LIONEL MARCH
MEMORIAL CONFERENCE

20 - 21 March 2019
Cripps Court
Magdalene College
Cambridge
Welcome to the Lionel March Memorial Conference, which enables generations of researchers – from many of Lionel March’s first colleagues in the 1960s to fresher research students today – to reflect upon the inspiring contributions that Lionel March (1934-2018) has made to the studies of art, architectural design, architectural history, mathematics, computing, modelling, data science, and city planning.

The fundamental questions that Lionel March worked on remain just as cogent today. The papers from this conference are inspired by his intellectual legacy, and through the papers and discussions we look ahead to the frontiers of research and practice.

Ying Jin
Director, The Martin Centre for Architectural and Urban Studies
University of Cambridge
Day 1  Wednesday 20 March

8.30 - 9.00  Arrival, Registration & Refreshments

9.00 - 9.10  Welcome from François Penz  
Head of Department, Architecture, University of Cambridge

9.10 - 9.40  Opening Paper: Peter Carolin, University of Cambridge  
Grow, Cambridge, Grow: Lionel March and Cambridge Planning

**Session 1: Geometry, Art, and Built Form**  
Chaired by Nick Bullock, University of Cambridge

9.40 - 10.10  Philip Steadman, University College London  
Lionel March’s Geometrical Artworks

10.10 - 10.30  Theodora Vardouli, McGill University  
Seeing Structures Beneath: Lionel March’s New Mathematics at LUBFS

10.30 - 10.50  Athanassios Economou, Georgia Institute of Technology  
Revisiting Lionel March’s “Microcosms”: Counting non-equivalent n-line shapes, for n<=4

10.50 - 11.10  George Stiny, Massachusetts Institute of Technology  
What Lionel March Saw But Didn’t Say — Calculating with Imagination

11.10 - 11.30  Refreshments

**Session 2: Data Science and Modelling**

11.30 - 12.00  Michael Batty, University College London  
What Do We Need to Know Before We Begin? Lionel March, Prior Probabilities and Information

12.00 - 12.20  Helen Couclelis, University of California, Santa Barbara  
An animal at the vanishing point of intelligence: Lionel March’s The Smallest Interesting World and the epistemology of existence
**Day I  Wednesday 20 March**

12.20 - 12.40  Chris Earl, Open University
Pattern and Proportion: dancing between necessity and possibility

12.40 - 13.00  Richard Coyne, University of Edinburgh
Shadow of doubt: Lionel March’s seminal paper on abduction

13.00 - 14.00  **LUNCH**

14.00 - 14.30  Judith Sheine, University of Oregon (E-presentation)
Lionel March and R.M. Schindler: Proportion Was Alive and Well

**SESSION 3: PLANNING AND DESIGN**
Chaired by Minna Sunikka-Blank, University of Cambridge

14.30 - 15.00  Marcial Echenique, University of Cambridge
Lionel March and Urban Planning

15.00 - 15.20  Darshil Shah, University of Cambridge
Nature’s Structures and their Architects

15.20 - 15.40  Ying Jin, University of Cambridge
Modelling land use, built form and transport to the 2070s: alternative regional outlooks in the UK

15.40 - 16.00  William Fawcett, Cambridge Architectural Research
Relationship between Architectural Research and Practice

16.00 - 16.20  Ed Hoskins, Lionel March and Applied Research Cambridge (ARC)

16.20 - 16.50  **REFRESHMENTS**

16.50 - 17.45  Panel Discussion

17.45 - 18.45  **DRINKS IN BENSON HALL, MAGDALENE COLLEGE**

19.00 - 21.00  **DINNER, THE HALL, MAGDALENE COLLEGE**
Prior Booking Required
Welcome from the Hosts at Magdalene College: Emily So & Robin Spence
Day 2    Thursday 21 March

8.30 - 9.00   Arrival, Registration & Refreshments

9.00 - 9.05   Welcome from Ying Jin
Director of The Martin Centre of Architectural and Urban Studies

**Session 4: Architectural Theory, History & Design Practice**
Chaired by Ola Uduku, Manchester School of Architecture

9.05 - 9.25   John Meunier, Arizona State University
Lionel March - Reflections of a Near Contemporary

9.25 - 9.45   John Sergeant, University of Cambridge
Lionel March - The (FL) Wright connection

9.45 - 10.05  Hendrika Buelinckx, Texas Tech University
Lionel March’s Architectonics

10.05 - 10.25 David Lea, Architect
Lionel March: Memories & Inspiration

10.25 - 10.45 John Ellis, University of California, Berkeley
Martin-March Diagrams and High Density Housing

10.45 - 11.15 Refreshments

**Session 5: Memories of Lionel March**
Chaired by Marcial Echenique

11.15 - 12.30 This is an interactive session: All Delegates

13.00 - 15.00 Lunch in Cambridge
Prior Booking Required
Riverside Restaurant, University Centre

From 15.00    Time Reserved for Specialist Subject / Alumni Group Sessions
Department of Architecture, Scroope Terrace
François Penz is Head of the Department of Architecture and a fellow of Darwin College. He directs the Digital Studio for Research in Design, Visualization and Communication. His current AHRC research project, ‘A cinematic musée imaginaire of spatial cultural differences’ (2017-2020), expands many of the ideas developed in his monograph Cinematic Aided Design: an everyday life approach to architecture (2017), construing films of everyday life as a revelator of deep spatial cultural differences between the West and China & Japan. Since 2010 he has been the co-director of the Research Centre on Architecture and Urbanism.

