ARCH 4630: ARCHITECTURE, SPACE AND CULTURE

Catalogue Description: Analytical models of the social functions of architectural space and evaluation of associated design choices, across a variety of building types.

Aims:

This is a research oriented elective class, with two aims.

1. To introduce theories of architectural space and associated methods of spatial analysis that can be applied to: (a) model the human functions of buildings; (b) benchmark design alternatives; (c) evaluate competing designs to support design choices; (d) inform the design imagination.
2. Collectively pursue a particular research question each time the class is offered, learning appropriate research methodologies.

Learning outcomes:

The most important learning outcome of any ambitious research oriented course is not easily assessable in the short term: the development of a fruitful way of thinking about a field of inquiry and an area of practice. This course is associated with the following particular learning outcomes that can be readily assessed.

1. Understanding the basic theoretical concepts that help us model the human functions of building layouts.
2. Understanding and ability to work with measures of spatial patterns such as: (a) visibility and accessibility; (b) integration/closeness centrality; (c) choice/betweenness centrality; (c) metric reach; (d) directional reach; (e) path overlap.
3. Ability to use freely available computational tools for spatial analysis, such as, for example, UCL DepthMap, and Georgia Tech Spatialist_Lines.

Course assignments and course assessment:

25% of the grade will be based on contributions to workshop sessions and class discussions. 75% of the grade will be based on the assessment of three class assignments.

Assignment 1 (25% of the course grade): Creation of a reasoned portfolio of building case studies.

Assignment 2 (25% of the course grade): Spatial analysis of a sample of building layouts and/or space use patterns.

Assignment 3 (25% of the course grade): A final presentation incorporating the work completed for assignments 1 and 2 and advancing an argument on a topic to be developed by each student.

Readings:

Students will be expected to thoroughly read a small number of papers and book chapters to be discussed in class (7-10 texts). Additional reading swill be made available and students are expected to choose from these according to their interests.

Prior knowledge and eligibility:

No prior knowledge with the software for spatial analysis or statistical analysis is assumed. 2

COA8630/ARCH4833
Architecture, space and culture
Spring 2015 – CRN 30486
Syllabus
While the detailed syllabus depends on the chosen research emphasis on a given year, the following topics are generally covered each time:
1. Introduction. What do we mean by spatial culture? Buildings accommodate programmatic requirements and generate their own effects, including co-awareness, informal interaction and learning and cognitive mapping of a social setting.
2. Current ideas about the design of a particular building type; for example: work environments; museums; educational buildings; hospitals. Mapping effective design spaces.
3. Introduction to spatial analysis: representing the spatial structure of buildings. Skeletons of movement; convex partitions; geometric visibility analysis.
4. Key measures of spatial form: closeness centrality; betweenness centrality; path overlap. Using overlays on drawings in order to visualize analytical outcomes.
5. Introduction to analytic software: UCL DepthMap.
6. Introduction to analytic software: Georgia Tech Spatialist_Lines.
7. Generic functions and underlying spatial principles. How all buildings become intelligible, how layouts affect the distribution of movement, how movement influences interaction, learning and other generic functions.
8. Strategic design choices: significant differences in design responses to programmatic requirements. Using analytical tools to model design alternatives and their implications.
9. Building shells and building interiors. How does building shape and floorplate shape affect potential interior designs? Simplified and elaborate models of built form. Modeling underlying constraints.
10. Social network analysis. Congruence and overlaps between network analysis and spatial analysis. Quantifying the impacts of layouts upon informal interactions and communications. Describing organizations as spatial systems.
11. Spatial cognition and wayfinding. How building design influences cognitive mapping. Cognitive maps support our understanding not only of buildings but also of the occupant organizations.
12. Functions of the unfolding visual field: how spatial structure influences visual learning. Patterns of co-visibility, paths, and groupings in museum spaces. 3

Bibliography

Key and supplementary readings are generally selected from the following bibliography.

1. Foundations:

Bafna S, 2010, "The visual functioning of buildings: outline of a possible general theory" *Journal of Space Syntax* **1** 133-148

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Hillier B, 1993, "Specifically architectural theory: a partial account of the ascent from building as cultural transmission to building as theoretical concretion" *Harvard architecture review* **9** 8-27

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Hillier B, Leaman A, Stansall P, Bedford M, 1976, "Space syntax" *Environment and Planning B: Planning and Design* **3** 147-185

Hillier B, Penn A, 1991, "Visible Colleges: Structure and Randomness in the Place of Discovery" *Science in Context* **4** 23-50

Knight T, 1994 *Transformations in design* (Cambridge University Press, Cambridge)

March L, 1976, "The logic of design and the question of value", in *The Architecture of Form* Ed L March (Cambridge University Press, Cambridge)

March L, Stiny G, 1985, "Spatial systems in architecture and design: some history and logic" *Environment and Planning B: Planning and Design* **12** 31-53

