# Spatial data analysis with R

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#### Introduction round

- Let us know
  - Who you are?
  - Which institution you're coming from?
  - Do you have experience with R?
  - Do you have experience with spatial data in R?

#### Introduction

- Doctoral researcher at Aalto University, School of Engineering
  - Themes include:
    - Methodological research
    - hydrology, environmental modelling
    - Spatial interpolation
    - Spatio-statistical methods in downscaling
  - Master's degree in Geoinformatics
  - Bachelor's degree in Environmental Engineering (Water management)
- Working daily with R
  - Small scripts to support fellow researchers
  - Package development: hydrostreamer, (dasymetric), (Smoodjustment)

#### Contents

- Day 1
  - Vector data in R, vector data manipulation and queries
- Day 2
  - Spatial analysis with vector data spatial autocorrelation, spatial clustering, and spatial models
- Day 3
  - Raster data in R, raster data manipulation, map algebra and spatial modelling with rasters

### Learning outcomes

- You'll have an idea how to get started with spatial data in R
- You can switch to programmatic workflows from desktop QGIS (at least for some operations)

 Most of all, I hope you'll have learnt something new not only about R, but also from the methods we will be using. Even if you're already experienced.

#### What this is not include:

- R basics. I assume you already know how R works.
- Comprehensive look at the R spatial ecosystem. There are far too many spatial packages in R to go through. This only skims the surface.
- Visualisation course we'll not learn how to make publication ready figures. Although we go through some basic visualisation, these are mainly how I personally use them when working interactively with spatial data. For proper maps, I use QGIS + Affinity, but there are many good packages for visualisation of spatial data in R.

### Beyond this course

- CRAN Task view of Spatial Analysis
   https://cran.r-project.org/web/views/Spatial.html
- Geocomputation with R
   https://geocompr.robinlovelace.net/index.html
- Spatial Data Science with R https://rspatial.org
- And so many more...

### Getting started

- All of the material and data we'll be using are hosted at <a href="https://github.com/csc-training/r-spatial-course">https://github.com/csc-training/r-spatial-course</a>
- Head to notebooks.csc.fi and log in with CSC or HAKA credentials

• Choose Rstudio environment for DAKI and teaching and all data is destroyed at the end of the session.

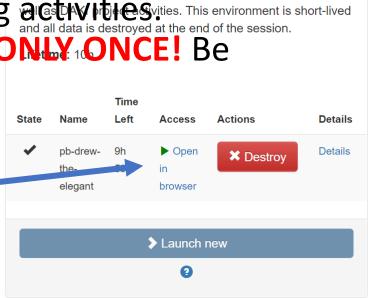
Rstudio environment for DAKI and teaching activities

This Rstudio environment is based on the latest version of R (v 4.1.0) along with the necessary R packages for teaching as well as DAKI project activities. This environment is short-lived and all data is destroyed at the end of the session.

Lifetime: 10h

Launch new

Click "launch new" ONLY ONCE! Be patient. Click open in browser when it is ready.



Rstudio environment for DAKI and teaching activities

This Rstudio environment is based on the latest version of R

### Getting started

- Copy the password given in prompt.
- Login using
  - Username: rstudio
  - Password: paste the password you just copied.
- Rstudio is now running on Puhti, and you'll be able to use it through your browser!
- One last thing: you'll need to clone the Github repository to get the material and data to the Rstudio session. ->

## Getting started

Click on the terminal

 In the terminal window, type git clone https://github.com/csc-training/r-spatial-course.git and press enter

Make sure you have everything: in the *files*-pane, check that you have a new folder called *r-spatial-course*.

The materials can be found under folders Day 1, Day 2, Day 3

