

Masterstudio 12–17 January 2015

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UNIVERSITY OF AMSTERDAM



Centre for Urban Studies

Since 2002 the master's programme Urban and Regional Planning of the University of Amsterdam organizes yearly a course intended for masterstudents, academics and professionals in the field of urban and regional planning, urban sociology, urban design, and city and regional government.

Every year an other current topic – in the front line of disciplinary development – is placed in the centre to discover new insights, to be discussed with domestic and international scientists. These courses have acquired a special place in recent years, particularly within institutions and agencies concerned with the quality of spacial planning in the Netherlands.

It opts mainly a form in which knowledge – high quality and international level – and practice meet, complement and reinforce: a masterstudio where students and professionals learn and work together on a specific issue. Students are thus offered an unique opportunity to deepen and broaden their education. Professionals can refresh their knowledge on an international level.

The course is organized in a studio of one full week consisting of lectures in the morning, and working groups in the afternoon, resulting in policy advices to the City of Amsterdam. Furthermore cases of practice in Amsterdam will be presented in addition to the lectures. The evaluation of the course is conducted also through scientific papers to be written by participating students in the weeks following the masterstudio.

Organisations like research institutes, city departments, consulting firms and urban design offices can purchase participation for several employees on different days.

Registration

For up-to-date information and registration, please visit www.urbanstudies.uva.nl/education

Costs

Institutional Participants:
per day € 200, full seminar € 1000
Private Participants:
per day € 40, full seminar € 200

Contacts

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Stichting Levensomgeving en Ruimte

VAN EESTEREN-FLUCK & VAN LOHUIZEN STICHTING

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PAKHUIS DE ZWIJGER*



Jaar van de Ruimte
2015

The Metabolic City

How do cities have to change for a sustainable future?

The concept of Urban Metabolism has been around for already 50 years. Yet, it gained a rejuvenated interest among the fields of urban studies, planning and architecture, becoming one of the most hip concepts of our times. The long history of the concept is comparable to its comprehensiveness. The idea of metabolism is based on the assumption that the environmental pressure generated by urban life needs to be assessed in a systemic approach: a relatively comprehensive view on the functioning of an ecosystem through a continuous process of input, throughput and output. A system is composed of 'material flows', generally defined into water, energy, materials (including food) and waste. These flows consist into inputs (local, regional, global inflow of resources), throughputs (energy required to transform these resources and waste produced by any process) and output (the material outcome of this process).

Most of the research on metabolism of cities has been focused on how different urban characters affect, influence and mutate the metabolic dynamic of food, energy, waste, water and other material resources. The policy challenge is the achievement of sector specific policies addressing the multiple ways according to which each of these material flows can be modified within the urban dimensions to reduce the ecological footprint of urban spaces and function. The issue addressed different policy levels and policy sectors. In our view the challenges for planning lies today in the radical change of regional and urban systems of production and consumption. The spatial approach of planning policies means among others:

- the production and distribution of energy, the use of energy in cities and for transportation, with regard to the carbon issue;
- the use of water and the re-use of wastewater within the urban, system, the production and re-use of material waste, in short the re-use issue;

- the way the urban distribution of functions affects the overall ecological impact of urban living (e.g. urban waste management, re-use and recycling at different scales, mobility and daily lifestyles), either the spatial issue.

However, despite the consolidated research field on metabolism and the widespread attention to particular technology solutions to enable a better management of resources, our cities are not yet showing radical changes in terms of their structures and functioning. Work on metabolism has been indeed largely built upon systemic modeling within the field of material sciences and engineering.

Today's urban challenge lies instead in enabling and changing the social, cultural and institutional conditions that hinder or promote a substantial change in the way cities use, produce and re-use their resources.

The Master Studio Urban Planning starts from this main statement: research and practices with regard to urban metabolism need to better discover and explore the institutional conditions for a radical innovation of the institutional and social condition of planning and urbanism, with a particular focus on the city-regional scale. New policies, hence, do not need exclusively to focus on technological innovation but must consider how these material aspects interrelate with the socio-cultural environments of cities.

