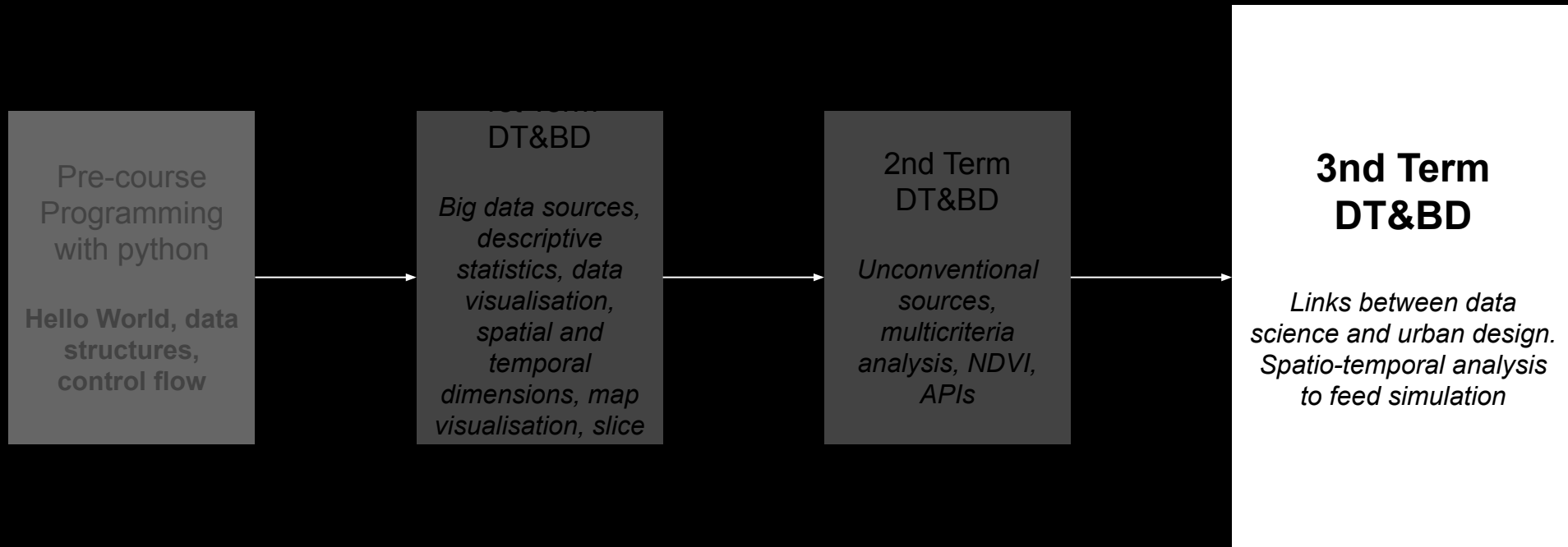




MASTER IN CITY & TECHNOLOGY
DIGITAL TOOLS AND BIG DATA - 3rd Term
2019/2020

FACULTY DIEGO PAJARITO

Big data and simulation



Master in City and Technology

Space and time patterns

A four-dimensional space in which reality can be represented

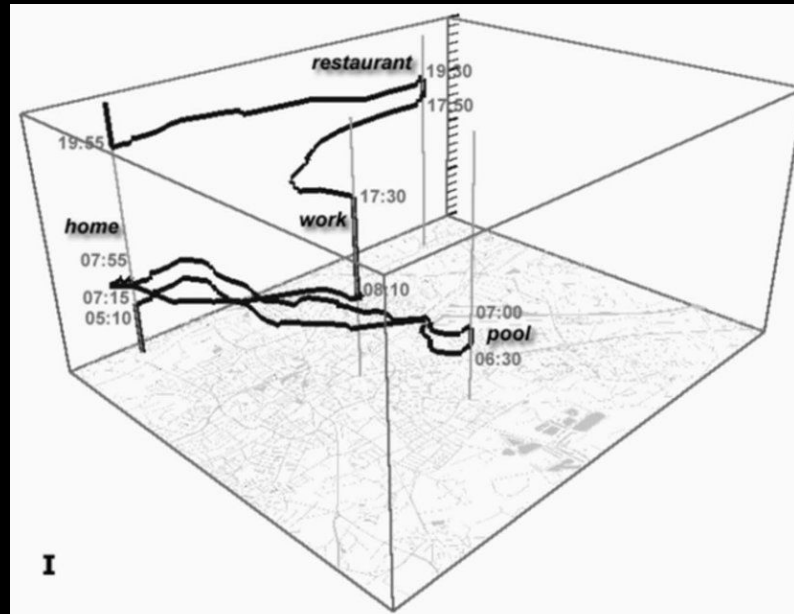
Moving objects research field focuses on the modeling and design of data from moving objects — such as people, animals, vehicles, hurricanes, forest fires, oil spills, armies, or other objects — as well as the storage, retrieval, and querying of that very voluminous data.

