SPHERE-PPL Annual Meeting & Workshop

Health Modelling & Forecasting

SPHERE-PPL Team

Thursday 23rd January 2025

Spatial, Health & Environmental Research using
Probabilistic Programming Languages

Welcome!

Agenda

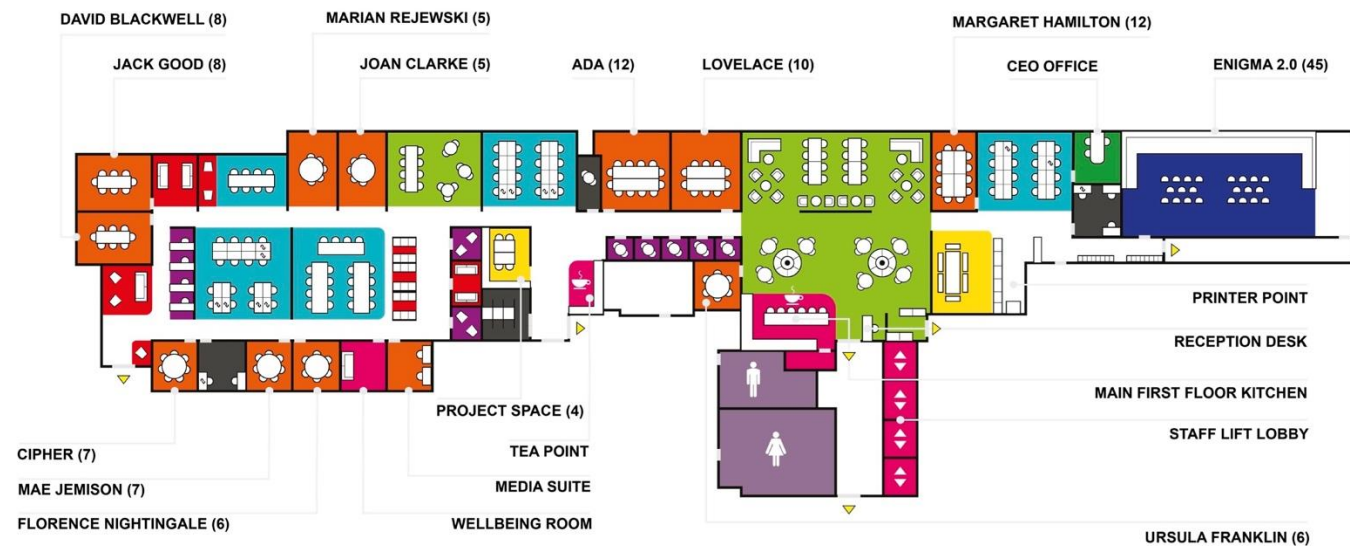| Timings	Activity	Description
9:30-10:00	Arrivals & Registration	
10:00-10:10	Introduction from the SPHERE-PPL Team	Meet the team and an introduction to the vision
10:10-10:35	Keynote 1 - Dr Hannah Rose Vineer	One Health Vector-Bourne Disease Hub
10:35-11:00	Keynote 2 - Dr Richard Wood	Insights from Modelling & Analytics within the NHS
11:00-11:30	Coffee Break	
11:30-12:15	Break-Out Discussion	Identifying key challenges in health policy
12:15-12:45	Break-Out Feedback	2-minute presentations on challenges
12:45-13:45	Lunch	

Agenda

Timings	Activity	Description
13:45-13:55	Presentation	Building a Forecasting Contest
13:55-14:30	Break-Out Design	Groups design forecasting contests
14:30-15:00	Break-Out Feedback	Group feedback and discussion of contest priorities
15:00-15:30	Coffee Break	
15:30-15:40	Presentation	What can SPHERE-PPL do for you?
15:40-16:00	Break-Out Discussion	Brainstorming requests for workshops, training and support
16:00-16:30	Break-Out Feedback	Creating a community priority list
16:30-17:00	Wrap-Up	

