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:

Personal information	
Name	Jinlai Song
Student number	5577381

Studio		
Name / Theme	Transitional Territories	
Main mentor	Nikos Katsikis	Urban design, Urbanization theory, Territorial design, Geospatial analysis
Second mentor	Daniele Cannatella	Urban development, Vulnerability, Urban Data, Landscape Design
Argumentation of choice of the studio	Land, river and ocean grounds, which define the urban as a material and socio-ecological space. But recent news covering wildfire, flood risk, sea level rise and other disasters happens frequently bringing us a more profoundly participatory understanding of humanity's relationship to the natural world. Facing and motivated by the news about forest blaze and geological hazard in China in the summer of 2022, my starting point would like to focus on how to improve natural resilience and restoration ability through design practice. Moreover, the negative externality from construction of built environment is a serious intervention and transformation of natural fabric. So that the consideration of the threatened socio-ecological balance and redefinition of human needs are necessary in compensating consumes. The studio of Transitional Territories believes that the territory is a shared project wherein the urban always co-constructs with nature. The topics of the studio are highly related to natural materials and spatial externality which help shape present and future life. Then, the studio focus on the design of alternative forms of coexistence and care in highly dynamic geographies characterized by fragility, criticality and risk. The research trajectory of studio starts from defining the subject/object of the project and	

	positioning, and then, lands in actions which presents a dynamic, time-sensitive understanding of spatial transformation that helps to clarify the interconnected and changeable nature of the underlying processes. In this case, I believe my interested thesis topics and research trajectory will be supported by these serious concerns of Transitional Territories studio.

Graduation project	
Title of the graduation project	Toward Wildfire Alternatives: Mitigating Wildfire Risk Through Landscape-Based Resilience
Goal	
Location:	• Mediterranean Basin (analytical scale) • Selected landscape-based fire scenario regions (analytical and design scale)
The posed problem,	Historically, wildfire are widely reviewed as key inputs to Mediterranean ecosystems by stimulating regeneration, where humans and fire can form a co-evolving system. But current alterations, mostly anthropogenic factors, have led to strong changes in fire regimes. These trends indicate longer and more intense heat and drought with rising frequency of unprecedented wildfire occurrence which has already converted wildfire into a major landscape disturbance factor in the Mediterranean basin. The burning cycle leads to large burned areas invading from forest to non-forest surface with species dispersing, losses of human life and property, damaged infrastructure, and destroyed ecosystems, etc. Although such catastrophic events have been apparent and partly-solved for some time, contemporary wildfire management policies in Mediterranean climate regions have continued to focus almost entirely on short-sighted fire suppression-led reaction. They are seeking to minimize burned area in the short-term during the crisis-happening phase, treats fire as delivering negative impacts, and react to public opinion with ever-expanding investment in firefighting capacity, while failing to adequately and proactively address the underlying causes of the problem. The high urbanization rate of most bordering countries in Mediterranean Basin, coupled with a widely known sensitivity to natural hazard, the persistence of old agricultural practices, and the diversity of ecosystems form a high and local complex heterogeneity landmark ensemble. Events such as political instability also quickly modify human–

	environment balances with large-scale spatial implications. The paradigm shift and pragmatist approach are urgently needed when confronted with the demand to coexist with wildfire in Mediterranean Basin where is a privileged area for a broad scale study and for observing and understanding interactions between landscape dynamics and wildfire risk constructs. The potential approaches then in reducing territorial vulnerability and facilitating adaptation of wildfire can be formulated in a holistic perspective through pyrogeography considering both ecosystem and socioeconomic aspects.
research questions and	**Research question** • How to facilitate territorial adaptation and resilience to wildfire risk by establishing the landscape-based fire scenarios in Mediterranean Basin? **Sub-research questions** • What are driving forces of wildfire regimes and how can they reshape and transform our territories? • How to identify and characterize the landscape dynamics in the Mediterranean Basin? • What are the socioeconomic and cultural values of these fire scenarios? • How to develop adaptive and resilient strategies based on landscape-based fire scenarios? • How these scenarios and strategies are applied in a multi-scalar way (from Mediterranean to community scale) ?
design assignment in which these result.	**Design aim** The aims of thesis is to establish the spatial differentiation of the structural and dynamic characteristics of a land area in relation to fire behavior. The main outcome is a set of homogeneous areas of landscape/fire interaction (atlas) providing a context specific and landscape-based approach for assessing and interpreting the effects of ecological and socioeconomic factors on fire behavior. This connection between landscape structure and dynamics and fire behavior is essential to move from the current fire management systems based on fire suppression tactics to a more strategical and pro-active fire management approach. I n this case, the final outcome is to apply these approaches on exemplary regional/local scale and build the future visions. This leads to new "fire-scapes" and new forms of resilience that can also change the layers and materials in