Peter Carolin. As an undergraduate at Scroope Terrace, was in the year following that of Lionel March. Worked with John Voelcker of Team 10 for three years and with Colin St John Wilson & Partners for fifteen years (including seven as a partner) on the British Library and other buildings. Technical Editor and then Editor of The Architects’ Journal in the 1980s. Professor of Architecture and Head of the University of Cambridge Department of Architecture 1989-2000. Founding editor of arq (Architectural Research Quarterly) 1995-2003. Chairman of Cambridge Futures 1997-2001. Fellow (now Life Fellow) of Corpus Christi College 1989-present.

Grow, Cambridge, Grow: Lionel March and Cambridge Planning
Cambridge was the only undamaged city in Britain to be the subject of a major post-war planning study. A primary motivation for this was the desire in certain Whitehall and Westminster circles to prevent Cambridge becoming partly industrialised, like Oxford, and to preserve it as the nation’s one ‘true university city’. The Holford Plan of 1950, adopted as the Cambridgeshire County Development Plan in 1952, was to have a profound influence on the size and form of Cambridge – limiting its growth, restricting industrial development and preserving its rural setting.

By the time the Plan was reviewed in 1962, the University had serious concerns and produced its own proposals supported by a radical plan researched and developed by Lionel March under the eye of Leslie Martin. Lionel, who had only just completed his postgraduate course, single-handedly drew up the plan and drafted the two accompanying publications. He became convinced that Cambridge had to grow and, over several years, in journal articles, letters and a scheme for the local Labour Party, he argued the case for growth. Indeed, it was from this period that the city’s long retreat from a policy of containment began. It was on the basis of Lionel’s work on the University’s Cambridge plan that, a year later, Leslie Martin asked Lionel to return from the US and work on the Whitehall Plan.
Nick Bullock is the professor of Architectural and Planning History of the 20th Century at the University of Cambridge and also teaches at the Architectural Association in London. His current research explores the way in which architecture and urbanism reflect the modernisation of France in the 30 years after WWII.

Philip Steadman is Emeritus Professor of Urban and Built Form Studies in the Bartlett Faculty of Built Environment at University College London. He trained as an architect, and has taught at Cambridge University and the Open University. He has published several books on geometry in architecture including The Geometry of Environment (1971) written jointly with Lionel March. In the 1960s he edited and published Form, a quarterly magazine of the arts, and co-authored a book on kinetic art. He helped to produce four computer-animated films on the work of Leonardo da Vinci for an exhibition in London in 1989. He has also contributed to other exhibitions, films, and books on perspective geometry and the history of art. In 2001 he published Vermeer’s Camera (Oxford University Press), on the Dutch painter’s use of the camera obscura. His next book is to be called Renaissance Fun: The Machines Behind the Scenes.

Lionel March’s Geometrical Artworks Lionel March started to make works of art in the early 1960s in the broad tradition of geometric abstraction, and following the principles of ‘serial art’. He had an exhibition at the Institute of Contemporary Arts in London in 1962. There was then a long gap in Lionel’s artistic activities until he started to produce pictures again after his move to the University of California in 1985, this time using digital technology. These works were shown on Lionel’s website The Museum of the Golden Ratio.

This paper will try to explain something of Lionel’s methods of composition and the mathematical structures that underpin his art. Links will be made to Lionel’s geometrical work in architecture, to serial music, and to the contemporary artists by whom Lionel was influenced. The talk will conclude with a showing of ‘Revolutions Around Red Square: Dusk to Dawn’ (2010).
Theodora Vardouli is an Assistant Professor at the Peter Guo-hua Fu School of Architecture, McGill University. Her research broadly examines algorithmic techniques for describing, generating, and simulating architectural form and performance -- their histories, cultural meanings, and operational implications for creative design. Her recent scholarship has revolved around processes of mathematization that preceded, and paralleled, the introduction of computers to architectural design, along with knowledge cultures of the settings in which these unfolded.

