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A Speculative Laboratory of Architecture: The Rise of Robotic Spaces



Yildiz Technical University
Faculty of Architecture

30th of September - 4th of October 2024

10 architectural students came together to explore new speculative scenarios of future buildings and functions characterized by human-robot interaction and collaboration.

Front cover image: Produced by workshop participants and instructors.

Information about the supervisors

Hüsnü Yeğenoğlu is a senior architect, educator, and researcher specializing in minimalistic designs and the interplay of space, time, and action. Known for the Utrecht-Sögütlü Primary School and the PhD project Woonsporen, He combines creativity, critical thinking, and play in all endeavors.

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Booklet Designer: Ihsan Erdem ER

Could human-robot interaction lead to **utopian** or **dystopian** spaces?

Introduction

This booklet aims to provide interested readers with the results of the workshop A Speculative Laboratory of Architecture: The Rise of Robotic Spaces, which was held in Istanbul between September 30th and October 4th, 2024, at the Department of Architecture, Yıldız Technical University. In the first part of the booklet, the primary topics of the workshop have been explained as the emergence of robotic spaces and the potential of speculative design to generate futuristic spatial scenarios. Furthermore, the outcomes of the projects are presented, designed by the students who participated in the workshop. The booklet concludes with some critical notes, reflecting on the content of the workshop and the process that the students went through. We hope that this booklet will provide readers with an understanding of the attendance of new robotic landscapes.

Hüsnü Yeğenoğlu, Ayşen Ciravoğlu, Nilsu Altunok,
Ihsan Erdem Er

Speculative scenarios

The speculative architectural investigation describes proposed futuristic plots that could be achieved through profound technological, historical, or ideological transitions and their possible impact on space and time. Speculative concepts have been developed particularly in the latter half of the 20th century. Archigram was a British architectural collective whose unbuilt and neo-futuristic projects, including the Plug-In City and the Walking City, “spawned the most influential architectural movement of the 1960s,” according to Peter Cook, one of the founders of the collective.¹² Both projects challenged the traditional perspective on space and time with super-organisms that could move on giant legs without any restrictions through a hypermodern urban landscape.

Superstudio offers additional examples with their creations of speculative design. The experimental work of the collective that was founded in 1966 in Florence, consists mainly of photo collages in which they “criticize the modernist thinking in design and architecture.”¹³ The collage Continuous Monument, a gridded monumental body “encompassed the whole earth, taking over iconic structures, and natural forms. The design represented equal access to essential resources and technology that would serve all.”¹⁴

Constant Nieuwenhuys’ New Babylon project was inspired by Johan Huizinga’s book *Homo Ludens*. The project includes a sequence of impressive physical models that presents the vision of a worldwide network of connected cities. New Babylon is inhabited by man the player, a human liberated from employment, has no need for art because man can be creative in ordinary daily life. Constant argues that “New Babylon offers only minimal conditions for a behavior that should remain as free as possible. Every limitation of movement, of the creation of mood and atmosphere, should be prohibited. Everything should remain possible; everything should be able to happen. The environment is created by the activities of life, not the other way around.”¹⁵

Also, OMA’s¹⁶ early projects from the 70s and 80s are impressive examples of speculative imagination and fantasy. *Exodus*, or the *Voluntary Prisoners of Architecture*, consists of eighteen drawings and text-scripts. The title of the project relates to West Berlin’s deviating condition during the Cold War as a walled city within the banned territory of East Germany, essentially “a prison on the scale of a metropolis, in which people sought refuge voluntarily.”¹⁷

The purpose of the wall was not to safeguard the inhabitants of West-Berlin from calamity, but rather to prevent individuals from fleeing from East-Berlin to the West: “Those trapped, left behind in the gloomy Bad half, become obsessed with vain plans for escape. Complete hopelessness reigned supreme on the wrong side of the wall. As so often before in the history of mankind, architecture had been the quality instrument of the wall.”¹⁸ *Delirious New York: A Retroactive Manifesto for Manhattan* is a visionary celebration and a polemical analysis of New York that portrays the city as a metaphor for the dizzying diversity of human behavior and cultural stratification. The speculative design is visualized with drawings, photographs, and maps, and provides a provocative perspective on the culture of congestion by documenting “the symbiotic symbolic relationship between its mutant metropolitan culture and the unique architecture to which it gave rise.”¹⁹

Contemporary speculative architectural scenarios of the future world do create utopian and dystopian narratives while questioning the increasing impact of extra-human conditions on man’s long-lived sensory perception of the three-dimensional natural world. The future architectural laboratory needs to be engaged in

technology networks, complex systems, and societal and environmental phenomena. Consequently, architects must envision new productive narratives on how to optimally operate within these intricate and highly influential domains. In the current setting, it appears that the significance of speculative architecture has never been greater. Liam Young’s *Planet City* is a good example of this point of view. It constitutes of an imaginary and densely populated landscape that encompasses the entire global populace of 10 billion individuals. This is a speculative design that examines the devastating consequence of the perpetual colonization of space on a global scale. Young’s space odyssey “explores the productive potential of extreme densification, where 10 billion people surrender the rest of the planet to global wilderness.”²⁰

We hope that our overview has provided readers with sufficient insight into the most pertinent aspects of the workshop. The subsequent section of the workshop booklet presents the practical execution of various projects designed by students who participated in our speculative adventure.

