

WATERLOO ARCHITECTURE

Spring 2018 Master's Thesis Reviews - Friday, August 3, 2018

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1. Sameerah Aumjaud - 9:30 Loft Gallery

S: *Lola Sheppard* C: *Jane Hutton*

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3. Anne Cheung - 9:30am Loft

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4. Justyna Maleczyk - 11:00am Loft Gallery

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6. Linda Si Liu - 11:00am Loft

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7. Elsa Tang - 1:30pm Loft Gallery

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8. Amir Abousadi - 1:30pm ARC 2026

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Navigating through peaks and valleys: Public space and water infrastructure as intervention tools for urban regeneration in Kigali, Rwanda

Sameerah Aumjaud

Supervisor:

Lola Sheppard

Committee Member:

Jane Hutton

Abstract:

Current methods of urban regeneration, more specifically as practiced in Rwanda, are totally devoid of socially inclusive approaches, and highly lack contextual adaptability. In the aftermath of the genocide of 1994, which plundered the country's resources and human capita, Rwanda has undergone various states of reconstruction - socially, economically and architecturally. Over the past two decades, Kigali, Rwanda's capital city, has been building up its momentum of development towards translating itself into a dynamic urban hub, aiming at attracting foreign investors to boost the local economy. In 2007, the government adopted the Kigali Conceptual Master Plan, designed by consultants from the United States, branding Kigali as a city of character, vibrant economy and diversity. Today, Kigali's skyline is dominated by steel, glass and concrete megastructures, in the image of 'modernity'.

However, these efforts at transforming Kigali into a city anchored on Western standards are completely disconnected from the current socio-cultural, ecological and economic dynamics. The masterplan promotes the annihilation of the informal areas within the city, which account for the dwelling area of 66% of Kigali's population. It also dismisses the undulating topography and communal significance of Kigali's wetlands to informal dwellers. Consequently, the latter remain deeply vulnerable, constantly living under the fear of being evicted or relocated, while the wetland valleys, currently under serious ecological threat, are destined to be converted into parks reserved for the elite.

Through the critique of current methods and proposals of urban revitalisation, this thesis advocates for a more inclusive approach to urban planning, and promotes urban development lying in the interest of every strata of Rwandan society. The work dwells into how wetlands can be utilised as a backbone for urban revitalisation by optimising the potential of Kigali's watershed to provide adequate infrastructure that consolidates existing community relationships. The juxtaposition of ecology, infrastructure and architecture opens the possibilities for various patterns of incremental growth, while remaining sensitive to the social, environmental and cultural dimensions of the urban fabric.

The design strategy proposes a framework supporting enhanced livability based on the dimensions of society, economy, biodiversity, and sustainable development. The framework is explored through three nodes, each with their own specific challenges, and focusses primarily on restoring water quality and wetland ecology through a decentralised, human-centric set of interventions. The work also demonstrates how the framework allows for continuous growth in the medium and long term, remaining in complete synchronisation with the altering dynamics of Kigali's emerging society. In contexts like Rwanda, where peace and conflict are sensitive and controversial matters, this thesis demonstrates how design can not only build communities and trigger tenacious social relations, but also how it can act as a gentle and subversive form of questioning the established.

Learning From the Past: Recreating Historic Persian Gardens in Downtown Tehran

Azadeh Shayanfar

Supervisor:

Val Rynnimeri

Committee Member:

Eric Haldenby

Abstract:

Persian gardens have been evolved through the history of Persian Empire in regard to the culture and beliefs of the society. One of the main purposes of the existence and building of these gardens was to provide various forms of relaxation such as leisurely or even spiritual. “Pairi Daeza” is a Persian phrase meaning enclosed space. ¹This term can also be seen in Christian mythology who had adopted it to define and describe paradise on earth, i.e. Garden of Eden. ²

In the past, Tehran was considered as the city of gardens as it held many gardens in it and nature was not separate from the urban areas. However, after the arrival of modernism and the urban growth, modern buildings and high-rise habitats replaced the historic gardens.

By looking at the historical formation background of the city of Tehran, it is concluded that in the past the city was formed according to the natural structure, but in recent decades as a result, the comprehensive and detailed plans carried out in Tehran neglect landscape ecology and the valuable historic gardens. As a result, the city is confronted with the environmental pollutions, fragmentation in the landscape ecology, disorder in the city structure and land use, etc.

This thesis is aimed to locate the lost gardens in the downtown city of Tehran and look for those gardens which now have been replaced by a small scale urban fabric filled with storages and garage facilities and have the potential to be rebuilt to better urban standards. As many of ancient Persian gardens were designed only to be experience by royalty, the new designed garden will serve all people with different programs such as childcare, healthcare, retail store, theater and etc. As a result, these public gardens are not only accessible to the public by being the part of urban fabric, but also, they offer the local people a better opportunity for their business.