Urban spaces are dynamic. However, capturing such changing environment is quite a challenging task. Data science, simulation and design converge in a common space for data management, analytics and visualisation.

The two elements (Space, defined in three dimensions, and time, an additional dimension) combined are conceptually capable of representing past, current and future states of urban spaces.

Definition from: R. H. Güting & M. Schneider (2005) Moving Object Databases
<https://doi.org/10.1016/B978-0-12-088799-6.X5000-2>

Space time cube



Simulation relies on time

The space-time cube for a single person. In paper by E. Dolaciho B., H. Laksmiwati and Y. Widvanti in [IEEE Xplore](#)

Vector and Raster data sources

(Multiple representation of urban spaces)

Cadastral Data (Centuries)
Satellite Imagery (Decades)
Aerial imagery (Centuries)
Social Networks (Decades)
Distributed Sensor Data (Decades)
GIS + Data analytics + Simulation

integration of data analytics and simulation within urban design.

The course is planned and executed together within two other courses of the third term, the main master seminar and the course on design tools.

a. To gain experience in the evaluation and preparation of datasets needed to simulate urban issues.

b. To analyze the spatial and temporal dimensions of datasets describing urban dynamics

Cadastral data, the big data source for vintage analysis

Satellite/aerial imagery, a historic record for urban dynamics

Satellite and aerial imagery, detecting changes in cities

Social data sources for urban design

Measuring environmental conditions

The role of GIS and descriptive statistics in parametric design

Session 1	Pawitra	Bureeak
	Byron	Cadena
Session 2	Aryo	Dhaneswara
	Rashid	Gilfanov
	Jianne	Libunao
Session 3	Akshay	Marsute
	Jochen	Morandell
Session 4	Elijah	Munn
	Alejandro	Quinto
Session 5	Michelle	Rodriguez Ruiz
	Linara	Salikhova
Session 6	Andrew	Saltzman
	Rovianne	Santiago
	Kushal	Saraiya

Cadastral data, the big data source for vintage analysis

Satellite/aerial imagery, a historic record for urban dynamics

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Measuring environmental conditions

The role of GIS and descriptive statistics in parametric design



Source Code

Analysis tasks supporting the master studio class

Blog post reporting on the sessions



Final Presentation

Windows/Linux/Mac Computer (Dual-Core + processor, RAM 8Gb)

Python 3.6.x or later (Get the installer at <https://www.python.org/downloads/>)

Anaconda (Get the installer at <https://www.anaconda.com/distribution/>)

Pycharm Community (Get the installers at <https://www.jetbrains.com/pycharm/download>)

QGis Desktop (Get the installers at <https://qgis.org/en/site/forusers/download.html>)

SAGA (Get the installer at <http://www.saga-gis.org>)

**Google Earth Pro on Desktop (Installer at
<https://www.google.com/earth/versions/#earth-pro>)**

**pandas <https://pandas.pydata.org/>
geopandas <http://geopandas.org/>
matplotlib <https://matplotlib.org/>
seaborn <https://seaborn.pydata.org/>**

Let's set this up

Pycharm and Anaconda working

Qgis

SAGA

Google Earth Engine

*** Visual Studio Code**

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