
# Towards sustainable transport planning in Newcastle: the contribution of e-mobility

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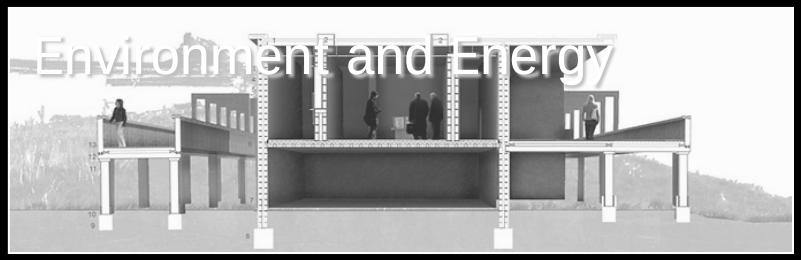
# Research into Teaching




**Subject Disciplines**

Architecture

Building Surveying

Construction

Housing

Project Management

Property and Real Estate

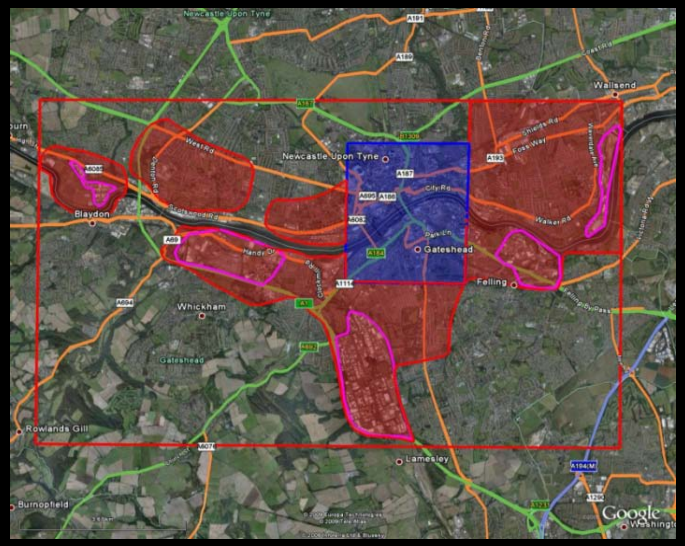
Quantity Surveying

Sustainable Buildings and Energy Systems

Human & Physical Geography

Environmental Management

# Virtual NewcastleGateshead (VNG)

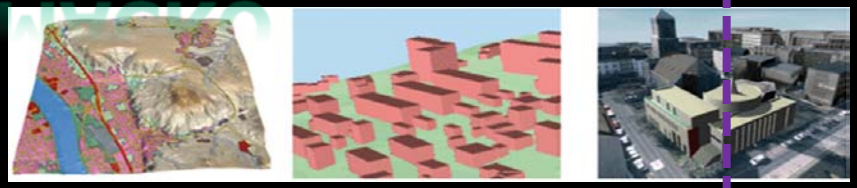




http://virtualng.northumbria.ac.uk/

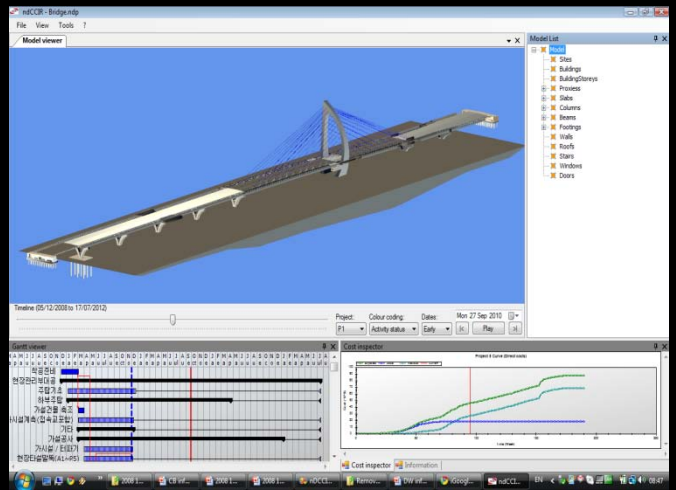
# Information Modelling

City Modelling

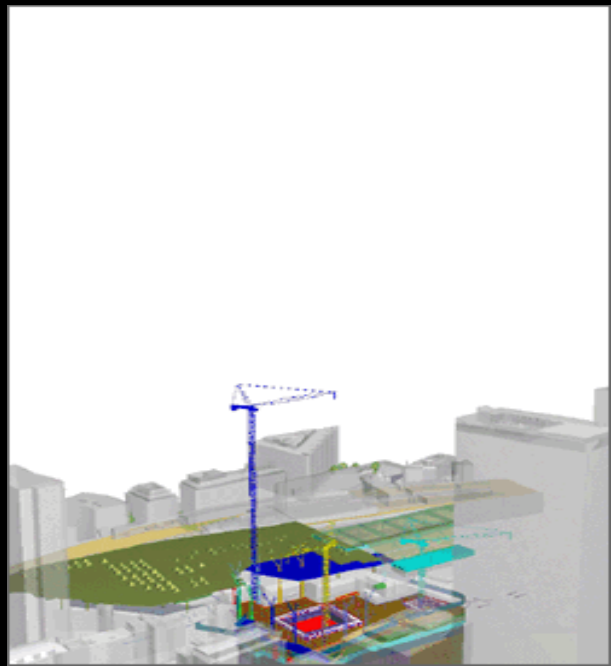
MACRO



MICRO



*n*-D Modelling



# Space Syntax and Pedestrian Movement

Professor Ruth Conroy Dalton

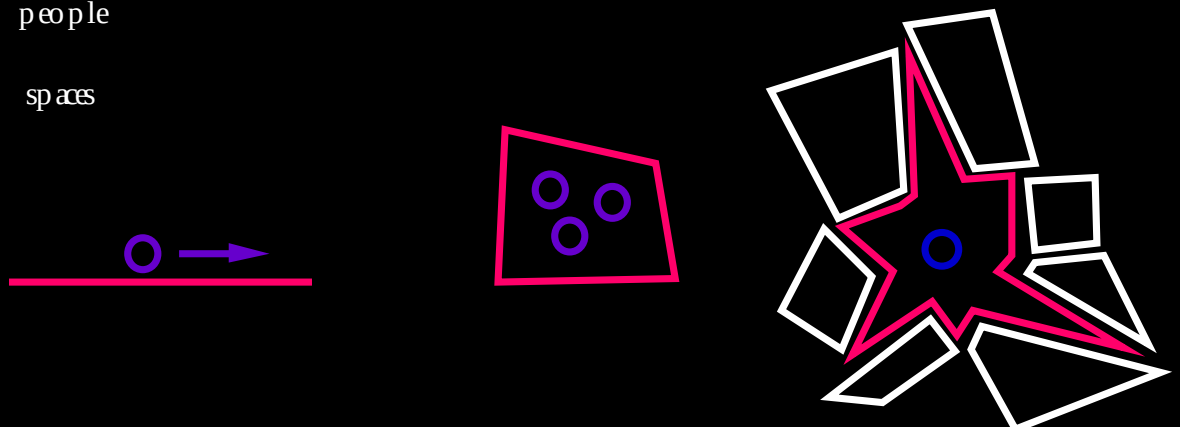
(with apologies for absence)

# Urban space

- Space syntax research is based upon the fact that all spatial systems (complex buildings, settlements etc) form configurations or ‘sets of spatial relations’.
