Built Environment
Urban Development & Design
2019
UDES0010 Communication in Urban Design

This core course extends students' capabilities for graphical, written, and verbal communication through the production of the annual MUDD Folio, Exhibition and associated public lecture - the Paul Reid Lecture in Urban Design. The aim is to critically reflect upon and re-present the year's work of the MUDD Program in a creative, compelling format which contributes to the design culture of Sydney.

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Message from the Dean:

Professor Helen Lochhead

Rapid urbanisation and the resultant consequences occupy our students in the UNSW Master of Urban Development & Design (MUDD) Program. For more than 20 years, the program has attracted an international student cohort and delivered a rigorous academic program that addresses our most pressing global urban challenges. Importantly, the 1-year intensive program of post-graduate study equips our graduates to lead the planning, design and development of these complex and fast paced urban environments, wherever they may be.

A key component of the MUDD Program is the immersive studio design projects that challenge students to address both local and international urban agendas. This creates well-rounded graduates who are able to think strategically as urban designers and appropriately adjust their design solutions to the different political, economic and social contexts of cities in which they may operate around the world.

Drawing on the writing of Manuel Castells in The Rise of the Network Society (1996), this year’s studio theme, Urban Networks, Urban Gateways challenged our students to think of the city as more than a series of places but a series of vital urban networks that shape the movement corridors and spaces in and through our cities. Focused in 3 cities, Sydney, Boston and Fukuoka, the students have explored the potential of major transport gateways to shape the urban form of the city. These great city gateways, whether rail stations, port or air terminals, have a tremendous influence on the shaping of our cities spatially, socially and economically. Major gateways such as Fukuoka’s Hakata Port, Boston’s Massachusetts Turnpike and Sydney’s new international airport, are much more than transport interchanges, they have the potential to be vibrant and memorable places intrinsic to the cities they serve. Their presence transforms the urban condition, the urban network and indeed the city life that surrounds them.

Often however, such projects are more introverted and singular in purpose, rather than harnessing the opportunity to deliver multiple benefits to the communities they serve. Transport projects, once publicly funded, have now become complex mixes of public and private investments, representing a significant range of.
stakeholders. These infrastructure investments are often driven by time and cost imperatives often at the expense of the broader city-making opportunities such investment can release.

Today, with alternative methods of procurement we need to rethink and challenge the key drivers informing the planning, designing and delivering of infrastructure. What if, moving forward, every transport project was a city-making opportunity?

Instead of dividing communities and leaving scarred urban landscapes, transport interchanges can be reimagined as a seam that joins, and an opportunity to create more liveable places. This challenge requires innovative design-led approaches, focused on integrated strategies for place-making. Urban designers are well positioned to lead this challenge. Urban design spanning professional boundaries provides a unique opportunity to work across scales and to break down silos of thinking. The leadership of urban designers in reimagining transport hubs presents an opportunity for interdisciplinary innovation and more considered urban development.

This year, students used Sydney, Boston and Fukuoka as laboratories for study. They examined the potential and impacts of transit-oriented densification in the Canterbury Station Precinct, one of Sydney’s middle-ring suburban centres, located on the new Southwest Metro line.

They postulated the new western Sydney airport development and the climate impacts of this burgeoning city growth around the proposed Western Sydney Airport and Sydney’s future aerotropolis. This studio was part of the International Geodesign Collaboration on climate change organised by Emeritus Professor Carl Steinitz, Harvard Graduate School of Design with 55 universities worldwide. Our UNSW students were the only participating university from Australia in this global challenge.

Further afield, in our international studio in Boston, students examined the implications of the network city potential with the redevelopment of a fallow 110 ha brownfields site on the Massachusetts Turnpike and a future high-speed rail hub for Boston and linking Harvard, MIT and Boston University.

And finally, the Fukuoka international studio hosted by the Graduate School of Design, Kyushu University posed the reconstruction of the Hakata waterfront in Fukuoka to meet the demands of booming trade, tourism, conventions and exhibitions in this gateway city to Japan from China, South Korea and the world.

Exploring projects of this magnitude across three global cities not only inspires students but also develops professionals that are adept at handling complex urban challenges. It is evident from the projects profiled, that the MUDD Program engenders robust strategic thinking and critical discourse, guiding students to propose urban design frameworks that balance competing urban agendas with vigorous analysis and objectivity.

