Spatial analysis is a technique that explores spatial data, which contains both locational and attribute information. Its goal is to analyze the locational information to reveal the underlying processes that generate the observed attribute values. Spatio-temporal analysis arises when spatial data is collected across time. For robust statistical inferences, this type of analysis not only accounts for the well-known spatial autocorrelation, but also the temporal autocorrelation as well as spatio-temporal interactions. The emerging new technologies such as social media, mobile sensors, High Performance Computing, and Artificial Intelligence have drastically changed the way we collect, process, analyze, and visualize spatial and spatio-temporal datasets.

This seminar aims to discuss selected topics in spatial and spatio-temporal analyses, including long-standing and newly proposed fundamental issues such as the Modifiable Areal/Temporal Unit Problem and the Uncertain Geographic Context Problem. Opportunities and challenges that spatial and spatio-temporal analyses face in the big data era are also covered, for example, the ethical and geoprivacy issues. For each topic, there will be readings from journal articles and/or book chapters. Students will lead presentations of readings and participate in discussions. Depending on the enrollment size of the class, each student will be a discussion leader at least once during the term. Students will also conduct independent research on a topic covered in the course that they are interested in and/or relevant to their own research. An oral presentation and a 15-page report of student research are required. This report could take the form of an article, a dissertation chapter, or a term paper.

**Evaluation criteria:**

1. Presentation of readings & discussion lead (30%)
2. Discussion participation (20%)
3. Student research presentation (15%)
4. Student research report (35%)
## Class 1: Introduction

### Readings

## Class 2: Fundamental issues

### Readings

## Class 3: Bringing time in: from spatial to spatio-temporal analysis

### Readings

## Class 4: Spatial and spatio-temporal analyses in the big data era

### Readings

**Class 5: Fundamental issues II**

**Readings**

**Class 6: Emerging spatial data sources**

**Readings**

**Class 7: Ethical and geoprivacy issues**

**Readings**

**Class 8: Geovisual analytics**


Class 9: From proprietary to open-source


Class 10: Student research presentation

Readings No readings for this week