Dissertation projects

Supervisor: **Fulvio Lopane**

Project 1: **GIS layers for spatial interaction models**

* Description of the project: Many layers of data which have a spatial representation are used to help translate spatial movements/interaction and locations into physical form. This is useful to develop model predictions of where land uses - which are consistent with spatial interaction - locate.
* Reference: the process of geodesign is relevant to this activity – as developed by Carl Steinitz in his books such as *The International Geodesign Collaboration: Changing Geography by Design*, editors Thomas Fisher, Brian Orland, and Carl Steinitz (2020) ESRI Press.
* Skills required: advanced GIS

Project 2: **Microsimulation**

* Description of the project: Development of a demographic forecasting model for Oxfordshire. The project would review the literature on microsimulation, adapt the SPENSER model for Oxfordshire and would link this to other models being developed there.
* Reference: Synthetic Population Estimation and Scenario Projection Model ([SPENSER](https://www.turing.ac.uk/research/research-projects/synthetic-population-estimation-and-scenario-projection)). For an introduction to microsimulation see Lomax, N., & Smith, A. (2017). Microsimulation for demography. *Australian Population Studies*, *1*(1), 73-85. https://doi.org/10.37970/aps.v1i1.14
* Skills required: This project requires some familiarity with a high level programming language such as Python or R and also access to the code developed by Nik Lomax at Leeds University.

Project 3: **Large-scale urban modelling** – Italian case study: Turin

* Description of the project: Development of a Land-Use Transport-Interaction (LUTI) model for the case study of Turin (Italy).

The LUTI model involves 4 sub-models:

* + Journey to work sub-model
  + Retail sub-model
  + Schools sub-model
  + Hospitals sub-model
* Reference: Quantitative Urban Analytics forecasTing ([QUANT](http://quant.casa.ucl.ac.uk/)). Also see “A new framework for very large-scale urban modelling” by Michael Batty and Richard Milton - *Urban Studies* (2021), online first, open access <https://journals.sagepub.com/doi/pdf/10.1177/0042098020982252>
* Skills required: advanced python

Project 4: **Large-scale urban modelling** – Greek case study: Athens

* Description of the project: Development of a Land-Use Transport-Interaction (LUTI) model for the case study of Athens (Greece).

The LUTI model involves 4 sub-models:

* + Journey to work sub-model
  + Retail sub-model
  + Schools sub-model
  + Hospitals sub-model
* Reference: Quantitative Urban Analytics forecasTing ([QUANT](http://quant.casa.ucl.ac.uk/)). Also see “A new framework for very large-scale urban modelling” by Michael Batty and Richard Milton - *Urban Studies* (2021), online first, open access <https://journals.sagepub.com/doi/pdf/10.1177/0042098020982252>
* Skills required: advanced python