

Graduate Programme Urban Infrastructures in Transition: The Case of African Cities

Graduate School for Urban Studies (URBANgrad)
Darmstadt University of Technology
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Programme Professors:

Prof. Dr.-Ing. Jochen Monstadt (Programme Director), Spatial and Infrastructure Planning

Prof. Dr. Marc Boeckler, Economic Geography and Global Studies

Prof. Dr. Mikael Hård, History of Technology

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in collaboration with the

Centre for Interdisciplinary African Studies (Zentrum für interdisziplinäre Afrikaforschung),
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1. General Information

1.1 Project Title

Urban Infrastructures in Transition: The Case of African Cities

1.2 Programme Professors

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1.3 Research areas, academic profiles and research experience of the professors

Jochen Monstadt is Professor of **Spatial and Infrastructure Planning** at the Faculty of Civil and Environmental Engineering and the Faculty of Architecture. He has conducted and coordinated extensive research on the co-evolution of cities and infrastructure, on the greening of the utility sector and on structural change in urban energy, water, wastewater and waste disposal systems, as well as on spatial and infrastructure planning in Germany, Switzerland, the United States and Vietnam. In recent years he has extended his research to African cities and currently heads a cooperative project financed by the German Research Foundation on urban water and wastewater systems in Dar es Salaam and Accra. Since 2013 he is the co-director of the Graduate School for Urban Studies “URBANgrad” and of the European Erasmus Mundus study course “Mundus Urbano – M.Sc. in International Cooperation and Urban Development” at the TU Darmstadt.

Marc Boeckler is Professor of **Economic Geography and Global Studies** at the Goethe University, Frankfurt. His research focus is on the interface of culture, spatial theory and economics. Following empirical work on economic practices in regions of the Near East and in the border areas of the United States and Mexico, his most recent research is concentrated

on countries in sub-Saharan Africa. Currently he is the head of research projects on the global integration of local agricultural markets in Ghana, on the pluri-local production of microinsurance knowledge and its local transfer into microinsurance markets, also taking the example of Ghana, and on the establishment of local land markets and the trans-local mobilisation of land taking the examples of Mali, Benin and Madagascar. Marc Boeckler is also responsible for the topic “Markets on the Move” in the cooperative project “Africa’s Asian options”.

As Professor of **History of Technology** at the TU Darmstadt, **Mikael Hård** aims at developing a cultural-history perspective on the development and diffusion of technology which explicitly uses the concepts of the circulation and appropriation of technical systems and artefacts, knowledge and abilities. As a member of the ESF project “European Ways of Life in the American Century” he has actively contributed to the development on a transnational historiography of technology and published a compendium on the history of urban technology. Since 2006 he has been the spokesman of the DFG-financed postgraduate programme “Topology of Technology”, in which, among other things, he is supervising a Ph.D. project on the subject of transnational tourism in African countries. Among the members of his research group is Dr. Catarina Caetano da Rosa, whose habilitation project (German postdoctoral degree) deals with seaports in Portugal and its former colonies.

Annette Rudolph-Cleff is Professor of **Urban Design and Development** at the Faculty of Architecture and the director of the international M.Sc. “International Cooperation in Urban Development (Mundus Urbano)” in the European Erasmus Mundus programme. In addition to research on housing, one focus of her research are the arising opportunities for sustainable urban development and networking building clusters in city districts. In the cooperative project “Semi-central: Resource-efficient and flexible utility supply and waste disposal systems for rapidly growing cities of the future” she uses a systemic approach to study a residential area in Qingdao in China. Her research group addresses participative models of urban planning, as can be seen in the Ph.D. topics and in research projects which include e.g. the development of innovative energy services with the participation of the users.

1.4 Duration period and extent of support

The postgraduate programme will run for three years, beginning in October, 2014. An extension for a further three years is intended. For the initial phase 8 Ph.D. scholarships and a postdoc position will be granted.

