MIDDLE EAST TECHNICAL UNIVERSITY
DEPARTMENT OF ARCHITECTURE

GRADUATE SEMINARS - ARCH504

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ARCH 504 Seminar in Thesis Research
Coordinators: Esin Kömez, İrem Hafız

10.15 – 10:40
Aslıhan Özen— Generative Urban Prototype to Decode City Squares with Big Data: Case Studies in Istanbul and Amsterdam
Supervisor: İpek Gürsel Dino
Jury: Funda Baş Bütüner, Olgu Çalışkan

The responsive city nowadays is considered as an assemblage of a large number of complex characteristics. Similar to cities, people's social behavior is a complex system. Big data as volumetric and dynamic urban phenomena play an important role in how to understand, interpret, and model urban environments. City models that learn from data are the best solution for architects, urban designers, and urban planners to integrate various information about urban complexity into the design process. This study outlines the concept of participatory urban design for future urban environments by linking public spaces with ever-changing contexts and human needs using the interactive urban prototype that adapts to various possible scenarios. In this framework, the hypothesis of the study is to create an urban space layout with social sensing. The thesis aims to reveal the characteristics of city squares and create a model that can learn the unique features of the squares in real-time to support transparent urban design processes that integrate big data-informed predictions. In order to achieve these goals of the research, the following questions were formulated. (1) How can we design that city if everyone's behavior is unexpected and complex? (2) Can we develop a design method that determines the characteristics of public spaces learned by urban data and social sensing? (3) Can city squares with different characteristics create their own creative and flexible design tools? The evidence-based urban design layout may be a potential model that can adapt to sustainable urban planning processes and respond to changing city conditions.

10:40 – 11:05
Gülin Yazıcıoğlu— From Streetscape to Data: Semantic Segmentation for the Prediction of Urban Microclimate Conditions
Supervisor: İpek Gürsel Dino
Jury: Funda Baş Bütüner, Olgu Çalışkan

In recent years, the increasing pace of urbanization is expected to increase the temperatures in urban contexts and amplify the Urban Heat Island effect. Urban forms, vegetation and surface materials have a drastic influence on urbanites 'thermal comfort in outdoor spaces. The quantification of UHI is important in design decision-making in urban contexts. Modeling and simulation-based approaches can precisely calculate urban microclimate effects; however, they are labor intensive and high in computational cost. Computer vision methods and regression models can help calculate the thermal conditions in urban spaces. This research addresses the question of how average universal thermal climate index (UTCI) on selected streets, Bağdat and Söğütlüçeşme street in Istanbul, can be predicted by analyzing semantic segmentation of their 360˚Google Street View (GSV) panoramic images. Preliminary explorations using 78 GSV panoramic images are used for semantic segmentation evaluation with a Cityscape dataset by using convolutional neural networks. Average UTCI values of each street are calculated using Ladybug / Grasshopper. Finally, a multivariate linear regression model that can predict average UTCI values from the images 'semantic segmentation results. Initial explorations indicate that the proposed model can predict UTCI with R2=0.66. Future work involves the improvement of the multivariate linear regression model and discusses the practice of climate-sensitive urban design.

11:05 – 11:30
Meliha İpek Erol Ağırsoy— Occupant Behavior Modeling in Sustainable Architectural Design
Supervisor: İpek Gürsel Dino
Jury: Koray Pekeriçli, Gülsu Ulukavak Harputlugil