Main questions

- What are the contemporary challenges of urban sustainability in relationship with urban living and urban communities?
- How do social dynamics affect systemic functioning of cities? In what way new city-regional spatial configurations affect the ecological footprint of cities?

The masterstudio is organized around five different topics, each providing a general theme for the series of 5 x 2 lectures:

General Introduction: the 21st century metabolism of cities

Urban metabolism is certainly established as a systemic concept able to model the material functioning of our cities. Yet, radical innovation is hard to achieve. In the general introduction we will portrait the cultural, social and institutional opportunities and barriers to a new thinking of urban metabolism. This entails a sociocratic view on urban metabolism, focusing on the role of cultural values, self-regulation practices and ultimately on the large scale of societal organization within city-regions. What are the social challenges of contemporary research on urban metabolism?

Energy and mobility: the carbon issue

In this subtheme we explore the relationship between technical innovation in the fields of transportation, energy production and economic production in combination to the trends of mobility of goods and persons. The management of energy and transport are certainly the most impacting factors in the ecological footprint of cities, in their capacity of CO2 emissions. We approach the problem of carbon emissions from a city-regional scale looking at transports and energy. For long time we imagined that knowledge-economy and online work and consumption could radically reduce the mobility needs of persons and goods in our cities. We invested a lot in smart grids, fiber power infrastructures and in online connectivity at local and global scales. Yet, physical mobility of persons and goods is not reduced but increased (and radically changed). Similarly, despite the increased technological advancement in the field of energy production, consumption and storage, CO2 emissions are raising. Why does this happens? What are the challenges for the low carbon city?

Water and waste: the re-use issue

Water and waste – both material waste and wastewater - are the two elements that provide the most space for thinking about re-use in a urban perspective. Today's technological innovation has certainly

redefined the conception of 'waste' in urban functioning. Most of the by-products of urban functioning can be today re-used, stored and processed to create new resources. Yet, this involves a radical change in the way consumption and production patters are spatially organized in cities. Water is certainly the most relevant of these resources. It is also one of the most central organized resources and new techniques of water management are continuously investigated to avoid overfills. In this subtheme we would like to explore the challenges and the techniques of water management and wate management in relationship with the concept of re-use.

Technical utilities, urban fabric and regional structures: the spatial issue

Research on the impact of different urban and regional structures in the metabolic functioning of cities is large. We are interested in exploring the different scales of spatial structure (living, neighborhood, city, metropolitan area, region) in relationship with urban metabolism. We discuss the relationship between emerging urban fabrics (and living styles) like regional polycentrism, working-living space, residential densification and post-suburbanization with changing usages of material resources. Technological innovation will be problematized in this multi-scalar perspective. What is the impact that certain technologies for sustainable living have at different scales? How do technological innovation change, and it is changed by, spatial and social organization in the city-regions?

Sustainable future: the local challenge

Who are the new actors of metabolism oriented urban policies? How do existent policy networks change and adapt to the question of more sustainable metabolism of cities? What does it mean to plan the city as a ecosystem? By looking at specific policies and cases in the world we will explore what are the institutional challenges and barriers of policy innovation and design. We are interested in discovering emerging agents and players in the field of energy, mobility, water, and waste, and how they can relate to a new view on systemic urban innovation, more oriented to social change and engagement.

