Call for Presentations

Urban Infrastructures: Criticality, Vulnerability and Protection

International Conference
Technische Universität Darmstadt
7th - 8th February 2019

Deadline CfP: 15th July 2018

TECHNISCHE
UNIVERSITÄT
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Concept of the Conference

Cities are the major sites and physical nodes in the infrastructurally mediated flows of water, energy, waste, communication, people, goods and services. Networked infrastructures have become increasingly critical for urban life. Their smooth operation is a prerequisite for the well-being of urban populations, and for economic prosperity and political stability in our cities.

However, their smooth functioning is not a given. Due to their complexity, interconnectedness and strong interdependency, these systems are highly vulnerable. The failure of a subsystem can cause serious cascading malfunctions within and across the system boundaries. A long power outage in a city can result, e.g., in the malfunction of water supply and wastewater disposal, and the breakdown of traffic flows and telecommunications, which in turn can have severe economic consequences and result in the failure of emergency and safety systems.

Obviously, there is a need for protecting critical infrastructures (CIs), taking into account their specific characteristics as socio-technical systems and their embeddedness in urban space. Besides engineering perspectives, the social sciences and the humanities are needed in order to assess the challenges and requirements of CI protection. Since 2016, the Research Training Group KRITIS at the Technische Universität Darmstadt has been carrying out multidisciplinary research on this topic. Its programme is based on concepts from Science and Technology Studies (STS), considering the interrelatedness of social/human and technical/material factors. In particular, protection strategies should be developed or assessed that take into consideration the criticality, vulnerability, and resilience of critical infrastructures in their interrelatedness and their embeddedness with urban space.

In its first international conference, the Research Training Group will bring together civil engineers, computer scientists, urban and spatial planners, architects, sociologists, political scientists, historians and philosophers as well as practitioners from public administration and operators of critical infrastructures.

The aim of the conference is to elucidate five different perspectives on urban CI protection in multidisciplinary panels. These perspectives are: Governance, Spatiality, Temporality, Safety and Security, and ICT solutions in emergency management.

Each panel will consist of invited speakers from the Research Training Group as well as from abroad. Additionally, there will be three keynote lectures by internationally renowned scholars, namely

Per Högselius (KTH Royal Institute of Technology Stockholm)
Christoph Lamers (State Fire Service Institute North Rhine Westphalia)
Stephen J. Collier (Graduate Program in International Affairs, The New School, USA, tbc.).

The conference will be held in English.

Conference Panels

Information for Applicants

- Each panel lasts 90 minutes
- Each talk should be no longer than 15 minutes.
- Please submit an abstract of your presentation (max. 2,000 characters/max. 280 words)
- Please add a short CV
- Send your application to conference@kritis.tu-darmstadt.de by 15th July 2018

Governance
Panel Chair: Jochen Monstadt
Faced by various external threats as well as the risk of multi-infrastructural collapse, urban infrastructures have become a key priority in the academic and policy debates on critical infrastructure protection. However, preventing various infrastructural failures from happening, and preparing for them in case they do, entails unusual governance complexities: often, the urban governance of CIs overarches different, often fragmented, policy domains and territories, and institutionally unbundled utility (sub-)domains. Preventing infrastructural breakdowns and preparing for them is not usually based on experience from past events, but on destructive scenarios of cascading failures, and involves considerable uncertainty and contestations among local decision-makers. In many cases, generally accepted institutions, procedural norms, and organizational capacities that could guide urban policy-making, the practices of utility companies and local crisis management are still missing. This panel welcomes theoretical and/or empirical contributions that address the "wicked" governance challenges involved in protecting urban infrastructures and in making them more resilient.

Spatiality
Panel Chair: Sybille Frank
The conceptualisation and material design of urban infrastructures has always relied on (mostly tacit) knowledge about space. If we look at infrastructures, their design allows us insights into the underlying spatial thinking. Space imagined as a territory allows us to conceive of infrastructures as fixed and bounded territorial units that adjoin each other and that may create an incompatible 'outside'. A relational way of thinking urban infrastructures allows us to grasp alignment processes as

constituents of spaces themselves. With the concept of a relational space, infrastructures come into the focus as complex arrangements of material needs, scientific possibilities and social aspects: they influence actions by constantly relating past decisions and future opportunities to each other. Last but not least, space in urban infrastructure may be thought of as a potentially (de)centralized network in which mobile subjects, objects, ideas, data, images, etc. circulate, thereby linking the material and immaterial facets of cities. We welcome theoretical or empirical contributions which investigate the implications and consequences of how space is conceptualized in infrastructure research.

Temporality
Panel Chair: Jens Ivo Engels

Temporality is an important factor regarding the functionality of infrastructures. There are several dimensions in which time has to be taken into account. First, time may be considered as a context. External effects, such as social and cultural, technical and economic, political and ideological circumstances in a given time period shape the design and the operation of a system. These features remain inscribed into the system's materiality, sometimes for decades or centuries. However, changing conditions may change the system – suddenly by the impact of critical event such as a catastrophe, or gradually by social change. Second, a system's technical features create specific time regimes. These can be the result of the network character of a technical system, including interdependencies and corresponding cascading effects. In the case of transportation, timetables may be required in order to guarantee connectedness and the flow of traffic. In order to facilitate cross-disciplinary discussions among the participants, we plan to focus on one system, namely transportation. Furthermore, we will privilege historical dimensions. Explicitly, we include very recent contemporary history, which might be of interest to practitioners, as well as long-term perspectives. Although "time as context" will be of prime importance, research and reflections on "time regimes" are also highly welcome.

Safety and Security
Panel Chair: Uwe Rüppel

Due to the complexity of critical infrastructure systems and the importance of their reliable functioning for society it becomes necessary to pay prime attention to the safety and security of said networks. This includes, on the one hand, approaches or methods aimed at addressing individual infrastructures, such as disruption management strategies and other backup solutions. On the other hand it also takes into account how safety and security gain further relevance across closely coupled systems, for example the relevance of the emergency services during larger infrastructural breakdowns. In order to identify current weaknesses and improve existing procedures we are interested in approaches that analyse the interdependencies at hand. The object of discussion is to be centred on mitigation options in planning, technical solutions for problems encountered when dealing with critical infrastructures as well as concepts for these networked systems in regard to their safety and security. Furthermore, we are interested in case studies that contain insights pertaining to relevant fields such as the criticality and vulnerability of said systems.

ICT solutions in emergency management
Panel Chair: Matthias Hollick

Currently, cities find themselves in a transformation process towards *digital cities* (or *smart cities*), to sustain the ever-increasing needs in urban infrastructure. Despite their vulnerability, the functioning of ICT-based infrastructures during times of crises has only been investigated superficially. We expect that digital cities will grow organically, resulting in a very heterogeneous, amorphous, and unstructured set of ICT. In this setting, the concept of *"Emergency Responsive Digital Cities"* refers to the capability of future digital cities to adapt autonomously to arbitrary crisis situations. Such cities can

sustain basic ICT operation during times of crisis, supporting efforts to deal cooperatively with the crisis and allowing a return to normal and efficient operation as smoothly as possible.
The panel will critically discuss the role of ICT in digital cities' emergency preparedness. It will identify open research questions and present selected solutions. We solicit contributions on making digital cities resilient, from both an academic and a practical perspective.

Contact

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