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Facilities & Accessibility

First floor zoning and capacity plan

Mural

We will be using Mural for all the activities: https://shorturl.at/QOSEy

Password: forecast

(No need to create an account)
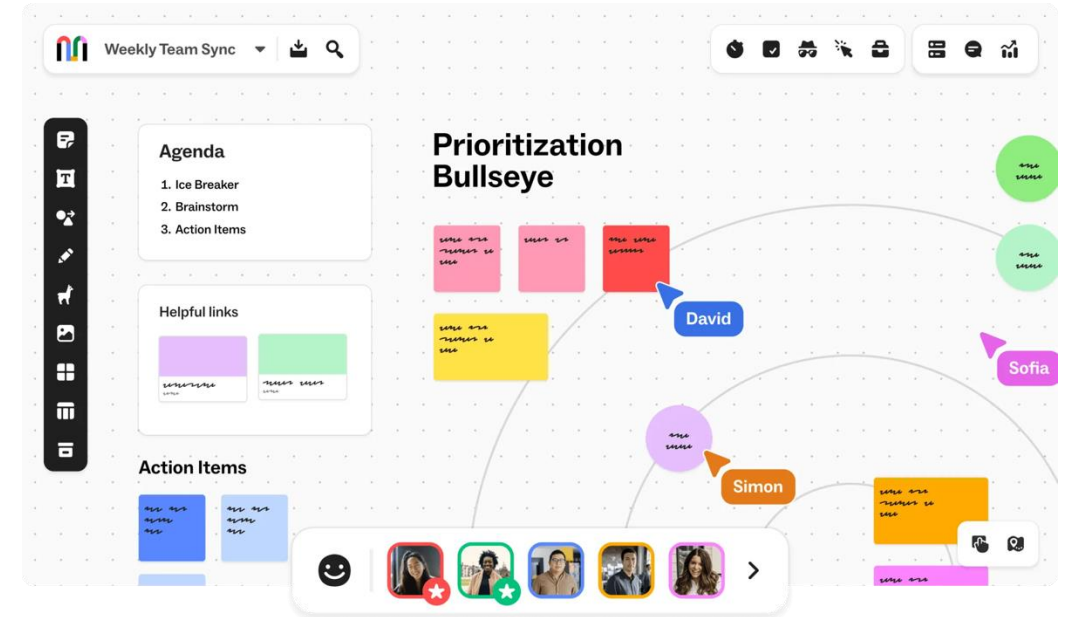
Code of Conduct

- **Respectful Communication**: Communicate with others in a professional and considerate manner. Be mindful of diverse perspectives and experiences. Avoid interrupting others and listen actively.

- **Inclusive Language**: Use inclusive language that avoids any discriminatory or offensive remarks. Be mindful of gender, race, ethnicity, religion, sexual orientation, and other personal attributes.

- **Active Participation**: Engage actively in discussions and activities. Share your insights and perspectives while being mindful of others' contributions.

- **Professional Conduct**: Maintain a professional demeanour throughout the workshop, including during breaks and social events.

- **Mobile Devices**: Minimize distractions by silencing mobile phones or using them only during breaks, unless they are essential for workshop activities.

Introduction from the SPHERE-PPL Team

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CUT TO WILL P SLIDES

Outcomes of the Day

- This full-day event will bring together experts in a range of fields from industry, academia, and government to discuss cutting-edge research and explore collaborative opportunities within health.

- Meeting participants will:

  1. Network with policy specialists and data scientists to discuss issues through a common language
  2. Identify forecasting challenges that the SPHERE-PPL Community will undertake and contribute to the design and outcomes of these endeavours to maximise their impact.
  3. Prioritise the training and support provided by SPHERE-PPL to the community to expedite the development of analytical capabilities where they are most urgently required

Keynotes

Keynotes

Dr Hannah Rose Vineer – *University of Liverpool & VBD Hub*

Dr Richard Wood – *BNSSG ICB & University of Bath*

Coffee Break

Refreshments are around the corner in the kitchen areas

Activity 1 - Identifying Key Challenges in Health Policy

How its going to work!

