TMMOB
PEYZAJ MİMARLARI ODASI
UCTEA CHAMBER OF LANDSCAPE ARCHITECTS

IFLA
INTERNATIONAL FEDERATION
OF LANDSCAPE ARCHITECTS

IFLA 60TH
WORLD CONGRESS

CODE RED
FOR EARTH

04-06 SEPTEMBER 2024
İSTANBUL-TÜRKİYE

ABSTRACT BOOK
POSTER PRESENTATIONS

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The 60th IFLA World Congress, held in the vibrant city of Istanbul under the theme "Code Red for Earth," has been a resounding success. As President of the **International Federation of Landscape Architects**, it fills me with immense pride to witness the culmination of years of dedicated work by the **UCTEA Chamber of Turkish Landscape Architects (CTLA)** in bringing together this global gathering of landscape architecture professionals, academics, and students.

With its urgent theme, this IFLA World Congress has underscored the critical role our profession plays in addressing the unprecedented environmental challenges facing our planet. The impressive number of submissions—770 in total, resulting in 366 accepted abstracts and 53 design projects—speaks volumes about the commitment and passion within our global community to contribute to a more sustainable and resilient future.

The Congress theme, **"Code Red for Earth,"** resonated throughout the diverse program, encompassing seven thematic tracks that explored crucial aspects of our profession's response to the climate crisis. From codifying the eco-emergency and fostering global solidarity to promoting sustainable communities, embracing diversity and inclusion, and harnessing the power of digital innovation, the 60th IFLA World Congress has provided a platform for in-depth discussions and knowledge sharing. The nine special roundtable sessions, brought the power of collaboration with the United Nations and its affiliated agencies, international sister organizations in the built environment and local stakeholders to debate the importance of landscape to address the most pressing issues globally.

I extend my sincere gratitude to the **UCTEA Chamber of Turkish Landscape Architects**, especially President Barış Işık and Organizing Committee Chair Yasin Otuzoğlu, for their exceptional leadership and dedication in hosting this landmark event. The tireless efforts of the various committees, sponsors, and volunteers have ensured a seamless and enriching experience for all participants.

The success of this Congress lies not only in the quality of the academic discourse but also in the spirit of collaboration and camaraderie that has permeated the event. The connections forged and the ideas exchanged in Istanbul will undoubtedly inspire and empower landscape architects worldwide to continue pushing the boundaries of our profession in service of a healthier planet.

As we move forward, let us carry the momentum and insights gained from this Congress to amplify our collective impact. The "Code Red for Earth" demands urgent action, and landscape architects, with their unique expertise and perspective, are uniquely positioned to lead the way towards a more sustainable and equitable future for all.

Sincerely,

Dr Bruno Marques

President, International Federation of Landscape Architects

The **60th IFLA World Congress**, hosted by the **UCTEA Chamber of Turkish Landscape Architects**, was held in **Istanbul, Türkiye**, from **September 4-6, 2024**, under the theme **"Code Red for Earth."** This theme highlighted the urgent need for collective action to address the environmental crises facing our planet. It also underscored the critical role that landscape architecture can play in advancing sustainability and resilience for future generations.

The Congress covered a broad range of pressing issues through **seven thematic tracks**, each focusing on a different facet of landscape architecture's contribution to addressing global challenges:

1. **Codifying Code Red: Eco-Emergency, Global Solidarity**
2. **Sustaining Life: Protection, Mitigation & Management**
3. **Cultivating Resilience: Sustainable & Resilient Communities**
4. **Acting for All: Diversity, Equity & Inclusion**
5. **Engaging with the Digital: Innovation, Technology & Big Data**
6. **Projecting the Process: Monitoring, Assessment & Applications**
7. **Building Bridges, Breaking Barriers: Education & Practice**

These tracks reflect the core concerns of landscape architecture today, and the proceedings book compiles the diverse range of **366 accepted abstracts** and **53 design projects** that were submitted from **770 total submissions**. The Congress itself attracted **860 participants** from **52 countries**, creating a vibrant platform for academic and professional exchange.

The Congress owes its success to the collective efforts of the **Organising Committee**, including the Programme Committee and its supporting commissions, as well as the teams managing finance, sponsorship, marketing, and communications. Their unwavering commitment, detailed planning, and collaborative spirit were instrumental in bringing this prestigious event to life.

A special note of thanks is due to the **IFLA Executive Committee**, whose guidance and support were invaluable throughout the Congress's planning and execution, as well as the **students and volunteers**, particularly the **PMOGenç members**, who played a crucial role in ensuring the smooth operation of the event.

In addition to the academic and professional presentations, the Congress was supported by **sponsors** and **expo participants**. Their support was essential to the success of the event, reflecting the diverse sectors within the landscape architecture profession.

The Congress was enriched by a series of **social activities**, including the **Welcome Cocktail** on the first evening, the **Gala Event** on the second evening, as well as the **Walk & Talks** during the pre-congress tours and the **technical excursions** following the Congress. These activities allowed participants to engage with the theme of the Congress in an interactive manner, forging valuable connections and deepening their understanding of the profession's role in global sustainability.

We extend our heartfelt gratitude to all the committees, participants, sponsors, and volunteers whose contributions made the **60th IFLA World Congress** a truly memorable and impactful event. The collective effort of everyone involved has highlighted the power of collaboration in addressing the pressing environmental challenges we face today.

Sincerely,

BARIŞ IŞIK
PRESIDENT, CHAMBER OF TURKISH LANDSCAPE ARCHITECTS

The **60th IFLA World Congress**, held in **Istanbul** under the theme "**Code Red for Earth**," represents the culmination of years of meticulous preparation, unwavering dedication, and extensive collaboration. As the **Chair of the Organising Committee** and **former President of the Chamber of Turkish Landscape Architects (CTLA)**, it is my privilege to highlight the remarkable contributions of the committees and individuals who have worked tirelessly to bring this congress to life.

From the very beginning, the organisation was structured to ensure that every aspect of the congress was addressed with precision and foresight. The **Executive Organising Committee (EOC)** and the **Organising Committee (OC)**, composed of distinguished professionals and leaders from CTLA, oversaw the overall framework of the congress, laying the foundation for a seamless and meaningful event. The collaborative efforts of the **Programme Committee (PC)**, **Finance and Sponsorship Committee (FSC)**, and **Marketing and Communications Committee (MCC)** were crucial in achieving our goals.

A special acknowledgment goes to the **Programme Committee**, whose leadership and subcommittees played a key role in developing the congress's theme and structure. The **Call for Abstracts and Reviews Committee** carried out a rigorous peer-review process, ensuring that each submission adhered to the highest academic and professional standards. This process led to the acceptance of **366 abstracts** and **53 design projects** from a total of **770 submissions**. These impressive numbers reflect the global landscape architecture community's enthusiasm and commitment to addressing pressing environmental challenges.

The **Student Charrette and Competitions Committees** provided platforms for creative exchange and innovation among students, further enriching the congress experience.
I would also like to express my deep appreciation for the tireless efforts of the **Finance and Sponsorship Committee** and the **Marketing and Communications Committee**. Their dedication ensured the **financial sustainability** of the congress and its **successful outreach** to a global audience.

Additionally, I would like to extend a special thank you to the **IFLA ExCo Congress Planning Team**, whose guidance and strategic support were invaluable throughout the planning process. Their contributions helped ensure that this congress would be an outstanding success.

Equally, the dedication and enthusiasm of the **PMOGenç members**, our volunteer students, deserve recognition. Their passion and commitment have played an essential role in the organisation of this congress, and their efforts have been truly invaluable.

This congress is the result of **collective excellence**, embodying the spirit of **unity** and **shared purpose** that defines our profession. On behalf of the Organising Committee, I extend my heartfelt gratitude to every committee member, reviewer, sponsor, volunteer, and collaborator whose contributions have made the **60th IFLA World Congress** a landmark event.

Together, we amplify our call for urgent action—**Code Red for Earth** is not just a theme, but a **global responsibility** that we must embrace.

Sincerely,

YASİN OTUZOĞLU
CHAIR, IFLA 2024 ORGANISING COMMITTEE
PAST PRESIDENT, CHAMBER OF TURKISH LANDSCAPE ARCHITECTS (CTLA)

CODE RED FOR EARTH

The 60th World Congress of the International Federation of Landscape Architecture (IFLA), hosted by the UCTEA Chamber of Turkish Landscape Architects, will be held in Istanbul between 4-6 September 2024 with the theme "Code Red for Earth".

The IFLA World Congress is the most important annual event for the Landscape Architecture profession and the IFLA community. The World Congress offers professional development and networking opportunities for practitioners, entrepreneurs, educators, researchers, students, journalists, as well as anyone interested in the impact of landscape architecture on our society, economy, and culture. It is also an international event where challenges in education as well as current trends and issues in professional practice are discussed and answers to all problems are sought.

Herein, the 2024 IFLA 60th World Congress calls for humankind to take urgent action to prevent the worst impacts of environmental crises. Acknowledging human responsibility, the Congress invites policymakers, professionals, scientists, and individuals on stage to establish discourse and a course for the Earth’s future.

International Federation of Landscape Architects (IFLA)

A truly global federation, IFLA currently represents 77 national associations from Africa, the Americas, Europe, Asia Pacific and the Middle East. Our mission as landscape architects is to create globally sustainable and balanced living environments for the benefit of humanity worldwide.

IFLA officially represents the world body of landscape architects through its member associations and regions and in both governmental and non-governmental organizations, such as the UN, UNESCO, UIA, etc. IFLA is a not-for-profit, non-political, non-governmental organization.

The mission is to promote the landscape architecture profession within a collaborative partnership of the allied built-environment professions, demanding the highest standards of education, training, research and professional practice, and providing leadership and stewardship in all matters.

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The Chamber of Turkish Landscape Architects (CTLA)

The Chamber of Turkish Landscape Architects (CTLA) is a public institution, established on 13/05/1994 with the decision of the 33rd General Assembly of the Union of Chambers of Turkish Engineers and Architects (UCTEA).

Organizing Landscape Architecture in Turkiye started with the "Landscape Architecture Association," CTLA's predecessor organization, which was first established in Ankara in 1966. Today, CTLA, with its headquarters in Ankara, continues its activities with 6 branches, 15 provinces, and 2 district representatives.

The Chamber of Landscape Architects is the only professional organization that gathers within its organization Landscape Architects who are legally authorized to practice their profession and art within the borders of Turkiye and who are engaged in professional activities.

The IFLA 60th World Congress is organized this year by the Turkish Chamber of Landscape Architects, the official representative of Turkiye in the IFLA European region.

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Leader: Yasin Otuzoğlu - *(CTLA Past-President)*

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- Call for Abstracts & Reviews
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- Competitions & Awards

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Ceylan Belek Ombregt

POSTER PRESENTATIONS

Codifying Code Red: Eco-Emergency, Global Solidarity

Constructing Heritage Interpretation System and Multi-dimensional Cognition from the Perspective of Landscape Anthropology: A Case Study of Suzhou Gardens

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[1]School of Landscape Architecture,Beijing Forestry University,Beijing,China
[2]Landscape Institute,China Academy of Urban Planning & Design,Beijing,China

In the context of the global climate crisis, the Chinese government has put forward specific requirements for low-carbon development in various industries. The urban and rural construction sectors account for 25% of the total social carbon emissions, necessitating urgent reforms to promote low-carbon construction. Through the calculation of the carbon budget of Beijing's green infrastructure in the whole life cycle, this study analyzes the spatiotemporal differentiation of carbon neutrality of urban green infrastructure, identify areas where further carbon reduction measures may be needed to achieve carbon neutrality and suggests targeted low-carbon construction strategies for different types of green spaces.Using updated carbon emission factors for Chinese construction materials, a tailored carbon emission inventory is developed. Based on Beijing's park maintenance standards, carbon emission levels for green infrastructure maintenance in different urban areas are categorized. A green infrastructure carbon emission accounting model is established. Four plant community carbon sequestration models are developed for Beijing's vegetation types. These models enable the calculation of carbon neutrality throughout the lifecycle of green infrastructure, considering both emissions and sequestration.
Through carbon neutrality accounting of 16 newly built green infrastructure in the main urban areas of Beijing in the past 5 years, three types of green infrastructure carbon neutrality were classified: "carbon sink+ecological type", "carbon neutrality+comprehensive type", and "carbon emissions+distribution type". Targeted low-carbon construction strategies were proposed for the construction and renovation of these three types of green spaces.

Keywords: Carbon Neutral,Carbon footprint,Green Infrastructure

Future modeling predictions of local heterogeneity in habitat climate suitability

Chundong Ma
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Current global action on climate change will not meet the requirement to limit warming to 1.5 °C. Climate change will directly affect the evolution of local heterogeneity in landscape perception and suitability, and thus landscape design strategies and practices. However, landscape heterogeneity of regional and local habitat climate suitability as a basis for landscape planning and design under future climate change is sorely lacking in landscape design studies.

The future global climate change data CMIP6 from IPCC AR6 was integrated into landscape architecture research, and a locally heterogeneous landscape dataset based on the perceived climate suitability of human habitats for the Yangtze River Delta (YRD) region of China for the period from 2030 to 2060 was developed in the context of China's "Dual Carbon" strategic climate action process.

(1) Background data source: The background data of this study adopts the CMIP6-SSP126 (China's "Double Carbon Target" scenario) multi-model ensemble of GCMs' future projections of monthly average wind speed, temperature, relative humidity, and solar radiation with 60-km accuracy for 2030-2060, which embeds the localization of the YRD region into the global climate change pattern.

(2) Spatial local landscape heterogeneity reproduction: machine learning big data refinement of spatial downscaling. the CMIP6 global model was with limited resolution (60km), which only reflects the global and intercontinental historical-future climate trends, which is insufficient to reflect the local heterogeneity of the YRD regional scale, and the data algorithms are needed to carry out the earth system big data refinement reanalysis of CMIP6 source data. The refined reanalysis of the data, i.e., the spatial downscaling of the data, is needed to reflect the spatially continuous pattern of local landscape heterogeneity through data algorithms.

(3) Activity landscape perception: Habitat suitability evaluation that aggregates thermal comfort perception. Five climate comfort models (COMFA, WBGT, AT, BCMI, NET) are assembled to translate climate physical environment data into landscape perception suitability data.

(4) Ternary coupling: local spatial differentiation of landscape climate suitability. Based on the evaluation of habitat climate suitability, spatial differentiation and heterogeneity trend analysis of the rate of change on a 30-year long time series were conducted. Three trend analysis methods of SLOPE tendency variability, SEN estimation, and MK test were used in this study.

In the future (2030-2060), compared with 2022, the average thermal comfort (COMFA) in the YRD region will increase by 13.482 W/m2 in winter and 18.332 W/m2 in summer; the average thermal stress (WBGT) will increase by 2.921 ℃ in winter and 1.389 ℃ in summer; and the average apparent temperature (AT) will increase by 3.653 ℃ in winter and 2.328 ℃ in summer. And then study the future local spatial differentiation of climate change risk and habitat perception impacts of 41 cities in YRD, the results show that it is Yancheng City, Yangzhou City, Taizhou City, Nantong City, Changzhou City. Thus, the landscape

heterogeneity basis is provided for the following planning and design practice of landscape architecture.

Keywords: Climate change, landscape perception, climate suitability, local spatial heterogeneity, future projections

Local Landscape Heterogeneity in Habitat Climate perceptual Suitability in China's Yangtze River Delta Region 2030-2060 Future Prognostications

Local Landscape Heterogeneity in Habitat Climate perceptual Suitability in China's Yangtze River Delta Region 2030-2060 Future Prognostications

Research on Site Selection of Wildlife Passage along HSR

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Wildlife corridor are effective measures to alleviate the isolation and destruction of surrounding wildlife habitats caused by transportation infrastructure,The position of the channel is a key factor affecting its efficiency of use.There is a clear lack of research on the location of wildlife corridors under the influence of high-speed rail(HSR), and it is particularly important to strengthen on-site research.Taking the Wuhan urban agglomeration as an example, the article proposes a channel selection method based on ecological corridor construction: through morphological spatial pattern analysis and landscape connectivity level evaluation, ecological source patches with high landscape connectivity are selected. Based on the minimum cumulative resistance model and gravity model, ecological corridors are extracted and their importance is evaluated to construct the ecological network of the Wuhan urban agglomeration, and the high-speed rail(HSR) network is overlaid with the ecological network, The research results are as follows:(1) The core area identified by MSPA has an area of 17068.3 km2, which is scattered and highly fragmented, mainly distributed in the northeast and southeast of the Wuhan urban agglomeration. However, the number of patches in the central and western regions is relatively rare and the area is small. (2) The potential ecological corridors formed based on the MCR model are distributed in a network, and important ecological corridors are mostly connected in a linear or circular shape, forming an ecological barrier in the eastern part of the Wuhan urban agglomeration. The ecological network consists of 17 ecological source areas, 21 important ecological corridors, and 138 potential ecological corridors. (3) A total of 27 intersection locations were identified, and the locations with high habitat quality were screened. Five of them were recommended for the construction of high-speed rail(HSR) wildlife corridors in the Wuhan urban agglomeration. The research results can provide methodological references for the construction of China's new high-speed rail(HSR) network and the selection of natural habitat animal passage locations under the influence of high-speed rail.

Keywords: high-speed rail(HSR),wildlife corridor, ecological corridor, morphological spatial pattern

Crisis and Cohesion: Tackling Agro-Ecological Emergencies in the Heihe Basin

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Against the backdrop of a global ecological crisis, drought represents a central challenge within the broader spectrum of climate change, drawing heightened attention from the international community and necessitating cooperative, global solutions. This study focuses on the Heihe River Basin (HRB), situated in the northwestern Qinghai-Tibet Plateau of China—often referred to as the "roof of the world." As a quintessential inland river basin, the HRB encapsulates the vulnerabilities of ecological environments, pronounced degradation of water ecosystems, and acute challenges in agricultural land resource utilization, epitomizing the complex ecological challenges faced by similar basins globally. Through an in-depth assessment of the agricultural ecological risks associated with water and land resources (WLR) in the HRB, this research offers crucial insights for sustainable agriculture production and management in arid regions. Moreover, while this study is concentrated on the HRB, the area's significant representativeness in reflecting ecological sensitivity and drought issues endows the findings with universal applicability. Thus, the outcomes of this research not only guide ecological protection and sustainable management in the HRB but also furnish a robust theoretical and practical framework for addressing similar ecological challenges worldwide.

The purpose of this research is to construct and apply an agro-ecological risk assessment system tailored to the HRB's unique context, incorporating the interplay between water and land resources (WLR). This system aims to facilitate a deeper understanding of ecological risks and inform sustainable management strategies, aligning with the global solidarity movement towards ecological resilience.

To achieve this, we employ the Malmquist DEA model and a coupling coordination degree model as our primary methodological tools. These models enable the construction of a comprehensive assessment framework that considers the coupling dynamics of WLR. We focus on the HRB from 1995 to 2020, conducting spatial autocorrelation analysis to examine the degree of WLR matching and analyzing the evolution of agro-ecological risk at the county scale. This approach allows for a nuanced analysis of spatial correlations and risk evolution over time.

Our results reveal several key FINDINGS: 1) The average ecological risk for both agricultural water and land resources in the HRB has been on a declining trend, with scores of 0.933 and 0.938, respectively, indicating a gradual improvement in the ecological status. 2) There is a divergent trend in the ecological risk coupling and coordination between agricultural soil and water resources, with risk levels rising in the upstream areas of the HRB and declining in the middle and lower reaches. 3) The matching coefficient of WLR emerges as a critical driver of the degree of water and land ecological risk, demonstrating a positive correlation that underscores the importance of integrated resource management.

Keywords: Agricultural WLR; Ecological risk; HRB

Green Space Intervention Proposal in Climate Sensitive Landscape Design

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The roles and responsibilities of plants in urban areas take them far beyond their aesthetic values, making them an indispensable part of design in creating successful and comfortable spaces. When climate change, one of the current global issues, is added to the equation, establishing a consistent plant-climate relationship in urban areas can make significant contributions to create both a sustainable environment and combate climate change. This study aims to produce a model defining the stages of plant species selection and plant placement principles in order to develop climate-sensitive landscape design projects.
It is known that climate is a significant constraint in urban design and development plans. Planting design, on the other hand, emerges as a systematic task that should evolve throughout the entire design process from the beginning, based on the combination of objective and subjective information, relying on logical and sequential decisions that complement and give meaning to the design. Therefore, approaching plant planning in landscape design projects within the framework of climate sensitivity can play a role in addressing climate-based problems that cities are predicted to face in the coming years. Hence, the main motivation of this study is to explore the concept of planning through the relationship between plants, climate and the urban environment.The model defines the stages of plant species selection and plant placement principles to develop climate-sensitive landscape design projects. Initially, the model considers temperature, precipitation, wind, and sunlight data as climate components. Each region is defined by various climatic conditions such as temperature limits, seasonal solar angles, wind direction and intensity, precipitation type and amount, humidity and sunny days. Therefore, climate components that limit the design require unique evaluations for each different area.Secondly, the proposed model aims to create an urban climate map by combining data such as urban topography, existing structures, green areas, roads and boundaries, soil, geology, vegetation, socio-cultural landscape features. This urban climate map is intended to enable the development of region-specific planning strategies in the planning and design process and to solve urban problems from the highest to the lowest scale.Thirdly, future-predictive micro-climate analysis is performed with precise analysis of climate elements. This is a meaningful step in taking precautions and developing strategies against the possible effects of climate change.
Fourthly, plant hardiness zones and heat tolerance zones, ecological demands, natural species status and the plant-structure relationship which constitute other determining and limiting factors of the plant selection process, are also included. For this purpose, a plant list is created for each species, including information on plant hardiness zones and heat tolerance zones, origin, and ecological demands (light, water, soil).Finally, the study presents design principles with scientific, specialized, and concrete decisions that are expected to guide planning. This model, which can be accepted by professionals as a "green space intervention proposal" supports making conscious decisions in urban planning, green infrastructure development and climate change strategies. It is a significant step towards preserving existing ecosystems, improving built spaces and restructuring lost or damaged structures.

Keywords: climate change, climate sensitive design, micro-climate parameters, plant selection principle, plant placement principle

Urban park design optimization for climate adaptability in summer

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OBJECTIVES: With the increasing prominence of urban environmental issues resulting from climate change, the impact of summer heat in urban areas on residents' health and comfort becomes even more severe. In this context, the relationship between the micro-scale environment climate and human habitation grows closer, making the climate adaptability design of landscape architecture a critical approach to harmonizing the relationship between humans and nature while improving the quality of the living environment. Focused on Suoshan Park, situated in Suzhou—a region characterized by hot summers and cold winters—the study aimed to optimize the park's climate adaptability using a method of landscape architecture during the summer season, based on field measurements and a questionnaire survey, assisted by the urban micro-climate simulation software ENVI-met.
METHODS: In our research, the Physiological Equivalent Temperature (PET) was selected as the primary thermal comfort index, with meteorological data from July 23rd, 2022, in Suzhou serving as the baseline data for simulation. Using ENVI-met software, we simulated Suoshan Park's summer climate conditions and analyzed the results of PET, as well as air temperature, relative humidity, wind speed, and solar radiation. Subsequently, four updating strategies were proposed: (1) construction of a rainwater circulation system; (2) intelligent sensing design for micro-climate regulation; (3) site vitality regeneration; (4) activation of vertical space. Ultimately, the optimized site was simulated and analyzed in ENVI-met, as before, to validate the effectiveness and rationality of the thermal comfort spatial design methods.
RESULTS: By comparing pre-optimized site data with post-optimized results, the conclusions pointed out that the increase in vegetation and water area, renewal of substrate, and addition of buildings and landscape facilities contributed to a decrease of 15.49% in PET while increasing the comfortable air temperature coverage area by 43.27%. Relative humidity and wind speed also experienced a noticeable increase, while direct sunlight exposure decreased by 34.36%.
CONCLUSION: The results indicate that the climate adaptability design of landscape architecture, based on ENVI-met analysis, significantly improves the summer micro-climate of urban parks in hot-summer and cold-winter regions. It provides a more scientific basis for understanding the methods of climate adaptability design for urban parks in such areas, offering guidance and reference for enhancing the livability quality of cities.

Keywords: Urban micro-climate, ENVI-met Simulation, Climate adaptability design, Thermal comfort

Land use/cover change impacts on ecosystem services and forest-farmland tradeoff

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BACKGROUND: In recent years, human intervention in nature has aggravated global climate change, resulting in frequent global problems such as soil erosion, desert expansion, water resource depletion, and environmental pollution. Mankind has realized the urgency of tackling climate change. Since 2020, the world has experienced a series of historic and devastating global crises, with the COVID-19 pandemic and the outbreak of war in Ukraine posing extremely serious challenges to global food security. According to the United Nations, as many as 828 million people will face hunger globally by 2021, and 205 million people in 45 countries and territories will experience "crisis" levels of food insecurity or worse by 2022. China is currently the world's largest food processor and third largest food exporter. At the beginning of the 20th century, China implemented the "grain for green" policy, which resulted in a large reduction of arable land and threatened food security. D 'Amour predicts that by 2030, a quarter of the world's total loss of arable land will occur in China.
OBJECTIVE: The Sichuan-Chongqing area is the main grain production and storage base in western China, and its grain production and cultivated land protection have an important impact on the long-term development of agriculture. However, the Sichuan-Chongqing region is facing a crisis of severe soil erosion and extreme weather conditions. In the past ten years, a large amount of cultivated land has been occupied and developed into ecological land in Sichuan and Chongqing area. At the same time, the proposal of "Chengdu-Chongqing Economic Circle" promoted the rapid economic development of the entire urban agglomeration, and more cultivated land was occupied by urban construction land. In the context of continuous urban expansion and increasingly serious ecological problems, how to ensure food security and reduce the negative impact of farmland encroachment is an urgent problem for the whole region.
METHODS: The contradiction between cultivated land and forest land and the contradiction between food security and ecological protection were scientifically quantified. Taking Sichuan and Chongqing as the study areas, the evolution of land use change and ecosystem services from 1990 to 2020 was analyzed, and the development law in the past two decades was obtained. Then, four scenarios related to cultivated land protection and ecological development were set up to simulate and predict the changes of land use and five ecosystem service functions in the future, and the spatial dimension of the ecosystem was studied based on GeoDa model. The whole study provides scientific guidance for the regional planning of Sichuan-Chongqing area.
CONCLUSION: This efficient environmental computing framework provides scientific basis and theoretical support for the balance and coordination between ecological protection and food production. This approach can be extended to complex areas around the world, especially where there are obvious conflicts between ecosystem services, to facilitate planners to quantitatively weigh conflicts between land use.

Keywords: ecosystem services, PLUS-InVest-GeoDa model, land use/cover change, Sichuan-Chongqing region

Sustainable recovery of the mangrove forest based on productive landscape

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As one of the most diverse ecosystems in the world, mangroves have a positive effect on the development of the city, such as wind and wave protection, the promotion of silting, and the bank protection. It is a special ecological system for the transition from land to the sea. However, this ecosystem is being seriously threatened due to the pressures of urbanization, land exploitation and economic development. This study took Pearl River Delta in Shenzhen, China as an example, analyzed the problems of disappearing mangroves caused by the aquaculture. Through the monitoring of different combinations of agroecological models, some feasible methods to balance the habitats preservation with land exploitation could be proposed. According to mangrove's characteristics and water environment of the experimental site, it is suggested to transform the aquaculture ponds into productive landscape, via building base peri aquaculture system. In this case, a symbiotic relationship between mangroves and aquatics would be built, and the gradually sustainable recovery of the mangrove forest would be great potential.

Keywords: Resilient Landscape, Productive Landscape, Ecological Restoration, Agroecological Models

Restorative Landscapes: A Solution for Equality and Refuge

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Given the absence of effective spatial planning to secure proper housing, refugees are drawn to cities, improvising shelter in areas lacking municipal services.Tehran has been a destination for such movements by the displaced Afghans with shared language, cultural, and religious commonalities, which climaxed in 2021 after the military onslaught of the Taliban and the downfall of Kabul. The study develops a placemaking approach, design theories, and traditional ecological knowledge solutions to equality for foreign refugees through restorative landscapes in Tehran's Kan District to demonstrate how landscape architecture can contribute to creating more equitable and inclusive landscapes by contextually responsive, sustainable, and impactful interventions to the needs of host and diaspora communities. This study has the potential to serve as a model for addressing similar challenges in other urban contexts.
Global urbanization, propelled by high internal and foreign migration, is an acute phenomenon in the developing world where officials often grapple with limited resources, making it challenging to address such demographic shifts, resulting in the rise of immigrant ghettos characterized by severe poverty and tensions between migrants and local communities. This study focuses on Tehran's Kan district, on the north-western edge of Iran’s capital, notable for its significant Afghan migrant population. Our method involved conducting interviews with the migrants residing in Kan, through which we identified significant challenges, including psychological stress induced by war and migration, gender discrimination, economic hardship caused by unemployment, working in non-specialized jobs due to limited skills and exacerbated by legal restrictions, public health issues, social inequality, homelessness, stray dogs, and a dearth of recreational spaces for children. Despite these hurdles, Afghan refugees find some solace in cultural, religious, and linguistic similarities and, consequently, a stronger sense of belonging. His study aims to elucidate the primary challenges and inequality affecting Afghan homeless migrants in the Kan district informal settlements. We engaged with these communities directly with the objective of pinpointing areas in need of urgent intervention in order to plan and design strategies. We proposed restorative landscapes solutions that are innovative, socially just, contextually sensitive, and financially feasible to improve the lives of Afghan immigrants and contribute to a sustainable and inclusive society. Considering stress reduction and attention restoration theories and following restorative landscapes regeneration, we developed design solutions for interventions in public spaces, community centers, housing, and infrastructure. Participatory design processes were explored to engage Afghan immigrants and local stakeholders in the

preparation of design solutions. We prioritized social equity by creating inclusive spaces that address marginalized communities within the Afghan diaspora.

Biography:
Reza Farhadi is a graduate student at University of Tehran, winner of IFLA student competition in 2023, urban planner, landscape architecture consultant, urban futurist, and lecturer at universities in Iran. He has co-authored four books on urban planning and landscape architecture in Persian. The titles of these books are “Xeriscape,” “Plants in Landscape Architecture,” “Urban Parks Design Guide,” and “Introduction to Urban Livability

Keywords: Restorative Landscapes, Refugees, Equality

Sustainable Future: Zero-Carbon Parks with Innovative Microgrid Integration

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In the urgent context of global climate change, addressing the challenges facing cities requires a key objective of low carbon. The city's vast green spaces are equipped with natural resources such as sunlight, wind, and hydropower, which have huge potential for renewable energy applications. The objective of this article is to reduce reliance on traditional energy sources by implementing the theory of low carbon energy to establish a self-sufficient microgrid system for urban parks. The aim is to explore the construction path of efficient and clean zero-carbon parks. This article proposes innovative and feasible measures for constructing microgrid systems in urban parks, focusing on energy carbon emissions and energy use. The measures are based on four aspects: source, network, load, and storage. Renewable energy facilities, such as solar, wind, and water energy, can be combined with park structures and landscape vignettes to efficiently generate power. New power system technologies can be applied for energy storage, while energy-saving products and intelligent management platforms can be adopted for power consumption. This approach minimizes wastage and maximizes the use of renewable energy.
Transforming urban parks from traditional recreational spaces into low-carbon demonstration spaces not only reduces carbon emissions but also provides a feasible and sustainable green development path for cities. Transforming urban parks from traditional recreational spaces into low-carbon demonstration spaces not only reduces carbon emissions but also provides a feasible and sustainable green development path for cities. Transforming urban parks from traditional recreational spaces into low-carbon demonstration spaces not only reduces carbon emissions but also provides a feasible and sustainable green development path for cities. This approach offers useful experience and reference for sustainable urban development worldwide.

Keywords: zero-carbon park,low-carbon,microgrid,urban park

POSTER PRESENTATIONS

Sustaining Life: Protection, Mitigation & Management

Analysis of Ecosystem Services from the Perspective of Production-Living-Ecological Space

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Under the background of rapid urbanization, urban land use is constantly transforming, resulting in a series of ecological problems such as habitat quality decline, ecological pattern fragmentation, ecological function degradation, extensive and inefficient land expansion, resulting in the slow development of land space. The examination of how ecological-living-ecological space is transformed in urban development is a crucial component of the development of territorial spatial planning, and it plays a major role in the preservation and enhancement of ecosystems as well as the efficient use of available land in the region. The concept of "ecological-living-ecological space" was developed with Loudi City as the research area in order to examine the trends and relationships in the city's spatial and temporal distribution. Based on the land cover data of the fifth period from 1980 to 2020, the InVEST model and the ESV estimation model were used to explore the impact of ecological-living-ecological space transformation on the habitat quality, carbon storage, and ecosystem service value of the city's ecosystem services, in order to provide reference for the sustainable development of land and space resources in Loudi City, as well as guidance for the ecological construction and protection of Loudi City. The findings demonstrate that: (1) The proportions of production, living, and ecological space were 35.31%, 61.02%, and 3.67%, respectively. During the 40 years from 1980 to 2020, the area of production space continued to decrease, the area of living space continued to increase, and the area of ecological space increased first and then decreased. (2) From 1980 to 2020, the total amount of carbon storage in various ecosystem service indicators in Loudi City gradually decreased, and the carbon storage decreased the most from 2010 to 2020, the overall habitat quality showed a downward trend, and the ecosystem service value increased first and then decreased. (3) From 1980 to 2020, the comprehensive score of ecosystem services in "Production-Living" in Loudi City decreased year by year, which further exacerbated the decline trend of the comprehensive capacity of ecosystem services in " Production-Living-Ecological " Space.

Keywords: Production-living-ecological space, Carbon storage, Habitat quality, Ecological service value, Loudi City

A new framework for establishing contiguous protected areas to enhance ecological civilization construction in tropical island

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Exploring the comprehensive impact of landscape pattern changes on regional ecosystem service values (ESVs) over a long time series is significant for optimizing ecosystem management. This study took Hainan Tropical Rainforest National Park (HTRNP) as a case and first assessed its five vital ecosystem services (ESs): water supply (WS), water purification (WP), carbon storage (CS), soil retention (SR), and habitat quality (HQ). Based on the ESs assessment results, we further calculated their ESVs and quantified the responses of ESVs to landscape pattern changes during 1980–2020. The results revealed that: (1) Forestland is the basal landscape type of HTRNP. Landscape patterns changed significantly after 2000; the proportion of both cultivated land and grassland decreased, while the proportion of forestland, water, and construction land increased; with the areas and landscape dominance of both forestland and water increased, the agglomeration and connectivity of the overall landscape increased and its homogenization decreased. (2) WS, WP, CS, and SR services tended to weaken, and HQ service tended to strengthen. The spatial heterogeneities of WS and SR changed significantly over time. WS, HQ, SR, and CS are the main contributors to the total ESV. During 1980–2020, the four ESVs of WS, WP, SR, and CS showed a decreasing trend; HQ's ESV tended to increase, and the total ESV tended to decrease. (3) The increase of areas and dominance in forestland and water was the main reason that HQ's ESV tended to increase, and WP's ESV and CS's ESV tended to decrease. The construction land scale was relatively small, so its impacts on ESVs were limited. The responses of both WS's ESV and SR's ESV to landscape pattern changes were insignificant due to the impacts of topographic and climatic factors. The study results provide a reference for managing and optimizing HTRNP's ecosystem to improve its integrated benefits of crucial ESs.

Keywords: landscape pattern, ecosystem service, spatial-temporal change, tropical rainforest, national park

Reexamining green infrastructure quality for creating heat resilient neighbourhoods

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By proposing a re-examination framework and optimisation strategies for enhancing the quality of green infrastructure (GI), the research aims at creating heat-resilient neighbourhoods in high density cities. With estimated 1.5°C to 2°C of global warming in this century according to the Intergovernmental Panel on Climate Change, the frequency and intensity of extreme heat events have accelerated over past decades and intensified urban heat island effect in high density cities including Hong Kong. It exacerbates heat risk and threatens our health. Green infrastructure, a nature-based solution is conducive to cool down urban environment with provisioning ecosystem services i.e. regulating microclimate. However, little is known about planning an effective GI system from climatological and spatial planning perspectives. It also faces challenges including overemphasis on quantifiable measures over quality and omission of climate 'agency', which are detrimental to developing quality GI and weaken cooling efficacy.

A systematic methodology is adopted to reassess and optimise the quality of GI. Initially, positioning climatic and urban issues in global and local scales, and identifying underlying determinants influencing and intensifying heat risk as well as factors hindering GI's cooling efficacy in city-level. The research hypothesizes that high-quality GI maintains a functioning urban ecosystem so effectively regulates urban microclimate and creates a thermally comfortable environment. To validate, an evaluation framework of GI is formulated through comprehensive literature review of international and local studies. The proposed framework contains two major function qualities: (1) cooling efficiency assessed by site scale, vegetation size and plant species diversity and (2) ecosystem health evaluated by green coverage, structural complexity and biodiversity.

City-scale spatial analysis is conducted in GIS for mapping heat risk, Local Climate Zone, Normalised Difference Vegetation Index and Green View Factor. On neighbourhood-scale, Yau Mong area is selected as a representative case for in-depth site analysis and speculation. The quality of GI is evaluated in the neighbourhood through fieldwork and scientific measurement tools. Public opinion towards GI is collected through online surveys and interviews to analyse community needs.

A series of design strategies is proposed, consisting of quality evaluation, green optimisation and green planning. Systematic planning and design approaches are devised to comprehensively ameliorate the quality of GI in the focus areas, the neighbourhood and the city as a whole. Green optimisation strategies, including reserving large trees, enhancing biodiversity, maximising green coverage, optimising cooling experience, bringing nature closer and creating more open space, hope to optimise green quality and enhance cooling efficacy in the neighbourhood. Green urban planning is proposed in the long term to achieve thermal comfort on district- and city-levels, benefiting more communities.

This research aims to bridge the gap between planning and implementation of GI through evaluating its quality and deconstructing misunderstandings about green equals ecological functioning. There is a pressing need to evaluate the quality of GI to ensure it is functioning and providing ecosystem services especially climate regulation for enhancing urban heat resiliency. Ultimately, the goal is to create a sustainable, liveable and heat-resilient urban environment for the community.

Keywords: Green infrastructure, urban heat island, thermal comfort, urban microclimate, ecosystem services

Research on spatial-temporal patterns and influencing factors of cultural heritages

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Cultural heritage area is an important part of China's territorial spatial pattern, and the protection of cultural heritage is an inevitable requirement of carrying forward the excellent traditional Chinese culture.
Dongting Lake is an important lake in the middle reaches of the Yangtze River. And the area around Dongting Lake contains rich history and culture. The region has formed a rich cultural heritage through thousands of years of continuous adaptation to the natural and social environment, with a long history and far-reaching cultural influence.
In the existing research, the research on Dongting Lake area mainly focuses on ecological protection, water treatment, etc., but the excavation of its cultural attributes is not enough and it can not provide a clear goal guidance for the cultural heritage protection in Dongting Lake area.
The paper takes the Dongting Lake area in Hunan province as the research scope. Combining with the data of eight batches of national and provincial key cultural relics protection units released by The State Council of China, this paper studies the cultural heritage of Dongting Lake area by using the nearest neighbor index method, nuclear density analysis method and geographical detector.
First of all, the number, category, formation time and protection level of cultural heritage are classified to form a regional cultural heritage database. Then, studying the temporal and spatial differentiation characteristics to show the multi-dimensional landscape characteristics of its space-time evolution. Finally, exploring the driving factors of temporal and spatial differentiation from the perspective of natural and humanistic elements.The research results are conducive to the spatial understanding and protection of the cultural heritage resources in Dongting Lake area and hoping to realize the inheritance and development of regional cultural landscape in the future.

