



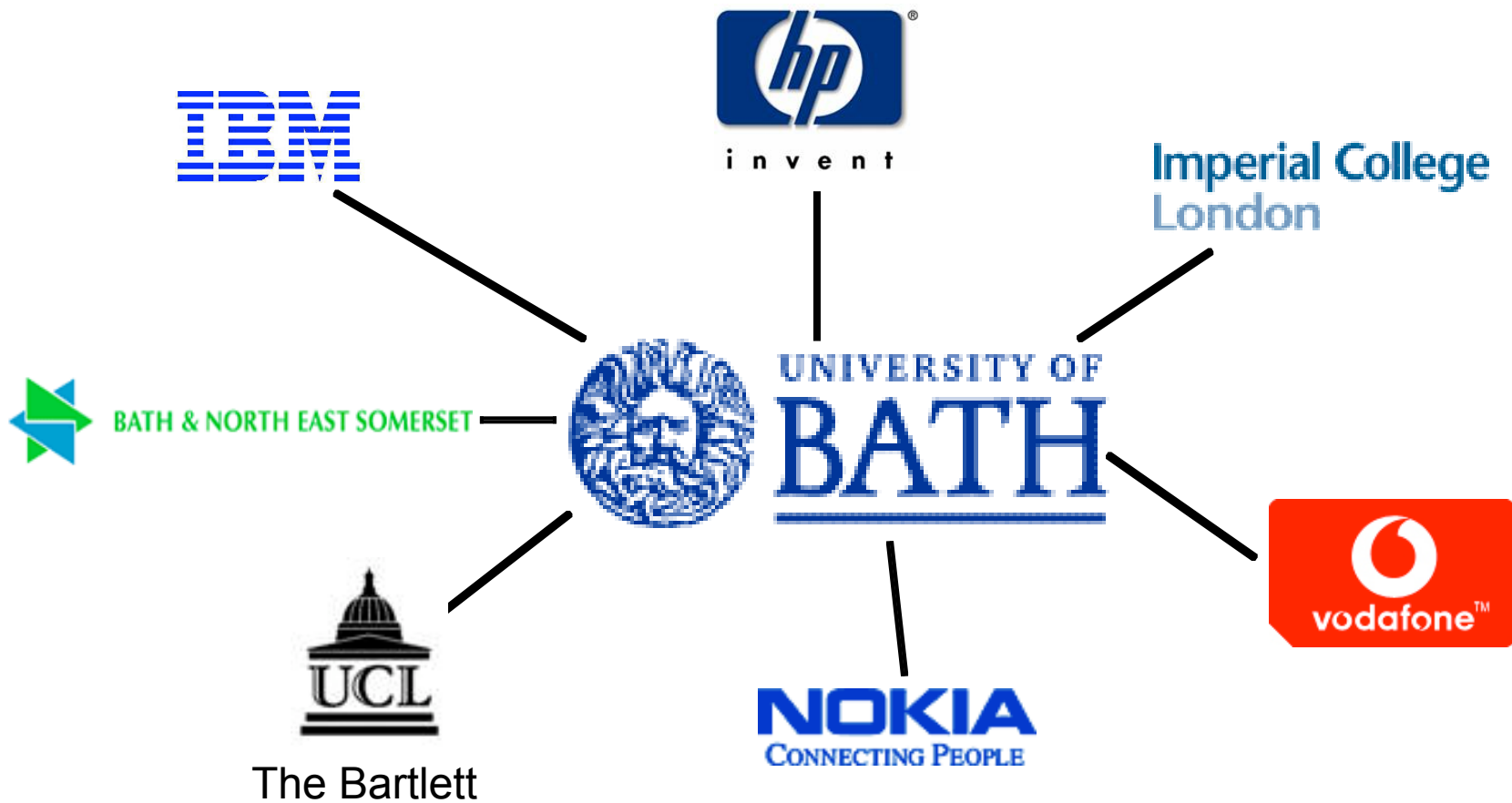
cityware  
urban design & pervasive systems

# Cityware

## Urban design and pervasive systems

Vassilis Kostakos  
Department of Computer Science  
University of Bath

16 November 2006, Cambridge, UK



Cityware partners



# Goals of Cityware

- Tools, methods and theories
- Urban design and pervasive systems
- Security, privacy and trust
- Context aware services
- User engagement (longitudinal)

# Bluetooth tracking?

- Initially used as a “digital enhancement” to observation methods.
- Gatecounts
- Static snapshots
- (UbiComp 2006)