- **Stage 1 - Break-out Discussions (45 minutes)**
  - Split into teams
  - 45 minutes to talk about key challenges in Health Policy that relate to modelling & forecasting
  - Add them to the Mural Board
  - Don't worry about finding solutions, we will do that in this afternoon's session

- **Stage 2 - Group Feedback & Contest Priorities Vote (45 minutes)**
  - Each team will have 2 minutes to present what they think is the biggest challenge they discussed
  - These will form the basis of our forecast contest discussions later!

Activity 1 – Group Feedback

Lunch Break

Refreshments and food are around the corner in the kitchen areas!

Welcome Back!

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Activity 2 – Designing a Forecasting Contest

How its going to work!

- **Stage 1 – Building a Forecasting Contest (10 minutes)**
  - o Quick presentation from the SPHERE-PPL team on how the forecasting contests are going to work mechanically and what makes a good contest

- **Stage 2 – Break-Out Discussions (40 minutes)**
  - o Split into teams of 8
  - o Using the Contest grids on the Mural Board, start designing a forecasting contest

- **Stage 3 - Group Feedback (40 minutes)**
  - o Each team will give an overview of their proposed contest
  - o Indicative vote on what would provide greatest impact

Building a Forecasting Contest

From Questions to Insights

Dr Josh Tyler

Why do a Forecasting Contest?

Grand Vision

- An open-source and globally-accessible competition to find innovative and accurate ways of predicting something.

- A conduit for connecting stakeholders with analytical capability.

Smaller Scale

- Find answers to the challenges we talked about earlier!

- Put resources and insights into your hands.

SPHERE-PPL Framework

A Github Repo, that can be cloned, edited and then collated by contest organisers, using our Forecasting AggregatoR App (FARA).

FARA can:

- Find all contest submissions automatically

- Check entries for errors and issues

- Be customised for any GitHub-based contest

- Condense all results and synthesise insights

FARA - Forecast AggregatoR App

Owner
- SPHERE-PPL

Repo
- Competition-Example-Mpox

Target File To Check

forecast.csv

Destination Folder

/Users/joshtyler/My Drive/PPL Tu

▶ Run FARA

Welcome to FARA

FARA (Forecast AggregatoR App) is a tool that finds all forked repos taking part in forecasting competitions and checks each submission before cloning the repos locally.

Instructions

1. Select the owner of the competition

2. Select the competition repo

3. Enter the name of the file to check (this is usually a forecast in a csv format)

4. Enter the destination folder where the repos will be cloned (this will autofill with the FoRkast app directory)

5. Click the 'Run FARA' button to start the process

Outputs

All submissions that pass the checks will be cloned to the destination folder (each within their own folder named owner_repo)

If there are any errors, the repos with issues will be named in the folder called 'Errors'. Each repo will have a text file with the errors listed.

If the cloned repo folders already exist within the destination folder, FARA will not overwrite them. To clone any updated repos, please delete the older versions.

Customising FARA

This app can be editted to find forks of any repo and check any file and the checks can also be customised to suit the competition requirements. Head to the SPHERE-PPL Forecast-AggregatoR to find the code and make changes. This app can also be used in conjunction with our contest template repo to run your own forecasting contests: SHPERE-PPL Forecasting Contest Template .