2. Objectives and research areas of the postgraduate programme

Urbanisation has become a fundamental characteristic of structural change in modern societies. This is particularly the case in sub-Saharan Africa, where the speed of urbanisation is the highest in the world. In two decades, the number of urbanites in Africa is likely to surpass the total number of city-dwellers in the Western hemisphere. The African urbanisation paths differ from those of the industrial countries in that they represent a “poverty-driven process and not the industrialisation-induced socio-economic transition” (UN-HABITAT 2010: 7) – factors contributing to the specific urban morphologies as well as typologies of basic service provision. In view of extreme poverty, social inequality, ecological, economic and political crises, the academic debate on African cities is usually framed in terms of “deficiencies”. In contrast to this perspective, the argumentation of “*postcolonial urban studies*” – and the conceptual starting-point of this project – is that African cities should be regarded as “ordinary cities” (Robinson 2002: 533), to which international urban research until now has been paid scarcely any attention. Not only the place-specific problems of urban change need to be analysed, but also the place-specific patterns of creativity, decentralised innovation and sustainable development (cf. *ibid.* 2006; Roy 2011; McLees 2013, Watson 2009).

One of the most powerful and dynamic keys to deciphering cities is the urban study of technical infrastructures. These socio-technical systems permeate all societal functions, the built environment and institutional structures of a city and represent long-term accumulations of capital, technology and organisational and geopolitical power (Star 1999: 381). At the same time these systems are crucial for the ecologically sustainable and socially just development of cities, and of their economic competitiveness. Nevertheless, international research continue to examine the characteristics and patterns of urban infrastructures in Africa in terms of “deficits”. Many of these analyses – we assume – are based on the ideals of modernity formulated in the global North, models which continue even after the formal end of the colonial period. This is true particularly for the urban and infrastructural ideal of the “*networked city*” (cf. Dupuy 1991; Monstadt/Schramm 2013a). According to this model it seems impossible to achieve a “modern” city or sustainable urban development without universal coverage by water, wastewater, electricity and telecommunication networks. More specifically, this model includes (1) the concept of a *centralised topology of technical networks* for the supply of sanitary, water, electricity and telecommunication services, (2) the notion that urban monopolists provide for ubiquitous infrastructure services (or of “public utilities”) covering the entire urban area, (3) the notion of passive customers and finally, (4) the assumption that the provision of infrastructure services is closely attached to the state or highly regulated by the state, and finally (5) the concept of *urban planning* which effectively regulates land use and guarantees the provision of critical services within an urban territory. This model, which is increasingly being eroded even in the global North (Coutard/Rutherford 2011), is inadequate for grasping the reality of African cities, their potential for creativity and their distinctive problems. The central thesis of the research programme is thus that innovative and modern technologies and social practices in the production of urban space can be identified beyond universal networks and traditional infrastructure models. These socio-

technical and socio-spatial assemblages break down place-specific restrictions but also open up potentials for the provision of general services and sustainable urban development.

2.1 Research focus, objectives and hypotheses of the programme

The postgraduate programme will examine the interplay between urban and infrastructure development by comparing the urban regions of Dar es Salaam (Tanzania) and Nairobi (Kenya). More specifically, it focuses on the (co-)production and use of water, wastewater, energy and telecommunication services. The objective is to identify and to compare the place-specific characteristics of the infrastructure regimes in different sectors and cities and to obtain knowledge for the sharpening of analytical concepts and for optimising urban and infrastructure development in the global South. By using the analytical concepts of “international circulation” and “local appropriation” (Hård/Misa 2008), hybrid forms of urban and infrastructure development will be examined, which find themselves in a tension between hegemonial planning, organisational and financial models on the one hand and local (self-) organisation and decentralised innovation on the other. The interdisciplinary cooperation of the fields represented in the programme is concerned with the following **research questions**:

- * To what extent and with what consequences has there been a transfer of the modern ideal of a “networked city” and of the corresponding planning and organisational models to the chosen cities since colonial times?
- * What socio-technical and socio-spatial characteristics of urban infrastructure regimes can we identify in the case studies?
- * What tensions arise from the internationally circulating ideals of a “networked city” and the place-based infrastructural and urban regimes? To what extent (and in which urban localities) have there been processes of adaptation or appropriation, of hybridisation, but also of rejection of hegemonic ideals and models in the supply and use of infrastructure services?
- * What place-specific patterns of creativity and innovation, but also what restrictions to sustainable urban and infrastructure development can we identify? What recommendations can be derived from this for urban and infrastructure planning and for the activities of international development agencies and NGOs?
- * What concepts are suitable when analysing the development and innovation patterns of urban infrastructure in African cities?