Keywords: Cultural heritage, Spatial-temporal patterns, Influencing factors, Dongting Lake area in Hunan province

Constructing an Urban Cooling Network based on PLUS model

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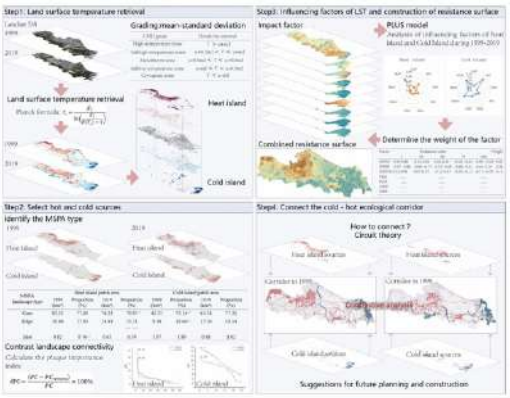
Global climate change is a serious challenge facing mankind. Previous studies have proved that urban blue and green space has a cooling effect. However, due to land restrictions and planning and development, blue and green space cannot be indefinitely increased, and these effective cooling measures should be planned and implemented in the most needed places. Many studies on the mitigation of Surface urban heat islands (SUHI) were conducted from the perspective of landscape patch allocation, and few studies were conducted on the impact of overall connectivity and network on SUHI. In this study, an ecological network was proposed to connect key patches and then determine the direction of the cooling corridor. Based on surface temperature inversion data, morphological spatial pattern analysis (MSPA) and landscape connectivity index are used to identify heat island and cold island patches with high ecological value as the source of network construction. The patch-generating land use simulation (PLUS) model is innovatively introduced to construct the resistance surface, and Circuit theory (CT) is used to connect the cold-hot island cooling corridor. The results show that: (1) From 1999-2019, land surface temperature (LST) increased significantly in the city of Haikou, the extreme LST became more and more significant, and the area with the highest temperatures showed a southward trend. (2) The connectivity between cold and heat island patches declined, and the Loop, Bridge, and Branch areas in heat islands increased. The latter scenario is conducive to the construction of cooling corridors. (3) The land cover index had a great influence on SUHI, and the resistance surface presented a distribution pattern with high values in the northwest and low values in the southeast, which is consistent with the distribution of LST. (4) The cold-heat island cooling network was extracted by CT, and the difficulty of corridor construction in 2019 was lower than that in 1999, mainly concentrated in the southern edge of the study area. This research can guide urban planning to strengthen ecological network construction to mitigate SUHI.

Keywords: Heat island effect, Ecological network, PLUS model, Circuit theory

Flow diagram



Andean Landscapes: The Inca Road System "Qhapaq Ñan" of Peru

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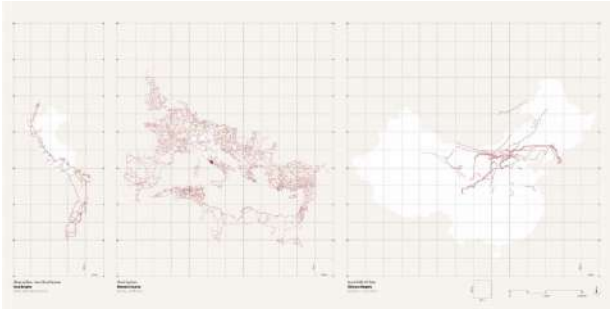
The Qhapaq Ñan is a complex road system that the Incas unified and built during the 15th century as part of a great political, military, ideological and administrative project known as Tawantinsuyu. This extensive road network has more than 60,000 kilometers, to articulate a diverse territory of almost 3 million square kilometers, much of which is in Peru and extends to the neighboring countries of Colombia, Ecuador, Bolivia, Chile and Argentina. In 2014, the Qhapaq Ñan was recognized by UNESCO as a World Heritage Site.
The Andean region of Cusco (southeastern Peru) is the starting point of the Qhapaq Ñan. This region is home to 13,000 kilometers of the road system. The roads of Cusco, in addition to being a communication and transportation infrastructure, also had another function as hierarchical parameters of the spatial organization of Cusco. As a consequence, the towns, places and resources of the different regions are referred to based on their relationship with the road system that articulated the territory and, therefore, a close conquest and physical and cultural construction of the Andean landscape is denoted. Currently, the Qhapaq Ñan is administered by the Ministry of Culture of the Peruvian government, whose purpose is to identify, investigate and enhance the value of the network of Inca roads that still exist in the Peruvian national territory.

The objective of this research is to demonstrate the physical-cultural characteristics that give value to the cultural landscapes associated with the Qhapaq Ñan of Cusco. The research will consider the areas of influence of the sections of the Qhapaq Ñan declared World Heritage by UNESCO and located in the regional district of Cusco. This itinerary focuses on the cases where the dynamics of intersection between landscape sustainability and human agency occur in the complex geography of the Peruvian rural environment. Diagrams, cartographies and geographic information systems are used to expose a graphic and descriptive reading of the multi-scale territorial analysis and the cultural system of the case studies.

In the geographical environment of the Qhapaq Ñan there is a variety of human groupings, from small communities, medium-sized cities, to large metropolises. In the areas farthest from the cities, i.e., in rural environments, long and impressive stretches of the Inca road are preserved. To this day, there are numerous stretches of the Qhapaq Ñan that continue to be the main access route to certain places, especially in remote areas and at high altitudes. These Inca roads are used daily by local inhabitants to travel to their homes, farms and communal grazing areas. In this context, the Qhapaq Ñan and the rural population centers it connects constitute a territory perfectly articulated by cultural and building manifestations.
The cultural landscapes associated with Cusco's Qhapaq Ñan are still in force due to the sustainability of its populations. These systems, made up of a human and geographic network, bear witness to a series of values that are not only scenic but also social and ethnographic, as they reflect the collective rural memory.

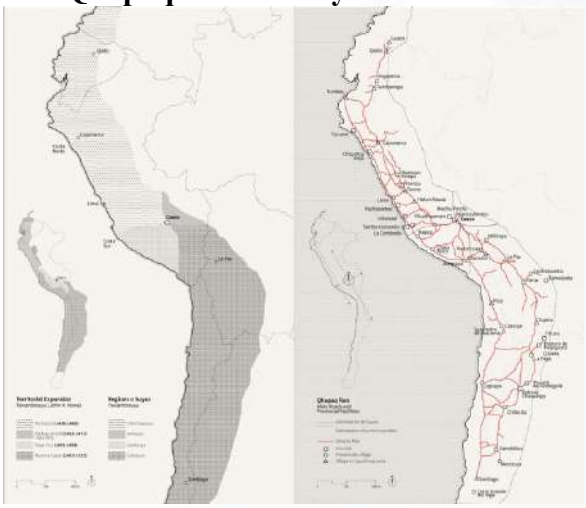
Keywords: Cultural landscapes, rural settlements, Andean territory

Comparison of dimensions between the Qhapaq Ñan, Roman Road System and the Great Wall of China

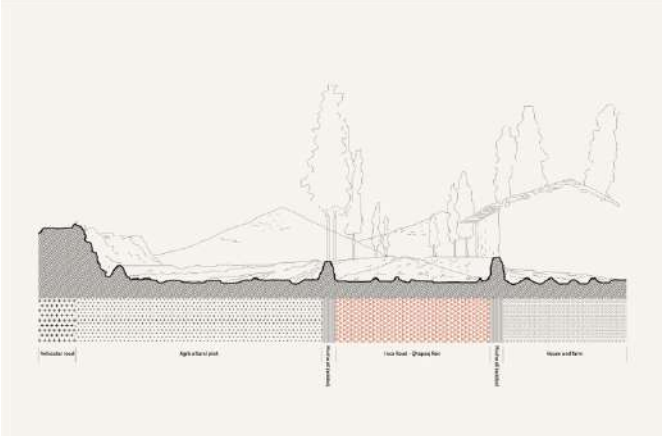


Longitudinal and transversal road system of the Qhapaq Ñan at present

The Qhapaq Ñan road system at the time of the Inca Empire



Typical cross section of Qhapaq Ñan



Cultural identity in the historic urban landscape of colonized cities

Wanyi Yang, Linfeng Shi
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In contemporary Chinese urban settings, certain areas still preserve historical urban landscapes established during the colonial era, contributing to the distinctive cultural fabric of the city. These landscapes hold significance in shaping the cultural identity of local inhabitants, reflecting both individual self-perception and collective identity within a heritage framework. Understanding residents' cultural identity is pivotal for the sustainable preservation and development of such historical urban landscapes.

This study aims to investigate the formation mechanisms and influencing factors of residents' cultural identity towards historical urban landscapes imbued with colonial culture, offering insights for the direction of planning and safeguarding such locales. The research is conducted in Qingdao, China, notable for its numerous historical urban landscapes profoundly influenced by colonial heritage, with the old town of Zhongshan Road serving as a prime exemplar. Employing a blend of quantitative surveys and qualitative interviews, this study devised a questionnaire grounded on a three-dimensional scale encompassing cognition, emotion, and behavior in assessing cultural identity. The survey was administered to local residents, followed by confirmatory factor analysis and path analysis utilizing SPSS to discern interrelationships among these dimensions. Subsequently, semi-structured interviews were conducted to expound upon the questionnaire findings, supplementing additional factors beyond the three dimensions of cultural identity.

Findings indicate that while the cognitive dimension exerts no significant influence on emotional and behavioral dimensions, a notable bidirectional impact exists between the emotional and behavioral dimensions. Furthermore, both emotional and behavioral dimensions significantly influence the cognitive dimension. Within these dimensions, factors such as cultural value and pride, shaped by colonial heritage, emerge as primary influencers of cultural identity, with conversational behavior serving as a predominant expression thereof. Additionally, spatial patterns influenced by colonial culture significantly impact residents' cultural identity. Overall, the preservation of cultural value, the enhancement of residents' pride, and the optimization of spaces facilitating resident-landscape interaction emerge as vital strategies in historical urban landscapes influenced by colonial heritage. This study underscores the significance of comprehending residents' cultural identity in historical urban landscapes retaining colonial culture, offering valuable insights for future urban heritage area revitalization and planning endeavors.

Keywords: Cultural identity, Historic urban landscape, Colonized cities, Urban planning

Comparing deltaic spatiotemporal mappings with collective imaginations towards the past

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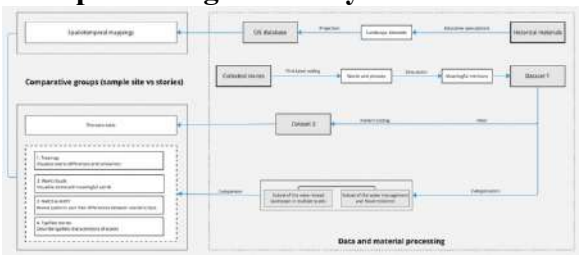
The 2023 IFLA World Congress has issued a declaration on indigenous knowledge and cultures. As landscapes represent a process rather than a stagnant object, one key question is to shed light on whether the site in evolution narrated by research evidence differs from the landscape-based traditions that individuals conceive based on their perceptions, and if so, how evidence can be presented. The case study in this paper is background in China's Yangtze River Delta (YRD). Deltaic urbanism is based on the interactive relationship between changing land-water conditions and continuous human settlement. To approach the question, site-specific mappings and generic landscape descriptions are comparatively paired. On the one hand, the transdisciplinary knowledge is visually synthesised through mapping and applied to a representative sample site (30 km x 20 km) in one of the lowest regions in YRD. The sample includes three ancient water towns and several major canals. On the other hand, empirical knowledge is approached through the Method of Empathy-based Stories (MEBS) with 240 people surveyed with local experiences in deltaic water towns and villages. Eight historical scenarios are set up for participants to write their own themed stories through their recalled experiences and imaginations, forming a collective discourse of deltaic urbanism.

By synthesising a variety of materials, the spatiotemporal mappings illustrate how the landscape has predominantly evolved over more than a thousand years, with significant interventions by canals and polders. The site's water urbanism is explained through a brief history of water urbanism. The collective discourses are encoded with further data processing methods such as NMDS & MRPP, treemaps, and word clouds. The typical stories and pattern coding are compared to the historical context of the selected representative site sample. Based on comparative analyses, we can observe that: (1) historical maps and non-visual history-based narratives can both contribute to the understanding of their respective contents, particularly concerning indigenous landscapes; (2) The significant changes in the landscape of the sample site do not align with the narratives of the participants. Most stories don't specify the particular historical periods, while the majority of them are situated in the 17th century onwards based on the content; (3) Although people include rich indigenous landscapes, they don't usually identify and position polders and canals as landscape contexts, as researchers do. Our research suggests that although the indigenous landscape is strategically positioned by professionals, it is crucial to acknowledge the disparity between the evidence based on historical and transdisciplinary studies and people's perspectives of the landscape context.

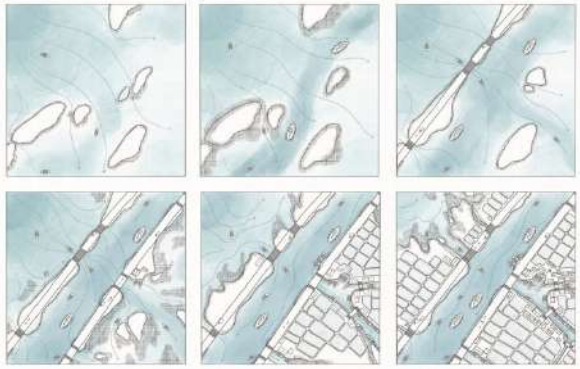
Keywords: landscape cognition and perception, indigenous landscape, deltaic urbanism, method of empathy-based stories, mapping

Data processing and analysis flow chart



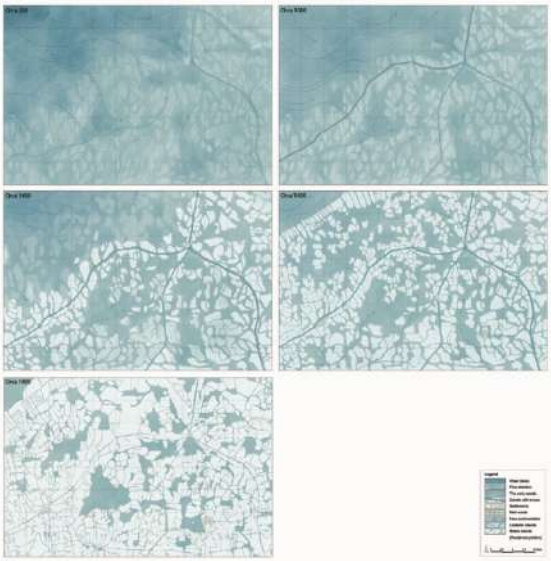
The mappings of a sample area are made based on educative speculations according to diversified materials. The empirical knowledge from the participants with local experiences is acquired through a storytelling method, the Method of Empathy-based Stories (MEBS). Mappings and the content analysis of the stories form a comparative group, where to which extent the indigenous polder-based landscape urbanism is perceived.

Diagram of the human-intervened deltaic landscape changes



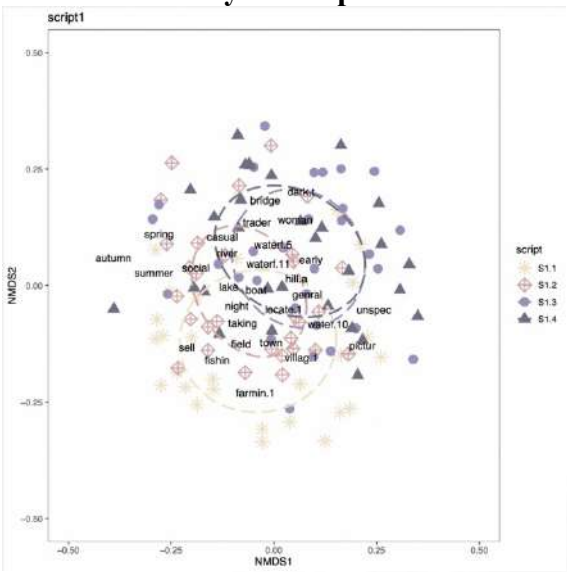
The series of diagrams are illustrative translations of works of literature studying the landscape changes intervened by canal engineering and the following emergence of reclamations in the delta

Spatiotemporal mapping of the sample area



Spatiotemporal mappings are made based on educative speculations in a sample region (30km x 20km) based on multiple historical maps and modern evidence-based research. The mappings present the vast landscape changes throughout centuries, predominantly intervened by canal engineering and polder-based reclamations.

The NMDS analysis sample



NMDS ordination plots based on story codings highlight differences between different scripts. The standard deviations of a particular version of each script are presented by ellipses. MRPP results measure the differences, the more negative, the greater the difference.

Cultural heritage research: west lake in southern song dynasty

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West Lake in Hangzhou is the only lake of cultural heritage listed on the World Heritage List in China. It is deeply influenced by Buddhism, Taoism, and Confucian culture. For thousands of years, it has created a picturesque scenery by perfect integration of humans and nature through artificial improvement of the natural landscape. Its embankments, islands, bridges, temples, and other scenic spots are widely spread in China and also spread to countries such as Japan, North Korea, and Vietnam. The Southern Song Dynasty was the most important period in the history of the development of the West Lake landscape. The famous "Ten Scenes of West Lake" were formed during this period. This article focuses on the study of the West Lake gardens in the Southern Song Dynasty and its impact on later generations.

The research is mainly carried out from four aspects. First, it studies the improvement of the overall landscape pattern of West Lake during the Southern Song Dynasty. The improvement of West Lake was a large-scale water conservancy project based on regional security and rich production. The pattern that three interfaces face the lake and mountains, and one interface faces the city not only has aesthetic pleasure but also brings Lin'an City ecological diversity and stability, it was the practice of ecological urbanism in ancient China.

The second is based on ancient poetry and paintings, combined with contemporary archaeological data to sort out and restore the private gardens, royal gardens, and temple gardens built around West Lake, including Zhenzhu Garden, Jujing Garden, Huanbi Garden, and Large Stone Buddhist Temple,etc. So far, we have sorted out information on 149 West Lake gardens in the Southern Song Dynasty, and completed restoration research on 21 gardens.

The third is to study the gardening activities in the Southern Song Dynasty, especially the water activities in West Lake, which was a major feature of this garden surrounded by the large lake and mountain. The groups visiting the garden included both literati and middle-class people.Activities included daily sightseeing, festival sightseeing, performing arts competitions, religious activities, etc. The flourishing gardening activities have promoted the development of Lin'an City's tertiary industry, resettled a large number of urban employed people, objectively promoted economic prosperity and social stability, and in turn influenced the aesthetic orientation and craftsmanship of gardening.

The fourth is to research the remaining Southern Song Dynasty garden relics, combining 3D scanning and field surveying, including Feilaifeng, Shuiyue Cave, Yanxia Cave, Shiwu Cave, etc., to establish digital archives for the relics, and further build the Large Stone Buddhist Temple Planning and heritage cultural park design.

The specialization of Chinese gardening began in the Southern Song Dynasty, and the master of gardens in the Southern Song Dynasty was West Lake Gardens. This study looks at West Lake gardens of the Southern Song Dynasty from a broader perspective, accumulates

information for the protection of cultural heritage, and explores new directions for the activation and development of heritage today.

Keywords: Southern Song Dynasty, Garden, West Lake, Relic, Garden activities

Guiding natural spontaneous order to maintain urban biodiversity

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This study hopes to give full play to the resilience of nature by leaving appropriate blank spaces in the urban park system, creating urban landscapes with the wisdom of going with nature, and guiding an uncarved and wild aesthetic paradigm. It provides shelter for the survival of the city's natural habitat and also provides the possibility for citizens to observe and appreciate the full range of nature at close range. The study selects several natural habitat patches in the city as sample plots, plans transects and quadrats, conducts continuous research on the diversity of insects, birds, small animals and other wild animals that live here for many years, observes their behavioral patterns, and records changes in the numbers of each species and population. To truly restore the impact of "rewilding" urban parks on wildlife habitats, and provide some suggestions and inspiration for future related designs.
In areas with good ecological environment, it is recommended to adopt the form of plank paths, which can not only limit the scope of people's activities but also minimize the interference to natural habitats while allowing citizens to immerse themselves in exploring natural habitats. 2. Restrained LED light sources and shortened lighting time can effectively prevent light pollution from interfering with birds and insects. 3. In the process of maintaining public green spaces, the preservation of dead wood is particularly important for the habitat of small animals and beetles. Understory shrubs and grass are important host plants for butterflies, they should be preserved to the maximum extent. 4. Some wildflower belts can be arranged to provide nectar plants for butterflies. At the same time, in the disposition of tree species, the selection of berry plants can effectively attract birds to form their niche. 5. Landscape pesticides should not be sprayed on the habitat island. We should try to guide the natural initiative and show the process landscape to the public.

Keywords: Natural spontaneous order,Urban habitat island,Low intervention design,Urban wildlife,Preservation of dead wood

Regeneration of Industrial Relics from the Perspective of Public Art

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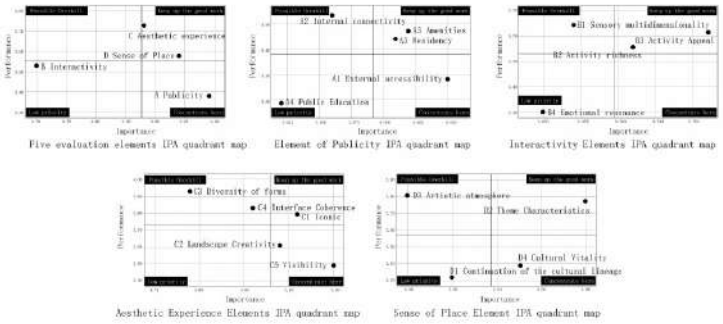
In an era when urban development is shifting from incremental expansion to stock optimization, these industrial relics will become an essential breakthrough for urban regeneration. The significance of industrial relics in urban regeneration is increasingly recognized due to their potential land use value and their capacity to create public spaces. At the same time, with the improvement of material living standards, people's demand for urban spiritual and cultural construction is growing day by day. Public art, as a language of integration, has commenced to play a vital role in the urban development process, demonstrating a unique cultural and economic influence and leading to numerous successful cases of industrial relics regeneration. Through the view of public art, the specific case of the Guangzhou Pearl River Piano Factory is used as an entry point to analyze the intrinsic connection between different elements in the process of industrial relic regeneration. As industrial relics hold substantial potential for land use and public space attributes, they have emerged as a focal point for urban regeneration efforts. The intervention of public art in the process of urban development has not only contributed to the revitalization of industrial relics but has also brought forward a unique cultural and economic influence. The successful transformation of numerous industrial relics through the integration of public art serves as a testament to its pivotal role in urban regeneration initiatives.

Firstly, the connotation characteristics of public art and the core elements involved in the renewal of industrial heritage are integrated and analyzed. It is pointed out that public art, as a comprehensive means with regional, contemporary, and cultural characteristics, has a catalytic effect on the renewal of industrial relics. The method and significance of industrial relics renewal are proposed from three levels of space, function, and culture, based on which the whole process method of industrial relics renewal design from the perspective of public art is proposed.

Secondly, taking the regeneration of the Guangzhou Pearl River Piano Factory as an empirical case study, the whole process of its regeneration is analyzed in three phases in detail, and the role of public art in this process is systematically sorted out. Based on the literature review, field research, and expert opinion consultation, the perception elements of public art and spatial elements of industrial relic regeneration are integrated to establish the evaluation indexes of industrial relic regeneration from the perspective of public art, and the regeneration effect of Guangzhou Pearl River Piano Factory is evaluated by using the IPA analysis method, corresponding optimization suggestions are put forward based on the results of the evaluation. The dynamic nature of public art intervention is conducive to guiding the process of self-organized urban regeneration and perpetuating the precious urban collective memory of industrial culture. Finally, based on the above theories and empirical research, the industrial relic regeneration design model and whole-process approach are proposed from the perspective of public art, which will be a useful reference for the innovative development of urban inventory land regeneration.

Keywords: Public Art,Regeneration of Industrial Relics,Pearl River Piano Factory,The whole process methodology

Importance Performance Analysis



Through the IPA quadrant analysis, the elements of aesthetic experience (C) and sense of place (D) are located in the first quadrant (Keep up the good work), where respondents perceive these indicator elements to be of significant importance and are satisfied with their performance. Of these, the C1 iconic feature is located in the area of Possible Overkill. The building façade has been adjusted from grey-white to bright brick-red, the floor pavement has been beautified, and the building façade has been decorated with giant pianos and a strong visual identity, which creates a public cultural image of the industrial relic of the Pearl River Piano Factory and meets the public's visual aesthetic needs.D2 Thematic features are located in the area of Possible Overkill. Relying on its own music culture tradition, the site identification, architectural decoration, ground pavement and landscape design are all tightly focused on it, using music culture to enhance site recognition, stimulating a catalyst chain reaction through the point implantation of public art, and fully demonstrating the great energy of public art and industrial culture in the space place.

Interpretation of "Dwelling in the Fuchun" sustainable design of Hangzhou

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For a long time, the dual development of urban and rural areas caused the decline of rural areas. Based on the integration of culture and ecology, this project aims to create a sustainable development model for the suburban areas of Hangzhou, China.

We take the Sanjianghui area as an example, which is the beginning of 'Dwelling in the Fuchun Mountains', a famous Chinese landscape painting. We put forward a series of design strategies on account of 'Contemporary Landscape Realm', which include four main factors: identity, livability, accessibility and flexibility. In order to balance the inheritance of traditional culture with the future development of the city, the importance of polder agriculture is fully emphasized as the core of the integration of culture and ecology in this urban design project. Finally, we realize the transition from city to nature by constructing three spatial levels: the cultural water town, renewed villages and the wetland park. We hope that this sustainable design strategy will serve as a model for future development of suburban areas in China.

Throughout the thousand years of Chinese history, Hangzhou has been the best place for intellectuals to write poems and articles since ancient times. Located in the southwest of the main urban districts of Hangzhou, Sanjianghui is the core area where the Qiantang River, Fuchun River and Puyang River meet. In history, it is also the beginning place in the famous painting "Dwelling in the Fuchun Mountains". Sanjianghui area contains a large number of natural landscapes of polders unique to the Jiangnan region, with multiple values of history, culture, agriculture and ecology. There are four types of settlements according to their main characteristics: hill settlement, plain settlement, riverside settlement and sandbar settlement. Four agricultural patterns are also distinct: hill terrace, plain farmland, polder and sandbar fishing field.

However, due to the rapid development of China's economy and society in the past few years, urban and rural areas in Sanjianghui have developed independently. This situation has led to the decline of rural areas and the pollution of ecological environment. Thus, traditional agriculture is facing a great threat. This vicious cycle is exacerbated by the migration of local populations to urban central district.

Based on the comprehensive analyses of the site, we combine the ideal scenery of the painting "Dwelling in the Fuchun Mountains" with traditional Chinese construction thoughts of landscape garden city, putting forward the overall design concept of " Contemporary Landscape Realm ", including four main principles. It is necessary to slow down the urbanization process and reorganize the original farming culture. We reserve the agricultural texture of the site, and build a resilient barrier from three levels: pallets - fields - dikes.

We think that future-oriented urban design is supposed to be green, ecological and sustainable, especially fully consider regional and cultural characteristics of the city. The

research on sustainable design strategy of Sanjianghui suburban area is a self-redemption for the future development of Chinese cities and villages.

Keywords: regional culture, ecological landscape, sustainable development, urban design

Contemporary Interpretation of "Dwelling in the Fuchun" Sustainable Development Design Strategy of Hangzhou Suburban Area

Permeable Green: Design for sustainable campus streetscape at Cortex

Yixin Jiang
Yixin Jiang, TBG Partners, San Antonio, USA

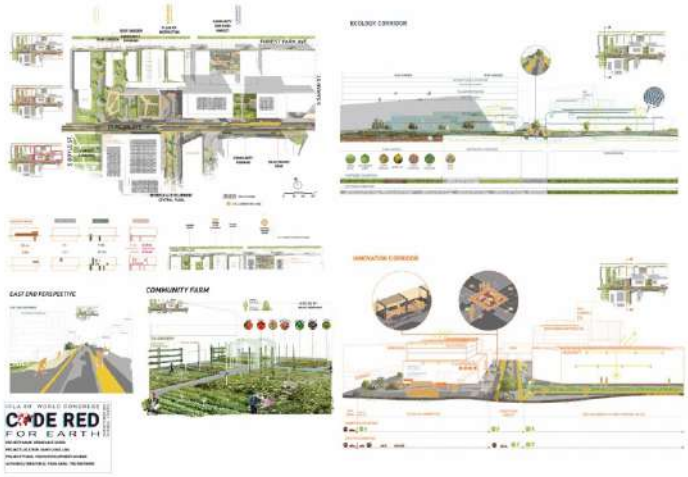
Cortex, innovation campus in midtown Saint Louis USA, has a high potential to increase density and diverse traffic mobility. To further develop “Equity, Ecology, Economy” theme during master plan ession, this pilot project focuses on the block between Sarah Street, Forest Park Ave and Duncan Ave, which was designed into a pedestrian street. As a community filled with high-tech innovation companies, the proposal was growing from existing context, Duncan was turned into a pedestrian and environmental friendly street, helping add lustre to Saint Louis ecological greenways are increased under green canopies. In the meanwhile, creating supportive commercial facilities for staff members as well as visitors helps increase economic income, and community farming or rain garden planting provides job opportunities and welcomes local communities to get equal public access to the neighborhood. Duncan Ave is a corridor with a majority of high-tech companies on both sides, including Microsoft, Alcami etc, together with rental lofts as infrastructure. The pioneer project is in accord with master plan, to emphasize ecological aspect of the site and provide equal opportunities for the public to enter. Large occupation of onground parking is the major issue in terms of site density and land use efficiency.

PROJECT GOALS: Make priority to slow traffic in the corridor of innovation, encourage more outdoor activities during business and non-busines hours, create sustainable business campus through landscape design.

RELEVANCE FOR THEME: The project proposes sustainable ways of land use through changing landscape patterns, take advantage of small volumn of rooftops to not only create outdoor opportunities but also increase the biodiversity of the campus. Then start taking focus on community memory creation and preservation from the base of goodwill store, to encourage all-direction accessibility to second hand market in the north-facing courtyard, while creating community farm engagement close to a multifamily living community, where density of people are concentrated. Therefore, the project is relevant to the theme of sustainability to improve social equity as well as ecological biodiversity and ecosystem service improvement.

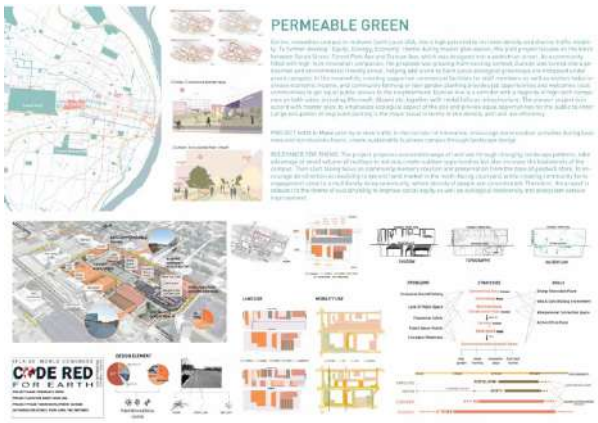
Keywords: sustainability, streetscape, campus, biodiversity, social equity

Permeable Green Poster 01



project poster presentation 01

Permeable Green Poster 02



project poster presentation 02

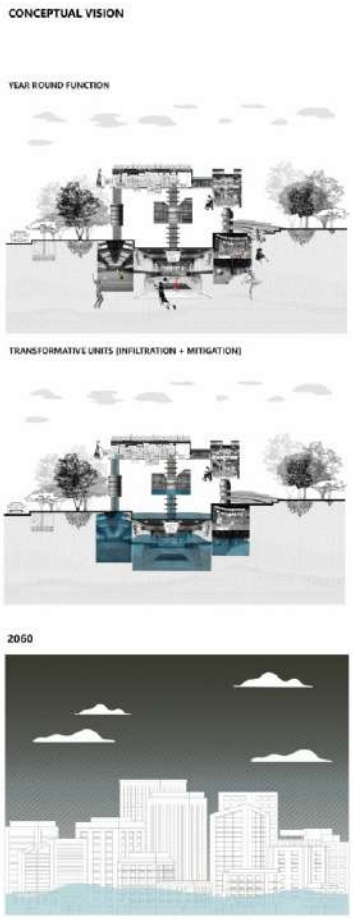
Natural Disaster Resilience

Ghada Abdulrahman Al Olayan
Department of Architecture, Kuwait University

Floods, one of the most devastating natural calamities in human history, has once wiped out Kuwait. Present day Sabah Al
Ahmed residential area is built on an ecologically flooded zone, endangering the residents of the area. With the escalation of global warming, humans around the globe humans are suffering from natural disasters, driving us to an uncertainty in the world, questioning the time and place of the next course of disastrous action. In the face of atrocities, Kuwait's resilience to flooding and earthquakes is frail
because the urban fabric is detached from ecological cycles. Flooding in Sabah Al Ahmed has led to economical and human losses, so the need to design resilient structures is of utmost importance to insure the safety and welfare of its inhabitants. Using a dual purpose approach, recreational space that is socio-ecologically designed to transform into cisterns, this thesis tackles the climatic uncertainties by providing resilience through a local farming facility that transforms into a safety hub. In the face of extreme challenges such as safety, water scarcity and food security, the time has come to design for resilience.

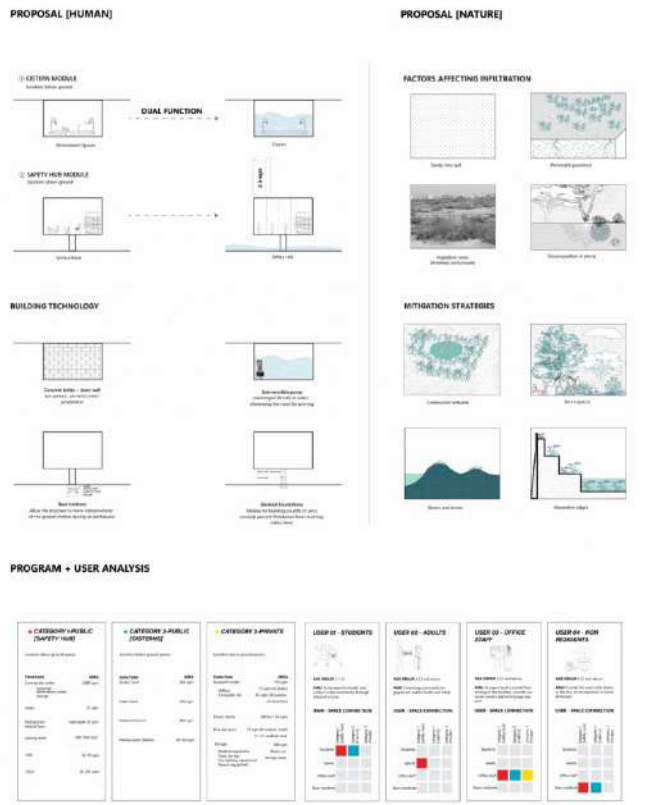
Keywords: Resilience, Water Harvesting, Safety, Food Security

Design Project Poster



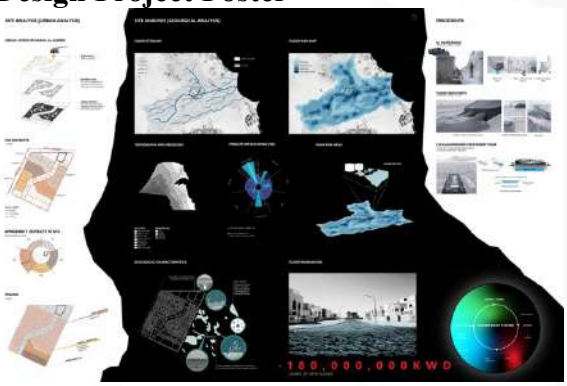
Conceptual design proposal stimulating water harvesting, food security and the safety and welfare of human beings.

Design Project Poster



Proposals on how to mitigate future flood risks.

Design Project Poster



Research of the floods afflicting Sabah Al Ahmed; analyzing the patterns and frequency of inundation.

Design Project Poster

Defining the thesis statement and problem.

Modern Inheritance of Ancient Chinese Spatial Narratives of Garden Entry

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Under the current trend of globalization, the landscape industry increasingly calls for design with national characteristics. As the spiritual home and important cultural heritage of people, ancient Chinese gardens contain rich artistic thoughts and concepts. The spatial relationship and landscape spirit in gardens can be used for reference by modern landscape and architectural design. However, in the process of expressing culture, many modern landscapes merely put cultural symbols into the design, but lose the place spirit in the traditional human settlement space, which makes it difficult to arouse people's cultural resonance. In order to alleviate the powerlessness of ancient garden culture in modern landscape translation, this paper attempts to explore the deep cultural psychology and aesthetic habits behind ancient garden design, and summarizes the modern available spatial narrative strategies.

The study focuses on the area with the most significant spatial narrative effect in ancient Chinese private gardens – the garden entrance space. Through macroscopic layout analysis and microscopic design analysis, it is found that the ancient garden entrance space generally has a structure of multiple gates (FIG. 1 and FIG. 2). The key feature of the narrative mode formed by this structure is that one element (the gate) is repeated several times but expressed in a different form each time (examples include the archway, brushwood gate, moon gate, archaic wooden gate, etc.), so that it is repeated without being boring. The ancient Chinese literature also has a similar narrative habit, forming narratives with a sense of rhythm and texture. In addition, the structure of multiple gates also reflects some aesthetic habits similar to traditional Chinese paintings, which are specifically manifested in 1) the pursuit of profound sense of multi-level space to avoid straightness and simpleness, and 2) emphasis on the sense of freedom and mystery of natural landscape.

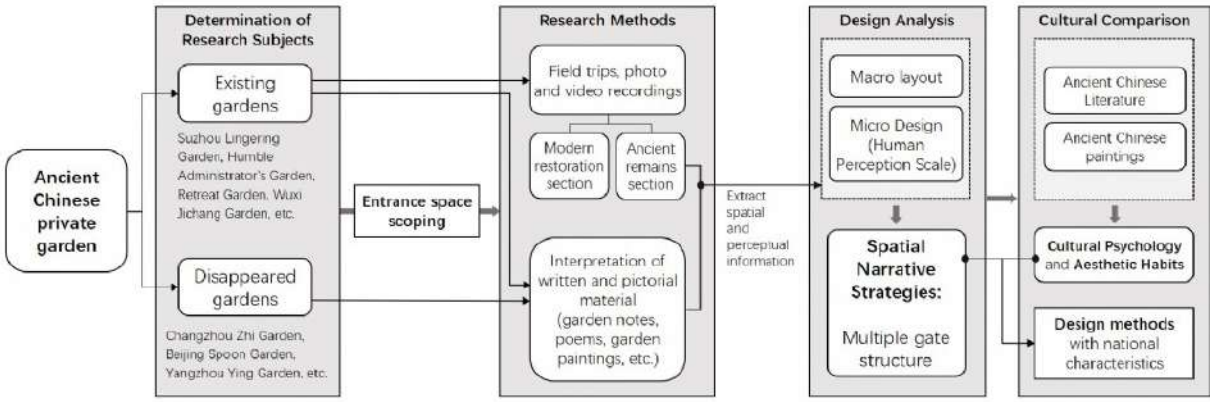
After recognizing the cultural consistency of Chinese garden art with literature and painting, the multi-gate spatial narrative strategy can be applied as a design method with national characteristics to the entrance design, boundary design, and connection design between different nodes of contemporary landscape. Specific design methods include 1) layout in the form of multiple small spaces and fields in series, 2) to ensure the heterogeneity of each space by changing the size of space, the canopy density of plants, and the interaction mode between human and nature, and 3) to use recurring cues to create a sense of narrative rhythm.

Based on the analysis of the design of the ancient Chinese garden entrance space, this paper points out a way for human to experience nature, which is rooted in Chinese national culture, namely seeking a kind of layer-by-layer revealed, perceptually rich and near-exploratory experience in the close interaction with nature. Applying such experience mode to the contemporary landscape architecture is beneficial to enhancing the cultural identity of local visitors and promoting the modern inheritance of ancient human settlement culture.

Keywords: cultural inheritance, national characteristics, spatial narrative, ancient Chinese garden, entrance space

Figure 1 Technical route

Figure 1 Technical route



* The entrance space is a transitional structure between the outside environment of the garden and the main landscape area of the garden, which needs to make visitors' emotions pull away from the outside world and keep pace with the internal scenery. Therefore, this space attaches great importance to spatial narrative techniques.
* Chinese gardens before the Ming Dynasty focused on static visual viewing effects, while after the Ming Dynasty people paid more attention to dynamic tour experience, which is closer to the needs of modern gardens. Therefore, this paper mainly studies the private gardens in Ming and Qing dynasties.