The restored Persian gardens serve as places of identity, memory, and belonging; enrich human life with meaning and emotions by providing important social and psychological benefits; bringing people together; increasing public congregation and interaction.; and enhance the quality of life of the citizens.

¹ Langgut, D. (2013). Fossil pollen reveals the secrets of the Royal Persian Garden at Ramat Rahel. *Jerusalem*, 37(1), 115–129.

² Delumeau, J. (2000). History of paradise: the Garden of Eden in myth and tradition. *University of Illinois Press*.

An Integrated Vertical Urban School For the 21st Century Hong Kong

Anne Cheung

Supervisor:

Terri Meyer Boake

Committee Member:

Donald McKay

Abstract:

Urban population continues to rise at an unprecedented rate. High-rise commercial and residential developments continue to intensify and remodel the cityscape. While intensification increases the quality of life for urban citizens, imbalanced student enrollment across the city's sub-divisions are becoming a more prominent urban problem. Children living in the intensified areas are attending over-crowded schools. Compromising the quality of learning and resources.

The research focuses on current urban development, school types and the situation of urban schools in developed cities. Particularly on the situations in Hong Kong S.A.R., China.

The relationship between pedagogy and school building forms a foundation for the architecture. The proposed school opens up a dialogue to discuss the roles of schools in the city with regards to the current urban conditions. It becomes an institution that reaches into the community and functions as an urban apparatus that connects the gaps between schools and the urban families' lifestyle. The design manifests an architectural identity of a flexible and adaptable learning environment. Increasing the utilization of schools as resources to the community while providing innovative learning spaces that is suitable for the pedagogical changes that is observed to be the trends in the 21st century.

Rethinking the Smart City: Interventions for a post-digital age

Justyna Maleszyk

Supervisor:

Lola Sheppard

Committee Member:

David Correa

Abstract:

The term Smart City is quickly gaining traction, as it spreads across North America in a series of urban initiatives. When depicted in mass media, Smart City developments are often portrayed as idealistic technological initiatives with sensors, intelligent traffic signals, autonomous vehicles and interactive screens – an ambiguous extension of the personal digital tools our society relies on for daily convenience and connectivity. They hold the idealistic promise of efficiency, innovation, dependability, security and sustainability, and in the words of Google’s Sidewalk Lab: an “[improved] quality of life” for all.

Architect Rem Koolhaas describes these technological trends as movements preoccupied with the improvements they bring, and often disregarding the experiences lost in the process. In reality, Smart City projects are much less concerned with user-experience and are driven instead by the potential for data collection and optimized consumerism. Historian Antoine Picon, argues that the engagement of large technology businesses in the Smart City discourse is motivated almost exclusively by the opportunity for collection and governance of data, and the resulting avenues for profit. By deploying city-wide digital infrastructures, companies like IBM, Cisco, Panasonic, Siemens and Google, are gaining the ability to commercially benefit from the data collected from our spending habits, social media use, means of transportation, energy consumption, etc.

The impact of digital tools on urban communities is engaging researchers in the fields of psychology and sociology, whose findings are leading to an increased concern with the way social media and personal media devices are depreciating the strength of our non-digital communities and relationships. 20th century sociologists such as Georg Simmel, Ray Oldenburg, and Lewis Mumford, have demonstrated the challenges technology has and continues to impose on their development. In response to some of these challenges, contemporary architects and designers are encouraging us to rethink our relationship to the digital city.

Understanding this reality, my research questions the paradox and promised success of cities planned by for profit-companies, as versus city planners. The thesis seeks to examine a new form of reflective interpersonal engagement in the digital age, by shifting the exchange dynamic between technology companies and users. Through a series of design interventions, the thesis asks if one can create meaningful human interaction in digitally saturated environments. Leveraging Smart City technology, a series of interventions interrupt the absentminded, habitual use of digital technologies in order to augment the presence of individual agency within the public realm.

Returning Wilderness: A Centre for Environmental Education on the Leslie Street Spit

Snober Khan

Supervisor:

Rick Andrighetti

Committee Member:

Val Rynnimeri

Abstract:

We live in a time when much of the natural world is lost in the wake of human agency on earth. No place of wilderness today remains untouched by human influence. This thesis is an attempt to finding wilderness in the Anthropocene. To urbanised people most importantly children, the source of food and the reality of nature are becoming more abstract. Lacking direct experience with nature, children begin to associate it with fear and apocalypse, not joy and wonder.

