



Sustainable Places Projects: spatial Design Network Analysis (sDNA)

sDNA is a suite of software tools produced by the Sustainable Places Research Institute, which are used to characterise urban environments, plan sustainable cities and predict the use of walking, cycling and public transport.

Developed by our Research Associate Dr Crispin Cooper, sDNA has hundreds of users worldwide in government, commercial, academic and third sectors.

Transport networks influence everything from environmental sustainability (pollution and carbon emissions) and social sustainability (health, wellbeing, community cohesion) to economic sustainability (town centre vitality, commercial success).

sDNA fills a gap between GIS and Transport models of cities. Transport demand models are the mainstay of modern simulation, but expensive to commission, and hard to apply to problems generally considered to fall outside the realm of transport planning, as well as the active travel behaviours, walking and cycling. Mainstream spatial analysis, on the other hand, only captures spatial proximity when considering factors that influence people's everyday lives.

Our research programme began by developing the sDNA software based on refining and updating a long tradition of spatial network analysis. The first version was used in a number of studies, including one which found links between town layout and community cohesion in the South Wales valleys.

More recent upgrades have been funded by an ESRC Impact Accelerator award, as well as Hong Kong and Tongji Universities. In partnership with sustainable transport charity Sustrans and engineering consultants Arup and WSP Parsons Brinckerhoff, we have also used sDNA to predict pedestrian and cyclist behaviour. The software has also been used to assist in ecological footprinting.

During 2017 we began a collaboration with the Data Innovation Research Institute on what we believe is the first ever test of a pedestrian flow model's ability to forecast changes caused by urban redevelopment. sDNA is also being used to model transport access for people with disabilities, access to natural recreational space in Wales, and the influence of spatial networks on land use intensification and commercial activity.

sDNA has a global user base who are currently being surveyed to discover the full range of uses. Perhaps most surprising is the discovery that archaeologist Hector Orengo used sDNA to analyse the transport networks of Roman Britain! Outside of academia, sDNA also continues to be used in numerous urban design projects worldwide.

Find out more about the sDNA project on the project website.
www.cardiff.ac.uk/sdna

Research team



Dr Crispin Cooper
Sustainable Places
Research Institute

Email: cooperch@cardiff.ac.uk
Phone: +44(0) 29 2087 6072

Hong Kong University

Dr Alain Chiaradia
alainjfc@hku.hk

Professor Chris Webster
cwebster@hku.hk

Dr Chinmoy Sarkar
csarkar@hku.hk