Transport investment can serve as a catalyst for city making, which this year’s student projects clearly demonstrate. If done well, it has the potential to transform communities, and the portfolio of projects in the MUDD 2019 Yearbook captures a series of propositions demonstrating this, so we look forward to seeing how these graduates use their interdisciplinary skills, to transform our urban environments and also the lives of city dwellers in the years to come.

Master of Urban Development & Design 2018-2019
Message from the Program Director:

Professor James Weirick

In our 24th year, the Urban Networks & Urban Gateways theme integrates studio projects undertaken in Sydney, Boston and Fukuoka with a series of critical essays exploring the complex challenge of city-making in the 21st century. Focussing on entry points to the three cities – urban development around the new airport in Western Sydney, transit oriented development associated with the Sydney Metro project, the potential of a reconstructed western entry to Boston, and the remaking of Hakata Port, Fukuoka, Japan – the MUDD24 projects have engaged with the central concerns of the UNSW Master of Urban Development & Design Program:

• Spatial political economy, the manifestation in urban form of global patterns of capital formation, investment and disinvestment;
• Urban design principles and paradigms, normative models of ‘good city form’ grounded in aesthetic, social and environmental concerns; and,
• ‘Urban design as public policy’, the intersection of public policy design principles, the deal-making of the property sector and defence of the public realm.

The decision to build the long-delayed Western Sydney Airport at Badgery’s Creek, announced by the Federal Government in 2017, has unleashed the last phase of urbanisation across the Cumberland Plain - an urban expansion that will pave over the last remnants of green in the ‘green wedges’ between the growth corridors of the 1968 Sydney Region Outline Plan. These patches of rural land, slated to become an Airport City or Aerotropolis, are themselves remnants of the heroic greenbelt proposal of the 1940s Cumberland County Plan. Confronting this reality, MUDD Studio 2 convened by Dr Scott Hawken undertook a year-long study of urban growth and change around Western Sydney Airport as part of the International Geodesign Collaboration organised by Emeritus Professor Carl Steinitz of Harvard Graduate School of Design, which has enlisted universities worldwide to model and measure alternative responses to climate change. The results, presented in the MUDD24 Yearbook, are complemented by the 2019 Reid Lecture, ‘Cooling the Cities,’ to be given by Scientia Professor...
Mattheos Santamouris, which critically reviews advances in science and design for the mitigation of urban heat. The ambition of MUDD Studio 2 has been to go beyond conjectural propositions to evidence-based designs, integrating computer-based decision-support systems with Climatype measures of environmental impact to model alternative ‘cool city’ scenarios for the Western Sydney Aerotropolis.

Within the existing low-density matrix of Metropolitan Sydney, MUDD Studio 1, which I convened in association with Consultant Planner and Urban Designer Michael Gheorghiu, undertook a critical, year-long study of transit-oriented development around a representative station on the proposed Southwest Metro at Canterbury on the Cooks River. The Canterbury Station Precinct was identified for upzoning and redevelopment by the NSW Government in 2017 as part of a plan to densify nodal points along the Sydenham-Bankstown Urban Renewal Corridor associated with conversion of the existing suburban rail line to a rapid-service Metro. To challenge the stereotyped ‘Legoland’ design solutions that have resulted from densification in Sydney to date, MUDD Studio 1 took a ‘Studies in Urban Form’ approach of learning from precedents worldwide – Barcelona, Berlin, Foshan, Lyon and Hammarby Sjöstad, Stockholm. Various urban forms and building types were tested within a development study based on existing property prices, housing types and subdivision patterns in Canterbury that revealed densification only began to be feasible at a Floor Space Ratio of 3:1. To reconcile human scale, street life and activity patterns with this scale of development, the Studio adapted the ‘City & Cinematic’ analysis techniques developed in MUDD Studio 1 in 2017 to a series of progression through space studies of a densified Canterbury, recognising that to fund an acceptable public realm, effective value capture would be essential. To cast light to fund an acceptable public realm, effective value capture would be essential. To challenge the complexity of imagining futures for Beacon Yards - the 110 ha brownfields site purchased by Harvard University across the Charles River in Allston, this is a former railroad marshalling yard crossed by a deteriorating viaduct of the Mass Turnpike (I-90) and a western rail line with the potential for a new West Station served by commuter rail, and indeed High Speed Rail to New York. Under study since the 1990s, the Beacon Yards development has recently gathered pace as the Harvard University endowment recovers from its $11 billion (30%) loss at the time of the Global Financial Crisis. The possibilities of the site are immense as a new western gateway to the centre of Boston and as a ‘network city’ of educational excellence and innovation connecting Harvard, MIT and Boston University. To highlight the differing interests in the site, MUDD Studio was divided into five teams, each approaching the design challenge from the perspective of a different player - the City of Boston, Harvard University, Boston University the Allston Community and Amazon HQ2 (a hot topic at the time of our visit). A convincing solution to the ‘Harvard in Allston’ campus plan, however, was the key to the Studio, and in meeting this challenge, we were immeasurably helped by a presentation by Dennis Pieprz on Sasaki’s achievements in creating the university campus of the 21st century, which he has provided as an essay for the MUDD24 Yearbook in association with his fellow Sasaki Principal, Romil Sheth.