- Within each complex environment there exists a spatial *hierarchy*, with some spaces being intrinsically more important or strategic whilst others are more segregated and less important (Hiller, 1984).
- Those spaces which are, on average, more accessible from all others (or *‘integrated’*) will tend to form part of more ‘everyday journeys’ compared to the more inaccessible (or ‘*segregated*’) spaces.
- Over time, integrated spaces will tend to attract movement-demanding urban activities (i.e. shops) and a multiplier effect will occur (‘the rich get richer, the poor get poorer’).

# Space Syntax (the kinds of spaces analyzed)

- people
- spaces



People move in lines ...interact in spaces ...see changing visual fields as they move around built environments

# Space Syntax

Here is part of an urban area.

Each line represents a single line of sight.

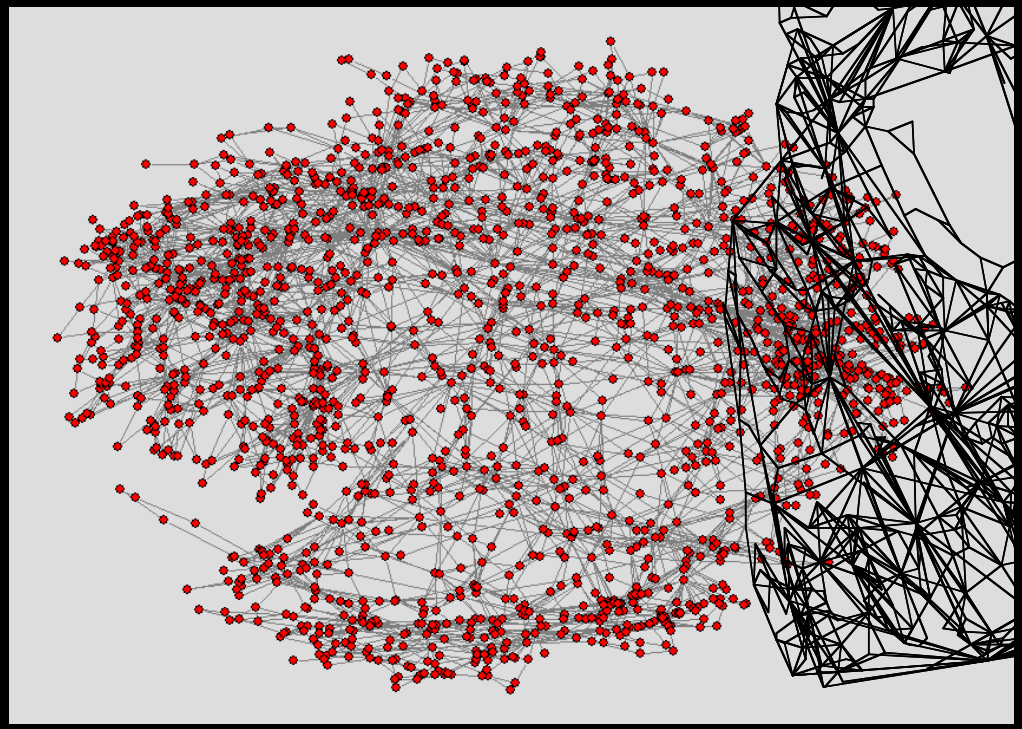
Frequently these lines of sight (or '*axial lines*') resemble road centre-lines.

