

Epiverse TRACE

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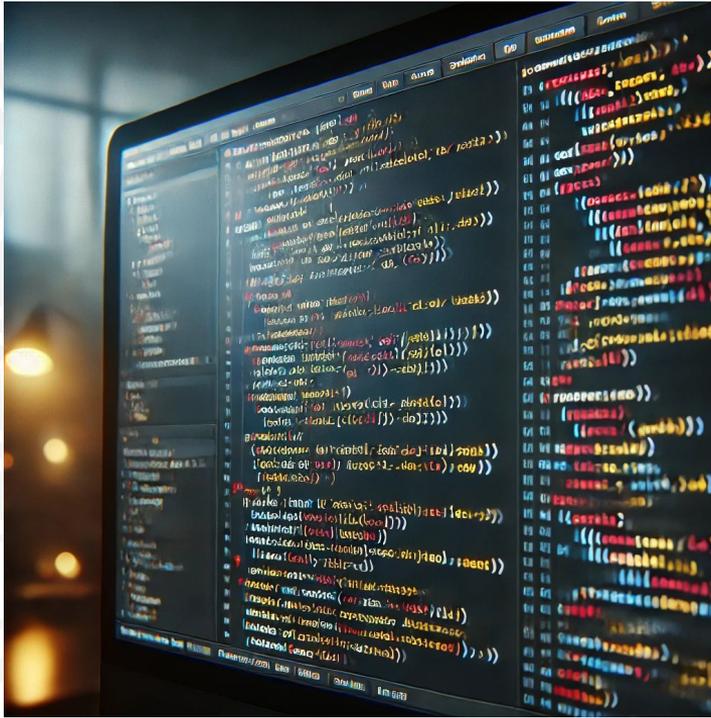
A collaborative
software
ecosystem for
outbreak analysis
and modelling

IDM 2024

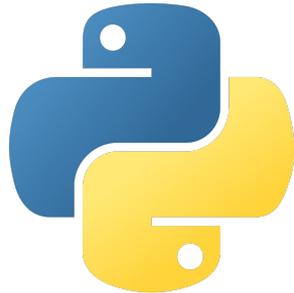
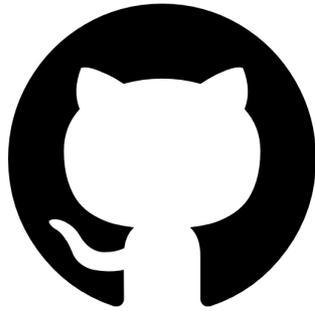
Presented by Joshua W. Lambert on behalf of the Epiverse-TRACE team



You're not
expected to build
your own computer



You're not
expected to write
your own
operating system



So do we require
epidemiologists to
engineer and
maintain software
for epidemic
analysis?



“
You don't build a fire
engine when there's
a fire.
”

The Epiverse initiative

LONDON
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HYGIENE
& TROPICAL
MEDICINE



data.org



Pontificia Universidad
JAVERIANA
Colombia



The **Epiverse** is

- Software
- Training
- Co-creation
- Community

Epiiverse is software

Early tasks

Middle tasks

Late tasks



Epiverse software is

- Documented
- Tested
- Interoperable
- Collaborative
- Open



Epiverse is training

Early tasks

- Read case data
- Clean case data
- Validate case data
- Aggregate and visualize

Middle tasks

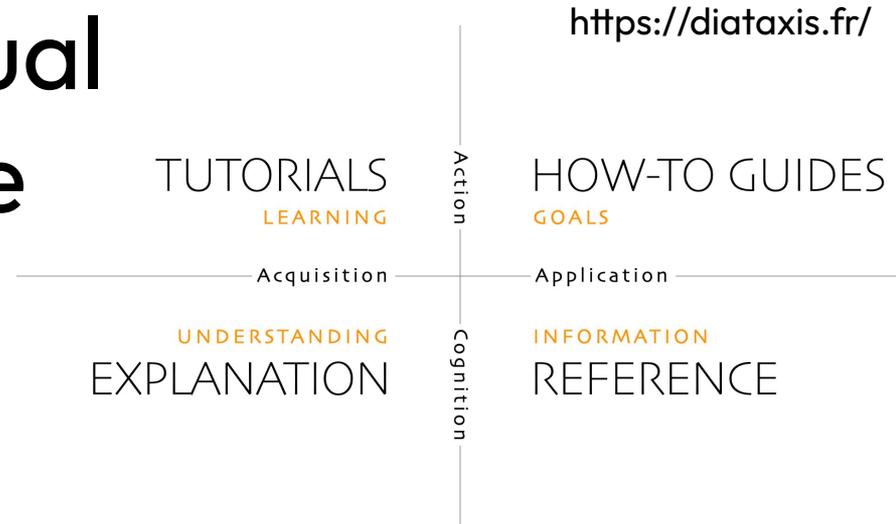
- Access epidemiological delay distributions
- Quantifying transmission
- Use delay distributions in analysis
- Create short-term forecast
- Estimate outbreak severity
- Account for superspreading
- Simulate transmission chains