The postgraduate programme will pursue the following **research activities**:

- * Investigating the circulation of the “networked city” as an ideal and a planning model
- * Analysing the local appropriation of these ideals in various urban-infrastructure regimes
- * Analysing the infrastructure regimes and morphologies of the cities examined
- * Identifying innovation potentials and restrictions and drawing conclusions on the governance and planning of cities and infrastructure
- * Further development of analytical concepts and theoretical contributions

2.2 Research areas and potential Ph.D. topics

The general topics and objectives of the programme will be further differentiated by the disciplinary focuses on:

History of technology (Prof. Dr. Mikael Hård):

The cultural history of urban technology in Africa

Starting from a globally oriented cultural history of technology, the historical part of the programme will concentrate on the circulation and appropriation of urban technologies, while at the same time analysing the evolvement of place-specific solutions in a comparative time perspective. The doctoral theses in the history of technology will cover a period of time that allows the path dependency of previous decisions to be investigated. Since the sources available do not allow every decade to be treated equally, we will focus on 3-4 points in time. We assume that developments have taken different courses in Nairobi – the capital city of a typical *settlement colony* – and in Dar es Salaam – the centre of a colony which was originally a *trading base* (cf. Osterhammel 1995). At the same time the geographical proximity of the two cities and the fact that they were both under the administration of the same colonial power (Great Britain) for more than four decades leads us to assume that information, personnel and experiences circulated between the two cities. Possible examples of doctoral theses are:

- * Laboratories of Modernity? Real-world experiments under different regimes in Dar es Salaam
- * Segregation by Infrastructure? Social engineering in two African cities
- * Beyond the networked city? Alternative solutions to the problem of utilities in Nairobi

Urban design and development (Prof. Dr. Annette Rudolph-Cleff):

Formal and informal ways of producing urban space in Africa

Taking post-colonial urban research approaches as a starting-point, the infrastructural arrangements in both cities under examination will be studied from the perspective of informal development patterns and urban planning processes. The development of settlements is marked on the one hand by informality and by fragile, improvised and temporary practices. On the other hand, the heritage from the colonial period of urban ideals, planning models and technocratic administrative cultures is particularly obvious. Our thesis is that the problems of infrastructural and urban inequality, unplanned settlement growth and increased environmental pollution can only be overcome if existing planning models are adjusted, and informality and the self-organisation of civil society are regarded not in the first instance as deficit but as a distinct mode of producing urban space in Africa. Possible examples of doctoral theses are:

- * “Unlearning (post-)colonial planning?” Planning ideals and models of development in Dar es Salaam and Nairobi
- * “Empowering for infrastructural and urban justice?” Women’s groups in socially deprived areas in Dar es Salaam and Nairobi
- * Informality and urban wealth: a study of the business districts and gated communities in Dar es Salaam and Nairobi

Spatial and infrastructure planning (Prof. Dr. Jochen Monstadt):

Socio-technical assemblages and the planning process in African cities

Taking the international debates on cities and infrastructure, postcolonial urban studies and the social studies of technology as its starting-point, the focus is on the spatial, technological and institutional assemblages of infrastructures in the two cities. The intention is, in particular, to qualify the paradigm of the “post-networked city” (Coutard/Rutherford 2011) for the African cities under examination from the perspective of planning studies. By comparing different sectors in the two cities, the research will identify the place-based characteristics of the infrastructural model of African cities and provide contributions to the interface of “postcolonial technosciences” (Anderson 2002) and “postcolonial urban studies”. At the same time the research will provide insights for the debate on urban planning and governance in African cities. The investigations focus on the one hand on the hybrid forms of networked and non-networked technologies and of self-organised and planned forms of service provision, and on the other hand on new, practices in the use of infrastructure services (particularly information and communication technologies). Possible examples of doctoral theses are:

- * Infrastructure as technology of (dis-)ordering urban space
- * Precarious or pragmatic? Self-organisation of water supply and sewerage in Dar es Salaam and Nairobi
- * Smart urbanism? Mobile prepaid systems in energy and water supply in Dar es Salaam and Nairobi

Economic geography and global studies (Prof. Dr. Marc Boeckler):