Each line is represented as a node in a large network-graph. (Inner London = 16,000 lines, Tokyo = 80,000 lines)

Where any two lines cross, those nodes are linked.

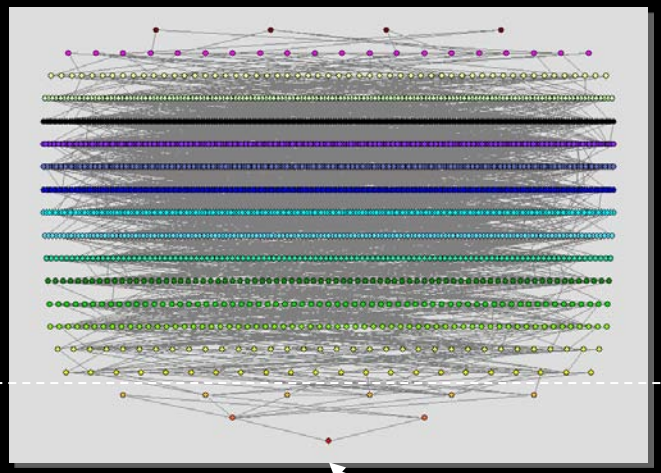
# Space Syntax

This is the underlying graph of the same neighborhood. On the right the nodes are invisible, only their links are shown. The graph is transformed below with the nodes indicated as red ‘dots’.

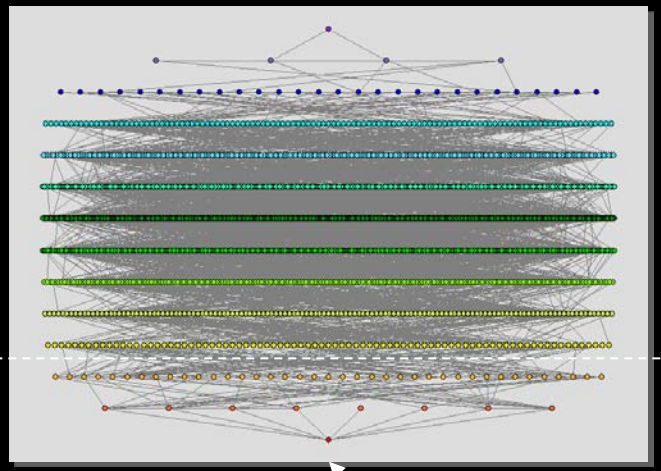


# Space Syntax

The blue line (top right) is 18 steps away from the rest of the network; the red line (middle) is only 13 steps away from everything else. The system looks different, depending where you are!



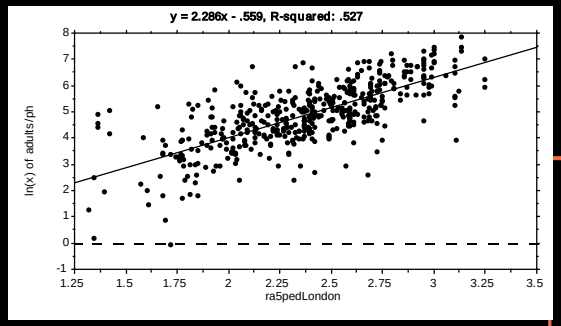
18 'steps' from root = 'segregated'