Journey of a Contest

Design

Participation

Insights

Implementation

Aggregation
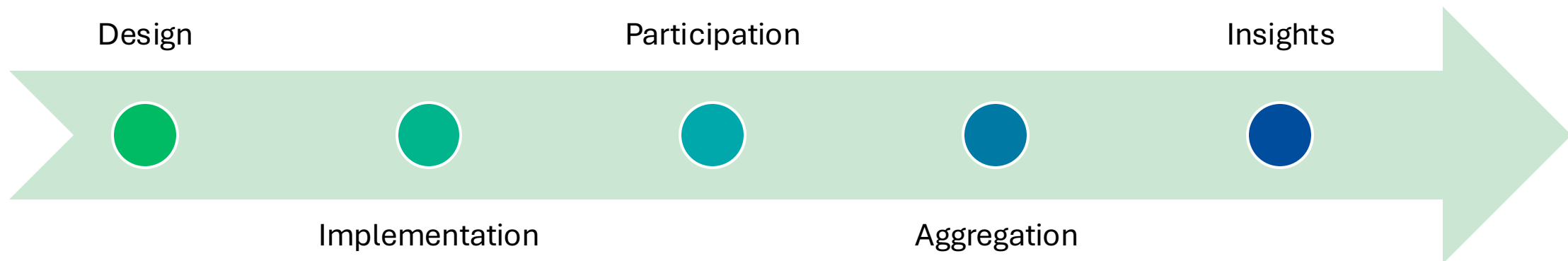
Considerations

Design
What are the Key Challenges we want to solve?

Who will benefit from the forecasts?

Implementation
What datasets can we use openly?
Are there any specific strategies or tools that we want to see?

Participation
Can we engage with a diverse set of teams?
Do they have enough time?
How can we best support them?

Aggregation
How should we aggregate all the entries?
Do we want to build a new model based on the findings of the contest?

Insights
What format would create the most impact?
How can we disseminate the results and maximise usefulness?

Maximising Value to Stakeholders
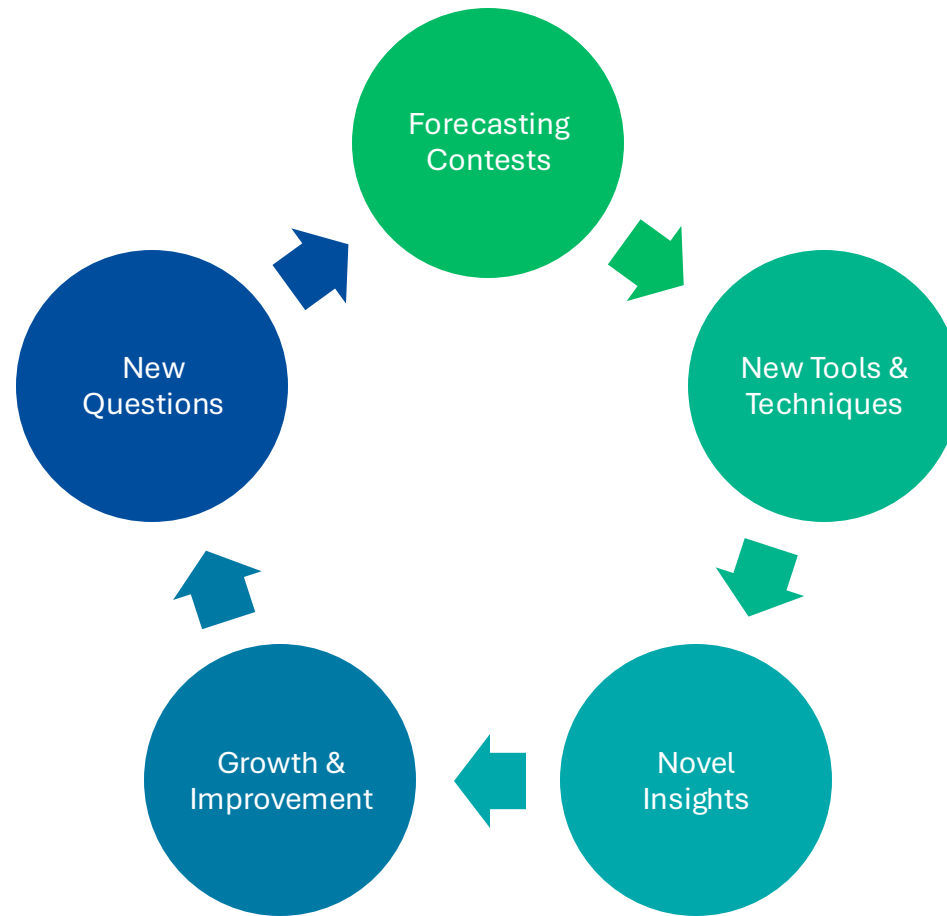
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Example - CVDs