Monday 12 January

Jacqueline Cramer

Professor Sustainable Innovation, Utrecht University;
Director Utrecht Sustainability Institute; former
Dutch Minister of Housing, Spatial Planning and the Environment

Closing the resource loops at city level

Cities are an attractive starting point for making the transition to a circular economy. They are where products are produced, consumed and discarded in large quantities. Their high population density and industrial productivity means that waste streams can be cost-effectively collected, transported and recycled. Systems for sharing services and setting up repair, thrift and re-manufacturing facilities have large potential markets: so cities are increasingly being seen as key players against global warming and resource depletion. The basic principle of the circular city is that all product and material streams can be brought back into the cycle after use, and become resource for new products and services. This means that waste as such no longer exists. This isn't yet the case, but a growing number of municipalities have gained experience on the road towards being a circular city. The primary responsibility for creating a circular economy has to be in the hands of industry, but local governments can play the role of facilitator and orchestrator. The most important mechanism municipalities can use to promote the circular city is to include circular thinking in its public procurement. In the Netherlands, pro-active municipalities and provinces like Amsterdam and Utrecht have been making a start with this approach. Circular city strategies need to go hand in hand with bottom-up initiatives by citizens and private companies. Empowering people to bring their own ideas into practice generates enthusiasm for the circular economy. This broad societal support is needed to close the resource loops at city level.

Pakhuis de Zwijger (kleine zaal)

Monday 12 January

Simin Davoudi

Professor Environmental Policy & Planning,
Newcastle University

**Metabolic city and
energy consumption behaviour**

The concept of urban metabolism uses biological analogy and conceptualises the city as 'stocks and flows'. The normative goal is to shift the way in which cities function from a linear to a circular metabolism in which outputs from social and economic activities are recycled and become inputs into the city's functions. Since its first use in the 60s, the concept has gained wide spread currency and is used in a range of disciplines from industrial ecology to political ecology, geography and urban planning. In this lecture, I will firstly, introduce the concept of metabolism and its critique. Secondly, I will focus on a key aspect of a sustainable urban metabolism which is carbon reduction. Although cities occupy only 2% of the Earth's land mass, they are home to more than 50% of the world's population, consume more than 75% of all natural resources and produce 40 to 70% of global anthropogenic greenhouse gas emissions. In most countries the built environment uses about 30% of the final energy used and absorbs an even larger proportion of electricity. This arises from complex interactions between urban form, transport flows, building design, types of infrastructure used, the design and layout of, and materials used in, buildings, and people's daily practices in using the built environment. Transition to low-carbon cities is crucial for effective metabolic cities. It requires transformative changes in how cities are produced and used. Thirdly, I will argue that low carbon transition needs changes in both energy supply and demand and the latter is not just about energy efficiency measures and technologies, but also behavioural change. But, why do people behave in the way they do? What motivates them to change their behaviour? What are the key factors in behaviour formation and change? In the fourth and final part of the lecture, I will address these questions by drawing on three dominant perspectives on the drivers of environmental behaviour: the *rational economic*, the *psychological* and the *sociological* perspectives. I will use examples from energy consumption to illustrate the points made.

Pakhuis de Zwijger (kleine zaal)

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Tuesday 13 January

Peter Newman

Professor of Sustainability, Curtin University, Australia

**The walking, transit and automobile city:
matching livability and sustainability**

In our 1999 book *Sustainability and Cities* we suggested an Extended Metabolism Model that shows our need to reduce resources input and wastes output and at the same time improve livability in cities. This is the basis of sustainability in cities. The cultural and economic processes of a city shape its metabolism but transport is fundamental to how this happens. A new theory of urban fabric will be outlined to show how this happens. The Marchetti travel time budget can be used to explain how three primary urban fabrics have been created: walking city, transit city and automobile city. Every city has a combination of these urban fabrics and they each have a metabolism associated with their fabric; data will be provided on energy and basic raw materials to illustrate how walking and transit fabric significantly reduces metabolism. Town planning strategic and statutory processes need to recognize, respect and rejuvenate these three urban fabrics in order to create more sustainable outcomes. Data will be provided on 21st century trends that show dramatic reductions in car use, increases in rail, walking and cycling and increases in density after 100 years of the opposite trends dominating city building. It appears that walking and transit city fabric have a new market force driving them. The forces that are causing such reversals are combinations of technology, culture and economics. The knowledge economy requires more intensive city centers and the consumer economy requires more dispersive land use. Intensive modes (rail, walk, bike) enable more intensive cities; dispersive modes (bus and car) enable more dispersive cities. Thus the choices are there for cities that want to encourage more competitive economic activity that is at the same time reducing their metabolism.