Public education is enamored, even mesmerized, by what might be called silicon faith: a myopic focus on high technology as salvation. In the presence of these ideologies, school nature programs must go beyond curriculum or field trips: involve physical design of schools with playscapes that incorporate nature into the central design principle; and use nature preserves with environment-based schools. The Leslie Street Spit, having found an abundance of ecological diversity is a befitting location for such an intervention. It exists as a unique form of wilderness in the city of Toronto. It is best suited for an opportunity to be served as an informative playground and education tool for children to discover their environment in its most natural form. Experiential education and nature-based experiences provide individuals of all ages with a unique and powerful opportunity to immerse themselves in the natural world in a constructive and beneficial manner. It allows them to explore several relationships including connections to oneself, connections to others, and connections to the land. These relationships, especially when created at a young age, have the potential to significantly increase personal wellbeing by providing an avenue for healthy development and exploration, fostering interpersonal relationships, and instilling core environmental values. Connecting children and youth to our natural world is therefore essential.

The concept for the Education Centre must address two challenges from its inception: (i) to make the site accessible to the public without endangering the rich flora and fauna present, and (ii) to engage building with landscape; architecture acting as a mediator between children and nature.

Landscapes in Motion: Active Aging in China

Linda Liu

Supervisor:

Adrian Blackwell

Committee Member:

Jane Hutton

Abstract:

Aging in China does not mean slowing down or losing flexibility. On the contrary, aging in China is about becoming younger. The practice of calligraphy for many seniors has become a daily exercise routine motivated by improvement of one's health rather than the traditional desire for creativity or communication. Calligraphy is ultimately an extension of the calligrapher itself. The art of calligraphy writing appears stationary, but the acts of writing exhibit a vast array of internal dynamics and motion that channels energy throughout the body. The composition of strokes, rhythm of movement, and release and withholding of vital energy creates the poetic choreography of calligraphy. The practice of calligraphy is an activity that not only expresses artistic expression yet also cultivates mental dexterity and spiritual tranquility.

In the fifth century, poet Tao Yuanming initiated the appreciation of pastoral lifestyle as the poetic retreat from the chaotic society. The Daoist idea of natural beauty and search for immortality has heavily influenced traditional landscape painting as a means of expressing the ideal dwelling in the spiritual world of literati. The landscape painting stimulates the viewer's imagination to a surreal level creating a feeling of wonderment rather than viewing from a still and distant point. The shifted perspectives in the painting are used to focus or withhold various elements upon different scales in the landscape. The control of external versus internal views depicts a spatial journey in landscape painting that can be discovered within a Chinese garden that is suitable for dwelling and exploring.

This thesis explores the concepts of calligraphy and Chinese garden to create an ideal retreat for seniors in the urban environment.

Syntrophic Waters

Elsa Tang

Supervisor:

Jane Hutton

Committee Member:

Terri Meyer Boake

Abstract:

The twentieth century witnessed a dietary shift in Japan, which resulted in greater consumption of exotic seafood species that occupy high trophic levels. This, along with the industrialisation of commercial fisheries and the subsequent global popularisation of Japanese cuisine in the post-war era have all contributed to the current ecological crisis in all of the world's oceans. The rapid depletion of marine biomass and large-scale destruction of ocean ecosystems have led to an intensifying marine metabolic rift[1] that threatens not only the survival of marine species, but also the livelihoods of communities still dependent upon their small-scale fisheries industries.

It is clear that a new fisheries model is needed. Rather than pitting the preservation of ecosystems and the provisioning of affluent markets against one another, this thesis envisions a hybrid model that combines conservation efforts with more sustainable production practices. It calls for a bottom-up approach that prioritises the establishment and maintenance of suitable habitats for fish populations to thrive. This model of syntrophic production would transform the fisheries worker from a mere extraction expert to a marine steward.

The Japanese town of Oma in the northern prefecture of Aomori is the testing ground for this new fisheries model. Renowned for its annual landings of Bluefin tuna, this remote, northern community is especially vulnerable to the impending commercial collapse of the species. Through the establishment of a “productive marine refuge”, the thesis aims to provide alternative revenue routes for the town’s fisheries workers while simultaneously allowing for the rehabilitation of the region’s marine ecosystem. The existing fishing port and associated shoreline are transformed into an intensive working landscape that supports the complex trophic relationships in the marine environment. At the same time, the new landscape will provide an opportunity for the general public to engage with the production processes that support its consumption habits.