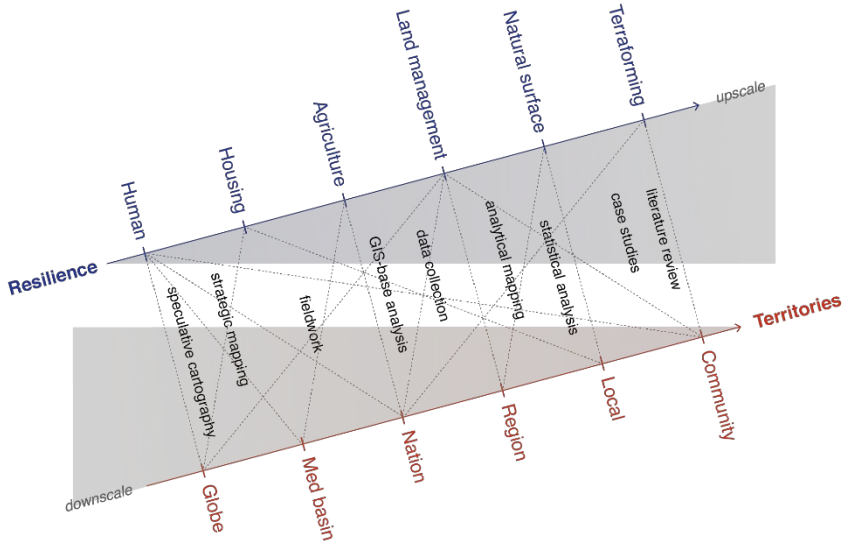
	the landscape in order to create an integral long time design. **Design field** • wildland ecosystem: promote fast post-fire recovery and regeneration with ecological, economic, therapeutic and aesthetic values • fire risk infrastructure: identify the limitation of the suppression-led fire risk approaches and retool the existing fire risk infrastructure • agricultural management: re-activate the agro-silvo-pastoral activities in close contact with the land, to promote regenerative practices and to support local breeds • suburban society: support local communities mostly in the interface areas of wildland and urban, booster local traditions in association with wildfire harness • urban fringe well-being economies: catalyze the com-back of new residents in the rural villages as economic drivers and update social platforms for better quality of life within the aging population groups • cultural agency: re-integrate of fire as a necessary ecological and cultural process into the Med landscapes **Design outcomes** • Atlas of landscape-based fire scenarios: The atlas in the broad scale of Mediterranean Basin shows the interaction between fire regimes and landscape dynamics, including meteorological, physiographic, biological and anthropogenic indicators that dedicate to form fire susceptibility typologies. The result of analytical and diagnostic atlas can be used as a decision support tool for spatial planning and wildfire risk management. • Toolkits of landscape-based fire management: The potential toolkits are the set of landscape-based fire management solutions. They are based on landscape typologies definition and follow the components of disaster risk management cycle (prevention, mitigation, preparedness, response, recovery). Each of them represents strategy on a larger scale and then guide the specific design practice on regional and local scale. • Specific design of key locations:

	Key locations are selected from the new definition of fire scenarios with dominant factors. These design practices reflect the application of fire management toolkits and promote the specific context design strategies of fire management.

Process

Method description

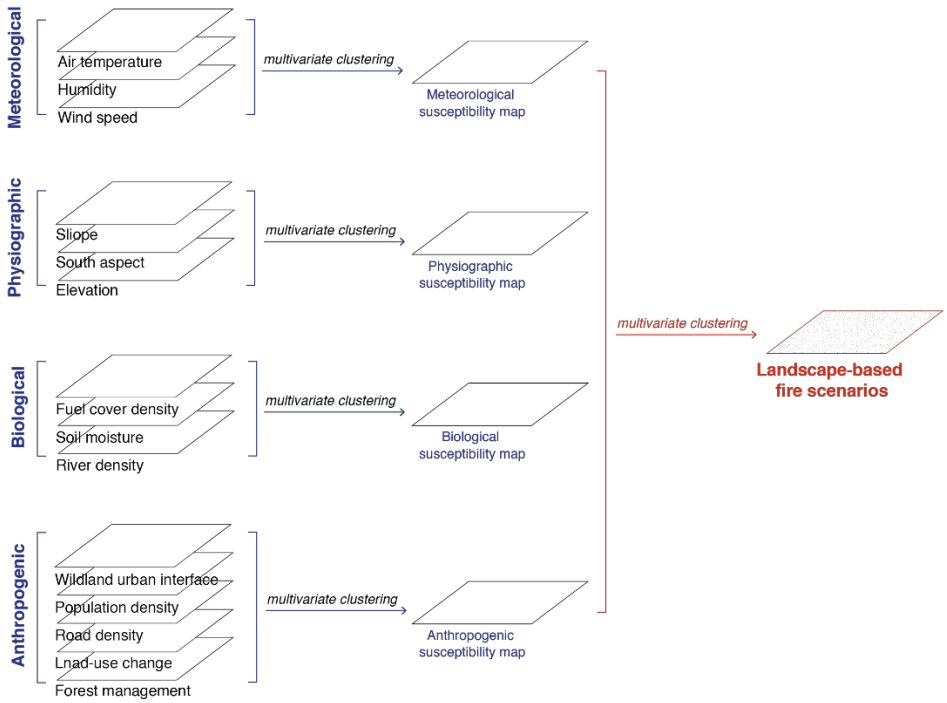
The methodology is about the bidirectional cooperation of territorial research and resilient design, varying and operating in multi scales. It integrates the down-scale territorial investigation and up-scale resilient intervention. The core of investigation lands mainly in the Mediterranean Basin scale in order to understand the interaction between fire regimes and landscape dynamic factors. Within this scale and path, the result goes to a set of landscape-based fire scenarios. Thus, the strategies in a comprehensive and macroscopic perspective are reflected in the toolkits aiming to these fire scenarios. It provides a systemic approach for analysing sites, developing place-based visions, supporting design processes and help monitor the state of fire risk. The design part locates in regional and local community scale. It bases and represents the clusters of fire scenarios, illustrating the application of toolkits and context-specific design strategies.



