Smart Cities

An Outline of the Lecture Course
PUP, GPH, GIS, & SOS 598 Fall 2015
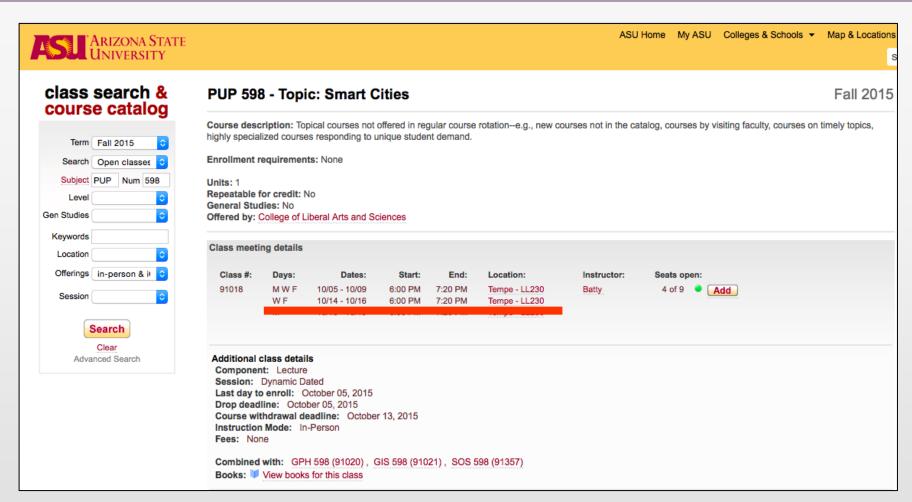*Also advertised to the MSc in Smart Cities & Urban Analytics UCL*

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http://www.spatialcomplexity.info/
http://www.casa.ucl.ac.uk/

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.
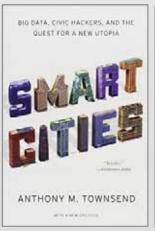
Smart Cities have many definitions. The one we will use is based on exploring the way information, specifically digital infor-mation is changing the physical as well as socio-economic structure of our cities. Computers and digital communications are being continuously embedded into the fabric of the 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

BIG DATA, CIVIC HACKERS, AND THE QUEST FOR A NEW UTOPIA

SMART CITIES

ANTHONY M. TOWNSEND

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THE EUROPEAN PHYSICAL JOURNAL SPECIAL TOPICS

Regular Article

Smart cities of the future

M. Batty[1,a], K.W. Axhausen[2], F. Giannotti[3], A. Pozdnoukhov[4], A. Bazzani[5], M. Wachowicz[6], G. Ouzounis[7], and Y. Portugali[8]
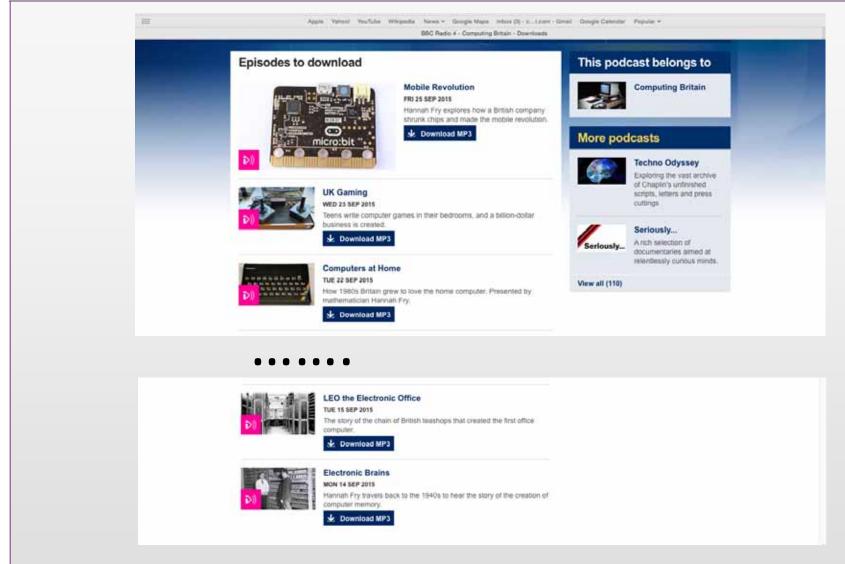
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Background Listening and Watching

My colleague Dr, Hannah Fray 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

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

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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

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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

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