

## **MSc & MArch SUSTAINABLE ENVIRONMENTAL DESIGN**

The main research object of the Master's Programme in Sustainable Environmental Design is the relationship between architectural form, materiality and environmental performance, and how this relation should evolve in response to climate change and emerging technical capabilities. Sustainable environmental design is not a fixed ideal, but an evolving concept to be redefined and reassessed with each new project. Observation, measurement and computer modelling and simulation are fundamental techniques that underpin the design research undertaken within the programme. These are applied at various levels of detail and intensity extending the understanding of theoretical principles to inform the design process. The AA School's master's programme in Sustainable Environmental Design has graduates who are active in practice, academia and research in some fifty countries. The programme's links with London and overseas practices and academic institutions continue to expand providing a network of contacts and opportunities for collaborative events and joint research. The MSc option runs over 12 months and is offered to both architects and engineers. It provides the conceptual, experiential and analytical skills needed for engaging in sustainable environmental design research and practice, making extensive use of advanced digital tools and seeking a creative synthesis between physics, engineering and architecture. The MArch option is addressed to architects and teachers of architectural design. Its 16-month duration enables the exploration of detailed design agendas that can include the realisation of experimental structures.

The taught programme is in two parts. The first part (Phase I, October-April) is common to both the MSc and MArch candidates and is structured around a series of joint studio projects undertaken in teams combining the two groups. Projects are supported by weekly lectures, seminars and workshops. These review theories and practices of sustainable design, present case studies by leading researchers and designers, define performative criteria for different building types and climates and provide training in the use of environmental simulation tools and design analysis techniques. The second part of the course (Phase II, May to end September for MSc, May to end January for MArch) is organized around candidates' dissertation projects. MSc dissertation projects combine design research with analytic work and case-studies related to the programme's areas of research and candidates' professional interests and backgrounds. MArch dissertation projects are in two stages. The first stage encompasses the technical research and analytic work including any field studies. The second stage follows after the summer break and is devoted to a design application that is then developed through the following Autumn Term. Dissertation projects continue developing the vocabulary of sustainable environmental design for a wide range of climates, building types and urban environments.

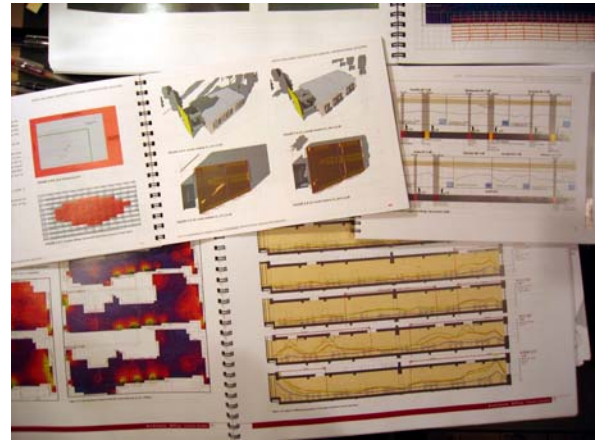
### **Studio Projects**

#### **Phase I Studio: What Can Buildings Tell Us, What Can We Tell Back**

##### *Autumn & Spring Terms*

Autumn term building studies around London combine occupant and designer interviews with on-site observations and environmental measurements. These provide a first glimpse of the dynamic interactions between building, occupant and outdoor environment. Measurements help calibrate digital models that are then applied to simulate environmental performance as a first stage of parametric analysis and design research. Studio projects are undertaken in teams, each focusing on different buildings of environmental interest. The theoretical knowledge, analytic tools and instrumentation required for project work are introduced by the taught programme in its weekly lectures and workshops.

The findings of the Autumn Term's fieldwork and environmental performance studies provide starting points for the following term's design research agendas. The objective of the Spring Term studio is to explore innovative as well as performative designs addressing climate change, maximizing use of natural resources and aiming at zero carbon buildings. Project teams can select urban sites in different climatic regions as the locations of individual design schemes.