- Literature review
  1) Scientific discourse theories and concepts: pyrogeography, risk response, landscape character assessment, etc.;
  2) Reports and documents related to climate change, global disasters, European fire risks, fire risk management and policy, etc.;
  3) Design projects about fire adaptive and recovery practice.

- GIS-based and statistical analysis
  Considering fire scenarios as land-type units which are defined through the analysis and interpretation of various spatial factors, Geographic Information Systems (GIS) and statistical analysis (normalization, k-means clustering) were

the main techniques applied to process and obtain the information needed to identify area typologies of homogeneous fire scenarios.



- Analytical cartography
  The analytical cartography mainly contains the monographies (also called Lines of Inquiry) that structures a clear body commence the exploration. It is a deconstruction on the hand of the landscape of accumulation in four different themes: matter, topos, habitat, and geo-politics. This reinterpretation of material semantic systems through critical methodology shapes an important framework.

- Speculative cartography
  The cartography of speculative part is to apply the strategies from "toolkits" in a local scale and unfold a concrete strategy for the reconfiguration of the site based on the local context needs and limitations. It also includes the envisioning of new socio-spatial realities toward fire risk in a temporal scale.

Literature and general practical preference

Literature

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Research data

1. New European Wind Atlas
2. Copernicus
3. European Forest Institute
4. EEA geospatial data catalogue
5. EFFIS
6. Hydro SHEDS
7. CORINE Land Cover
8. BBN session (European forest management data)

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)?

The project is a deep exploration and reimagination about fire and landscape typologies, which is rooted in the physical geography and ecological characteristics of the earth's organisms, and this diversity also reflects the variability of terrestrial environmental functions. This perspective of territorial dynamics follows the studio topics closely which focus on the natural materials and spatial externality in a transitional process. Regarding the master track of urbanism and MSc AUBS program, the project regards wildfire as a negative object to elaborates various conflicts between its regimes, land-use and the living environment since the transformation of

the landscape by humans in the industrial era has largely obscured the diversity inherent. In this case, the role of an urbanist in such a setting is to challenge the spatial implications of territorial transitions and geopolitical interests that shape the land and to be critical of the ways human activities are integrated into new adaptive and resilient societal structures of peri-urban and natural areas.

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

Social

The object of fire has a big impact on a huge amount of land. The pressures imposed by the growing uncontrolled wildfire occurrences, in related with climatic stress, economic security and biodiversity loss etc. forced the national government to act toward new economic and ecological paradigms. In this case, landscape-based solutions help enlarge the scope of fire risk response and shift the paradigm from suppression-led attitude to a more strategical and pro-active fire management approach.

Scientific

This project is a start of research and design in urbanism for the topic of fire. Considering fire scenarios as land-type units which are defined through the analysis and interpretation of various spatial factors, Geographic Information Systems (GIS) and statistical analysis were the main techniques applied to process. Thus, this combination of spatial characterization, geo-data and statistics provides a new idea for analysing urban and landscape issues in a large scale.

Professional

In the future fire will be a more prominent part of the landscape due to the change in climate. Landscapes need to change in order to deal with this new force of nature. Multiple risks, including wildfire, are taken into account in long-term land use planning. In this change, urbanism and landscape architecture play a prominent role in designing new resilient landscapes and to prepare the society on a life with the fire.