PRIMARY TOPICS OF THE WORKSHOP

Human-machine synthesis

The existence of robotic spaces was previously described by philosopher Donna Haraway in her essay *A Cyborg Manifesto* in 1985 as a cybernetic human-machine synthesis, a living entity of social reality and a living entity of fiction.¹ What was once considered a utopia has now become an everyday reality of human-machine creatures whose physical abilities are extended beyond human limitations with mechanical, biological, and digital parts built into the body and guided by generative artificial intelligence, and 5G technology.

This transition is not just another consequence of technological progress, but the advent of a new geological epoch that is described as a rising post-Anthropocene, a new era dominated by computer technology and artificial intelligence that is capable of imitating natural human intelligence and problem-solving capabilities without human intervention. According to the philosopher Benjamin Bretton, this is the most recent period in Earth's history that comes after the Anthropocene, where humans were the dominant force constituting the planet.² This significant change is commonly referred to as the critical theory of posthumanism, as it responds to the emergence of the post-Anthropocene in the 21st century. Posthumanism raises concerns about the rapid deconstruction and replacement of historical notions of human nature and human condition.³

However, the impact of technologies on all aspects of the natural environment and human activity was already critically discussed in depth by philosopher Martin Heidegger in his text *The Question Concerning Technology* as early as 1972. He states that our increasing dependence on technology makes us “unfree and chained to [it], whether we passionately affirm or deny it. But we are handed down to it in the worst possible way when we regard the phenomenon as neutral; for this conception of it, to which today we particularly like to do adhere, makes us utterly blindfolded for the essence of technology.”⁴

Reaching far beyond Heidegger's critical perspective, with the advent of cybernetics the impact of artificial intelligence is becoming limitless.⁵ The Heideggerian artificial-natural dichotomy appears to be replaced by a new kind of human, also known as *Homo ex data*,⁶ who experiences the world of technologies as a vital source or even as his second nature. Therefore, “the ultimate level a technology can achieve is to become naturalized.”⁷ This transition has now spread widely. It now effects all natural and human systems in our world. It is also connected to all aspects of architecture: architectural design, architectural theory, and perhaps most significantly, architectural criticism.

Liam Young, the founder of the architectural praxis *Tomorrow's Thoughts Today*, describes this development in the most expressive manner. Once architects used to design space applying systems of human scale, such as the *Modulor*, and developed visions and patterns defined by the aura of *genius loci*. In the era of the cyborg, however, “the body is no longer the predominant measure of space: rather, it is the machines that occupy the spaces that now define the parameters of the architecture... Post-Anthropocene has nothing to do with our bodies; they are more accurately extra-human in that they are outside us, totally indifferent to us, where we are no longer part of the equation at all.”⁸

The increasing dominance of cybernetic-controlled spaces is not only leading to new extra-human building types, but also challenges the future of the architectural profession on an extraordinary level. What does it mean to be an architect “while machines” design “our planet, hidden behind windowless walls and anonymous forms?”⁹ Are architects planning to experiment with novel approaches to interact with the artificial world, seizing opportunities as they arise, without considering the principles or implications of regulating humans by neo-machines? Or will they critically and transparently discuss the emerged possibilities and limitations for the field of architecture without ideological restrictions?

It is challenging for architecture to depict strategic changes, since due to the revolutionary impact of artificial networks on all human domains of development and future alternations will be determined by virtual and artificial conditions. Here, the fate of contemporary and future architecture echoes with the verdict of Manfredo Tafuri, a key architectural historian of the 20th century, when he claims in his novel *Modern Architecture*, that the architecture of his days “speak[s] very much fluently precisely of that in which it has no part.”¹⁰

As future modifications will be influenced by virtual conditions rather than physical ones, the ongoing advancement of artificial intelligence poses a significant challenge to the origins of the profession of architect, as the indispensable expert who can command and create the entire execution of the building cycle.¹¹ These abilities are rapidly adopted by the unlimited capacities of neo-machines. We think that architecture's future role is to explore new forms of spatial scenarios that are critical and fundamental within and without the emerging framework of the artificial world. The original territory of architecture is lost. Architecture's ability to reflect on the key phenomena of the 21st century should not be assent or conformist, but rather questioning, hypothetical, and perhaps most importantly, speculative.

W O R K S H O P D E S C R I P T I O N

Science fiction had long inspired technological innovation, influencing developments like the touch screens, self-driving cars, and drones. During the workshop, participants critically explored the spatial implications of emerging technologies, envisioning new building types designed for smart robots guided by generative AI, augmented reality (AR), and virtual reality (VR)- based networks.