CREA (muziekzaal)

Tuesday 13 January

Christian Zuidema

Lecturer Spatial Planning, University of Groningen

**Societal transformation
towards sustainable energy systems**

Among the most daunting challenges of the 21st century is to shift from an almost sole reliance on fossil fuels for our worldwide energy demand, towards a more sustainable energy system. This challenge is not just daunting because we have come to depend on using high amounts of energy in almost all aspects of our societies, but also as shifting to alternatives is highly complex. The aim of this lecture is to provide students with a theoretical perspective that helps them critically reflect on the pursuit of a more sustainable energy system. The lecture will discuss this pursuit as an encompassing societal transformation, which is in academic debates also referred to as a 'transition'. Furthermore, the lecture will explain how we might practically operationalize the more abstract theoretical debate on such a transition. Inspired by current hardships experienced in the Netherlands in trying to pursue such a transition, a critical reflection will be given on current Dutch policies. In providing new pathways for progress, emphasis will be put on the spatial consequences and opportunities for developing a sustainable energy system. The argument will be made that it is exactly in understanding the energy system as being an integrated part of the wider physical and socio-economic landscape, that it becomes possible to find practical pathways for stimulating and pursuing the desired transition.

CREA (muziekzaal)

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Wednesday 14 January

Boris Lesjean

Boris Lesjean, Research Director,
Berlin Centre of Competence for Water

**Water management in the cities of tomorrow:
revisiting the concept of urban water cycles**

The water management infrastructures of European cities are characterized by a linear water flux: drinking water is taken from the resource “upstream” (groundwater or surface water), distributed, collected as wastewater, treated “end of pipe” at waste water treatment plants (WWTP) and discharged “downstream”. Rainwater runoff from impervious surfaces is either collected in a combined sewer, mixed with wastewater and treated at the WWTP, or collected in a separate rain sewer and diverted to the surface water bodies without treatment. Extreme rain events cause hydraulic and pollutant peaks in the surface water bodies, as well as urban flooding when the sewer and drainage system is overloaded. These negative impacts may further aggravate with increasing imperviousness and global warming. The talk will present new options to approach water management in cities, reintroducing water cycles in the urban environment along the new concept of “Water Sensitive Urban Design” (WSUD). Concrete examples of modern rainwater management at building, district or catchment level show that WSUD can help to reduce the negative impacts above while adding benefits for the environment and the quality of urban living via improved landscape quality (“greening the city”), reduced heat island effect and increased urban biodiversity. In water scarce areas, similar urban water cycles can be achieved through wastewater and rainwater reuse. The complexity of the urban system will be discussed, which leads to a necessary and multi-scale interaction of the water management planning together with city planning and other aspects like climate adaptation and mitigation strategies, turning water management as a chance to increase the resilience of the city instead of being a problem. The challenge of developing more resilient cities, resides in the capacity to perform integrated planning based on local constraints and conditions, using multi-disciplinary approach and stakeholder involvement to maximize local benefits of water management at minimal direct and indirect cost.

Waternet's Head Office

Wednesday 14 January

Roelof Kruize

Director Waternet Amsterdam

**Amsterdam water and waste
in transition to a green economy**

Climate change, growth of the world population, shortage of raw materials and fast-growing cities lead worldwide to the necessity of changing our behaviour towards water, energy and waste materials: use less, and recycle more on a high level quality. A circular approach contributes to a green economy and asks for integrated solutions. The level of metropolis appears to be the right scale for this, offering profits for the environment, liveability and the economy. The Amsterdam metropolis is a good example of a city with an integrated approach of water, energy and waste management. The cooperation between Waternet as watercycle company and the City of Amsterdam Waste to Energy company (AEB) is unique in the world. Waternet is the water utility of the City of Amsterdam and the regional public water authority Amstel, Gooi and Vecht (AGV) and is responsible for the drinking water supply, sewerage, wastewater treatment, water quality and quantity management and for water safety. Working together and putting together the abilities of both companies results in significant cost-reduction, increased production of energy, heat and raw materials and contributes to the ambition of Amsterdam to develop further as a sustainable metropolis. In the urban context the interfaces between different stakeholders offer opportunities for efforts in recycling, re-using and reducing costs of material and energy. Both on a urban scale, connected to our current facilities as on a decentralized scale, where citizen participation takes on a more visible role.