Our second MUDD24 International Studio was held in Fukuoka, Japan hosted by the Graduate School of Design, Kyushu University. Convened by Brendan Randles from Architectus and Jun Sakaguchi from Jackson Tece, the Studio took on a challenge presented by our hosts, Professor Magakuzu Tani (Dean of the School of Design), Associate Professor Tetsuya Ukai and Assistant Professor Masaaki Iwamoto - redevelopment of the Hakata Port waterfront. Returning to Boston once again at the generous invitation of our 2017 hosts, Martin Zogran and Dennis Pieprz of Sasaki Associates, the first of our MUDD24 International Studios which I convened in association with Michael Gheorghiu, took on the challenge of imagining futures for Beacon Yards - the 110 ha brownfields site purchased by Harvard University across the Charles River in Allston. This is a former railroad marshalling yard crossed by a deteriorating viaduct of the Mass Turnpike (I-90) and a western rail line with the potential for a new West Station served by commuter rail, and indeed High Speed Rail to New York. Under study since the 1990s, the Beacon Yards development has recently gathered pace as the Harvard University endowment recovers from its $11 billion (30%) loss at the time of the Global Financial Crisis. The possibilities of the site are immense as a new western gateway to the centre of Boston and as a ‘network city’ of educational excellence and innovation connecting Harvard, MIT and Boston University. To highlight the differing interests in the site, MUDD Studio was divided into five teams, each approaching the design challenge from the perspective of a different player - the City of Boston, Harvard University, Boston University the Allston Community and Amazon HQ2 (a hot topic at the time of our visit). A convincing solution to the ‘Harvard in Allston’ campus plan, however, was the key to the Studio, and in meeting this challenge, we were immeasurably helped by a presentation by Dennis Pieprz on Sasaki’s achievements in creating the university campus of the 21st century, which he has provided as an essay for the MUDD24 Yearbook in association with his fellow Sasaki Principal, Romil Sheth.

We congratulate the MUDD24 students for the creative achievement of Urban Networks | Urban Gateways - Sydney | Boston | Fukuoka. Both international studios were informed before our departure overseas by background studies undertaken in UDES009 Urban Landscape & Heritage directed by Dr Scott Hawken and Dr Anne Warr and by stimulating lectures on the spatial political economy of Boston and Fukuoka by John Zerby, which he has recast in his MUDD24 Yearbook essay, ‘Value Creation with Spatial Networks.’

Enthusiastically supported by Mr Takahisa Nakamura, CEO of the Fukuoka Port Authority and his colleagues, the Studio reconsidered the MICE-focussed brief (Meetings, Incentives, Conferencing, Exhibitions) to propose a rich array of mixed-use solutions as a new centre for Fukuoka, complementing the commercial core centred on the main railway station at Hakata and the dynamic retail centre at Tenjin. The complexity of the challenge is presented in essays by Brendan Randles and Professor Iwamoto, and a companion essay on the development of HafenCity Hamburg by our Visiting Professorial Fellow, Dr Karl Fischer provides a fascinating parallel study to the proposed redevelopment of Hakata Port, which is a very real project.

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Master of Urban Development & Design 2018-2019
Cities are centres of significant size where the population, living in an organised way consumes and develops commercial and cultural activities. Cities are supposed to improve the quality of life of human beings. A city comes into being for the sake of life, but exists for the sake of living well, in the words of Aristotle. Expectations for a better life created by urban economic growth and industrialisation, local conflicts in rural areas, mechanization of agriculture and lack of resources in rural areas are the main drivers of the massive migration of the rural population into cities, and the unprecedented growth of the urban population. Although in the 1950s, only 30% of the world’s population lived in cities, in our day the proportion has passed the 50% mark and now stands at 54% with the number of city dwellers passing 3.9 billion. Future projections show that by 2050 the proportion will be around 66%.

