INLABRU WORKSHOP

ICES 2025, Copenhagen

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1 Welcome to the course!

- Welcome to the `inlabru` workshop!
- The aim of this workshop is to introduce you to a range of statistical modelling approaches, in particular the temporal, spatial and spatio-temporal modelling as implemented in the `inlabru` package.
- Workshop materials are available in the github repository inlabru-workshop

2 Learning Objectives for the workshop

At the end of the workshop, participants will have an understanding of:

- the motivation for and the challenges of analysing and modelling spatial data
- statistical models used to analyse spatial and spatio-temporal data
- the implementation of these models in the `inlabru` package
- how to independently analyse spatial data with `inlabru`

3 Intended audience

The workshop aims to cater for participants with a range of different backgrounds, who is interested in analysing data with modern spatial and spatio-temporal statistical modelling approaches.

4 Prerequisites

Participants should be familiar with the `R` environment, and general statistical approaches for modelling such as regression, analysis of (co)variance, and generalized linear models.

No knowledge of `R-INLA` or `inlabru` is required.

5 Schedule

5.0.1 Day 1

Time	Topic
10:00 - 10:30	ICES information session
10:30 - 11:30	**Session 1**: Introduction to `inlabru`
11:30 - 13:00	Practical Session 1
13:00 - 14:30	Lunch break
14:30 - 15:30	**Session 2**: Latent Gaussian Models and INLA
15:30 - 15:45	Coffee Break
15:45 - 16:45	Practical Session 2

Time	Topic
16:45 - 17:00	wrap-up and outlook

5.0.2 Day 2

Time	Topic
9:00 - 10:00	**Session 3**: Temporal modelling and smoothing part 1
10:00 - 10:30	Snack
10:30 - 11:30	Temporal modelling and smoothing part 2
11:30 - 13:00	Practical Session 3
13:00 - 14:30	Lunch break
14:30 - 15:30	**Session 5**: Introduction to Spatial Statistics
15:35 - 15:45	Coffee Break
15:45 - 16:45	Practical Session 4
16:45 - 17:00	wrap-up and outlook

5.0.3 Day 3

Time	Topic
9:00 - 10:00	**Session 6**: Areal Processes
10:00 - 10:30	Snack
10:30 - 11:30	**Session 7**: Geostatistics
11:30 - 13:00	Practical Session 5
13:00 - 14:30	Lunch break
14:30 - 15:30	**Session 8**: Spatial Point processes
15:35 - 15:45	Coffee Break
15:45 - 16:45	Practical Session 5 continued
16:45 - 17:00	wrap-up and outlook

5.0.4 Day 4

Time	Topic
9:00 - 10:00	**Session 9**: Spatiotemporal models
10:00 - 10:30	Snack
10:30 - 11:30	**Session 10**: Model comparison and evaluation
11:30 - 13:00	Practical Session 6
13:00 - 14:30	Lunch break
14:30 - 15:30	**Session 11**: Multi-likelihood/joint likelihood models
15:35 - 15:45	Coffee Break
15:45 - 16:45	Practical Session 7
16:45 - 17:00	wrap-up and outlook

5.0.5 Day 5

Time	Topic
9:00 - 10:00	**Session 12**: Zero inflated models
10:00 - 10:30	Snack
10:30 - 11:30	**Session 13**: Complex observational processes: Distance Sampling
11:30 - 13:00	Practical Session 8: Zero Inflated models - Distance sampling
13:00 - 13:15	Coffee Break
13:15 - 14:00	Closing session

6 In preparation for the workshop

Participants are required to follow the below steps ahead of the first day of the workshop:

1. Install R-INLA
2. Install `inlabru` (available from CRAN)

```
# Enable universe(s) by inlabru-org
options(repos = c(
  inlabruorg = "https://inlabru-org.r-universe.dev",
  INLA = "https://inla.r-inla-download.org/R/testing",
  CRAN = "https://cloud.r-project.org"
))

# Install some packages
install.packages("inlabru")
```

3. Make sure you have the latest `R-INLA`, `inlabru` and `R` versions installed.
4. Install the following libraries:

```
install.packages(c(
  "CARBayesdata",
  "DAAG",
  "dplyr",
  "FSAdata",
  "ggplot2",
  "gt",
  "lubridate",
  "magrittr",
  "mapview",
  "patchwork",
  "scico",
  "sdmTMB",
  "sf",
  "spatstat",
  "spdep",
  "terra",
  "tidyr",
  "tidyterra",
  "tidyverse"
))
```