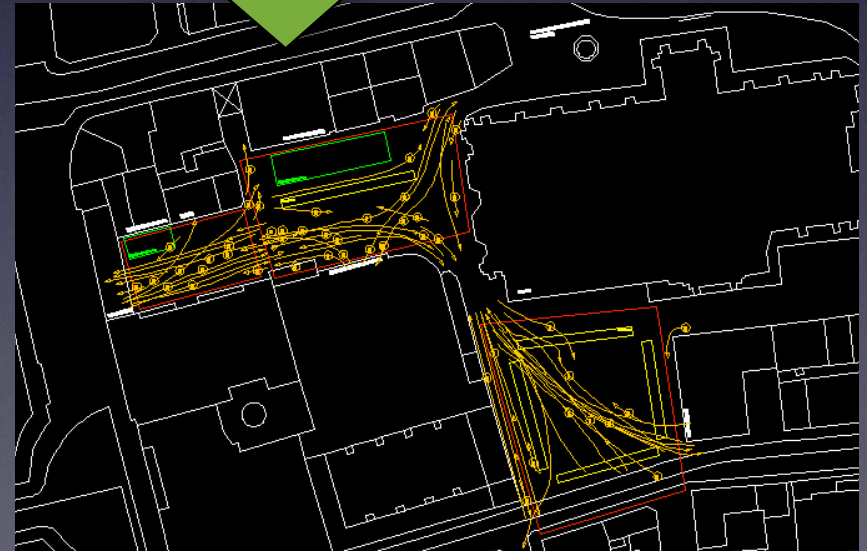


# Gatecounts



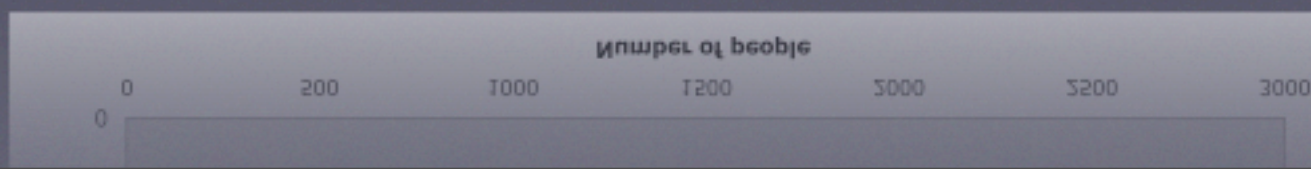
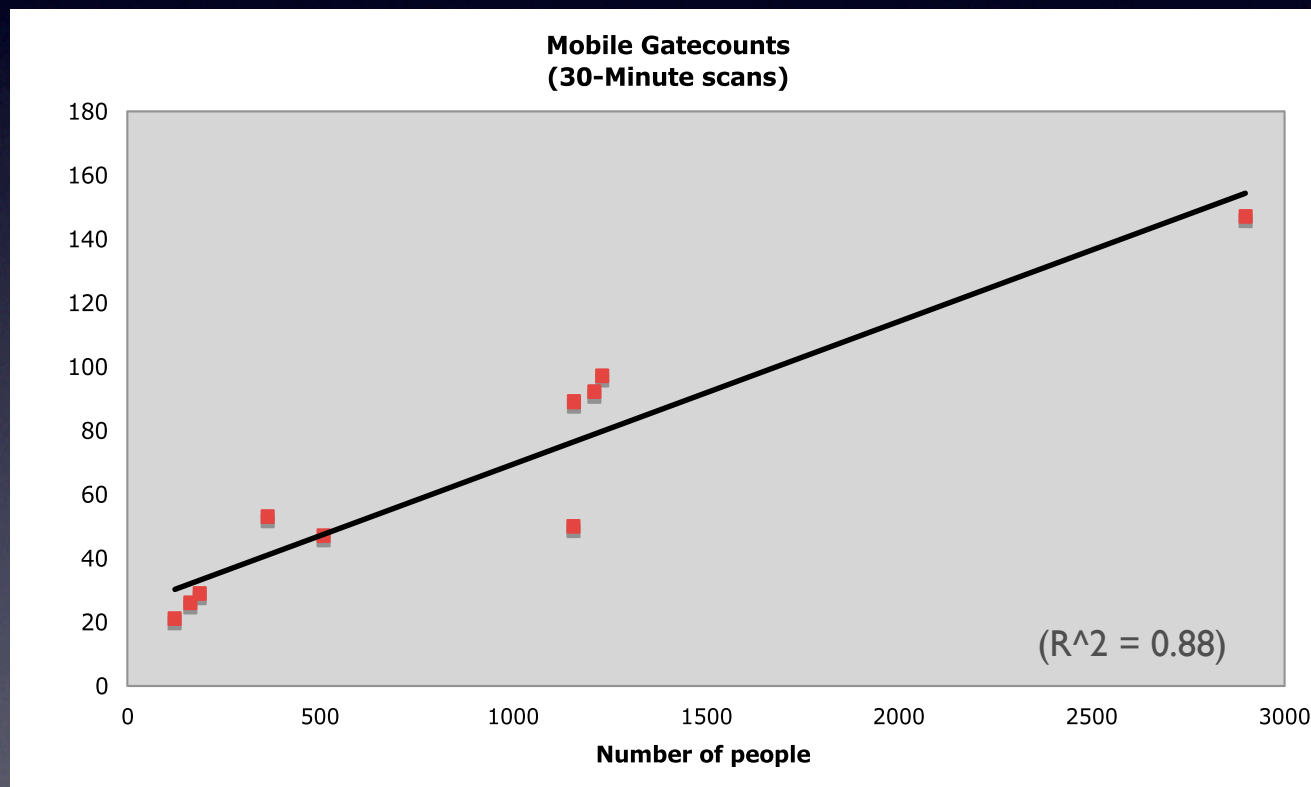


# Static Snapshots



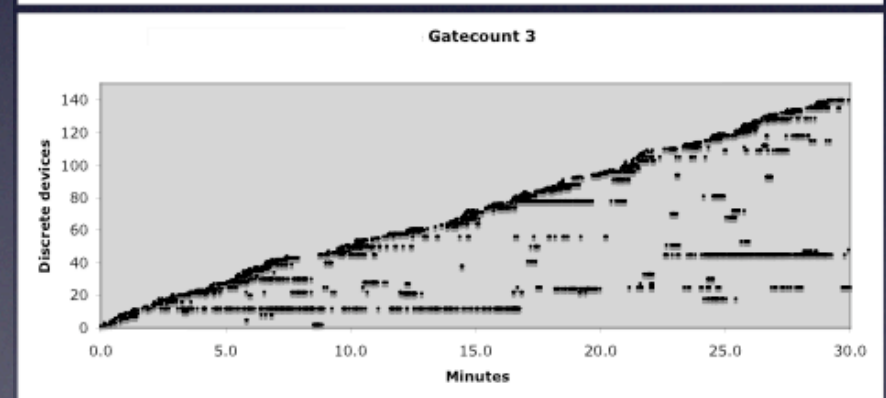