Users who directly interact with the building are a significant parameter of the architectural design process. Occupant behavior is one of the users related driving factors for buildings and building design. The uncertainty in behavior is a variable parameter of sustainability in architecture. Human building interaction affects energy consumption and creates an unpredicted result for the building's calculated energy use. Building energy simulation (BES) is a fundamental tool to predict the energy use of a building. However, an inconsistency commonly occurs between predicted and measured energy consumption of a building. Occupant presence and behavior is one of the drivers of uncertainty in building performance. Multiple types of occupancy schedules were introduced to understand these occupant behaviors in building energy simulations. Static schedules are a primitive example of occupancy schedules that are not adequate to represent real-life behaviors. On the other hand, recently developed agent-based occupancy schedules involve spatial and temporal diversity. These schedules simulate the occupant's stochastic behavior and movement in buildings. This study explores the potentials of integrating agent-based occupancy schedules to building performance simulations and how it affects the inconsistency between predicted and measured energy use. An office case is studied to simulate energy consumption with different types of occupancy schedules. The aim is to create more consistent energy use predictions with agent-based occupancy schedules, which provide more accurate feedback for architects to consider energy consumption in the early design stages.

11:30 – 11:55

İsmet Berke Çakır— Generative Adversarial Networks in Daylighting Simulation Process: Alternative Models of Sustainable Architectural Design Workflow

Supervisor: İpek Gürsel Dino

Jury: Arzu Gönenç Sorguç, Sevil Yazıcı

Proper natural daylighting is important for architectural design due to the fundamental relationship of light and architectural space and the need for creating designs that use minimal amounts of energy by taking the natural environment into consideration. Building daylight simulations can quantify illuminance and luminance values of sensor points within a building or digital model of a building. However, the Building daylight simulation process is currently limited by its high level of expertise and the required amount of computational power. Machine learning techniques, specifically Generative Adversarial Network models lately have been used to find correlations between two sets of images, and then use that correlation to predict the pair of one type of image that has similar data distribution that the neural network has been trained on. This research proposes a new method using GAN that can translate architectural plans to paired daylight simulations using a pix2pix variant of Generative Adversarial Networks, which can yield fast results, bypassing the lengthy simulation process. Initial results of this GAN model have shown a 5% to 26% total pixel difference percentage error on predicting daylight simulations by only feeding a color-labeled architectural plan to the GAN model. This method makes the daylight simulation process both faster to iterate within the conceptual stage, therefore daylight simulation being integrated faster into the early stages of architectural design, and being accessible to an average architect via a simple interface.

11:55 – 12:20

Ezgi Erdemir— Recognition of Architectural Spaces and Methods for Reproduction of Familiar Environments in Virtual Worlds

Supervisor: İpek Gürsel Dino

Co-advisor: Elif Sürer

Jury: Arzu Gönenç Sorguç, Mine Özkar Kabakçıoğlu

Video games as interactive media have seen a boost in their production when new computer technologies started to reach end-user easily. As they provide a platform for escapist fantasies, the plots, settings, and places in games were shaped to meet these desires. When a user feels connected to an imaginary world via their virtual avatar, a phenomenon called immersion occurs. Immersion can be described as being completely absorbed in a make-believe world (Schmidt, 2007). An immersive world makes users engaged, and conveying this feeling can be strengthened with the way game environment is designed. This study analyzes key concepts such as immersion, persuasion, and presence in virtual environments, and searches for more approaches that can further develop these sensations. For instance, the ideas that are borrowed from architectural spaces can provide an answer to the question of how users ’perception and recognition shape according to given virtual space. Spatial cognition begins with understanding the language of surroundings. Architectural language uses visual patterns which increase the degree of familiarization with the environment. Procedurally generating architecture while using this language can help us create cities that are recognizable yet unfamiliar. The studies that are planned to be done in this thesis can become a tool in visualizing what-if scenarios of future cities.

12:20 – 12:45

Başak Çakmak— Hallucinating 3D-GANs: Machine Learning for Context Adapted Modelling