The speculative laboratory examined the rise of non-human spaces such as data centers and automated factories, and their integration into architectural design. Participants addressed key questions about the role of humanoid robots in future spaces, including healthcare, education, and mixed-used environments, while considering whether such advancements would lead to dystopian or utopian spatial narratives.

Through readings, spatial sketches, and architectural model-making, the workshop developed innovative scenarios for future buildings, focusing on human-robot interaction and collaboration.

Synthetic Eden Natural Hell

Yasemin Şahinbaş &
İrem Büyükçapar



For a long time, nuclear wars, climate crises, and natural disasters have rendered the surface of the Earth almost uninhabitable. Forests have turned to ash, cities have collapsed, the atmosphere has become unbreathable, and extreme temperatures threaten human life. The sky is permanently covered with a reddish hue and thick layers of smoke; the world has become a scene of disaster. The remaining people on the surface struggle to survive amidst scarce resources and harsh living conditions.

However, a group of people with access to technological resources and material wealth has found a way to escape these dire conditions: by building a new world underground. These cities, dug deep into the Earth, are isolated from the chaos and dangers of the surface, offering a safe and sustainable way of life. Contrary to the surface, life underground has become more colorful and orderly.



Life **rises** where the surface **falls**.

The underground cities are organized in layers, but there is no strict functional separation between these layers. Each layer hosts both living spaces and production units in a hybrid manner. People have the opportunity to grow their own food by setting up small agricultural areas near their living spaces. These agricultural areas consist of vertical farms and biotechnology-based micro farming systems. Everyone can grow plants in these areas, either individually or as part of a community, and be involved in agricultural production.

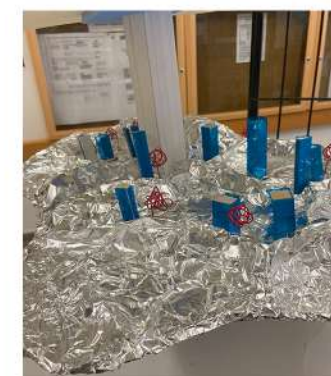
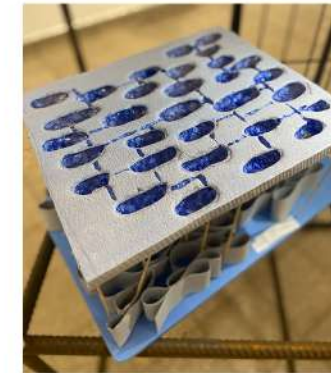
Climate control systems are individually regulated in each layer and connected to an energy grid. Each section can adjust its own climate. Humidity and air quality are maintained at optimal levels in every area. The agricultural waste produced and the gases and waste from the climate systems are directed to the surface through special channels.

In the underground cities, people can maintain a day-night rhythm similar to the natural life cycle thanks to artificial sun systems. This system mimics daylight with varying light intensity and color tones at specific intervals, allowing people to preserve their biological rhythms and daily routines from their old lives. The day starts with a soft glow in the morning, turns into bright and strong light at noon, and gradually dims in the evening to create a calm night atmosphere. This artificial cycle enables people to maintain the order of their former world in every aspect of life, from agricultural activities to social life, from rest periods to work schedules, while also contributing to their mental and physical health.

