

# Smart Cities

An Outline of the Lecture Course

PUP, GPH, GIS, & SOS 598 Fall 2015

*Also advertised to the MSc in Smart Cities & Urban Analytics UCL*

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<http://www.spatialcomplexity.info/>

<http://www.casa.ucl.ac.uk/>

class search & course catalog

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PUP 598 - Topic: Smart Cities

Fall 2015

**Course description:** Topical courses not offered in regular course rotation--e.g., new courses not in the catalog, courses by visiting faculty, courses on timely topics, highly specialized courses responding to unique student demand.

**Enrollment requirements:** None

**Units:** 1  
**Repeatable for credit:** No  
**General Studies:** No  
**Offered by:** [College of Liberal Arts and Sciences](#)

Class meeting details

Class #:	Days:	Dates:	Start:	End:	Location:	Instructor:	Seats open:
91018	M W F	10/05 - 10/09	6:00 PM	7:20 PM	Tempe - LL230	Batty	4 of 9 <input type="button" value="Add"/>
	W F	10/14 - 10/16	6:00 PM	7:20 PM	Tempe - LL230		

Additional class details

**Component:** Lecture  
**Session:** Dynamic Dated  
**Last day to enroll:** October 05, 2015  
**Drop deadline:** October 05, 2015  
**Course withdrawal deadline:** October 13, 2015  
**Instruction Mode:** In-Person  
**Fees:** None

**Combined with:** [GPH 598 \(91020\)](#) , [GIS 598 \(91021\)](#) , [SOS 598 \(91357\)](#)  
**Books:** [View books for this class](#)

Note that the last class will be merged into the preceding five due to the fact that I need to finish this class in two weeks as I need to return to UK to pick up my work there

The lectures are divided into FIVE sessions with two lectures in each, each lasting about 50 minutes.

We have a break of 5-10 minutes in the middle of each session. In this first presentation, we will briefly sketch the topics.

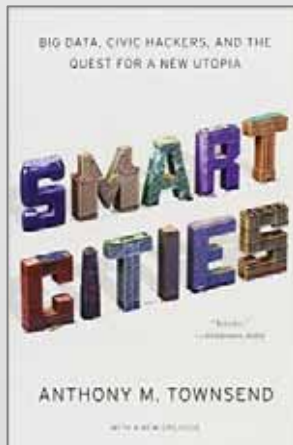
Let me begin by saying this is not a technical course, it is an impressionistic set of lectures that introduces you to ideas about Smart Cities.

***Smart Cities have many definitions.*** The one we will use is based on exploring the way information, specifically digital information is changing the physical as well as socio-economic structure of our cities. Computers and digital communications are being continuously embedded into the fabric of the city. The information they relay is changing the way we behave. This is what the course is all about.

## Background Reading

The web site <http://www.spatialcomplexity.info/> is where the lectures will be placed. I have adopted Anthony Townsend's book *Smart Cities* as good background. You can read a review here: <http://www.spatialcomplexity.info/archives/2419>

Something to read today, download the following paper <http://link.springer.com/content/pdf/10.1140%2Fepjst%2Fe2012-01703-3>



Eur. Phys. J. Special Topics 214, 481–518 (2012)  
© The Author(s) 2012. This article is published  
with open access at [Springerlink.com](http://Springerlink.com)  
DOI: 10.1140/epjst/e2012-01703-3

THE EUROPEAN  
PHYSICAL JOURNAL  
SPECIAL TOPICS

Regular Article

### Smart cities of the future

M. Batty<sup>1,a</sup>, K.W. Axhausen<sup>2</sup>, F. Giannotti<sup>3</sup>, A. Pozdnoukhov<sup>4</sup>, A. Bazzani<sup>5</sup>,  
M. Wachowicz<sup>6</sup>, G. Ouzounis<sup>7</sup>, and Y. Portugali<sup>8</sup>

## Background Listening and Watching

My colleague Dr, Hannah Fry has just released 10 radio programmes on BBC Radio 4 which you can download as podcasts from the BBC i-Player site or from the links below. These programmes will tell you a vast amount about the history