Geographies of markets, technopolitics and infrastructure in African cities

The economic and cultural-geography part of the research programme investigates the interfaces of markets and technology policies for the local materialisation of transnationally circulating models of infrastructural networks. The focus is on markets as a hegemonial governance mode in modern societies. Firstly, infrastructures are analysed as socio-technical arrangements providing the preconditions for the circulation of labour, goods and capital. Secondly, the relationship between the market and urban infrastructure is studied by empirically focusing on the governance of urban infrastructure via market mechanisms and on their effects on social and spatial inequality. The central questions of the research programme are how infrastructures are “marketed” and what urban infrastructures make markets possible. How are such markets stabilised and with what degree of success? Possible examples of doctoral theses in economic geography are:

- * African micro-cities? Urban development between micro-financing and micro-technologies
- * (Dis-)connected cities? The digital South, innovative ICT infrastructures and urban development
- * (Re-)oriented cities: Globally circulating models of urban infrastructures in the post-colonial period

2.3 Selection of the infrastructure domains and cities for the interdisciplinary study

The graduate program focuses on the provision and use of urban energy, water, sanitation and telecommunication services. These are technical infrastructure sectors which play a central role in sustainable urban development because of their critical functions for resource use and waste production, social and spatial cohesion and competitiveness. We have selected Dar es Salaam (Tanzania) and Nairobi (Kenya) as comparative cases because of various similarities between these cities. They are of a similar size, with a population of about 3 million, and are the centres of economic, political and scientific decision-making in their respective countries (even though Dar es Salaam no longer functions as a capital city). Both were strongly influenced by Great Britain as a colonial power and today they are multiculturally and internationally oriented. Both cities are marked by rapid demographic and settlement growth, which largely takes place outside of formally designated planning areas or outside the control of the local administrations. Government administration, planning and economic regulation, and the organisation of the provision of infrastructure continue until the present day to represent the heritage of the British legal tradition. In addition, the geographical proximity of the two cities and the transportation system that links them, as well as the English language and the existing collaboration with local partners were important factors in the selection of these cities.

3. Support and qualification programme

3.1 Organisational structure and cooperation in the postgraduate programme

The programme provides an advanced training programme for PhD students and aims at shortening and internationalising the doctoral phase, the promotion of academic independence, and the supervision under binding conditions. The students will be integrated into the interdisciplinary networks of the *Centre for Interdisciplinary Africa Studies (Zentrum für interdisziplinäre Afrikaforschung – ZIAF)* at the Goethe University of Frankfurt. The following integrative elements are provided:

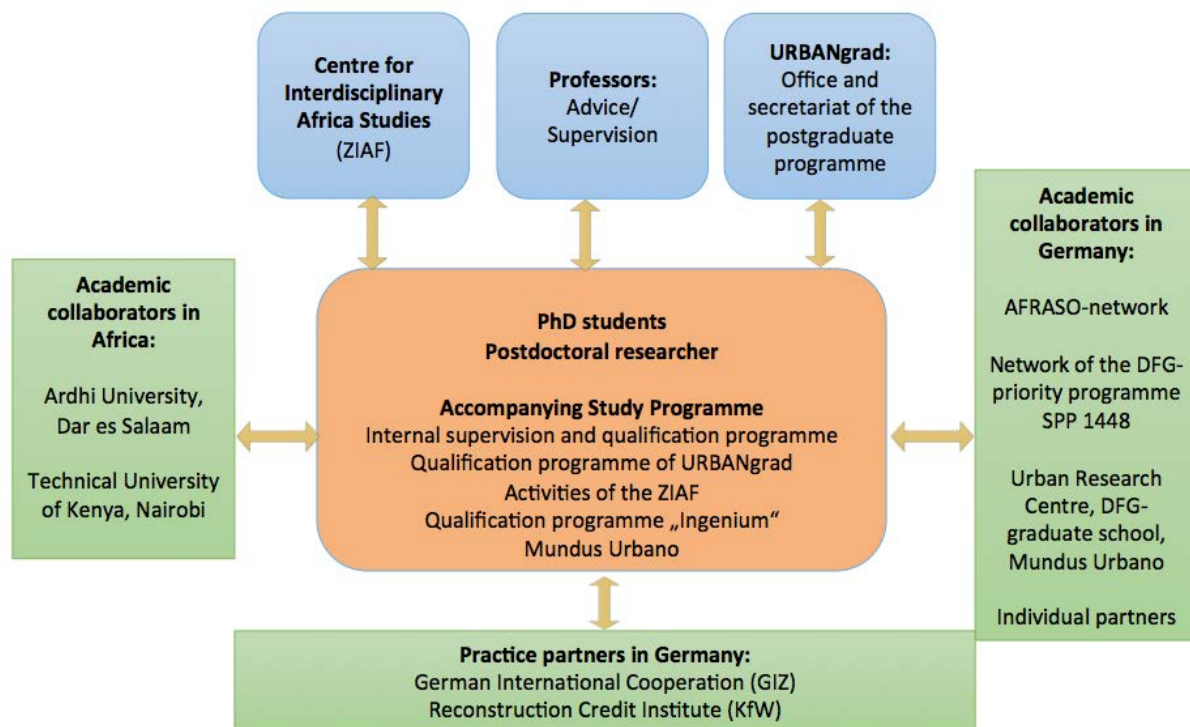
- * Academic coordination and management by the programme director and the supervisors;
- * Co-supervision, advice and administrative coordination by a postdoc;
- * Compulsory attendance of the PhD students and common workplaces at the URBANgrad premises;
- * Weekly seminars within the framework of URBANgrad;
- * Common activities with the postgraduate programme “Topology of Technology” (2014-15);
- * Two-day workshops of the entire programme (twice per year);
- * Integration into the qualification programmes of URBANgrad and the TU Darmstadt (*Ingenium*);
- * Research on the same cities and related topics (establishment of a literature databank, common local collaborators, common field trips).

