

Integrating environmental sustainability into bioinformatics training and delivery

SC4RC, 6 May 2026



Flaminia Zane

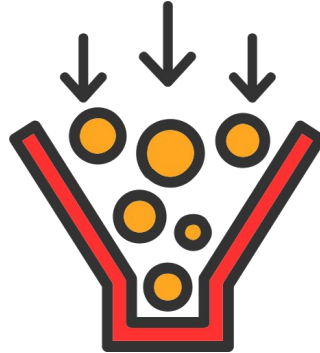
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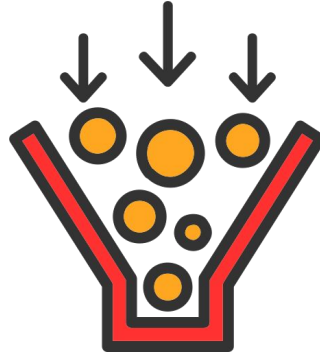
A brief introduction to bioinformatics

Since the '90s, advances in technologies have led to a boom in **biological data production**



A brief introduction to bioinformatics

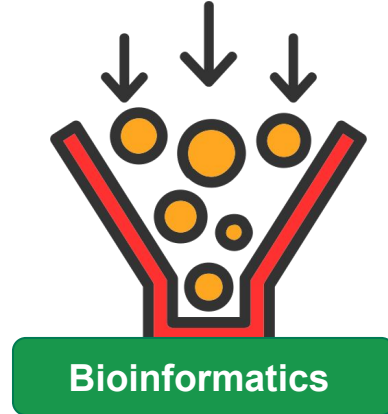
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Interpreting data, answering biological question and developing new questions

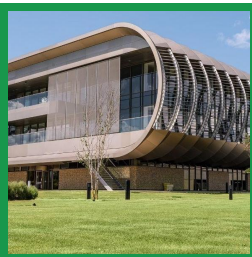
A brief introduction to bioinformatics

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Interpreting data, answering biological question and developing new questions