Supervisor: Zeynep Mennan

Jury: Haluk Zelef, Şule Taşlı Pektaş

Concepts such as hallucination, imagination, and dreaming have had an essential place in the visionary architectural studies of the 1960s. Nowadays, the study of these same concepts has shifted to the fields of neuroscience and computer science with interdisciplinary perspectives. Computer science reintroduces these concepts in the automation of generative processes, where artificial generative models are used for their imitation in the field of Artificial Intelligence (AI). Occupying an important place in recent architectural design practices in the human-machine interface, these AI systems are used as tools to inspire new design discourses and perspectives in architecture, expected to expand the human mind and imagination. This study aims at a reconsideration of visionary architecture with machine vision in the 21st century through an investigation of AI techniques used in architectural design. Artificial generative models learn the compressed representation of data for an understanding of underlying similarities and patterns. Meaningful or not, this representation allows for a semantic manipulation that aims to modify the semantics of the context instead of a direct modification of the real structure. This research investigates the premise of a Machine Learning (ML) model, which is generic in the sense that it can learn the architectural style in different contexts and at different abstraction levels, makes predictions and dreams about the evolution of an architectural design in the built environment. The envisioned ML model is being developed as an interdisciplinary project study that involves the METU, Faculty of Architecture for its data collection.

13:45 – 14:10

Ayşenur Onaran— The Production of Tactical Space within the Rural Spatial Practices of TOKİ: The Case of Yukarıköy

Supervisor: İnci Basa
Jury: Güven Arif Sargın, Zeki Kamil Ülkenli

My research aims to explore the power relations embedded in society by focusing on the intermingled dynamics of spatial production. The idea is to investigate the ways in which the state, private sector, and inhabitants get involved in the production of space; their methods of action and objectives. Drawing upon de Certeau's terms of strategy and tactic in order to decipher the reciprocal practices, I aim to analyze how space is built, represented, and used by different actors. I will focus on the spatial practices of a post-earthquake rural area in Turkey named Yukarıköy through the indirect interplays of the villagers and the Housing Development Administration of Turkey (T.C. Başbakanlık Toplu Konut İdaresi, hereafter TOKİ). While much has been written about TOKİ's works in cities as part of neoliberal urbanization projects, less has been said about its practices in rural areas. TOKİ is mostly criticized by although it was founded to fulfil citizens' need for housing, it ended up being an actor in the private sector with an ability to reach government resources. Without dismissing the differences in TOKİ's practices between urban and rural areas, I plan to present the active role of the people of Yukarıköy to the production of space in the aftermath of the earthquake. I argue that the analyzation of the production of space in Yukarıköy will reveal the villagers' conforming and/or countering everyday practices to becoming neoliberal subjects in the field of actions opened up by TOKİ.

14:10 – 14:35

Özge Süvari— Architecture in the Era of Anthropocene: Reading and Reclaiming Ecologies of Space through the Southeast Fringe of Ankara

Supervisor: İnci Basa
Jury: Güven Arif Sargın, Bülent Batuman

Anthropocene is a geological epoch proposed by chemist Paul Crutzen in 2000, arguing that increased human activity became a major global force. The concept gains academic and public attention upon rising concerns over climate change. The beginning of the Era marks the Industrial Revolution, which leads to mass production and consumption of energy sources, and therefore, the destruction of the planet's elemental cycles. One of the Anthropocene Era's biggest problems is a growing population and consumption, rapid urbanization, and deforestation as the outcome of construction. Scholars of urban political ecology (UPE), with similar concerns of environmental problems in an increasingly urban planet, discuss the socio-ecological transformations shaping nature through human labor, capital investments, and technology by using Marxist ideas such as metabolization of nature and uneven development. Reviewing different theories is an attempt to understand better the contemporary agenda around the concepts of nature and the city. As a city once characterized by its valleys, streams, and orchards, Ankara is a contested ground for socio-ecological transformations. The city's Southeast fringe with recent housing developments such as Sinpaş Altınoran, Güneypark Project, Marina Ankara, became a concrete example of nature's metabolization in human-dominated earth. Therefore, the study aims to understand the complex human/non-human dynamics in socially and politically metabolized nature and reclaim the space through a theoretical and visual reading of it.

