

## General Information

### Workshop title

Spatial visualisation of health events: An introduction to cartography and geocomputation in R

### Name of instructors, short biographies and contact information:

**Brandon H Hayes DVM MPH PhD** is a veterinary epidemiologist and mathematical modeller with a passion for cartography and spatial modelling. Currently a post-doctoral researcher at the French National Research Institute for Agriculture, Food and the Environment (INRAE), he is involved in informing avian influenza biosecurity policy through mathematical modelling. His interests include spatial epidemiology, Bayesian statistics, spatiotemporal mechanistic models, and cats.

[brandon.hayes@envt.fr](mailto:brandon.hayes@envt.fr)

**Jun-Sik Lim DVM MPH** is a veterinary epidemiologist at the National Veterinary School of Toulouse (ENVT) currently researching African swine fever in wild boar in South Korea. He holds a DVM from Kyungpook National University, South Korea and a Master of Public Health (Epidemiology) from Seoul National University, South Korea. He has conducted extensive spatiotemporal epidemiological research on avian influenza, African swine fever, and COVID-19 at various institutions, including the Animal and Plant Quarantine Agency, Kangwon National University, and Konyang University, South Korea. His research interests focus on infectious disease epidemiology in humans, livestock, and wildlife using spatiotemporal and mechanistic modelling.

[jun-sik.lim@envt.fr](mailto:jun-sik.lim@envt.fr)

**Sophie Planchand DVM MSc** is a veterinary epidemiologist, having received her DVM and MSc in Veterinary Epidemiology from the National Veterinary School of Toulouse (ENVT) and CIRAD of Montpellier, in 2022. Following her graduation, she began a PhD program at ENVT where she researches highly-pathogenic avian influenza within-farm transmission through applying mathematical modelling techniques to cross-sectional viral load distribution data. Outside of research, Sophie conducts courses for French veterinarians on managing regulated animal infectious diseases.

[sophie.planchand@envt.fr](mailto:sophie.planchand@envt.fr)

### Workshop description (150 words)

The goal of this workshop is to provide attendees with the knowledge and tools needed to visualize and manipulate spatial health data using R and RStudio. Theoretical learning objectives consist of gaining understandings of basic geocomputational theory (e.g. coordinate systems and projections), geocomputation in R (e.g. what are types of spatial objects), and where to find publicly-available spatial data sources. The practical learning objectives, achieved through a hands-on group practical, are how to explore and manipulate synthetic spatial data to generate thematic maps. Coding scripts will be provided to transform, subset and visualize a data set using boundary and base maps, dot maps, choropleth maps, and bubble maps. By the end of the workshop, participants will understand how to transform raw spatial data into publication-quality plots through using the *sf*, *tmap*, and *ggplot2* packages.

### **Participant background and skills**

This workshop targets students, researchers, and professionals who desire to build a cartography foundation in R for manipulating spatial data and creating spatial visualizations.

Requirements:

- Basic familiarity with R and the R Studio environment is required. Workshop time will not be spent on the most basic R facets (e.g. installing R or RStudio, basic R syntax and object classes).
- No prior spatial programming experience is assumed.

Tools to be used:

- R and R studio
- Internet browser of participants choice

### **Workshop history**

**Have you carried out this workshop before? Yes  No**

This workshop was conducted at the 2022 Annual Conference of the Society for Veterinary Epidemiology and Preventive Medicine (SVEPM2022) on 23 March 2022 in Belfast, UK, to 20 participants. Previously, this workshop was given at the National Veterinary School of Toulouse (ENVT) to approximately 30 members of the Host-Pathogen Interaction mixed research unit (UMR 1225 IHAP) (6 May 2021).

### **Workshop Specification**

#### **Do you prefer to organize a pre or post workshop?**

Pre  Post  Either  – We can do either, but as this is an introductory workshop intended to provide a foundation in spatial visualizations, we feel it would be best situated to occur pre-conference.

#### **What is the minimum and maximum number of attendees for the workshop?**

Minimum: 10

Maximum: 25

#### **What is the proposed workshop duration (days) (max. length is 2 days)?**

1 day

#### **What is the proposed cost (€) of the workshop for the participants?**

Full cost: 350€

Student rate: 250€

**Workshop contents and schedule**

Time	Topic	Format
08:30–09:00	Welcome	
09:00–09:45	Introduction to computational cartography and R spatial theory	Lecture
09:45–10:30	Session I: Static boundary maps and base maps	Lab
10:30–11:00	Coffee break	
11:00–13:00	Session II: Interactive maps and spatial data exploration	Lab
13:00–14:00	Lunch	
14:00–15:30	Session III: Choropleths, bubble maps, and more	Lab
15:30–16:00	Break	
16:00–17:00	Session IV: Moving beyond <i>tmap</i> ; cartography in <i>ggplot2</i>	Lab

**Materials provided by the facilitators**

Participants will be provided with a pre-workshop checklist of which R packages to download and install, and a how-to guide for using an R Project file in case participants are not familiar with R Project files.

Participants will receive the powerpoint lecture slides that cover geocomputational theory.

The hands-on practical will come with a completed R script, an R project file, and simulated case data to be used for generating plots. Additionally, though the intent is for all participants to download any necessary freely-available data in real-time, in case of a poor internet connection all these files will also be provided in a zip file as backup.

**Additional material**

As participants are expected to learn how to find and download spatial data, a stable and fast internet connection to download files up to 10MB is requested