The European Molecular Biology Laboratory



EMBL-EBI

Bioinformatics



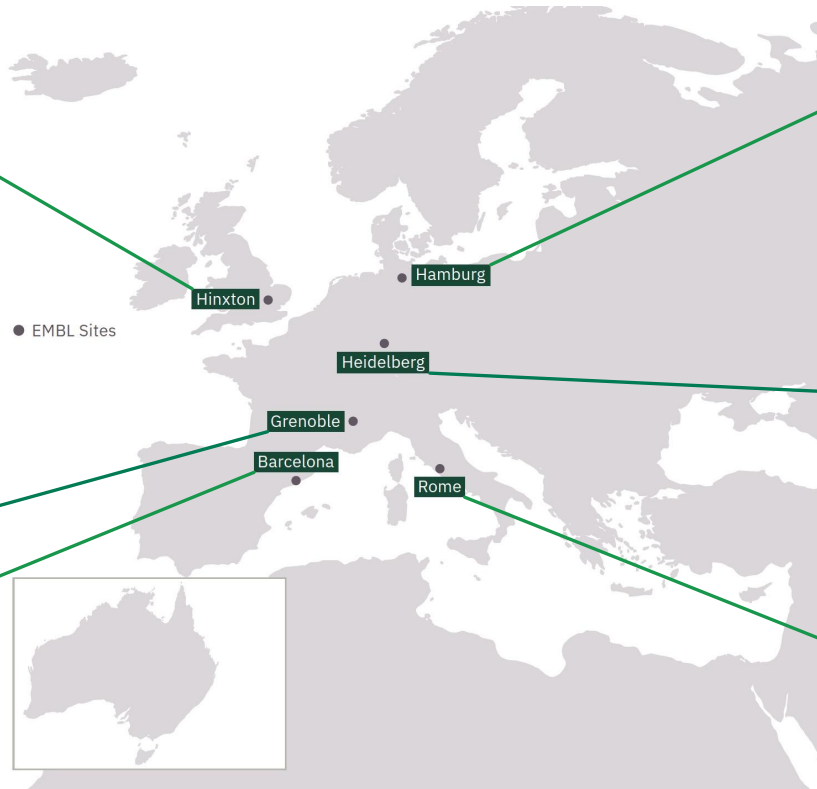
Grenoble

Structural biology



Barcelona

Tissue biology
and disease
modelling



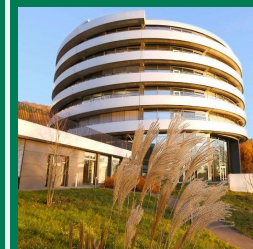
Hamburg

Structural biology



Heidelberg

Life sciences



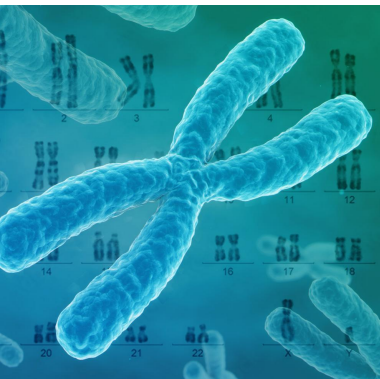
Rome

Epigenetics
and neurobiology

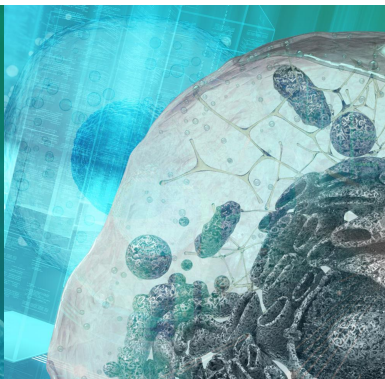


EMBL-EBI = EMBL's European Bioinformatics Institute

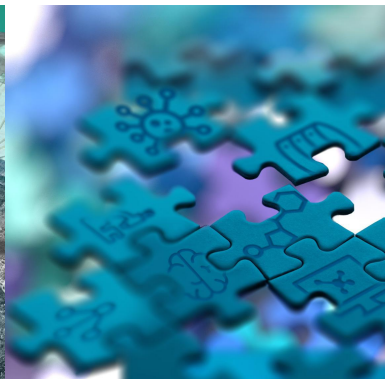
Our mission



Deliver data
resources



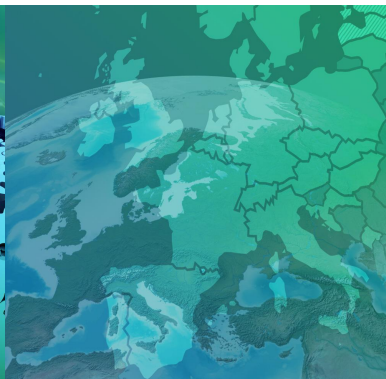
Perform excellent
research



Train the next
generation of
scientists



Engage with
industry



Support
bioinformatics
efforts
in Europe

Transitioning to sustainable science

- EMBL Sustainability Office (2020)



Environmentally Responsible Research

Our operational focus is on: Energy Consumption & Emissions, Waste & Resource Efficiency, Business & Commuter Travel, and Sustainable Construction.



Environmentally Relevant Research

The biggest impact EMBL can have on the environment is through the insights and knowledge created by our research.

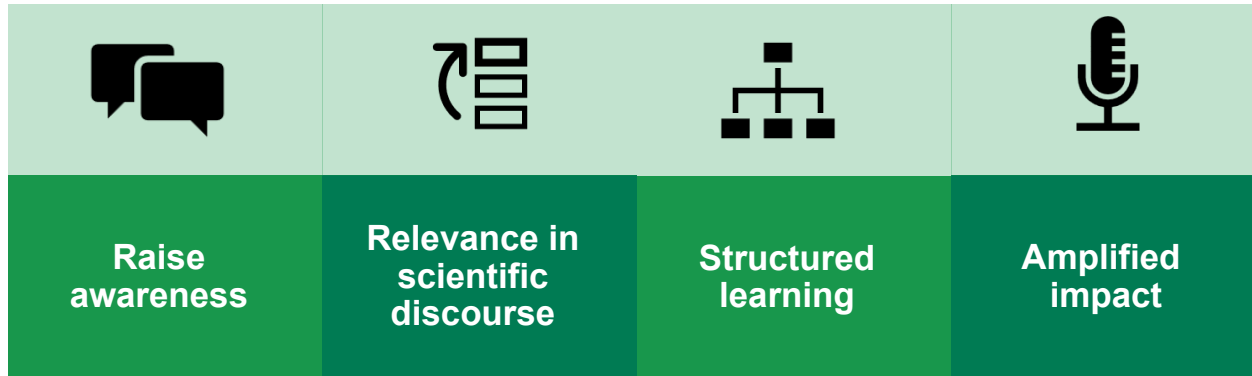


Promoting Sustainable Science

We want to lead a transition to more sustainable scientific research across Europe through transparency and openness.

<https://www.embl.org/about/info/sustainability>

The role of training in the transition



EMBL-EBI Training in a nutshell



Live training

Join us – virtually or in person – to learn with other scientists from around the world



On-demand training

Dive straight into learning through our online tutorials, course materials and recorded webinars



Support for trainers

We support you and your courses with open resources and skills development

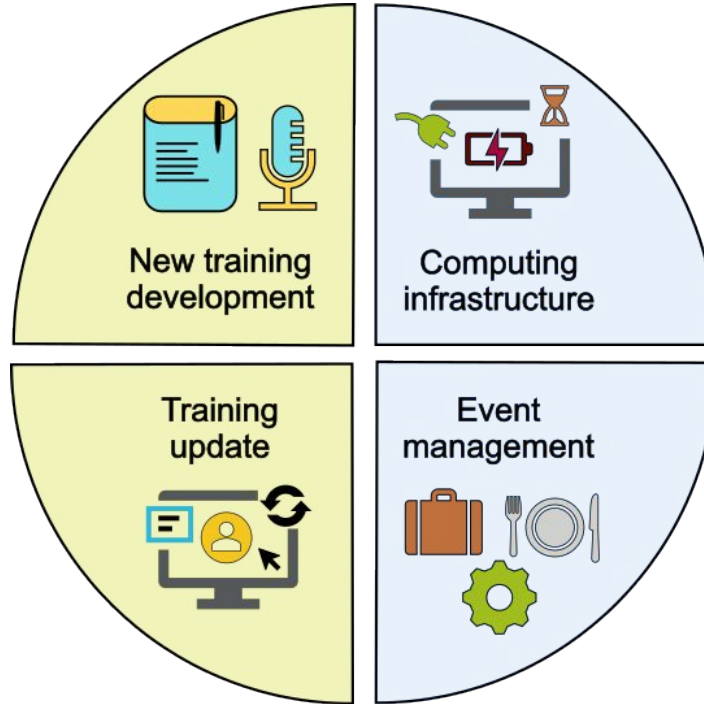


Partnerships

We collaborate to innovate in scientific training best practice, and to champion open science globally