Worldwide the population of cities increases at a rate of almost 1.5 million people per week due to migration from rural areas and childbirth. Increase in the urban population has resulted in serious territorial urban expansion, spatial growth or sprawl that affects consumption patterns in a direct way. Although cities occupy 0.5% of the earth’s surface, they consume about 75% of the global resources. In most of cases, urban sprawl and associated land use change result in serious climatic and environmental degradation - air pollution, noise, poor water quality, temperature increase, thermal stress. Urban expansion and sprawl lead to a reduction in green areas, the sealing of urban surfaces through intensive paving and building construction, and increase of the anthropogenic heat released to the atmosphere.

Urban climate is the result of urban, local and regional geographical features. Changes in land cover at the regional and local scale affect the urban heat balance, increased heat storage by the urban structure, higher anthropogenic heat liberated, lowered evaporative cooling and increased sensible heat released by buildings and pavements. The effect is known as the Urban Heat Island (UHI) and it is the most documented phenomenon of climate change. Its magnitude is a function of the urban layout, its morphological, physical and structural characteristics, the synoptic weather conditions, local meteorological factors and finally the...
intensity of the anthropogenic heat produced and liberated in the city. Intensive experimental studies performed in numerous cities of the world report Urban Heat Island intensities as high as 10 K - almost every city has a heat island.

Furthermore, the actual urban warming cannot be explained solely in terms of the Urban Heat Island. Global climate change resulting from the increase of greenhouse gases in the atmosphere caused by human activity also increases urban temperatures. In fact, the suggested projections of the Intergovernmental Panel on Climate Change (IPCC) of an average ambient temperature increase of 0.15 K to 0.3 K per decade for 1990 to 2005, have been verified by recent measurements. Depending on the scenario chosen, the most recent estimates of IPCC suggest a worldwide increase of 1.8 K to 4 K to occur between 1990 and 2100. Thus, urban warming should be attributed to both phenomena. The relative contribution and synergy between the two phenomena is for the time being a quite grey scientific zone. Evidence from numerous experimental studies shows that in many locations, climate effects attributed to UHI are of similar or of a greater magnitude than that caused by global climate change.

Higher urban temperatures and frequent extreme events have a serious impact on various domains of human life. Numerous studies have documented that UHI increases the concentration of specific urban pollutants and affects the urban air quality, increases energy consumption for cooling purposes as well as peak electricity demand, raises the CO2 emissions and the ecological footprint of cities while it has a serious impact on human health, thermal comfort and economy. Increased urban ambient temperatures facilitate the formation of tropospheric ozone, a harmful pollutant created as nitrogen oxides react with volatile organic compounds during the day time. Evidence from numerous observational and numerical studies, show a strong positive correlation between the UHI intensity and the concentration of tropospheric ozone. Important research has been carried out to identify the energy penalty induced by urban warming. It is commonly accepted that higher urban temperatures increase peak electricity demand as well as the energy spent for cooling purposes while the heating energy demand is decreased.

Urban warming has a serious impact on indoor and outdoor thermal comfort. Several studies have correlated the levels of outdoor thermal comfort in cities against the corresponding increase of the urban temperature. In most of the cases a significant degradation of the outdoor comfort conditions is observed. In parallel, studies investigating indoor environmental conditions during extreme events report very warming results. Extensive monitoring of low-income houses shows that indoor temperatures are significantly higher than the defined allowed levels, putting at risk the health and well-being of citizens. It is widely accepted that exposure to substantially high temperatures is a health threat. Medical research has shown that high ambient temperatures cause serious respiratory, cardiovascular and cerebrovascular problems. Recent research has proven that increase of the ambient temperature up to a threshold is associated with a significant increase in mortality rates and hospital admissions.

