Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences
Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

<table>
<thead>
<tr>
<th>Personal information</th>
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<tbody>
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<tr>
<th>Studio</th>
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<tr>
<td>Name / Theme</td>
<td>Urban Fabrics – Automated Mobility</td>
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| Teachers / tutors | Marco Lub (1st mentor)  
Ulf Hackauf (2nd mentor) |
| Argumentation of choice of the studio | The studio urban fabrics is concerned with the physical forms of urban areas. Also, it focuses on the relationships between urban forms and social processes. Within different contexts the relationships between the tangible and intangible structures will be elaborated.  
This year the studio focuses on the topic Automated Mobility. Exploring the possible impact of technological and societal innovations on the built environment will be key.  
Scenario’s will be used to inventory and analyse the different impacts. The focus area of this studio is the Amsterdam Metropolitan Area (Msc3/4 Semesterbook, 2018).  
The project focuses on the impact of automated mobility on urban health. Due to the ease and comfort of automated mobility it is to be expected that the amount of cars and the frequency of travels will increase. Exploring the possible impact on the built environment and intangible subjects like urban health and quality of life, this project aims to stimulate physical activity in residential neighbourhoods. |
This will be done because this physical activity comes under a great pressure by the new mobility technologies.

**Graduation project**

| Title of the graduation project | Active neighbourhoods  
A research and design project investigating the impact of automated mobility on physical activity patterns in residential neighbourhoods in the AMA |

**Goal**

| Location: | Almere (Almere Haven and Almere Stad) |

The posed problem, research questions and design assignment in which these result.

This project discusses two main problem fields, which are in a way connected to each other. On the one hand the sedentary lifestyles in many industrialised countries, which causes 1.9 million deaths a year. Easy executable and moderate forms of physical activity, like walking and bicycling, can already contribute to a healthier lifestyle. It reduces the chances of getting non-communicable diseases like obesity, heart diseases, diabetes (type 1), some cancers, anxiety, depression, and so on (Frank & Engelke, 2001). On the other hand, the sub-urban development is discussed. Suburban development causes a population level reliance on car use every day. This imposed reliance on cars causes low physical activity levels in a lot of sub-urban residential neighbourhoods among many industrialized countries (Badland & Schofield, 2005).

These trends on itself causes already a lot of problems, however with the introduction of the automated mobility there is a threat that this problem even gets bigger. Due to the attractiveness of the new motorized transport modes in terms of costs, travel time (value of time) and the opportunities to work or relax in their cars, the share of cycling and walking can decrease (Arcadis, 2018; Stead et al., 2018). Due to the new comfort and ease, people are willing to travel longer, and the frequency of trips might increase (Stead et al., 2018). This can lead to more urban sprawl and an even bigger reliance on the car. The general idea is that automated vehicles lead to higher pressure on the road network. The increase in vehicle kilometres can be explained by a changing modality choice among users. Automated vehicles make mobility more accessible to a wider audience as a result of expected lower costs, with longer distances being covered. Leading to more and more vehicles driving around (Arcadis, 2018).

Impact of automated mobility on active transport might be for example a decrease of the use of public transport because automated mobility will be more time efficient,
leading to less active travels towards the public transport stations. Besides, people do not have to walk to their car anymore if the automated vehicles can pick you up wherever you like, whenever you like. This pick-up and drop-off system will cover a lot of space, which leaves little or no space for pedestrians or cyclists. Also, it might be needed to separate roads to reduce disruption of the autonomous vehicle flow. This leads to less accessibility for pedestrians and cyclists (Stead et al., 2018).

The scope of this project is narrowed down to residential neighbourhoods, since the largest part of our society lives in residential neighbourhood and the car dependency is here the highest. Therefore, two areas in Almere are selected, because inhabitants in Almere commute a lot. Also, the choice for active mode of transport is very low in Almere.

Since we are dealing with a problem which might occur in the future, there is a challenge to stimulate physical activity, while automated mobility is posing a threat on the physical activity patterns in residential neighbourhoods.

Where the rise of industry and mobility in the nineteenth century, had a negative impact on the health of society (pollution, physical inactivity due to greater distances and convenience), new technologies might be a catalyst for health. A new chance? The hypothesis of this project is: the implementation of automated mobility can contribute in stimulating physical activity, to improve liveability, urban health and the quality of life in residential neighbourhoods. The aim of this project is to stimulate physical activity to improve urban health and the quality of life in residential neighbourhoods, by using automated mobility as catalyst.

This has led to the main research question:

“**How can the implementation of automated mobility contribute to stimulating physical activity, to improve urban health and the quality of life, in residential neighbourhoods in the AMA?**”

To come to a design a few sub-research questions need to be answered. The sub-research questions are divided into 6 themes. The themes are Situation, Methods, Physical activity, Residential neighbourhoods, Automated mobility, and Context & Design.
The intended outcome of this project are multi-scenario urban designs, with design interventions and strategies, for two residential neighbourhoods in the AMA. This will be done during several stages in time, because, outcomes will differ from when the automated mobility will be fully implemented or when we are still in a transition period.