Figure 2 Schematic diagram of the multiple gates structure (Taking Changzhou Zhi Garden of the Ming Dynasty as an example)

Figure 2 Schematic diagram of the multiple gates structure (Taking Changzhou Zhi Garden of the Ming Dynasty as an example)

Zhang Hong, *Album of Zhi Garden*, p. 1 Panoramic view of Zhi Garden (partial)

Restoration plan of the entrance space of Zhi Garden (Self-drawn by the author)

How to improve bird community diversity in urban green spaces?

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Urbanization contributes to the loss of biodiversity and fragmentation of habitats, whereas urban green spaces are essential habitats, offering multiple ecosystem services. Research exploring the impact of urbanization on ecosystems has proven birds to be important indicator species for the health of urban ecosystems. However, the influence of different characteristics of urban green spaces and their interactions on bird community diversity has yet to be fully understood.In this study, the Yuelai international convention and exhibition city (18.67 km²) in Chongqing, China was chosen as the research area. Bird data was collected from 49 plots across four seasons using point count method, and 19 urban green space characteristics, including vegetation features, environmental features, and human disturbance, were recorded for each plot. Generalized linear models, multimodel inference, and variance analysis were used to explore how urban green space characteristics affect bird alpha diversity, which includes bird richness, abundance, Shannon-Wiener diversity index, and Pielou's evenness index. The results indicated that factors such as tree coverage, tree richness, shrub coverage, shrub abundance, herbaceous coverage, herbaceous diversity, environmental noise, distance from construction areas, and the interaction of vegetation habitat type and distance from water bodies significantly influenced bird alpha diversity ($P < 0.05$). In bamboo (Dendrocalamus latiflorus) habitats located within 300 meters of water bodies, it was observed that bird abundance progressively increased as the distance from these water bodies grew. Significant differences in bird alpha diversity were observed across different vegetation habitat types and seasons. Bird abundance in bamboo habitats was significantly lower than in other habitats ($P < 0.01$), with lower bird alpha diversity in winter. Based on models and field survey results, several suggestions for enhancing bird diversity have been proposed. These include the increase of tree coverage to not exceed a threshold of 0.8, the supplementation of the understory with shrub layers, and the enhancement of vegetation structural complexity. The use of native food source tree species, such as Ficus virens and Morus alba, as dominant species within vegetation habitats is suggested. The reduction of human disturbance, including the decrease of environmental noise and the limitation of chemical applications on farmlands and water bodies, has also been recommended. Furthermore, the implementation of seasonal management measures, such as zoning and the preservation of dormant vegetation during winter, is advised.This study investigated how urban green space characteristics influence bird alpha diversity, offering strategies for enhancing bird alpha diversity through adjusting vegetation structures, vegetation types, and reducing human disturbances. These findings can provide guidance for the construction and management of urban green spaces, optimizing urban ecosystems, and promoting urban biodiversity conservation. The findings and strategies were applied in the local government project, namely “the Yuelai City Ecological Habitat Protection Project” and the related competition entry won the first prize in “the University Students Design Competition of the Chinese Society of Landscape Architecture”.

Keywords: urban green spaces, biodiversity, bird alpha diversity, bird community, influencing factors

Conserving Migratory Bird Biodiversity: Habitat Network Optimization in Jiaozhou Bay

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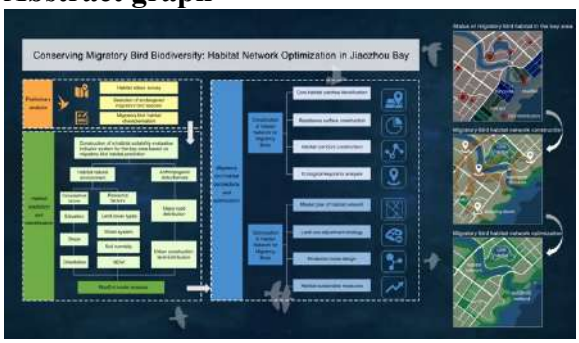
The Qingdao Jiaozhou Bay in China represents a pristine ecosystem of estuarine bay wetlands, characterized by unique and diverse natural landscapes and rich biodiversity. It serves as a crucial node along the route of migratory birds in the Asia-Pacific region, providing habitat and breeding grounds for rare migratory birds. However, rapid urban expansion has resulted in the fragmentation and loss of critical habitats essential for the survival of migratory birds. To address this issue, constructing ecological corridors and habitat networks to enhance ecological connectivity has emerged as a promising approach for biodiversity conservation. In this study, we focused on the Jiaozhou Bay area, selecting seven endangered migratory birds as indicator species. By integrating bird distribution points, natural habitat characteristics, and anthropogenic disturbances, we employed the Maximum Entropy (MaxEnt) model to predict and identify suitable habitats for migratory birds. We generated a resistance surface using various data such as Digital Elevation Models (DEM), the Normalized Difference Vegetation Index (NDVI), distance to water, land cover types, distance to roads, and distance to urban areas. Subsequently, the Least-Cost Path (LCP) model and Circuit Theory were applied to identify key nodes influencing habitat connectivity and construct a conservation network for migratory bird habitats in the bay area. Our results reveal 88 core bird habitat hotspots predominantly clustered in estuarine wetlands and marine parks, along with 317 bird ecological corridors totaling 361.25 km in length. Additionally, 114 ecological pinch points are mainly distributed in ponds, tidal flats, and urban green spaces surrounding the bay, potentially serving as stepping stones for bird dispersal, while 257 ecological barriers are mainly located on urban roads, industrial and construction land, requiring ecological restoration. Based on these findings, we propose further optimization of habitat networks through the integration of network structural elements, land use types, and spatial morphology, presenting the "zone-corridor-node-facility" habitat network optimization strategy. Our study provides insights into the construction and optimization of habitat networks for the conservation of migratory bird biodiversity in the bay area, offering theoretical and applied guidance to resource managers and policymakers.

Keywords: Biodiversity conservation, Ecological connectivity, Habitat network optimization, Migratory birds, Bay area

Abstract graph



The abstract graph presents the research objectives and materials-methods of this paper. The study was accomplished in three main steps: (a) Preliminary analysis, (b) Habitat prediction and identification, (c) Migratory bird habitat connectivity and optimisation. The construction and optimisation of migratory bird habitat network in Jiaozhou Bay was finally achieved.

Application of Biotope Mapping Incorporating Human Anthropogenic Disturbance in Country Parks

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[Background] The sprawling expansion of cities has led to the degradation of ecological spaces at urban fringes, resulting in a significant decline in biodiversity. The construction of country parks presents an opportunity to regulate urban ecosystems and provide habitats for urban organisms. However, many country parks lack consideration for ecological design, thus overlooking the significance of creating biologically friendly habitats and exhibiting a dearth of biotope research. Existing studies on biotopes mostly focus on large-scale sites such as urban and rural areas, with limited attention to small-scale environments like country parks. Moreover, country parks, situated in urban-rural interface zones, face challenges such as extensive construction activities outside park boundaries, unclear land tenure within the parks, and environmental instability. Consequently, anthropogenic interference emerges as a critical factor affecting country park biotopes, yet most biotope studies only consider the spatial characteristics of biotopes, neglecting the impacts of anthropogenic disturbances. [Objective] Therefore, this paper aims to propose a methodology that integrates anthropogenic disturbance factors and is suitable for small-scale country park biotope research, providing a practical foundation for biotope creation in country parks. [Methods] This study selected Beijing's Jiangfu Park as the research site and analyzed its biotope characteristics in two main aspects: biotope classification and mapping, and biotope index computation: (1) Utilizing the biotope unit mapping method, biotope spatial classification was conducted, resulting in the identification of four levels of biotope units comprising 53 units. Remote sensing interpretation facilitated the creation of a biotope unit map reflecting the spatial structure of biotopes. Subsequently, based on the intensity and type of anthropogenic interference, seven levels of anthropogenic interference intensity were classified, and anthropogenic interference intensity was mapped through heat maps and field research to integrate anthropogenic disturbance factors into the biotope unit map. (2) Eleven biotope analysis indices suitable for small-scale research were screened, and the biotope index of Jiangfu Park was calculated to summarize its biotope characteristics. [Results] Jiangfu Park predominantly features a multitude of contiguous natural plant biotopes, with deciduous dense forest-herbaceous ground cover being predominant. Hard biotope types are mostly distributed in a punctate manner within the park, while aquatic biotopes exhibit relatively uniform and dispersed distribution patterns. The biotopes in Jiangfu Park are minimally affected by anthropogenic disturbances, primarily attributed to visitor recreation and conservation management activities. Biotopes influenced by these anthropogenic disturbances exhibit characteristics of concentrated distribution, contiguous patches, and high diversity, albeit with the potential for biotope fragmentation. Biotope units neglected in conservation management demonstrate low separation and high diversity, suggesting potential for further expansion into continuous biologically friendly biotopes in the future. [Discussion] This paper primarily proposes a systematic approach suitable for small-scale country park biotope research, providing a methodological framework for the creation of biologically friendly biotopes in country parks.

Keywords: Biotope mapping, Biotope, Biodiversity, Country parks, Anthropogenic interference factors

Assessing Landscape Aesthetic Quality of Qinghai Lake National Park

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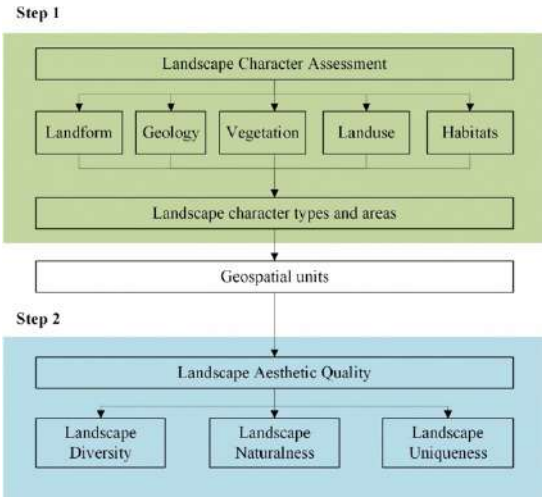
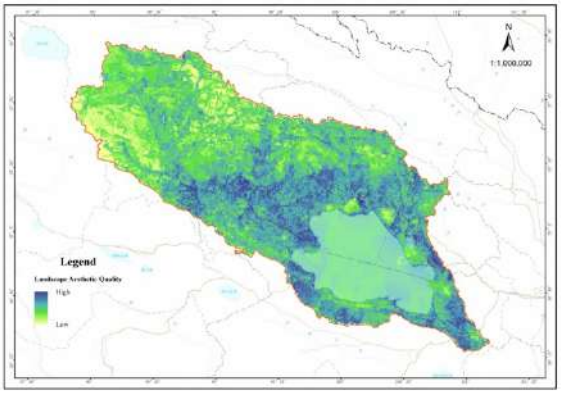
Landscape aesthetic is a cultural ecosystem service (CES) usually associated with the appreciation of natural and cultural phenomenon, which positively impacts human health and well-being. Landscape aesthetic quality (LAQ) is tied to various features of natural and cultural environments, reflecting the integration of spatial structure, functional value, and visual perception. Mapping and assessing LAQ would be beneficial to decision-making and contribute to the development of land use policies and landscape management strategies.
As a world-renowned high-altitude wetland nature reserve, Qinghai Lake is undergoing the construction and planning of a national park. Qinghai Lake National Park plays an irreplaceable role in protecting and maintaining biodiversity, regulating climate, conserving water sources, and maintaining ecological balance. At the same time, it has a high aesthetic value due to its unique highland lake scenery, which provides important cultural ecosystem services. The Qinghai Lake National Park is characterized by large spatial scales and diverse landscape types.
This study assesses the LAQ of Qinghai Lake National Park and analyzes its spatial distribution characteristics. Firstly, the directly perceivable landscape elements are selected for landscape character assessment (LCA), and the landscape character types (LCTs) and areas are divided. The results of LCA can be used as a geospatial unit for the assessment of LAQ. Secondly, with reference to the existing LAQ framework, assessment was constructed from the perspective of diversity, naturalness and uniqueness. Fragstats was used to calculate the landscape metrics. The results are visualized in a GIS.
The results show that the high-value areas of LAQ in the Qinghai Lake basin are mainly concentrated along the lake shore and extend along the river valleys, with the LCTs being mid-high altitude river valley grasslands and mid-high altitude loess hills grasslands. Low-value areas are mainly distributed in the northwest of the basin, with the LCTs being high-altitude undulating meadows and high-altitude river valley deserts. High LAQ areas reflect the representativeness and significance of the natural landscape, need to be better protected and provide wellbeing for the population, while low LAQ areas may require additional restoration and enhancement. This study assesses the LAQ from the objective attributes of the landscape and explores its feasibility in large-scale national park planning and management. The assessment results can provide suggestions for the landscape planning and management of Qinghai Lake National Park.

Keywords: Landscape aesthetic quality, Cultural ecosystem services, National Park

Framework of Landscape Aesthetic Quality



Landscape aesthetic quality map of Qinghai Lake National Park



Research on the evaluation of multifunctionality of cultivated landscapes

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This paper aims to systematically review the literature on multi-functional evaluation of cultivated landscape, summarize its origins, connotations, index system construction, calculation and analysis methods, discuss existing deficiencies, and analyze future research trends. The goal is to provide references for establishing public awareness of multi-function values of cultivated landscape and formulating policies on its multi-functional utilization.

The research adopts literature study approach. By extensively reviewing relevant Chinese and English literature, the study qualitatively and quantitatively summarizes the basic information of multi-functional evaluation of cultivated landscape.

The results are as follows: 1) The multi-functionality of cultivated landscape is derived from and relies on that of agriculture, and there is an inseparable inherent connection between them; 2) The research shows an overall trend of integrated development from single evaluation to systematic integrated evaluation, specifically manifested in the multi-varietalization, data multi-sourcing, method integration, and multi-dimensional analysis of evaluation content, data source, research methodology, and analytical means; 3) Existing research has deficiencies in aspects of indicator system's lack of systematicness, subjectivity in evaluation grading, and insufficient applicability.

The paper predicts several future trends of multi-functional evaluation of cultivated landscape: 1) Research connotations will become richer and more systematic, emphasizing integrality; 2) Research means will achieve multi-disciplinary integration, making methodology more scientific and rigorous; 3) Practical application value of research results will be further enhanced. In summary, this study comprehensively reviews and analyzes the fundamentals, existing issues and developing trends of multi-functional cultivated landscape evaluation research through extensive literature review. With strong systematicness and sufficient demonstration, it provides important references for enriching existing research and carrying out future studies.

Keywords: Cultivated landscapes, Multi-function evaluation, Literature review, Sustainable development

Desert Urban Ecology: Urban Forest, Climate, and Ecosystem Services

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In arid and hot regions, the interactions between climatic characteristics and land cover change resulting from the urbanization process have unique impacts on the ecosystems due to their low precipitation, vulnerable and sparse desert flora community, and bare soil. This study aims to answer the question of how land cover changes in vegetation structure due to the urbanization process affect regional temperature and ecosystem services in arid and hot regions.

The study evaluated the impact of 21-year (2002-2022) changes in tree canopy cover and vegetation structure on urban land surface temperature and ecosystem services in the Cities of Chandler, Gilbert, Mesa, and Tempe in Arizona, USA, located in the northern Sonoran Desert. The i-tree canopy software was used to evaluate the change in tree cover between 2002 and 2022 and to calculate the changes in ecosystem services and benefits derived from urban forests (i.e., air pollution reduction, stormwater management, and carbon sequestration). The Urban Heat Island (UHI) and Land Surface Temperature (LST) indices, as well as the Normalized Difference Vegetation Index (NDVI), which indicates the presence and density of vegetation on the land surface, were used to evaluate the climatic and ecological structure of the region. In addition, the Urban Thermal Field Variation Index (UTFVI), which measures spatial and temporal thermal variations in urban areas, and the Ecological Evaluation Index (EEI) were used in conjunction with the LST for ecological assessment of urban environments. Then, the relationship between the indices was evaluated by pearson correlation analysis.
The results demonstrated that decreased tree canopy cover over a 21-year period resulted in decreased carbon and equivalent CO2 storage and decreased annual carbon and equivalent CO2 sequestration rate. In addition, the amount of increased air pollution and increased stormwater runoff due to tree removal over the years has negative impacts on the urban economy. Moreover, the large amount of bare soil land cover is susceptible to the exposure of solar radiation all day long, which heats up land surface temperature rapidly due to its low specific heat capacity, compared to impervious surfaces in urban areas. What's more, dense urbanization and especially in bare soil land cover in the southeastern part of the study area revealed a high urban heat index and low ecological values.
This study has provided methods for assessing the relationship between ecological structures and ecosystem services and benefits at both temporal and spatial scales. The evidence-based assessment can assist decision-makers and landscape architects to identify areas that are vulnerable to climate change impacts such as increased urban heat exposure and prioritize nature-based solutions and green infrastructure investment to mitigate urban heat and enhance ecosystem services, which in turn enhance urban resilience and sustainability.

Keywords: Arid and hot region, Urban heat, Ecosystem services, Land cover, Arizona

Empirical Study of the Canopy Leaf Area Index across Seasons

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In recent years, various disasters triggered by extreme weather events due to global warming have been occurring worldwide. To mitigate the occurrence of extreme weather conditions, it is crucial to engage in research on utilizing planting design to create ecologically friendly microclimate environments. Leaf Area Index (LAI) serves as a paramount parameter for reducing radiative heat, providing practical insights for the selection and arrangement of plantings in landscape design.

This study focuses on the crown structure parameters of 15 different tree species planted within the Wenshui Visitor Center area of Shei-Pa National Park, Taiwan. Among these, 8 are evergreen trees, and 7 are deciduous trees. The AccuPAR model LP-80, a canopy analyzer, was utilized to measure the Leaf Area Index (LAI) of the 15 tree species during both summer and winter seasons. Subsequent analysis and comparisons were conducted to examine the LAI variations among the different species.

The results indicate that during the summer season, the Leaf Area Index (LAI) ranged from 7.37 to 2.05, while in the winter season, it varied from 4.12 to 0.67. For effective shading during the summer, recommended plant species with the highest LAI include Prunus armeniaca, Erythrina crista-galli, Machilus thunbergii, Zelkova serrata, and Ficus microcarpa. Additionally, among evergreen tree species, the average difference in LAI between summer and winter seasons was 1.49, whereas among deciduous tree species, this difference averaged 3.30.

The findings of this study can serve as design references for microclimate adjustments in humid and hot climatic regions. Achieving human comfort requirements aside, it offers a deeper understanding of the translucent environment in the context of multi-layered planting design.

Keywords: Leaf Area Index, Multi-layered Planting, Microclimate

Nature-Based Solutions and biophilic design in coastal systems

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Nature based solutions is a concept that has become more relevant in recent years. From the conservation and restoration of ecosystems that provide natural contributions (ecosystem services) to human well-being by mimic nature to adapt to climate change, these are actions that landscape architecture design, inspired by nature, aim to preserve our natural heritage. Biophilia (love of living things and nature) can be used as a tool that enhances the planet's environmental conditions by looking for ecological solutions and promoting greener and more sustainable actions, meanwhile, having a positive impact on human well-being. In this sense, the main goal is to improve the existing relationships between nature and society more harmoniously, building alternatives that allow a more resilient system and the provision of multiple natural and human contributions facing climate change.

The scenic beauty of the landscape and recreation are some of the most valued contributions (ecosystem services) by humans on the coast, however, disordered growth in tourist sites has broken the dynamic balance of nature, making the coast more vulnerable to climate change. In the Yucatan Peninsula in Mexico, the development of coastal tourism has focused mostly on sun and beach tourism, where the greatest selling point are white beaches with soft sand. This has led to a deterioration of the coast due to the deforestation of coastal dunes, which, in a good state of conservation, are the sources of sand that allow the formation of healthy and resilient beaches within their dynamic balance.

On the coast of Sisal, Yucatán, a paradigm shift is being promoted in the development of infrastructure to receive tourism, conserving the natural geomorphology of the system and the existing coastal dune vegetation patches and generating new ones. This will maintain the sand banks available for the formation of beaches and at the same time provide the service of regulating floods and erosion that generally impact this fragile area. To this end, a space for outreach and communication is promoted among users and providers of tourist services on the beach and among local and regional authorities for the implementation of landscape architecture based on natural coastal system and its elements. This multi-scale approach can strengthen the connection between ecosystems, and between humans and nature providing physical and emotional well-being as a result of the proximity and beauty of the coastal landscape without losing its ecosystem services.

From Nature Based Solutions at the landscape scale to biophilic design with tangible responses from users, are an alternative to being in contact with a natural environment, surrounded by a harmonious socio-ecological context that motivates emotional restoration surrounded by an organic environment respecting nature and local activities.

Keywords: Nature based solutions, Adaptation based Ecosystems, Biophilia, coastal dunes, landscape architecture.

How to Achieve Sustainable Recreation in Natural River Corridors?

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Recreation is one of the most important ecosystem services provided by river corridors. As a significant form of outdoor recreation, a large number of tourists worldwide participate in outdoor river recreations every year. However, with the reduction of free-flowing rivers globally due to the process of urbanization and so on, there is an urgent need to address the issue of how to make natural river recreation more sustainable.

This study has chosen natural river recreation areas that are representative, including both mountainous and plain rivers located in national parks and their surrounding areas. The following rivers in national and provincial parks around the world are notable: the Colorado River in Grand Canyon National Park in the United States, the Vjosa River in Vjosa Wild River National Park in Europe, the Whanganui River in Whanganui National Park in New Zealand, the Skeena River in Skeena Valley Provincial Park in Canada, the Alligator Rivers in Kakadu National Park in Australia, the Zambezi River in Mana Pools National Park in Africa, and the Lancang River in Sanjiangyuan National Park in China.

Through literature review and interviews with managers, the study summarizes the important management experiences of these natural river recreation areas in spatial planning, impact monitoring, visitor management, site management, and other aspects under different management subjects, different visitor volumes, different geological features, and different degrees of river disturbance. Examples include using river recreation opportunity spectrum for spatial planning, trail monitoring methods, weighted lottery visitor management strategies, etc. Additionally, it addresses new issues encountered in sustainable natural river recreation management, such as monitoring new recreational facilities and activities, aiming to provide references for future natural river recreation management.

Keywords: river, national park, recreation, sustainable, management

RESEARCH ON THE CONSERVATION, PROPAGATION, AND LANDSCAPING of 'Tulipa Sprengeri'

Öykü Çelik Çerçioğlu
ÇANAKKALE ONSEKİZ MART ÜNİVERSİTESİ, BİYOLOJİ BÖLÜMÜ

Turkey ranks among the countries that have attracted the most attention from scientists in the past and present due to its phytogeographic position and rich biodiversity. Rapid urbanization, city expansion, and the decrease in natural areas have led to the loss of many species. Infrastructure projects and construction during the urbanization process have fragmented ecosystems, weakening interactions between species and causing harm to biodiversity. The reduction of green areas, combined with effects such as global warming, disrupts the balance in the ecosystem. Species extinctions and losses harm nature and humans in many ways. It is expected that this decline will have a negative impact on the future of humanity and the adaptation ability of species.

One of these species today is the "lost tulip" (Tulipa sprengeri), which is an endemic taxon that has naturally spread in Turkey and is considered "Extinct in the Wild" (EW) according to the IUCN threat categories. The lost tulip, thought to have disappeared in Turkey, is still cultivated as an ornamental plant in England. Unlike other Tulipa (tulip) species naturally grown in our country, the conservation, propagation, and long-term sustainability of this extinct species are aimed at gaining value as a landscaping plant in Turkey and other countries.

Within the scope of this study, efforts will be made to reintroduce this species, increase its recognition, and establish its place in the landscaping sector at the Nezahat Gökyiğit Botanical Garden in Istanbul. Educational activities are planned in two areas, for adults and children, as part of these efforts. In addition, it has become necessary to prepare this project to determine the work required to recreate the natural habitat, increase the population, and spread it to other regions for the continuity of the species in its natural environment.

Keywords: Biodiversity, Species Conservation, Ecosystem, Endemic.

Regenerating post-industrial landscapes: multinational comparison, protection, principles, evolution, and design

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Post-industrial landscapes, once a reminder of history and industrial development, now pose a conservation problem and opportunity. The preservation of these landscapes is essential for maintaining their relics and evidence of industrial history, creating unique cultural identities. However, the preservation of these landscapes faces challenges and uncertainties due to environmental, economic, and social difficulties. This paper analyzes post-industrial landscape historic sites, covering preservation classification, protecting principles, cross-national comparisons, recent modifications, and design approaches related to protection laws. It examines the historical evolution and theoretical frameworks that influence the preservation of post-industrial landscapes, using a mixed-methods approach, including site visits, interviews, and archival research. The study examines the laws and regulatory systems that protect these unique areas on both national and international levels. Case studies illustrate different approaches to preservation in a global context, addressing differences in guiding ideas. A cross-national analysis reveals advances, similarities, and contrasts in the management of post-industrial landscape heritage, providing a comprehensive view. The research highlights the challenges and potential for preserving post-industrial landscape heritage, emphasizing community involvement and compliance with protection principles. It provides information on existing practices and changes, enabling informed decision-making and emphasizing the need for adaptive solutions to protect sites for future generations.

Keywords: : Post-industrial landscape, Industrial heritage, Regeneration, Protection principles, Cross-national comparison

Local cultural practices promote conservation of Chiang Mai green space

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For over seven centuries, the Lanna culture and Buddhism have profoundly influenced the people of Northern Thailand. The Lanna temple intricately weaves Buddhist and cosmological themes into its zoning, layout, and site design. It reflects deep connections to culture and society. Additionally, it elevates the temple area's pivotal role in urban green space. Indigenous plants have been gathered at Lanna temples since the time of Buddha, a tradition that persists in contemporary cultural customs. Furthermore, the temple plays a vital role in maintaining the city's sustainability, underscoring its ecological significance. This study employs multi-criteria analysis following principles from landscape studies and urban forestry, guided by the Historic Urban Landscape (HUL) concept, to examine landscape plants in Chiang Mai Old City. It emphasizes both tangible and intangible elements, showcasing how many plants symbolize the city's stability and progress. Beyond their aesthetic contribution to the city skyline, plants facilitate social contact and enhance communal connectedness by weaving together individuals' memories and experiences. Literary works and Lanna's beliefs further underscore the profound connection between humans and nature, enriching the cultural tapestry. The primary aim of this study is to raise awareness of the ecological and cultural significance of urban green spaces in Chiang Mai Old City. By exploring Buddhist teachings and the local cultural beliefs of the Lanna people regarding nature protection, the study sheds light on the profound importance of these. The article explores how cultural beliefs and conceptions evolve into tangible and intangible heritage within the framework of Lanna culture. Furthermore, it examines the impact of urban growth in Thailand on the landscape of the Lanna temple, highlighting the need for mindful urban development practices. Through this research, we aim to foster a deeper appreciation for the intricate relationship between culture, nature, and urbanization in Chiang Mai Old City. By recognizing urban green spaces' cultural and ecological value, stakeholders can make more informed decisions regarding landscape planning and conservation. Moreover, by integrating traditional knowledge and cultural practices into urban development strategies, we can preserve Chiang Mai's unique heritage for future generations. In conclusion, this study serves as a testament to the enduring legacy of Lanna culture and Buddhism in shaping the landscape and cultural identity of Chiang Mai Old City. By embracing the principles of the Historic Urban Landscape framework and leveraging multi-criteria analysis, we can gain valuable insights into the role of landscape plants in enhancing the city's livability and cultural vibrancy. Through collaborative efforts, we can pave the way for sustainable urban development practices that honour both the past and the future of Chiang Mai Old City.

Keywords: Historical Urban Landscape Approach, Lanna Culture, Chiang Mai, Landscape Plants, Local cultural practices

Rural Landscape Planning with Ecosystem Services

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The rural landscape harbours enormous potential within a seed. The most important part of this is terrestrial carbon stores. If these stores can be managed quantitatively, land use plans can opt for protection of carbon stores. In this way, landscapes with relatively high carbon stores will naturally engender green infrastructure and the rural landscape will allow the seed to realize its potential. The idea concept is based on the ecosystem service - carbon storage - green infrastructure network - mitigation of global climate change - resilient transformation hierarchy in spatial planning as a metaphor for the transformation from rural to urban. The landscape is not a component of the spatial planning system in Türkiye. The landscape is evaluated only in the "social reinforcement" category in the Development Plans.
This main goal of this poster is to be able to situate landscape-specific analyses at the upper scales in the spatial planning system in Turkey. In this context, this conceptual project is based on qualitative research measurements and findings. The determinant of spatial planning, or the biggest piece of the puzzle, is carbon. The more carbon is stored in the rural landscape, the more valuable it is. Landscape parcels offer alternative carbon stores in line with the precision of the modelling resolution. In other words, the carbon storage ecosystem service of each parcel is different. In order to mitigate climate change, while the parcel with the least carbon storage property allow for the tendency towards urbanization, those with progressively higher carbon storage values meanwhile engender the natural green infrastructure mechanism. In this way, while reducing the impact of climate change, it will also be possible to make an economic contribution in the context of ecosystem services. For Turkey and countries seeking a foothold in the spatial planning system, carbon-based landscape planning strategies in land use plans will contribute to a resilient ecosystem and the landscape will see the value it deserves.

Keywords: Climate change, mitigation, ecosystem services, rural planning

Salit-Silat: A Creative City Development for San Nicolas, Manila

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Urban historic areas face ongoing challenges in preserving their cultural identities as they experience rapid changes from globalization. This struggle is evident in San Nicolas, a multicultural trade district of Manila, which despite possessing a history as rich and old as its prominent neighbor, Binondo 'Chinatown', remains unnoticed. Over the years, San Nicolas has been marred by vehicular congestion compounded by the recent development of high-rise condo-warehouse buildings. This construction trend is gradually eroding the cultural landscape and burying the community's attachment to the place.

The research explores the creative city approach in reinforcing San Nciolas' identity to become more adaptive to urban changes. As a cultural platform, the urbanscape of San Nicolas can be developed into a creative district serving as an incubator for a wide range of creative potentials– from everyday creativity to those of the cultural and creative industries (CCI). Through volunteer-employed photography, the local community's perception of the district and 'creative' places can be located. Moreover, a survey of San Nicolas stakeholders and key informant interviews of local CCI workers reveal the present affordances of San Nicolas as a potential creative environment. A focus group discussion with representatives from the seven CCI domains also informs their respective social, spatial, technical, and materials needs. Conditions to enable these common needs can be integrated into the design development through landscape urban design, governance, and event planning. With the synergistic integration of traditional culture with new creative functions fueled by the CCIs, a creative milieu fostering visionary individuals can emerge, transforming San Nicolas from an overlooked warehouse district into a vibrant cultural and creative community of Manila.

Keywords: Creative City, Historic Urban Area, Cultural and Creative Industries, Cultural Landscape Planning

Reconsideing the ecological value of water heritage in classical garden

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Sustainability is contingent upon holistic, system-thinking encompassing both ecological and cultural aspects. The traditional gardens exemplified a profound comprehension of water and nature, functioning as intricate ecosystems. Unfortunately, scholarly examination has predominantly focused on isolated elements, such as individual gardens, rather than adopting a systemic approach. Even when utilizing GIS tools, the intricate blue and green infrastructure often goes unnoticed. This research aims to resurrect the holistic understanding and knowledge embedded in the old gardens, showcasing their potential to inspire contemporary blue-green infrastructure. The term "blue-green infrastructure" refers to an integrated, sustainable approach that considers both water and greenery, operating on a larger scale. Contrary to contemporary master plans that often emphasize greenery without truly integrating the water element, this study underscores the need for a more comprehensive approach. In conclusion, revitalizing the systemic thinking inherent in traditional gardens provides valuable insights for fostering sustainable blue-green infrastructure today.

Keywords: BGI, water heritage, the classical Chinese garden

POSTER PRESENTATIONS

Cultivating Resilience: Sustainable & Resilient

Optimization of Blue-green Infrastructure Element Allocation in Urban Watersheds

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Blue-green infrastructure plays a crucial role in maintaining the health of watershed ecosystems and ensuring the sustainability of their services. Its positive impact on improving the ecological health of urban watersheds is becoming increasingly evident. Studies have shown that water quantity and quality are critical factors in determining ecosystem health. Blue-green infrastructure is a strategic approach to urban stormwater management that aims to reduce the pressures on stormwater infrastructure caused by urbanization and ecological challenges while increasing the resilience of urban stormwater systems to climate change. From the perspective of element allocation, optimizing the ratio of different elements of blue-green infrastructure can effectively mitigate urban flooding and improve the city's ability to manage flood risks, thereby improving the overall ecological health of urban watersheds. Tianhe Smart City, located in the Yangmei River basin in Guangzhou, China, serves as a pilot project for sponge city construction in Guangzhou. The optimization of blue-green infrastructure configuration is a concrete practice in promoting sponge city construction in urban watersheds. The response surface method is an optimization method that is relatively simple to calculate, requires relatively few experiments, and expresses the results relatively clearly and easily understood. In this research, this method was selected to optimize the allocation of four selected green infrastructures. The runoff total control rate, pollutant removal percentage, and comprehensive economic cost were quantified by SWMM model simulation and life cycle cost analysis. The results showed that the optimal layout proportions of green roof, permeable pavement, vegetated swale, and bioretention cell were 34.818%, 49.838%, 29.999%, and 20.000%, respectively. Based on the optimal green infrastructure layout scheme, seven blue infrastructures in the Yangmei River basin were reconstructed to meet the demand of the total storage volume in the study area.

Keywords: Blue-green infrastructure, Response surface method, Rainfall runoff, SWMM, Multi-objective optimization

Blue-green infrastructure optimization indicators

Water Quantity and Quality Control	Runoff Control Rate	Runoff Peak Reduction Rate	Pollutant Removal Percentage
	$R_T = \left(1 - \frac{V_{SR}}{V_{TP}}\right) \times 100\%$	$R_P = \frac{P_0 - P_t}{P_0} \times 100\%$	$R_Q = \frac{V_{IL} + V_{BR}}{V_{IB} + V_{SB}} \times 100\%$
Economic Costl	Life Cycle Cost	$LCC_{j,n} = IC_j + \sum_{i=0}^{n} \frac{1}{(1+i)^t} OMC_j - \frac{1}{(1+i)^n} SV_{j,n}$	
	Unit Annual Life Cycle Cost	$ULCC = \begin{cases} \frac{LCC_j}{n_j} & \text{(single)} \\ \sum_{j=1}^{m} \omega_j \cdot \frac{LCC_j}{n_j} & \text{(combination)} \end{cases}$	

Positioning the indigenous polder-based landscape in the urbanised water towns

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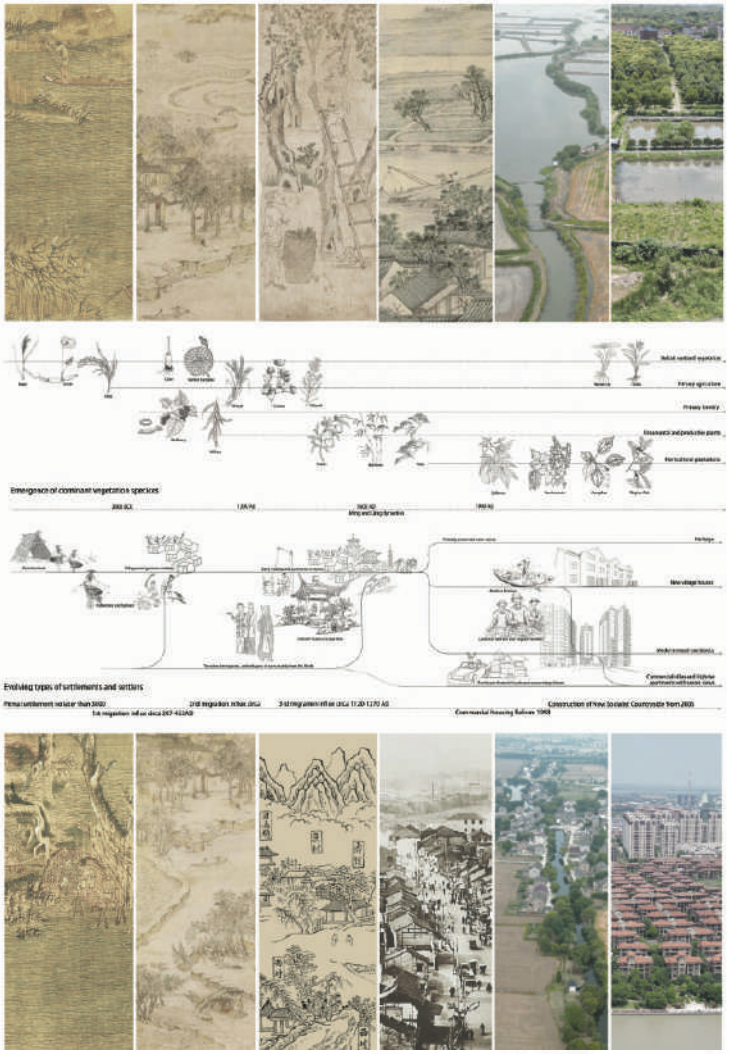
The Yangtze River Delta is one of the most developed metropolises in China where many historical water towns and surrounding villages have been highly urbanised over the past decades. The landscape there has endured vast destructive transformations after the introduction of mass modern engineering, gridded road systems, residential and industrial blocks, etc. The paper argues that except for the phenomenal depiction based on the 'above ground knowledge' of modern planning, there is an alternative 'grounded knowledge' where seemingly monotonous landscapes can still be interpreted as an adaptive inheritance of indigenous landscape-based urbanism within this centuries-long desakota region. Three adjacent historical water towns—Pingwang, Shengze, and Zhenze—that are under the administrative zone of the megacity Suzhou are selected as study cases. Located in one of the geographically lowest areas in the delta, polders used to be, and may still be deemed as, the dominant landscape context of the studied area. The paper explores mixed methods to position the evolving polder-based landscape through cross-scalar and spatiotemporal mappings and 'thick descriptions' of territorial transformations. Decomposed polder-based landscapes (water management systems, path-topped dikes, settlements, agriculture and forestry, etc) are visually analysed based on fieldwork, literature, and traceable historical scenarios. Their historical versus present uses and further socio-environmental interventions that deeply define the site identities are highlighted and interlinked, conceptualising a novel cultural ecosystem service. The research values the examined potential approaches of describing the site we know now through the landscape as a medium rooted in an extended local history and culture. In that sense, the indigenous landscape is not dichotomised from modern practices but a process of intrepretable consistent evolution. Crucial knowledge about the quickly diminishing local 'living landscape systems' might inspire strategies to solve many 'modern problems without modern solutions,' while the landscape systems need to be seen and interpreted first in a more holistic local way.

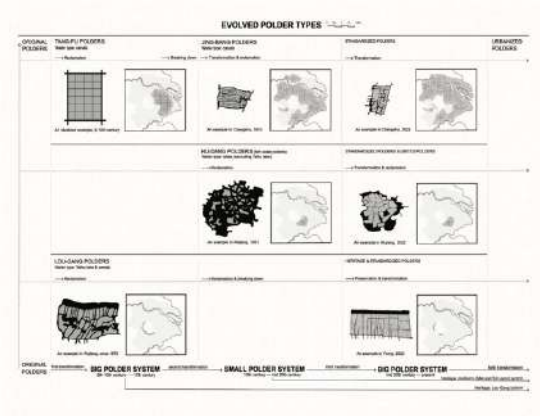
Keywords: indigenous landscape, polder-based landscape, deltaic urbanism, critical mapping

Chronological analysis of deltaic vegetations and settlements



The figure presents the chronological analysis of the emergence of dominant polder-based plant species and the evolving types of settlements. Linkages between landscape changes and urbanism could be observed and explained in a continuous narrative.

Evolving deltaic polder types



Polder is a dynamic representation of human interventions and natural hydro-typological changes, which involve different spatial layouts and scales. The so-called indigenous polder-based landscape in the delta refers to diversified polder reclamations and management strategies rather than its status right before modernization in the recent century.

Spatiotemporal mapping of a water management zone in Zhenze

As one of the three study cases, a polder-based water management zone in Zhenze (town) is mapped based on educative speculations. Spatiotemporal mapping and transects are applied as analysis methods to unfold the site development.