A “greener” bioinformatics training

Content



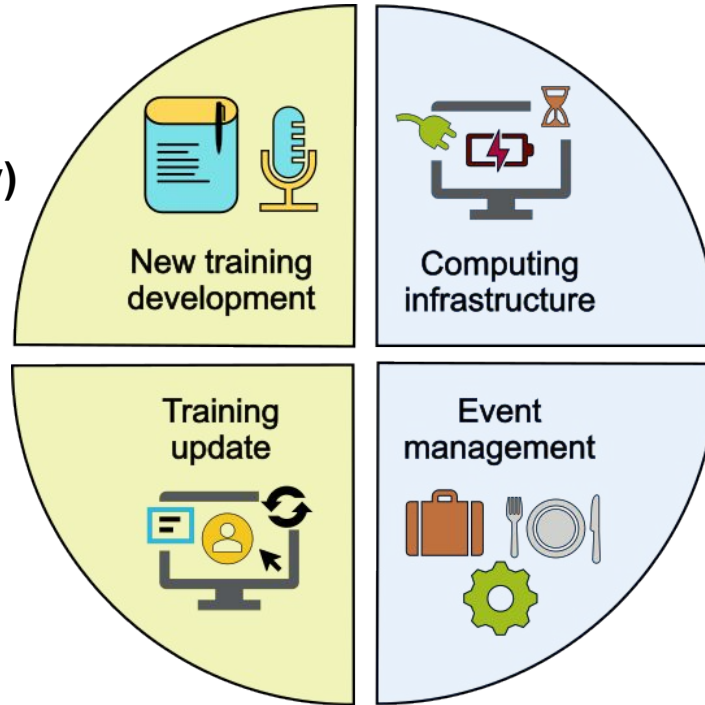
Operations

A “greener” bioinformatics training

New, tailored training
(from materials to delivery)

Content

Update and integrate
existing content



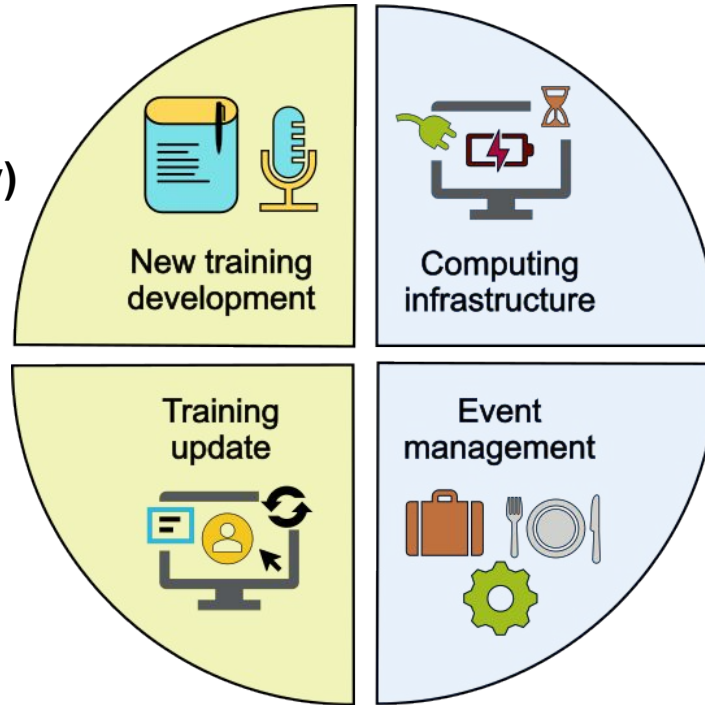
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Optimising computing
infrastructure for training
activities

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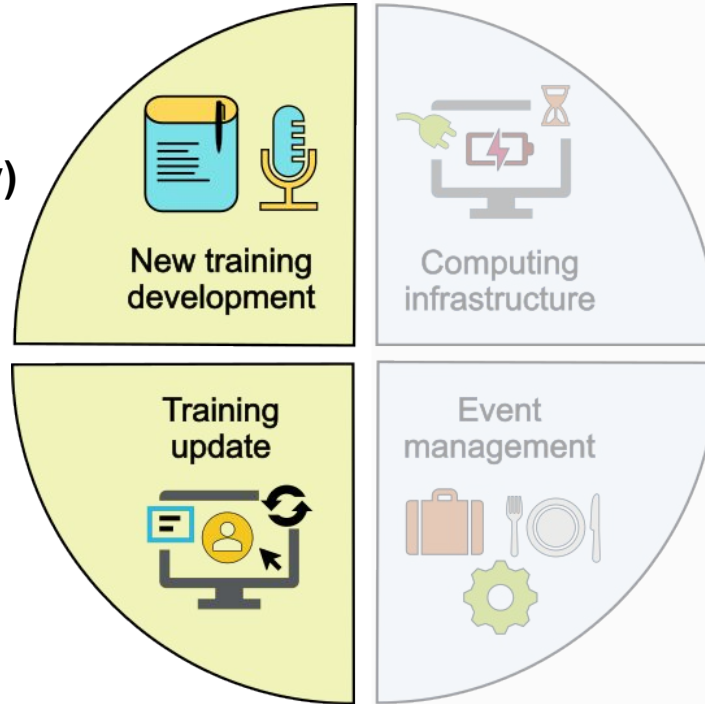
Events & logistics:
Travelling, catering...