Key Challenge	Future burden of Cardiovascular Disease (CVD)
Exam Question	Forecast the number of new cases of CVD in the UK for each year from 2024 to 2034, stratified by age group and sex.
Usable Data	• PHE Data (Trends in CVD mortality, morbidity, and risk factors • ONS Data (population projections, mortality rate, socioeconomic factors)
Output Format	• Table of forecasted numbers • Summary report • Deployable app
Other Information	Include coronary heart disease, stroke, and heart failure
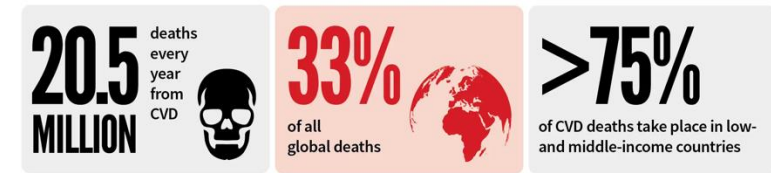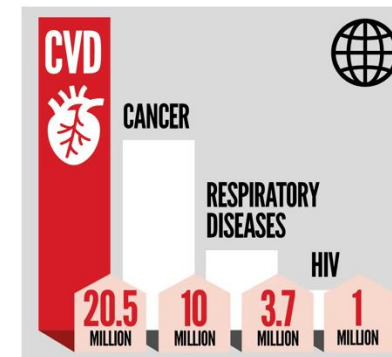
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Key Challenges in Health & Policy

Activity 2 – Group Feedback

Coffee Break

Refreshments are around the corner in the kitchen areas

Activity 3 – Building a Community

How its going to work!

- **Stage 1 – What can SPHERE-PPL do for you? (10 minutes)**
  - Quick presentation from the SPHERE-PPL team on what the future holds

- **Stage 2 – Brainstorming requests for workshops, training and support (20 minutes)**
  - Split into groups and make a list of different ideas that would help you make progress in your area (added on the Mural Board)
  - Include as many details as possible!

- **Stage 3 – Creating a community priority list (30 minutes)**
  - Each team will give an overview of their requests
  - Discussion around how the SPHERE-PPL community can best facilitate and maximise value

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What can SPHERE-PPL do for you?

- The network's primary goal is to connect data-scientists, researchers and policy-makers, to enable high-quality modelling and data-driven decision-making.

- The SPHERE-PPL project has funding to facilitate workshops, training and targeted support on both fundamental modelling & probabilistic programming, alongside events and sessions like today, working directly with stakeholders.
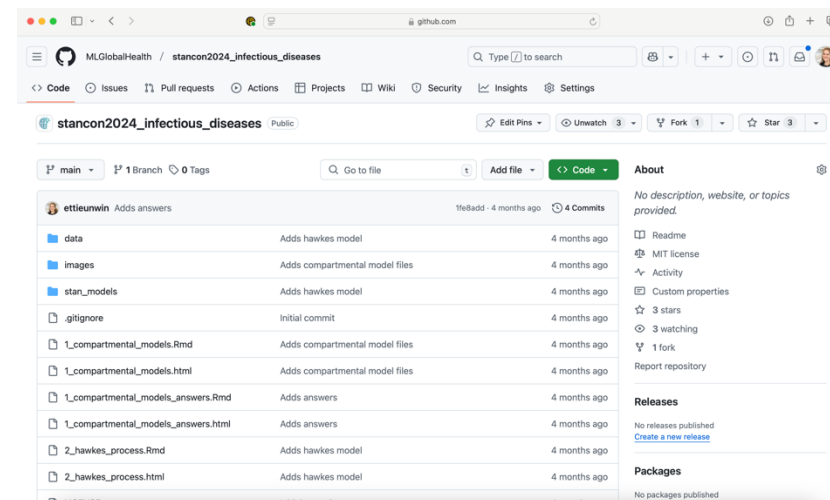
What we've done so far

How its going to work!

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Activity 3 – Priority List

Wrap-Up

- We've reached the end of the day!
- Please complete the <u>Feedback Survey</u>!

Post-event feedback survey

Thank-You!

For more information, please visit www.sphere-ppl.org or email the team at info@sphere-ppl.org.