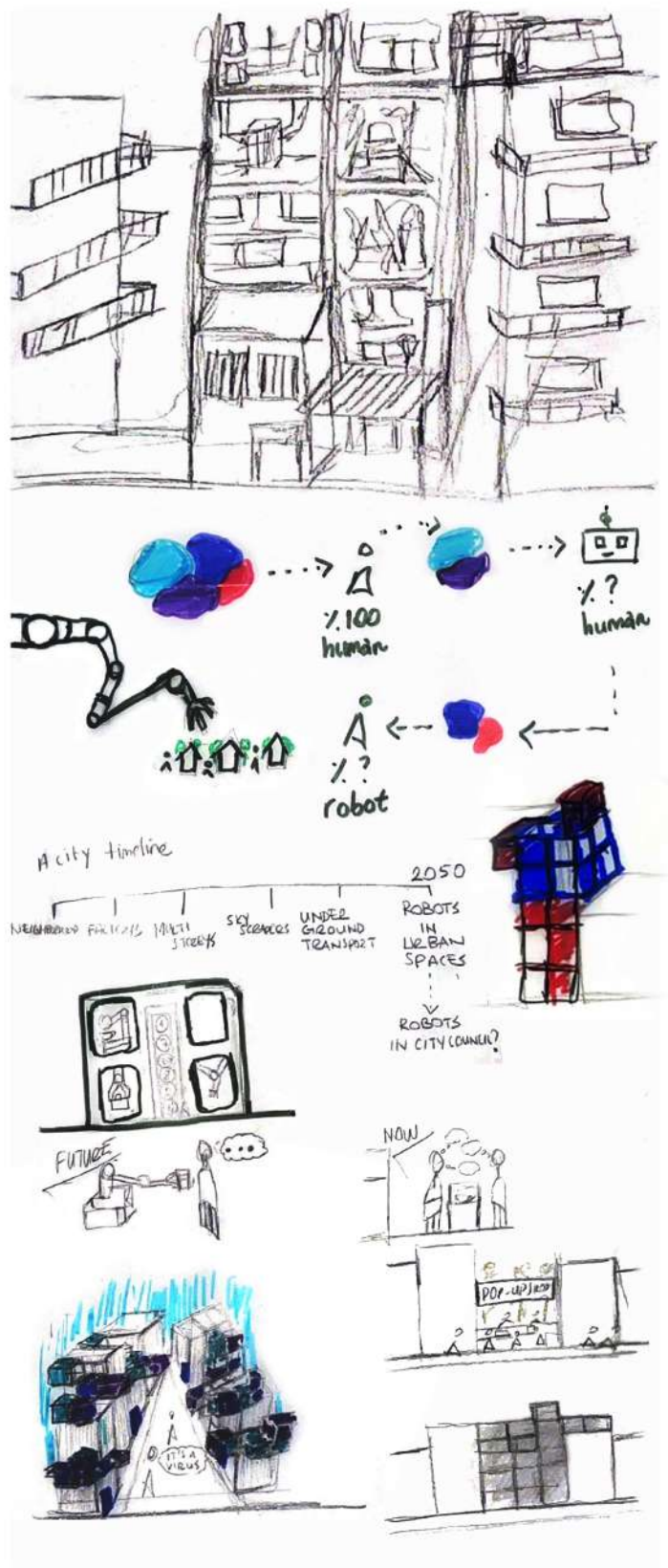
This underground world offers a life where the limits of technology are pushed, and sustainability is at the core. Transportation is provided by high-speed trains and magnetic roads, while energy needs are met entirely through renewable sources.

Doors and elevators opening to the surface conceal the existence of these cities, making it impossible for the people struggling to survive above ground to notice the life underground.

While the surface may seem like a wasteland left behind by wars and disasters, a new civilization has blossomed underground, breathing life once again. This new world is a utopia where humanity has used its technological capabilities to save itself, building a life from the ruins of the old order.



Post-Anthropocene Production



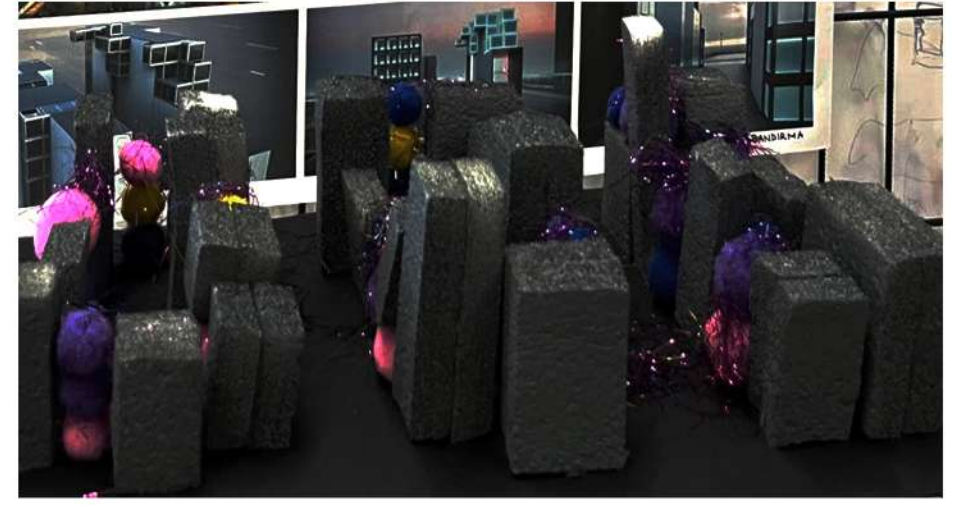
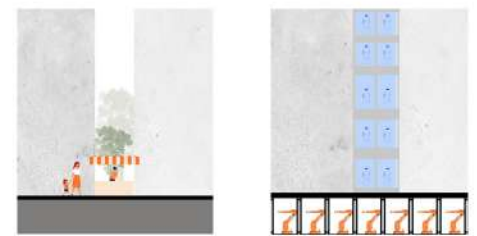
Futuristic Prediction: an **OCCUPATION**



The rise of AI and robots in creative and production roles triggers a human identity crisis, as tasks once defined by human ingenuity become automated. With AI taking over design and decision-making, traditional notions of creativity and autonomy are challenged, raising questions about humanity's role in a future dominated by machines. This shift forces a redefinition of human identity in relation to advancing technology.