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Events & logistics:
Travelling, catering...

New training development

- With **Cambridge Sustainable Computing Lab** (Cambridge University)
- **E-learning:** webinars & on-demand courses
- Wide outreach; free and open on EBI Training website; flexible time commitment



“Sustainable computing in science”

- Open, on-demand introductory course. **February 2026**
- **Target audience:** everyone interested in the environmental impacts of computing



Enter course

♥ Mark as favourite

Time to complete:
3 hours

This course includes:

- 🔪 Activities
- ☰ Quizzes
- 🎥 Videos

Written by:
Loïc Lannelongue
Flaminia Zane

In this course, we will introduce the different ways in which computing infrastructure and activities impact the environment, and in particular, how this relates to scientific research. We will look at how to quantify these impacts and explore the tools available to help us do so. Finally, we will discuss how we can, as researchers or computer users, reduce the footprint of our work, along with the challenges we might face.

[Course overview](#) [Course contents](#) [Getting started](#) [Competencies](#)

[Feedback and help](#)

Who is this course for?

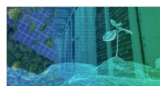
This course is designed for anyone involved in computational work, from students to researchers in both academic and industry settings. It is also suitable for everyone who is interested in the environmental impact of computing. No prior knowledge of computing infrastructure is required.

This course has been developed in collaboration with the [Cambridge Sustainable Computing Lab](#) at the University of Cambridge. It was supported by funding from the Wellcome Trust Foundation and the University of Cambridge.



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5k views
from 688 users

“Sustainable computing in science”



We are looking for **feedback!**

*“... I will use it to **advocate within my research institution** for behaviour and organisational change. Enjoyed the **interactivity** of it...well **structured...**”*

*“Perhaps showcase examples of institutions and teams who have embedded this knowledge into their practices. **Concrete examples for inspiration and reflection.**”*

Update and integrate existing content

Plug-in new content in already established live courses we run yearly.

Live courses

- **Pros:** Reaching a not-already-engaged audience

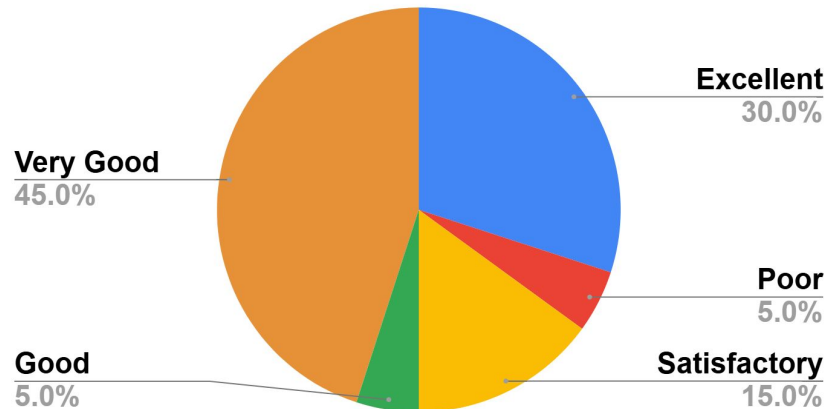
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Environmental impact of computational biology (Loïc Lannelongue, “Data science for life scientists”, 2025)



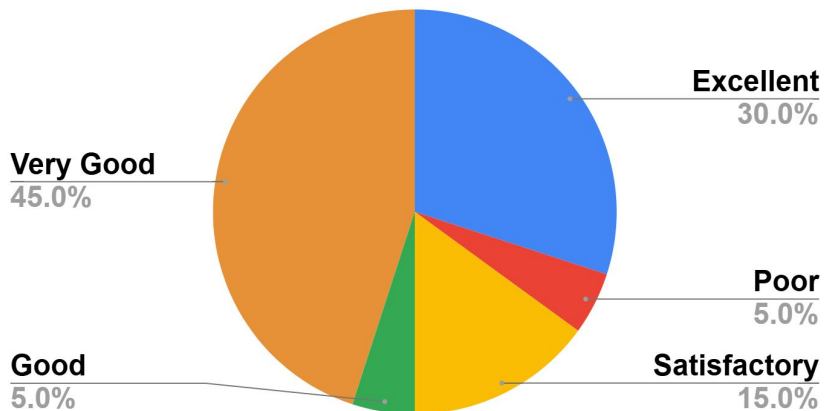
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“I had no idea how computing can impact the environment in such drastic ways especially with AI use!”

