Sustainable Environmental Design

The conditions for a symbiotic relationship between buildings and the urban environments they form and occupy are the main concern of the SED masters programme. The dynamic energy exchanges characterising this relation foster distinct change in the climates of cities, the environmental performance of buildings and the comfort and energy use of their inhabitants. Knowledge and understanding of the physical principles underlying these exchanges, along with the conceptual and computational tools to translate them into an ecological architecture and urbanism, form the core of the taught programme in sustainable environmental design. This is structured in two consecutive phases. Phase I combines MSc and MArch candidates and is organised around joint studio projects that are worked on in teams. Project work is supported by weekly lectures, research seminars and computer workshops. Phase II is focused on dissertation projects, which are undertaken individually and supported by regular seminars and tutorials. This year both MArch and MSc dissertation projects will focus on sustainable urban refurbishment.

Programme Directors:
Simos Yannas

Programme Staff:
Paula Cadima
Klaus Bode
Gustavo Brunelli
Joana Carla Soares Gonçalves
Jorge Rodriguez Alvarez
Rosa Schiano-Phan

Visiting Lecturers:
Nick Baker
Raul Moura

Simos Yannas has undertaken research in many areas of environmental design and has taught and lectured in some 30 countries. His latest book, *Lessons from Vernacular Architecture* is due for publication in 2011. His earlier *Roof Cooling Techniques* was shortlisted for the RIBA International Book Award for Architecture. A new edition of his Portuguese language *Em Busca de uma Arquitetura Sustentavel para os Tropicos* was recently published in Brazil. He was awarded the PLEA (Passive and Low Energy Architecture) International Achievement Award in 2001.

Paula Cadima has been in architectural practice and environmental research for some 25 years and has taught at the Technical University of Lisbon where she created and directed the Masters course on Bioclimatic Architecture. She worked for the European Commission in Brussels for five years managing projects on energy efficiency, renewable energy sources and world-class research in emerging fields. She chaired the Environment & Sustainable Architecture working group of the Architect's Council of Europe and is currently the President of PLEA (Passive Low Energy Architecture).

Klaus Bode co-founded BDSP Partnership, an international environmental engineering firm with offices in London, Lisbon and Belgrade. He was project engineer on Foster + Partners' Commerzbank and on Rogers and Piano's Potsdamer Platz projects in Berlin. He 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 with Hopkins Architects on the Velodrome for the London 2012 Olympics among other projects.

