Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

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

Personal information		
Name	**Rutger Roodt**	
Student number	4229088 (wordt gebruikt voor koppeling met student file)	
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Studio		
Name / Theme	**Hyperbody / Non-standard, virtual and interactive architectures**	
Teachers	Nimish Biloria, Henriette Bier	
Argumentation of choice of the studio	**Investigate & master the use of parametric and computational tools for creating informed, non-standard architecture**	
Graduation project		
Title of the graduation project	Floating 'Incubating Community' Rotterdam	
Goal		
Location:		Merwe-Vierhavens Rotterdam
The posed problem,		Merwe-Vierhavens is a harbor area with lots of old industrial buildings that will become empty in the near future. The same goes for the harbors themselves. To be able to transform the entire region, there should be an attracting factor economic growth and prosperity. Simple top-down methods are a less than guaranteed way of directing economic value, it could rather be more effective to achieve an increase of knowledge in one concentrated place that can have a bottom-up effect on the entire area. This project will investigate the complex systems that lie at the core of the flow of knowledge and looks specifically on how to create dynamic and interactive morphologies that can inform the economics in society. This investigation contains the

	architectural implementation of adaptive multi agent systems based on the flow of knowledge and how architecture can adapt to these constantly changing circumstances and the technical abilities. Complex algorithms are all about complexity through networks. One simple cell can be part of a super complex network. The way these financial algorithms work is making one big transfer but first splitting it up in millions of little transactions. Can the same be done to create dynamic systems in architecture? Could we be able to take one big building and splitting it up in little cells of agents, and let the connections of those agents generate the complexity for the whole?
research questions and	Main question: How can a building be designed to actively participate in the flow of knowledge and adapt to the change of flow over time? Scientific-theoretical question: What are complex systems or complexity science and how can it inform architecture to be adaptable to changing requirements and growth? Computational question: Why is complexity science and agent-based modeling beneficial for the creation of intelligent and adaptable architectures? Conceptual-design question: In what way can complexity science and computational techniques be translated in order to create intelligent and adaptable architecture designs?
design assignment in which these result.	The case location, Merwe-Vierhavens has a number of distinct features like the partly empty Marconi towers by

	SOM architects on the site as well as some significant nearby locations like the RDM campus across the river and the Erasmus MC to the east. Also, the recently created Climate Campus initiative will be situated in this area. Being a port area, the water is also a fundamental feature in the area at hand. The design will relate to these external connections and incorporate parts of the Climate campus. The goal for this design is to use computational methods and complexity science in order to understand the interconnecting relations. Through analysis of parametric models, simulations and generative formations, the design alternatives can be evaluated so that the final design can gain a higher level of intelligence. Making use of the water in the harbor area as foundation, new possibilities for dynamic solutions can add another level of intelligence to the design process and the final building design.

This should be formulated in such a way that the graduation project can answer these questions.
The definition of the problem has to be significant to a clearly defined area of research and design.

Process

Method description

Complexity science and computational techniques will be used to create simulations for water, wind and other important elements from that area. Multi-agent system simulations will be used to inform the main relations and functions within the building and, along with path simulations, determine the core and interface of the project as well as the proposed relations and probable flow of knowledge. Computational design tools like Rhino and Grasshopper will help to translate these inputs of information into a unified architectural concept. Along with these computational design tools, diagrams, sketches and model making can also help during the design process to visualize thoughts and ideas, and to show them to explain my process.

Literature and general practical preference

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The literature (theories or research data) and general practical experience/precedent you intend to consult.

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- PICKERING, A. 2004. *The Science of the Unknowable: Stafford Beer's Cybernetic Informatics,* Medford, NJ, Information Today, Inc.
- SLAVIN, K. 2011. How algorithms shape our world. TED Talks.
- MOREL, Ph. A few Remarks on the politics of 'radical computation'
- LATOUR, B.; YANEVA, A. 2008. *Donnez-moi un fusil et je ferai bouger tous les bâtiments: le point de vue d'une fourmi sur l'architecture*, Basel, Birkhäuser. Pp.80-89
- ALEXANDER, C. 2004. The Luminous Ground: An Essay on the Art of Building and the Nature of the Universe, Center for Environmental Structure.
- BILORIA, N. 2012. Interactive morphologies: An investigation into integrated nodal networks and embedded computation processes for developing real-time responsive spatial systems
- LYNN, G. 1999. *Animate Form*, New York, NY, Princeton Architectural Press.

Reflection

Relevance

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The value of the graduation project in the larger social and scientific framework.

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This project will try to generate an architectural typology that is adaptable over time based on parametric systems and informed by computational simulations. It will try to use its water environment and floating behavior in intelligent ways like energy production and a high degree of flexibility. This could set a precedent for new intelligent buildings and future water-based societies.

Time planning

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A scheme of the division of the workload of the graduation project in the 42-week timeframe. Compulsory in this scheme are the examinations at the middle and end of the semester, if required, the minors you intend taking and possible exams that have to be retaken. The submitted graduation contract might be rejected if the planning is unrealistic

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1. **Introduction**

2. **General Analysis - Group / Deadline History Thesis**
3. **Socio-Economic Analysis - Group**
4. **Socio-Economic Analysis - Group**
5. **Socio-Economic Analysis - Group**
6. **Workshop: Scalable Porosity - Group**
7. **Workshop: Scalable Porosity - Group / Research Methods Discussion**
8. **Workshop: Scalable Porosity - Group**
9. **P1: Midterm Presentation - Group**
10. **Exam Period**
11. **Personal Proposal / 3C Conference**
12. **Finishing Socio-Economic Analysis – Group**
13. **Workshop Informed Computational Form-Finding**
14. **Workshop Informed Computational Form-Finding**
15. **Personal Analysis / Deadline Media Studies Paper Abstract**
16. **Parametric System Experimentation**
17. **Vacation**
18. **Vacation**
19. **Multi-Agent System Design / Computational Analysation**
20. **Form Finding & Graduation Plan**
21. **Final Preperation & P2: Final Presentation**
22. **Exam Period / Deadline Media Studies Paper**
23. **Vacation**
24. **Multi-Agent System Design & System Integration**
25. **Multi-Agent System Design & System Integration**
26. **Multi-Agent System Design & System Integration**
27. **Multi-Agent System Design & System Integration**
28. **Multi-Agent System Design & System Integration**
29. **Urban Plan**
30. **Urban Plan & Architectural Design**
31. **Architectural Design**
32. **Architectural Design & Structural Design**
33. **P3: Midterm Presentation**
34. **Architectural Design & Structural Design**
35. **Architectural Design & Structural Design**
36. **Architectural Design & Model Making**
37. **Architectural Design & Model Making**
38. **P4: Go | No Go Presentation**
39. **Finalizing**
40. **Finalizing**
41. **Finalizing**
42. **P5: Final Graduation Presentation**