
# PathoGFAIR is Awesome

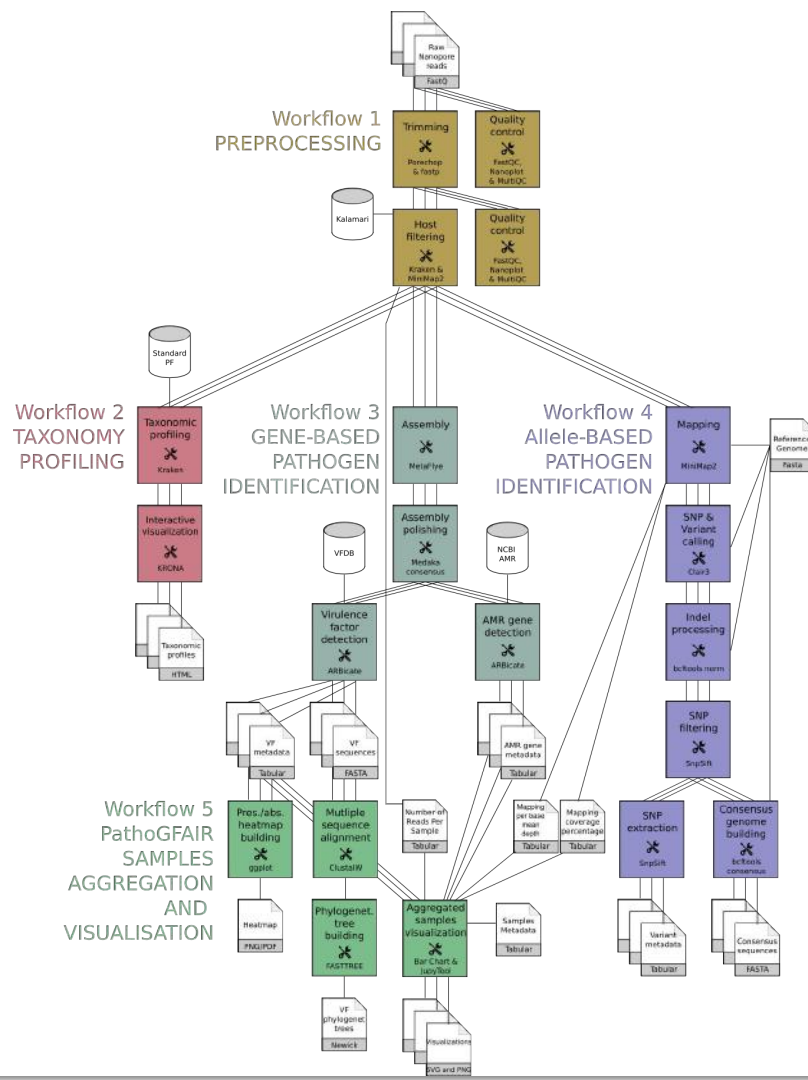
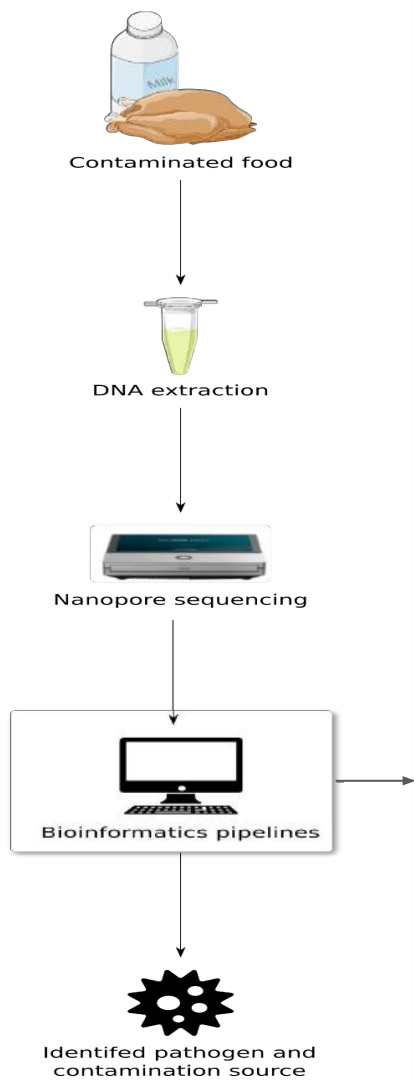
All tools used in PathoGFAIR workflows have available free **conda** packages and are wrapped in **Galaxy tool wrappers**



# PathoGFAIR is Awesome

All 5 PathoGFAIR workflows are fully annotated, shared, and instantly deployable via the Intergalactic Workflow Commission (IWC), **Dockstore** and **WorkflowHub**





Packaged open source tools

Explicit user friendly workflow environment

Freely available to be directly run

Annotated, shared and deployable

Training and Documentation

Tested successfully on 130 samples

# Thank You ...

## All authors



Engy Nasr



Anna Henger



Björn Grüning



Paul Zierp



Bérénice Batut

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Wolfgang Maier



Mina Ansari

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Tobias Schindler



Marius van den Beek

## EOSC-Life For Funding



PathoGFAIR

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# Thank You

Questions?

Waiting for you all in the **Pathogen Detection Training**

**Today at 13:00, Room: Congress hall B**