The idea of AI and robots taking over both production and creative processes aligns with the post-Anthropocene theme of the workshop, offering a profound exploration of how architecture and urban spaces could evolve when humans are no longer the primary creators or users. This concept raises critical questions about the future of human creativity, autonomy, and identity in a machine-driven world, particularly as

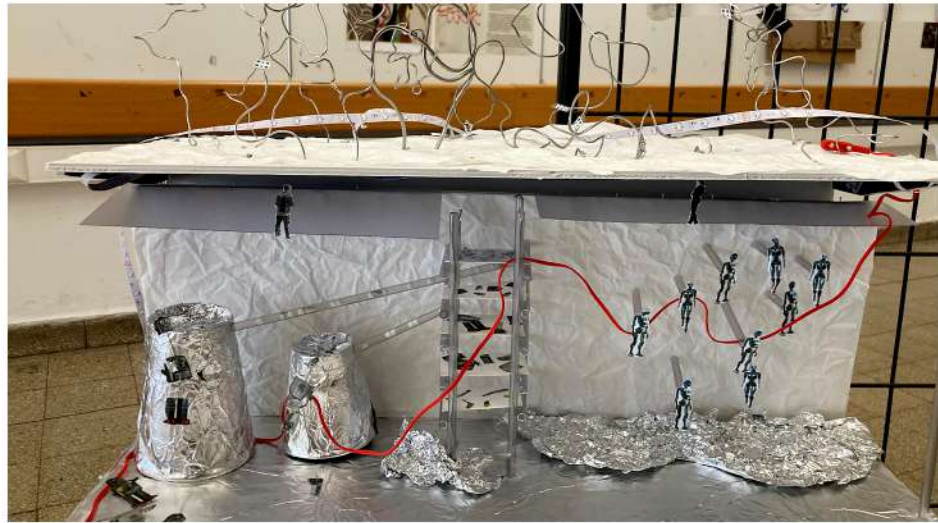
AI begins to assume roles traditionally tied to human ingenuity. By addressing this shift, the idea ties into the human-robot interaction focus, offering a compelling exploration of how AI might reshape human identity and space.



The concept of dark, airless, robot-operated mini factories fits perfectly with the discussion of non-human spaces. These are environments optimized for machines, not for people, which creates a new typology of space. This kind of architectural scenario is a representation of dystopic spaces designed primarily for robot inhabitants, with human involvement pushed to the periphery.

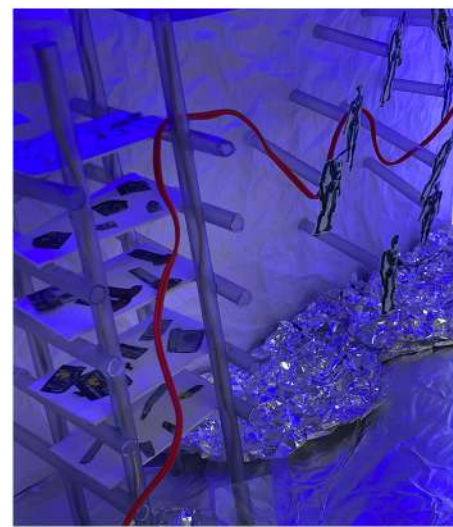
Empty spaces in cities like plain walls or in between alleys in a dystopic idea can be occupied by virus like tetris robot boxes. Although they create products there is always lack of creativity. Human has capacity to turn deserted areas to living spaces and make social connections. However robots do not need that kind of search. Its all about production to them. All said that a dystopic futuristic prediction would be an occupation of our spaces. This might start at cities and streets first but how can we know that they will not take it further to our apartments?