Current research projects include investigation of activity in design methodology and its intersections with computer aided design research in postwar North America, genealogies of formalism in the interface of architecture and mathematics, and histories of dynamic modeling in postwar British architectural theory. Alongside these critical historical projects, Vardouli investigates collisions between perceptual shape, material things, and structural abstraction while designing and making with digital tools. Vardouli’s articles have been published in Leonardo, Design Studies, and several edited collections. She is co-curator of the forthcoming exhibition Vers Une Imagination Numérique (UQAM, 2020) and co-editor of Computer Architectures: Constructing the Common Ground.

Seeing Structures Beneath: Lionel March’s New Mathematics at LUBFS
In a 2002 survey article reviewing relations between architecture and mathematics since 1960, Lionel March recounted the events that led to the Geometry of Environment — the first book publication of the Centre for Land Use and Built Form Studies (LUBFS). The book, which March co-authored with Philip Steadman, was an invitation from the RIBA Library Committee to illustrate the potential of “new maths” in architecture. The invitation, March remembers, was triggered by Alison and Peter Smithson’s remarks about a “generational gap” between the mathematics that they knew as architects and the mathematics taught to young British students, including their son, which left them “at a loss.” This presentation traces influences and parallels between the educational movement of the new math - along with the mathematical cultures from which it emerged - and early work at LUBFS. It begins by providing some historical context on the new math and positioning it within broader currents in 20th century mathematics, with particular focus on debates about the status of geometry, shapes, and visual intuitions. Then, through examples drawn from the Geometry of Environment and other LUBFS working papers, it contemplates both technical and intellectual influences of these currents on the ways in which Lionel March and LUBFS researchers mathematically described architectural form. Ultimately, the presentation seeks to offer historical and critical insights on the ways in which this early body of work was permeated by, and contributed to, the cultivation of a new mode of seeing in architecture: one that moves away from sense-perceptible appearance and sees structures beneath.
Athanassios (Thanos) Economou is Professor in the College of Design at the Georgia Institute of Technology. Dr. Economou’s teaching and research are in the areas of shape grammars, computational design, computer-aided design and design theory, with over forty published papers in these areas. Recent funded projects include the Shape Machine (NSF/iCorps) and the project Courtsweb: A Visual Database of Federal Courthouses, GSA/US.Courts. Design projects from his studios at Georgia Tech have received prestigious awards in international and national architectural competitions.

He is the Director of the Shape Computation Lab at Georgia Tech and the Director of the Architectonics in Greece and Italy Study Abroad Program at Georgia Tech. He has been invited to give talks, seminars, and workshops at several universities including MIT, Harvard, TU Vienna, U. Michigan, UCLA, U. Tsinghua, NTUA, U.Thessaly, U.Aegean, among others. Dr. Economou holds a Diploma in Architecture from NTUA, Athens, Greece, an M.Arch from USC, and a Ph.D. in Architecture from UCLA.

Revisiting Lionel March’s “Microcosms”: Counting non-equivalent n-line shapes, for n<=4

Lionel March’s “Microcosms” is a highly condensed body of work lying in-between his “Possible Worlds” – his term of design research inquiry on languages and configurational possibilities – and his “Experiments in Serial Art” – his personal aesthetic take in rule-bound composition. The elements in his Microcosms are fragments of visual and sonic thought: shapes, grids, notes and chords all waiting to be combined and transformed in aesthetic or design inquiry. The work here revisits these small worlds and adds to them the pictorial catalogue of subshapes of 1-, 2-, 3- and 4-line shapes, a work that bridges the discrete math underlying Microcosms (permutations, combinatorics, Burnside’ lemma, Polya’ theorem, matroids) with shape grammars. The calculations are telling: a line has an unlimited number of parts when it is in no spatial relation with some other line; the same line splits to up to 5 parts when it is in a spatial relation with another line, 13 parts with 2 lines, 41 parts with 4 lines, and so forth, following the sequence of centered square figurate numbers and their corresponding powers in higher dimensions for more elaborate combinations of number of parts per line. The very same parts combine one with another to create a visually staggering world rising from the singularity of the 1-line shape, to the 8 2-line shapes, to the 519 3-line shapes (among which there is the triangle and its parametric variations) and to the 312,880 4-line shapes (among which there is the square and its parametric variations).
George Stiny is Professor of Design and Computation at MIT. He invented shape grammars in the late 1960’s, and has been exploring their remarkable sweep in art and design ever since.

What Lionel March Saw But Didn’t Say — Calculating with Imagination

S. T. Coleridge distinguishes FANCY and IMAGINATION (“esemplastic power”) in the Biographia Literaria. Shape grammars subsume both in the embed-fuse cycle – fancy for 0-dimensional elements (“counters”), and imagination when dimension is greater than 0. This proves that visual calculating in shape grammars includes art and design, and shows why symbolic calculating in Turing machines (computers) doesn’t.