14:35 – 15:00

Sarp Tanrıdağ— Truth as a Discursive Object in Architecture

Supervisor: İnci Basa
Jury: Haluk Zelef, Neşe Gurallar

Current truth concepts hybridize the disappearing modern dichotomies in architecture, respectively factuality, truthness, and objectivity with fictionality, falseness, and subjectivity. This study investigates the discursive formations of truth in architectural discourse from the perspective of aesthetics and examines truth's role in architecture's engagement with reality. The theme of truth is an advancing topic in philosophical debates on the comprehension of the real. Accordingly, this study aims to analyze this topic through a debate on aesthetics. It scrutinizes aesthetics in architecture as the sensitive perception of things rather than the judgment of beauty. The study begins with an inquiry into non-architectural truth theories and continues with reflections of the prevailing truth theories on architecture, particularly the correspondence theory. A literature review on architecture's engagement with reality demonstrates new approaches in this aspect, specifically the object-oriented ontology. An in-depth analysis of the practices and theories of object-oriented architects Mark G. Foster and Ferda Kolatan will be employed to contextualize the potential applications of discussed truth concepts. In conclusion, through the works of these architects, the study attempts to explore the intricate relation between the aesthetic reason in architecture and truth as a hybrid of fact and fiction.

15:00 – 15:25

Rumeysa Aydın— City Life and Architecture in Transitions: Yalova at the Threshold

Supervisor: İnci Basa

Jury: Esin Kömez, Zeynep Uludağ

Within the context where the city's outdoor space loses its social content and habitability gradually, the potential role of architecture is still underestimated and even misguided. Since the disciplinary split of urban planning and architectural design, the fact that the buildings and their edges actually have a substantial voice upon social possibilities in urban everyday life, is also ignored. Meanwhile, by the rise of modern functionalist architecture, spreading misconception of the relationship between interior and exterior raised some initial arguments regarding the spatial rapture and social isolation. With the quest for meaningful and psychologically effective transitions, the concept of threshold is suggested to better describe the connection between divergent scales and spaces in an urban area. Hereby, as an ignored dimension between urban life and architecture, threshold is revisited and its rehabilitation is brought to the agenda. Based on this understanding, rather than implying plain boundaries, thresholds hereinafter are referred to as the delimiters of threshold space that reshapes the city's outdoors and is scrutinized whether it operates as public space. Thus, this study examines city's outdoor space within the context of thresholds to reconsider and recontextualise their critical position and role in the activities of everyday life. It compiles spontaneous and intimate city everyday life scenes from Turkey, particularly Yalova, to illustrate the inhabitant's instinctive search for spatial solutions to generate, utilize or improve the thresholds through some relatively limited physical attributions. They expose human endeavor to contact and communicate, to engage with public space and urban life primarily through the possibilities of architectural form, thresholds and threshold spaces.

15:40 – 16:05

A.Setenay Özsoy— METU Campus A1 Gate: An Architectural Reflection of Urban Memory

Supervisor: Ayşen Savaş

Jury: Esin Kömez, Umut Şumnu

This study is a part of the ongoing Getty Project entitled "Modern Campuses", which focuses on one of the iconic examples of modern architecture in Ankara, Middle East Technical University (METU) Campus. The purpose of this study is to investigate the significance of the Middle East Technical University Campus, a prominent modern architecture artefact in Ankara. The METU campus has had a defined and autonomous land since its establishment. As a gated campus, it was interacted with the city through its monumental entrance gate, A1. As stated elsewhere, "this complex structure takes place in the urban memory with its symbolic meaning as well as its architectural image". This structure can be evaluated as an object of representation. Therefore, this study defines the Gate A1 as an interface between the METU campus and the city, Ankara. When the entire campus is considered, the Gate A1 is an architectural element that can be described as a "detail" with its modest scale. The gate will be examined as a part representing the whole, the METU campus. Examining the main entrance gate as an architectural detail will also reveal the structural and material clues regarding the architects' intentions for the campus's first impression. It will also compile the readings for the first image designed for the urban memory. The building plastic and surface finishings are revealed as a result of meticulous drawn plans, sections, façades and detail drawings. This sculptural structure conceals many clues about the architectural formation of the entire campus.