Echoes of the Symbiotic Cycle



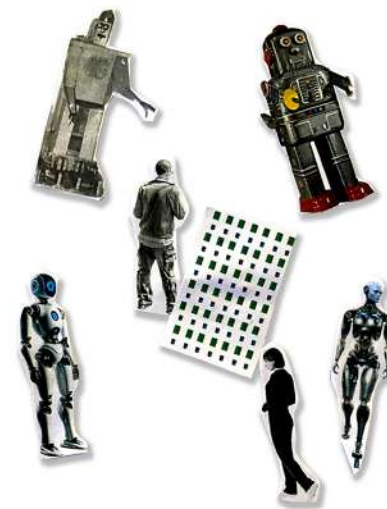
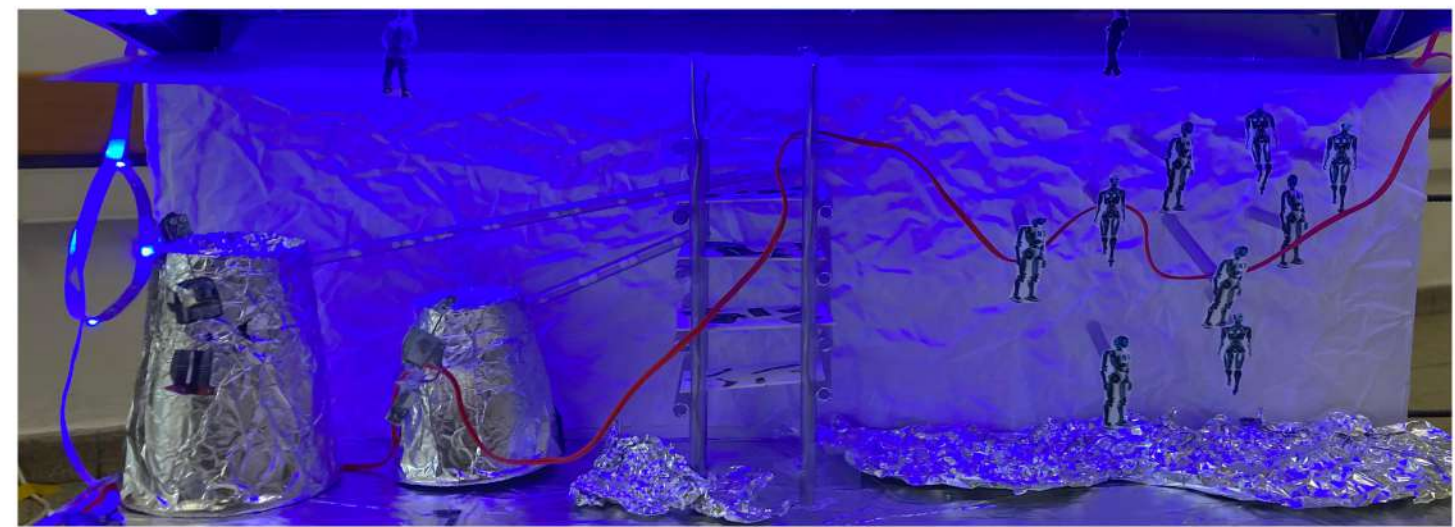
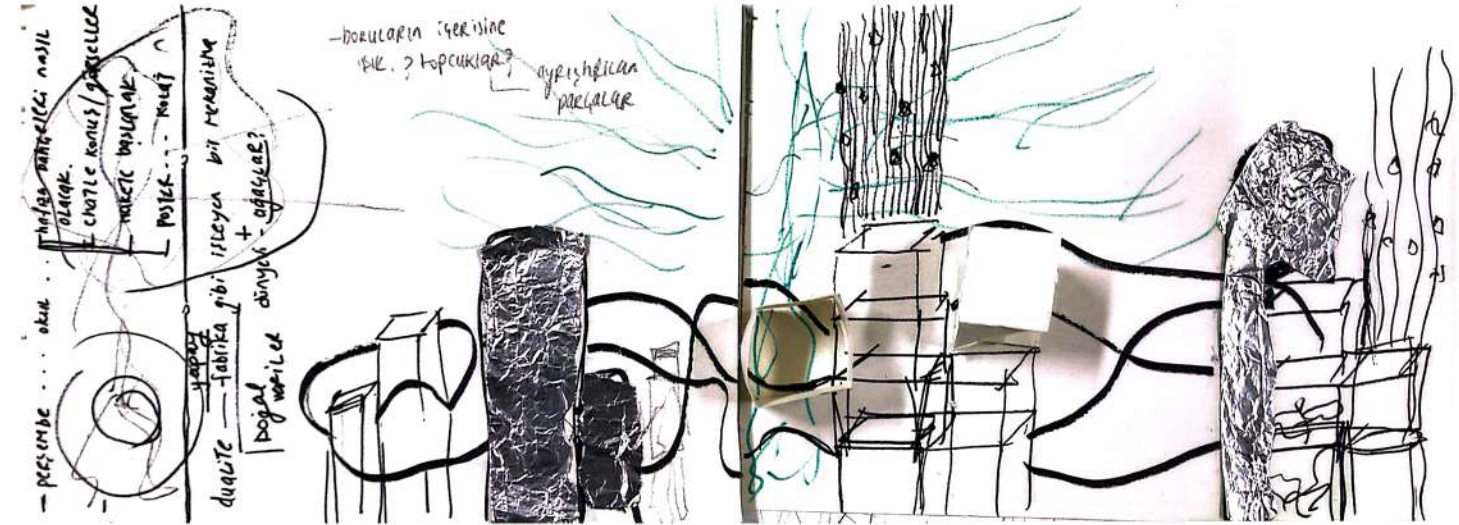
In a distant future, technology evolves at an unprecedented pace, extending human lifespans while drastically shortening the “lifespan” of robots. As advancements render processors and robots obsolete almost overnight, these machines are collected in a specialized facility to be dismantled, renewed, or reassembled into modern iterations. This center operates as part of a symbiotic cycle: robots handle the physical and repetitive labor, while humans focus on creative and emotionally intelligent pursuits—writing innovative code, designing next-generation robots, and upgrading complex processors. Together, they form a balanced partnership, hinting at a future where the line between human and machine blurs, potentially giving rise to cyborgs—part human, part robot entities that embody the strengths of both.