Michael Batty is Bartlett Professor of Planning at University College London where he is Chair of the Centre for Advanced Spatial Analysis (CASA). He has worked on computer models of cities and their visualization since the 1970s and the work of his Centre CASA is heavily concentrated on the development of urban analytics, big data and smart cities. His blogs www.complexcity.info cover the science underpinning the technology of cities and his posts and lectures on big data and smart cities are at www.spatialcomplexity.info. His most recent book is The New Science of Cities (MIT Press, Cambridge, MA).

What Do We Need to Know Before We Begin? Lionel March, Prior Probabilities and Information

Lionel March had a mind that engaged in endless speculation. He was not content to accept the status quo in anything and in this context; he worried about how one might take data pertaining to building and cities and use this constructively to explain their function before and during any designs for the future. In this talk, I will recount by time in working with Lionel when he was a Professor in the Department of Systems Design at the University of Waterloo (1974-1976) where we dwelt on what we already knew about how cities functioned and how we could incorporate this into our models so that the models moved somewhat beyond what we knew from data. We focused on the idea of prior probabilities that I had worked on briefly in thinking about entropy statistics for measuring urban configurations while Lionel was focused on thinking about how one might update our models in time and space using Bayesian methods. Recently these ideas have become significant again, as we have entered the world of big data and the need to formally do something about all these through data-driven models.
Helen Couclelis is Professor Emerita of Geography at the University of California, Santa Barbara. She earned her PhD at University of Cambridge with Lionel March as supervisor. Earlier degrees were in architecture (Athens) and in urban and regional planning (Munich). A brief professional career in Greece included working for an architectural firm, and as planner, for the international firm of Doxiadis Associates and for a government think-tank. At UC Santa Barbara she served as Associate Director of the National Center for Geographic Information and Analysis (NCGIA), and for two decades she was co-editor of the journal Environment and Planning B.

She has held visiting appointments at the Department of Civil Engineering of the University of Waterloo, the Institute of Urban and Regional Development of the University of California at Berkeley, and the Woodrow Wilson School of Princeton University. Her research interests and publications are quite diverse, including urban theory and planning, geographic information science, spatial cognition, the geography of the information society, and the philosophy of science. Some of her best-known work is in urban and regional modeling (also the topic of her PhD dissertation). In the mid-1980s she was among the very first in geography to publish work on urban cellular automata and agent-based models, which subsequently became very popular approaches. She was awarded an Honorary Doctorate by Utrecht University.

An animal at the vanishing point of intelligence: Lionel March’s The Smallest Interesting World and the epistemology of existence

The passage by CS Peirce of which a fragment appears in the title, as well as the conventionalist argument underlying March’s 1996 paper also mentioned above, have resonated with my own thinking from my PhD days to the present. This paper will briefly outline Lionel’s set-grammatical take on conventionalism and then discuss some of the author’s work along similar lines, and in particular her recent explorations of the epistemology of geographic information science and its implications for practice. Lionel’s intellectual influence clearly continues to this day.
Chris Earl. As Lionel’s PhD student at the Open University in the 1970’s, Chris Earl worked on the mathematics of configurations. In his group at the Open University research was being created, just as Chris Earl had glimpsed it happening in Mathematical Physics at Oxford. Lionel went to the Royal College of Art in 1981, and Chris Earl continued as research fellow and lecturer in robotics. Moving to Bristol Polytechnic, Chris Earl’s lab won big projects in robotics which laid the foundations for the Bristol Robotics Laboratory which continues today with great success. Chris Earl took positions at the Engineering Design Centre at Newcastle University in 1990 and then as Professor of Design at the Open University in 2000, sitting in Lionel’s chair. Chris Earl was Head of Department, founding Dean of Faculty of Mathematics, Computing and Technology, and have been Professor Emeritus since 2015, continuing to publish, supervise and carry on research projects in Design.

**Pattern and proportion: dancing between necessity and possibility**
This paper will discuss Lionel’s ability to generate proportional and modular schemes. In particular, it will examine how his productions explore possibilities within the bounds of necessity posed by proportionality, a theme which Lionel pursued throughout his career. He embedded proportionality into his generative rules to create surprising and magical effects. This enterprise played out a colourful and shapely expression of logic with modalities in necessity and possibility. The paper will give examples from Lionel’s historical, theoretical and design works.