1. Clausen, Rebecca and Brett Clark. "The Metabolic Rift and Marine Ecology." *Organization & Environment* 19, no. 4 (2005): 425

Sustainable Design of a residential mixed-use mid-rise in Junction Triangle neighbourhood

Amir Abousadi

Supervisor:

Marie-Paule Macdonald

Committee Member:

Val Rynnimeri

Abstract:

The purpose of this thesis is to move past generic conventional building strategies for housing to be able to design an efficient well-integrated continuity between human, nature and technology for a high- density building in a populated urban environment on a main avenue in Toronto's Bloor Street south and the West Toronto rail path. Such a building will adopt a significant number of sustainable strategies such as Passive cooling methods, energy generation, Rainwater harvesting, CO2 consumption, Vertical Integration of vegetation, Natural ventilation, Daylight penetration and constructed wasteland for sewage treatment. In consequence achieving a better state of mental and physical health for the tenants and their neighborhood. The aim of this thesis is to propose this line of thought regardless of its financial viability at this day and age, aiming to promote such methods and mentality in forthcoming constructions.

The pressing issue in a project based research thesis like the above is how we as Architects can help in reforming our society with today's ever-changing needs? What are those most pressing issues? And finally, how can architecture tackle these issues from its own standpoint?

Global warming (climate change) and mental health seem to be our biggest issues at the time (at least in developed countries), In order to steer our planet away from an ecosystem collapse and attempt to reconstruct that environment, we need to pursue a posthumanistic line of thought in order to address humanity's manipulation of the environment as to change the makeup of the physical spaces we occupy. As the realities of climate change become increasingly evident, attention has turned to direct mediation strategies focused on warming processes like the urban heat island effect, CO2 emissions and Energy consumption.

Increased urban density, heat production from cars, air conditioning, vegetation removal, increased impermeable surfaces and air pollution all contribute to the urban heat island effect. Guidelines for mediating the warming of our cities encourage the construction of green infrastructure in the form of green roofs and green walls, increased vegetation and the adoption of reflective and light-colored surfaces for roofs and paving.

Emerging research, however, suggests that these highly generalized recommendations may not achieve the desired outcome. A 2015 article in Nature highlights that in some cases rooftop plantings may actually increase night-time temperatures, "cool" roofs can slow wind and limit rain precipitation, green infrastructure on buildings can have minimal impact on thermal comfort at street level, and extensive tree planting can actually increase humidity.

Consequently, researchers are beginning to warn against the application of a one-size-fits-all approach to climate change mediation. Therefore the purpose of this thesis is to research by design in the specific setting of Bloor St South meets West Toronto rail path. In the hope to find the best possible solution regarding overall health and sustainability, software such as Insight for Revit and world engines will be used to calculate every outcome.

Envisioning a Future City with Autonomous Vehicles

Brian Liu

Supervisor:

Rick Andrighetti

Committee Members:

Maya Przybylski

Abstract:

The evolution and formation of our urban fabric have an inextricable relationship with transportation and urban mobility. The revolution in speed and power of transportation as a result of the automobile in the early 1900's brought about radical changes in how cities were designed and constructed. City streets, previously built for horse-drawn vehicles and foot traffic, were modernized with asphalt and segregated for the sake of speed and convenience. Parking lots, garages and gas stations were carved out of the city fabric to support its ubiquity and the population's dependence on it as the ultimate form of movement. Expansive highways and extensive networks of arterial thoroughfares were put in place as cities began to undergo urban sprawl. As North American cities have evolved and developed around the use of automobiles, the requirements to support its use have become increasingly oppressive to other forms of city life. However, an upcoming revolution in transportation and urban mobility, ushered in by the development of autonomous technology, will present urban designers with new opportunities to re-evaluate the relationship between motorists and the city.

Autonomous technology has the potential to completely redefine the rules regarding the spatial requirements of automobiles and how they operate within the city. It is widely believed that AV (autonomous vehicle) technology will encourage car sharing, shifting the business model from that of predominantly individual car ownership to a service based model, resulting in a significant decrease in number of vehicles on the streets. The efficiency of AVs will also drastically reduce the amount of space required to operate vehicles, allowing for a reduction in traffic congestion and road sizes. Another consequence of AV technology will be the reduction in need for parking, as a result of car-sharing opportunities and the possibility for vehicles to perpetually be in operation. This thesis explores the implications of AVs on the urban fabric and aims to direct urban design towards incorporating AVs towards a more equitable future.