At the heart of the project lie the Memory Gardens, a poetic and symbolic space where robots’ memory chips—housing data, experiences, and interactions—are preserved after their decommissioning. These chips are transformed into “data trees,” creating a mystical archive of robotic lifetimes. Visitors to the Memory Gardens can engage with these data trees, experiencing the history and emotions embedded within the memories of the machines. This unique element introduces an unexpected layer of emotional depth, weaving together cold mechanical precision with a surreal, almost spiritual experience.



The juxtaposition of industrial efficiency and the ethereal quality of the Memory Gardens creates a striking duality. While the factory hums with productivity and technical innovation, the gardens provide a space for reflection and connection, emphasizing that even in a world dominated by machines, traces of humanity, empathy, and memory persist.

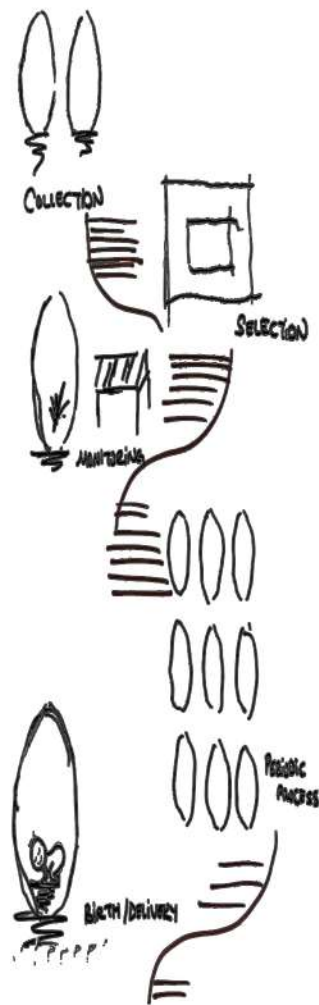
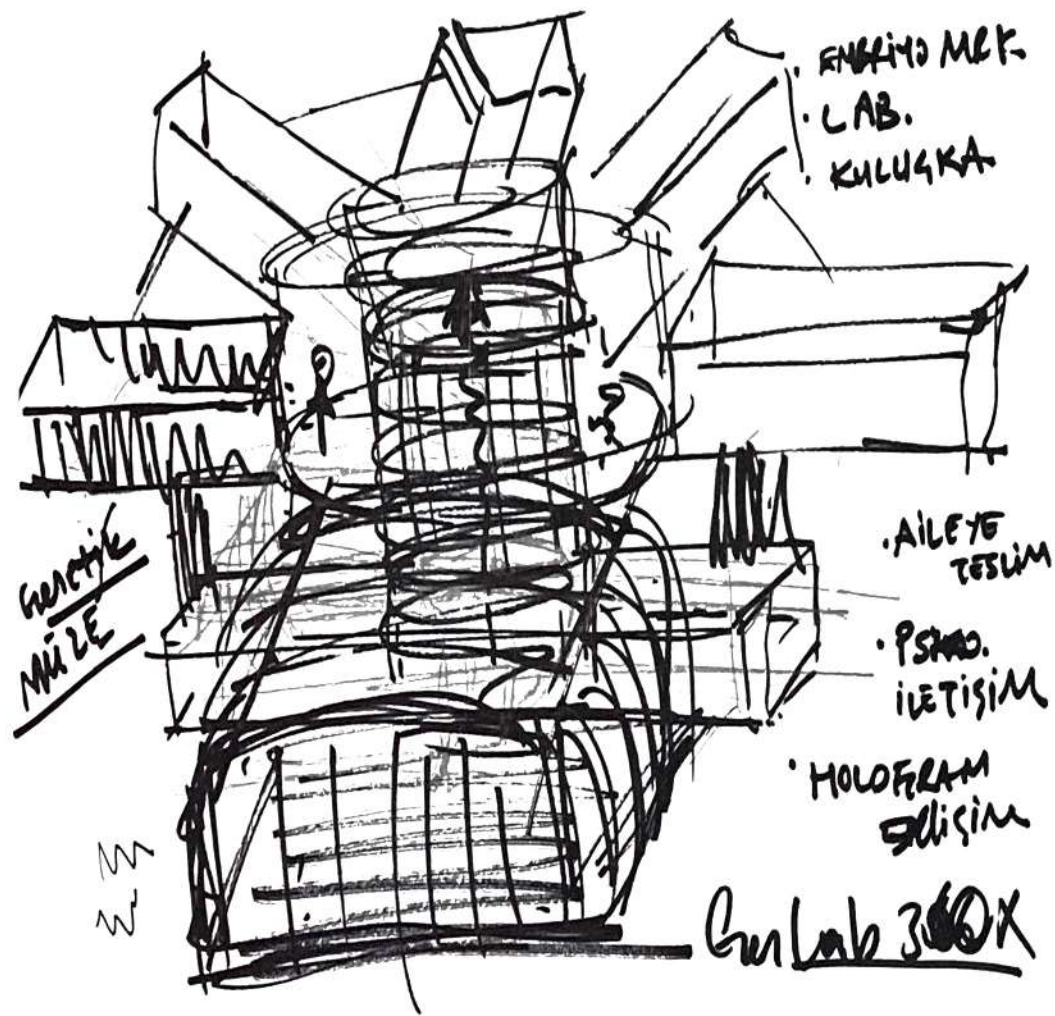
Where Machines **Remember** and Humanity Evolves: A Future of Symbiosis and Sentiment.