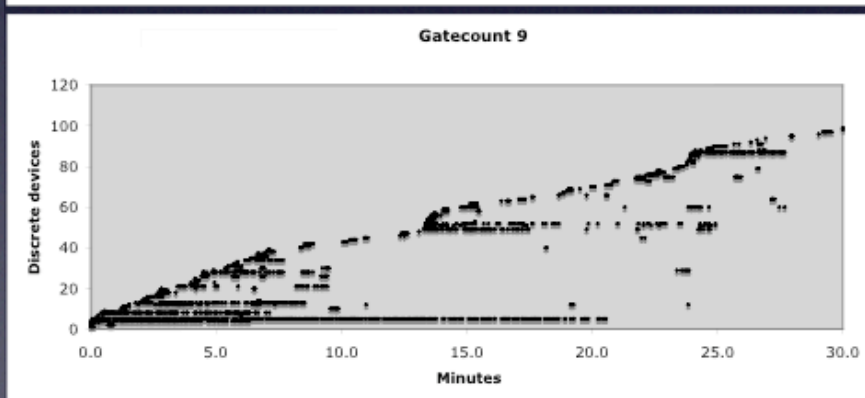
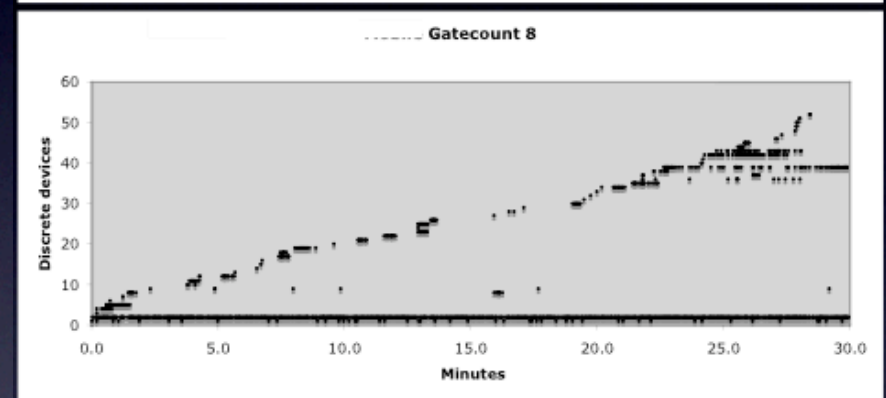
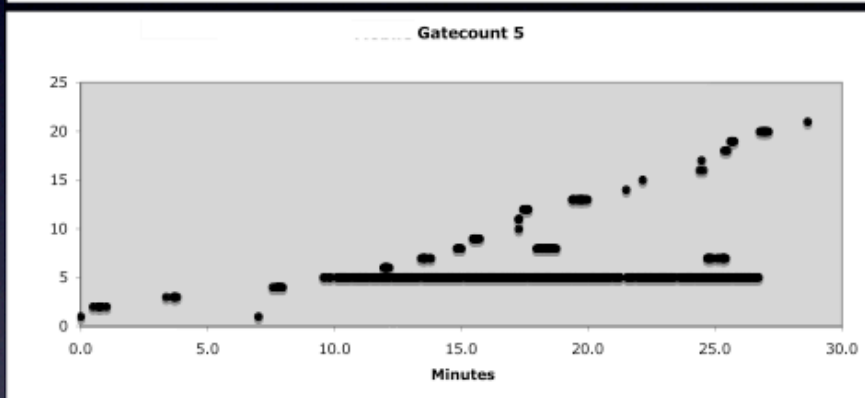
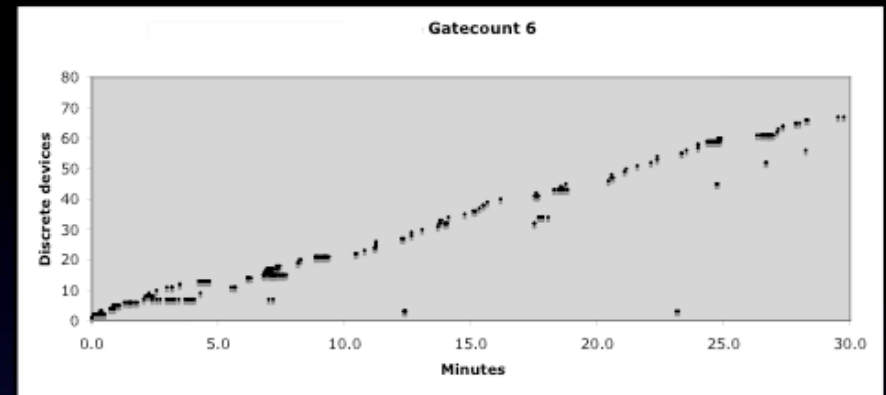
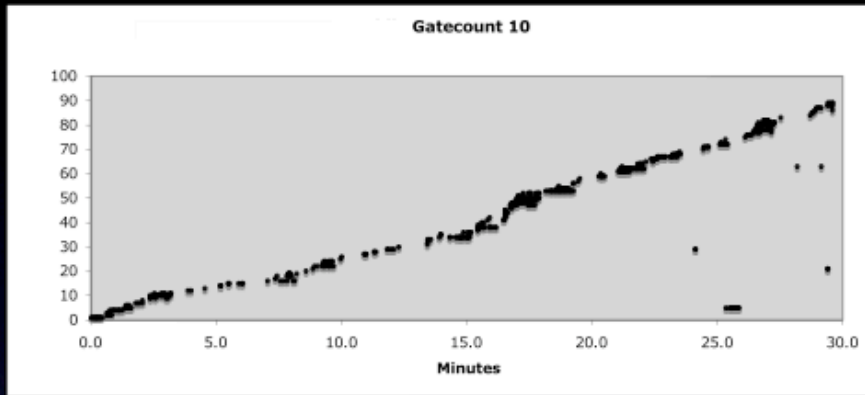
# Bluetooth visibility