Markus T A, 1993 *Buildings and power: freedom and control in the origin of modern building types* (Routledge, London)

Mitchell W J, 1990 *The logic of architecture* (MIT Press, Cambidge, MA)

Peponis J, 2012, "Building layouts as cognitive data: purview and purview interface" *Cognitive Critique* **6** 11-52

Peponis J, Wineman J, 2002, "Spatial structure of environment and behavior", in *Handbook of environmental psychology* Eds R Bechtel, A Churchman (John Wiley and Sons, New York) pp 271-291

Stiny G, 1999, "Shape" *Environment and Planning B: Planning and Design* **26** 7-14

Stiny G, 2006 *Shape: Talking about seeing and doing* (MIT Press, Cambridge, MA)

2. Spatial analysis:

Glassie H, 1975 *Folk houses in middle Virginia* (The University of Tennessee Press, Knoxville)

Batty M, 2001, "Exploring isovist fields: space and shape in architectural and urban morphology" *Environment and Planning B: Planning and Design* **28** 123-150

Glassie H, 1975 *Folk houses in middle Virginia* (The University of Tennessee Press, Knoxville)

Benedikt M L, 1979, "To take hold of space: isovists and isovist fields" *Environment and Planning (B)* **6** 47-65

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Peponis J, Wineman J, Rashid M, Kim S H, Bafna S, 1997, "On the description of shape and spatial configuration inside buildings: Convex partitions and their local properties" *Environment and Planning B-Planning & Design* **24** 761-781

Rashid M, 2011, "Mutual visibility of points in building plans" *The Journal of Architecture* **16** 231-266

Rashid M, 2012, "On space syntax as a configurational theory of architecture from a situated observer's viewpoint" *Environment and Planning B: Planning and Design* **39** 732-754

Turner A, Doxa M, O'Sullivan D, Penn A, 2001, "From isovists to visibility graphs: a methodology for the analysis of architectural space" *Environment and Planning B: Planning and Design* **28** 103-121

Turner A, Penn A, Hillier B, 2005, "An algorithmic definition of the axial map" *Environment and Planning B: Planning and Design* **32** 425-444

3. Generic functions

Hillier B, Hanson J, Peponis J, 1984, "What do we mean by building function?", in *Designing for Building Utilization* Eds J A Powell, I Cooper, S Lera (Spon, London) pp 61-72

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4. Design formulation and design choices from an analytical point of view

Bafna S, 2005, "Symbolic content in the emergence of the Miesian free-plan" *The Journal of Architecture* **10** 181-200

Bafna S, 2008, "How architectural drawings work — and what that implies for the role of representation in architecture" *The Journal of Architecture* **13** 535-564

Bafna S, 2013, "Attention and imaginative engagement in Marcel Breuer's Atlanta Public Library", in *Rethinking aesthetics. The role of body in design* Ed R Bhatt (Routledge, London) pp 51-84

Peponis J, 1993, "Evaluation and formulation in design: the implication of morpholoogical theories of function" *Nordisk Architekturforsking* **6** 53-62

Peponis J, 2005, "Formulation" *The Journal of Architecture* **10** 119-133

5. Case studies: Museums

Hillier B, Tzortzi K, 2006, "Space syntax: the language of museum space", in *A companion to museum studies* Ed S Macdonald (Blackwell, Oxford) pp 282-301Hooper-Greenhill E, 1992 *Museums and the shaping of knowledge* (Routledge, London)

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Lu Y, Peponis J, 2014, "Exhibition visitors are sensitive to patterns of display co-visibility" *Environment and Planning (B): Planning and Design* **41** 53-68

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Stavroulaki G, Peponis J, 2003, "The spatial construction of seeing at Castelvecchio", in *4th International Space Syntax Symposium* Ed J Hanson, Citeseer, London pp 66.61-66.14

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Tzortzi K, 2004, "Building and exhibition layout: Sainsbury Wing compared with Castelvecchio" *Architectural Research Quarterly* **8** 128-140

Zamani P, Peponis J, 2010, "Co-visibility and pedagogy: innovation and challenge at the High Museum of Art" *Journal of Architecture* **15** 853-879

6. Case studies: Work Environments

Allen T J, 1977 *Managing the flow of technology : technology transfer and the dissemination of technological information within the R&D organization* (MIT Press, Cambridge, Mass.)

Allen T J, Henn G n, 2007 *The organization and architecture of innovation : managing the flow of technology* (Elsevier ; Butterworth-Heinemann, Amsterdam ; Boston)

Duffy F, 1974, "Office design and organizations: 1. Theoretical basis" *Environment and Planning B* **1** 105-118

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Wineman J D, Kabo F W, Davis G F, 2009, "Spatial and Social Networks in Organizational Innovation" *Environment and Behavior* **41** 427-442

7. Other case studies

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