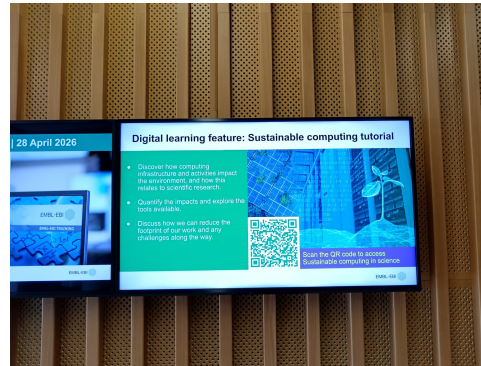
Raising awareness during our courses

Course intro & wrap up

Slide carousel outside training rooms

Handbook update

- Course info, EMBL, Training offer
- **Green practices in bioinformatics**
- Already done for EMBO-sponsored courses (2025)



*With special thanks to
Rebecca Nicholl!*

Overview

Search

Welcome

Introduction

Code of conduct

Pre-course challenges

Programme

Additional resources

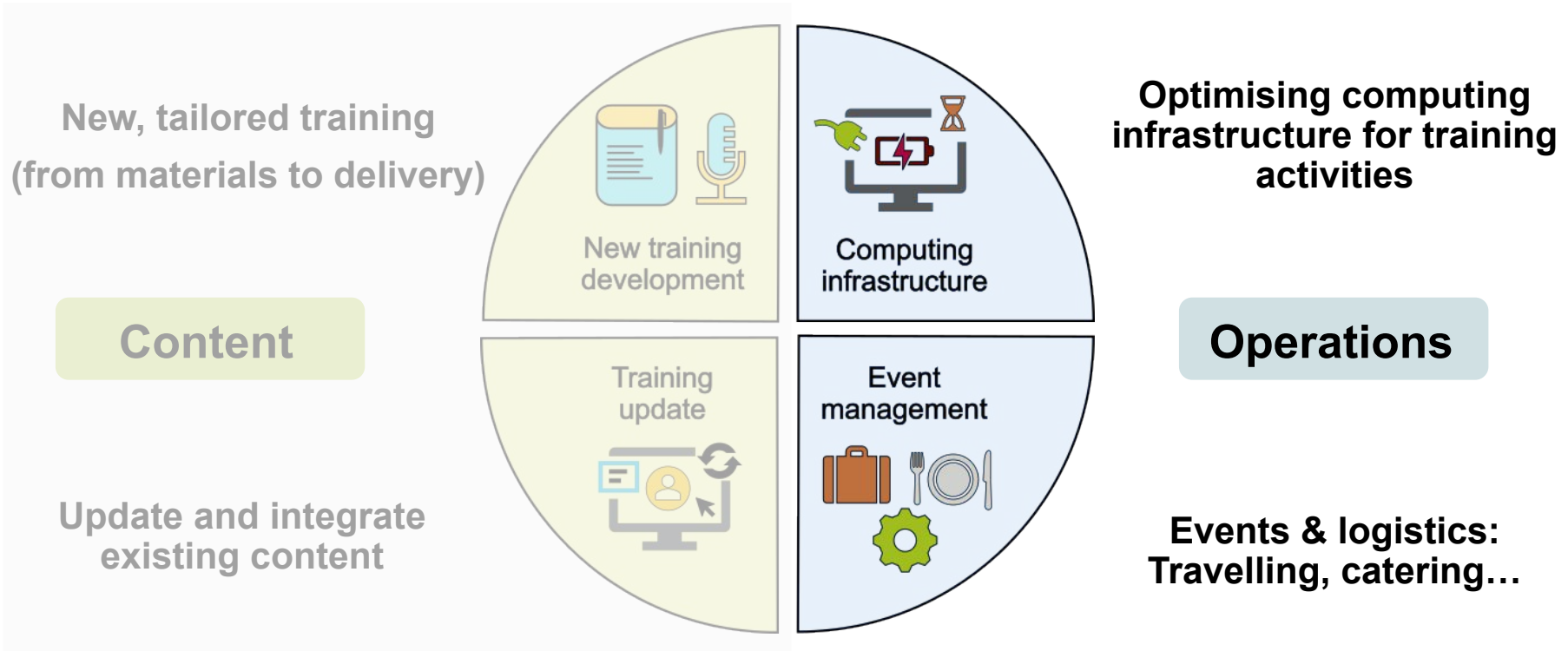
Help sheets

Further learning

What's next on content development

- **Planning/Brainstorming**
 - **Webinar series** (tools demo, case-studies...)
 - **Hands-on session** for live courses
- **Mapping** audiences and their needs
- **Ideas** are welcome!

A “greener” bioinformatics training



Computing infrastructure

- Our bioinformatics live courses involves around 50% of hands-on work

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Virtual Machines

- Amazon Web Services (AWS) provider (switch from local cluster in 2022)
- **Flexibility:**
 - one environment per course and/or session
 - tailored to computational needs
 - easy to switch on/off
- Reduced **maintenance** and improved **security**
- Reductions in **costs**

Computing infrastructure

Goal: evaluating carbon footprint of computing usage

Status: exploring!

Working in collaboration with the ITS Applications Team at EMBL-EBI

Computing infrastructure

Goal: evaluating carbon footprint of computing usage

Status: exploring!