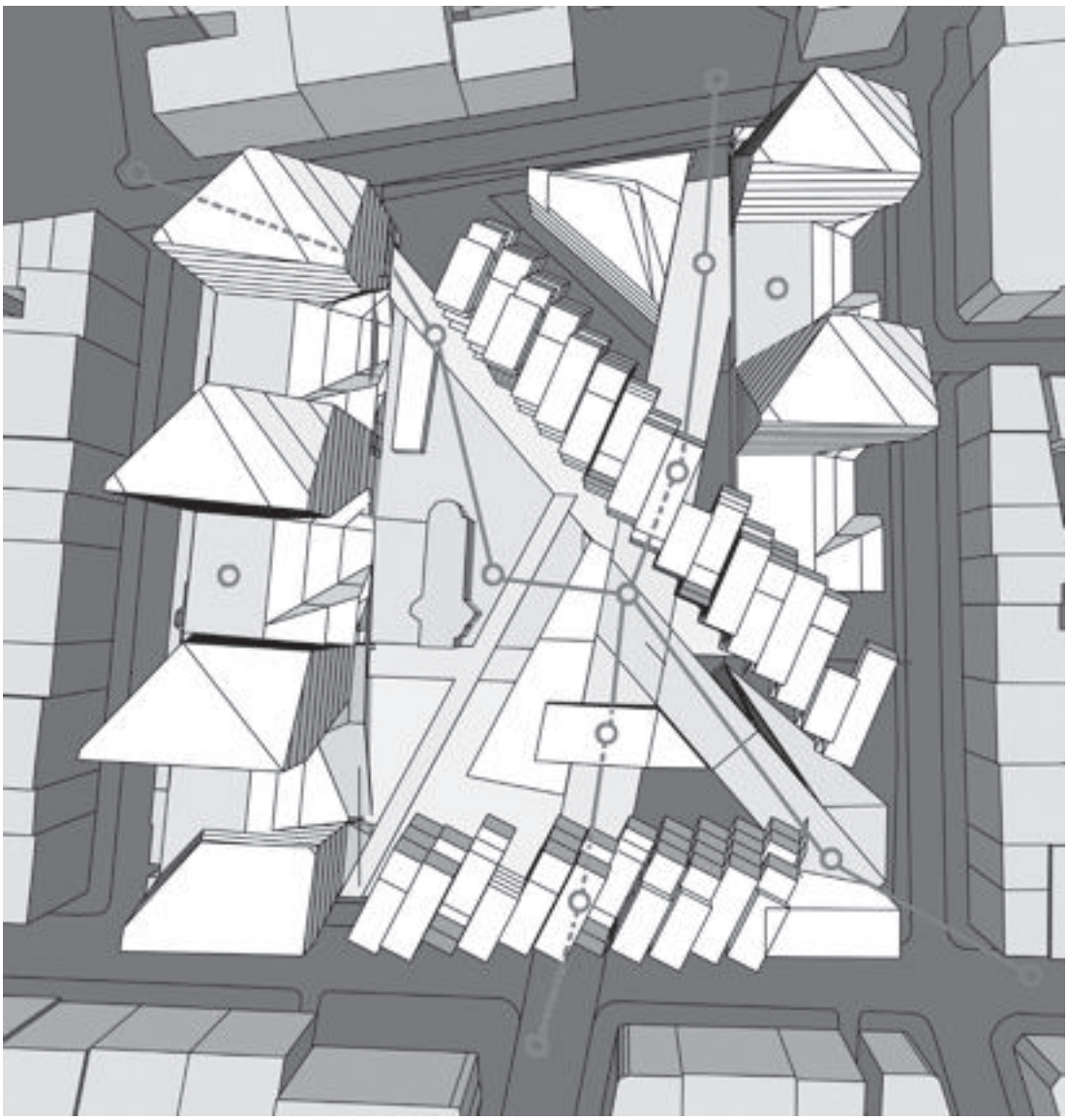
Gustavo Brunelli graduated from the Faculty of Architecture and Urbanism of the University of São Paulo and won an Alban scholarship to the MA in Environment & Energy Studies at the AA, which he completed with distinction in 2004. He has worked as an environmental consultant on the new headquarters for Petrobras in Rio de Janeiro and with BDSP on projects in the UK and abroad.

Joana Carla Soares Gonçalves completed her PhD on the sustainability of tall buildings at the University of São Paulo, where she has taught since 1998. She has practiced in Rio de Janeiro with Ana Maria Niemeyer and has worked as an environmental consultant on projects in Brazil, winning awards in a number of design competitions. She is the author of *The Environmental Performance of Tall Buildings* published by Earthscan in 2010.

Jorge Rodríguez Álvarez graduated from the architectural school of A Coruña, Spain where he currently teaches and undertakes research on sustainable urban design. He was awarded an MA

in Building Conservation and Urban Regeneration from the University of Santiago and completed the MSc in Sustainable Environmental Design at the AA with distinction in 2008. He co-founded SAAI in 2009, an international environmental consultancy with projects in Europe, Asia and America.

Rosa Schiano-Phan studied architecture in Italy and completed masters and PhD studies in environmental design in the UK. She worked as senior sustainability consultant with Brian Ford & Associates and at WSP Environmental, and was a Research Fellow on passive cooling at the Department of Built Environment, University of Nottingham. She is a co-author of *The Architecture & Engineering of Down-draught Cooling* published by PHDC Press in 2010.