SITES analysis in China's urban green space application

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The Sustainable Sites Initiative (SITES) has gained widespread recognition as a comprehensive assessment system for promoting sustainability within the landscape architecture industry. However, a noticeable research gap exists concerning the applicability of SITES in Chinese urban green space construction projects. This study builds upon theoretical insights into sustainable landscapes, aiming to explore methods for achieving sustainability in the unique context of Chinese landscapes. Simultaneously, it evaluates the intrinsic value and practical feasibility of implementing the SITES framework in the development of urban green spaces across China. Central to this research is a dedicated examination of urban green space projects, with a specific focus on SITES as the core subject. Employing a case study methodology, we systematically scrutinize Xuhui Runway Park, a noteworthy case that has received official SITES certification in China. In this detailed analysis, we not only provide comprehensive descriptions but also engage in a thorough investigation of the park. Our study offers optimization suggestions for pertinent indicators and provides recommendations for intensified publicity and promotion efforts. Drawing insights from both existing theoretical frameworks and practical cases, we elaborate on pragmatic strategies to meet SITES requirements within the specific context of Chinese urban green space projects. This research extensively probes the nuanced applicability of SITES in the domain of Chinese urban green space projects, critically assessing the challenges associated with system promotion. Subsequently, we propose targeted recommendations aimed at optimizing the SITES framework and fostering its broader adoption. In conclusion, our study not only sheds light on the potential hurdles in implementing SITES in China but also emphasizes the importance of adhering to SITES requirements for site sustainability throughout the entire life cycle of a landscape project. This includes the four stages of project planning: project planning and programming, schematic design, construction, and operations and use. The outcomes of this study are envisioned to serve as invaluable references for practitioners involved in sustainable design, thereby contributing significantly to the continual evolution of the landscape architecture industry towards sustainable development.

Keywords: Urban Green Space, Sustainable SITES Initiative (SITES), Sustainable Landscape, Landscape Performance

Reshaping the relationship between tongxing community and surrounding natural environment

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Tongxing is a typical traditional riverside town in the mountainous Ba Yu region of southwest China, representing a distinctive rural commercial and residential settlement, it encompasses not only the physical infrastructure but also the surrounding natural environment and the social community structure by its inhabitants, it is a comprehensive system composed of multiple complex relationships. In the process of urbanization, changes in production methods and lifestyles have led to the decline of the traditional rural market town. Taking Tongxing as a practice case, since 2016, our team has been committed to ecological restoration of illegall farmland, monitoring the town's surrounding natural environment, promoting biodiversity protection, enhancing the town's landscape design, proposing guidelines for modifying the old buildings as well as native plant configuration techniques, at the same time, organize community activities to enhance the cohesion and vitality of the community in the traditional town. Through the cycle of survey-feedback-planning-design-practice, we focus on the ecological changes of the natural environment around the town and the utilization of natural space by members of the community, continuously arranging, coordinating and cultivating the relationship between the community residents and the surrounding natural environment, guiding all kinds of people in the community to actively participate in the governance and management of the natural environment around the town, and leveraging the traditional skills and knowledge of community residents to contribute to protection. At present, the impact of the community people on the natural environment in Tongxing is in a controllable state, and they have gradually changed from the role of ecological destroyers to that of managers, protectors and enjoyers, and the relationship between the community and the surrounding natural environment tends to be a sustainable state of basic coupling and symbiosis. In the future, the study will try to regulate the management of the area with the latest international conservation concept“other effective area-based conservation measure” (OECM) test standards, and learn from its more flexible governance mechanism and adaptive management characteristics in accordance with local conditions, so as to better achieve the goals of biodiversity conservation in the town area and the vision of harmonious coexistence between man and nature.

Keywords: Traditional rural market town, Community design, Ecological Restoration, Sustainable Practices

Resilience Wisdom Reflections Under the National Planning System

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With the frequent occurrence of various types of public emergencies around the world, the construction of "resilient" territorial space is imperative. In the face of the new requirements of dual-carbon and the new changes of digital intelligence, the integration of resilient cities and smart cities is in line with the new trend of socio-economic development and the new requirements of the modernisation of spatial governance capacity. Urban resilience construction and planning has become an important task in the preparation of territory development planning and spatial governance. Under the national planning system, urban resilience construction should be integrated into all aspects of the territory development planning work system, so as to enhance the level of comprehensive resilience in the new period. Based on the connotation of urban resilience wisdom, the study constructs a framework of land space wisdom governance for the construction of resilient cities by sorting out the current status of related research on land space in China and the possible problems and deficiencies, and proposes strategies and revelations for the construction of resilience wisdom in land space planning under the national planning system, so as to provide decision-making references for the improvement of the overall ideas and specific work practices of the construction of resilient land space.

Keywords: Resilience, National planning systems, Territorial spatial planning, Smart cities

Coupling analysis of physical activity and environmental perception in campus

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Xi'an University of Architecture and Technology

In the post-epidemic era and the background of China's implementation of child-friendly city construction, how does campus environment promote students' health become an important topic for sustainable and resilience development of community, while physical activity is an important means to promote adolescent health. Firstly, this study recorded the spare-time physical activity situation of students in 3 middle schools by using by UAV tool, which are from high-density communities in Xi 'an. At the same time, the students' perceived preferences on campus environment were obtained through questionnaire survey, including five dimensions: campus safety, comfort, aesthetics, accessibility and functionality. Secondly, using visualization software and mathematical statistical analysis to obtain the coupling of students' physical activity and campus perception, the campus environment is divided into four quadrants: high perception/high vitality, high perception / low vitality, low perception /high vitality and low perception/low vitality. Finally, in order to provide design basis and reference for campus environment and resilient community, this study analyzed the problems of campus environment from four quadrants in turn and proposed campus environment optimization strategies.

Keywords: Physical activity, Environmental perception, Middle school campus, Middle school campus

Coastal Rescue: Resolution of Bangkok and New Orleans

Yixin Jiang
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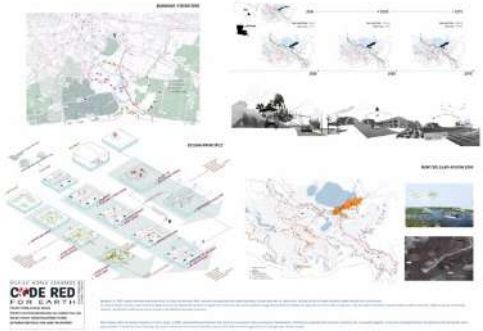
Bangkok is increasingly susceptible to continued shocks and disturbances from both the north-freshwater flooding versus intense droughts and the south-coastal erosion and saltwater intrusion. Coastal area is the place to suffer from subsidence and many other related problems earlier than the city, therefore community lives may have significantly changed accordingly. In response of addressing the issue, the project seeks to establish levels of protection for coastal Bangkok bu proposing open sea production station, offshore marine cultivation island, coastal brackish wetland and marine production wetland to take actions to start releasing sea water intrusion process and bring economic opportunities to local communities. And by restoring coastal wetland and build ecological resilience and resistance to disaster, adaptations will help to make coastal communities safer.

PROJECT GOALS: Release intrusion process, minimize impact on coastal residency.

RELEVANCE FOR THEME: Under the background of global warmth, sealevel rise becomes the biggest concern for the city of Bangkok and New Orleans. Disasters such as storm surge and sea water encroachment are destroying ecological resiliency in Bangkok and New Orleans through time of human development. Threfore, by taking actions for climate change, the project seeks for sustainable practices to build up self-recycling systems across the coastal region, while keeping coastal residents in mind, to take the opportunity of living in the brackish to generate economical income for them in terms of agriculture and energy.

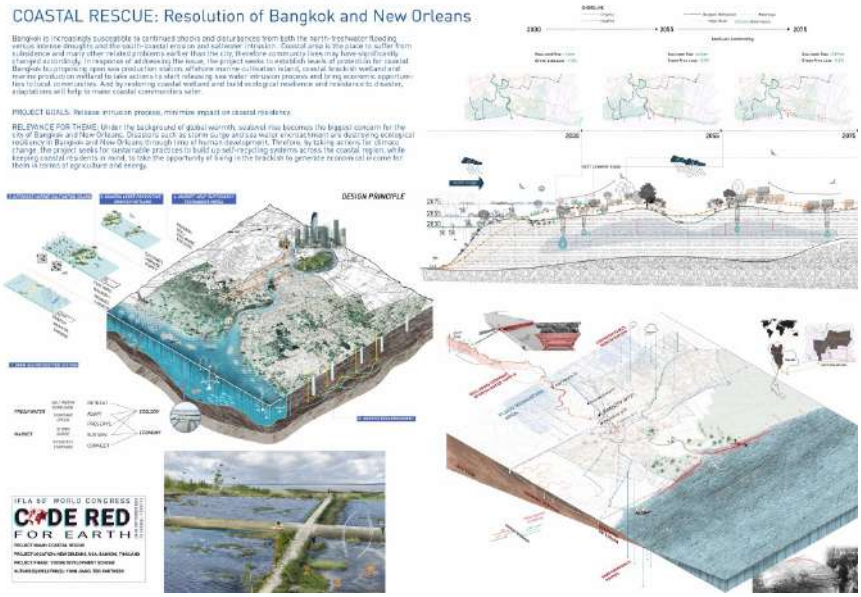
Keywords: climate action, sea level rise, coastal city, bangkok, new orleans

Coastal Rescue-resolution of Bangkok and New Orleans



Poster 02

Coastal Rescue-resolution of Bangkok and New Orleans



Poster 01

Understanding Urban Surfaces: Nature-Based Solutions for Stormwater Management

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Department of Science and Technology, UAGM University

Nature-based solutions (NbS) have emerged as highly efficient strategies for managing stormwater runoff in urban environments, a fact substantiated through extensive studies and validations by professionals across diverse disciplines such as engineering, hydrology, landscape architecture, planning, social sciences, soils, conservation, economy, biology, and ecology. The proven effectiveness of NbS, particularly in the context of a rapidly changing climate, underscores its significance as a tool in conferring resilience to urban landscapes facing climate uncertainties. Its adaptability makes it especially valuable in navigating the uncertainties associated with climate change while supporting multiple ecosystem services. However, the successful integration of NbS into urban planning necessitates a deep understanding of the specific context of their implementation. In the quest to mainstream NbS, site selection becomes a factor, requiring careful consideration of physical characteristics, land use, and social considerations. The recognition that the efficacy of NbS is contingent on the dynamic interaction between water and urban surfaces represents a leap forward in NbS implementation. The organization of NbS according to the water/surface (W/S) relationship offers a comprehensive view of how these solutions address diverse aspects of water management in urban settings.This research proposes an organization method, emphasizing the interplay between surface and water, to categorize NbS based on their functionality. This acknowledges the intricate relationship between water and urban soils and surfaces—streets, buildings, and open areas—which is crucial for optimizing the effectiveness of these solutions.

This structured approach establishes a strong basis for effective decision-making in the implementation of Nature-based Solutions (NbS) while enriching the knowledge of a wide range of stakeholders in the urban realm. While recognizing the high efficacy of NbS in stormwater management, it is crucial to avoid viewing it in isolation as the exclusive remedy for climate-related risks. Instead, NbS should be seamlessly integrated into a comprehensive urban development strategy, ensuring a holistic response to the diverse challenges posed by a shifting climate.

Keywords: Nature-Based Solutions, Urban Soils, Urban Surfaces, Water/Surface Relationship

Sustainable Landscape Practices Inspired by Barchan Dune Geomorphology

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Man has always been captivated by the alluring beauty of natural landscapes since the dawn of time, sometimes one could not even begin to apprehend the phenomena behind its existence. Long before man set foot on the planet, nature has been at play shaping our environment and creating intricate wonders that we see today. If nature could create resilient landscapes that could adapt to the ever-changing dynamics of our ecosystems, wisdom dictates we learn from these natural processes to develop solutions to address the environmental concerns and challenges we face today. With the philosophy behind Biophilic design that tends to create a harmonious coexistence between man and his natural environment, this research aims to explore the potential of nature-inspired solutions for sustainable practices with a specific focus on the geomorphological aspect of Barchan Dune. The research employs a multi-faceted methodology, utilizing both qualitative and quantitative approaches. On-site observations, case study documentation, and interviews with interdisciplinary experts are used to gather qualitative data. Meanwhile, environmental data is analyzed using remote sensing and geographical information systems, of bio-inspired algorithms which are synthesized with the aid of Matrix Laboratory and Python to optimize and generate patterns. The preliminary findings revealed distinct patterns in dune shapes, orientations, and sizes, indicating a correlation between environmental factors and dune morphology to facilitate a comprehensive understanding of its effective potential of integration in practices across various fields.

Keywords: Sustainable Landscape; Barchain Dune; Geomorphology

Green Schoolyards Design: Exploring School Landscape's Impact on Child Health

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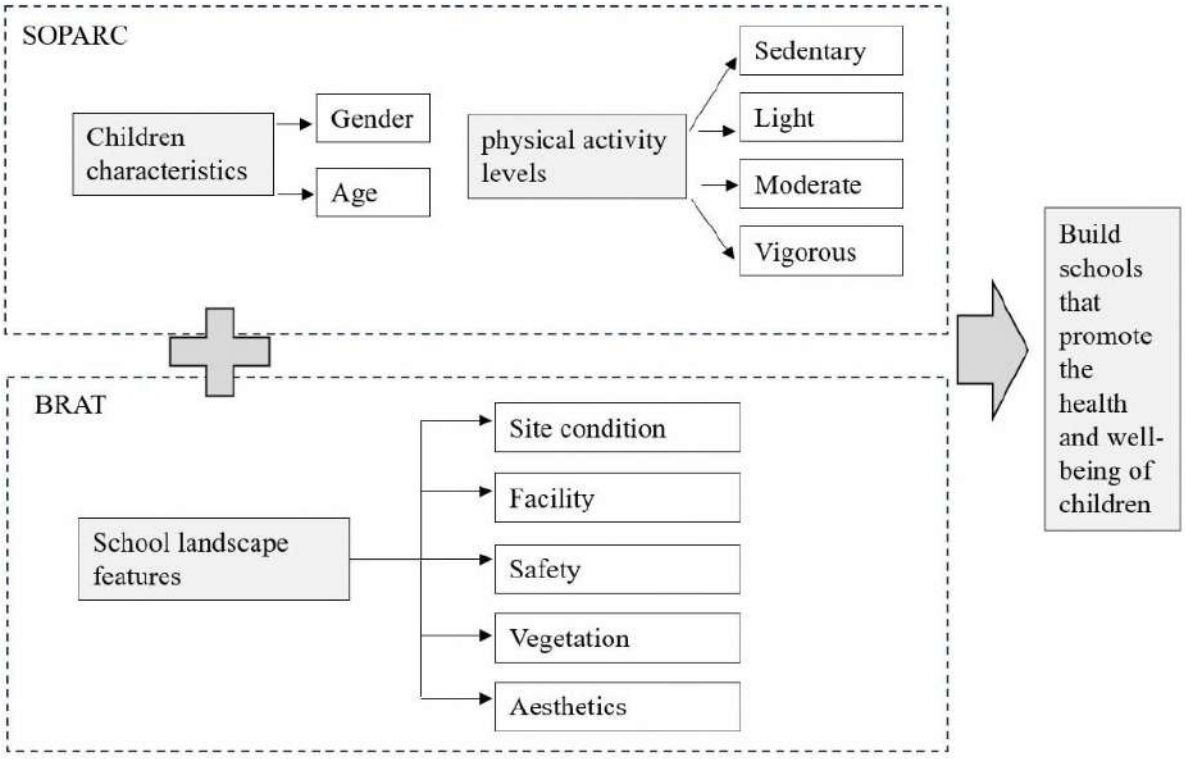
As urbanization progresses, access to and exposure to green spaces are diminishing. Children are particularly vulnerable to environmental hazards, which may affect their physical growth, development, and socio-emotional construction. Green spaces may serve as critical resources in alleviating these urban hazards and promoting children's physiological and psychological well-being, especially in schoolyards. The establishment of child-friendly cities is a globally significant issue, and existing research has demonstrated the moderately positive impact of green spaces on children's health. However, there remains a gap in understanding the relationship between school green spaces, physical activities, and children's health.
Therefore, this study aims to identify the characteristics of school landscape, investigate, and evaluate the quality of these green spaces, and their relationship with children's physical activity participation and sense of well-being. Milan, Italy, was chosen as the case study. First, Bedimo-Rung Assessment Tools（BRAT）was employed to collect landscape features concerning primary and secondary schoolyards. This included site conditions, facilities, green space exposure rates, safety, vegetation, and aesthetics.
Subsequently, children's interactions with landscape were observed using an adapted version of the System for Observation of Play and Recreation in the Community (SOPARC) to assess their physical activity levels and engagements with landscape features. Spatial overlay analysis of landscape features and physical activity behaviors was used to demonstrate the multidimensional relationship between green spaces and children's physiological health.
Finally, planning strategies for green spaces in child-friendly contexts were discussed.
The research findings reveal significant variations in the distribution characteristics of school green spaces in primary and secondary schools in Milan. Furthermore, the comprehensive determinants of green space are associated with increased physical activity. Notably, shorter distances to facilities, increased walkability, and higher exposure to green spaces are linked to fostering vigorous physical activity among children. In order to enhance the health and well-being of children, the provision and optimization of green schoolyards emerge as pivotal factors. Thus, policymaking and urban planning processes should redesign of green spaces in the face of climate change and health inequities.

Keywords: Green schoolyards, physical activity, health promotion, children’s well-being

Children characteristics - Physical activity levels - School landscape Conceptual Model.



Japanese traditional dyke "Waju" with multiple and multifaceted-uses in Nobi-Plain

Toshiya Okazaki, Akihiko Ono
Graduate School of Design and Architecture, Nagoya City University, Nagoya, Japan

This study aims to clarify the composition and spatial features of houses and shrines on dykes in flood-prone areas in Japan. The Nobi Plain in central Japan is a unique flood-prone area where representative rivers in Japan are concentrated in one area. Since early modern times, the area has constructed dykes that surrounded settlements and farmland, known as “Waju”. While studies have focused on the history of the formation of “Waju” itself, the communities within “Waju”, and the development of new rice paddies, there has been few researches on the spatial design of the dykes themselves.

Methodology

In this research, we make the specific GIS data for analyses, which is overlaid with old maps (1891~1898), old aerophotos (1961~2009), topographical maps, and measured spatial features through field surveys. The 58 cases are selected as sites for our research from area in the existing old dikes.

As a result, we clarified the following.

1) 45% of dike crest are used for housings and shrines, temples in the area. Housing use is occupied with 40% of land-used area (Fig.1). These residences mainly manage dykes. However, The higher the height, the more shrines occupies(Fig.2). So that, the shrines offer shelters for local community in the inner area surrounded dykes.

2) 40% of housing use are placed on outer slope of dikes to the rivers(Fig.3).

3)Foundation walls to prevent flooding for housing and shrines are constructed with mainly earth but at only sides of roads on the dike crests consist of piled stones which can be collected from surroundings near the rivers (Fig.4-5).

Discussion

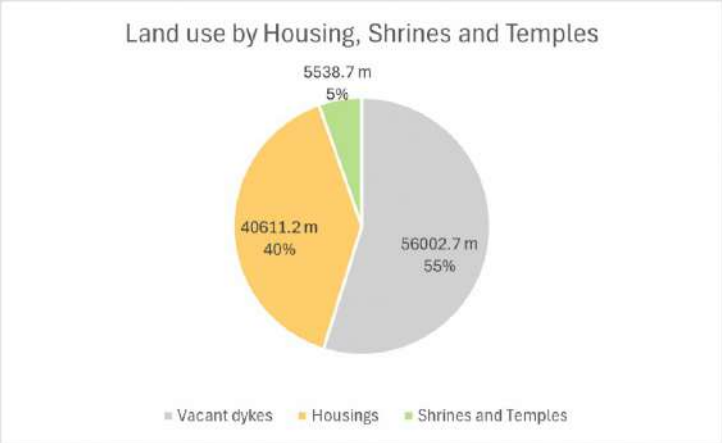
These results indicate that dykes in flood-prone areas in Japan are not only flood control facilities, but also are facilities that support multiple and multifaceted uses, functioning as bases for flood countermeasures and as evacuation places during disasters. To realize such multifaceted and multi-faceted use of the narrow width at the crest of the dykes, various ingenuity was used in every detail. The crest of the dykes are not uniformly the same height, but are raised above the surrounding area to allow for the storage of goods, such as in warehouses, and are also raised above some areas of the shrines that serve as evacuation centers for the local community. In addition, the center of the crest of the dykes is covered with a main road, which forms a traffic network between villages in “Waju”. Even when embankments are built, stone walls are placed between the road and the embankment to prevent landslides from affecting the road.

Since current civil engineering standards do not allow land use on dykes, this study is conducted in the belief that it is possible to understand the integration of flood control facilities and land use. In Japan, where the population is decreasing rapidly and occurring frequent extreme weather events, it is time to rethink the role of disaster prevention facilities and land use.

References(Selected)
Ando, Masuo(ed) (1975) Waju: Deployment and Structure, Kokonsyoin

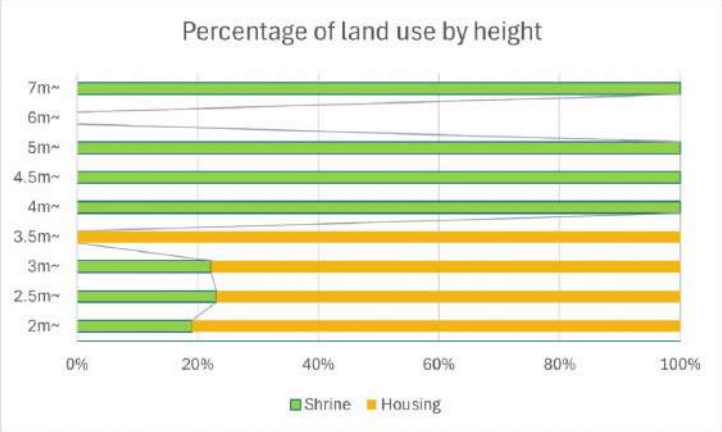
Keywords: dyke design, dyke house, flood control, GIS analysis, multifunction

Figure 1: Land use by Housing, Shrines, and Temples



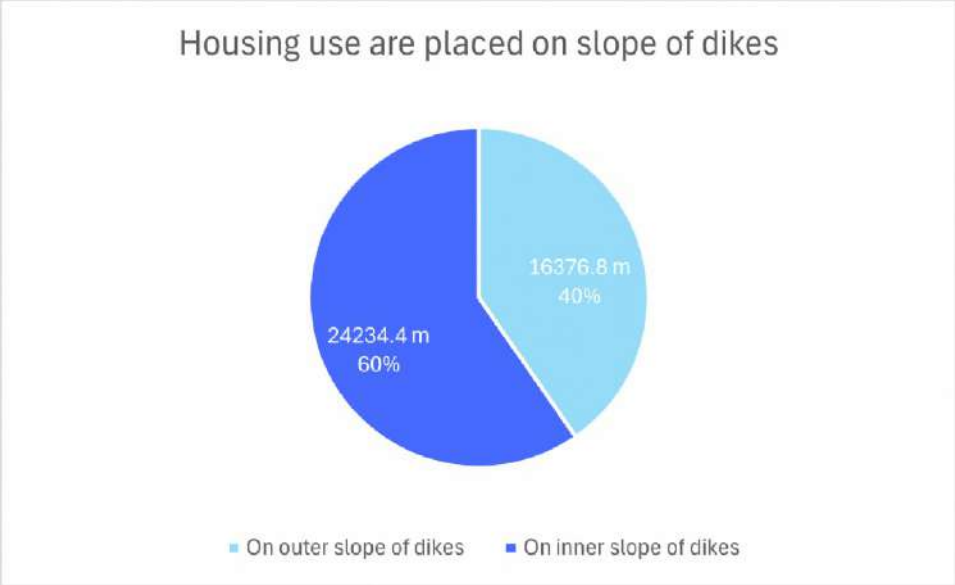
This shows the land use on overall the existing old dikes we surveyed.

Figure 2: The percentage of land use by height



This chart indicates for houses and shrines on the dike, the higher the foundation, the more the shrine tends to occupy.

Figure 3: The pie chart of housing use which are placed on slope of dikes



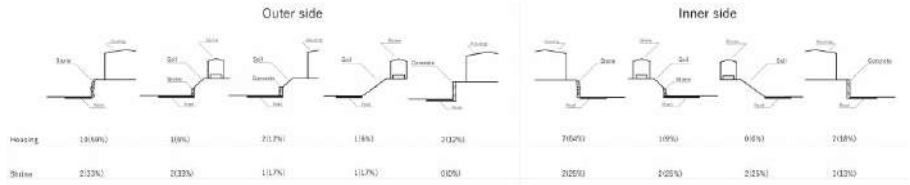
This pie chart shows which side of the dike slope more houses are placed on.

Figure 4: The table: the foundation slope material of facilities on the dikes

	The foundation slope at the side of the road				The foundation slope at the opposite sides			
Foundation materials	Outer slope of dikes to the inside		Inner slope of dikes to the rivers		Outer slope of dikes to the rivers		Inner slope of dikes to the inside	
Piled stone	15	58%	9	43%	8	38%	9	39%
Soil	2	8%	2	10%	6	29%	7	30%
Concrete	2	8%	4	19%	1	5%	2	9%
Soil fixed by earth retaining	6	23%	5	24%	5	24%	5	22%
Concrete & Various materials	1	4%	1	5%	1	5%	0	0%
	26		21		21		23	

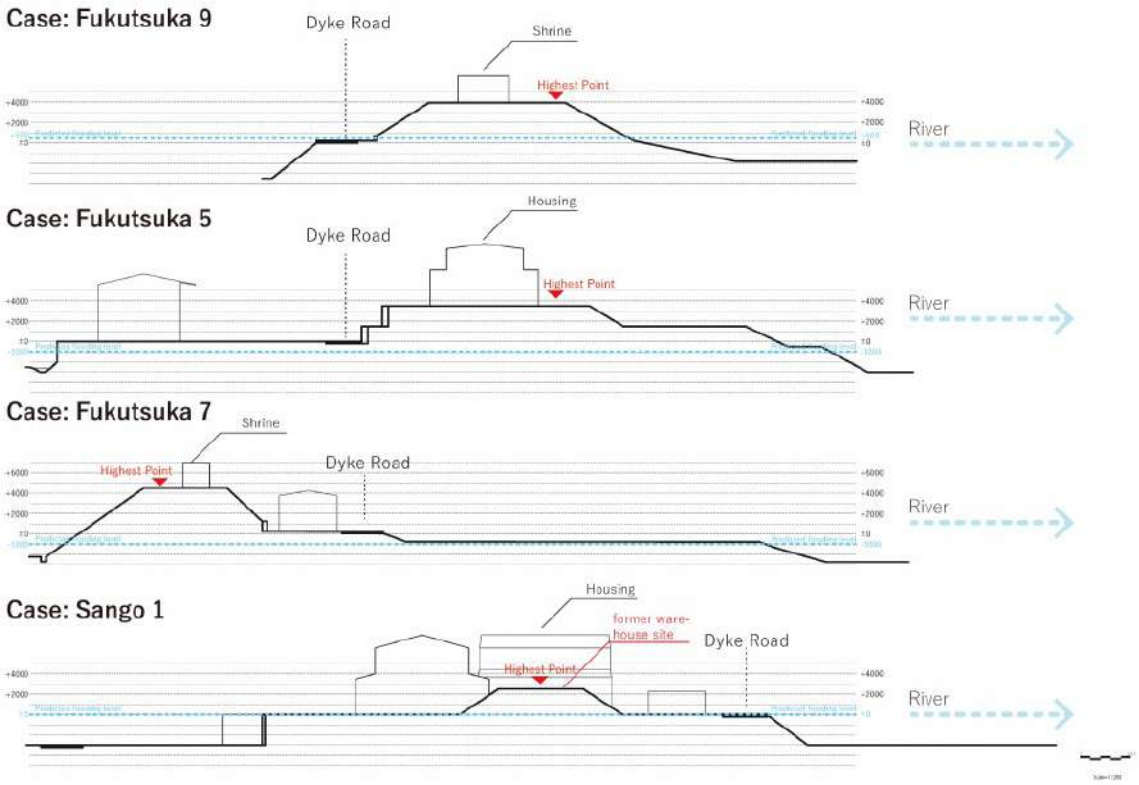
In this figure, we would like to show the difference and tendency in foundation slope material of the facilities between the one facing the dike crest road and the opposite side of it.

Figure 5: The table: the foundation slope material of housings and shrines on the dikes



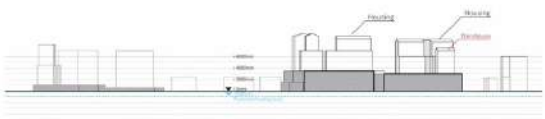
In this figure, we would like to show the difference and tendency in foundation slope material between the high foundation housings and shrines on the dikes by using diagrams.

The cross-sectional diagrams of housings and shrines on the dikes



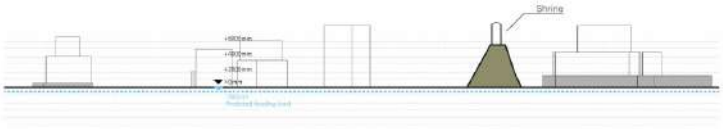
These diagrams are 4 cases of the housings and shrines placed on high foundations, furthermore on the old existing dikes. We would like to explain the positional relationship of the dike slope on which they are, crest road and river.

The longitudinal section diagram 1 for a part of the old dike in Wanouchi-cho



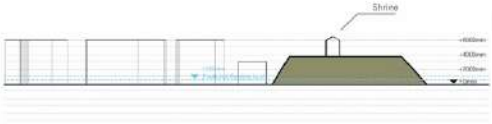
We would like to show the dike which has a village and high foundation house.

The longitudinal section diagram 2 for a part of the old dike in Wanouchi-cho



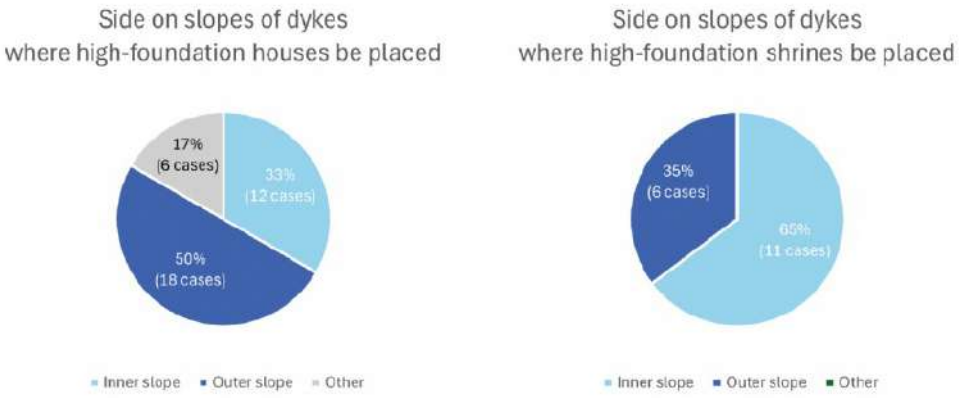
We would like to show the dike which has a village and high foundation shrine.

The longitudinal section diagram 3 for a part of the old dike in Wanouchi-cho



We would like to show the dike which has a village and high foundation shrine.

The pie chart of sides on slopes of dykes where high-foundation houses and shrines be placed



These pie charts shows the differences in the percentage between high foundation housings and shrines on the outer slope.

Plant Selection and Substrate Design in Unirrigated Green Roofs

Ying Xu, Zhongtang Liao, Jialin Liu, Can Liu, Yufei Li
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Low-maintenance extensive green roofs hold potential for application in the context of climate change. However, there is limited understanding when designing such green roofs in the humid subtropics. This study aimed to investigate diverse green roof ecosystems capable of thriving under drought and heat stress with low maintenance. It evaluated plant growth performance in the second year of an experimental green roof in southwest China under unirrigated conditions, involving two plant communities (forbs and grasses) across four substrate types. Metrics such as plant survival, green coverage, visual appearance, leaf stomatal conductance and substrate volumetric water content were used to analyze impact of substrate on plant growth. Specially, substrate A (30%v expanded shale + 25%v vermiculite + 25%v perlite + 20%v compost) cultivated with forbs, achieved superior green coverage of 67.9% to 78.2% and visual health, despite having the lowest water content during the monitoring period, making them suitable for designing low-maintenance extensive green roofs in the context of climate change. The research indicates that substrate water content is not a limiting factor for the growth of established selected forbs. Instead, total porosity, phosphorous content and organic matter content in the substrate may play critical roles. Notably, established selected forbs could thrive on an extensive green roof without irrigation, outperforming grasses, which experienced higher mortality rates. Based on the performance of plant survival rate, green coverage, and visual appearance index, four forb species, namely Lycoris chinensis, Tradescantia pallida, Liriope muscari, and Salvia farinacea, are recommended as ideal plant candidates for unirrigated green roofs. These findings support the feasibility of developing unirrigated extensive green roofs in humid subtropics areas and provide insights into vegetation selection and substrate optimization for the successful establishment of extensive green roofs under drought and heat stress.

Keywords: mixed communities of forbs and grasses, plant selection, subtropical green roof, substrate type; unirrigated

Correlation between urban foraging and urban biocultural diversity

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BACKGROUND:
As urbanization accelerates, people's opportunities to connect with nature diminish. Given that urbanization significantly impacts urban biocultural diversity, addressing this issue is crucial for the future development of cities. Urban foraging, the practice of gathering edible plants in city environments, promotes interaction between urban dwellers and the natural world. This activity, rooted in urban traditions of plant use, fosters a connection with nature and deepens understanding of natural processes. However, too frequent urban foraging activities may conflict with the goal of conserving urban biocultural diversity, and over-foraging may have adverse effects on local biodiversity.

OBJECTIVE:
This study aimed to investigate the relationship between the rise of urban foraging and urban biocultural diversity, including strategies to mitigate potential conflicts.

METHODS: The research was conducted around the Qinhuai River and its vicinity in the Qinhuai District, Nanjing, Jiangsu Province, China. A total of 1,000 anonymous questionnaires were distributed to local residents, of which 216 valid responses were received. The questionnaire was segmented into three parts; the initial section requested information on the respondents' socio-cultural background, encompassing gender, age, residential address (down to the street level), occupation, childhood environment, dietary preferences, and more. The second part inquired about their preferences regarding the use of urban green spaces, including duration, location, activity types (whether or not they would engage in urban foraging), among others. For respondents who do urban foraging, they were asked to answer the third part of the questionnaire - specific details of urban foraging, including location (distance from home, formal or informal green space), frequency, start time, motivation, types of edible plants, etc.

CONCLUSION: The findings suggest that urban foraging can significantly bridge the gap between city residents and nature. Establishing clear foraging guidelines and ethical practices can not only support urban foraging but also bolster urban biodiversity and ensure that public green spaces serve multiple functions for both city dwellers and the environment. Urban foraging is recommended as a strategy for developing green infrastructure in biodiverse cities, enhancing biodiversity, and promoting sustainable interactions between humans and nature in future urban settings.

Keywords: Urbanization, Urban foraging, Biocultural diversity, Sustainable

Research on Removal of Pollutants from Runoff by Terrestrial Plants

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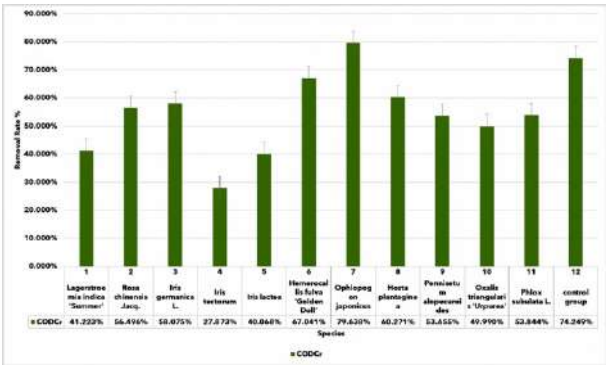
The use of terrestrial plants to remove pollutants from runoff is a sustainable ecological restoration technique. Plants can achieve desirable results in removing pollutants from runoff due to their unique physiology and have an advantage in settlement dominated by large amounts of gray infrastructure due to their good visual landscaping. Pollutants such as nitrogen and phosphorus in runoff are essential nutrients for plant growth and development, and can be reduced through uptake and utilization. These studies have mainly focused on aquatic plants, while less research has been done on the restoration performance of terrestrial plants, especially road greenery. Terrestrial plants can remove runoff pollution at the source so that it does not accumulate in large quantities downstream, their remediation effectiveness varies depending on the plant species, and the long-term remediation capacity is not clear. The risk of pollution from long-term concentrated infiltration of runoff in bioretention facilities has not been studied enough, and it is uncertain whether plants can slow down the accumulation of pollutants. In addition, phytoremediation is cheaper and has better economic benefits and sustainability. This study focuses on the following three aspects: first, the removal effects of specific terrestrial plant species on TN, TP, and CODCr in simulated runoff under specific conditions; second, the potential trend of phytoremediation capacity; and third, the remediation effect of plants on soil. We hope to help the landscape designers and engineers to select specific plants for ecological restoration in order to realize sustainable ecological restoration.
METHODS: The method was to irrigate plants with a solution (i.e., influent water) having a specific pollutant concentration. The pollutant concentrations of the influent water and the leachate (i.e., effluent water) were tested after passing through the plants and their growing medium. The ability of different growing groups to remove pollutants is investigated by comparing the differences between the two. To study the trend of plant removal rates and the reduction of soil pollutants by comparing the changes in soil pollutant levels before and after the tests.
RESULTS: The average removal rates of TP in runoff were high; plants had a certain removal effect on CODCr in runoff, but the removal rates of CODCr varied among different plant species; the average removal rates of TN in runoff varied greatly, and none of the plants could remove TN in runoff except for Iris germenica, Ophiopogon japonicus and control group.
CONCLUSION: (1) Different terrestrial plants have different removal effects on TP, TN and CODCr in runoff. Suitable plant species can be selected for sustainable restoration according to specific objectives.
(2) Soil itself cannot meet the requirement of reducing runoff pollution.
(3) Plants can reduce the accumulation of TN and TP in soil caused by runoff pollution, slow down the accumulation rates of soil pollutants and reduce the risk of soil pollution. The removal rates of TP vary greatly among different plant species.

