

August 14, 2026 (Fri.) 10:00–11:00

Zoom webinar

Invited Speaker:

Prof. Matthias Templ

University of Applied Sciences and Arts Northwestern Switzerland



Functional data analysis in Bayes spaces with an application to spatio-temporal population data

Abstract:

Many data sets that look multivariate are collections of whole probability distributions, such as the age structure of a municipality or the grain size distribution of a sediment sample. Densities carry only relative information, and the standard toolbox of functional data analysis, built on the Lebesgue space of square integrable functions, serves them badly: sums and multiples of densities are no longer densities, and functional principal component analysis can return negative density values. The Bayes Hilbert space offers a way out. A density becomes a compositional vector with infinitely many parts, perturbation and powering replace addition and scalar multiplication, and the centred log-ratio transformation acts as an isometric isomorphism into a subspace of the Lebesgue space. This restores smoothing, with ZB-splines under the zero-integral constraint, and yields simplicial functional principal component analysis. I illustrate the approach on age distributions of Upper Austrian municipalities by sex, where mapped scores and local indicators of spatial association expose patterns of ageing and migration that raw counts conceal. A second part reports ongoing work in the R package DistributionalIDDA: freely combinable reference measures, distributional depth, and grouped and multivariate simplicial principal component analysis, closing with open questions on spatial dependence.

Short bio:

Matthias Templ is Professor of Statistics at the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) in Olten. He studied technical mathematics at TU Wien, where he also took his doctorate and later his habilitation in statistics, and he spent more than a decade at Statistics Austria in parallel to his academic appointments, an experience that continues to shape his taste for problems that arise from real data rather than from theory alone. He is also holding a teaching appointment at the ETH Zurich since 2021 and on various other institutions. His work centres on compositional data analysis, on statistical disclosure control and synthetic data, and on the treatment of missing values, always with the conviction that a method is only as useful as the software that makes it available to others. He is a co-author of *Applied Compositional Data Analysis*, written together with Peter Filzmoser and Karel Hron and published in the Springer Series in Statistics. He maintains the CRAN Task Views on Official Statistics and on Compositional Data Analysis as well as a number of R packages, e.g. {robCompositions}. Since 2014 he has served as Editor-in-Chief of *the Austrian Journal of Statistics*, and he is an elected member of the International Statistical Institute.

***Registration required.**

The presentation will be given in English.

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https://u-tokyo-ac-jp.zoom.us/webinar/register/WN_Kt2DYN9PQRCJ2NhoaeHxrg

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[Event Host: Center for Spatial Information Science, The Univ. of Tokyo, Japan]