- Around 7.5% of observed pedestrians had discoverable Bluetooth devices



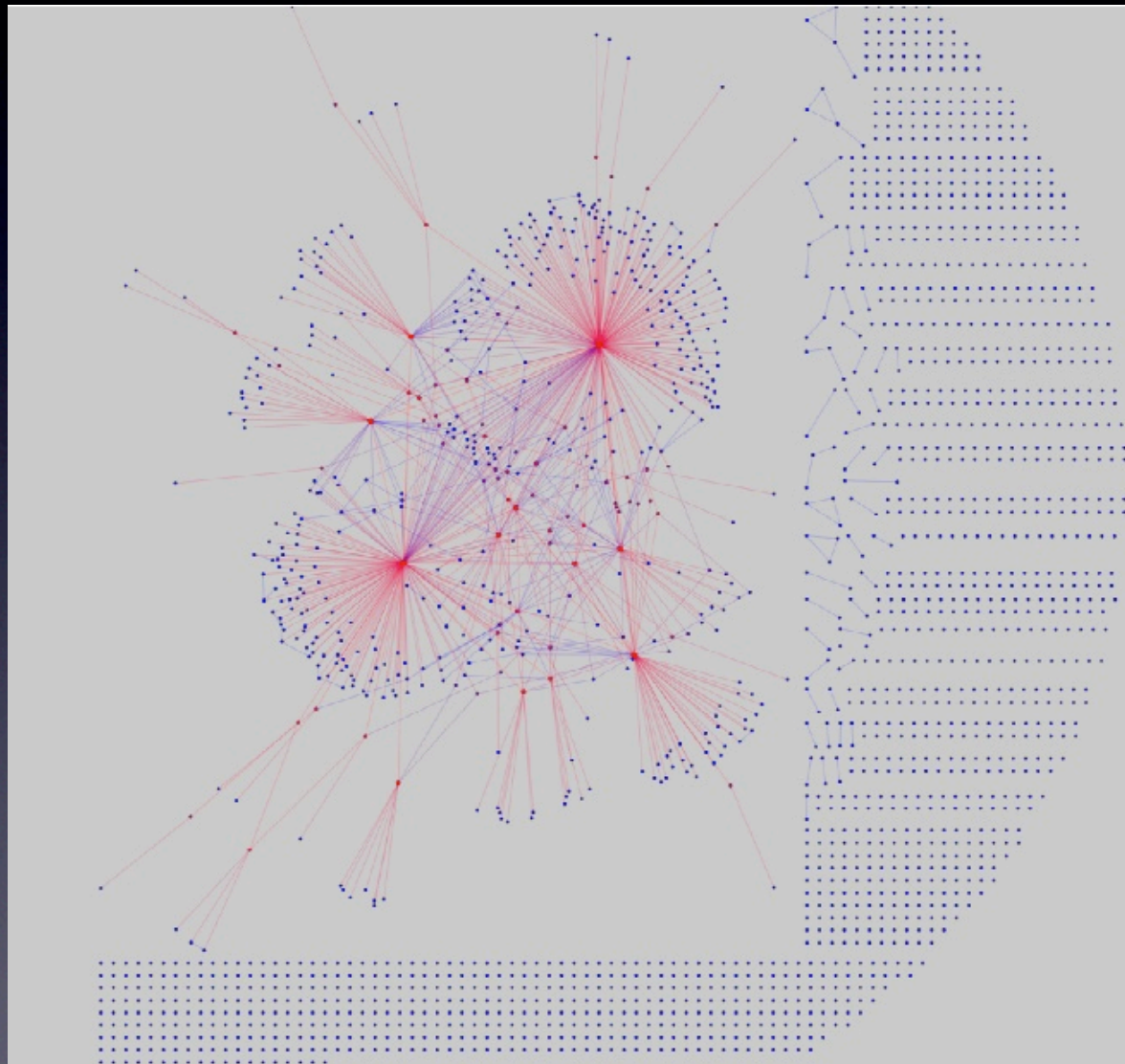


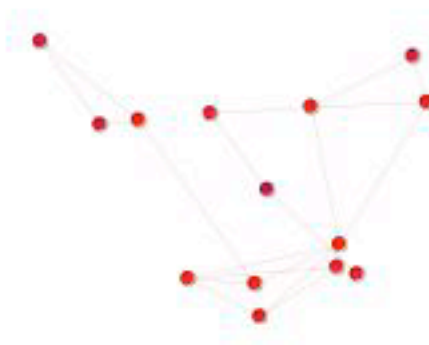
# Gatecount timelines



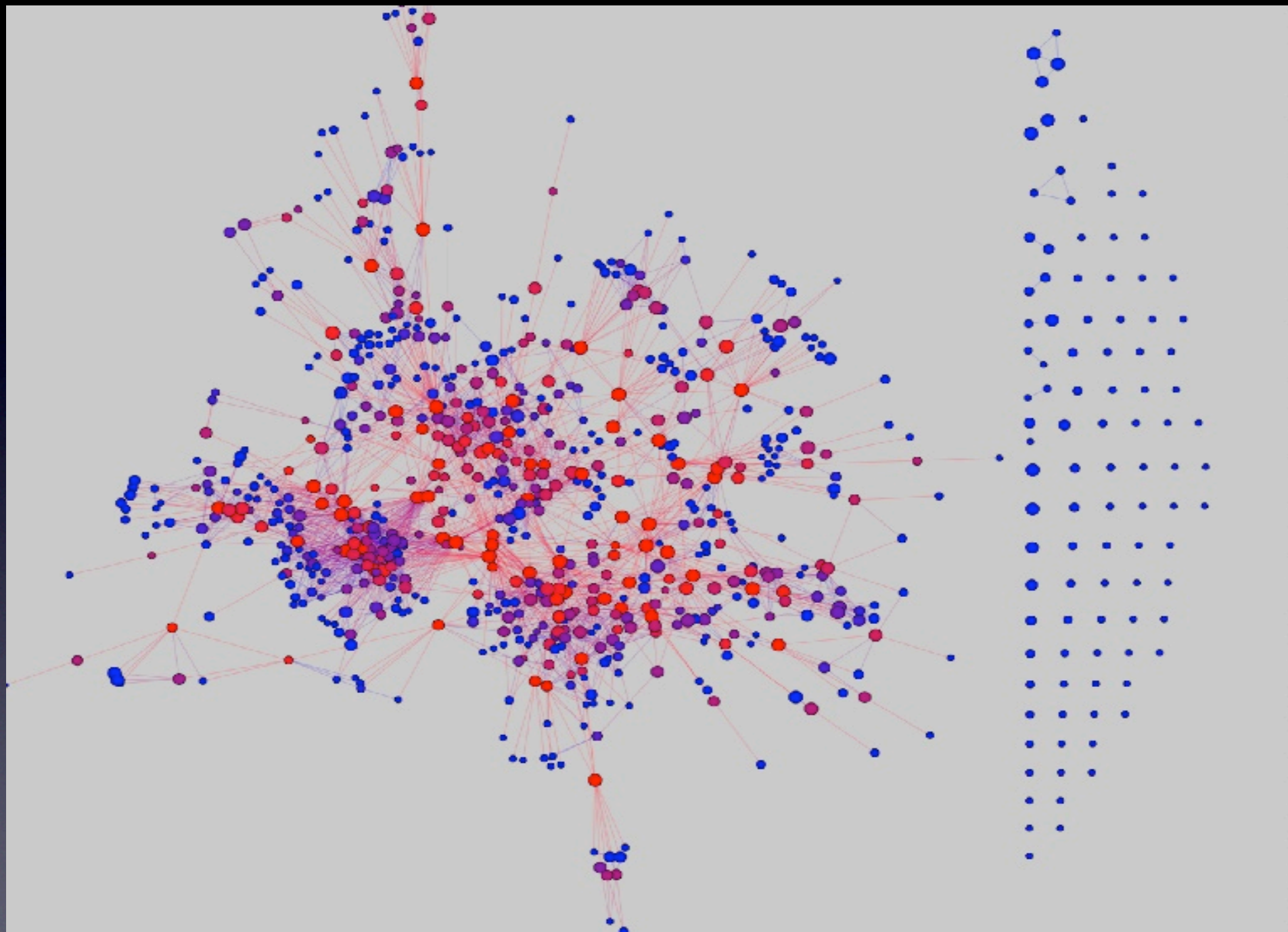


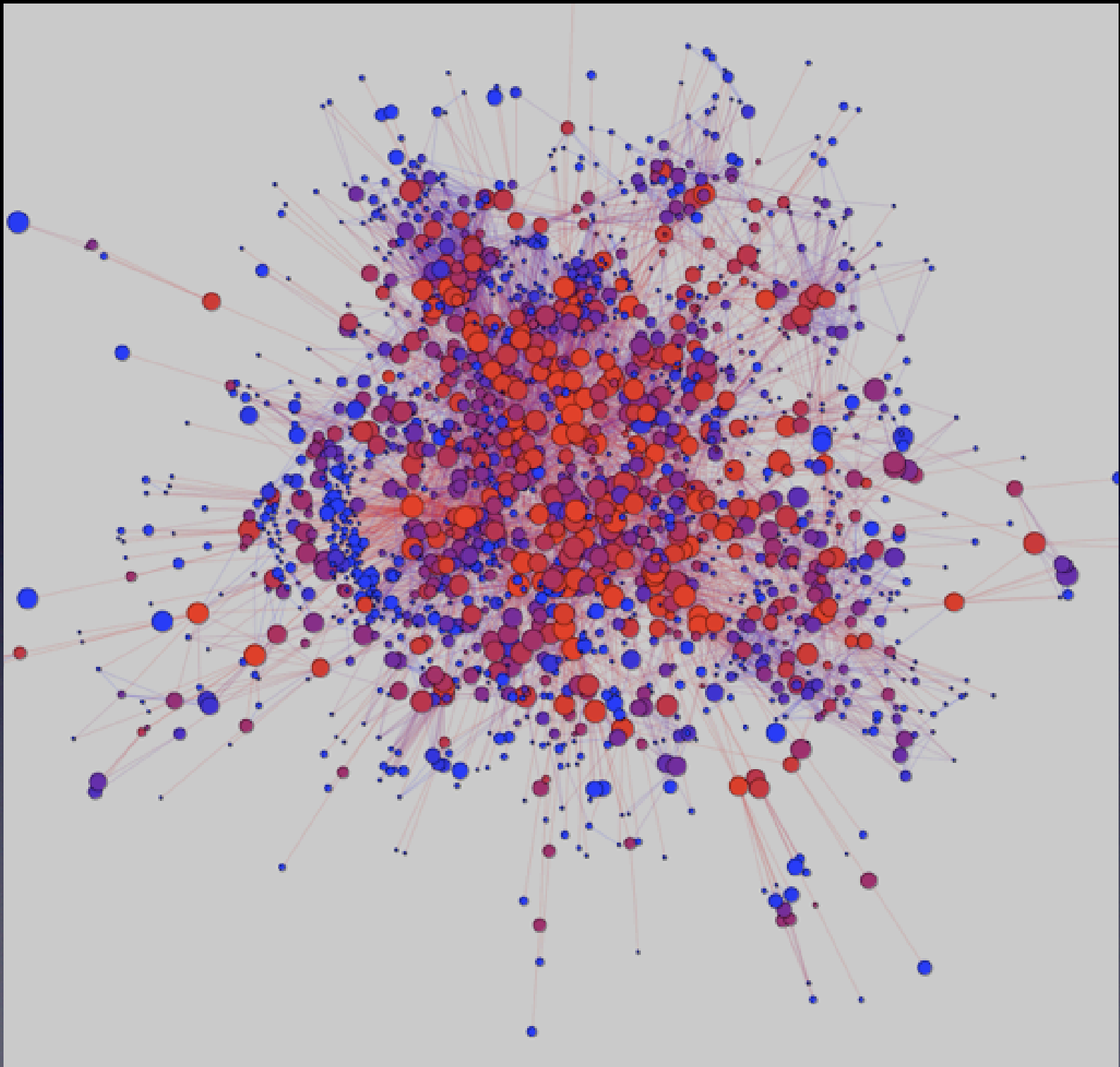
# Derived social network





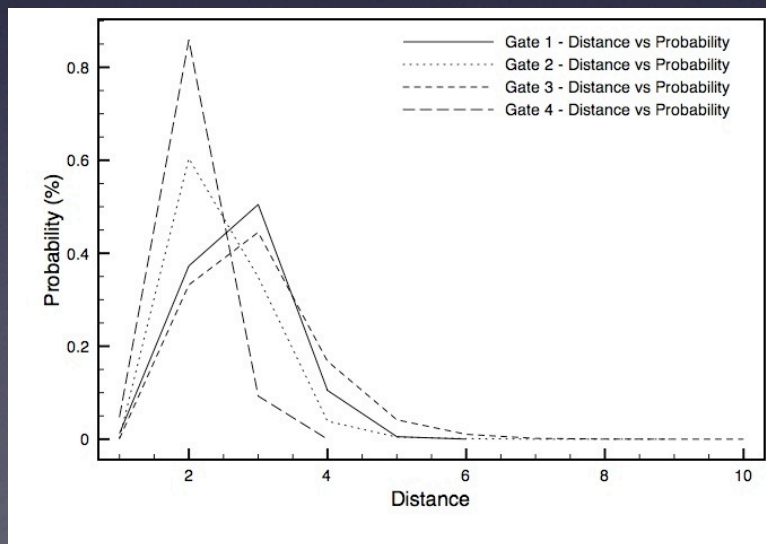