- **Reporting** carbon footprint of each course (monitoring:transparency)
 - Data collected for 2025
 - How do we **interpret** this data?
- Consider **carbon intensity** when choosing data centre
- **AWS** vs other providers

Working in collaboration with the ITS Applications Team at EMBL-EBI

Computing infrastructure

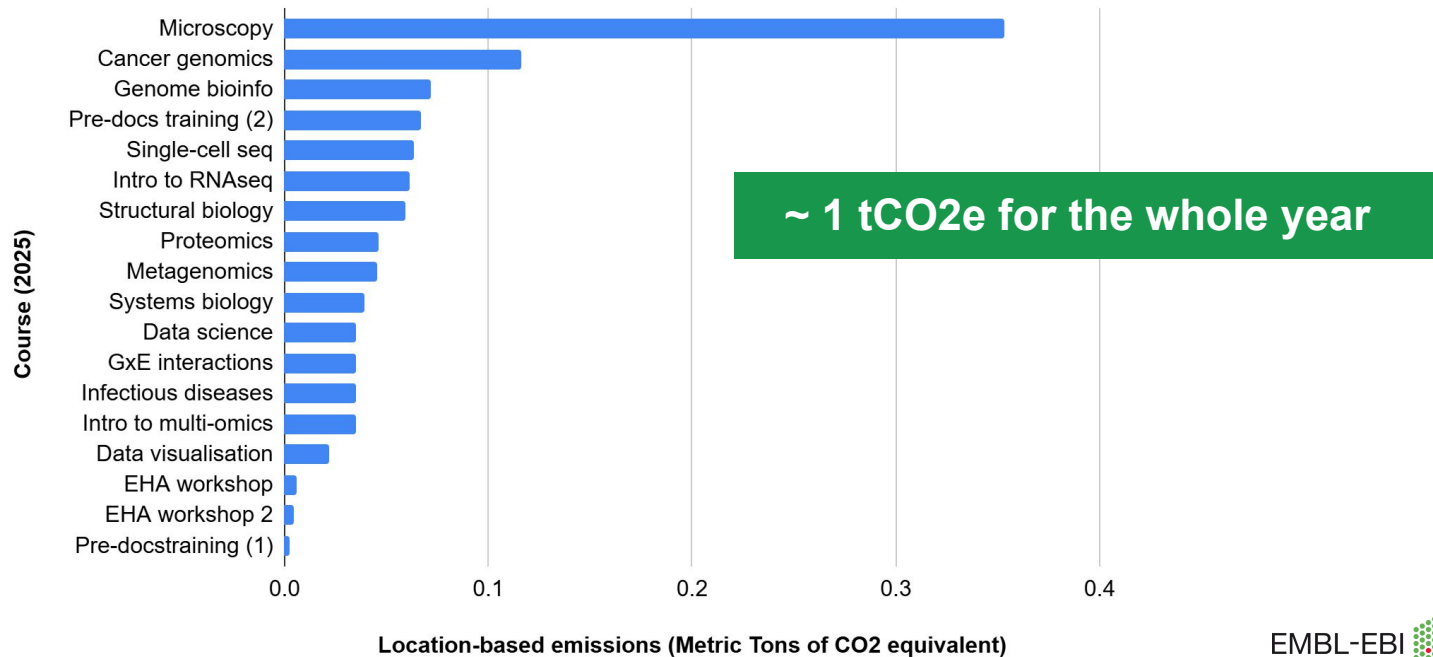
Interpreting and evaluating emissions report from AWS

- **Location-based** vs **Market-based** methods

Computing infrastructure

Interpreting and evaluating emissions report from AWS

- **Location-based vs Market-based** methods



Event management

- EMBL events sustainability pledge: guide and support
- Work in progress



Sophie Spencer
Senior Events Manager

Travelling & Accommodation

- On-site accommodation
- Shuttles from local train stations
- Dedicated slack channel