Waternet's Head Office

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Thursday 15 January

Helga Weisz

Professor Industrial Ecology and Climate Change,
Humboldt University Berlin

Urban metabolism, form and scale

How are urban form, urban metabolism and city scale related? This is one of the most promising but also most challenging questions in urban metabolism research. Despite very limited empirical and conceptual evidence this lectures seeks to develop elements of a quantitatively based theory of this relation. I am interested in what drives urban dynamics and what limits it. What were the urban-metabolic conditions in the past, what are they now, and what will they be potentially in the future? I will take into account historical socio-metabolic transitions, the function cities have and had for human development, explore definitions of urban form and explore the existing evidence how urban form and scale is related to urban energy and material use. The ultimate goal of this lecture is to specify general socio-metabolic boundary conditions for urbanization. Hopefully this will enable us to distinguish between the existing robust evidence base and the huge body of questions that yet need to be addressed. I am hoping that for some of you these specifications will inspire a focal topic of your further scientific endeavor.

UvA, Building C (room C.1.04.)

Thursday 15 January

Arjan van Timmeren

Professor Environmental Technology & Design,
Delft University of Technology

**Environmental technology & design;
the concept of the Urban Metabolism (UM)**

The field of interest of the Environmental Technology and Design (ETD) chair concerns the interaction of nature, people, technology and design towards sustainable solutions. At different scales, however starting mainly from the perspective of the urban dynamics and of emerging theories of complexity related to this. It includes a renewed look on the 'urban metabolism' and the role of environmental technology, urban ecology and environment behavior focus for the field. Relevant aspects are the continuing transformation, economic-technological innovation and changing tasks in the public sector before, during and after design and construction of buildings and cities. Scale-free thinking and permanent insight in ecological, spatial, technical and social backgrounds are of vital importance. As the field concerns both integrated and reciprocal problems, or better said: challenges and potentials. The perspective presented in this paper anticipates on this. An accurate and permanent way of operational development will occur as a type of place-making, incorporating self-organization, network & systems thinking and parametric design. This implies that plans are tied together with surrounding projects as a total concept within a structure supporting flexible and continuous processes of change.

UvA, Building C (room C.1.04.)

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Friday 16 January

Vanesa Castan Broto

Lecturer Environment and
Sustainable Development, University College London

**Towards an urban metabolic analysis
of the informal city**

Urbanisation, a defining characteristic of our modern times, is a multi-dimensional process which involves both social and spatial transformations, within and beyond the boundaries of any given city. Urbanisation today cannot be understood without understanding the informal city. Informality refers to patterns of spatial organisation, social relations and economic exchanges and it emerges in a variety of setting. Informality is often misunderstood in two ways. First, it is often thought of representing the evils of the city, and as something that should be eliminated. From Hernando De Soto's prescriptions for land titling as a means to fight poverty to the formulation of urban development policies in India, informal settlements have been misrepresented as areas of decline and depravation. Second, informality is related with simplifying vision of the city dividing it into the formal and the informal city, as if there were not spillovers, hybridisations and multiple relationships between the informal processes and economies and the formal ones. In this lecture we will analyse the relevance of urban metabolism analyses to understand formal and informal relations. Using the case of Maputo, Mozambique, we will explore how the informal and the formal city are in a constant process of overflow, in the same way as informal economies and processes are visible in the formal city the informal city is constantly being regulated by multiple attempts at reorganising the city. Second we will look into particular strategies to engage with the urban metabolism of informal settlements. We will look specifically into strategies to understand infrastructure landscapes which open up the multiple dimensions that emerge around urban infrastructures beyond simplistic formal/informal dichotomies.