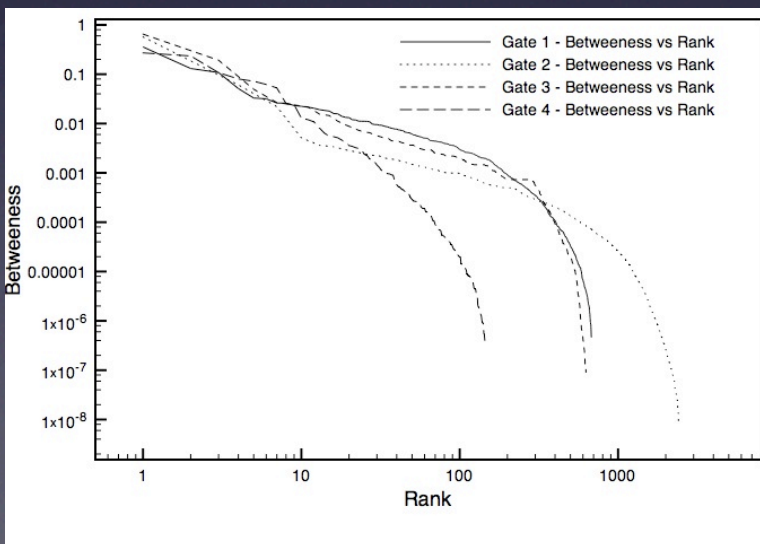
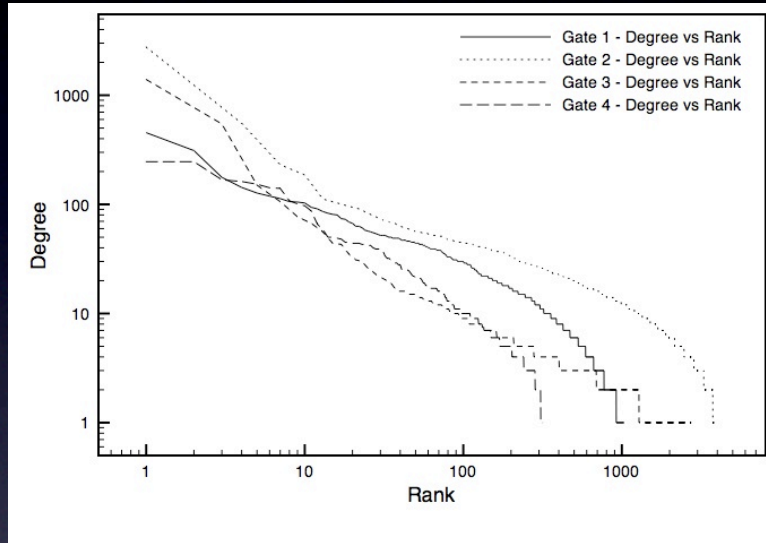
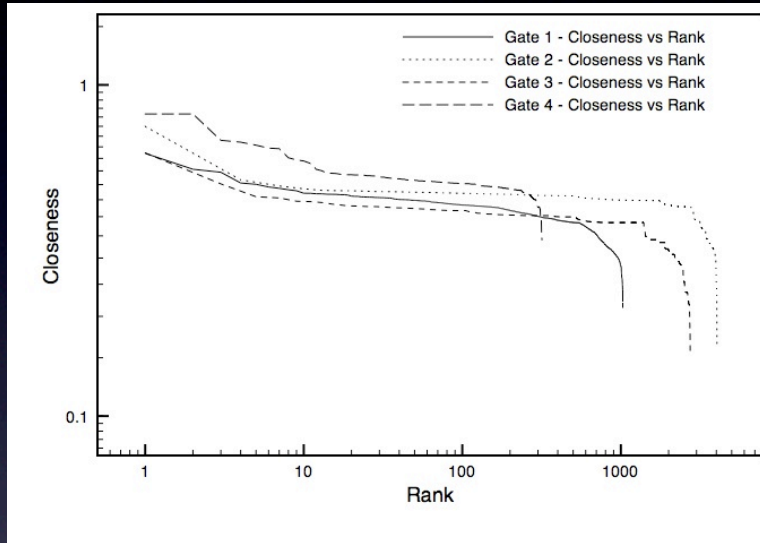








# Power laws and exponential decays



# Why?

- Understand effect of space on behaviour, patterns of encounter
- Effect of space on use of technology
- Mobility of technology