16:05 – 16:30

Elif Didem Pamuk— Public Space Programming as a Tool for Appropriating the City: Re-Appropriating Gençlik Parkı, Ankara

Supervisor: Cânâ Bilsel

Jury: Ela Alanyalı Aral, Müge Akkar Ercan

Public spaces are settings where public life takes place and they have the capacity to bring together people from different social groups. However, in some cases where social segregation in urban spaces is accentuated, public spaces of the city lose their capacity to do so. Today, the society has turned away from the public spaces along with the social cohesion they provide. Ankara, the capital city of Turkey is a significant example of fragmentation and neglected public spaces. A public urban park, Gençlik Parkı, created with the purpose of enhancing social relations, is not appropriated and used by most citizens. Although located at the very core of the city, the park is left aside by upper and middle income groups, in spite of the fact that it was subject to a rehabilitation project in 2009. The reasons for the park's being underused will be investigated. The aim of this study is to investigate strategies to strengthen the relationship between the city and its citizens. It is argued that special programming is required to attract and bring together people of different groups through the insertion of multiple activities and events. For this purpose, programming and management of several public spaces and parks from different metropolitan contexts are examined and analyzed. It is asserted that continuous programming at Gençlik Parkı and its surroundings with the assets of the city will help improve its perception and appropriation by different groups and contribute to produce a new urban culture in the city.

16:30 – 16:55

Alperen Alan— Architectural Experience and “Existential Sense”: Analysis of Some Architectural Patterns in Their Socio-Cultural Context

Supervisor: Mualla Erkılıç
Jury: Gizem Deniz Güneri, Pınar Öktem Erkartal

Experiencing in architecture is closely related to awareness of human life. This awareness occurs through our understanding of built environment, basically with our senses: sound, smell, tactile, taste, etc. Multiplicity of senses have been topic of experiential relationship in architectural research, especially last century. However, the domination of the sight and visual formations of architecture remains limited in better experiencing the architectural environments like private spaces, public spaces, transition spaces, social spaces in a wider sense. Although vision is considered the most important sense in architectural experience, Pallasma states that, existential sense is the most vital one. This existentially grounds on the experience of our embodied sense of being and self, rather than multiplicity of senses. The life of people becomes clearer in their social cultural context. Social life patterns, social behaviours etc. are important parameters that give clues about human life and their both physical and social environment. In order to emphasize the significance of existential sense in human life in the concept of architectural experience, this study will use Christopher Alexander’s patterns as architectural environment which give messages about the living atmospheres, social and cultural life images as well as existential senses of people. The research aims to make an inquiry for understanding the relation between architectural patterns and socio-cultural environment in terms of “existential sense” in architectural experience.

16:55 – 17:20

Hatice Tuğba Karayama— Exploring the Necessity of Participation of People with Disabilities in Architecture

Supervisor: Mualla Erkılıç
Jury: Gizem Deniz Güneri, Esra Burcu Sağlam

Under social model, disability is defined as a result of the interaction between the individual with an impairment and the social and built environment. Discussing the effect of organization of the societies and inequality of opportunities, scholars established the idea that disability is constructed socially, and it is a socio-political concern which should be studied under human rights-based approach. What is offered by scholars to deconstruct the negative image put on disability is changing the pathological role of people with impairments to active members of society who define the disability, the disabling barriers and the wishes of disabled people. However, like in the rest of the society, also in the architectural profession, there is a limited number of participants representing diversely abled people. With the ideas that (a) architectural knowledge is developed with an experience based progress and (b) the problems in achieving barrier free design may be caused by the lack of diversities in the profession, this paper discusses the possibility that people with various bodily experiences may contribute to architecture to make a shift towards Universal Design. In order to achieve an architecture which enables people with disabilities to actively participate, a new perspective is needed to be developed with a knowledge of sociological and conceptual discussions. Gaining insight in this background is the particular aim of this seminar study.