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| **Topic** | **Source** | **Examples** | **Details** |
| Random Fields in One Dimension | Finn’s workshop | Simulated count data | Compare GAM with spde in 1d |
| Core concepts | Inlabru book | modelling worflow syntax in inlabru  simulated data for:  linear model, GLMs, LLM, GAMMs, TS, non linear predictor | How to fit, produce summaries and predict |
| Intro to Bayesian HM and LGM | Sara Geilo workshop |  |  |
| More on LGM & INLA | Sara Geilo workshop  Sara 2 day workshop Zurich | Implement INLA for a Gaussian Model  Linear model and GLM | Exercises include: plot posterior marginals & changing priors |
| INLA Basics | Sara Geilo workshop  Sara 2 day workshop Zurich | Fit Linear model to simulated data    Simulated AR(1) raneff  Tokyo Rainfall disease mapping  MCMC comparisson | Covers Organization of inla-objects  Visualization of posterior marginals  Adding random effects  Prediction  Spatially structured effects (BYM) |
| Spatial Modelling | Sara 2 day workshop Zurich | Italy temperature (geostatistics) | Code in inlabru just needs to update code to run with rast & sf |
| SPDE in a nutshell | Inlabru book | NA | NA |
| Geostatistics | EnvSTATS notes  Paula [Spatial Statistics for Data Science:](https://www.paulamoraga.com/book-spatial/index.html) | Paraná Rainfall  PM2.5 values in the USA | Code in inla |
| Areal processes | EnvSTATS notes  Paula [Spatial Statistics for Data Science:](https://www.paulamoraga.com/book-spatial/index.html) | SDM with BYM2  Modeling of lung cancer risk | Inlabru/inla |
| Point processes | EnvSTATS notes  Paula [Spatial Statistics for Data Science:](https://www.paulamoraga.com/book-spatial/index.html)  Finn workshop | Gorillas  Butterflies in Cairngorms Scotland National Park  *Solanum* plant species in Bolivia | Inla/inlabru |
| Spatiotemporal Modelling | Sara 2 day workshop Zurich | PM10 concentrations (geostatistics) | Code in inlabru just needs to update code to run with rast & sf |
| Model selection | Sara 2 day workshop Zurich | Model assessment for georeferenced data in 2D  CPO,WAI,DIC,PIT | LGOCV? |
| Models with multiple likelihoods | Sara 2 day workshop Zurich  Inlabru book | Coregionalization  For Simulated data  TS example | Inlabru code available |
| Non-linear predictors | Inlabru book | Aggregating a continuously indexed field to area units  distance sampling  Logistic Growth |  |

**Course Structure**

**1. Core concepts**

* LGM and INLA
* inlabru workflow
* Model selection

*Practical Examples*

LM, GLM & GAM

**2. Temporal Models**

* Discrete time models , e.g, AR (1) as a LGM
* Continuous time models, RW & 1-d SPDE

*Practical examples*

TS, LMM, GAMMs

**3. Introduction to Spatial Modelling**

* Types of spatial data
* Spatial data wrangling and manipulation in R (e.g, terra & sf)
* Areal processes

*Practical Examples*

Lung cancer disease modelling

**4. Modelling geostatistical data**

* SPDE & the mesh
* Geostatistical Data
* Spatial predictions

*Practical Examples*

Temperature in Italy/ Rainfall in Paraná state

**5. Spatial Point processes**

* Spatial point process
* Distance sampling

*Practical Examples*

Cairngorms national park

Gorillas

Dolphins

**6. Spatiotemporal Models**

* Separable time-space models
* non-separable space-time models

*Practical Examples*

PM2.5 example

**7. Multilikelihood and Non-linear models**

* iterated inla
* logistic growth
* Corregionalization models

*Practical Examples*

Simulated data