The city of Toronto will be used as a lens for envisioning how a future urban landscape incorporating AVs may take shape. The city currently suffers from immense friction between the overbearing requirements of automotive infrastructure and daily city life. Accidents involving motorists and cyclists are increasingly a problem and efforts to limit the range of the automobile within the city are becoming popular. It is estimated that one third of land in Canadian cities are for cars that aren't even moving, removing land that could otherwise be allocated to additional housing or retail space. Toronto is putting its best foot forward towards a future with AVs though with investment from all levels of government, academia and private entities. The thesis studies the impact of the automobile on a variety of actors and spaces within the city and proposes visions of how the proliferation of AVs may change the inherent structure of typical spaces in our city today. The work serves as a guideline in how we may design a more equitable city as a result of the opportunities presented from AVs. The advent of autonomous vehicles is inevitable and the visions proposed serve as a porthole into what may become reality within just a couple of decades.

Preloading: A Transformative Approach to Flood Preparation and Relief

Anqi Zhang

Supervisor:

Rick Andrighetti

Committee Member:

Jane Hutton

Abstract:

Natural disasters are mostly unpredictable and often cause devastating impacts to life and property. For islands and coastal cities, the body of water that nourishes the land can easily become a main source of threat. Although intensive tsunami inundations rarely occur, annual recurring flooding caused by rising water levels and coastal inundation is definitely a common problem. People are often repeatedly trapped in flooded homes or are forced to quickly evacuate to inadequate temporary shelters.

Two common approaches to flood threat are to build permanent barriers or physically distant people from the water. However, as the water is essential to the livelihood of islands and coastal cities, these approaches often create more harm than good, destroying the usual beneficial relationship between people and the water. Damage to homes and the destruction of communities are often inevitable, and thus require large amounts of material and time for post disaster reconstruction. Since external resources are expensive and difficult to transport during times of need, the lack of immediate internal response to sudden natural disasters can cause drastic delay in the disaster relief process and hinder the future redevelopment of the community. Consequently, the urgent issue is how to incorporate flood readiness into the built environment.

How do we prepare ourselves for the occurrence and reoccurrence of flooding in coastal cities? What are the roles of an architect in designing for disaster? The role of an architect should be designing for buildings that could respond to, recover from, and become resilient against water inundation. The thesis investigates a new strategy for flood protection and relief within the context of Port Alberni, British Columbia. The aim is to preload a cyclical relationship into pre and post disaster buildings, materials and resources. This means designing existing architecture in public space to contain the material and programmatic capacity to partially withstand the flood and strategically transform into spaces for flood relief. These in turn contribute to the rebuilding of a resilient community. Daily public interactions with these architectural elements can also preload the residents with disaster awareness and knowledge for disaster relief. The design aims to reduce the gap between the urgent need for shelter and the speed of reaction, at the same time, create a syntax that constructs place and brings people back to the water.

Driverless Car Transit Hub

Winnie Ko

Supervisor:

Val Rynnimeri

Committee Member:

Terry Meyer Boake

Abstract:

As the world is moving towards automation, manual labour is quickly becoming obsolete to avoid unnecessary human error. In 20 to 30 years, a new era of driverless technology will revolutionize the modern transportation system. This technology will not only change the road systems but it will also alter the way people live their lives, have urban planners exchange parking lots for drop-off zones, as well as transform the workforce commuting paradigm. It is up to the architects and urban planners to create an innovative plan to design city systems that bring citizens from point A to point B seamlessly without sacrificing the flexibility of where this citizen may need to go. An additional challenge in this shift is to use the existing cityscape and public transit infrastructure to accommodate a booming population as the rigidity of an established metropolis prevents mass reconstruction and rebuilding. This thesis presents the case that an inter-modal transit hub can effectively integrate driverless car technology into a city's public transit system to improve efficiency and flexibility while maintaining the city's traditional legacy and networks.

Nomos/Nomad: Millennium spatial framework of a people

Daniel Shen

Supervisor:

Adrian Blackwell

Committee Member:

Marie-Paule Macdonald

Abstract:

Contemporary issues in China that capture the attention of architects and other spatial thinkers range vastly in space and scale. From the intercontinental infrastructures in the exploded peripheral territories to the internal migrations in the imploded inner cities. Meanwhile, modernity and changing ideologies in the past decades have architects and thinkers in China questioning the very idea of Chinese architecture and spatial practices; how to forage a path ahead while also looking for their roots.

This thesis finds the connections between these issues by reexamining a millennium of Chinese history and spatial practices through a new spatial framework. It is constructed in the form of a new journal of architecture and urbanism, *Xintiandi*. Each issue of the journal consists of a single theoretical concept, with five narratives at various points in Chinese history that relate to it, all told and documented through architectural methods of spatial representation.

This thesis is the first volume of *Xintiandi* in its entirety, centred on the concept of *Nomos/Nomad*. The stories document the spaces produced by the ever-entangled relationship of the *State*, *Nomad*, and *Nomos* throughout Chinese history.