Mixed-use redevelopment in Fitzrovia, London with sun, wind and inhabitant adaptive opportunities as architectural and environmental design generators. Winter Term design project by Herman Calleja, Noah Czech, Alexandre Hepner and Anna Tziastoudi, January 2011.

Studio Projects

Phase I Studio: What Can Cities Tell Us, What Can We Tell Back?
Autumn & Winter Terms
In the autumn term the Phase I studio looks at how different microclimates form in cities and the effects these have on activity and environmental quality in and around buildings. With London as our laboratory this phase starts with field studies that combine the mapping of activities in selected buildings and outdoor spaces with environmental measurements across sections of the city. The mappings inform the nature of environmental conditions, as well as provide numerical data that can calibrate computational tools applying these to parametric studies as part of design research. The findings of these studies provide starting points for design projects that follow in the winter term exploring adaptive and performative strategies that can achieve autonomy from conventional energy sources addressing climate change and environmental quality.

Phase II Studio:
MArch Dissertation Projects
Autumn, Spring & Summer Terms
In the autumn term the MArch studio will host the final stage of Phase II dissertation projects that began in the previous academic year. This comprises 15 individual design projects focusing on building programmes with the majority located in hot climates. These projects will be completed in early February and a similar number of projects will start in the spring term by candidates that join the programme in the autumn.

Phase II Studio:
MSc Dissertation Projects
Spring & Summer Terms
MSc candidates embark on a significant piece of design research addressing the SED programme's areas of concern as well as students' own backgrounds, professional interests and special skills. Project topics are decided by the end of the winter term and grouped into thematic clusters identifying areas of research that can be developed individually or in teams of 2–4 students.

Lecture Courses, 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, while others see environmental performance as a mere by-product of the digital revolution. The course dispels such myths, which continue to obscure the development of an architectural discourse of sustainable design. Far from being a computational gadget or an issue of engineering, the environmental performance of buildings is fundamentally a matter for architecture, being an outcome of programmatic, formal and operational choices made, or ignored, by design. Sustainable environmental design requires essential architectural knowledge that recent generations of architects did not receive. Its main concepts and performative criteria are introduced in this course, providing the cognitive grounding and critical framework needed for design research and practice.

Environmental Design Primer
Autumn & Winter Terms

The course deals with key topics in environmental design research. Lectures will look at the historical relationship between climate and architecture; adaptive theories of environmental comfort and their application in design; daylight and artificial light in architecture; natural and mechanical ventilation; passive and mechanical heating and cooling; ecology and performance of traditional and new materials; energy expenditure in buildings; renewable energies and other related topics.

Refurbishing the City
Autumn & Winter Terms

This course provides quantitative and qualitative criteria for the environmental assessment of cities based on local climatic conditions, built density, urban morphology, materiality and anthropogenic activity. The course will examine masterplanning and design strategies that attempt to improve urban microclimates on the ground as well as at roof level while also looking at examples and case studies of recent refurbishment schemes and new developments in different urban locations and climatic regions.

Lessons from Practice
Spring & Summer Terms

This course draws on the experience of practising architects, engineers and researchers who are invited to present their approach and practice of sustainable environmental design with examples of projects from different climates and building programmes.

Design Research Tools
Autumn & Winter Terms

This is a core technical course on fieldwork methods and computational tools that are essential for all project work in exploring environmental objectives, performance targets and design strategies – to simulate and compare the likely environmental performance, energy use and comfort conditions of alternative designs; to assess predictions of environmental conditions against measured data and benchmarks; and to fine-tune design proposals and inform final design decisions.

Modelling & Simulation Workshop
Autumn, Winter & Spring Terms

The weekly sessions of the Design Research Tools course are followed by hands-on training in the application of the digital tools and research techniques introduced by the course, helping to build the necessary knowledge and skills under close supervision.

Research Seminar
Autumn, Winter & Spring Terms

This seminar fosters the development of the research, presentation and writing skills required for studio projects, dissertations and professional work. A primary aim is the acquisition of a shared visual language for communicating the principles and outcomes of sustainable design.