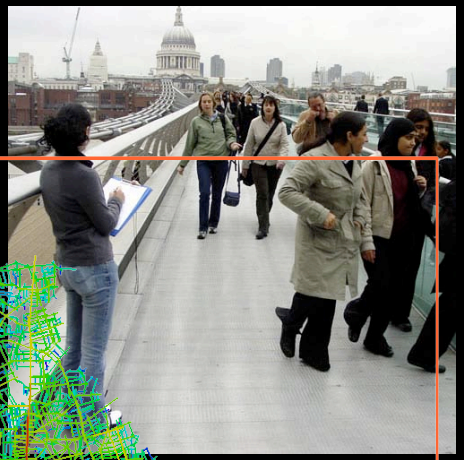
13 'steps' from root = 'integrated'

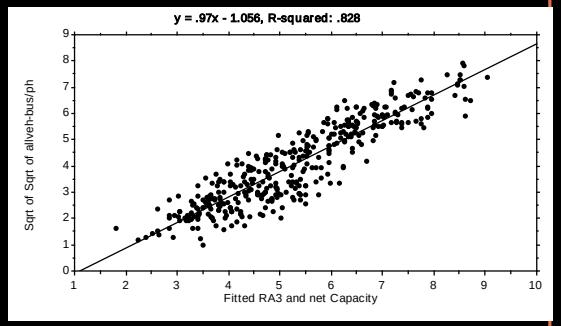
We call these ranked & ordered graphs (above left) *'justified graphs'*.

**And the resultant values (of *integration*) correlate significantly with relative values of observed pedestrian movement.**




***The correlation between the log of observed adult pedestrian flows and radius 5 integration, (r=.726, p<.0001, n=466)***

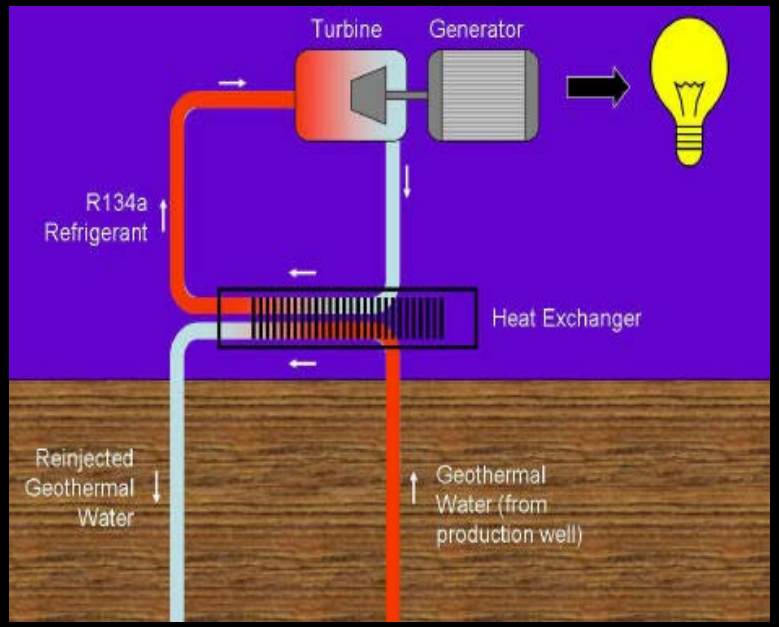




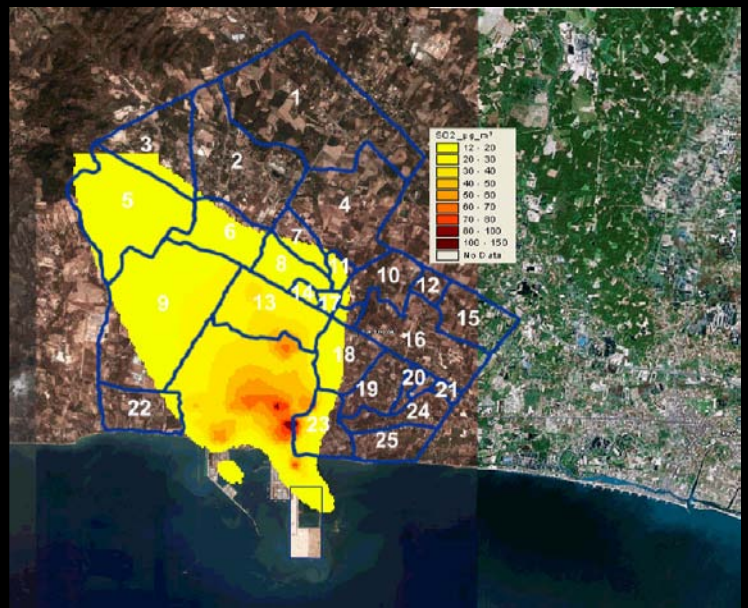

*Correlation between normalised vehicular flows and a fitted variable including radius 3 integration and net road width, (r=.91, p<.0001, n = 395)*

This is the axial map of London

# Geothermal Energy and Subway Climatology




# Environmental Protection



# ENODO

- 3D high quality VR

enodo March, 14th 2011 x 2 c.url