Richard Coyne researches the impacts of network technologies on the configuration of place and space. He has examined sound in the city (The Tuning of Place: Sociable Spaces and Pervasive Digital Media), and research into emotion and environment (Mood and Mobility: Navigating the Emotional Spaces of Digital Social Networks). Related research includes the use of mobile electroencephalography (EEG) to map stress levels of older participants while moving around busy urban streets and parkland. He has also addressed the relationship between nature and urban living in the digital age (Network Nature: The Place of Nature in the Digital Age). These books were published by MIT Press and Bloomsbury. Technology, Stockholm, at Silpakorn University, Bangkok. He is the founder and programme director of the Ancona summer school ‘The Culture of the City’, which focuses on the post-earthquake strategies for reconstruction in the Marche region.
Richard Coyne: Shadow of doubt: Lionel March’s seminal paper on abduction
Lionel March introduced abduction into the architectural lexicon in the first chapter of his edited book, The Architecture of Form. In that chapter March examined the concepts from the Pragmatic philosopher Charles Sanders Peirce’s (1839-1914) of induction, deduction and abduction. The early Design Methods Movement advocated that design should proceed in an inevitable manner from information about a design problem to a design solution. March argued against the naïve proposition that the design of a building is a simple deductive process -- as if all we need is the full range of facts pertinent to the design challenge, and that design can and should proceed in a purely methodical way. He recruited Peirce’s theory to argue that this is not the case. March thought abduction provided a suitable account of the design process as it indicates the contingency of design outcomes. He also characterised this challenge as a matter of value. People bring competing values to the design process, as they bring competing evidence to the process of abduction.

Judith Sheine is a Professor in the Department of Architecture at the University of Oregon and is the Director of Design for the TallWood Design Institute, a collaboration between the University of Oregon’s College of Design and Oregon State University’s Colleges of Forestry and Engineering focused on the advancement of timber manufacturing and design. Sheine is also an award-winning architect whose projects have been published internationally and she has been recognized as the leading authority on the work of R.M. Schindler; her publications on the architect include R.M. Schindler (Phaidon Press, 2001), R.M. Schindler: Composition and Construction (Academy Editions, 1993), co-edited with Lionel March, and her most recent book, Schindler, Kings Road and Southern California Modernism (University of California Press, 2012), co-authored with Robert Sweeney.

Lionel March and R.M. Schindler: Proportion Was Alive and Well
Lionel March wrote two articles in our co-edited book R.M. Schindler: Composition and Construction (Academy Editions, 1993) that addressed the architect’s theories on proportion. One discussed Schindler’s 1946 article on his own proportional system, “Reference Frames in Space;” the other focused on the application of Schindler’s theories on proportion to his 1925 How House, which was March’s own house in Los Angeles. While many architects expressed skepticism about March’s detailed analysis and its connections to Schindler’s design process, a discovery in Schindler’s notes for a series of lectures he gave in 1916 at the Church School in Chicago confirmed March’s argument. These connections between mathematics, musical rhythms and architectural design in Schindler’s work could have been made by no one else.
Marcial Echenique OBE DArch ScD RTPI RIBA, is a fellow of Churchill College and professor emeritus of Land Use and Transport Studies and former Head of Architecture at the University of Cambridge. He was the director of the Martin Centre between 1973 and 1978. He is accredited, in particular, with early work on the integration of land use and transport planning. He has acted as a consultant to numerous government and local authorities and has directed major planning studies financed by international institutions such as The World Bank and The United Nations.

Minna Sunikka-Blank is a registered architect and a Senior Lecturer at the Department of Architecture. Her research focuses on energy use behaviour and impact of policy instruments such as the German Energy Saving Regulations (EnEV), the Energy Performance Certificates (EPC) of the Energy Performance of Buildings Directive (EPBD). Her current research looks at the application of social science methods in energy research and gender as an overlooked factor in domestic energy, including the British Academy projects on ‘Gender and household energy: female participation in designing domestic energy in India’s slum rehabilitation housing’ (2018) and ‘Energy innovation for low-cost housing in India and South Africa: strategies for interdisciplinary and cross-institutional dialogue’ (2017-2019). Dr Sunikka-Blank is a Director of Studies and Fellow in Architecture at Churchill College.

Lionel March and Urban Planning

Lionel March’s contribution to the “science” of architecture and urban planning is second to none. His main interest was the properties of geometrical forms, fundamental to the spatial configurations of buildings and cities. This paper looks briefly at his contribution to the physical aspects of urban planning and focusses on his seminal article of 1967 “Let’s build in lines” which inspired many plans for expanding cities, in particular the renewal of Bilbao, the expansion of Santiago in the Central Region of Chile and of Cambridge Sub-region, all of which the author had been involved. While his main contribution was on the physical layout of cities he was also interested in their inhabitants and proposed novel mathematical functions to represent their behaviour in choosing where to live and work, contributing to the development of the first computer simulation model of a European city – Reading – and thus initiating the interest in research into Land Use Transport Interaction models (LUTI).
Darshil Shah is Senior Research Associate at the Centre for Natural Material Innovation (Dept. of Architecture), where he explores the use of engineered wood and bamboo composites for construction, and natural fibres (such as hemp and flax) as reinforcements for structural composites. Combining sustainability with performance in natural materials is a major focus of his research and teaching. Shah was a member of the Oxford University’s Silk Group (Dept. of Zoology, 2013-2014), where he developed high-toughness silk-based polymer composites for defence and aerospace applications, and explored biomaterials such as elephant ivory for bioinspiration. Shah obtained his PhD from the University of Nottingham (2009-2013), during which he developed the world’s first 3.5-meter 11kW flax biocomposite wind turbine blade.