Venue & Facilities

- Working with EMBL-EBI facilities team
- Ensuring equipment is switch off

Catering

- Locally sourced suppliers (when possible)
- Trialling one vegetarian day

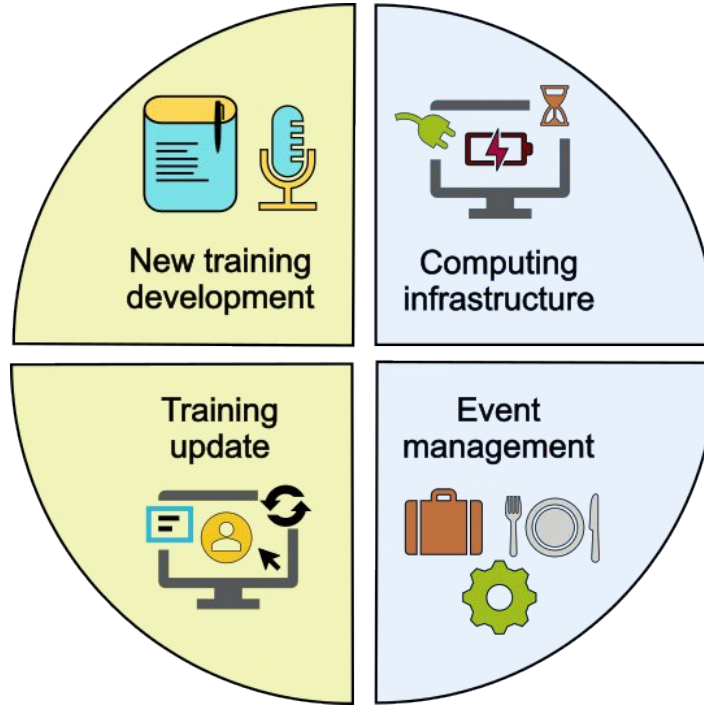
Engagement

- Plans for “Sustainability booth” next to Training Rooms

**Dedicated page on our website
currently in development!**

A “greener” bioinformatics training

Content



Operations

A “greener” bioinformatics training

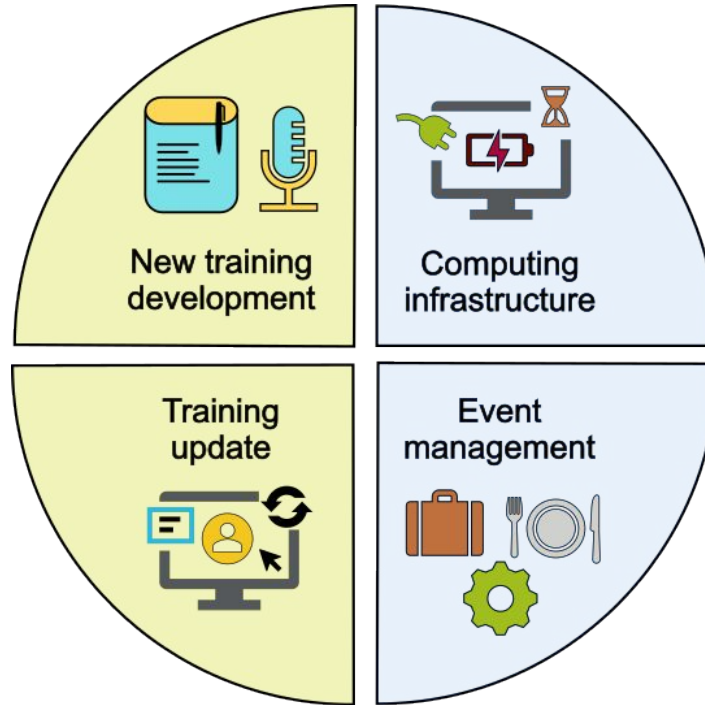


E-learning



Audience mapping & prioritisation

Content



Operations

A “greener” bioinformatics training



E-learning



Audience mapping & prioritisation

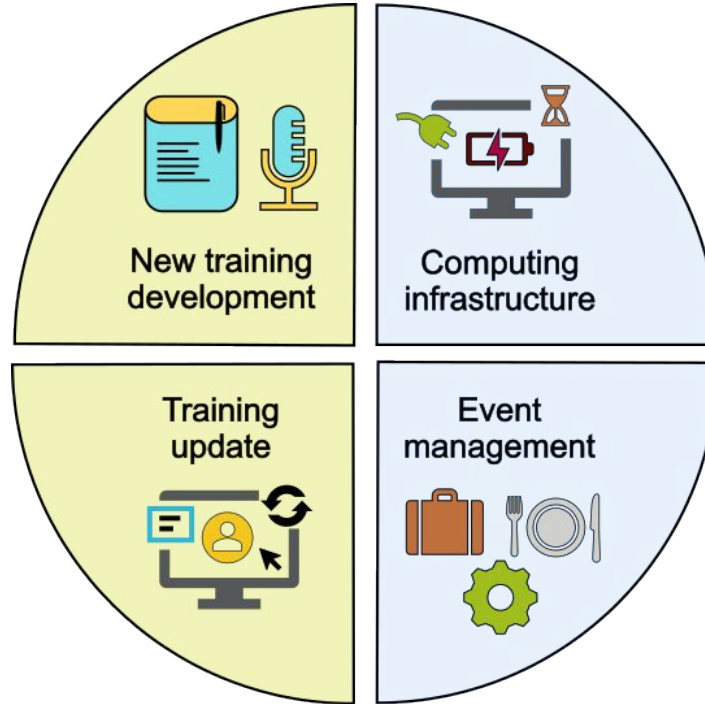
Content



Raising awareness



**Hands-on training
(Trainers expertise & organisers engagement)**



Operations

A “greener” bioinformatics training



E-learning



Audience mapping & prioritisation