Late tasks

- Simulating transmission
- Choosing an appropriate model
- Modelling interventions
- Comparing public health outcomes of interventions

Epiverse training is

- Designed Curriculum (Learner Personas)
- Multi-lingual
- Interactive
- Open



Epiverse training is

Epiverse tutorials

TUTORIALS

LEARNING

Action

HOW-TO GUIDES

GOALS

Acquisition

Application

UNDERSTANDING

EXPLANATION

Cognition

INFORMATION

REFERENCE

<https://epiverse-trace.github.io/tutorials.html>

Epiverse training is

Epiverse tutorials

TUTORIALS

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Epiverse howtos

HOW-TO GUIDES

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Epiverse training is

Epiverse tutorials

TUTORIALS

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EXPLANATION

Epiverse vignettes

Epiverse howtos

HOW-TO GUIDES

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<https://epiverse-trace.github.io/<package>/articles/<vignette>.html>

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Epiverse references

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<https://epiverse-trace.github.io/<package>/reference/index.html>

Epiverse is co-creation

Level of involvement



Standardise

Develop tools
interoperable
with Epiverse

Integrate

Incorporate
tools to
Epiverse
pipelines

Co-create

Co-develop
tools hosted
externally

Consult

Contributions
from Epiverse
to external tools

Participate

Co-develop
tools hosted
by Epiverse

Epiverse co-creation is

Level of involvement

Standardise

Develop tools interoperable with Epiverse

Epi-pipeline community:
WHO Collaboratory & Epiverse

Integrate

Incorporate tools to Epiverse pipelines

R packages for epidemiological parameters:

{epiparameter} ←→ {epireview}
Epiverse PERG

Co-create

Co-develop tools hosted externally

Consult

Contributions from Epiverse to external tools

Participate

Co-develop tools hosted by Epiverse

Social contact matrix collaboration
{contactmatrix}

{conmat} ←→ {socialmixr}
Kids Institute, Australia LSHTM, UK

Epiverse is community

Co-organisation of
workshops and hackathons

**Refining the Global Repository of
Epidemiological Parameters data schema**
Collaboratory workshop

Meeting report
WHO Hub for Pandemic and Epidemic Intelligence
Berlin, Germany
May 14 - 16, 2024