**Nature’s Structures and their Architects**

Energy is the basic currency of life and resources are limited. Consequently, in an effort to conserve energy and make the most of simple material building blocks, biology primarily utilises multi-scale hierarchical architectures and embedded information to develop solutions to problems. In contrast, man-made technological solutions often require an abundance of substances and high-energy processes. For instance, think of the production of steel or concrete, and the energy we use in heating and cooling buildings. To use nature as an inspiration for the design of our future sustainable built environment, this talk will explore some of nature’s marvellous structures and their architects. These include the non-woven cocoons of Bombyx Mori silkworms, the highly-oriented tubes of the Chaetopterus sp. marine worm, the bird-catching orb webs of Nephila edulis, the brick-mortar structure of nacre, and the laminate structure of plant cell walls.
Ying Jin is a Reader in Architecture and Urbanism at University of Cambridge Department of Architecture. He has been working on land use planning, transport modelling and urban design in the UK since 1992, and since 2013 leading the research on cities and transport at the Martin Centre for Architectural and Urban Studies in creating and using predictive models for cities. Ying is currently leading model-based scenario analyses for the UK2070 Commission, an inquiry into regional inequalities and framework for action across England, Wales, Scotland and Northern Ireland. He became the Director of the Martin Centre in October 2017. Ying is an inaugural Visiting Fellow at the Bennett Institute for Public Policy, University of Cambridge.

Ying Jin: Modelling land use, built form and transport to the 2070s: alternative regional outlooks in the UK
This paper reports the most recent predictive modelling work on balancing jobs, housing and travel that the author is leading for the UK2070 Commission, that explores the long term land use, built form and transport infrastructure development scenarios for the UK in the next 50 years. The predictive model builds on the Martin Centre’s tradition of land use, built form and transport studies, which traces back to the Cambridge planning work of Lionel March, and the land use and transport interaction modelling pioneered by Marcial Echenique and colleagues at the Martin Centre.
William Fawcett is an architect. He trained at the School of Architecture (as it then was) at Cambridge when Sir Leslie Martin was Professor. A fifth-year dissertation on adaptability led to PhD research at the Martin Centre on ‘A Mathematical approach to adaptability in buildings’ (thesis approved 1979), supervised initially by Marcial Echenique and then by Lionel March. The idea was to explore simplified models of building use, comparable to the simplified models of built form that had already been so productive in land use-built form studies.

Following the PhD he worked in a conventional architectural practice and then held a lectureship at Hong Kong University Department of Architecture and a research fellowship at the Open University, before joining Cambridge Architectural Research Ltd as a founder-director in 1987. Since 2016 he has been the Chair of CAR. Here he continued PhD interests with studies of buildings in use, and worked on a new method of life-cycle evaluation that can quantify the value of design strategies for adaptability/flexibility. Other CAR projects involved topics such as design briefing for new buildings, measuring visual preferences for building appearance, and conservation plans for listed buildings. In parallel, he ran a small architectural practice with his wife Diane Haigh. In 2005-2010 he held the Chadwick Fellowship in Architecture at Pembroke College, Cambridge, supported by Andrew

Lionel March and the relationship between architectural research and practice

Lionel March is famous for his wide-ranging research activities, but he went through a conventional training intended as preparation for architectural practice – and he did make forays into practice at the beginning and end of his career. These were brief episodes but architecture’s attraction for Lionel is also revealed in much of his research work. This presentation summarises Lionel’s architectural practice and recalls a few of his architectural enthusiasms that he spoke of during PhD supervisions in the 1970s; the seminal Whitehall Plan; and the architectural frame of reference that is seen in his research, from the never-to-be-forgotten land use-built form diagrams and the beautiful and beautifully analysed plans in Geometry of Environment, written with Phil Steadman, to the dissections, polyominoes and shape grammars of his configurational studies phase. Lionel also researched and published books on the architect Rudolf Schindler and Renaissance architecture.

Lionel straddled the divide between architectural research and architectural practice and argued strongly that they should be connected. But few researchers design buildings and few practicing architects read research papers, so how can research connect to practice? Possibilities include expert consultancy, regulations, education, as well as entering the conventional wisdom. The question is important when evaluating the impact architectural practice of Lionel’s own research — and the research of his many successors.
Ed Hoskins built from scratch in 1970 a software company to a turnover of £11m in 1985 with 140 people in the United Kingdom producing a profit of £1.1m. He sold the company after fifteen years of profitable trading to the McDonnell Douglas Corporation. Hoskins evolved the company from academic based research and consultancy to become a premier supplier of Computer Aided Design with effective distributor representation world-wide. Since 1985 through own consultancy company contributed to the raising of in excess of £3,000,000 in venture funds for various organisations through business planning activities.