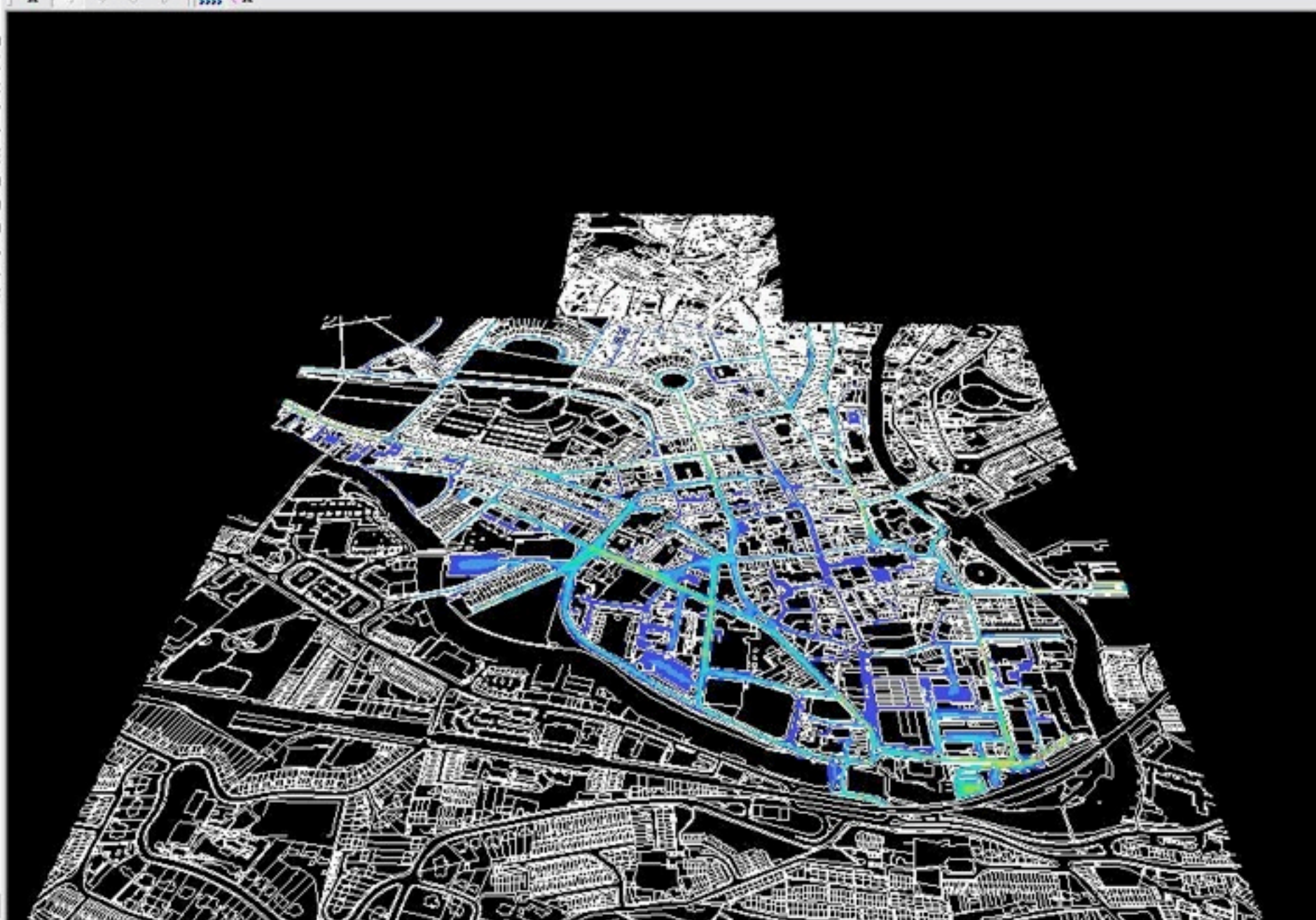
# Current work

- Scanners are expensive and difficult to install & maintain.
- Use simulations to extend our dataset.





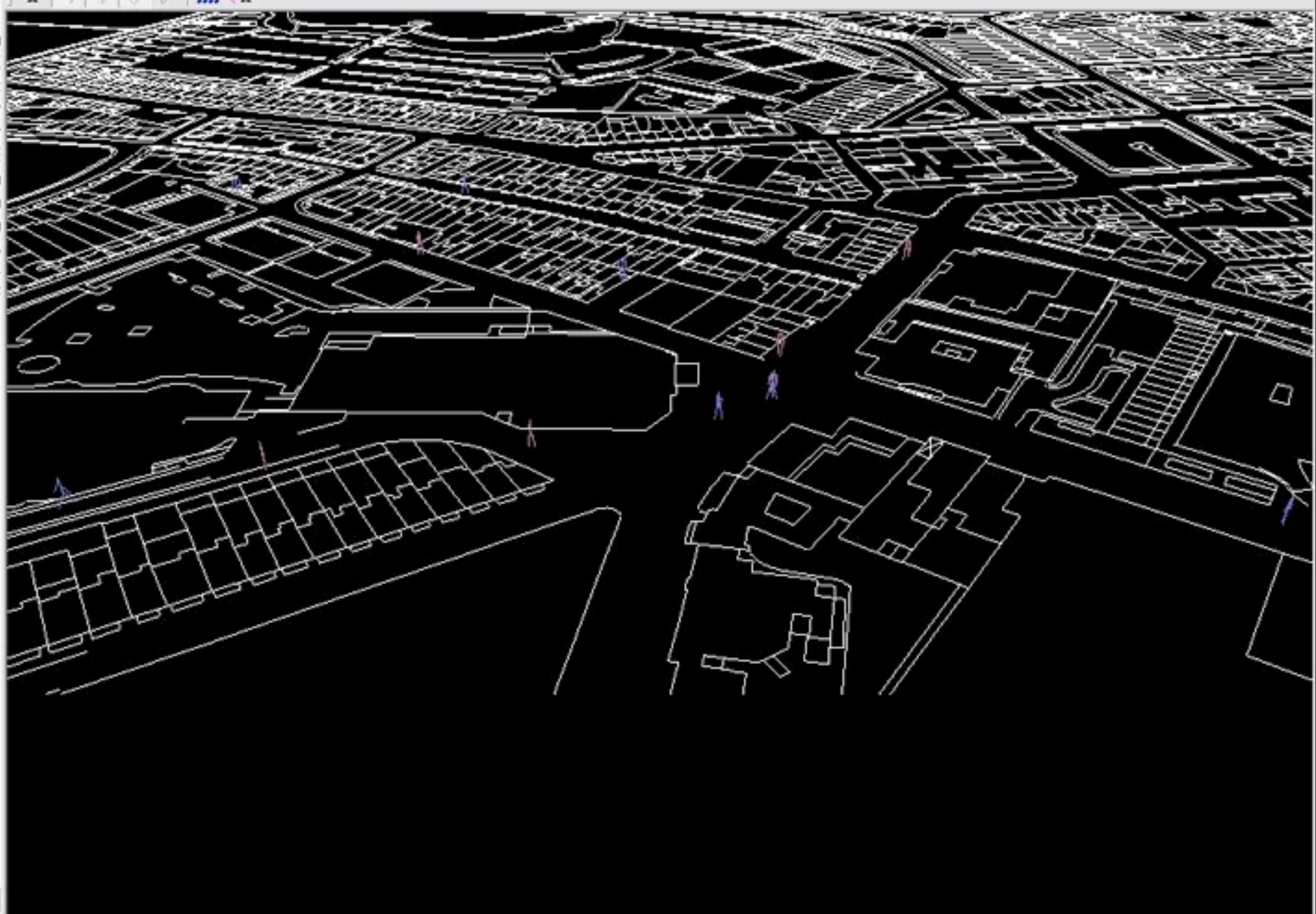
- Point Graphs
  - Point Map
    - Ref Nu
    - Agent C
    - Conne
    - Isovist f
    - Isovist f
    - Visual E
    - Visual Ii
    - Visual Ii
    - Visual Ii
    - Visual M
    - Visual M
    - Visual F
- Drawing Layers