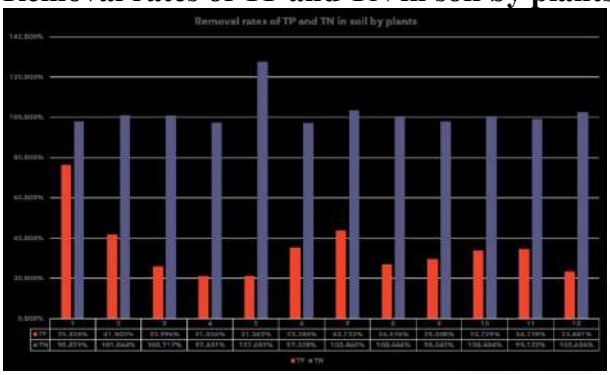
Keywords: terrestrial plants, runoff pollutions, phytoremediation

COD



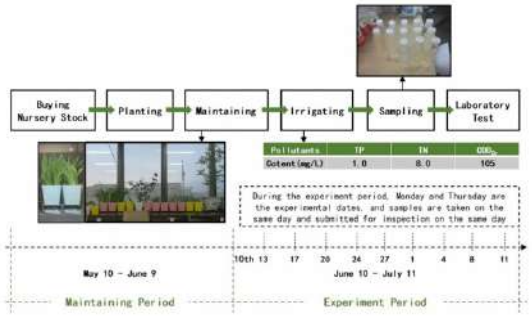
Removal rates of COD by different plant groups

Removal rates of TP and TN in soil by plants



Removal rates of TP and TN in soil by plants

Step

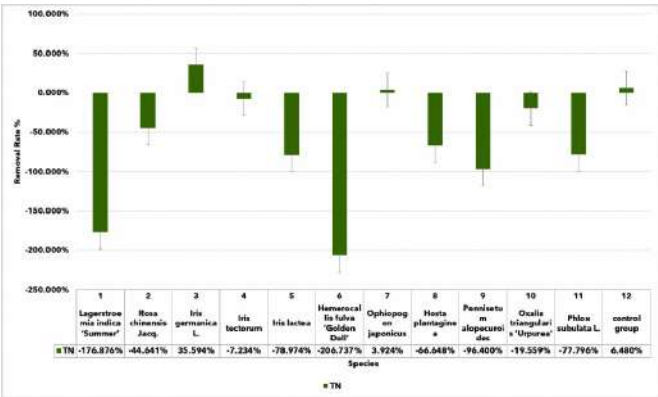


Flow chart of test steps

Test plants

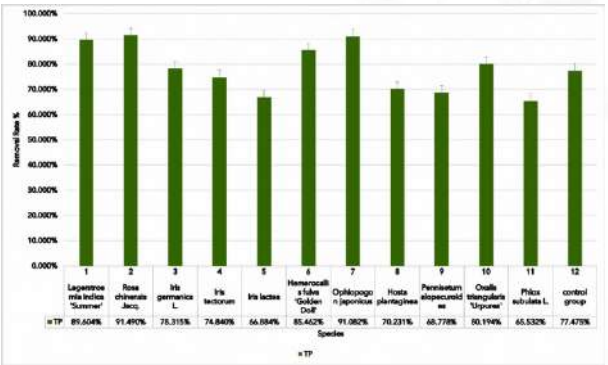
Test plants

TN



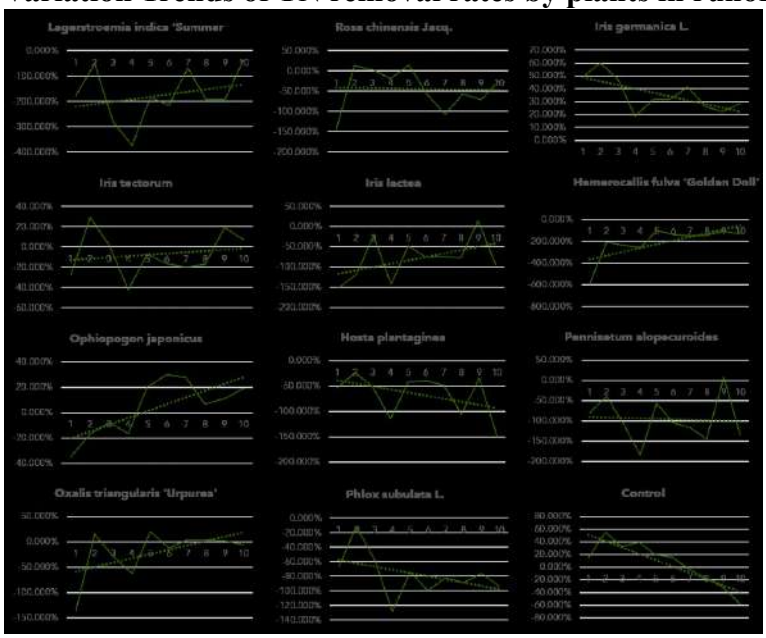
Removal rates of TN by different plant groups

TP



Removal rates of TP by different plant groups

Variation Trends of TN removal rates by plants in runoff



Variation Trends of TN removal rates by plants in runoff

Sustainable Neighborhood Design. An evaluation of Park Oran Development

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Worldwide, the cities of both developing and developed countries are struggling with problems of managing rapid urban growth so called urbanization. Urbanization refers to the increasing number of people that live in urban areas. It is responsible for many environmental problems and social changes in the environment. The rapid growth of cities strains their capacity to provide services such as energy, education, health care, transportation, sanitation and physical security. As uneven urbanization cause diverse problems, changes are required. The sustainability concept which could be considered as a change and solution approach has become very popular and widely used over the last decades. The sustainable development concept which was derived from sustainability, has become a policy tool of many governments in terms of economics, ecology, politics and culture since 1990s. In 2015, United Nations (UN) established 17 Sustainable Development Goals (SDG). The implementation of SDGs into politics and governance at local level is very urgent and significant.
The 11th SDG which was named as "Sustainable Cities And Communities", aims to make cities inclusive, safe, resilient and sustainable. One major topic of 11th SDG which sustainable cities and human settlements are the main starting point of this research. SDGs must be considered in decision-making.
Neighbourhoods which are the main components of cities, include open and enclosed spaces for living, business, administration, public services and entertainment. As urban and climate problems emerge, the transformation of neighbourhoods into sustainable communities is inevitable in the light of SDG 11. In the face of the growing urban challenges posed by climate change, Integrated Guidelines for Sustainable Neighborhood Design (IGSND) was prepared by Urban Morphology & Complex Systems Institute with the support of United Nations in 2021. By incorporating these guidelines into the design process, urban areas can be transformed into vibrant, resilient, and environmentally responsible spaces that meet the needs of current and future generations.
Ankara which is the capital city of Türkiye has been experiencing rapid urbanization and expansion since 1960s. Neighbourhoods have been built or modified in all parts of the city. The main objective of this research is to evaluate Ankara Park Oran Neighborhood based upon IGSND. Using a content analysis approach, sustainability coverage and efforts toward achieving SDG 11 on neighborhood scale is discussed.
The research is structured in qualitative research method and consists of five parts. Theoretical framework is given in the first part. Secondly, research design is explained. The description of the research area, Park Oran Housing and Commercial Development is provided in the third part. The fourth part features analyses and evaluation. Finally, the study revealed some recommendations and directions for further studies. This study touches upon the importance and benefits of IGSND approach in Türkiye.

Keywords: Sustainable Cities, Sustainable Neighborhood Design, Ankara, Park Oran Design

The effect of different dimensions of landscape on perceived oppressiveness

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The interaction between humans and the environment has mutual effects on each other. This interaction forms the perception of the user. One of the perceptual aspects of the interaction between the user and the urban environment is perceived oppressiveness. Although this aspect has been less researched, But the scope of its influence is very wide. Perceived oppressiveness creates double psychological pressure for the user. At the same time, city dwellers endure high psychological pressure in their lives. Based on this, this article has been written using a qualitative method and by referring to scientific documents using the content analysis method. Landscape architecture is a part of today's cities that can be effectively used to improve the mental state and mental health of users. Identifying the aspects of perceived oppressiveness and analyzing the place of landscape architecture and different aspects of the landscape can be important. Therefore, the present research seeks to answer this question: "How can the perceived urban oppression be reduced through landscape aspects and landscape e; elements?" The findings of this study indicate the direct impact of landscape aspects on the reduction of perceived oppressiveness. also, the findings of this study revealed that landscape architecture involves four elements, biological, social, and interactive, physical, management, and planning, to lessen perceived oppressiveness. The findings of this research can be directly used by landscape designers and urban planners. Applying these findings in the operational field will be an effective step toward the well-being and mental health of city residents, especially in crowded and dense cities.

Keywords: Landscape dimension, perceived oppressiveness, social resilience

Microclimatic Parameters Combinations for Outdoor Thermal Comfort Using Decision Tree

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OBJECTIVES: Given the context of global warming and the urban heat island effect, creating a comfortable outdoor microclimate is an important task in ensuring the physical and mental health of residents and meeting their needs for a higher quality of life. However, little research has investigated the fundamental combination of microclimate elements and their quantities needed to produce outdoor thermal comfort in hot and humid climate areas during the summer, especially in high-density urban areas. There are two objectives of this research. The first one is to investigate the significant correlation among outdoor thermal comfort, thermal sensation, and microclimatic parameters. The second is to explore the combinations of microclimatic parameters and their quantities that can make people feel thermal comfort in outdoor spaces (at or above neutral) by employing the decision tree algorithm C5.0.
METHODS: In this study, microclimate measurements and psychological comfort questionnaires were conducted in three city squares in Shanghai. A total of 509 valid questionnaires were collected over 9 sunny or slightly cloudy days in July and August 2018. Descriptive and repeat-measure correlation analyses were investigated using RStudio. Further, the decision tree algorithm C5.0 was employed to explore the best combinations of microclimatic parameters and their quantities that can make people feel thermal comfort in outdoor spaces (at or above neutral zone) in high-density urban areas in summer.
RESULTS: (1) the extreme values of solar radiation and air temperature in summer are high, humidity is moderate, while wind speed is low; (2) thermal sensation and thermal comfort are strongly correlated with solar radiation, while air temperature and relative humidity are moderately correlated. (3) Respondents who feel slightly warm to warm (43.7%) have a higher thermal acceptance, indicating that their comfort level is normal. Therefore, by slightly improving the respondents' thermal sensation through microclimate design, the microclimate comfort can be significantly improved. (4) Reducing solar radiation through microclimate design is the most effective way to improve microclimate comfort. (5) The model information shows that eight rules meet the object. (6) Moreover, when the air temperature is above 30.6 °C, the preferred option to create a comfortable microclimate is to control the solar radiation between 73.2 and 143.7 W/m2, as well as maintain the relative humidity over 53.1%.
CONCLUSIONS: This study proposes a new research method of microclimate thermal comfort and can provide methodological support for future intelligent sensing design of microclimates, as well as come up with directly applicable data support for guiding the microclimate design of urban squares in hot summer and cold winter regions to create thermal comfort.

Keywords: outdoor thermal comfort, combinations of microclimatic parameters, decision tree algorithm, urban suqare

Sustainable Mining in Nature Reserves Network: European and Chinese Experiences

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With the continuous expansion of protected areas, as well as the increase of the utilization of mineral resources, there is a trend towards a high degree of overlap between the space for the exploitation of resources and the nature reserves. Currently, about 75 per cent of global mining areas (including potential mining areas) are located in nature reserves of high ecological value. European countries have protected biodiversity within European territories under the framework of the NATURA2000, while they also develop diversified mining management and ecological restoration policies. China's nature reserve system with national parks as the main body has a common goal with NATURA2000. How to sustainably utilize mining resources at all levels of nature reserves and their periphery and how to remediate mining brownfield sites scientifically and systematically will be one of the key points to realize the goal of harmonious coexistence between human beings and nature. This paper firstly systematizes the current policies and spatial planning tools related to the disposal of mineral rights in nature reserves in China, and concludes the mineral development policies and land use plans proposed by major European mining countries under the framework of Natura 2000. On this basis, a comparative study is conducted between China and Europe, focusing on various aspects such as classified and hierarchical management, planning articulation, restoration and reuse methods. A set of synergistic paths for sustainable mining development and ecological protection in the nature reserve network are summarized with strategic mineral development and ecological restoration as the means, flagship species and characteristic habitat protection, and gradient resource utilization mode as the strategy, which is intended to provide a reference for the formulation of national policies.

Keywords: Nature Reserves Network, Sustainable Mineral Exploitation, Ecological Restoration, Natura 2000, China

Health-based Landscapes: A Study of Microclimate Factors in Parks

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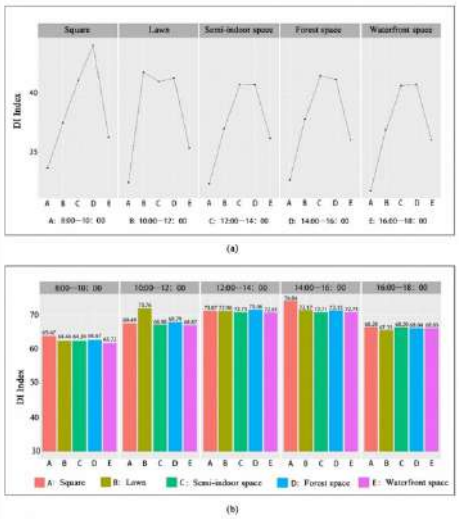
[2]Department Planning, Design, Technology of Architecture, Sapienza University of Rome, Italy
[3]Department of Urban Planning, Henan Agricultural University, China

Parks are one of the main open spaces in urban area, and their internal environment is closely related to the health of residents. A better environment in parks can increase the frequency of residents' outdoor activities and enhance the vitality of urban. In this research, three parks in China are used as research objects, and the internal spaces of the parks are classified into five types (open square, lawn, semi-indoor space, forested space and waterfront space). The spatial and temporal distribution of environmental factors in urban parks and their relationship with residents' health were investigated through field surveys, monitoring environmental factors (wind speed, temperature, humidity, sky view factor (SVF), leaf area index (LAI)) and population characteristics in different spaces. The results showed that there were no significant differences in air temperature and relative humidity in different spaces at different times of the day. The comfort levels of lawn, semi-indoor, forest and waterfront spaces were the best comfort levels, and the comfort levels of plaza were on the hot side. Comfort in the inner spaces of urban parks is influenced by the overall comfort of the city. The temporal variation of human comfort for each space type showed an inverted "U" shape. By analysing the relationship between environmental factors and population characteristics at different time periods, it was found that humidity, wind speed, SVF and LAI had significant effects on population characteristics. During the daytime, humidity and wind speed affect the changes of population characteristics. However, SVF and LAI did not change the characteristics of the resident population. People preferred to stay in plant-rich spaces with low openness at different times of the day. The results of the study provide theoretical basis and practical experience for future planning, design and management of landscapes aiming at public health.

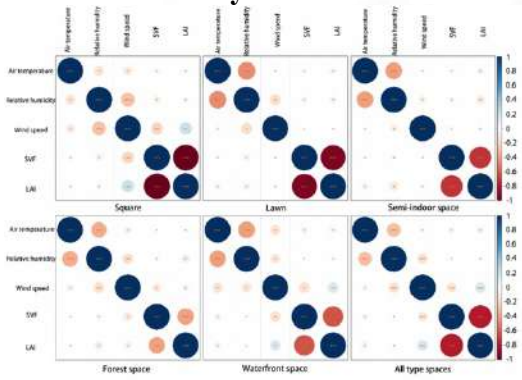
Keywords: Healthy Landscapes,Urban Parks,Microclimates,Public health

comfort distribution in different time and spaces



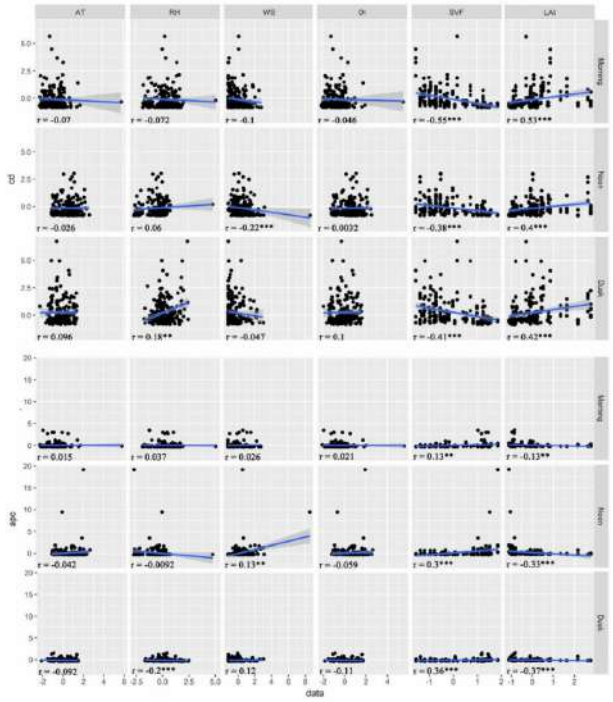
(a) Time variation pattern diagram of human comfort in five kinds of space (A-E refer to five different time periods); (b) Spatial distribution characteristics of human comfort (A-E refer to five different types of spaces)

Correlation analysis



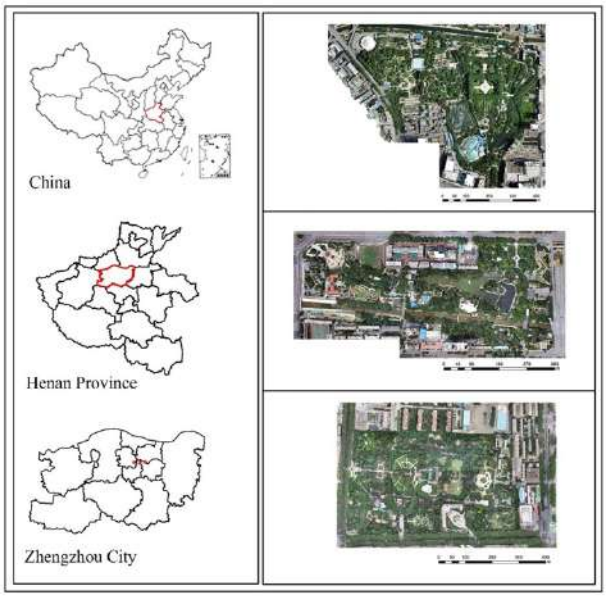
Correlation analysis of microclimate factors with sky visibility factor (SVF) and leaf area index (LAI). (refers to 90% confidence interval,p<0.1. * * refers to 95% confidence interval,p<0.05. * * * refers to 99% confidence interval,p<0.01.)*

Correlation analysis of environmental factors with crowd density and area per capita



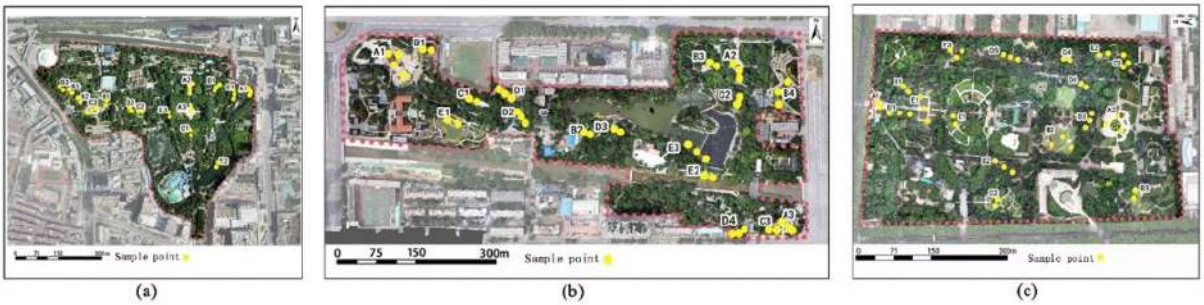
*r represents correlation coefficient; * * * is significantly correlated at 0.005 level (bilateral), * * is significantly correlated at 0.01 level (bilateral), * is significantly correlated at 0.05 level (bilateral); shadows represent 95% confidence interval range*

Location of three parks



The right hand side of the figure shows the three parks (top to bottom),Zhengzhou People's Park, Zijingshan Park and Bishagang park

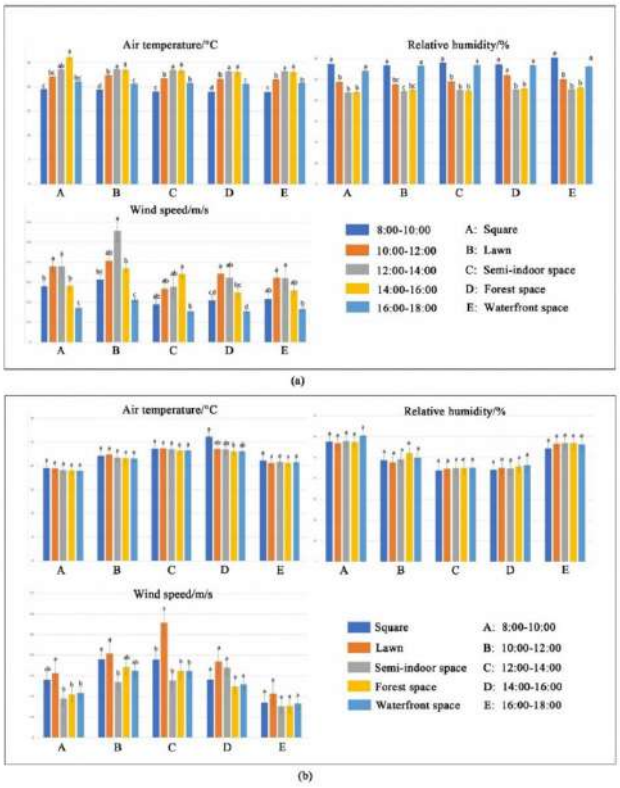
sample points



(a) (b) (c)

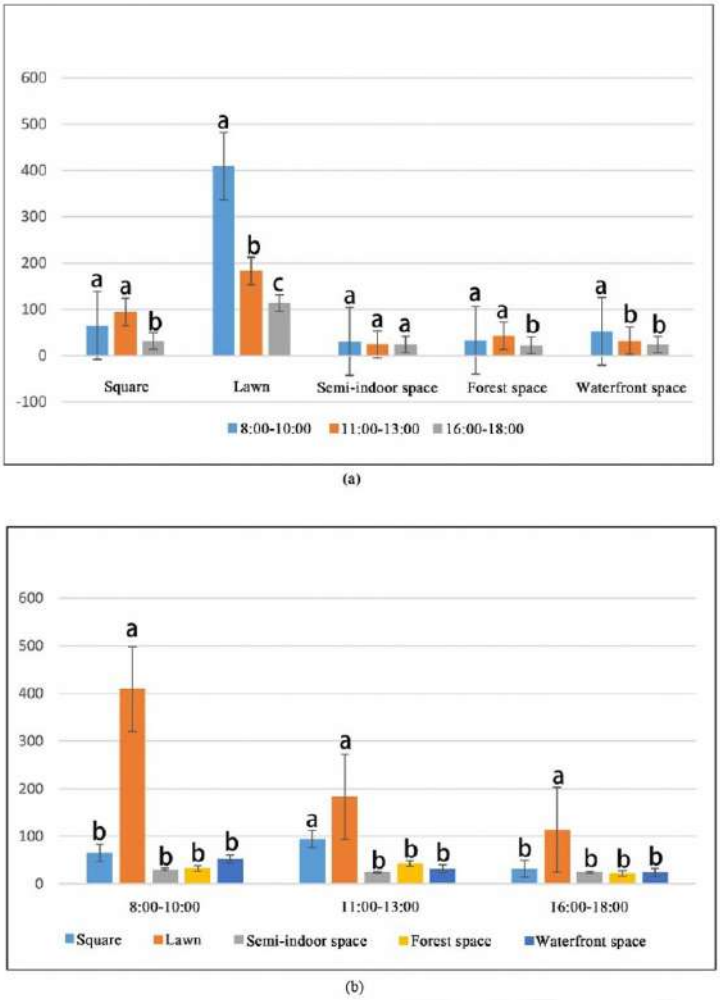
(a) Distribution of Zhengzhou People's Park sample area and sample points; (b) Distribution of Zijingshan Park sample area and sample point; (c) Distribution of Bishagang sample area and sample points (The yellow dots on the three drone image refer to each sample point)

Variance analysis



(a) Variance analysis of time distribution of microclimate factors (A-E refer to five different types of space, and five colors refer to five different time periods); (b) Variance analysis of spatial distribution of microclimate factors (A-E refer to five different time periods, and five colors refer to five different types of space)

Variance of time and spatial distribution



(a) Variance of time distribution of area per capita; (b) Variance analysis of spatial distribution of area per capita in each period (Lowercase letters represent a significant level of 0.05. a, b and c refer to the results of multiple comparisons)

Classification of human comfort level

Human comfort level	Level	Human feelings
>85	Grade 4	Very hot, heat regulation dysfunction, the human body feels extremely uncomfortable
81~85	Grade 3	Hot, the human body feels very uncomfortable, prone to excessive sweating
76~80	Grade 2	Warm, the human body feels uncomfortable, easy to sweat

71~75	Grade 1	Slightly warm, the human body feels
61~70	Grade 0	Neutral
51~60	Grade 1	Cool, the human body feels comfortable
41~50	Grade 2	Slightly cool, the human body feels uncomfortable
20~40	Grade 3	Cold, the human body feels very uncomfortable,the body temperature drops slightly
<20	Grade 4	Very cold, the human body feels extremely uncomfortable, cold shivering

Historical meteorological data of Zhengzhou in experimental dates

Date	10.13	10.19	11.03	11.05
Weather condition	Sunny	Sunny	Sunny	Sunny
AQI index	63	65	97	106
Air quality level	Good	Good	Good	Mild pollution
PM2.5 index	33	32	71	79
PM10 index	76	72	106	122
Average daily wind speed /（m/s）	0.9	2.2	2.3	0.3
Daily average temperature /℃	18	17.3	15.9	12.5
Daily maximum / low temperature /℃	23.5/14.4	24.3/9.7	18.8/14.4	20.4/7.7
Daily average humidity /%	75	65	60	82

Restoration strategy based on the dualistic water cycle efficiency improvement

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[1]Engineering Consulting and Evaluation Division, Academy of Forest lnventory and Planning, National Forestry and GrasslandAdministration, China
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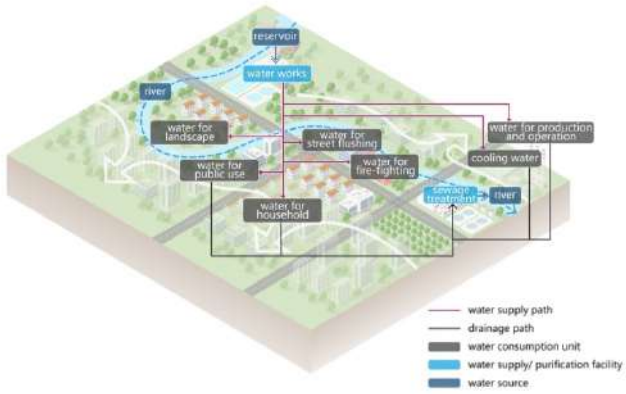
Urban wetlands play a crucial role in regulating the water cycle of the human-earth system. With the development of cities, the problem of water scarcity has become increasingly prominent. Therefore, exploring the role of wetlands in alleviating urban water resource crisis is of great significance. Based on the nature-society binary water cycle theory, this study comprehensively analyzes the current situation of the rapid increase in the proportion of urban water consumption in the total national water consumption in China, as well as the key problems in the inefficiency of the urban water circulation pathways. Taking into consideration the five stages of urban water circulation-abstraction, transmission, utilization. drainage, and return, the study systematically proposes that the protection and restoration of wetlands contribute to improving the urban water resource utilization, optimizing the spatial distribution of urban wetlands, and enhancing the synergistic effects of sustainable water resource utilization. By fully considering the overall optimization of urban ecologic space and wetland layout, the study elaborates on how, under the guidance of urban land-use planning, enhancing social water return capacity and reducing the distance of social water return in urban water circulation can enhance efficiency. The regulatory role of wetland ecological engineering in optimizing urban water circulation is fully utilized. Finally, with consideration for the coordination and adaptability of medium and long-term urban planning and development, strategies for wetland protection and restoration to enhance water cycle efficiency are discussed. These strategies include the construction of multi-functional water sources land, shortening the drainage distance, multi-stage water purification, establishing small-scale wetlands, and constructing regenerative systems based on the concept of self-circulation. These specific measures provide an important basis for the overall layout of urban wetland resource space planning, and are of great significance for promoting sustainable urban water resource utilization and building resilient cities that achieve harmonious coexistence between humans and nature.

Keywords: urban wetlands, water resources, dualistic water circulation, ecological restoration, strategy

Schematic diagram of urban water cycle path

Fig.1 Schematic diagram of urban water cycle path



Schematic diagram of wetland conservation and restoration strategies for improving urban water cycle efficiency

Fig.2 Schematic diagram of wetland conservation and restoration strategies for improving urban water cycle efficiency

Response of Landscape Tree Species to Thermal and Humidity Effects

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In the process of urbanization, the urban heat island effect has become increasingly severe, making the optimization of urban thermal environment a hot topic in landscape architecture research. Urban parks, as ecological conservation and recreational areas, possess functions such as air purification, noise reduction, carbon sequestration, oxygen release, cooling, and humidifying. They play a significant role in mitigating the urban heat island effect, enhancing human comfort, and strengthening urban climate adaptability. However, existing research often lacks an understanding of the response mechanisms of individual landscape tree species to thermal and humidity effects under the urban heat island environment, as well as studies on the response of different landscape tree species to high-temperature stress.

Based on the theory of local climate zones and the current status of thermal environmental impact factors, this study investigates the spatial distribution characteristics of the urban heat island effect in the main urban area of Suzhou City. By constructing and overlaying local climate zoning maps with urban heat island grade distribution maps, areas with moderate high-temperature zones, diverse landscape tree species, small water area, and surrounding environments mainly consisting of commercial land in Suzhou parks were selected as the research area. Twenty-two high-frequency landscape tree species were selected for physiological and ecological index measurements. The study investigates the influencing factors of carbon sequestration, oxygen release, and cooling and humidifying effects of different tree species under summer high-temperature and non-high-temperature conditions, including plant physiological characteristics, leaf area index, canopy structure, and their correlations with environmental factors.

The study ranks and classifies the daily average carbon sequestration, oxygen release, and cooling and humidifying capacities of high-frequency landscape tree species per unit leaf area, per plant, and per unit land area, showing significant differences in the carbon sequestration and cooling and humidifying capacities among different tree species. Furthermore, this study highlights the significant impact of thermal and humidity environment on the carbon sequestration and cooling and humidifying capacities of different landscape tree species, emphasizing the interrelationships between temperature, humidity, wind speed, and tree physiological processes. Additionally, the study conducts cluster analysis on the carbon sequestration and cooling and humidifying capacities of different tree species under high-temperature and non-high-temperature conditions at different levels, demonstrating their heterogeneity in improving urban thermal environment.

Guided by the concept of local climate zones, this study refines the division of the internal thermal environment of the city and selects landscape tree species with high carbon sequestration, oxygen release, and cooling and humidifying efficiency. It reveals their past response mechanisms to thermal and humidity effects and predicts their response to climate change in future higher-temperature urban environments. This study provides scientific basis for the rational allocation of landscape tree species in Suzhou City and quantitative evaluation of environmental benefits, as well as reference for the rational and orderly construction of urban green spaces, especially urban parks, in the future.

Keywords: Urban Heat Island Effect,Carbon Fixation and Oxygen Release,Cooling and Humidifying,Landscape Tree Species,Local Climate Zones

Nature Based Solutions & the Resilient City

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[1]City of Toronto, Urban Design
[2]International Landscape Collaborative
[3]City of Toronto, Environmental Planning

How can we ensure the growth of Toronto, Canada's largest and fastest-growing city, is climate resilient? What role do landscape architects play in implementing resilience? Climate action requires a collaborative approach for all of us involved in city building, including designers and regulators. The work of landscape architects can inspire other professionals, and requirements for nature-based solutions can stimulate creative design that results in a more resilient city that is more prepared to address a changing climate.

This session will provide an overview of Toronto's path to becoming a resilient city, including the use of nature-based solutions and the role of innovative, thoughtful landscape architecture. Participants will hear from two landcape architects working for the City of Toronto, one in an environmental planning policy making role and another in an urban design role. They will also gain better understanding of the tools Toronto has used to encourage nature-based solutions, including the Biodiversity, Ravine, and Resilience Strategies, Toronto Green Standard, and Green Roof Bylaw.

The session engages with the audience about their views of resilience. The question is: how successful are nature-based design solutions in addressing resilience in an urban environment? Do Toronto's policies, implementation tools, and actions enable nature based solutions to adequately address resilience in the light of future shocks and stresses, and how do these impact our most vulnerable populations? What should we be doing and what are the gaps and opportunities? How does Toronto compare to other cities and urban regions around the world?

Keywords: Nature based solutions, green infrastructure, resilience, policy, guidelines

Environmentally Significant Areas

A map of Environmentally Significant Areas in Toronto's natural heritage system that are indentified and protected in policy. More info here: https://www.toronto.ca/explore-enjoy/parks-gardens-beaches/ravines-natural-parklands/environmentally-significant-areas-2/

Gardiner Public Realm Linear Park

An image of the public realm naturalized design for a highly constrained urban area between an elevated rail corridor and elevated highway, with integrated green infrastructure to manage stormwater from both infrastructure corridors, while accomodating multiuse trails for pedestrians and cyclists. Image Credit: West 8

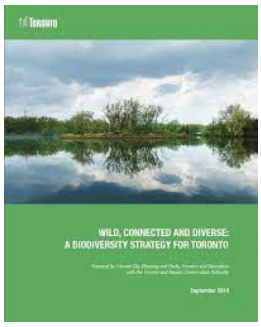
Green Infrastructure in Highly Constrained Urban Streets: LakeShore Boulevard East

An example of adaptive design of green infrastructure in a highly constrained street in Toronto's waterfront. More info here: https://www.waterfrontoronto.ca/news/little-pilot-project-big-impact Image Credit: West 8

Port Lands Flood Protection - An unprecedented scale of Nature Based Solutions in Toronto

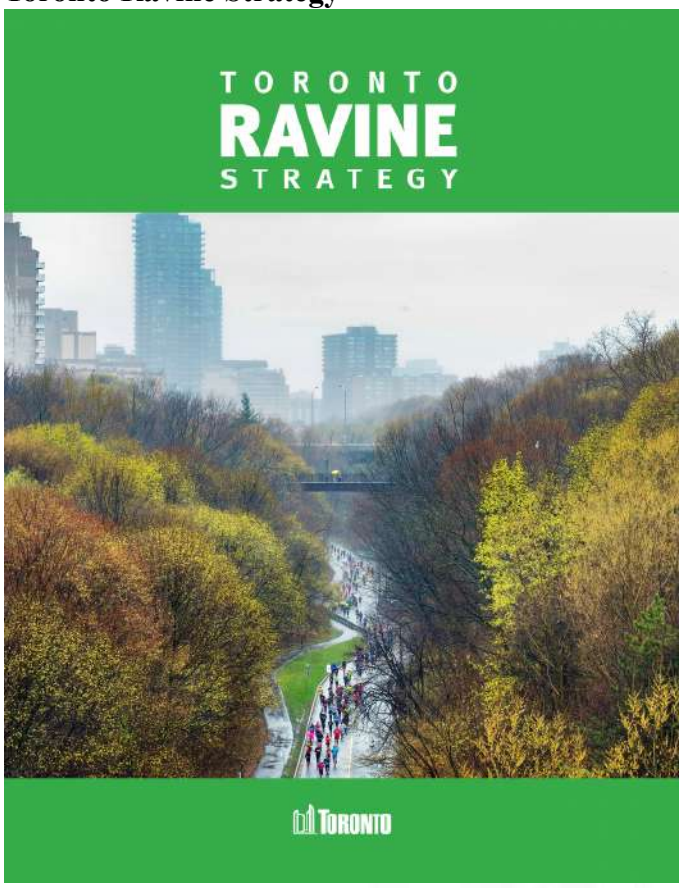
The outcome of a decades long process and 1.6B investment, this massive lanscape infrastructure project is renaturalizing the outlet of the Don River into Lake Ontario and establishing flood-proof developable land for development on Toronto's Waterfront. The Nature Based Solutions approach to flood protection infrastructure is evident in this construction photo, nearing completion. Image Credit: Vid Ingelvics and Ryan Walker

Toronto Biodiversity Strategy



Toronto's Biodiversity Strategy, another policy initiative led by Environmental Planning to enable conservation and promotion of biodiversity in our urban region while it is undergoing rapid urban growth. More info here: https://www.toronto.ca/explore-enjoy/parks-gardens-beaches/ravines-natural-parklands/biodiversity-in-the-city/

Toronto Ravine Strategy



Toronto's Ravine Strategy, a policy intiative led by Environmental Planning to protect and invest in restoration of Toronto's natural heritage system and resilience infrastructure. More info here: https://www.toronto.ca/city-government/accountability-operations-customer-service/long-term-vision-plans-and-strategies/ravine-strategy/

POSTER PRESENTATIONS

Acting for All: Diversity, Equity & Inclusion

Local Landscape Diversity and Emotional Identity in Modern Commercial Cities

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Under the background of globalization, ' locality ' plays an increasingly important role in shaping urban landscape and residents ' emotional identity. As an important center of economic development, modern commercial and trade city has a fierce flow of resources and population. Local residents, foreign businessmen and tourists, driven by the commercial and trade industry, have created more diverse, rich and flowing local landscapes and cultural characteristics. The protection and inheritance of traditional ' locality ' and the emergence and development of modern ' locality ' continue to blend. The purpose of this study is to explore the relationship between diverse local landscapes and local emotional identity of diversified residents in modern commercial cities, and to explore the significance of local landscapes for human subjective perception and sense of belonging. This study takes Yiwu, a well-known small commodity distribution center in the world, as an example. The questionnaire was used to collect the local perception data of Yiwu residents. SPSS was used to analyze the residents ' perception characteristics, and ArcGIS was used to visualize them. The results show that: (1) The life and participation of Yiwu 's commercial and trade locality construction process enhance residents ' perception resilience; the local inheritance and development of commercial landscape has multiple potential; the local perception of Yiwu commercial landscape presents emotional diversity due to the difference of perception subjects. Based on the research results, this paper proposes an adaptive planning strategy to construct the overall pattern of Yiwu commercial landscape perception by clearly defining the perception nodes, shaping the brand of local commercial landscape, and guiding the local self-driven development of commercial landscape. The research results provide useful enlightenment for the local inheritance and development of modern commercial city landscape.

Keywords: Locality of landscape, modern commercial city, local identity, diversity, Yiwu

Conceptual exploration of the recreational place in urban green space

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【Objective】In the context of existing social development, the increasing scarcity of available land for construction and the growing and diverse recreational demands of the population have heightened the apparent contradiction. Efficiently and rationally planning and designing recreational sites, managing recreational resources, and ensuring that limited urban green spaces precisely meet the needs of recreation enthusiasts for health and entertainment have become imperative for sustainable development. Therefore, the importance of research from the perspective of recreational behavior-environment is increasingly evident. However, current research often operates on a broad scale, and there is a need to supplement studies at the site level, exploring the specific correlations between recreational activities and the three-dimensional layout of supporting elements. At the same time, there is a gap between academic research on urban green spaces and practical design. The transferability of cutting-edge research findings into practical recommendations for practitioners and managers is challenging. To address these issues, this paper innovatively introduces the concept of "recreational place."【Method】The concept is derived from years of field investigations and practical observations of urban green spaces, employing interdisciplinary research methods from recreation studies and ecological psychology. Inspired by Roger Barker's behavior setting theory in ecological psychology, the concept emphasizes the inseparable relationship between people and the environment, with behavior and the environment forming a mutually influential whole.【Results】Based on the behavior setting theory, a recreational place is defined as a holistic entity composed of recreation enthusiasts, recreational activities, and the recreational environment, providing comprehensive opportunities and experiences. The scope is delineated by the recurring cycle of recreational activities. Grounded in the tangible "place units" perceived by recreation enthusiasts, the study aims to explore the specific correlations between recreational activities and the three-dimensional layout of supporting elements. The research also proposes a "identify-eliminate-describe-classify" approach through recreational place surveys to create a recreational place atlas for resource management.【Conclusion】Ultimately, the concept, survey, and atlas of recreational places will form a comprehensive tool for urban green space researchers, designers, and managers. It establishes a bridge between research and practice in green space studies, innovating the knowledge system of site-scale human-environment relationships. This study provides a more precise basis for meeting citizens' recreational needs, contributing to the creation of higher-quality, more efficient urban green spaces.

Keywords: Urban green space, Recreational place, Recreational behavior, Recreational environment, Behavior setting

World Heritage's Gentrification Impact on Housing Prices

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Urbanization is a multifaceted process that involves various aspects of urban transformation, land use, and spatial restructuring, and has significant implications for redistributing urban infrastructure and environmental resources. The process of gentrification has significantly impacted the spatial structure created by the transformation of the old city and the development for tourism. By constructing the Hedonic model, we analyze the spatial differentiation and influencing factors of residential prices. Further, we explore the impact of the cultural landscape of West Lake in the World Heritage City of Hangzhou on the equity of residential space.

（1）Residential Price Impact Elements. The price of residences is impacted differently by various characterizing elements. The distance of residences from the cultural landscape West Lake and the age of residences are the most important elements. The West Lake is a key element that influences the equity of Hangzhou's urban living space.

（2）World Heritage Differential Impacts. The West Lake cultural landscape has a maximum effect on the housing price of 5380m, and there is a significant external influence, every 1km increase in distance to the West Lake, the corresponding housing price decreases by 11.97%. The West Lake Heritage Site has led to a spatially differentiated distribution of urban residential prices in Hangzhou, with a gradual increasing trend.

（3）Transmutation of the urban spatial pattern. The built-up areas affected by the maximum influence of West Lake are mainly located on its south side. There is a significant spatial gradient decrease, and the residential spatial development in the study area from 1980-2020 has evolved from northwest-southeast to southwest-northeast. It has transformed from a centralized distribution to a small centralized and large dispersed one, which is closely related to the pattern of Hangzhou's urban development.