1961 BDS Bachelor of Dental Surgery, (Distinction in Orthodontics).
1967 B.Arch. Bachelor of Architecture, (Double First Class Honours).
1965 - 1967 Scholar Peterhouse.
MA Master of Arts, University of Cambridge.

Lionel March and Applied Research Cambridge (ARC)

Lionel was the director of the Centre for Land Use and Built form studies in the late 1960s. The Group was being asked to undertake projects, which were commercial rather than academic. A decision was made to form a company, with the pretentious name, Applied Research of Cambridge rather than to take such projects on within the Centre. There were several barely successful examples by then of attempts to encompass commercial projects within academic research groups: Lionel chose the opposite route. This presentation shows the progress of that new company from 1969 to 1985. From analytical tools for hospital design, dependent on the reputation and thinking of LUBFS to the implementation of a system, BDS, which was a truly comprehensive precursor by 1977 to what is now known as BIM, Building Information Modelling: that was only about 30 years before its time. Eventually by 1985 the company was responsible for the software that supported major construction and mapping projects world-wide.
**Day 2**

**Ola Uduku** took up a Chair in Architecture at the Manchester School of Architecture in September 2017. Prior to this she was Reader in Architecture, and Dean International for Africa, at Edinburgh University. Her research specialisms are in modern architecture in West Africa, the history of educational architecture in Africa, and the contemporary issues related to social infrastructure provision for minority communities in cities in the ‘West’ and ‘South’. She is currently investigating “Architecture and Aid”.

**John Meunier** went to Arizona State University in 1987 to be Dean of the College of Architecture and Environmental Design, a position he held until 2002 when he returned to the faculty as a Professor of Architecture. In 2017 he became Emeritus Professor of Architecture in The Herberger Institute for Design and the Arts. Previously he was Director of the School of Architecture and Interior Design at the University of Cincinnati, having been Head of the Department of Architecture there from 1976 to 1979. He started teaching architecture at Cambridge University in England where he was on the faculty from 1962 to 1976, and was Acting Head from 1973-4. While in Britain he was a widely published practicing architect. His work was exhibited at the Paris Biennale in 1967, and he and his partners, Barry Gasson and Brit Andresen won the competition and commission for the Burrell Museum in Glasgow in 1972. The building was completed in 1983. Professor Meunier studied at Liverpool University from which he graduated with a first-class honors degree, B.Arch, in 1959. He then received a Frank Knox Fellowship to the Graduate School of Design at Harvard from which he graduated with a Masters of Architecture in 1960. On his appointment to the Faculty of Fine Arts at Cambridge University in 1962 he received an M.A.
John Sergeant (b 1939-) is an architect, still building in Spain. He taught at the Houston and Liverpool Schools of Architecture, Bartlett UCL, and Cambridge. He trained with SOM, Charles Moore and YRM. Author of Frank Lloyd Wright’s Usonian Houses and numerous studies of Bruce Goff, Jorn Utzon, Glen Murcutt and Ralph Erskine. He is currently completing Going East: Modernism’s Encounter with Extreme Climate.

Lionel March - The (FL) Wright connection
Lionel’s laugh could be humourless, this usually accompanied his more numerical utterances: for example when telling a high-rise Singaporean audience that they could all be accommodated in bungalows with a view of the sea (perimeter chains). But it could also be from the heart, with infectious enthusiasm. I address the latter. His passion for Wright’s work was only part of his love for America, more especially for its wilder shores, in Oklahoma, Kansas, California, and the progressive tradition, both economic and political.
Hendrika Buelinckx, PhD is currently an associate professor at the College of Architecture, Texas Tech University, Texas. She obtained her first professional Architectural degree from the St. Lukas Institute in Brussels and her Master of Science degree in Building Engineering from the Free University of Brussels, Belgium. In 1994, she obtained a PhD in Architecture from the Graduate School of Architecture and Urban Planning, University of California, Los Angeles. During the following year she spend a Post-Doctoral year at the UCLA’s Department of Design. Since joining the College of Architecture at Texas Tech University in 1995, she conducts and coordinates Design Studios at both the undergraduate and the graduate level, lectures on Design Fundamentals and Theory in Architecture, and conducts seminars on Women in Architecture in conjunction with TTUs Honors College. Her research interests include shape grammars, architectonics, visual spatial literacy, and women in architecture.