This duality shapes the project, blending utopian aspirations with dystopian undercurrents. It envisions a future where technology and memory coexist in harmony, balancing progress with the intangible essence of existence. The facility stands as a testament to the intertwined evolution of humans and machines, forging a delicate equilibrium between innovation and sentiment, precision and reverie. It’s a place where the mechanical and the emotional find common ground, offering a vision of a world both strikingly futuristic and deeply reflective.

GenLAB 360 X

What Attributes Would You Like in Your Baby ?



Pursuit of **Perfection**

Explore and Redefine Genetic Possibilities

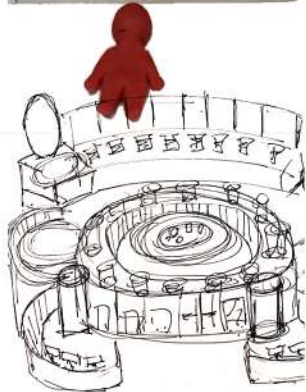
GENlab 360X envisions a future 30–40 years ahead where technology enables the design and nurturing of "perfect" children in sterile, automated environments. Couples visit advanced centers where genetic traits are selected, and robotic systems manage the collection of sperm and egg samples, followed by embryo development and modification in state-of-the-art laboratories. Parents can monitor the development process through 360-degree platforms and VR systems. The birth process is completed in incubator-like systems, ensuring a safe and sterile delivery, with robots facilitating the infant's first contact with the parents.

The facility also features the Genetics Museum, offering public education on the science, ethics, and societal impacts of genetic engineering. Visitors can explore the history, ethical debates, and future potential of this technology through interactive exhibits and VR experiences.

GENlab 360X presents numerous advantages, including the elimination of genetic diseases, the creation of healthier individuals, and groundbreaking innovations in reproduction. However, it also introduces challenges such as social inequality due to restricted access, ethical dilemmas regarding human rights and natural evolution,

and discrimination against naturally conceived children. Additionally, the sterile nature of the process may weaken the natural emotional bonds between parents and children.

This project highlights both the promise and the complexities of reshaping humanity through genetic advancements. The "X" in GENlab 360X symbolizes the unknown, representing humanity's drive to explore and redefine genetic possibilities. Ultimately, GENlab 360X pushes society to confront the balance between innovation and ethics in shaping the future of humanity.



Photographs from the workshop



We would like to thank the **Dean's Office of YTU Faculty of Architecture** for hosting the event, our coordinators and all our participants.

Participants: **Begüm Kankaynar, Burçin Yenice, Ece Bandırma, İrem Büyükçapar, Melek Çimen, Yasemin Şahinbaş, Zeynep Koç, Zeynep Sude Köroğlu**



FINAL NOTES

We would like to briefly discuss the process and results of our workshop. The five days of the workshop proved to be exhilarating, exuberant, and inductive. We noticed that students struggled to concentrate on science fiction-like themes. The absence of precise substantive frameworks, design rules, and possible outcomes were experienced as obstacles that were gradually overcome. An intensive period of discussions regarding the meaning of human-machine synthesis, the rise of the post-Anthropocene and the increasing dominance of computer technology and artificial intelligence on the architectural discipline followed as a result.

Is it possible to design a future development while its characteristics are not yet fully clear? What would a speculative design, wherein future perspectives can be envisioned in an exciting and challenging manner, look like? What would the future look like for a genetic laboratory, where flawless human fetuses can be produced by utilizing biotechnology and robotics? When war, climate and natural disasters have rendered the world uninhabitable, what might new livable underground landscapes look like? These are just two of the discussed questions. At the beginning of the workshop, students primarily explored these questions via the internet in search for answers and solutions, also using AI image creators such

as ChatGPT and Figma, that do generate unlimited numbers of detailed images of any object within minutes. The images that were assembled by the neo-machine were impressive. However, they had also a significant impact on the speculative design process, largely dominating the individual imagination of students.

We did apply the most fundamental principles of architectural design to limit, even temporarily to escape, the dominance of AI by generating spatial scenarios, creating abstract, figurative, and metaphorical hand sketches, and particularly by fabricating large scale physical architecture models. Making models with real materials is a slow process that requires time and physical effort. However, it also generates an intermediate domain that offers students an opportunity to repeatedly contemplate their spatial scenarios and work on adjustments during the process. As discussed in our general statement, the original territory of architecture has been lost. However, the workshop also showed that speculative scenarios are a suitable medium to critically discuss and question this development from various perspectives. The workshop turned out to be an exciting journey that led to new insights and, above all, new questions for students and for our supervisory team.

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