By quantifying the factors that influence residential prices, we analyze the spatial differentiation of the West Lake cultural landscape on urban residential prices and its influencing mechanism. This helps us better understand the formation process of Hangzhou's urban space, explore the urban pattern and residential space under the influence of the world's heritage, and take into account social equity while building a symbiotic relationship between the "heritage-city-citizen". In the process of transforming dilapidated or low-income neighborhoods in Hangzhou, it is important to consider how to guide urbanization in a more sustainable and inclusive direction through planning and policy. This is an issue that needs to be addressed in the future gentrification process of Hangzhou's residential space.

Keywords: world heritage,gentrification,urbanization,residential prices

Heritage From Below: Does Bottom-up Conservation Start From the Bottom?

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This paper discusses the concept of bottom-up conservation, emphasizing the importance of public participation in heritage preservation and management. This approach gives priority to conservation initiatives driven by communities, addressing the needs and concerns of local communities, and establishing strong partnerships between communities, professionals, and power institutions. However, it is crucial to recognize that bottom-up conservation planning is not detached from top-down management. There is a need to clarify complex issues such as decision-making, whose opinions are heard, and who benefits. Therefore, the article introduces the concept of a "layered cake structure" to delve into the complexity of the bottom-up conservation process. It challenges the simplistic binary perception of "top" and "bottom," elucidating the roles of marginalized groups in the conservation process and the often overlooked facts. Through case studies and analysis, the article emphasizes the necessity of understanding and interacting with the unique perspectives and knowledge of these groups to ensure that the voices of the "bottom" groups are heard in the conservation process. Overall, the article advocates for a more nuanced and inclusive approach to both built heritage and natural heritage conservation.

Keywords: bottom-up, duality, layer-cake structure, heritage, vulnerable groups

Typical Research on Human Settlement in Mining Rural Areas

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[3]China Northwest Architectural Design and Research Institute Co., Ltd

China has abundant mineral resources, the safety, sustainable development, and improvement of public space quality of many villages affected by mining need to be addressed. The study expands the scope of research on rural public spaces to the special regional environment of mining areas. Three villages around the Binchang mining area with varying degrees of mining impact are selected for investigation, classification, and evaluation. Combined with research on the daily life behavior of villagers, a multi-dimensional analysis method is adopted based on the perspective of mining land integration to sort out typical problems of rural public spaces under mining influence, and to explore improvement strategies suitable for the coordinated development of mining villages. It has theoretical and practical significance for promoting the revitalization of mining resource-based rural areas, practical spatial planning for special rural areas, and improving the construction of rural public spaces.

Keywords: Resource,Villages,Integration

The Art of Balance Admist Economic Development and Environmental Problem

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[2]Business School, University of Bristol, Bristol, United Kingdom

In developing countries, rapid urbanization and climate change pose challenges to the ecosystem, species diversity and animal welfare. While numerous studies have discussed animal welfare, there remains a notable lack of attention to analyze the relationship between animal welfare, economic development, and Zero-Carbon cities construction from a broader regional perspective. This paper not only attempts to build the connection among animal welfare, carbon emissions, and economic development but also emphasizes how the relationship varies across different regions in China. A new framework was built to identify attributes that represent animal welfare at a macro scale, taking into account both rural and urban areas. Quantitative analysis through Simultaneous Equations Model (SEMs) was conducted by employing cross-sectional data to examine these relationships. Our results show a clear link among animal welfare, Zero-Carbon cities construction, and economic development. These findings are important for future animal welfare protection and enhancement, while considering environmental problem and economic development particularly in developing countries. We can also take these advantages to better One-health city and Zero-Carbon cities construction, where we need to consider all community members, not just humans.

Keywords: Sustainable Development, Zero-Carbon cities, One Health, Biodiversity, Simultaneous Equations Model

Exploring the effect of urban blue-green spaces on housing prices

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[3]Zhejiang Guangsha Vocational and Technical University of Construction

The integrated planning of blue and green spaces is an important topic within the realm of urban and landscape planning. A comprehensive understanding of the land economic value of urban blue-green spaces (UBGS) holds immense significance for urban sustainable development, urban spatial equity and the promotion of human well-being. However, within discussions concerning economic and land values, most studies focus on the single effect of blue or green space on house prices, and often initiate from the perspective of residents' willingness to pay. There exists a significant lack of exploration into the immense advantages arising from the joint figuration of blue and green spaces on a larger spatial scale.
Based on the MGWR model, this study firstly discussed the heterogeneous effects of UBGS on housing prices in Hangzhou. Then, the interaction effect between blue space and green space was examined at the district level, and the specific locations and spatial patterns were identified. The results show that (1) different types, features and accessibility of UBGS have different degrees and spatial scale of effect on housing prices, and will be affected by other attributes of UBGS; (2) in 30.92% of the main urban area of Hangzhou, the effect of blue spaces and green spaces on housing prices exhibits an interactive effect. And the spatial patterns are divided into blue-green positive synergistic, antagonistic and negative synergistic regions. The specific UBGS planning recommendations for each spatial patterns are provided; (3) in urban core areas and development zones, the co-figuration of blue and green spaces will generate higher housing premiums. However, near ecological conservation areas, they jointly suppress housing premiums. The water bodies can promote the positive effect of green spaces on housing prices or alleviate the negative effect, except for unexploitable areas under ecological protection. Green space has positive and negative effects on housing prices, while blue space only has positive effects at the district level. The economic value of blue space does not vary as much as green space due to land use and ecological control, but is more influenced by its internal features and specific types. Hence, planners must consider the integration of blue spaces into green spaces planning. The results indicate that planners must consider the integration of blue space into green space planning, rather than a single focus on blue or green space planning.

Keywords: Urban blue-green spaces, MGWR, hedonic price model, housing prices, urban planning.

Figure 1.Research process overview

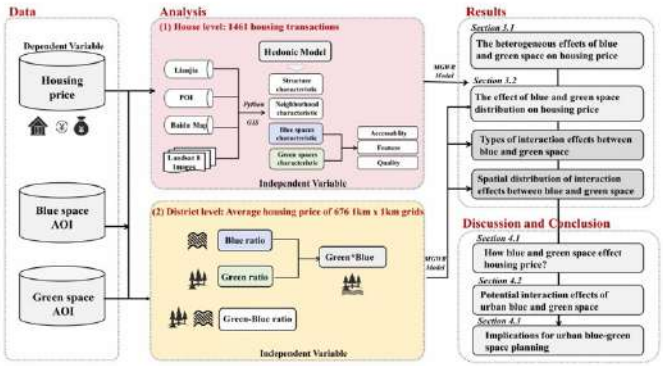


Figure 2. Location of study area

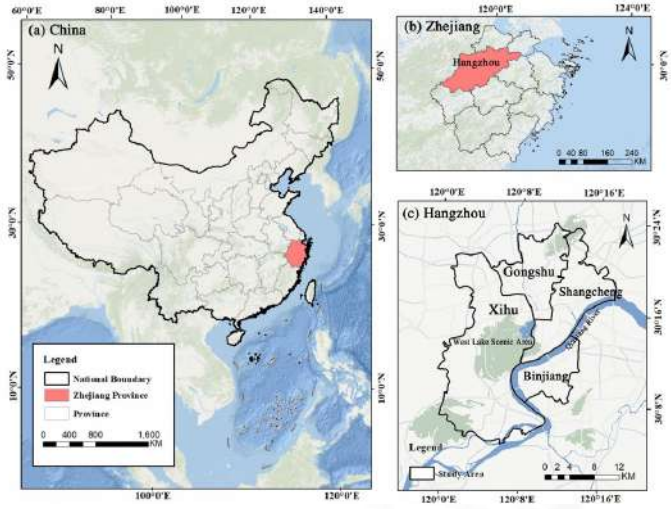


Figure 3. Spatial distribution of regression coefficients for Model 1-4.

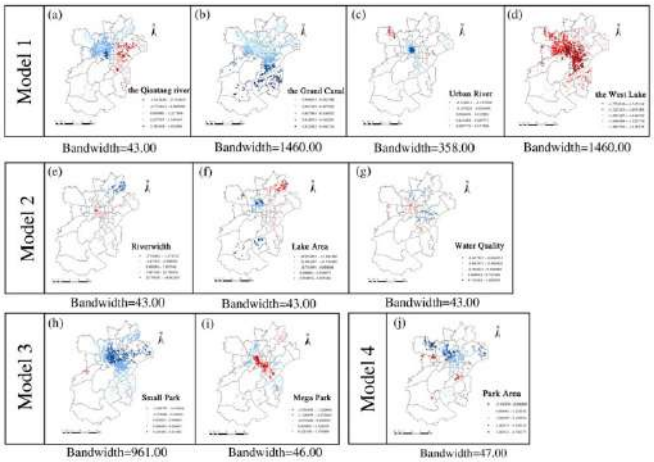
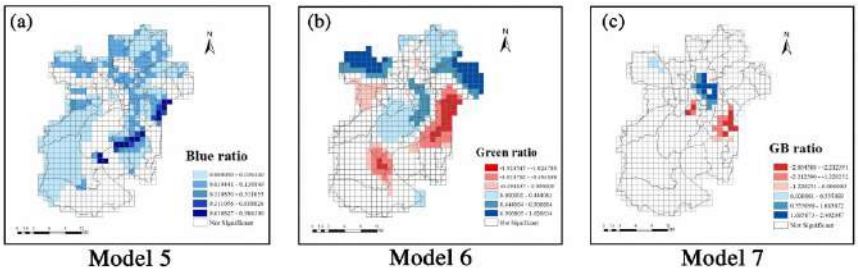
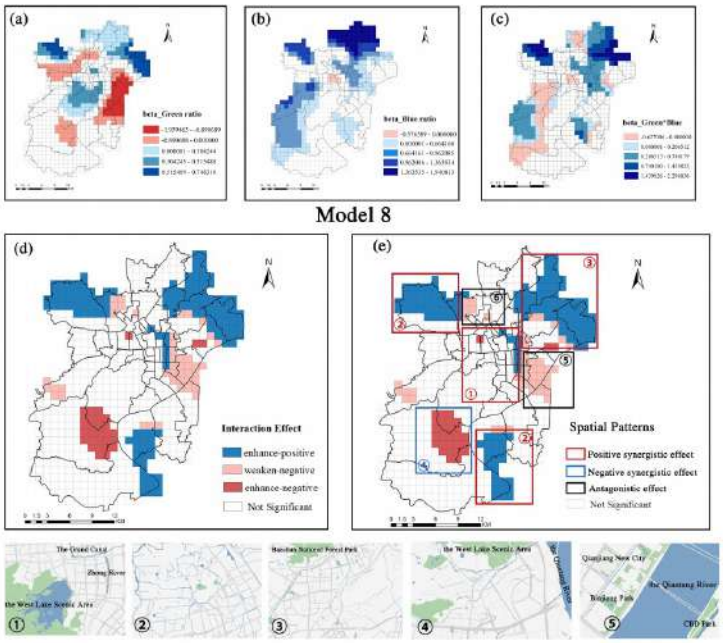


Figure 4. Spatial distribution of regression coefficients for Model 5-7



Model 5 Model 6 Model 7

Figure 5. Regression coefficient distribution of Model 8 and spatial distribution of blue and green space interaction effects



Going Coliving: Transformational amenity recreation through community planning and design

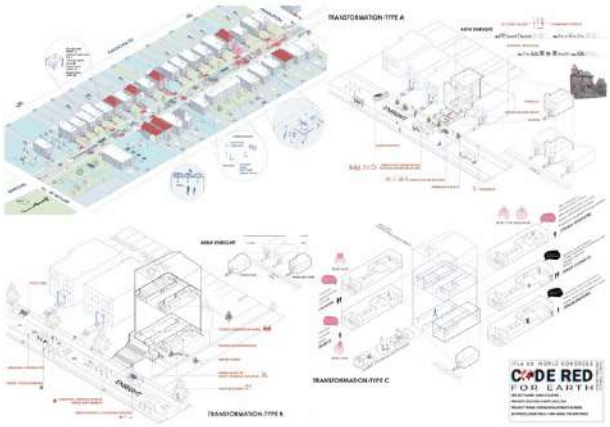
Yixin Jiang
Yixin Jiang, TBG Partners, San Antonio, USA

The communities along the hodiamont track keep shrinking and aging, in addition, the younger generation is leaving to seek opportunities elsewhere parts of the city such as the Central West End or Clayton. Our design intervention is to bring people together in the community regardless of age, by proposing a co-living style for people to interact with space, resources, other generations, and the community. In spatial proposal, the project took use of underused property houses to regenerate opportunities such as community cafe, multigenerational housing and social spaces, taking consideration of outdoor open spaces to create a new urban life for the community.
By asking: What if we introduce a multi-generational way of living to enright avenue that allows a wide range of people to live and work together? Through a fine tuned spatial transformation of the interior of the houses, their surroundings setting as well as the street configuration itself, we envision enright avenue to become an example for a sustainable way of living. Therefore by proposing the example of Enright Avenue, the model will be likely to multiply and adapt to other community blocks.

RELEVANCE FOR THEME: The project intended to design for all residents around Hodiamont Track, a single family housing community. Reusage of abandoned housing provides inclusive opportunities fro public access and participation, and activation of outdoor spaces in the front keeps the most amount of visitros together including residents, shop owners, customers of all ages. Therefore, the social infrastructural spaces into3 transformational typologies we provided the community a potential to revitalize neighborhood connection, commercial vitality and interpersonal cohesive from an equal design standpoint.

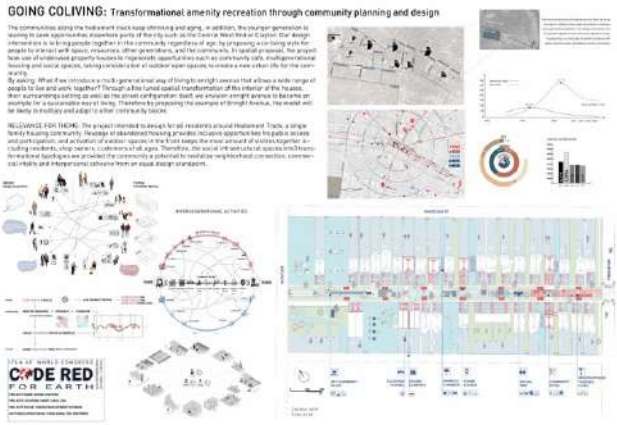
Keywords: shrinking city, revitalization, Saint Louis, urban sprawl, social equity

Going Coliving: Transformational amenity recreation through community planning and design



project poster presentation 02

Going Coliving: Transformational amenity recreation through community planning and design



project poster presentation 01

How Disney Resorts make Child-friendly City：A study on Shanghai

Qing Qin, Yumeng Zhang, Jiale Xiong
Huazhong University of Science and Technology

As public outdoor spaces gradually gain increasing importance, the planning and design of Child-friendly Cities have garnered attention. Despite previous studies on Child-friendly from the perspectives of urban-planning theory, the configuration of public community spaces, and the relationship between children's development and play-space design, the significance of landscape elements in creating Child-friendly cities remains underexplored. Disney Resort, recognized globally as a destination for children, embodies imaginative design, cultural integration, and accessibility, making it an ideal model for examining how landscape design interacts with children's activities and needs. Shanghai Disney Resort, in particular, stands out for its profitability, underscoring its strategic planning and appeal to the Chinese young audience.

This study delves into the pivotal role of Child-friendly landscape elements at Shanghai Disney Resort through a literature review and site investigation. The Resort was divided into eight themed areas, selecting 3-4 different scenarios per landscape element for evaluation in each area using standardized checklists and scales. Systematic observations were then conducted to record the interactions, using behavior maps to document the locations and frequency of children's engagement with specific landscape features. It reveals that,

1. Shanghai Disney Resort fosters parent-child interactions that encourage shared experiences, understanding, and joy. Attractions such as family-friendly rides and exploratory educational spaces are designed to be enjoyed together, creating lasting memories and discussion points for families, and enhancing their bond. The resort's parent-friendly amenities, such as baby care centers, stroller rentals, and various dining options prioritize accessible and comfortable spaces for families, making the entire park a conducive environment for both children and their caretakers.

2. Secondly, cutting-edge storytelling and interactive elements skillfully craft immersive experiences that appeal to a wide audience. The integration of beloved Intellectual Properties (IPs) such as LinaBell, alongside interactive character encounters, is key in creating these experiences. Social media network (SNS) promotion then enhances the anticipation and excitement of visiting. These strategies foster a community of enthusiasts eager to share stories and discoveries, allowing potential visitors to pre-experience online, making re-visitings akin to battling monsters in a Nintendo game, where players can always find new secrets and challenges at different levels.

3. In light of the challenges posed by the COVID-19 pandemic and economic downturn, the significance of fostering collective memory for healing has intensified. In this context, the central castle serves as a spatial core, embedding landscape memory and establishing a landmark that aligns with Kevin Lynch's five elements of urban imagery. It enhances the park's navigability and visibility, offering a clear orientation point and improving overall transparency and openness. Its familiarity and fantasy offer visitors an escape from

psychological strains, serving as anchors that help individuals and communities navigate through uncertainty.

By analyzing the specific landscape elements employed at Shanghai Disney Resort, this study extends the concept of Child-friendly Cities with parent-friendly, highlighting importance of inclusive, engaging urban environments for both children and their caregivers, and enhances understanding of children's play-space, collective memory, and Child-friendly landscape design within city and community.

Keywords: Child-friendly Cities, Disney Resorts, landscape element

Community renewal system in underdeveloped areas-an attempt in Kathmandu

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The slum in Kathmandu, Nepal, exemplify the typical challenges faced by communities in economically underdeveloped areas. In these neighborhoods, residents confront fundamental issues such as clean water shortage and waste management, and the limitation of greenery and social recreational spaces. Housewives, the elderly and children are the main users of community public space.

In 2018, the University of Washington partnered with local universities to provide design and construction in the form of design classes, funded by a foundation set up by professors of the two schools, and in partnership with local women's organizations, to launch a renewal project of the community. Through engaging with the community via meetings, all groups' needs were heard and multiple rounds of voting on designs took place until a final plan was agreed upon by residents and students alike. During the initial phase of this project, we constructed modular facilities that can be detached and moved when needed, serving as play facilities, benches, garbage bins, and planting ponds in an open space that previously occupied by vehicles. While opening up the public space, it also avoids the security risks brought by vehicles, especially for children. Furthermore, students also proposed future directions for addressing other demands raised during community meetings regarding updates or improvements required. A follow-up project library was established to facilitate local organizations in carrying out subsequent renewal.

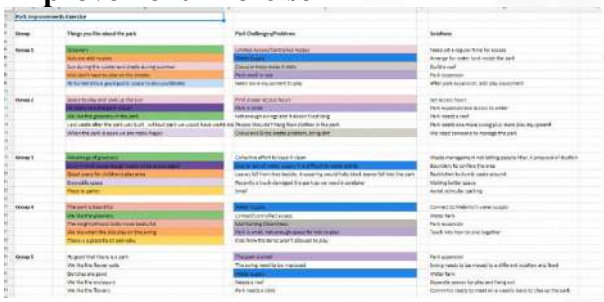
This project operation model, which is all composed of non-profit organizations, can be used as an important reference for updating projects in underdeveloped areas lacking official investment. Through the Kathmandu project, it can be seen that the promotion of a similar type of project needs at least four basic roles: investor, designer, builder and operator, and the same organization can assume one or more roles. In the upcoming projects, we can refer to this operation model to explore potential local partners to fill the required roles, so as to basically guarantee the promotion and operation of the project.

Keywords: Renewal in underdeveloped areas, operational model, design justice, community involvement

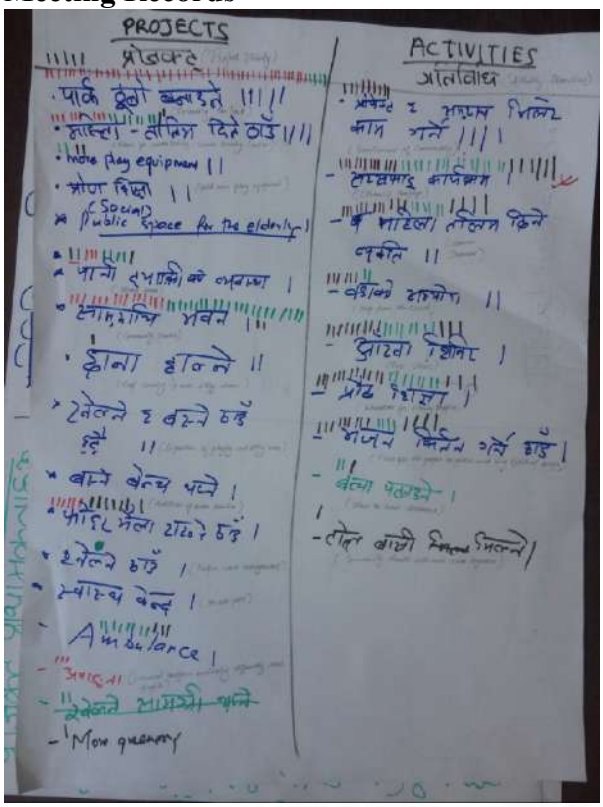
Community meeting

Construction Process

Improvement Exercise



Meeting Records



Student Work

Analysis of Emergency Shelter Spatial Design in Gender Perspective

Xinmei Hu
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Due to differences in biological and social constructs of gender, there are obvious differences in the performance of genders in the shelter space during and after disasters. While there has been some progress in international research on gender in shelters, no such research has been conducted in China. Based on an analysis of the main manifestations of gender differences in the design of emergency shelters, this paper proposes a set of design principles and design points for the design of emergency shelters from a gender perspective. It is hoped that this paper will enrich the diversity of perspectives in the study of emergency shelters and provide some reference values for the spatial planning and design of emergency shelters in China.

Keywords: Gender Difference,Emergency Shelter,Space Design

Exploring the intersection of urban agriculture and public space across cultural contexts: United States and Nepal

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Over one billion people currently live in informal settlements around the world, with this number projected to grow as cities experience rapid urbanization. It is becoming an increasingly popular belief that informal settlements have the potential to play a vital role in the equity and accessibility of these cities. This has generated the establishment of loose frameworks that allow for these settlements to grow while striving toward a higher quality of life and greater integration into the cities in which they are situated. The purpose of this research is to explore culturally appropriate public space opportunities for the informal settlements of the Kathmandu Valley in Nepal. A large portion of these communities are rural farmers who have migrated to the city in response to Nepal's increasingly urbanized economy. The demographics of these settlements, the importance of public space, and the rapid development of the agriculturally fertile Kathmandu Valley all suggest that retention of agriculturally productive landscapes should be a priority in this region. For these landscapes to be a public asset, communal management is crucial – the management strategy of community gardens in which individuals care for specific plots can restrict the site's ability to act as public space by omitting the collective management strategies that contribute to a sense of uniformity and a common goal for the site. Nepal's highly successful Federation of Community Forest Users (FECOFUN) will serve as a central case study to inform ways in which a similar management strategy might be formed to address agriculturally productive landscapes in a site-scale, urban context.

This study, comprising two phases, intends to be conducted in the Summer of 2024 and on site in Nepal in the Fall of 2024. The primary question driving the study is "how can the community forest model of land management in Nepal be scaled to support communally managed urban farms for informal settlements in the Kathmandu Valley?" Objectives of the study include a combination of quantitative and qualitative analyses of Nepal's community forest management model, agricultural practices, and informal settlements; identification of opportunities for urban agriculture in Kathmandu; and the exploration of opportunities to scale the FECOFUN management model to accommodate urban agriculture. Methods conducted over the Summer will include preliminary geospatial analysis applied to descriptive case studies relating to informal settlements and communally managed urban farms. Results and conclusions from this research to be presented in September will aim to reveal physical, socioeconomic, and cultural relationships within the Kathmandu Valley and draw comparisons between the analysis and the case studies. These results will form the foundation for further research to be conducted in Nepal, which will include case studies of community forests and urban farms, refined geospatial analysis, community outreach, and design iterations. Results intend to provide future researchers with a framework to identify urban agriculture opportunities from both a physical and management perspective. Ultimately, the research aims to impart communities with the ability to assess their needs and establish culturally appropriate public space that contributes to the community's health and vitality.

Keywords: Nepal, communal management, urban agriculture, informal settlements, public space

Refined Governance Exploration for Everyday Landscape Renewal in Historic Context

Liu Yifei, Hu Xiaomin, Yu Gang
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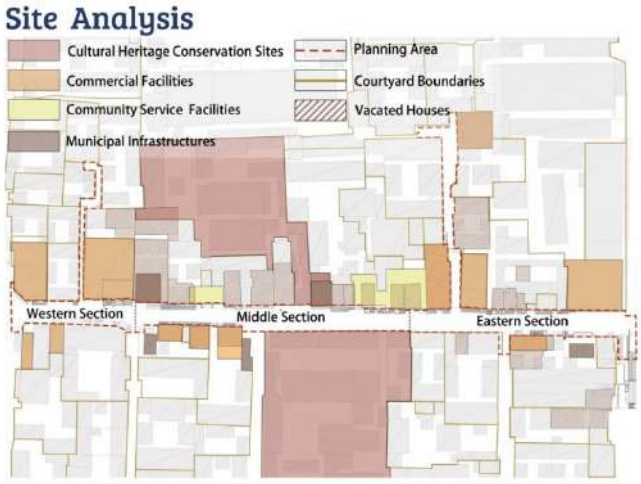
High-quality spatial governance carries the people's vision of a better life, and in the context of stock regeneration, the utilization of everyday landscape renewal that serves as a spatial medium to build a community home for co-construction, co-sharing, and co-governance has become an important strategy to promote grassroots governance in the Old City of Beijing. As a typical traditional residential area, Dazhiqiao Hutong in Xicheng District has a large quantity and different types of inefficient green landscape spaces, so this paper takes the community building process of Dazhiqiao Hutong as an example to explore more possibilities of promoting co-sharing governance through landscape renewal with multi-subject participation. The practice first takes the participatory planning of community self-governance as the working framework, defines the boundaries of public, semi-public, and autonomy areas, and clarifies the rights and obligations of different spatial types. Secondly, carry out a refined renewal of the everyday landscape as the core strategy to meet the diverse demands within the limited space. Thirdly, take the full-cycle companionship approach as the technical guarantee, including pre-survey, participatory design, and ex-post evaluation. Fourthly, develop the sustainable toolkit of community building as a specific means, including activity, education, and management tools. Finally, this community building process has mobilized more than 70 community residents to participate in the master planning of community self-governance, created 12 micro-community sites and 4 half-square-meter gardens, optimized the living space of Hutong, explored the institutionalization process, and achieved refined management gradually. The research aims to provide a reference for the renewal of community public spaces in the historic city and to contribute experience to promoting grassroots governance.

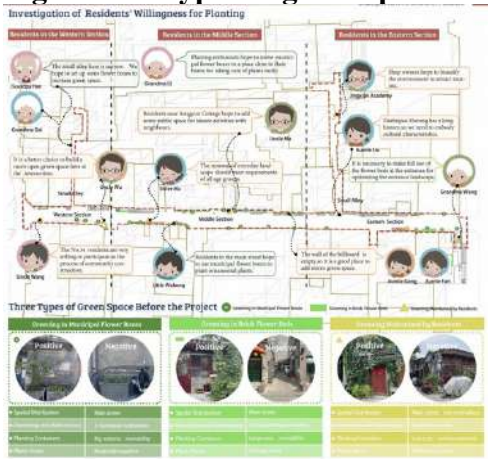
Keywords: historic city, refined governance, everyday landscape, community building, Old City of Beijing

Fig.1 Site Analysis



Site Analysis

Fig.2 Three types of green space before the project

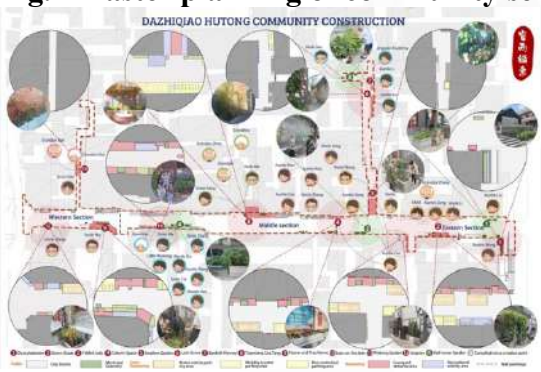


Three types of green space before the project

Fig.3 Framework

Framework

Fig.4 Master planning of community self-governance- professional version

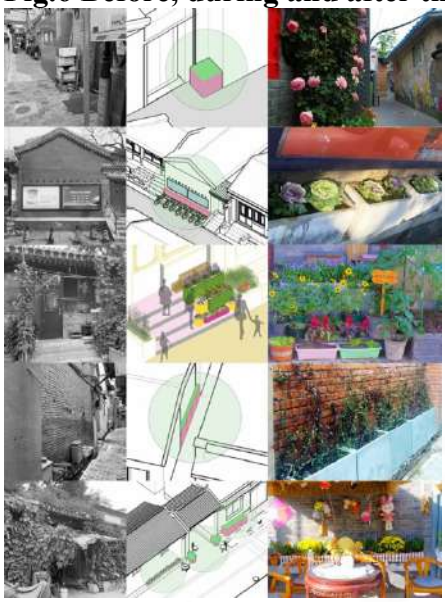


Master planning of community self-governance- professional version

Fig.5 Master planning of community self-governance- residents version

Master planning of community self-governance- residents version

Fig.6 Before, during and after the renewal of Micro-Community Greening Sites



Before, during and after the renewal of Micro-Community Greening Sites

Fig.7 Relatively positive Half-Square-Meter Gardens

Relatively positive Half-Square-Meter Gardens

Fig.8 The record of full-cycle empowering activities

The record of full-cycle empowering activities

Fig.9 The science and voting poster used in the activities of plants recommendation for the Hutong

The science and voting poster used in the activities of plants recommendation for the Hutong

Perceived restorativeness of small-scale blue spaces

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Water, as a fundamental landscape element, holds immense aesthetic, ecological, cultural, and social value. Although theorists have suggested that "blue space," such as marine environments or large water bodies, may possess unique restorative potential for enhancing human health and well-being, empirical research on the perceived restorativeness of small-scale blue spaces, especially artificial water features in urban areas, remains limited. Furthermore, research on the restorative effects of blue spaces has mainly emphasized the physical characteristics of landscape elements, overlooking the crucial role of spatial patterns in human perception. Moreover, reliance on laboratory experiments in such studies impedes the integration of landscape perception with behavior, despite their inherent interconnections.

This study investigated two artificial water features at Tsinghua University to explore the relationship between perceived restorativeness, spatial characteristics, and human behavior of small-scale blue spaces. The two sites exhibited distinct differences: one was a ceremonial fountain located at the campus entrance, while the other was a natural cascading waterfall within the campus greenery. The study aimed to address the following questions: (1) Are there significant differences in perceived restorativeness between the two sites? (2) What potential correlations exist between perceived restorativeness and the spatial characteristics of the two sites? (3) What potential correlations exist between perceived restorativeness and human behavior?

Data collection involved a structured quantitative survey, including a shortened version of the Perceived Restorativeness Scale for assessing perceived restorativeness and a multiple-choice question for behavioral preferences. We surveyed 108 individuals passing through the sites between 4:00 pm and 6:00 pm over three sunny days in April, ultimately collecting 97 valid questionnaires. In spatial analyses, we defined a 40m*40m area around the water features and identified five spatial elements: water feature, resting area, traffic area, movement barrier, and sightline barrier. Proportions of each element were calculated from the plan view, while sightline openness was calculated from the profile view. Correlation analysis was then conducted between the questionnaire results and spatial feature analysis.

Findings indicated that the fountain generally exhibited lower perceived restorativeness scores (6.04) compared to the cascading waterfalls (7.24). The naturalness of water features correlated positively with restorative effects and overall preference. In the spatial analyses, resting space proportion (17.6% vs 62.1%), movement barrier portion (45.9% vs 9.8%), and sightline openness (23.5% vs 58.8%) significantly differentiate between the fountain and the waterfall, suggesting that adequate resting spaces, ample movement freedom, and openness were likely crucial factors of a restorative blue space. The linear regression analysis indicated a significant correlation between “willingness to stay” and perceived restorativeness. Behavioral surveys revealed that the option " sitting down " (unstandardized coefficient=1.957) is more likely to enhance perceived restorativeness compared to others. Issues such as the lack of seating and perceived disconnection between people and water were

commonly raised by participants regarding the fountain. In contrast, the waterfall provided open lawns for resting, facilitating positive communication between people and the environment. This study uniquely combined the restorative benefits, spatial characteristics, and behavior of blue spaces, offering fresh insights for future design practice.

Keywords: Urban blue spaces, Restorative effects, Spatial characteristics, Behavior, Water feature

Figure 1. The current situation of study sites

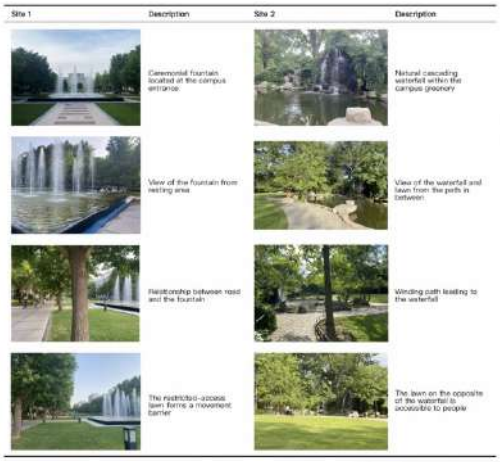
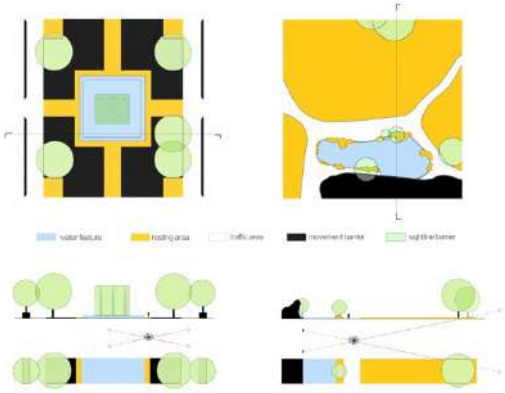


Figure 2. Spatial characteristics analyses



*The study defined a 40m*40m area around the water features and identified five spatial elements: water feature, resting area, traffic area, movement barrier, and sightline barrier. Proportions of each element were calculated from the plan view, while sightline openness (total length of the section divided by the length of openness on both sides of standing point) was calculated from the section view. In the result, resting space proportion (17.6% vs 62.1%), movement barrier portion (45.9% vs 9.8%), and sightline openness (23.5% vs 58.8%) significantly differentiate between the fountain and the waterfall, suggesting that adequate resting spaces, ample movement freedom, and openness were likely crucial factors of a restorative blue space.*

Table 1. Summary of demographic statistics of sample

Item	Subgroup	n	%
Site1 participants		55	
Sex	Male	31	56.36%
	Female	24	43.64%
Age	16-30	36	65.45%
	31-40	13	23.64%
	41-50	4	7.27%
	51-60	1	1.82%
	>60	1	1.82%
Site2 participants		42	
Sex	Male	20	47.62%
	Female	22	52.38%
Age	16-30	27	64.29%
	31-40	8	19.05%
	41-50	6	14.29%
	51-60	1	2.38%
	>60	0	0%

Table 2. Perceived restorativeness, preference, naturalness, and behavior scale for small-scale blue spaces

Measurement		Description	Scale
Perceived restorativeness	Being away	This is a place away from daily routine and stress. I can relax myself here.	9-point Likert scale
	Fascination	This place is fascinating. It has a lot of new things that make me want to explore.	
	Coherence	Everything here seems to have a proper place.	
	Scope	There are few hard boundaries here to limit me.	
	Compatibility	I can enjoy myself in this setting and do anything I like.	
Preference		I like this place.	9-point Likert scale
Naturalness		This place is natural.	9-point Likert scale
Behavior		Willingness to stay	9-point Likert scale
		Passing by without stopping. Pausing to observe/listen. Sitting down. Walking around the area. Engaging in conversation with others. Interacting with the water.	multiple-choice question

Table 3. The perceived restorativeness, preference, naturalness and willingness to stay of two sites

Measurement		Site 1 (M±SD)	Site 2 (M±SD)
Perceived restorativeness	Being away	6.16±2.19	7.62±1.56
	Fascination	5.22±2.32	7.12±1.78
	Coherence	6.67±1.84	7.07±1.61
	Scope	6.44±2.22	7.38±1.91
	Compatibility	5.69±2.34	7.02±1.96
Total mean		6.04	7.24
Preference		6.80±1.51	7.57±1.63
Naturalness		5.20±2.41	7.45±1.67
Willingness to stay		4.42±2.42	7.62±1.68

Table 4. Correlation analyses of Perceived Restorativeness, Preference for Naturalness, and Willingness to Stay

	Perceived Restorativeness	Preference	Naturalness	Willingness to Stay
Perceived Restorativeness	1			
Preference	0.689*	1		
Naturalness	0.492*	0.331*	1	
Willingness to Stay	0.445*	0.705*	0.692*	1

Note: * p < 0.01.

Table 5. Correlation analyses of behavioral preference and perceived restorativeness

	Coefficients	Standard Error	t	P
"Intercept"	5.15	0.424	12.159	0
Interacting with the water	0	0	-0.288	0.774
Engaging in conversation with others	1.679	0.62	2.707	0.008
Walking around the area	1.514	0.557	2.719	0.008
Sitting down	1.957	0.609	3.214	0.002
Pausing to observe/listen	1.274	0.516	2.469	0.015
Passing by without stopping	0			
Dependent variable: Perceived restorativeness				

Using "passing by without stopping" as the reference category, linear regression was employed to compare the association between each behavioral preference and restorativeness using dummy variables. As shown in the table, except for "interacting with the water," all other options significantly contrast with the reference category, with "sitting down" exhibiting the most pronounced difference.

POE analysis of urban park based on visual landscape evaluation

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Understanding users' perceptions and satisfaction towards urban park environments is crucial for providing effective feedback for initial design and subsequent optimization strategies. This study utilizes a combination of questionnaire surveys, semantic differential scales for aesthetic evaluation and landscape feature element assessment, and eye-tracking experiments to comprehensively evaluate the visual landscape quality of Xiaohong Stone Carving Park in Nanjing, China. The subjective assessment provides insights into users' aesthetic preferences and perceptions of landscape features. Meanwhile, objective analysis through eye-tracking experiments elucidates users' visual preferences objectively. By integrating subjective and objective assessments, a comprehensive understanding of users' overall spatial landscape preferences in the park is obtained. Finally, combining the findings with design expectations, potential optimization strategies are proposed through comprehensive analysis. This research framework not only contributes to evaluating the effectiveness of urban park design but also offers insights into enhancing users' experiences through tailored optimization strategies.

Keywords: eye tracking analysis, Post-use evaluation, Urban parks, Landscape visual quality

Environmental Justice for Children on Urban Streets

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When a city meets the needs of many different users, it makes the city more livable. The needs and wishes of different user classes such as disabled, elderly, children and adults are different from each other in the city. Especially in our country, it is important for the establishment of children's relationship with the city to provide a suitable structure of urban life that directs the physical, spiritual, emotional, mental and moral development of children between the ages of 0-6, which has an important place in population distribution. At this point, for children, who are both the active users of the city and the future of the city, it is necessary to create spaces where their needs can be met, where they can move freely, and where they can contribute to their development.

While creating the urban environment, most of the decision makers do not see the city through the eyes of children and often leave them out of the design process. This situation is one of the main problems not only in big cities in Turkey but also in many other cities around the world. In the 20th century, UNICEF's "Child Friendly City" discourse emerged with the contribution of the positive change in the social perception of children and childhood, as well as the studies on international and national platforms. In this way, the reflection of children's rights in policies, laws, programmes and budgets has been supported through the Child Friendly City concept defined by UNICEF. In addition, within the scope of the Urban 95 studies developed by the Bernard Van Leer Foundation, studies on child-friendly streets aim to find an answer to the question "how would it be to design the streets in the city for children?", which is one of the most important public spaces where children are involved in urban life, play, learn and experience being both an individual and a part of the community. The aim of this study is to establish the necessary standards to ensure that children in early childhood and their caregivers live in better conditions in the city and to emphasise once again the importance of the concept of "Child Friendly City" on the streets in the city. In this context, Child Friendly Street types determined in Kocaeli Körfez were selected as the study area. The parameters found as a result of the literature review were developed, an index was created and the area was evaluated in accordance with the determined index criteria. Within the framework of the findings obtained, the current situation was tried to be revealed. In the light of this information, solution suggestions have been put forward for child-friendly street applications to be made in cities. As a result, it is emphasised that Child Friendly City based approaches should be prioritised while creating suitable spaces for children in the city in the studies to be carried out by local governments and it is expected to contribute to the formation of qualified urban spaces.