Counterbalancing the impact of urban warming is a serious challenge for scientists and all those involved in 21st century city-making. Mitigation technologies which aim to reduce the strength of the sources and enhance temperature sinks in the urban environment have been developed and are already being used in real scale applications. Mitigation technologies focus mainly on:

(a) reduction of the solar heat stored in the urban fabric and corresponding decrease in the sensible heat released to the atmosphere. Cool materials presenting a high reflectivity to solar radiation, combined with a high emissivity value have been developed and are used to minimise the absorbed solar radiation by building structure, cool roofs, cool pavements and urban infrastructure. Monitoring of numerous large-scale applications aiming to augment the global albedo of specific urban zones, has shown that cool material technologies present a high mitigation potential and may decrease peak urban temperatures up to 2 K;

(b) increase of latent heat losses to the atmosphere through evapotranspiration processes. This involves the use of additional green zones in the urban environment as well as the application of planted roofs on the top of urban buildings. Significant research has been carried out on the mitigation potential of green roofs and urban green zones. Existing knowledge on the topic permits us to take maximum possible benefit from these techniques and systems;

(c) dissipation of the excess urban heat to environmental sinks like the ground that present a much lower temperature than the ambient air. Such systems are already proposed and used in demonstration projects. Evidence from existing studies show that their mitigation potential may be very significant;

(d) decrease of the amount of heat released to the urban environment due to various anthropogenic activities. Despite the mitigation potential of such a procedure seems to be very high, very little information is available.

Mitigation technologies can counterbalance the impact of UHI and local climate change. Existing mitigation technologies applied at city or neighbourhood scale may reduce the peak ambient temperature up 2-3 K. A further decrease may be achieved in smaller urban zones using advanced evaporation technologies, provided that the local climate is dry.
There is a need to develop more efficient mitigation technologies able to further decrease the ambient temperature and counterbalance local climate change. This goal may be achieved either by developing materials able to present and keep their surface temperatures below the ambient, or by large scale dissipation of the excess urban heat to a low temperature heat sink, or through technologies combining both principles.

UHI is the most documented phenomenon of climate change. It was reported for the first time at the beginning of the 19th century in London (Howard 1833, pp.2-3). It is related to the development of higher ambient temperatures in the dense central urban zones compared to the surrounding suburban and rural areas (Figure 1).

The phenomenon is the result of the positive energy balance of the urban areas that increases the ambient temperatures. Several parameters influence and determine the magnitude of the phenomenon. Oke (1997) has summarised the most important factors influencing Urban Heat Island development:

(a) Thermal Properties of the Materials in the Urban Environment. Most of the materials used in buildings and open spaces present a high absorptivity to solar radiation. This results in higher surface temperatures and important heat storage in cities. The stored heat is then released to the atmosphere through convection and radiation processes. In parallel, the replacement of the vegetation and of the natural soil decreases the evaporation processes and results in higher ambient temperatures.

(b) Anthropogenic heat released by heating systems, air conditioning, cars, industry and the other combustion systems.

(c) Radiative Geometry of Canyons. Because of the specific geometry of the urban canyons, the infrared radiation emitted by buildings, streets and pavements cannot escape. It is reflected and absorbed by the canyon surfaces and contributes to a more positive thermal balance in the canyons. In parallel, because of the multi-reflections in the canyon, a high part of the initially reflected solar radiation is absorbed increasing the surface temperature of the vertical walls and the other surfaces.

(d) Urban Greenhouse Effect. Because of the high concentration of atmospheric pollutants, part of the emitted infrared radiation from the ground surfaces is reflected back to the earth's surface, while the emitted infrared radiation by the pollutants is higher.

(e) Reduced Turbulent Transfer of Heat from within streets.

(f) Reduction of Evaporating Surfaces in the urban environment that decreases the latent and increases the sensible heat load.

Higher urban temperatures increase energy consumption for cooling, deteriorate the outdoor and indoor thermal comfort conditions, raise the concentration of harmful pollutants like the tropospheric ozone, have a serious impact on human health and well-being, and increase the ecological footprint of cities. To document the amplitude and the characteristics of the Urban Heat Island, measurements have been performed in hundreds of cities, the phenomenon is fully documented in more than 400 major cities around the world. Western Sydney suffers from a serious overheating problem during summer. Data collected from a network of 25 meteorological stations operated by UNSW in combination with the existing Bureau of Meteorology (BOM) stations, reveal that the intensity of urban overheating may exceed 9-10°C compared to the Eastern Suburbs. During the peak summer period, ambient temperatures in Western Sydney may be 7-8°C higher than at Observatory Hill and the airport. A recent analysis, of the relevant climatic data (Figure 2) shows that during the peak summer period the daytime ambient temperature in Western Sydney may be 1 to 10°C higher than at the reference climatic station at Observatory Hill.