3.2 Doctoral and vocational teaching and study programme

During the academic semesters the PhD fellows will regularly present the progress of their theses for discussion in a weekly *URBANgrad seminar*. In addition, they will be provided with insights into relevant occupational fields through workshops with partners from practical expert fields. The programme will hold a mandatory two-day *closed workshop* twice a year with all

the members of the programme, in which the progress of the individual theses will be discussed and general research topics will be covered in depth. Students will also participate in the TU Darmstadt's *qualification programme for PhD students "Ingenium"*, which will be supplemented by *specific further training in collaboration with the ZIAF*. Two seminars together with experts from the German international Cooperation (*Deutsche Gesellschaft für Internationale Zusammenarbeit – GIZ*) will give the students insights into career perspectives outside the academy.

Figure: Organisational structure of the postgraduate programme



3.3 Integration of the programme into the university environment and university teaching

TU Darmstadt offers a wide range of large interdisciplinary research networks and postgraduate programmes in the humanities, social sciences and engineering; which have a long tradition and a rich environment in both urban and technology studies. Accordingly, the TU Darmstadt's regulations explicitly allow for interdisciplinary PhD projects. The students will be directly integrated into the following institutions through direct personal contacts of the participating university teachers:

- * The TU Darmstadt's fully funded research centre on urban research with its present 14 DFG-financed research projects and 33 participating university teachers
- * Graduate School for Urban Studies "URBANgrad"
- * Centre for Interdisciplinary Africa Studies at the Goethe University of Frankfurt
- * Network of the DFG Priority Programme 1448 "Creativity and Adaptation in Africa"
- * Postgraduate programme "Topology of Technology" (DFG 1343)
- * AFRASO – "Africa's Asian Options". BMBF-funded collaborative project with 16 sub-projects on African-Asian relationships at the Goethe University.

In addition, students can use the personnel network – and participate in the course’s activities – of the TU Darmstadt’s programme “*Mundus Urbano – M.Sc. in International Cooperation and Urban Development*”, which is part of the European Erasmus Mundus programme and is dedicated to urban development in the global South. In this way the students can gather experience in independent academic teaching and the supervising of Master theses.

3.4 Cooperation with partners from academia and field experts

The PhD fellows and the postdoc will jointly organise a *lecture series* at the *Centre for Interdisciplinary African Studies*, to which renowned academic experts from urban research and social studies of technology in the global South will be invited. Their contributions will subsequently be published. The programme will also be integrated into a network of partners *from academia and practice* in Germany and in the countries studied. Numerous partners have signalled their willingness to collaborate with the programme and guaranteed the applicants that they will provide a provide a critical and supportive role to the PhD projects, arrange contacts to partners from academia and practice in the countries studied, offer support in obtaining field access and advise the students in the planning of their professional careers.

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