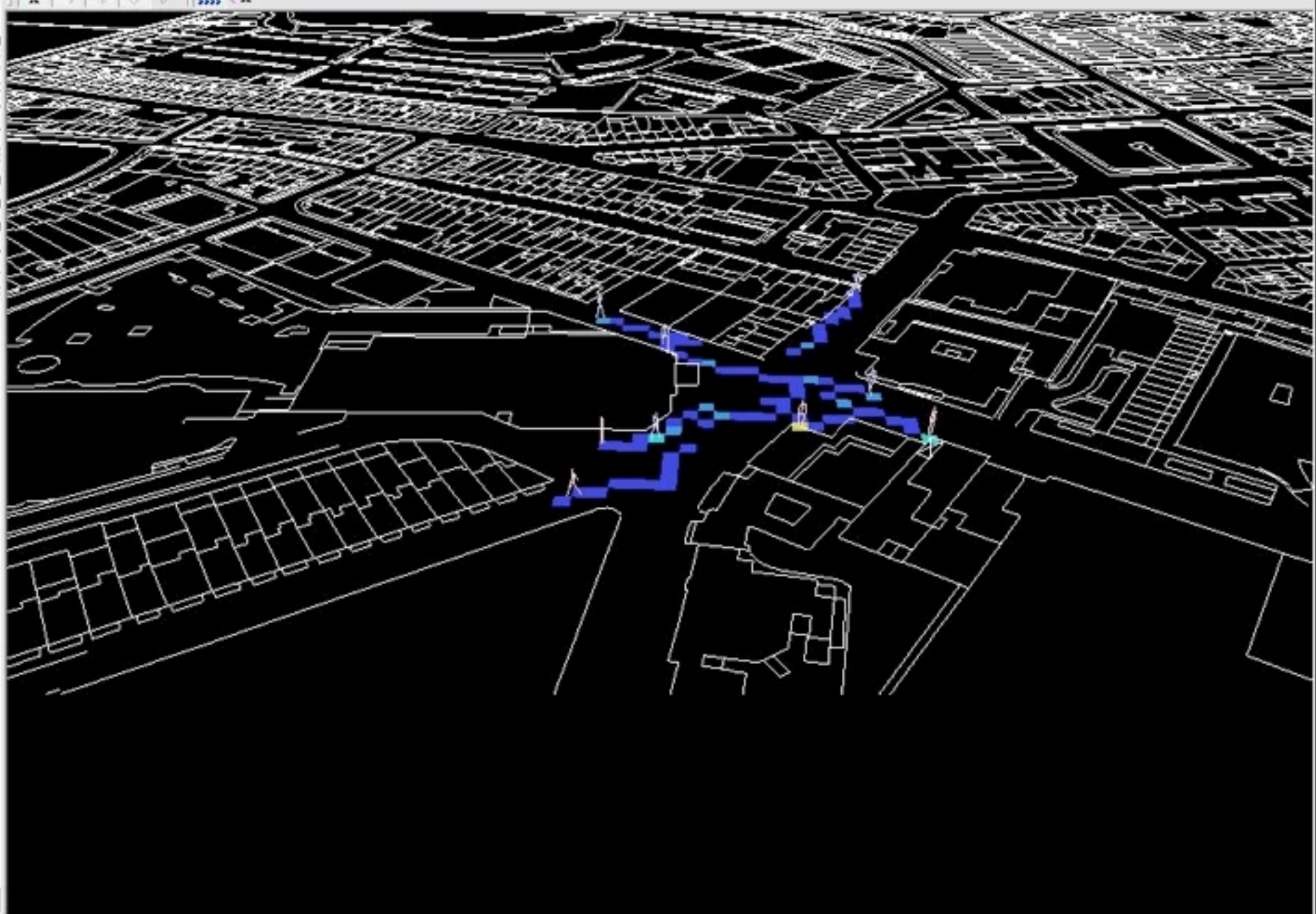


- Point Graphs
  - Point Map
    - Ref Nu
    - Agent C
    - Conne
    - Isovist f
    - Isovist f
    - Visual E
    - Visual I
    - Visual I
    - Visual I
    - Visual M
    - Visual M
    - Visual F
  - Drawing Layers





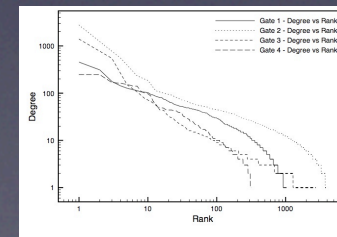
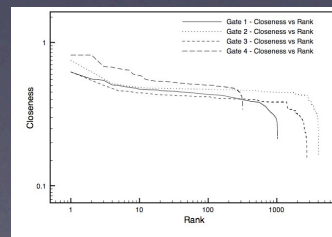
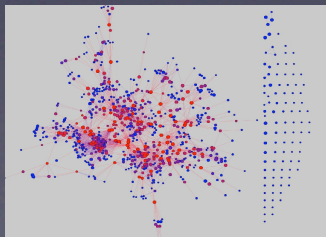
- Point Graphs
  - Point Map
    - Ref Nu
    - Agent C
    - Conne
    - Isovist f
    - Isovist f
    - Visual E
    - Visual I
    - Visual I
    - Visual I
    - Visual M
    - Visual M
    - Visual F
- Drawing Layers



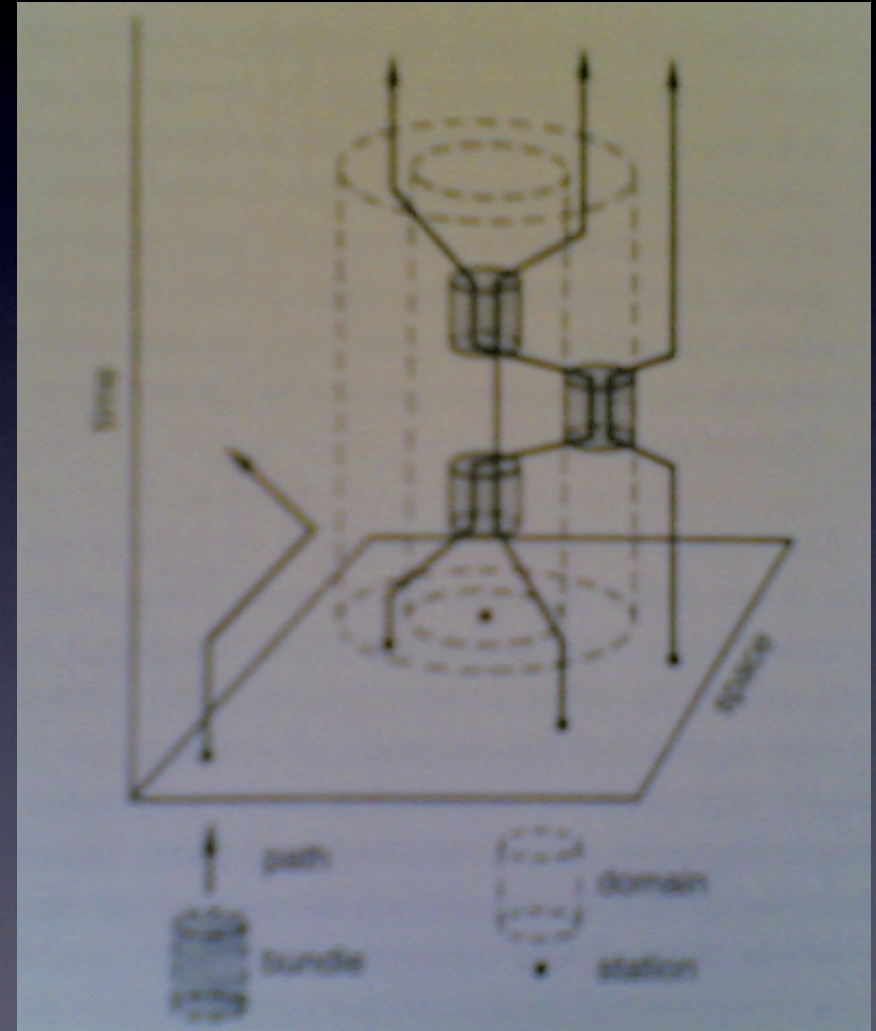
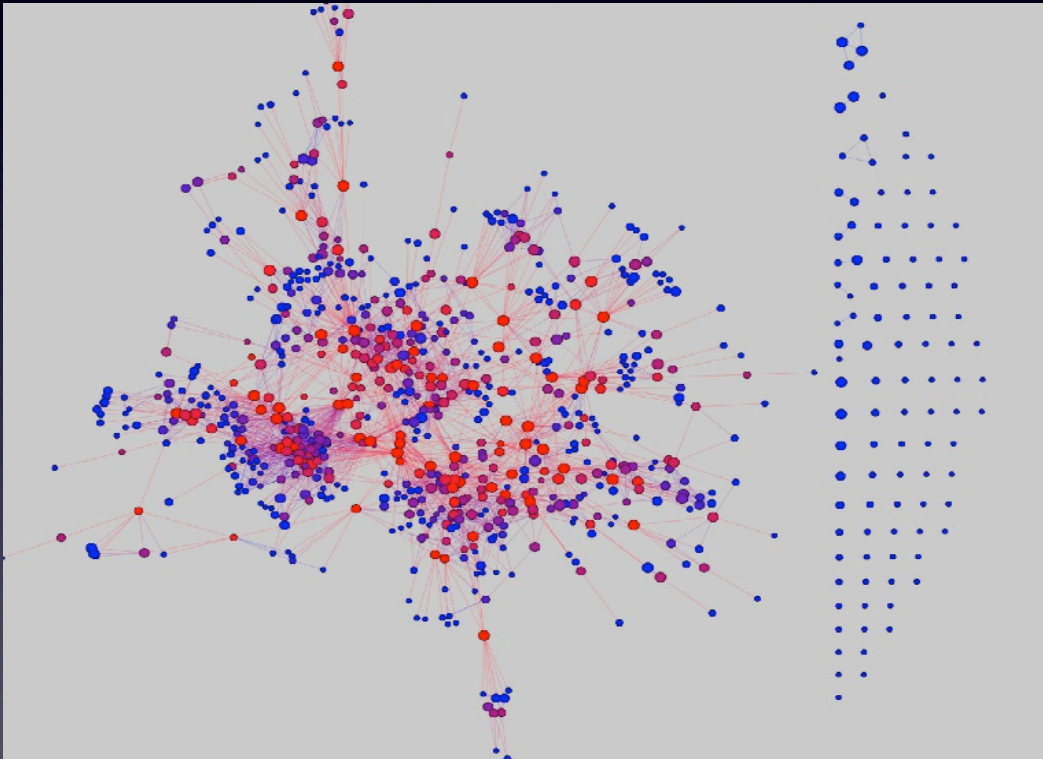