UvA, Building C, room C.1.04.

Friday 16 January

Maarten Hajer

Director Netherlands Environmental Assessment Agency (PBL);
Professor Public Policy, University of Amsterdam

**Smart about cities:
connect urban life to nature**

The discourse on 'Smart Cities' is everywhere. It promises an era of innovative urban planning, driven by smart urban technologies that will make cities safer, cleaner and, above all, more efficient. Efficiency seems uncontroversial but does it make for great cities? In the lecture I will plea for a 'smart urbanism' instead of uncritically adopting 'smart cities'. Such smart urbanism needs to find solutions for what modern 20th century urbanism has forgotten to take into account: the 'metabolism' of cities – the variety of flows that connect city life to nature. What are we taking in, what are we discharging, and how efficiently are we doing that? I will call for a 'globally networked urbanism' that allows cities worldwide to learn faster and jointly identify effective strategies. A viable 21st century planning, rather than including top-down innovation, opts to embed technology in social innovations.

UvA, Building C, room C.1.04.

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Locations

Day 1: Monday 12

Pakhuis de Zwijger (kleine zaal)
Piet Heinkade 179, 1019HC Amsterdam

Day 2: Tuesday 13

CREA (muziekzaal)
Nieuwe Achtergracht 170, 1018 WV Amsterdam

Day 3: Wednesday 14

Waternet Head Office,
Korte Ouderkerkdijk 7, 1096 AC Amsterdam

**Day 4 & 5:
Thursday 15, Friday 16**

University of Amsterdam
Building C (room C.1.04.)
Nieuwe Achtergracht 166, 1018 WV Amsterdam

Day	Time	Activity	Topics & Location	Speakers
Mon. 12	09h00–12h30	Lectures	General introduction Metabolic city	Jacqueline Cramer Professor Sustainable Innovation, Utrecht University; Director Utrecht Sustainability Institute Simin Davoudi Professor Environmental Policy & Planning, Newcastle University
	12h30–13h30	Lunch		
	13h30–17h00	Excursion	Pakhuis de Zwijger	
Tue. 13	19h30–22h00	Symposium De Zwijger	Sustainable Agenda Amsterdam	Simin Davoudi, Peter Newman and Jacqueline Cramer
	09h00–12h30	Lectures	Energy and mobility The carbon issue CREA	Peter Newman Director Curtin University Sustainability Policy Institute (Australia) Christian Zuidema Lecturer Spatial Planning, University of Groningen
	12h30–13h30	Lunch		
13h30–17h00	Workshops			
Wed. 14	09h00–12h30	Lectures	Water and waste The re-use issue Waternet	Boris Lesjean Director Berlin Centre of Competence for Water Roelof Kruize Director Waternet (Water Company of Amsterdam)
	12h30–13h30	Lunch		
	13h30–17h00	Workshops		
Thu. 15	09h00–12h30	Lectures	Scale and form The spatial issue Uva, Building C	Helga Weisz Professor Industrial Ecology and Climate Change, Humboldt University Berlin Arjan van Timmeren Professor Environmental Technology & Design, Delft University of Technology
	12h30–13h30	Lunch		
	13h30–17h00	Workshops		
Fri. 16	09h00–12h30	Lectures	Sustainable future The local challenge Uva, Building C	Vanesa Castan Broto Lecturer Environment and Sustainable Development, University College London Maarten Hajer Director Netherlands Environmental Assessment Agency (PBL); Professor Public Policy, University of Amsterdam
	12h30–13h30	Lunch		
	13h30–17h00	Workshops		
Sat. 17	10h00–12h00	Presentation	Results of workshops Policy advises	Student presentations and comments by representatives of the City of Amsterdam