Keywords: Child, City, Street, Child Friendly City, Early Childhood.

POSTER PRESENTATIONS
Engaging with the Digital: Innovation, Technology & Big Data

Urban Villages in Greater Bay: Big Data Distribution and Usage

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The rapid urbanization of the Greater Bay Area has drawn significant attention to urban villages as distinctive cultural phenomena within urban spaces. This study employs big data analytics to delve into the spatial distribution and usage patterns of urban villages in the Greater Bay Area, offering a scientific foundation for urban planning, landscape design, and community enhancement. Utilizing data primarily from Baidu Maps, supplemented by POI, Baidu Heat Maps, and Dianping data, the research employs a multi-dimensional approach to reveal the distribution and usage of urban villages. Through ArcGIS kernel density analysis, it systematically explores the core density distribution and geographical orientation of these villages, observing their relationship with surrounding businesses and service facilities. The study leverages big data analytics, combining various data sources to comprehensively uncover the nuances of urban village distribution and usage. Baidu Maps serve as the primary source for urban village information, complemented by POI, Baidu Heat Maps, and Dianping data. The analysis employs ArcGIS kernel density techniques to provide insights into the density distribution and spatial orientation of urban villages, particularly focusing on the interplay with nearby commercial and service establishments. Examining specific urban villages like Liede Village and Tangxia Village reveals a clustering trend in the central-southern region. The kernel density distribution of urban villages exhibits a mutual promotion with nearby commercial and service facilities, indicating a coupled relationship. Through in-depth data analysis, a holistic understanding of the structural composition, usage patterns, and influencing factors of urban villages emerges, laying the groundwork for sustainable development in the Greater Bay Area. The findings not only confirm the significance of urban villages within the context of rapid urbanization but also highlight their close connections with surrounding commercial and service infrastructure. The theoretical and practical implications of this research extend beyond the specific case studies, providing valuable insights for urban planning, landscape design, and community development in the Greater Bay Area.

Keywords: Urban Villages, Big Data, Greater Bay Area

Comparative Evaluation of Mountain-landscapes in Beijing Based on Social-media Data

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An important part of Beijing's ecological pattern, mountain landscapes are also the most important natural tourist destinations in Beijing. The unique mountain environment in Taihang and Yan Mountains attracts Beijing and foreign tourists alike. Tourists publish travel photos and comments on social media, which provides a new opportunity for a systematic evaluation of these mountain parks based on social media data. To fully understand the developmental status of mountain landscapes in Beijing, this paper comparatively evaluates 45 mountain landscapes in Beijing based on social media data. Using big data capture, semantic network analysis, importance-performance analysis (lPA), etc., it explores the composition of tourist groups in mountain parks, the preferences of the tourist groups, and the relationships between park tourists and different influencing factors, and evaluates the recreational experiences of tourist groups. The development of recreational activities was found to be more important to local tourists than scenic sites for foreign tourists. According to gender differences, women were more interested in recreational experiences than men, while men were more interested in the park's landscapes. According to the lPA, tourists were satisfied with the overall recreation offered by mountain landscapes. The perceptual experience was dominated by visual perception, followed by smell; touch, hearing, and taste were of minor importance. Using social media data to analyze mountain landscape resources in Beijing can provide useful insights into the advantages of these landscapes under a variety of site conditions, strengthen local mountain resource development and tourism publicity, integrate tourism management and planning resources in a targeted and attractive manner, and enhance ecological leisure services.

Keywords: mountain landscape,perceived destination image,social media data,important-performance analysis,tourism sustainability

Perception Method for Waterfront Open Spaces Based on Panorama Acquisition

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BACKGROUND:
Waterfront open spaces, integral to human well-being, are at the forefront of promising landscape areas. Evaluating their visual quality is a significant concern within landscape architecture, yet traditional approaches face challenges in efficiency and practicality. The advent of street view big data and artificial intelligence offers new possibilities but is hindered by the limited temporal and spatial extent of image data.
OBJECTIVE:
This research focuses on Xuanwu Lake Park in Nanjing to showcase a method for assessing the visual quality of waterfront open spaces. It employs panoramic cameras for image collection and deep learning for data analysis.
MATERIALS-METHODS: Between November 2022 and February 2024, a team member traversed all waterfront pathways in the park six times, utilizing a panoramic camera set at roughly 1700mm above ground and GPS sensors for location tracking. The study extracted objective visual metrics (such as the green visibility, water surface visibility, sky view factor, road visibility, and visibility of man-made structures) from equal-area cylindrical projected panoramic images using a convolutional neural network model designed for semantic segmentation. Additionally, subjective metrics (including attractiveness, richness, naturalness, and enclosure) were identified and analyzed using the Vision Transformer (VT) model.
CONCLUSION: The spatial distribution maps of both objective and subjective metrics effectively illustrate the quality distribution of park spaces, pinpointing areas of inferior quality, showcasing the seasonal variation in landscape elements, and capturing visual and perceptual preferences of visitors. The methodologies for image collection and visual quality analysis presented in this study offer valuable insights for the design and management of waterfront public spaces, proving their substantial practical application.

Keywords: Panoramic images, Landscape perception, Waterfront open spaces, Deep learning, Digital landscape

Optimizing Low Impact Development Spatial Allocation Based on D8+NSGA-II Algorithm

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[2]Department of landscape architecture, The Pennsylvania State University, Pennsylvania, USA

OBJECTIVE: The stormwater problem has become a key restrictive factor for the development of shallow mountain areas, and implementing low impact development (LID) practices is an important means to solve such a problem in shallow mountain areas. Forming an optimization method for the spatial allocation of LID practices for multi-objectives, such as runoff control and cost, can provide important technical support for the efficient solution of stormwater problems in shallow mountain areas, and contribute to the future high-quality development of these areas.

METHOD: Based on the characteristics of greenspace planning and design and runoff in shallow mountain areas, the study formed a model for optimal spatial allocation of LID practices by a D8 and NSGA-II coupled algorithm, which realized spatial quantitative optimization of the type and scale of LID practices based on collaborative optimization of runoff control and cost. In addition, Westmount Country Park in Shijiazhuang City was taken as the experimental object to verify the feasibility of the method.

RESULT: 24, 30, and 30 optimal solution sets for the optimal spatial allocation of LID practices of the study area were obtained in the simulated 2-hour rainfall event under return periods of 5-year, 10-year, and 20-year; the 'ideal investment upper limit point' of each simulated rainfall event was 75.141 million CNY, 66.344 million CNY, and 60.651 million CNY, respectively; visual results of the spatial allocation of most efficient cost based on ArcGIS showed that raingarden, permeable pavement, and water were scattered, and vegetative swale was scattered in small-scale linear spatial allocation.

CONCLUSION: The D8 and NSGA-II coupled algorithm can well match the LID of greenspace in shallow mountain areas and simplify the cumbersome design process of LID in traditional greenspace; there is a diminishing marginal benefit between peak flow of runoff and LID practices cost, which accelerates with the increase of rainfall return period; the permeable pavement and raingarden have more cost performance than other LID practices; the visual simulation results of the experimental object basically accord with the principle and pattern in real design, which verifies the feasibility and rationality of the method; in order to improve the rationality and guidance of simulated results of spatial allocation, further research should focus on the collaborative method for optimal spatial allocation of LID practices and greenspace planning and design.

Keywords: shallow mountain area, low impact development (LID), multi-objective optimization method, NSGA-II, landscape architecture

Decision-making of optimal distribution of LID controls

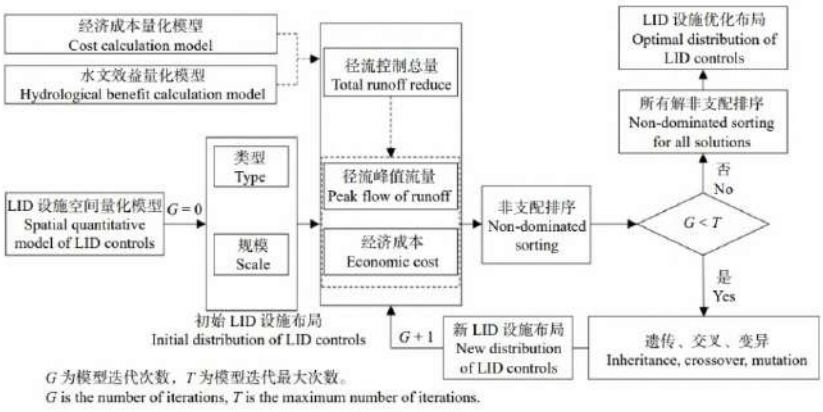

图 3　基于 NSGA-Ⅱ的 LID 设施优化布局选择

Fig. 3　Decision-making of optimal distribution of LID controls

Mechanics of optimal distribution of LID controls

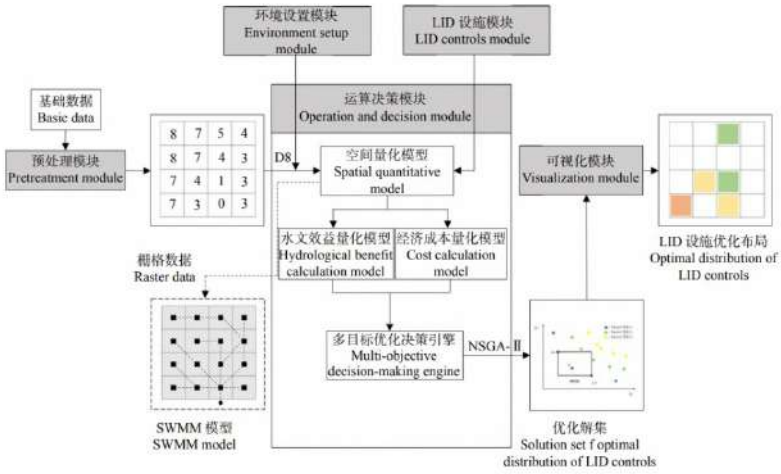

图 4　LID 设施优化布局平台工作流程

Fig. 4　Mechanics of optimal distribution of LID controls

SWMM model in subcatchments based on raster

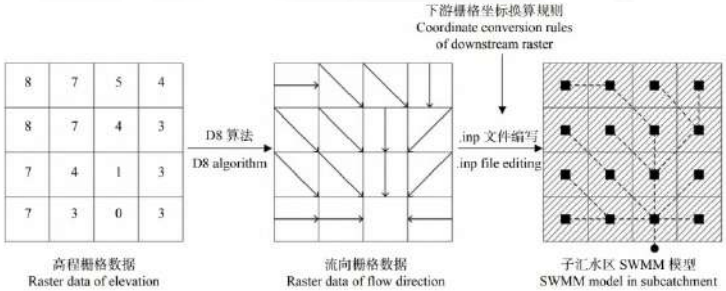

图 2　基于栅格的子汇水区 SWMM 模型

Fig. 2　SWMM model in subcatchments based on raster

The most cost effective distribution of LID controls in different simulated events with a 2-h rainfall

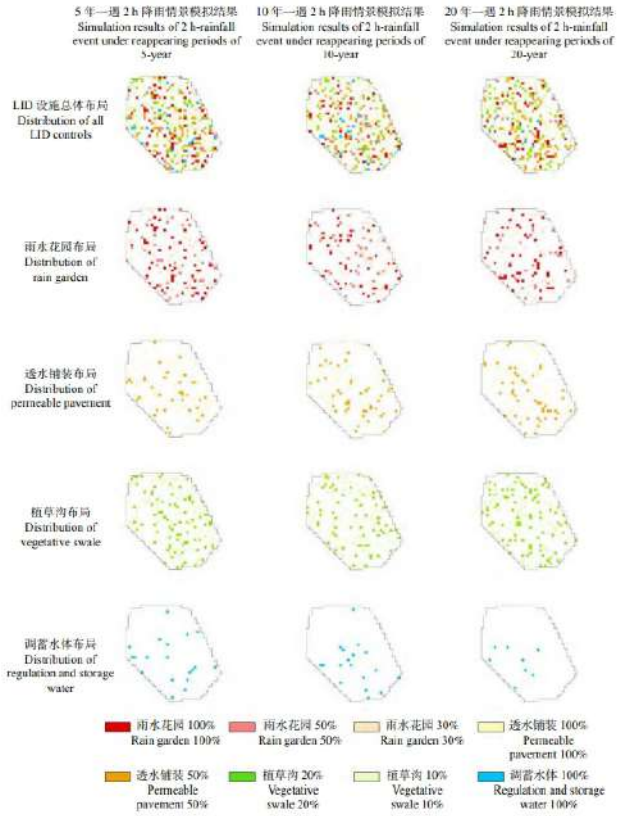

图 8　2 h 降雨模拟情景成本效益最优 LID 设施布局结果

Fig. 8　The most cost effective distribution of LID controls in different simulated events with a 2-h rainfall

Optimal Economical Design of Low Impact Development in External Environment

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[2]Department of landscape architecture, The Pennsylvania State University, Pennsylvania, USA

Low-impact development (LID) in the external environments of buildings plays a pivotal role in facilitating effective urban runoff control and the utilization of rainwater resources. However, challenges persist in the spatial allocation of LID practices, notably the oversized scaling of facilities and diminished runoff utilization efficiency, which culminate in construction inefficiencies and waste. This study endeavors to address these issues by proposing an economical design paradigm for LID in the external building environment, leveraging the Storm Water Management Model (SWMM) and the Non-dominated Sorting Genetic Algorithm II (NSGA-II). This approach meticulously balances runoff control, rainwater resource utilization, and the cost implications of LID practices, rooted in the runoff characteristics of the building's external environment and the distinctive functional guidance attributes of various LID practices.

Employing the campus of Nanyang No. 1 High School as a case study, this research elucidates the optimal spatial allocation of LID practices through the devised economical design paradigm. The effectiveness of this allocation is quantitatively assessed via simulation, utilizing the daily precipitation data of 2021 as a benchmark. The findings of this study are promising, revealing that the annual runoff control ratio for the case study locale reached an impressive 82.0%, alongside a substantial financial saving of 51,900 yuan in water expenses for the year 2021.

The scholarly contributions of this research are manifold. Firstly, it offers a nuanced refinement to the application scenarios of LID practice allocation, addressing the previously overlooked aspects of rainwater utilization quantification and the cost-effectiveness of LID practices. Secondly, by integrating cost considerations into the optimization of LID practice construction, this study enhances the efficacy of investments in LID infrastructure. Lastly, it champions the construction of high-performance, quality-enhanced "Sponge Cities," aligning with sustainable urban development goals.

The methodology adopted—a synergy of SWMM and NSGA-II algorithms—stands as a testament to the innovative approach towards optimizing LID practice allocation, demonstrating a significant advance over traditional methods that often neglect the economic dimensions of LID implementation. By focusing on the economical design pattern, this research underscores the importance of a holistic perspective that encompasses environmental, economic, and operational sustainability in LID practices.

In conclusion, this study not only foregrounds the criticality of incorporating economic efficiency into LID practice allocation but also paves the way for future research to explore and expand upon the integration of cost-effectiveness, environmental sustainability, and urban water management. As urban areas continue to grapple with the challenges posed by climate

change and urbanization, the findings of this research offer valuable insights and practical solutions for enhancing the resilience and sustainability of urban environments through strategic LID practice implementation.

Keywords: low-impact development, stormwater reuse, landscape architecture, external building environment, multi-objective optimization

Analyzing Human-Physical, Player-Virtual Landscape Interaction in Disaster Simulations Context

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This study delves into the intricate interplay between human-environment interaction and spatial legibility in physical and virtual landscapes, specifically focusing on urban design principles within the context of digital environments, notably game settings. It posits that simulations and video games, particularly those themed around natural disasters, can serve as valuable tools to enhance disaster preparedness and raise awareness. The research centers on the digital realm, exploring how urban theorists such as Jacobs, Lynch, and Gehl's principles can be translated into virtual spaces and incorporated into disaster-themed video games. The goal is to elucidate how Lynch's five urban elements—roads, nodes, edges, districts, and landmarks—can be adapted to virtual spaces to foster strategic thinking, endurance, and quick reaction skills in players while heightening disaster awareness.

1-INTRODUCTION: The article contributes to urban design and spatial legibility debates, building on foundational theories by urban theorists. It addresses the adaptation of Lynch's urban design principles to digital environments and highlights the need to explore the integration of spatial principles into disaster-themed games. The interdisciplinary approach incorporates GIScience methodology, game classification systems, and urban design theories, aiming to inform applications in game design, urban planning, and broader spatial research.

2-Human-Physical Environment Interaction and Spatial Legibility
Drawing from the works of Jacobs and Lynch, the research emphasizes the significance of accessible layouts and community participation in well-designed cities. It explores the complex relationship between spatial legibility, individual perceptions, and disaster scenarios, underscoring the role of design principles in shaping human-environment interactions during crises.

3-Player-Virtual Environment Interactions
The study recognizes the evolving landscape of virtual environments, especially in MMORPGs, and utilizes Kim's classification method to understand virtual worlds in games. It draws parallels between urban design elements and digital spatial experiences, with a focus on disaster games. Integrating Lynch's principles into the classification method provides insights into designing virtual environments that simulate and facilitate human responses in emergencies.

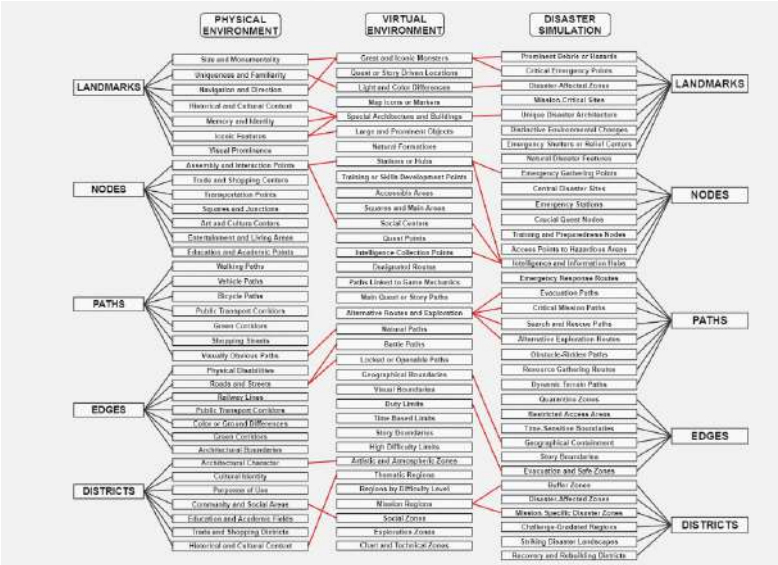
4-Comparison of Kevin Lynch's Five City Elements
Using Kim's classification (2016), the study compares Lynch's five urban elements in physical and virtual landscapes. It highlights differences in the representation of landmarks, nodes, paths, regions, and edges in the two environments, emphasizing the importance of determining virtual equivalents to enhance interaction and design in disaster simulations.
5-Methods Used to Transfer Data to Digital Media

Building on Lynch's "Image of the City," computational approaches, especially GIScience techniques, are employed for analyzing urban elements. The computational model, transferable to GIS environments, enables comprehensive spatial analysis and simulation modeling for urban planning decisions, bridging the gap between urban design concepts and virtual world construction.

6-CONCLUSION: The research concludes by emphasizing the intersection of urban design principles, spatial legibility, and human-environment interaction in both physical and virtual landscapes. It advocates for an interdisciplinary approach, incorporating urban design theories, GIS science methodologies, and game classification systems, providing a solid foundation for understanding the complex relationship between physical and virtual environments, particularly in disaster scenarios.

Keywords: : Virtual landscape, disaster simulations, human-environment interaction, gamer-virtual landscape interaction

Comparison of Kevin Lynch's 5 elements in physical, virtual environment and disaster simulations



Kim's (2016) classification reveals distinctions between Lynch's virtual and physical landscape elements. Understanding these variances is crucial for designing game or disaster simulation environments in both realms. Establishing equivalents for Lynch's elements in the physical world, and subsequently in the virtual landscape, ensures a cohesive and immersive experience. This study identifies potential disaster simulation areas based on these insights, enhancing the effectiveness of virtual environments in disaster preparedness.

VR Mirror Integration: Reducing Carbon Emissions Through Enhanced Communication Design

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Online platforms reduce carbon emissions, which many researchers have proven. As Yin et al. (2022) presented, decreasing emissions due to transportation and electricity consumption is enough to calculate the positive impact of online platforms on carbon emissions. With the developing technology, as Kameoka and Kaneko (2022) define, VRSNS (virtual reality social network service) platforms enable the attraction of individuals to convene online. However, it is important to consider the lack of design in VRSNS platforms. Pang et al. (2022) highlighted the graphics and environment design limitations of Virtual Reality (VR). According to Kim (2017), virtual landscapes require a design methodology for users and the environment to engage in an interactive activity.

As the deficiency in design aimed at attracting individuals to VRSNS platforms increases, Kameoka and Kaneko (2022) investigated user behaviors in VRSNS. As they observed the player's attraction towards mirrors, they conducted experiments about it. Despite the research and experiments thus far indicating that mirrors affect users, a definitive conclusion about how to use mirrors as a design asset in VR has yet to be reached. If we can discover how to use mirrors in VR to enhance user interaction, VR performance will increase and reduce carbon emissions. Therefore, this paper examines the functions of mirrors in VR to enhance user communication.

To understand the defalcation for communication in VR, users observed the VRSNS platforms VRChat, Oasis VR, and Horizon Worlds. As we observed the limitations of VR environments without mirrors, we interviewed 20 users in the VRSNS platform VRChat to understand how users utilize the mirrors. As a result of the interviews, we discovered that mirrors play an important role in VR communication. Most participants stated that they utilize the mirror as a communication tool. In addition, we discovered significant details about using mirrors for design in VR. Along with the requirement for at least one mirror in areas designated for communication, the measurement of the mirrors is critical. Since users utilize mirrors in VR to observe their avatars and surroundings better, the mirrors should be at least larger than the size of the avatars. If more than one group needs the mirror to communicate, positioning separate mirrors so that the sounds will not interfere with giving a positive response (Kameoka and Kaneko, 2022), but the number of mirrors should not be increased more than necessary to stabilize the optimization of the virtual environment.

The result of this study will attract more users by improving social interaction in VR, and it will lower carbon emissions. However, future studies should be made to deliver practical design methodology based on this study’s findings. Additionally, as head-mounted displays (HMD) improve the user's vision, future studies need to be conducted on this topic to encourage user interaction.

Keywords: VR, communication, design methodology, mirror, carbon emissions

Interview in social Virtual Reality platform VRChat.

The figure shows the interview process with users that utilize the mirrors in the social VR environments.

Characterizing online dissemination of cultural heritage through big data analysis

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INTRODUCTION: Cultural heritage plays a crucial role in urban landscapes, exerting profound impacts on urban historical preservation and socio-economic development. With the widespread adoption of information technology, the internet and social media have become vital channels for shaping public awareness and altering social structures. Utilizing big data from the internet to analyze the network dissemination characteristics of cultural heritage has become a crucial means of understanding the contemporary significance and value of cultural heritage in contemporary society.

OBJECTIVES: This study aims to employ big data analysis methods to comprehensively investigate the internet dissemination characteristics of seven World Cultural Heritage sites in Beijing. The goal is to reveal their contemporary image and value in society. By clarifying the online representation of cultural heritage, this research seeks to further broaden the understanding of cultural heritage and provide an effective basis for its protection and utilization.

METHODS: Building upon prior research, we have developed a comprehensive indicator system for analyzing the network dissemination characteristics of cultural heritage based on internet big data. This system encompasses four aspects: image features, text features, user behavior features, and publication time features. Using web crawling technology, we collected 6420 online images and 26530 text data from social media and tourism websites. After data cleaning, we employed image processing and natural language processing techniques to extract features from images and texts. Subsequently, we utilized methods such as cluster analysis, association rule mining, and descriptive statistics to conduct in-depth analysis of the feature data, aiming to reveal patterns and trends in the network dissemination characteristics of cultural heritage.

CONCLUSIONS: Image features indicate that 80% of online images focus on traditional culture and historical elements, emphasizing classical and warm color tones while highlighting the integration of cultural heritage with the natural environment. Text features reveal that 90% of user comments are positive, covering topics such as historical culture, architectural styles, and visitor experiences. User behavior features disclose that online users are more inclined to share in-depth content about cultural heritage, with a 30% higher sharing frequency compared to ordinary content. The posting time features show that cultural heritage receives higher attention during weekends and traditional holidays, exhibiting cyclicality. These findings provide a scientific basis for the protection and utilization of World Cultural Heritage sites in Beijing, emphasizing the importance of the internet in promoting cultural heritage awareness and dissemination.

Keywords: Cultural Heritage, Network Dissemination, Big Data Analysis, Natural Language Processing

Driving digital innovation in plant landscape design: LLM-based multimodal solutions

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BACKGROUND: In the creation and optimization of urban living environments, plant landscapes play a crucial role. Plant landscaping permeates all levels, from urban scales to various green spaces, and even extends to residents' yards and interiors. It not only improves the ecological environment upon which human life depends but also creates aesthetically pleasing spatial realms, carrying significant ecological and livelihood functions.To fulfill ecological and aesthetic functions, plant landscaping must adhere to ecological requirements, artistic principles, and community succession laws, managing short-term and long-term relationships effectively. This process involves the handling of vast amounts of information and multi-level reasoning, which can be assisted by language models. However, general language models face issues with hallucinations.

OBJECTIVE: Hence, we recognize the utility of a language model tailored to assist in urban plant landscape planning and design. We innovatively propose PlantLM, a plant landscape foundation language model infused with authoritative knowledge in the field of plant landscaping.Our innovations include:
1. A plant landscape foundation language model.
2. A GPT-based training data construction program.
3. An open-source fine-tuning dataset.
4. Model evaluation and continuous training.

METHOD: The construction of the PlantLM model is carried out in stages. Initially, we incrementally trained the model with a large amount of text, enabling it to possess knowledge of plant landscapes. Subsequently, we selected multiple downstream task scenarios, including professional knowledge answering, plant landscape scheme generation, scheme feasibility judgment, and academic paper outline writing in the field, to carry out specialized task tuning. We centered our approach on the language model, utilizing the concept of multimodal retrieval generation. We attached text and image vector libraries to the model as auxiliary reference modules, and an image generation model as a scheme drawing generation module. This formed a plant landscape question-answering and drawing generation system, with the language model at its core and multiple intelligent models working in collaboration.
We also constructed a training dataset auto-generation system and a model evaluation system based on GPT-4. This formed a model training-evaluation-optimization framework, achieving continuous iterative improvement in model capabilities.

RESULTS: We obtained a language model, PlantLM, that possesses professional knowledge and has strong understanding and generation capabilities. With PlantLM as the foundation for the intelligent development of plant landscapes, we constructed a plant landscape configuration generation system that integrates multimodal technology, based on the existing semantic understanding and strong generation capabilities of PlantLM.

Keywords: Large Language Model, Intelligent Plant Landscape Planning, Multimodal

Quantifying beauty: Global sentiment on public aesthetic-views of Chinese gardens

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What scenarios evoke what emotional cognition in tourists" is the most crucial question in grasping design principles. By investigating tourists' emotional responses to different scenarios, we can better understand these principles.

The challenge lies in the fact that tourists' emotional cognitions are in their brains, and each individual has different emotional predispositions. We found that the images in tweets posted by tourists always contain the scenes they care most about, while the accompanying texts are emotionally charged and related to the scenes.

Therefore, we collected millions of tweets from the top five global social media platforms and used artificial intelligence algorithms to explore the connection between images and texts. This helped us uncover the relationship between tourists' emotional cognition and scene perception, aiming to explore "what scenarios evoke what emotional cognition in tourists.

This research was orally reported at IFLA last year, and this time, we updated it using the latest GPT technology.

In this version, we trained a large language model with a million dataset and simulated multiple AI language models (similar to multiple GPTs) to create a virtual community. This community can have different AI agents representing real-world stakeholders, such as tourists from different countries, governments, and designers.

This work mainly serves design evaluation and public opinion analysis. Traditional public opinion analysis techniques struggle to comprehensively process billions of dynamic public opinion comments, capturing only superficial information. However, big model agent technology can deeply understand the underlying relationships in comment languages through data training, simulating different stakeholders' speeches.

Thus, establishing an agent community can not only accurately simulate and predict the public's reaction before landscape construction but also provide insights into other design fields related to landscape architecture. By simulating through the agent community, it is possible to anticipate construction effects in advance, ensuring that each planning project accurately reflects the will of various interest groups, enhancing landscape equity.

Keywords: Aesthetic cognition, Cultural communication, Deep learning

Impact of Street Lighting Types on Night Joggers' Comfort

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Night running is becoming an increasingly important physical activity in noc-turnal activities. The formal running spaces in cities are often insufficient to meet the daily fitness needs of the urban population, leading to street spaces being incorporated into the spatial choices of night runners. Artificial lighting is an indispensable factor in the night running environment on streets. How-ever, the current understanding of how artificial street lighting affects run-ners' comfort in urban settings is not fully clear. This study selected three classic night running routes in Suzhou city based on running route recom-mendations from a mobile fitness app and conducted on-site photography using panoramic cameras. Subsequently, individuals with night running ex-perience were recruited to conduct a questionnaire survey on artificial light-ing factors in the photographs. The results indicate that street environmental lighting brightness contributes the most to the comfort of night runners, fol-lowed by lighting coverage and color, with the variety of lighting types hav-ing the least impact. The findings provide a theoretical basis for optimizing lighting conditions in urban night running spaces in the future, contributing to the creation of a more comfortable urban nocturnal running light environ-ment.

Keywords: Night Running Space, Street Space, Crowdsourced Data, Physical Activity, Artificial Light Environment

Feeding the city: digital entrepreneurship around food-delivery in informal settlements

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This study focuses on the emergence of a new entrepreneurial ecosystem fuelled by digital platforms within 'village-in-the-city' (*chengzhongcun*), a unique type of informal settlement in Chinese cities that has evolved from historically rural areas engulfed by urban expansion through the self-help building efforts of local villagers. These new entrepreneurial practices are notably represented by networks of distributed small independent restaurants within these villages, individual delivery personnel, and technical support departments, all connected with digital food-delivery platforms. These practices also encompass specific interactions between all individuals involved, including rural migrants, as well as their engagement with the environment. This entrepreneurial dynamic has shifted the historical position of village-in-the-city as spill-over from the exploitative system of factory-dormitory, where the villages provided basic housing for millions of rural migrants, allowing them to settle and make a living in cities far from their hometown. Using food-delivery-related digital entrepreneurship as a clue, this study analyses the modes of production within village-in-the-city active in such entrepreneurial activity, and seeks to explore the conditions and processes constituting this unique informal ecosystem.

This study reviews a substantial body of existing literature on village-in-the-city. Yet, articles on their digital transformation are scarce. Adopting the theoretical perspective of agonistic solidarity and commoning in recognising the Right to the City, we analyse grey literature such as news reports and documentaries about the transformation into 'food-delivery village,' as well as materials obtained from field observations in two villages in Guangzhou city.

The analysis suggests that the collective appropriation of digital means of production, technology-enhanced collaboration and the production of new commons are significant characteristics of the modes of production in these villages. The synergies between multiple actors enable individual restaurants to become part of an enormous, distributed kitchen for the city, reconfiguring themselves daily, spatially, culturally and socially.

Digital entrepreneurship based on pluralistic solidarity subverts the polarisation and exploitation logic dominated by capital giants and establishes connections among individuals in a community, developing spatial practices of re-commoning to resist the denial of dominant forces of the Right to the City. A historical retrospection reveals that these new transformations are inseparable from the continuous unfolding of a series of informal practices over time related to the formation of village-in-the-city. In other words, the vitality of digital entrepreneurship in village-in-the-city is deeply rooted in their informality.

Keywords: Informal settlements, digital platform, digital entrepreneurship, agonistic solidarity, commoning

Traditional Tools, Virtual Realities: Sustainable Landscape Design Exihibt in Brazil

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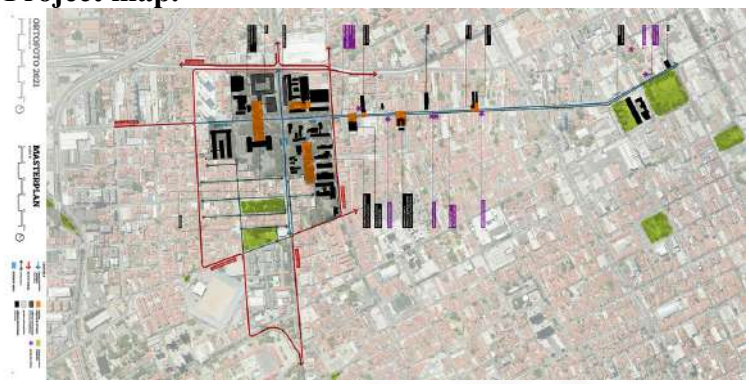
New digital tools, such as Extended Reality (XR), can serve as the means to convey landscape design projects' content to the user's scale, particularly for designers and clients involved in landscape projects (Orladn et al., 2001; Adrienne & Nora, 2024). Understanding our cognition associated with the use and experience of digital technologies is presently an urgent and necessary field for constant and in-depth reflections in both theoretical and practical domains (Hassenzahl, 2010; Ricca et al., 2022). However, how can the use of XR technologies be incorporated into urban landscape design? Would the solution entail abandoning "traditional" tools entirely and transitioning solely to the use of digital technologies and XR? This research, through a case study, intends to explore these questions. The case study in question revolves around a project called the "Cultural Corridor." It proposes a series of renovations for one of the main avenues in the city of Fortaleza (Ceará, Brazil), aiming primarily to make it more pedestrian-friendly by employing nature-based solutions (SBN). This transformation would enable pedestrians to use the avenue as an extension of cultural buildings situated along it, such as theaters, universities, museums, etc. As this project spans over four neighborhoods in the city and affects several public institutions, a museum-style exhibition format was proposed (CSIKSZENTMIHALYI & HEMANSON, 1995). A space at the Museum of Art of the Federal University of Ceará (MAUC) was allocated for showcasing the graphic and digital productions that collectively constitute the project. Subsequently, various stakeholders from municipal, state, and federal political spheres, along with museum visitors, were able to "visit" the project over a period of 2 months, schedule meetings, and ask questions. The exhibition comprised physical graphic pieces (models, banners, mosaics, and maps), digital components (project videos), and interactive experiences (VR immersion and motion-capture interactions). As a result, the project successfully engaged diverse stakeholders transparently and integrated them with the population. Over the two months, individuals of various ages, genders, and backgrounds were able to visit and comprehend the project, which is considered a positive aspect for a project of significant urban impact. Another positive aspect, owing to the vast possibilities for interactions, is the project's accessibility to different users. Even those unable or unwilling to participate in the XR experience could engage with the rest of the exhibition. In conclusion, it is observed that XR technologies still face some hindrances concerning hardware utilization (virtual reality goggles), and physical graphic elements remain necessary. XR experiences are deemed important tools for negotiation among the project's involved stakeholders, striving for more inclusive and resilient solutions to burgeoning urban challenges.

Keywords: Virtual Reality, Landscape Planning, Musem Exhibit, Sustainable Design, Urban Planning

Exhibition Space.

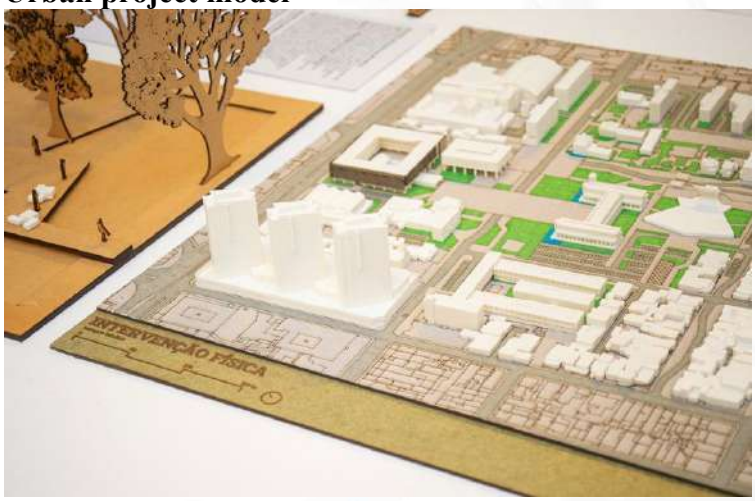
Exhibition space at the museum.

Project map.



A map which was plotted and placed in the exhibition.

Urban project model



Model shown at the exhibition.

Virtual Reality experience.

Photograph of visitors at the exhibition.

Virtual Reality image.

Image taken from virtual reality environment.

Quality of Life in Cities: Landscape Perspectives and Relational Tools

Sonja Vangjeli[1], Sonja Vangjeli[2], Matt Perotto[3], Matt Perotto[4], Matthew Canaran[5]
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[2]International Landscape Collaborative
[3]University of Toronto
[4]Janet Rosenberg Studio
[5]Friends of Allan Gardens

The role of Landscape Architects has always involved designing livable cities and preserving a relationship to nature, even in the densest environments, through access to sunlight, air, land, plants and animals. The origins of the Landscape Architecture profession from Frederick Law Oldmsted's Central Park to Charles Eliot's Boston Metropolitan Park System were firmly rooted in ensuring the conditions for good quality of life by managing urban growth through environmental design. Issues of light and air were important for public health and well-being and were regulated accordingly in fast growing cities like New York during its building boom.

In the current context of rapid urban growth, the polarized debate that is inadvertently shaping our cities, often positions the moral imperative for housing against values like sunlight and comfortable microclimate in the public realm. These values are framed as less important and standing in the way of the moral imperative for housing, yet they are critical to ecological function and qality of life. The recent Globe & Mail newspaper article on Toronto 'City of Shadows' is a telling example of this polarized debate and growing trend that is inadvertently shaping our cities across the world.

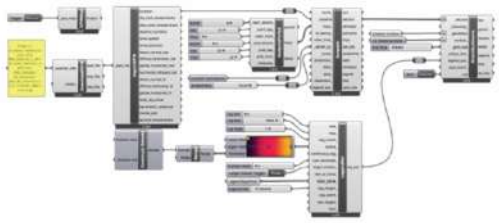
As we now face environmental, climate and biodiversity crises, paired with rapid urbanization and exacerbated by the risk of public health crises like the recent global pandemic, we need to remind ourselves of the origins of our field, and our important role in guiding the current hot debate on the housing crisis so that it is not binary. The value of design is to solve for more than one goal at a time, to find the right balance between competing interests and achieve a vital living urban landscape that functions ecologically and economically, with multiple co-benefits. Landscape Architects have valuable perspectives and tools to offer in guiding urban development, yet they are not often invited to the table on political issues like housing. With a more holistic understanding of urban development as part of its natural environment, as well as valuable spatial analysis and visual communication tools, Landscape Architects can help the public make more informed decisions about what we value most, without having to choose between housing and a livable city.

The future of our cities and of our profession depends on being engaged and bringing value to this important debate that is playing out in growing cities across the globe and inadvertently shaping the future landscape and quality of life of major urban regions like Toronto.

Keywords: Microclimate, Relational design, Housing, Quality of Life, Sustainability

Parametric Tools: Grasshopper

Figure 3-4 Components Used in the Direct Sun Hours Analysis, Configured for the Dark Season



Note. The *AnalysisPeriod* component is set to start on September 21st at midnight and runs through to the end of the day on March 20th. Source for components: McNeel, 2010. Arranged by author.

Parametric tools like Grasshopper and open source plugins like Lady Bug are democratic tools that anyone with some knowledge of parametric design can use to analyse microclimate of urban design massing. By sharing this knowledge broadly, more intelligent urban design and decision-making can be achieved.