**Process**

**Method description**

Since this project is concerned with the topic automated mobility is and the impact of it on the quality of life and urban health, the research type is a predictive one. Automated mobility is still in an early stage, it is uncertain what will happen in the future.

The project aims to find a balance between automated mobility patterns and physical activity patterns. This will be done by developing urban regeneration strategies, guidelines and design interventions for residential neighbourhoods in the AMA to improve the urban health and the quality of life. This will be achieved by using scenario planning as main method. Scenario planning takes into account a range of possible futures which includes its uncertainties as a whole (Peterson, Cumming, & Carpenter, 2003).

In this project a few scenarios will be constructed which will serve as guiding framework for the rest of the project. Within different themes, for example technology, culture & attitude, and accessibility determinants for the scenario will be set. Using predictions, knowledge and assumptions the scenario(s) will be constructed. The constructed scenarios will form the heart of the project, to deal with an unpredictable future.

When the impact of the scenarios, of automated mobility, on the residential neighbourhood is clear and the impact is analysed, design interventions can be tested. When the scenario in combination with a certain set of design interventions result in the right balance between mobility patterns and activity patterns, an active neighbourhood can be created.

The research strategy for this project is research by design. Research by design will be used because designing can in a critical way, by exploring different perspectives and insights, to investigate various impacts of automated mobility on two specific residential...
neighbourhoods. Going back and forward between the design, the design interventions and the scenarios will be an ongoing process of this project.

**Literature and general practical preference**

To understand complex and uncertain futures, scenario planning is used as a systemic method. Scenario planning takes into account a range of possible futures which includes its uncertainties as a whole (Peterson et al., 2003). In this project a few scenarios will be constructed which inform on the development of automated mobility. Within different themes, for example technology, culture & attitude, and accessibility determinants for the scenario will be set. Using predictions, knowledge and assumptions the scenario(s), which will be used during the whole project, will be constructed. Scenario theories and methods are researched. Besides, existing scenario constructors are studied. Scenario constructors for automated mobility were often limited to only two scenario determinants and did not focus on the aspect of health. Therefore, a specific scenario constructor is developed for this project. It focuses on the manifestation of automated mobility in the future, the impact on health and therefore activity patterns stand out in the scenario constructor.

Besides the scenario construction also case studies are important in this project. Case studies can be used for understanding new or existing processes on behaviours. During this project case studies will be used to learn from physical activity stimulating environments that already exist, addressing the knowledge gap between urban planning and urban health. Also, case studies of the implementation of automated mobility will be used, however there are not a lot of these available (yet).

Finally, pattern and travel behaviour analyses will be done during this project. The new mobility and activity patterns will be mapped. This will be done for the different scenarios which are created. The new patterns will be compared with existing patterns, which are gained from data of the municipality of Almere.

**Reflection**

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?
Urban planners in the 21st century have to integrate socio-cultural, economic and political perspectives. Besides they are dealing with the natural conditions on site. The purpose is to shape and manage the process of urban development. In this, local trends and global developments, have to be taken into account. Today’s urban world is more challenging than ever (Msc3/4 Semesterbook, 2018).

This project will be executed within the studio Urban fabrics. The studio urban fabrics is concerned with the physical forms of urban areas. Also, it focuses on the relationships between urban forms and social processes. Within different contexts the relationships between the tangible and intangible structures will be elaborated.

This year the studio focuses on the topic Automated Mobility. Exploring the possible impact of technological and societal innovations on the built environment will be key. Scenario’s will be used to inventory and analyse the different impacts. The focus area of this studio is the Amsterdam Metropolitan Area (Msc3/4 Semesterbook, 2018).

Due to the ease and comfort of automated mobility it is to be expected that the amount of cars and the frequency of travels will increase. Exploring the possible impact on the built environment and intangible subjects like urban health and quality of life, this project aims to stimulate physical activity in residential neighbourhoods. This will be done because this physical activity comes under a great pressure by the new mobility technologies.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

Scientific
This project tries to tackle two knowledge gaps to contribute to the scientific body of knowledge. The first gap addresses how to plan/design healthier cities/neighbourhoods. Still, there is not enough knowledge about ‘how much’ and ‘what types’ of infrastructure and other design elements are needed to support urban health. Therefore, this project will search for a set of design interventions, for different neighbourhoods, which will guide urban planners and designers to improve health and behaviour (Koohsari, Badland, & Giles-Corti, 2013).

The second knowledge gap concerns the impact of automated mobility on our cities and societies. Automated mobility is still in an early stage. It is uncertain what will
happen on the long term, depending on the pace of technology development and the response of the market (European Commission, 2018). It is therefore important that research will be done now, to inventory possible impacts and develop strategies and design interventions which can respond to those impacts. In this way cities can adapt (slowly) to the rapid developing technologies.

Social

On a social level the project contributes to healthier and therefore more sustainable cities. By promoting active ways of transport physical exercise can be increased. The chance of getting several physical health related problems like heart disease, diabetes, obesity, and some cancers, will decrease (Guthold, Stevens, Riley, & Bull, 2018). Besides, the travel behaviour of a community influences also the human interaction levels in public places and streets which helps to build communities and enhance the quality of life (Hoehner, Brennan, Brownson, Handy, & Killingsworth, 2003).

References