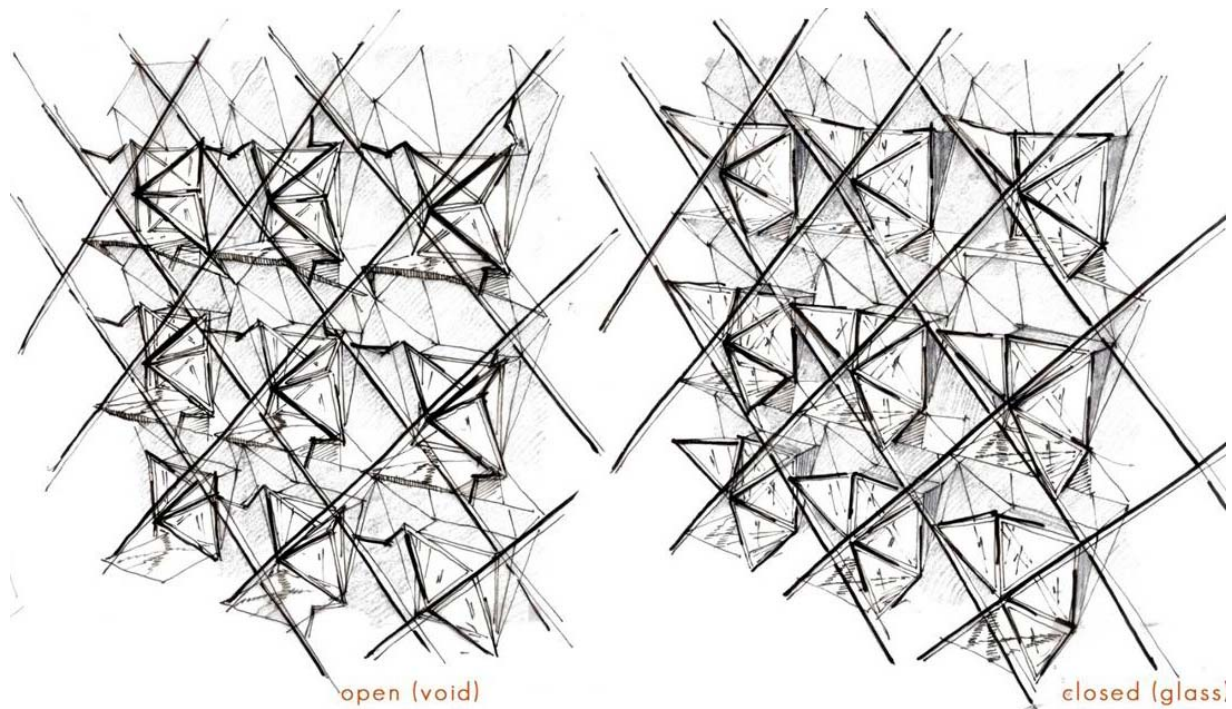


*What Can Buildings Tell Us? Autumn Term Building Studies 2008-09.*

## **MSc Dissertations**

### *Summer Term*

Phase II of the MSc takes place over an extended summer term of some 24 weeks that represent half of the total duration of the taught programme. During this term MSc candidates are expected to undertake a significant piece of research that addresses the programme's areas of research as well as candidates' backgrounds, professional interests and special skills. Dissertation topics are decided by the end of the Spring Term. Dissertation research is supported by regular seminars and tutorials.

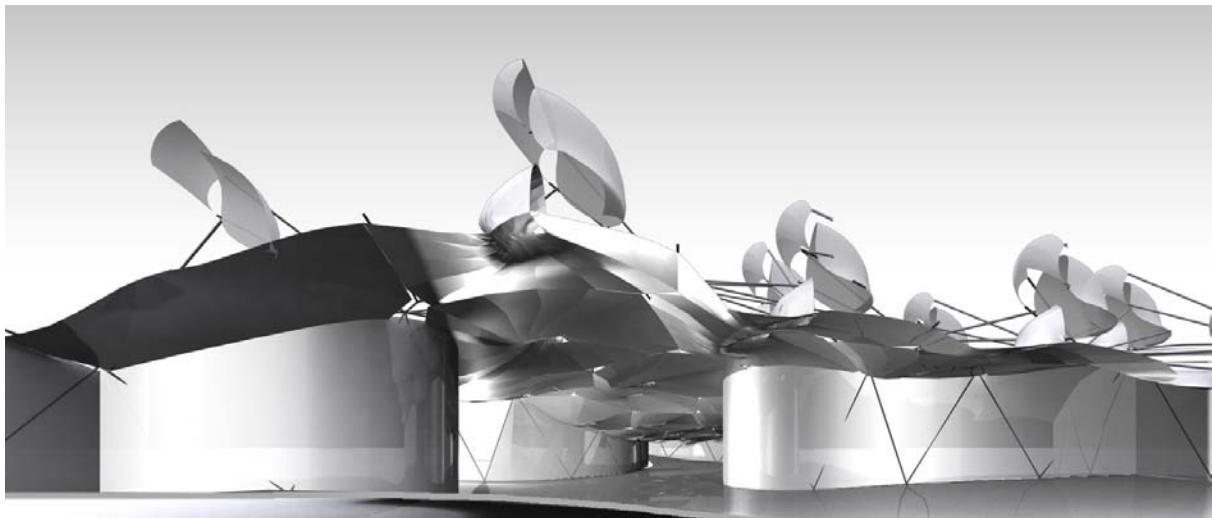


*Natalia Kafassis Dynamic façade for variable control daylight and air in a composite climate, 2009.*

## **MArch Dissertations**

### *Autumn, Spring & Summer Terms*

In the Autumn term and early part of the Spring term the MArch studio hosts the final stage of Phase II dissertations started in the previous academic year. In the coming year these comprise eleven individual projects that encompass a wide range of design briefs and climates including proposals for emergency housing in the Chilean Patagonia, a low-income community in Bangkok, sustainable urban development in Reykjavik, social housing and special need learning environments in Bogota, housing refurbishment in London, urban housing in Pune, façade design for office buildings in Belgrade, daylighting in places of worship, and designs for urban rooftops and open spaces in Athens and Patras. These projects are due for completion in early February 2010. The MArch studio will then resume in the Summer Term with a new group of Phase II projects.