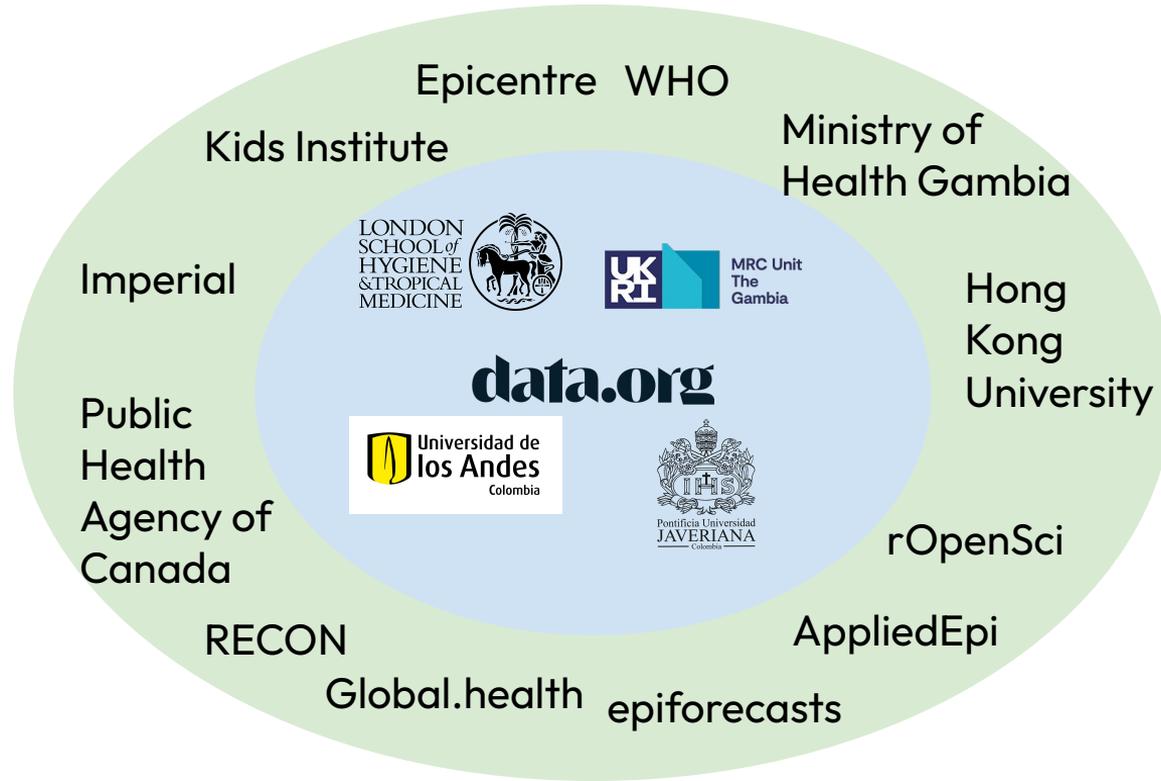
Direct engagement with public health

**What Should the First 100 Lines of Code Written
During an Epidemic Look Like?**

Discussion board

The screenshot shows the 'epiverse-trace' discussion board interface. At the top, there is a search bar with the placeholder text 'Type [Z] to search' and navigation icons for home, overview, repositories (60), discussions (selected), projects (27), packages, teams (2), and people (38). Below the navigation bar, there are two main sections: a 'Welcome to Epiverse-TRACE Discussions!' section with a blue header and an 'Announcements - Bisaloo' link, and a 'Resource section' with a purple header and an 'Announcements - chartgerink' link. At the bottom, there is a search filter 'is:open', a 'Sort by: Latest activity' dropdown, a 'Label' dropdown, a 'Filter: Open' dropdown, and a green 'New discussion' button.

Epiverse community is





Why is **Epiverse**



Outbreak analytics is predictable



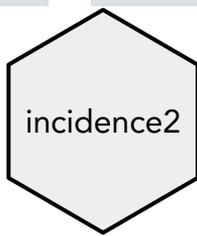
Import line list data

Clean & standardise

Convert to incidence

Estimate reproduction number

Simulate epidemic



Import epidemiological parameter



Import contact matrix



Outbreak analytics is predictable



Import line list data

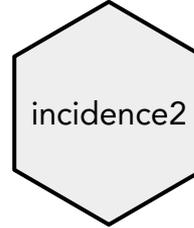
Clean & standardise

Convert to incidence

Estimate case fatality risk



Import epidemiological parameter





Take home message

- Freedom to write and share software is needed
- Reliable, easy-to-use tools should be available when needed
- Epidemic preparedness needs proficiency with the tools required
- Community-driven development and maintenance of software for outbreak response

Epiverse team

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& TROPICAL
MEDICINE



- Adam Kucharski
- Sebastian Funk
- Rosalind Eggo
- Joshua Lambert
- Carmen Tamayo
- James Azam
- Andree Valle



- Bubacarr Bah
- Nuredin Mohammed
- Karim Mane
- Banky Ahadzie
- Abdoelnaser Degoot
- Atta Lowe

TRACE-LAC



- Zulma Cucunubá
- Catalina González-Uribe
- Juan Manuel Cordovez
- Mauricio Cortés
- Laura Gómez Bermeo
- José Velasco
- Miller Diaz Valderrama
- Natalia Niño Machado
- Jaime Pavlich-Mariscal
- Andres Moreno Barbosa
- Adriana Buitrago-López
- Magda C. Cepeda
- Geraldine Gómez
- David Santiago Quevedo
- Nicolás Torres
- Juan Daniel Umaña
- José Bocanegra
- María Camila Tavera



- Julián David Otero
- Juan Montenegro Torres
- Mabel Chavarro
- Hawyn Ernesto Diaz Mora
- David F. Gallo Caycedo
- Denís Toledo Nieto

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- Hugo Gruson
- Chris Hartgerink



Thank you for
listening

Any
questions?

Epiverse GitHub



Get involved