Apple Yahoo! YouTube Wikipedia News Google Maps Inbox (0) Gmail Google Calendar Popular

BBC Radio 4 - Computing Britain - Downloads

### Episodes to download

**Mobile Revolution**  
 FRI 25 SEP 2015  
 Hannah Fry explores how a British company shrunk chips and made the mobile revolution.  
[Download MP3](#)

**UK Gaming**  
 WED 23 SEP 2015  
 Teens write computer games in their bedrooms, and a billion-dollar business is created.  
[Download MP3](#)

**Computers at Home**  
 TUE 22 SEP 2015  
 How 1980s Britain grew to love the home computer. Presented by mathematician Hannah Fry.  
[Download MP3](#)

**This podcast belongs to**  
 Computing Britain

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**Techno Odyssey**  
 Exploring the vast archive of Chaplin's unfinished scripts, letters and press cuttings.

**Seriously...**  
 A rich selection of documentaries aimed at relentlessly curious minds.  
[View all \(110\)](#)



**LEO the Electronic Office**  
 TUE 15 SEP 2015  
 The story of the chain of British teashops that created the first office computer.  
[Download MP3](#)

**Electronic Brains**  
 MON 14 SEP 2015  
 Hannah Fry travels back to the 1940s to hear the story of the creation of computer memory.  
[Download MP3](#)

To STREAM <http://www.bbc.co.uk/programmes/b06bq6j1>  
 To PODCAST <http://www.bbc.co.uk/programmes/b06bq6j1/episodes/downloads>

## **SESSION I: THE CONTEXT**

### *1. A Walk Through the Smart City*

Examples of How the City is Being Automated and Instrumented. A Very Quick History of the Development of Wireless, TV, Computers, the Internet and Real Time Control in the City

### *2. Turing's Legacy*

How Computers got Started, Miniaturization, and the Convergence with Telecommunications. The Underlying Technologies, Hardware, Software, Data and Orgware, Network Computation

## **SESSION II: SMART CITIES ARE ABOUT INFORMATION, HARDWARE AND SOFTWARE**

### *3. The Wired City: Computable City: Information Infrastructure*

Graphics, and Convergence of IT and Communications. Automating, Instrumenting, Measuring, and Sensing How We Locate and Move in the City: Where the Hardware Really Resides, The Transformation of Physical Distance

#### *4. The Smart City as a Communications Mechanism*

Defining Smart Cities Again: Space and Time: Cities as Flow Systems, Coupled Networks, Materials, People, Energy, Information, Vehicle Movements in Real Time

### **SESSION III: NETWORKS, FLOWS AND BIG DATA**

#### *5. Transport and Transit: Smart Systems and Big Data*

Automating, Instrumenting, Measuring, and Sensing How We Locate and Move in the City. Predicting Travel behaviours from Smart Card Data

#### *6. Online Public Networks: Communications Data*

Passenger Timetable Flows, GPS in Special Purpose Vehicles, Buses, Taxis, Phone Data and a Discussion of the London Bikes Scheme and Its Visualisation

### **SESSION IV: CITIES AS SERVICES DELIVERY**

#### *7. Big Data and Urban Information Systems*

The Origins of Information, Transactions Processing, Municipal Information Systems, GIS and Interoperability; Confidentiality, Privacy, the Surveillant Society



## *8. The Participatory City: Crowd-Sourcing, City Dash Boards, Social Media*

Integrating Data, Open Data, Coordinating Services, Emergency Response and Location-Based Services, Web Mapping, Real Time Sensing and Information. Making Cities Smarter, Coupling Networks, Services and People, New Forms of Electronic Community

## **SESSION V: THE VIRTUAL CITY: REPRESENTATION, MODELLING, AND PREDICTION**

## *9. Modelling The City: GIS, 3D and Virtual Reality Representations*

The Development of 2D maps to 3D Environments, Virtual Reality, Augmented Reality, Serious Visual Gaming

## *10. Urban Simulation and Prediction*

Building Mathematical Models of the City, The Science of Cities, and the Synthesis of Simulation with Representation, Data Driven Models, Prediction and Forecasting