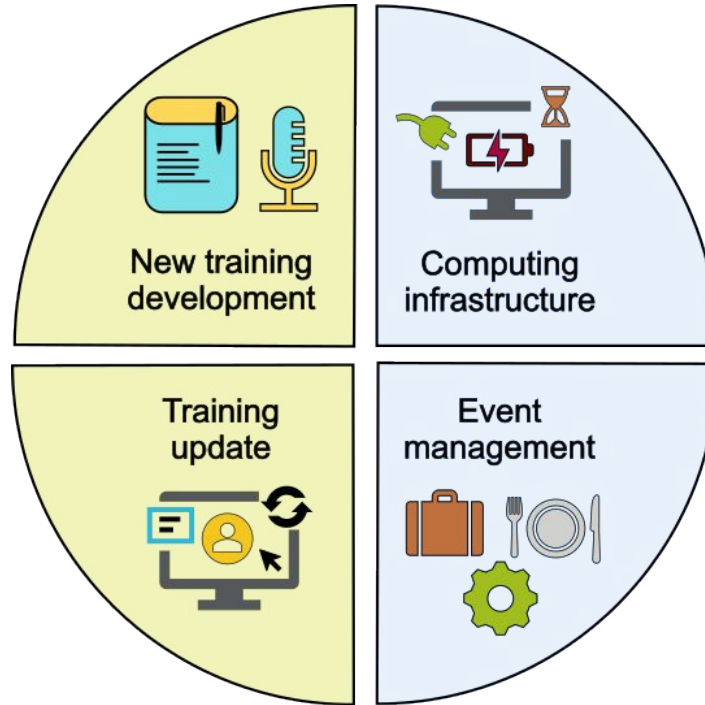
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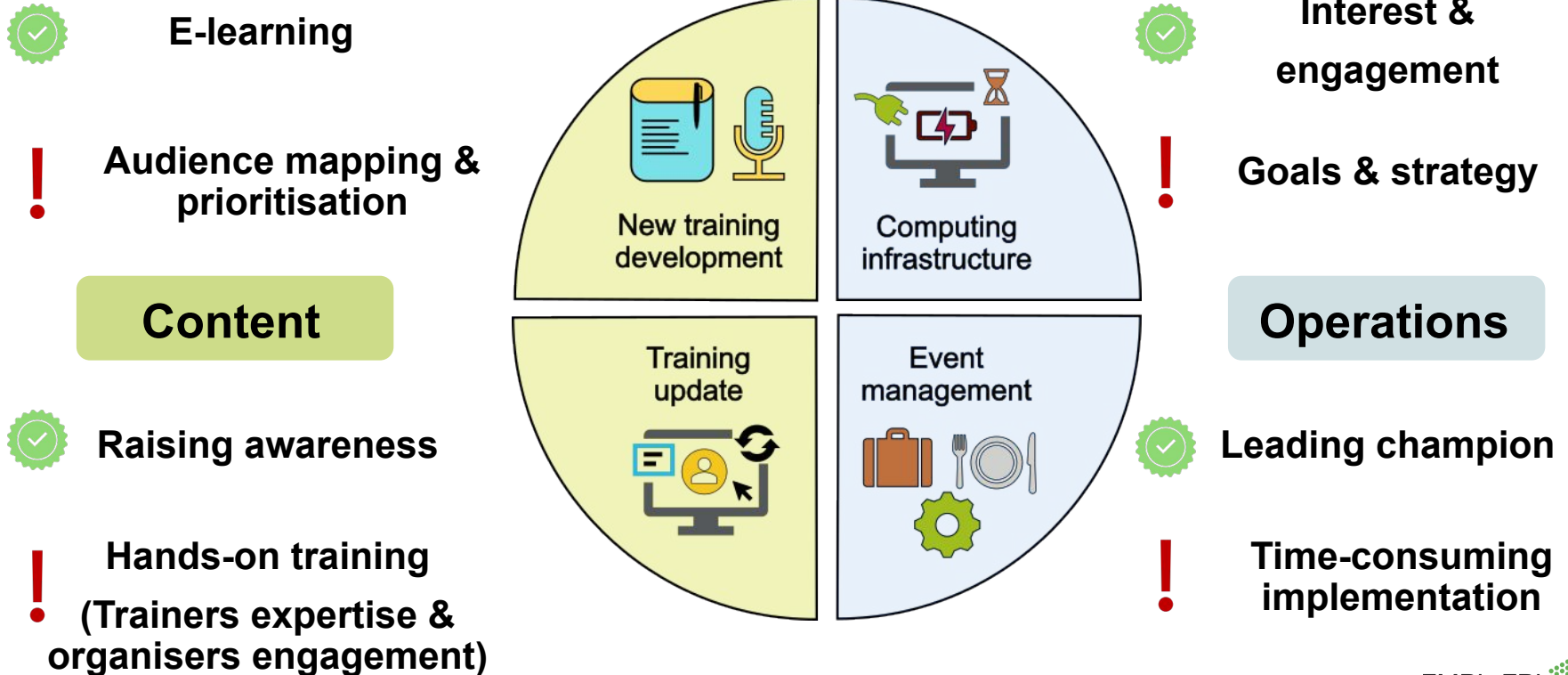
Interest & engagement



Goals & strategy

Operations

A “greener” bioinformatics training



Nobody would design a course on model organisms in research without addressing and discussing ethics.

Could environmental impact become just as essential a consideration in bioinformatics training?

Acknowledgements

Training Team, EMBL-EBI



Anna Swan

Ajay Mishra

Kim Gurwitz

Rebecca Nicholl

Sophie Spencer

Adam Broadbent

Marina Pujol

Aziz Mithani

EMBL

EMBL Sustainability Office
(Brendan Rouse)

EMBL-EBI Comms Team

EMBL-EBI Cloud & Ops
Team

Cambridge Sustainable Computing Lab

Loïc Lannelongue

Anica Areneta

“Special Guests”

Martin Farley

Gabrielle Samuel

Alex Bateman

Florijin Dekkers

Kristy Pringle



UNIVERSITY OF
CAMBRIDGE

