

1222-2022  
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ANNI



UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA

DIPARTIMENTO  
DI SCIENZE  
STATISTICHE



Dipartimento  
di eccellenza  
2018-2022



DEPARTMENT OF STATISTICAL SCIENCES  
PhD Course in Statistics



Fondazione  
Cassa di Risparmio  
di Padova e Rovigo



广州大学  
GUANGZHOU UNIVERSITY

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<http://phd.stat.unipd.it>



# PhD Course in Statistics Cycle XXXVII Opening

**November 11, 2021**

**Padova | Scuola della Carità,  
via S. Francesco 61-63 |  
Room Sala della Carità**

The PhD Course in Statistics welcomes the new PhD students, starting their doctoral program in October 2021.

The event foresees an invited research lecture.

### **Invited lecture | Abstract**

Many fields of science nowadays gather data at a very fine resolution but do inference at a higher aggregated level. For example, in neuroimaging data are gathered at the level of  $3\text{ mm} \times 3\text{ mm} \times 3\text{ mm}$  voxels, but the relevant biology happens at the level of cm-scale brain areas; in genetics, data are gathered at the level of single-DNA-base polymorphisms, but interesting questions happen at the level of genes or even gene groups; in spatial statistics, data may be gathered at street level but interesting questions are about neighbourhoods or regions. Often, there is not just one natural way to aggregate data to prepare for inference. Multiple alternative criteria could be used to drive the grouping. Aggregation to large regions may give low specificity; more limited aggregation may give low power.

This talk presents how Closed Testing can be used to analyze this type data at all resolutions simultaneously. The method allows the choice how and how much to aggregate to be chosen freely by the researcher, in a data-dependent way, while still strictly controlling the probability of false positive findings. This allows researchers to adapt the inference to the amount and the shape of the signal that is present in the data: the stronger the signal, the better it will be pinpointed by the closed testing procedure. I will review the general idea and theory of closed testing and recent progress in method development in this area. Several example contexts illustrate the wide applicability of all-resolutions inference.

### **Programme**

16:30 | **Welcome**  
**Giovanna Boccuzzo**  
Head of the Department of  
Statistical Sciences  
University of Padova

**Massimiliano Zattin**  
Vice Rector for Research Training  
University of Padova

**Nicola Sartori**  
Coordinator of the PhD Course  
in Statistics  
University of Padova

17.00 | **Invited lecture**

**Jelle Goeman**  
Professor of Biostatistics  
Leiden University Medical Center,  
Netherlands

***All-Resolutions Inference***

18.00 | **Cocktail**  
Room “I. Damini”