Ekachai Sophonudomporn *Roof component for daylighting of Art Gallery in Bangkok* MArch Dissertation Project, 2009.

## **Lectures, Seminars & Workshops**

### **Myths & Theories of Sustainable Architecture**

#### *Autumn Term*

Many architects and students take sustainable environmental design for granted, as if it were now standard practice. Others see environmental performance as a mere genetic corollary of the digital revolution. For others still, energy and environment are technicalities best dealt with outside architecture. The course dispels such myths, which continue to obscure the development of an architectural discourse of sustainable design. Far from being an issue of engineering, the environmental performance of buildings is fundamentally a matter for architecture, being a direct outcome of programmatic, formal and operational choices made, or ignored, by design. Sustainable environmental design requires essential architectural knowledge that recent generations of architects simply did not receive. Its key concepts and performative criteria are introduced in this course, providing the cognitive grounding and critical framework needed for design research and applications.

### **Environmental Design Primer**

#### *Autumn & Spring Terms*

The course deals with key topics in building science drawn from current thinking and research in sustainable environmental design as it applies to architecture and urbanism. Lectures will look at the relationship between climate and architectural evolution; people, buildings and sustainability; occupant environmental comfort and thermal performance of buildings; daylight in architecture; daylight, artificial

light, and energy; natural and mechanical ventilation; health and energy expenditure in buildings and related topics.

### **Lessons from Practice**

#### *Spring Term*

The course looks at both historical and contemporary approaches using built examples from the research and practices of the programme's teaching staff as well as guest lecturers to discuss design concepts and environmental performance in practice. Visiting contributors have included Catherine Harrington and Ben Humphreys of Architype Architects, Bill Dunster of Zed Factory, Ian Taylor of Feilden Clegg Bradley Architects, David Lloyd Jones of Studio E, Mark Hemel of IBA, Rab and Denise Bennetts of Bennetts Associates, Richard Soundy of Corrigan Soundy Kilaiditi, Daniel Wright of Rogers Stirk Harbour & Partners, Stefan Behling and Irene Gallou of Foster & Partners, Jolyon Brewis of Grimshaw & Partners, Michael Pawlyn of Exploration, Andy Ford of Fulcrum Engineering, Peter Chlapowski of PCKO Architects, Mario Cucinella of MC Architects, Dean Hawkes, Alexandros Tombazis, Ken Yeang and other UK and international practitioners with a stated commitment to environmentally responsive architecture.

### **Environmental Analysis Tools**

#### *Autumn & Spring Terms*

This is a technical course on methods and tools applied before and during design to test ideas and environmental targets, simulate and compare the likely performance of alternative designs, assess predictions of environmental conditions against measured data and benchmarks, fine-tune design proposals and inform final design decisions. Over two terms the course and weekly workshop (see below) engage with a selection of specialist digital tools and techniques that are now increasingly used by environmental design professionals. These include digital tools for climate and urban microclimate studies, daylighting, solar and airflow simulation tools, thermal comfort studies, prediction of energy requirements and carbon emissions, performance assessment and environmental impacts of buildings and cities.

### **Design Research Workshop**

#### *Autumn & Spring Terms*

This is a hands-on workshop that provides training on the application of digital tools and procedures introduced by the Environmental Analysis Tools course. The workshop follows the weekly sessions of the Tools course helping to build the necessary knowledge and experience in stages under close supervision. The tools covered by the workshop include scientific instruments and survey techniques for use on fieldwork, as well as digital tools applied to the modelling and simulation of environmental processes and to form generation. The sequence in which different tools are introduced mirrors their application on the year's projects.

### **Productive Research**

#### *Autumn, Spring & Summer Term*

The purpose of this seminar is to foster the development of the research skills required for studio projects and professional work in the areas of this masters programme. These include sifting through the vast amount of information and technical data now available in the field of sustainable environmental design, the selection of topics for research papers and dissertation projects, the writing of technical papers and reports for presentation and publication, and the development of a visual language for communicating the principles and outcomes of sustainable environmental design.