Qualitative Analysis_MattCanaran

Figure 4-8 Sliver of Sunlight on John Street – Unedited Stills

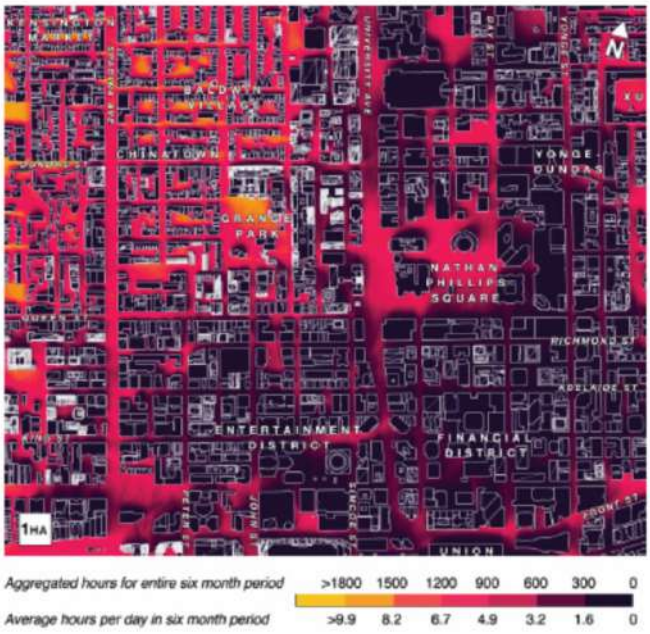
Note. Unedited stop-motion stills showing the movement of the sun between two buildings on John Street over an eight-minute period. Source: Author.

Landscape Architects use and understand both qualitative and quantitative methodologies to

evaluate urban design based on parameters like sunlight access to the public realm. This is an illustration of a qualitative analysis based on photographic documentation of sunlight on public realm over time. For full thesis see: https://atrium.lib.uoguelph.ca/bitstreams/8b17ba0f-230f-4ce8-a353-957a4e051b97/download.

Quantitative Analysis_MattCanaran

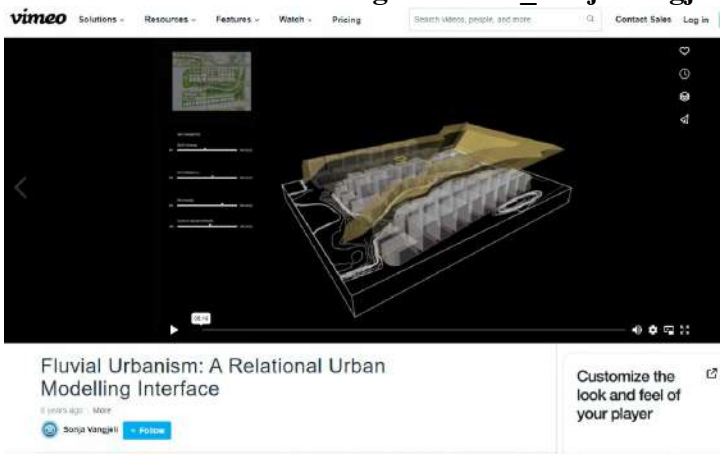
Figure 4-48 Direct Sun Hours for the Dark Season – Sep 21st to March 20th



Note. Source: Author, using the City of Toronto's 3D massing model and Ladybug's Direct Sun Hours analysis and sunpath. Source: Author.

Landscape Architects use and understand both qualitative and quantitative methodologies to evaluate urban design based on parameters like sunlight access to the public realm. This is an illustration of quantitative analysis of cumulative solar radiation on Toronto's downtown streets over the period of the dark winter months. For full thesis see: https://atrium.lib.uoguelph.ca/bitstreams/8b17ba0f-230f-4ce8-a353-957a4e051b97/download

Relational Urban Modelling Interface_SonjaVangjeli



A snapshot from a video explaining a concept for a relational urban modelling interface that enables democratic collaborative planning and design by testing different prioritized values liek sunlight access to public realm and its impacts on built form. This is applied to a case study of Toronto's post industrial waterfront, the Lower Don Lands. For full video see: https://vimeo.com/147977694

AI-Based Botanical Landscape Creation Community

Zhengqi Han[1], Ran Chen[2], Xueqi Yao[3], Jing Zhao[4]
[1]Zhengqi Han
[2]Ran Chen
[3]Xueqi Yao
[4]Jing Zhao

In the enhancement of urban environments, plant landscapes offer not only ecological benefits but also deep cultural implications. In the face of digital age challenges and opportunities, we prioritize the intelligent evolution of plant landscapes.
The introduction of numerous large AI models in 2023 presented digitalization opportunities. However, due to professional constraints, these models' performance in the specialized plant landscape field is suboptimal. Hence, our objective is to establish an AI-Based Botanical Landscape Creation Community, promoting plant landscapes' digital transformation.
Our community includes a language model system and a cross-modal generation system. In the language model system, we independently train the base language model PlantLM, link the retrieval module, and construct a knowledge index scheme, thereby regulating PlantLM's generation. PlantLM, a collaborative creation of urban environment workers and general AI, will persistently be improved. We utilize the GPT-4 model for training data self-construction, significantly reducing construction costs.
In the cross-modal plan generation system, we develop a joint encoder Plant-Clip and connect the latest Diffusion model to construct the PL-Designer module, effectively encapsulating plant planning and design schemes in landscape plans and effect drawings.
This study successfully probed the application potential of large models in plant landscape creation using state-of-the-art AI technology. By employing a multi-intelligent agent framework, we map multiple plants' attributes and plant landscaping wisdom to the vector space, achieving cross-modal information transmission. This exploration allows us to understand how AI comprehends plants and plant landscapes, providing intelligent planning and design solutions.
Our AI-Based Botanical Landscape Creation Community is still evolving, with the cross-modal group PL-Clip and PL-Designer undergoing training. We plan to employ reinforcement learning to enhance model results based on designer and public feedback. We aspire for PlantLM to flexibly apply knowledge, acting as a designer, climate change and urban development researcher, and plant knowledge disseminator. For drawing generation, we plan to extract plant positions in drawings post cross-modal group completion, laying the groundwork for transforming plans, elevations, and effect drawings, even generating 3D space, advancing towards comprehensive, high-level urban environment intelligence.

Keywords: Plant Landscape Planning and Design, Artificial Intelligence, GPT, Agent Linkage Framework, Multimodal Generation Model

Fully AI-Driven: Human-Free Intelligent Design Company for Landscape Architecture

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In 2023, the rapid advancement of ChatGPT technology not only marked a global technological revolution but also triggered unprecedented transformations across various industries. This latest artificial intelligence (AI) agent technology can now simulate multiple human roles and engage in social behaviors such as conversations and social activities, surpassing the capabilities of any previous time. Moreover, these AI agents are not limited to simple conversational interactions; they can also integrate with various intelligent tools for complex operations such as drawing, analysis, and coordinating complex design tasks.

Building on this, we have integrated numerous cutting-edge intelligent technologies to create a fully automated "unmanned design company" focused on landscape architecture. This revolutionary company is coordinated by a powerful intelligent core brain, guiding a series of AI agent "employees" to fulfill clients' design requirements. The core intelligence is based on an advanced language model trained on hundreds of millions of professional design data, covering sixteen related disciplines such as botany, ecology, and art, enabling it to devise customized intelligent design processes for various design needs.

The unmanned design company is structured as follows:

AI Brain: A high-level model trained on 300 million texts, coordinating design tasks via text. Training data includes books, papers, specifications, and question banks across disciplines like botany, ecology, and art, allowing complex reasoning and intelligent design process formulation.

AI Text Agents: Comprising 16 specialized text-generating robots capable of handling tasks such as design standard Q&A, design specification generation, contract and tender document review, and software command generation, effectively conveying instructions from the AI brain and ensuring smooth information flow between clients and the system.

AI Plan Drawing Agents: Specialized in design plans, trained with a large design work database including annotations, layer explanations, tags, and sketches. Using Graph Neural Networks (GNN) and Generative Adversarial Networks (GAN), GNN refines design information and element relationships, while GAN generates drawings with logical reasoning.

AI Rendering Agents specialize in high-quality drawings and aerial views, leveraging a vast image database. They blend stable diffusion with Midjourney API and use CLIP technology for precise design information representation. CLIP searches for images matching customer intentions, guiding the generative model for refined creations.

AI Analysis Software Agents cater to landscape architecture's scientific needs, offering carbon emission, PM2.5 estimates, and ecological simulations. They integrate with tools like ArcGIS, SPSS, and utilize R language and GPT Langchain for generating analysis charts.

AI 3D Model Agents: Specializes in 3D visualization, converting 2D drawings to 3D using NeRF and Grasshopper technologies, and the Enscape engine. Information is input as vectors, transformed into point clouds, and then into editable vectors. Enscape renders the final 3D models, with lighting parameters set by text agents and user-adjustable.

Our work represents a deep application scenario of agent technology in landscape architecture, pushing forward the new AI industrial revolution and promoting industry intelligence. It has received national funding and commercial investment from Chinese investment institutions, and has been recognized as one of China's top ten artificial intelligence application scenarios.

Keywords: AIAGENTS, Large language model, Generative design

POSTER PRESENTATIONS
Projecting the Process: Monitoring, Assessment & Applications

From assessment to enhancement: An approach of landscape performance analysis

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Landscape performance analysis plays a key role in building livable, equitable, and resilient landscapes. Relevant research is highly concerned with the measurement of benefits in built projects. The landscape performance series (LPS) proposed by the Landscape Architecture Foundation (LAF) realizes the measurement of sustainable benefits from three dimensions: environmental, social, and economic performance benefits, and has formed a set of landscape performance indicator frameworks, benefit measurement tools, and workflows. Moreover, the LAF-funded Case Study Investigation (CSI) Program has provided a large number of empirical cases for LPS. However, the potential of large sample databases have not been well explored. Most existing studies cannot discovery that which part of project area needs to be optimized during the design process, and are limited to the incremental benefits of performance results between previous conditions and current ones. Furthermore, the relationship between the various indicators for the benefit results is not yet clear. A targeted performance assessment system and an evidence-based enhancement approach have not been established.

We propose a landscape performance analysis approach, which tries to solve three problems: (1) how to set the judgement standard on landscape performance, i.e., whether the higher benefit on landscape performance is the better; (2) how to construct a scientific and reasonable performance indicator system, i.e., whether the various benefit dimensions can complement each other; (3) how to use the performance measure result to guide the design practice from a spatial level.

Taking pedestrian blocks as an example, this study focuses on the rationality of spatial resource allocation, establishes a landscape performance indicator framework for pedestrian blocks, and collects 45 samples and obtains their indicator. Furthermore, the mechanism between each indicator and landscape performance is explored by using multivariate statistical analysis. Subsequently, the threshold intervals for each indicator are analyzed to identify the ideal range so as to form a criteria for judging the landscape performance. By setting weights and assigning grades, the landscape performance benefit is comprehensively measured and mapped. Finally, based on the spatial clustering characteristics of each indicator and the assessment result of landscape performance benefit, the priority of indicator and the key areas for renewal are clarified.

The results show that the approach can achieve a comprehensive assessment of landscape performance at the spatial level, and the analysis results can assist the quantitative optimization of the landscape space in pedestrian blocks and evidence-based benefit enhancement design. This study provides a set of workflow for objectively assessing the landscape performance, and has important practical significance for optimizing landscape space and improving landscape performance benefits assessment efficiency and accuracy.

Keywords: Landscape performance, Quantitative assessment approach, Evidence-based benefit enhancement design

Research on evolution of agricultural landscape in pearl river delta

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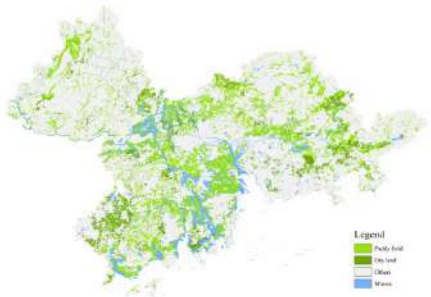
In the context of globalization and urbanization, the Pearl River Delta Basin, as the core region of China's economic development, holds significant research importance in the evolution of its agricultural landscape. With urban expansion and economic development, agricultural land in the Pearl River Delta faces immense pressure and challenges. Therefore, this paper delves into the evolutionary process of the agricultural landscape in this region. Leveraging Geographic Information System (GIS) technology, an overall analysis of the landscape ecological pattern is conducted based on land-use data. Combining this with a review of previous literature, the paper systematically reviews the historical changes and modern trends in the agricultural landscape of the Pearl River Delta Basin, analyzing changes in agricultural land use and their causes, as well as their impact on the ecological environment. The study reveals a gradual shift of agricultural land from the urban periphery to the hinterland, forming a new spatial pattern that has had a certain impact on the ecological environment. Finally, the paper puts forward a series of recommendations aimed at providing reference and insights for agricultural development and ecological environmental protection in the region.

Keywords: Pearl River Delta,Agricultural Landscape,Historical Evolution,Geographic Information System (GIS),Landscape Ecological Pattern

The schematic diagram of agricultural land in the Pearl River Delta in 2020.



This is a schematic diagram of agricultural land in the Pearl River Delta in 2020. In order to analyze the modern trends in landscape ecological patterns, the author of this paper created an analysis chart depicting the evolution of agricultural land from 1980 to 2020. This chart serves as a valuable resource for research. Please note that this is just one of the charts; for the complete set, please refer to the full paper.

Innovative Stormwater Management Infrastructure SuitableDesigned for Landfill Regeneration

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Under the process of urbanization, landfills serving as the primary infrastructure for municipal waste disposal are commonly confronted with pressing issues such as reaching full capacity and closely surrounded by urban areas, which exacerbate NIMBY (Not In My Backyard) effects and create challenges in reutilization. To effectively promote the reuse of landfills, it is essential to firstly ensure post-closure site stability.Effective stormwater management plays a critical role in ensuring landfill stability. However, common drainage systems typically employed in landfills, composed of stormwater channels, rapid discharge cages, and interception ditches, often demonstrate significant inadequacies in environmental adaptability, subsidence resistance, and operational economics.
To tackle the above challenge, we worked on the ecological transformation project of Beishenshu Landfill in Beijing for three years and conducted extensive investigation and technological innovation. Traditional drainage facilities were optiminsed and creatively tranformed, specifically integrating underground rapid discharge cages with surface stormwater channels and improving material performance. The upgraded drainage system not only maintains its high-efficiency drainage function but also enhances its resilience against complex environmental changes, particularly uneven settlement conditions, while significantly reducing maintenance costs over time. This series of measures has not only achieved harmonious coexistence between the landfill and its surrounding ecological environment, but has also provided reliable technical support and practical experience for sustainable management of similar landfill sites.

Keywords: Brownfield Regeneration, Landfill Stabilization, Stormwater Management, Sustainable Infrastructure

Comparative Analysis of Drainage Capacity Before and After Improvement

Drainage Hydraulic Design (Traditional Mode)

City Name	A	c	b	n	Return Period (a)	Drain Type	1. Reinforced Concrete Rectangular Open Channel	Roughness Coefficient	0.014	Reduction Coefficient	1.20							
BEIJING	5	2001	0.811	8	10	Side Slope of the Channel (Channel Height / Slope Length)	0.71	Side Slope Angle (α°)	44.42	Groundwater Infiltration Time t(min)	5							
Pipe Number	Computation Manhole Number	Catchment Area F(hа) Segment Area	Area Served by Each Stormwater Inlet	径流系数 ψ	Σ (Catchment Area × Runoff Coefficient)	Pipe Length L(m)	Bottom Width W(mm)	Channel Height H'(mm)	Maximum Water Depth H(mm)	Channel Gradient /(‰)	Travel Time within the Pipe t2(min)	Rainfall Duration t(min)	Rainfall Intensity q(L/(s·ha))	Conveyance Capacity Q'(L/s)	Design Flow Rate Q(L/s)	Drainage Capacity Qd(L/s)		
V1—Y2	Y1	6.92	1.73	0.400	0.69	50.0	400	400	300	200.00	0.14	5.00	506.1	0.0	350.2	932.6		
V2—Y3	Y2	25.80	3.23	0.400	1.29	50.0	400	400	300	200.00	0.12	5.00	506.1	0.0	652.9	932.6		
V3—Y4	Y3	3.79	4.17	0.400	1.67	50.0	400	400	300	200.00	0.11	5.00	506.1	0.0	844.7	932.6		
V4—Y5	Y4	4.65	5.34	0.400	2.13	50.0	500	500	400	200.00	0.10	5.00	506.1	0.0	1080.1	1834.3		
V5—Y6	Y5	5.80	6.79	0.400	2.71	50.0	500	500	400	200.00	0.10	5.00	506.1	0.0	1373.8	1834.3		
V6—Y7	Y6	7.90	8.76	0.400	3.50	50.0	600	500	400	200.00	0.09	5.00	506.1	0.0	1773.5	2365.8		

VS Drainage Capacity Remains Essentially Level

Drainage Hydraulic Design (Improved Mode)

City Name	A	c	b	n	Return Period (a)	Drain Type	2. Steel Structure Open Channel	Roughness Coefficient	0.014	Reduction Coefficient	1.20							
BEIJING	5	2001	0.811	8	10	Side Slope of the Channel (Channel Height / Slope Length)	0.71	Side Slope Angle (α°)	44.42	Groundwater Infiltration Time t(min)	5							
Pipe Number	Computation Manhole Number	Catchment Area F(hа) Segment Area	Area Served by Each Stormwater Inlet	径流系数 ψ	Σ (Catchment Area × Runoff Coefficient)	Pipe Length L(m)	Bottom Width W(mm)	Channel Height H'(mm)	Maximum Water Depth H(mm)	Channel Gradient /(‰)	Travel Time within the Pipe t2(min)	Rainfall Duration t(min)	Rainfall Intensity q(L/(s·ha))	Conveyance Capacity Q'(L/s)	Design Flow Rate Q(L/s)	Drainage Capacity Qd(L/s)		
V1—Y2	Y1	6.92	1.73	0.400	0.69	50.0	300	300	200	200.00	0.11	5.00	506.1	0.0	350.2	955.5		
V2—Y3	Y2	25.80	3.23	0.400	1.29	50.0	300	300	200	200.00	0.10	5.00	506.1	0.0	652.9	955.5		
V3—Y4	Y3	3.79	4.17	0.400	1.67	50.0	300	400	300	200.00	0.09	5.00	506.1	0.0	844.7	2102.8		
V4—Y5	Y4	4.65	5.34	0.400	2.13	50.0	300	400	400	200.00	0.08	5.00	506.1	0.0	1080.1	2102.8		
V5—Y6	Y5	5.80	6.79	0.400	2.71	50.0	300	400	500	200.00	0.08	5.00	506.1	0.0	1373.8	2102.8		
V6—Y7	Y6	7.90	8.76	0.400	3.50	50.0	300	400	300	200.00	0.07	5.00	506.1	0.0	1773.5	2102.8		

Rapid Flow Channel Improvement Technology Description

Rapid Flow Channel Improvement Technology Description:

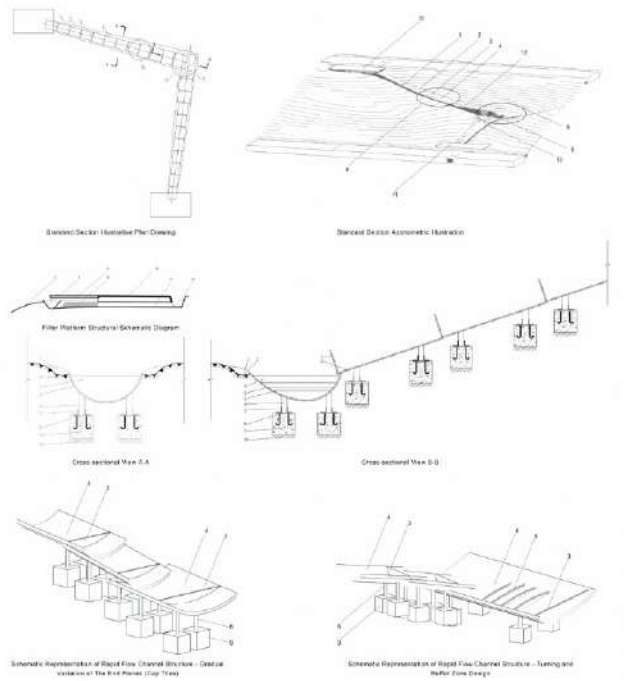
①The rapid flow channel is interconnected with the intersection ditch and incorporates a filtration platform. In conjunction with path-like resting nodes along streets, a buffer zone is established where the rapid flow channel connects to the intersection ditch, featuring coarse and fine grating to obtain debris near the park road for easy maintenance and cleaning. The structure of the rapid flow channel design adopts a multi-segment short-axis line control system, supported by an elastic beam structure that mitigates the impact of uneven settlement across the surface area as the overall rapid flow channel performance. Additionally, concrete material has been replaced.

② with weather-resistant steel, enhancing the structural resilience.

③At transition points where one rapid flow channel transitions another (turning buffer channels), consideration is given to the adaptability of the rapid flow channel to changes in topography and space, with the upstream opening dimensioned larger than the downstream opening based on specific parameters calculated from the flow rate, typically set at a ratio of 1:2. A transitional buffer zone is also incorporated to ensure smooth and controlled water velocity within the rapid flow channel, thereby reducing the risk of overflow while harmonizing with the terrain and blending into the landscape environment.

Illustration Legend:

1 Flexible buffer trench; 2 Cultivation soil; 3 Tiered steel weirs with H-shaped foils; 4 Short-axis tiles, including: 4.1 Intersecting short-axis tiles; 4.2 Resting short-axis tiles; 4.3 Tile coping drainage troughs; 5 Multi-level buffer weirs; 6 Square steel support poles; 7 Angle steel connectors; 8 Embedded parts; 9 Concrete pedestals; 10 Environmental art covering layer; 11 Collection trench buffer platform; 12 Upper segment of rapid flow channel; 13 Lower segment of rapid flow channel; 14 Main body of the drainage ditch; 15 Footpath; 16 Drainage gutter; 17 Land fill site; 18 Interception ditch



Rapid Flow Channel Introduction

Rapid Flow Channel Introduction:

A rapid flow channel in a waste landfill is an engineering measure designed to quickly drain rainwater from the landfill body, primarily to prevent water accumulation that could lead to slope instability and landslides of the waste heap as well as potential pollution risks caused by rain seepage entering the landfill area.

Limitations of Rapid Flow Channels:

①High Maintenance Costs: In waste landfills where uneven settlement persists, conventional rapid flow channels using concrete lined ditches are prone to cracking due to their resistance to subsidence. These structures can easily become clogged with soil debris, leading to high maintenance costs.

②Poor Landscape Compatibility: As the function of the space changes after reclamation, traditional rapid flow channel restoration methods fail to adapt to the natural topographical trends of the reclaimed site. They are not suitable for the ecological attributes and post-reclamation landscape reuse functions.

Rapid Flow Channel: Comparison of Everyday and Operational Conditions

Practice of Guanwan National Wetland Park Guided by Nature Education

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Nature education development is an important approach for the sustainable utilization of wetland parks, and it holds significant significance in achieving harmonious coexistence between humans and wetlands. This study examines the development trajectory of nature education, analyzes the existing issues in nature education within Chinese wetland parks, and proposes a construction model for nature education in wetland parks. The research focuses on Guanwan National Wetland Park in Feidong, Anhui, the first national wetland park in China featuring native Peitang wetlands. Through analysis and evaluation of the park's nature education resources, construction strategies are proposed, including the valorization of nature education resources, emphasis on distinctive themes, integration of local cultural elements, diversification of media, and modular curriculum development. These strategies aim to guide wetland ecological restoration and establish a comprehensive development model based on nature education. The park's nature education-led planning and practice facilitate the effective inheritance and rejuvenation of Peitang culture and heritage in the new era, with the intention of providing references and inspiration for nature education construction in wetland parks domestically and internationally.

Keywords: wetland park, natural education, planning, pond

POSTER PRESENTATIONS
Building Bridges, Breaking Barriers: Education & Practice

Teaching with Music: A Novel Approach to Enhance Design Creativity

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Landscape architecture design involves the intricate creation and composition of space across various scales. Within the realm of higher education studio teaching, the cultivation of students' design inspiration and creativity during the conceptual spatial design process is of utmost importance. The inherent musicality in architecture and landscape architecture design has been recognized in both Eastern and Western literature. Friedrich W.J. von Schelling notably characterized architecture as "frozen music," echoing Plato's assertion that music is a moral law, breathing soul into the universe, and providing wings to the mind. Confucius, too, emphasized the indispensable pleasure derived from music.While extant research delves into the relationship between music and architecture, a conspicuous gap exists in the exploration of the systematic pedagogy involving the application of music in architectural design education, particularly in the context of landscape architecture. This research seeks to pioneer an interdisciplinary approach in landscape architecture education by integrating music into studio teaching, aiming to develop more efficient and effective methods for training students in landscape architecture design, with a specific focus on nurturing creativity and imagination. The paper systematically reviews the commonalities between music and spatial design, along with the role of music in evoking creativity, establishing foundational knowledge for the study.

The research methodology encompasses the design of an empirical experiment where music is incorporated during landscape architecture design studio teaching sessions. Tutors guide students in developing concepts and inspirations for their designs. The experiment involves selecting music sections analyzed by a tutor with professional music training, followed by organizing a musical-drawing workshop during the landscape architecture design studio. Workshop participants, lacking any background in music education, engage in drawing while listening to sample music sections, guided by their imagination and intuition. The results indicate that music serves as an exceptionally effective medium in enhancing students' imagination and generating design concepts for landscape architecture. Students perceive music as a universal language conveying invisible information to their brains, inspiring creative decisions, and translating them onto paper.This not only aids in the conceptual stage of landscape architecture design but also provides students with an immersive experience in the holistic creative design process. Feedback from students suggests that the musical drawing workshop offers a platform for expressing themselves freely, contributing positively to their mental health.

Future research suggestions include refining the workshop design to explore specific types of drawing, such as investigating the relationship between music and color, music and narrative, and other aspects linked to spatial design. Additionally, incorporating measurements of brain activity during students' participation in musical drawing could scientifically elucidate the function of music in generating design concepts. Seeking professional feedback from psychologists to interpret students' drawings may aid in understanding their specific strengths and weaknesses in various aspects of creative design. This study represents a pioneering

exploration into the potential of music as a systematic pedagogy in landscape architecture and other design education disciplines.

Keywords: Landscape Architecture Education；Music；Conceptual Design；Creativity

Innovative pedagogy for educational landscape and environmental interpretation system design

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The traditional landscape architecture education has relatively fixed professional boundaries, design contents, and targets students within majors. This makes it difficult to break through professional boundaries in teaching and teach students in accordance with their interests and strengths. This study aims to explore the pedagogy of transdisciplinary landscape teaching, in terms of educational landscape and environmental interpretation system design, construct the knowledge chain based on the perceptual thinking way of art students and their artistic knowledge structures.

This study was conducted at Central Academy of Fine Arts in China. There are 3 courses of biodiversity conservation design, community design studio, and Beijing natural history and biodiversity study, provided for students of landscape major or not, who were interested in biodiversity conservation. The method of education for sustainable development was used to improve students' environmental emotions, attitudes, and cognition, inspiring their interests in related thematic design themes of habitat design, art integration into popular science communication, and ecological art. In order to make up for students' lack of knowledge about ecosystems, flora and fauna, and environmental issues, field studies in zoological gardens, botanical gardens, natural history museum, zoological museum, wetland reservation, and other related educational sites were held, lectures from related specialties were conducted. Mean a while, placed-based learning was used to develop students' practical skills and problem-solving abilities, in forms of social serving programs held during summer vacations. Through participating in organizing public environmental education events in urban parks, students learned the functions and people's using habits of educational venues, and given their creativities to educational site and facilities renewal, media design for popular science communication, and public participated eco-art creation.

As a result, more than a hundred future designers and artists has evolved in this study, and their design outcomes were presented in 6 exhibitions in urban parks and community art gallery, which helped spread the concept of biodiversity conservation to the public. In conclusion, this innovative teaching method with Sustainability Development Goals stimulates students' enthusiasm of learning, and promote interdisciplinary exchanges during design process and group work.

Keywords: Landscape architecture pedagogy, education for sustainable development, service learning, educational landscape, environmental interpretation system design

Introducing Landscape Literacy in Architecture students through Pedagogical Exercises

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Indian Education Society's College of Architecture, Mumbai, India

Landscape Literacy is described as the ability to read landscapes and decipher the stories they tell. Developing/Imbibing this ability in all disciplines whose work impacts the landscape would go a long way in ensuring that human interventions tread lightly on the natural environment. This poster documents the teaching methodology adopted at my school, IESCOA Mumbai, for the landscape architecture introductory course for undergraduate students of architecture - the generation of one of the key professions that is next going to lay claim to our built and unbuilt environment.

The presentation will outline the course objectives and learning outcomes of each of the following exercises:
- Landscape Associations at the Personal, Collective and City level (cultural, social, educational, recreational, ecological engagement and significance)
- Reading Landscapes (through an understanding of scale, composition, textures, colour)
- Natural, man-modified and man made landscapes and the behaviour of natural systems in each
- Lessons from the Past (traditional responses to natural and designed landscapes)
- Narratives woven into Landscapes and Landscapes woven into Narratives (sociocultural engagement with landscapes)

Landscapes capture the fourth dimension of time - they need time to grow into what they were designed to look like, they take time to bloom and showcase their seasonal glory and they take time to bear the fruits they were planted to produce and provide shade to their patiently-waiting nurturer. Much akin to this, is the knowledge of landscape architecture that is introduced to the students…every exercise/assignment is completed and graded but the real learnings will only appear in a few months and years - in their studio designs and eventually live projects. The assessment of landscape literacy and the measure of success of the pedagogical model and the teacher can only be tested over time, one sensitive student at a time.
The method adopted is documentation and self assessment of a personal journey and the study sample is the work of a single batch of students over 3 years.
In this research, the academic exercises done for the course is mapped over 3 years (beginning with the year that the introductory course is taught upto the final year of Architecture school) to monitor the nuances that exhibit landscape literacy:
- Response to site and setting
- Response to context
- Strengthening existing associations in a context and introducing newer narratives in the design

Keywords: Landscape associations, Sensitising architecture students, Landscape narratives

The Public Cognitive Bias between the Physical and Cyber Space

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(Background) In the new period of incremental expansion to the urban renewal, the protection and sustainable reuse of industrial heritage have become a key issue for urban spiritual and cultural construction and high -quality development. Recently, the industrial heritage creative park has become an "internet-famous site" because of its novel space and the public's pursuit of internet influencer culture. The space vitality of these sites has been improved to a certain extent; however, the fragmented and symbolic cognition fades the cultural value of the industrial heritage, which is not conducive to the sustainable development of industrial heritage. Studies on public cognition of industrial heritage are mostly focused on the heritage authenticity perception and cultural service perception, cultural identity and local attachment, post-use evaluation and satisfaction evaluation, and lack in the quantitative analysis of the propagation characteristics of the industrial heritage in the internet influencer culture, which couldn't effectively support the sustainable development of industrial heritage in the digital age.
(Objectives) This study aims to explore the public's overall perception of the industrial heritage creative park and describe their behavioral characteristics in the physical and cyber space by analyzing public cognition and behavior information, and to express it graphically. It aims to provide a reference for other industrial heritage creative parks, realizing the cultural value inheritance and sustainable reuse of the industrial heritage.
(Methods)Taking Beijing Shougang Industrial Park as an example, this study describes the public cognition characteristics of its physical space and cyber space and then compares similarities and differences between them, by online data crawling, text semantic analysis, picture semantic analysis, spatial data visualization, combined with site investigation, questionnaire, and interviews.
(Results) It finds that differences exist between public cognition of physical and cyber space in terms of architectural style perception, industrial element preferences, industrial cultural identity, preference activity type and public preference space. For example, in the architectural style perception aspect, the number of original buildings accounts for as much as 70% in randomly collecting 1,000 photos on an online platform, while it only accounts for 30% in the physical space. On this basis, further analysis of the influencing factors causing public cognitive bias was conducted and targeted strategies for promoting industrial heritage protection for physical and cyber space was proposed.

Keywords: Public Cognition, Industrial Heritage, Physical and Cyber Space

Experiencing the Atlantic Forest

Ana Carolina Carmona-Ribeiro, Douglas Luciano Lopes Gallo
Federal Institute of São Paulo (IFSP)

This work presents a didactic experience carried out with students from the IFSP Architecture and Urbanism course, in the context of the discipline "Landscape Planning", between 2017 and 2023. The activity, entitled "Vegetation study: the Atlantic Forest biome", pursued a rapprochement between the students – many of whom had never hiked or closely observed the forest – and this important Brazilian biome, a biodiversity hotspot that stretches along the east coast of the country and is one of the most threatened tropical forests on the planet. The experience sought to awaken interest in the biological, spatial and social dimensions of vegetation (in a context in which the so-called "plant blindness" is increasingly common), in addition to highlighting the importance of conceiving landscape design within an ecological vision – considering Roberto Burle Marx's definition of the garden as an "association between plants, soil, climate and people" or Gilles Clément's "planetary garden" (a garden without fences, whose citizen-gardeners act locally and think globally). The method adopted involved two interconnected practices: firstly, the on-site observation, carried out during visits to environmental preservation areas in the Metropolitan Region of São Paulo, which provided a corporeal, lived experience; and, secondly, the practice of drawing, fundamental for a deeper understanding of the ecosystem's characteristics and plant species, and for overcoming the view that "all plants are the same". The results of the work were the production of plates bringing together information about the biome and its phytophysiognomies, sketches of species observed during the in-site visits (and later identified), and a drawing showing the complexity of the context where those plants were found. Analyzing the students' production, it is observed how the exercise contributed to the learning processes. Basic knowledge about the biome was reinforced with the bibliographic reviews, such as its geographic distribution, relief, hydrography, climate – aspects little addressed in Architecture courses, but essential for the Landscape Architect. They better understood the concept of phytophysiognomy and the differences between the various plant formations of the same biome (in the case of the Atlantic Forest, the humid tropical forest, the mixed forest, coastal ecosystems such as mangroves and salt marshes, altitude fields, and areas resulting from natural regeneration processes after human disturbance). They were also able to figure out the relationships between the various species and between biotic and abiotic elements – for example, the impact of disturbances caused by human action on the borders of preservation areas (which lead to the replacement of native vegetation by invasive species), or the observation of the difference (obvious to a biologist, but unclear to most people) between an epiphytic plant and a parasite. Finally, they were able to approach – not only in terms of scientific knowledge, but also more subjectively –, the native or endemic species of the biome, discovering new possibilities for landscape design, in a country where the native flora is still largely undervalued.

Keywords: Education, Ecological landscape design, Atlantic Forest

Exploring landscape memory: A case of Elasa Türkiye

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This study explores the analysis of landscape memory concept within the educational framework of the European Landscape Architecture Students Association (ELASA) Meeting, with a particular focus on the upcoming ELASA Türkiye 2024 event. ELASA's objective is to acquaint landscape architecture students across Europe with landscapes from various countries. Its events typically comprise panels, workshops, and excursions designed to enrich students' comprehension of landscapes.

With the 2024 mini meeting scheduled to be held in Türkiye, with a focus on the theme of landscape memory, this paper aims to examine the concept within the context of the ELASA Türkiye 2024 program. The program's overarching goal is to instill a profound appreciation for Turkey's rich and diverse landscapes and heritage among participants, thus contributing to the preservation and understanding of landscape memory within the field of landscape architecture. It aims to explore strategies aimed at enhancing participants' conceptual understanding and problem-solving skills through a series of proposed activities. By doing so, it aims to contribute meaningfully to the preservation and understanding of landscape memory, a fundamental aspect of our shared cultural and environmental heritage.

The methodology adopts a two-pronged approach. Firstly, it involves the collection of participants' perceptions of landscapes both prior to and following the event. This will be accomplished by requesting participants to complete the statement "Landscape is ____." The objective is to discern any shifts or developments in participants' perceptions of landscape within the landscape memory framework influenced by the event.

Secondly, the methodology integrates field trips as essential elements of the program. During these excursions, participants will immerse themselves in the exploration of memory images ingrained within natural and cultural landscapes. Subsequently, participants will be encouraged to conceive innovative solutions aimed at conserving landscape memory across natural and cultural realms.

This comprehensive approach seeks to highlight the effectiveness of educational strategies in fostering an appreciation for and commitment to the preservation of landscape memory within the ELASA Türkiye 2024 program.

In line with the methodology, this paper introduces a case program aimed at providing innovative educational opportunities for emerging landscape architects. The program is intricately designed to delve into the concept of landscape memory through the utilization of diverse techniques and tools. Through practical and theoretical engagement, participants will explore the intricacies of landscape memory, culminating in the development of a comprehensive educational program tailored to the needs of the younger generation of landscape architects.

Keywords: landscape analysis, multi-layered landscapes, natural heritage education, cultural heritage

Multidisciplinary Urban Built Environment: Expanding Landscape Architecture Body of Knowledge

You Wu, Ming Zhang
College of Architecture and Urban Planning (CAUP), Tongji University, Shanghai, China

[Objective] Based on the paradigm transformation of China's urban development pattern, this research aims to expand the landscape architecture body of knowledge oriented to the regeneration of urban built environment. This endeavor not only aligns with the pressing themes of rapid urbanization and its consequent human impacts but also delves into the evolving dynamics of design pedagogy and professional practice under the lens of multidisciplinary methodologies. The primary objective is to foster a deepened understanding and to catalyze advancement within the core areas of landscape architecture, grounded in the practical realities of landscape planning and design initiatives.
[Methods] This study is anchored in a comprehensive theoretical framework that synthesizes the insights of sociological "Field Theory" with the emerging principles of Landscape Urbanism. This dynamic framework offers a robust platform for dissecting and reinterpreting the complex interrelations within social structures and implemental mechanism, particularly in the context of urban regeneration. The research identifies three pivotal paradigm shifts critical to the regeneration of urban built environments: 1) a transformation in viewing the "field" relationships; 2) a strategic shift in the pathways to urban regeneration; 3) a redefined identity for landscape architects. On the practical front, the study draws upon extensive redevelopment projects along the waterfronts of the Huangpu River and Suzhou Creek in Shanghai, among others, to construct a "Six-dimensional Regenerative Design System, SdRDS." This system is meticulously designed to address the multifaceted challenges of urban regeneration, emphasizing sustainable and inclusive growth for both physical placemaking and non-material urban systems.
[Results] The study proposes transcending disciplinary boundaries and fostering collaboration among different stakeholders to enhance the landscape architecture body of knowledge. The findings underscore the necessity across six critical dimensions: 1) systematic knowledge of placemaking; 2) responsive knowledge of cultural and historical contexts;3) innovative integration of infrastructure; 4) strategic creation of scene nodes; 5) ecological knowledge for environmental restoration; 6) artistic intervention of public spaces. Each dimension is explored in depth, revealing its intrinsic value and potential impact on the broader field of urban regeneration.
[Conclusion] By advocating a cross-disciplinary ethos and championing multidisciplinary integration, the research presents a compelling case for a paradigm shift in the landscape architecture domain. This shift is not only pivotal for expanding the knowledge base but also for empowering the landscape architecture community to forge new values, paradigms, and leadership roles in the quest for regenerating urban built environments. Landscape architects are envisioned to emerge as vital coordinators and harmonizers, leading the charge in navigating the complexities of urban regeneration against the backdrop of contemporary societal and environmental challenges.

Keywords: body of knowledge, multidisciplinary integration, urban regeneration, Landscape Urbanism, design pedagogy

Reconstruction of historical memory through landscape structure

Exemplary case study

Reshaping of water-city relationship in Shanghai

Exemplary case study

Six dimensions of extended body of knowledge

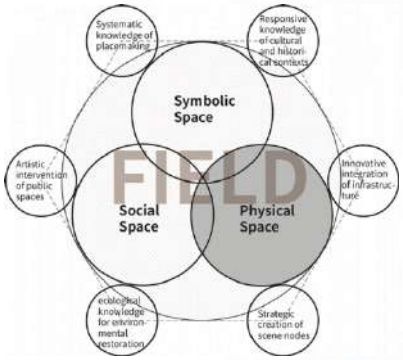

Diagram of the theoretical structure

TMMOB
PEYZAJ MİMARLARI ODASI
UCTEA CHAMBER OF LANDSCAPE ARCHITECTS

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INTERNATIONAL FEDERATION
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