Lionel March’s Architectonics

In this paper, I hope to share some personal recollections and insights on Lionel March’s “architectonics”—a term he coined after careful consideration and numerous conversations with his peers and graduate students at UCLA during the late 1980s and early 1990s. I attempt to define the concept, to distill some quintessential characteristics of his architectonic studies, and to address his call for this field of scholarship. It is my sincere hope, that with this writing, I might provide a preliminary response to his question: “Where are the musicologists and linguists of architecture?”
David Lea studied architecture at Cambridge University School of Architecture from 1958 to 1963. In late 1963 he sailed to America to work for Harry Weese in Chicago for 6 months before touring significant works of architecture and National Parks from the east to the west coasts. Returning to Cambridge in the winter of 1964 he worked with Lionel March on Leslie Martin’s Whitehall report before joining Sandy Wilson’s new practice where he contributed to the Liverpool Civic and Social Centre project. After Cambridge he moved to the London Borough of Merton with Richard MacCormac and Peter Bell to design the Pollards Hill housing scheme. In 1968 he started his own practice in London. He moved to Wales in 1975 to a small holding in Snowdonia. The rugged and beautiful landscape became a constant source of inspiration and a place in which to test out agricultural and architectural ideas. His over-riding belief is that we should build in such a way that we harm the natural world as little as possible. At first, inspired by Walter Segal, he designed a series of flexible lightweight timber-frame buildings. As the practice developed he included materials which require the minimum energy to convert them from their natural state into building: stone, earth, lime, wood and hemp.

Lionel March: Memories & Inspiration

The presentation starts with a brief description of the first encounters with Lionel March’s planning theories while working on Leslie Martin’s Whitehall report. This is followed by two examples of David Lea’s own experience of perimeter development. The first is Pollards Hill and Eastfields housing schemes for the London Borough of Merton. The second is an alternative to the volume housebuilders preferred layouts in Edgbaston on the west side of Birmingham. The numerous advantages of perimeter development are discussed, mainly focussing on the conservation and use of open space in built up areas, and on the potential simplification of planning and construction methods. A brief summary of Lionel’s contribution to the future well-being of our planet concludes the presentation.
Lionel March and Leslie Martin’s diagrams showing how high density housing can be achieved in low rise form challenged the orthodoxy of the time that favored high rise towers as a solution to Britain’s housing crisis. They explored a variety of ways similar amounts of built form can be configured as perimeter block buildings, free standing pavilions or towers. One of the first architects to translate these abstract diagrams into buildings was Richard MacCormac when he worked for the London Borough of Merton in the 1970’s. Richard transformed the diagrams into architecture and showed how they can create a traditional urban fabric of perimeter block buildings with both private and common open space. I worked with Richard after he had established his own practice where we developed these ideas further on a number of housing projects in Milton Keynes and Warrington New Towns. Since moving to California in 1977 I have explored those ideas further in my own practice and teaching at UC Berkeley. Much of our work is focused on social housing and urban repair. The Bay Area like London is facing a severe housing crisis with the need to raise densities without destroying the existing urban fabric. I propose to show examples of high density low rise housing that adhere to the March diagrams and that are relevant today as a greater percentage of the world’s population lives in cities and as we face the challenges of creating a sustainable urbanism in an era of Climate Change.

**Martin-March diagrams and high density housing**

John Ellis is an Anglo-Californian architect, urban designer and teacher. He studied architecture at Cambridge under Leslie Martin, Lionel March, Sandy Wilson and John Meunier. On graduating in 1970 he worked with David Roberts on a number of Cambridge buildings including the Fitzwilliam Museum extension before working for Richard MacCormac in London. At Richard’s office he worked on designs for several housing projects in Milton Keynes and Warrington New Towns which explored the ideas of low rise high density housing behind the March /Martin diagrams. Since 1977 John has lived and worked in San Francisco. He has worked with a number of Bay Area practices and was project designer for the twin-towered Oakland Federal Building, Plaza Tower in Sacramento and the Far East International Building in Shanghai. He is a principal with the firm Mithun / Solomon whose focus is on affordable housing and urban repair. The March diagrams have continued to influence thinking about urban design and density. John has taught at UC Berkeley College of Environmental Design and helps run the Master of Urban Design Programme. In 2012 he was the inaugural Marshall Visiting Professor of Sustainable Urban Design at Cambridge University and for the last three years has helped run a series of joint UC Berkeley/ Cambridge University urban design workshops. This year the Cambridge students will be visiting Berkeley to take part in a week-long event focused on a major mixed-use, high density, transit-oriented site in San Jose.
CONFERENCE

Cripps Court
Magdalene College
1-3 Chesterton Road
Cambridge
CB4 3AD
T. +44 (0)1223 332 100

DINNER

The Hall
Magdalene College
Magdalene Street
Cambridge
CB3 0AG
T. +44 (0) 1223 332 100

Panther Taxis. +44 (0)1223 715 715
Riverside Restaurant
University Centre
Granta Place
Cambridge, CB2 1RU
T. +44(0) 1223 337 766

Department of Architecture
1-5 Scroope Terrace
Trumpington Street
Cambridge, CB2 1PX
T. +44 (0)1223 332 950