### **Other Events**

The programme's projects are regularly presented, published and exhibited in national and international events. Recent such events included the PLEA 2008 Conference "Towards Zero Energy Buildings" in Dublin in October 2008, the Jerusalem Seminar in Architecture in January 2009, the

Ecobuild exhibition in London in March 2009 and the PLEA 2009 Conference “Architecture, Energy and the Occupant’s Perspective” in Quebec City in June 2009. Over the last year some twenty papers were presented in international conferences by members of the group and there were published contributions in several books and journals. Forthcoming events in 2009-10 include the PALENC 2010 Conference *Cooling the Cities* to be held on the island of Rhodes in late September, collaboration in a new international project on environmental design and architectural training in Europe, and continuing research collaborations with colleagues in the UK and abroad,.



Preparing for presentation of SED projects at the PLEA 2009 International Conference, Quebec, Canada, 24 June 2009.

## STAFF

**Simos Yannas** is an architect engaged in environmental design research, teaching and consultancy since the mid-1970s. He has lectured in schools of architecture and professional institutes in some thirty countries and is currently a Sir Isaac Newton Design Fellow in Architecture at the University of Cambridge and visiting professor at Queensland University of Technology. His book *Roof Cooling Techniques* was shortlisted for the RIBA Book Award in Architecture and *Lessons from Traditional Architecture* is due for publication in 2009. He was awarded the PLEA (Passive and Low Energy Architecture) International Awards in 2001 and 2008.

**Klaus Bode** co-founded BDSP Partnership, a London-based environmental engineering firm with projects across Europe, North America and the Far East. He was project engineer on Foster + Partners' Commerzbank, and on Rogers Partnership's and Renzo Piano Building Workshop's Potsdamer Platz developments in Berlin, and has collaborated with the Rogers Partnership on the Welsh Assembly building in Cardiff, with the sculptor Antony Gormley on the engineering of the Blind Light exhibition and is working with Hopkins Architects on schemes for the London Olympics.

**Gustavo Brunelli** graduated from the Faculty of Architecture and Urbanism of the University of Sao Paulo and won an Alban scholarship to the MA in Environment & Energy Studies at the AA which he completed with Distinction in 2004. He has worked as environmental consultant on the new headquarters for Petrobras in Rio de Janeiro and with BDSP Partnership on projects in the UK and abroad including the Velopark project for the London Olympic & Paralympic Games.

**Joana Carla Soares Gonçalves** is an architect and urbanist from Rio de Janeiro where she practiced with Ana Maria Niemeyer before undertaking an MA in Environment and Energy Studies at the AA and PhD on the sustainability of tall buildings at the University of Sao Paulo where she has been teaching since 1998. She has worked as an environmental consultant on projects around Brazil and has won awards in a number of design competitions. Her book on the environmental attributes of tall buildings is due for publication in 2009.

**Raul Moura** studied architecture and urbanism at the Technical University of Lisbon and worked for the Department of Strategic Planning of Lisbon City Council before moving to London. He was awarded the MA in Environment & Energy Studies from the AA in 1998 and has been teaching in the programme since 1999. He has worked as a sustainability consultant since 2002 leading major masterplanning projects in the UK and overseas.

**Jorge Rodriguez Alvarez** graduated from the Architectural School of A Coruña, Spain and was awarded an MA in Building Conservation and Urban Regeneration from the University of Santiago. He completed the MSc in Sustainable Environmental Design at the AA with Distinction in 2008. He has worked for Glez-Cebrian's on architectural and urban design projects, and was involved in New Dwelling Spaces, a research project for sustainable housing prototypes. He co-founded SAAI in 2009, an environmental consultancy firm with projects in Europe, Asia and America.

#### *Visiting Lecturers*

**Nick Baker** studied physics but has spent the majority of his professional life working in building physics as a teacher, researcher and consultant. His particular interests lie in energy modelling, thermal comfort and daylighting, on which topics he has published many papers. He is author of the LT Method, an energy design tool, and has written and contributed to several books including Daylighting Design, and Sustainable Refurbishment. His recent interest has focused on the impact of human behaviour on energy consumption in buildings.

**Paula Cadima** has been in architectural practice and environmental research for some twenty five years and has taught at the AA Graduate School and at the Technical University of Lisbon where she created and directed the masters course on Bioclimatic Architecture and taught in the Faculty of Architecture's undergraduate course. Working for the European Commission in Brussels since 2005 she is involved in the promotion of energy efficiency and renewable energy sources and in the management of European projects. She currently chairs the Environment & Sustainable Architecture working group of the Architect's Council of Europe.

**Catherine Harrington** is an associate with the London office of Architype, winners of the RIBA Sustainability Award in 2007 and the Ashden Award in 2009. Since 1999 she has been responsible for a wide portfolio of low energy buildings and competition winning schemes, including the Chiltern Hills Visitor Centre, the Singleton Environment Centre and a number of educational and cultural buildings. She is a consultant on Birmingham County Council's schools for the future programme and a regular participant on the RIBA Schools Client Forum.