# Approach

- Fine-tune simulation to match observed data
- Install scanners within the simulation
- Generate more networks & graphs
- Correlate with features of the environment



# Data exploration





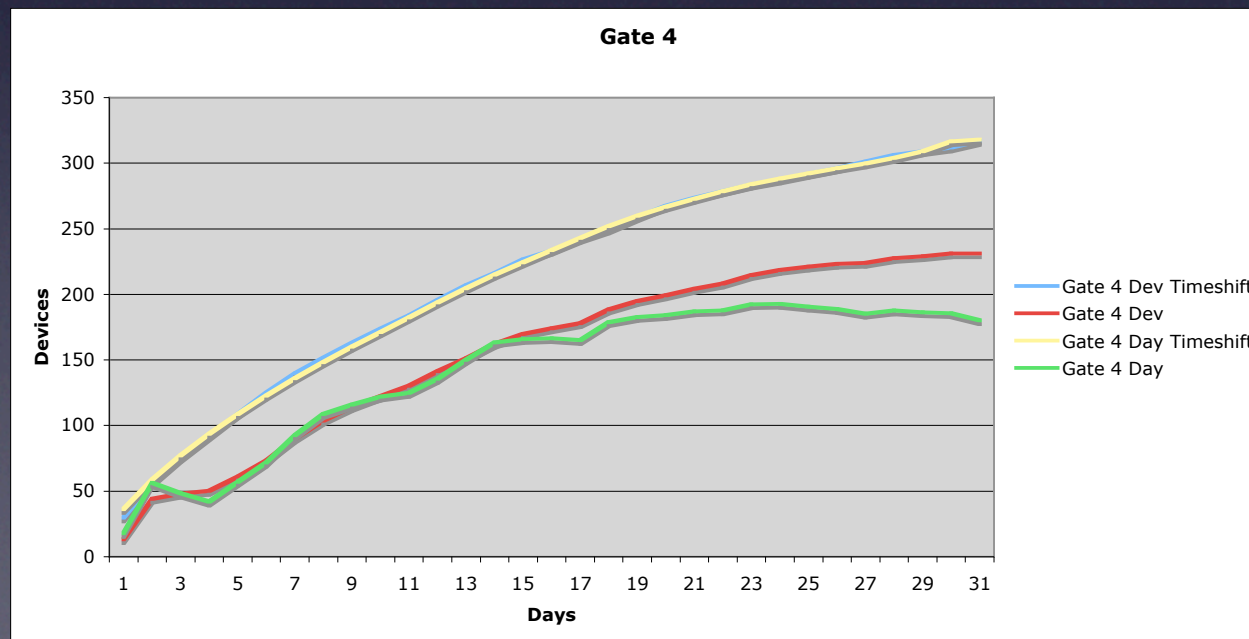
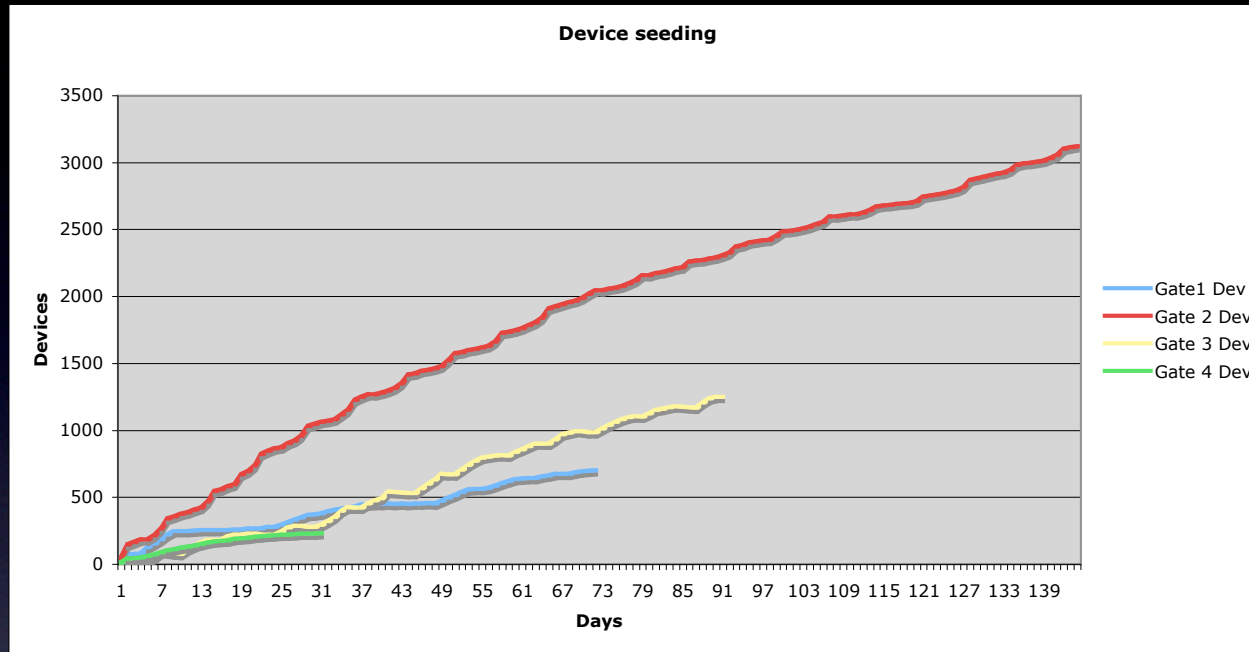
# Patterns of diffusion Epidemics (?)


- Reconstructive simulation
- Action-replay of real-world activity
- Encounter in space

		Society	
		Open	Closed
Space	Open	Street	Campus
	Closed	Pub	Lab



# Action-replay simulations



The top of the slide features a background image of a sunset over a city skyline. In the foreground, three people are silhouetted against the bright sky, standing on a balcony or walkway. The Cityware logo is positioned in the upper left corner of this image.

cityware

urban design & pervasive systems

# Thank you

vk @ cs . bath . ac . uk

<http://www.cityware.org.uk>