Higher ambient temperatures in Western Sydney persist during the whole summer. This is clear once the distribution of the cooling degree days is calculated for the various zones of Sydney. As shown in Figures 3 and 4, the annual cooling degree days in Western Sydney are almost 80-100% higher than at Observatory Hill or in the coastal area. Such a tremendous increase in cooling degree days has a very significant impact on the cooling energy demand in the area, imposing a serious penalty on the local population. The recent study by the Cooperative Research Centre for Low Carbon Living and of Sydney Water, shows that due to substantial overheating, the energy consumption of typical commercial and residential buildings in Parramatta is almost 50-70% higher than in the coastal area of the city.
Additional to the energy penalty, heat related mortality and morbidity in Western Sydney is increasing by a factor of two compared to the Eastern suburbs of the city (Figure 6). Such a health penalty has a serious impact on the living conditions as well as on the health cost in Western Sydney and increases tremendously the stress on the local population.

The impact of the considered mitigation technologies on energy and health has also been assessed in detail. It is calculated that the cooling energy demand of a typical residential building in Western Sydney may decrease up to 50% when the proper mitigation techniques are implemented (Table 1).

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Table 1: Calculated cooling load of a typical residential building in Western Sydney when various mitigation technologies are considered.

- Figure 7 shows the results of mesoscale simulations of ambient temperatures across Metropolitan Sydney (a) for one heat wave day in 2017; (b) a typical summer day in 2017; (c & d) under projected 2050 climatic conditions taking or not taking into account land use change and population increase. As shown, ambient temperatures for a typical summer day in 2050 may increase up to 4°C, putting the local population under extreme stress.

To counterbalance the impact of local and global climate change in Western Sydney, the potential of several mitigation technologies has been assessed in detail. More than 15 mitigation scenarios have been evaluated considering the use of reflecting materials, additional greenery, additional evapotranspiration, etc. It is calculated that the application of reflective materials combined with an increase of the evaporation levels can decrease the peak ambient temperature up to 4°C (Figure 7). It is evident that the use of well-designed climate mitigation techniques may decrease substantially the average and peak temperature conditions in Western Sydney.

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In parallel, it is expected that the number of heat related deaths will decrease significantly once advanced mitigation technologies are applied. Figure 9 presents the calculated decrease of the heat related mortality in Western Sydney considering the impact of the mitigation technologies. As shown, in Western Sydney, heat related mortality may decrease up to 35% due to the implementation of the proposed mitigation technologies.

Figure 9. Western Sydney: excess deaths in the unmitigated and mitigated scenarios (May 2014 - May 2015).

Increase of the urban temperature is caused by local phenomena like UHI, and also global climate change. The temperature increase is very well documented in most of the large and medium size cities of the world while its intensity varies as a function of synoptic weather conditions, regional climatological parameters, the urban layout and the overall energy balance of the city.

Urban warming has a serious energy and environmental impact. Apart of the important increase of the tropospheric ozone and the other pollutants, review of existing energy studies related to urban warming show that peak electricity demand per degree of temperature may rise between 0.45 and 4.6%, while the corresponding increase in the peak demand per person is close to 21 (±10.4) W per degree of temperature rise. In parallel, the hourly, daily or monthly electricity consumption increases between 0.5% and 8.5% per degree of temperature rise. Studies aiming to evaluate the impact of global warming at city level show that the average energy penalty per unit of city surface is close to 2.4 (±1.5) kW h/m², the Global Energy Penalty per unit of city surface and per degree of UHI intensity is around to 0.74 (±0.67) kW h/m²/K.

Recent research has shown that due to urban warming, indoor and outdoor temperatures have substantially exceeded set comfort temperature thresholds, and indeed have exceeded the maximum allowed temperatures for health reasons. There is a very strong relationship between ambient temperatures and mortality rates. Many studies have found that above a threshold ambient temperature, mortality rates increase very rapidly and are considerably higher than annual average values. Although important knowledge has been acquired on the impact of urban warming, more quantitative information is necessary to be collected and evaluated under different climatic and boundary conditions.

Counterbalancing the impact of urban warming can be achieved through the use of efficient urban mitigation techniques. Important research has been carried out in recent years on the development of techniques and technologies to expand green spaces in cities, increase the reflectance of urban surfaces, decrease the generation of anthropogenic heat, and increase the use of low temperature heat sinks to dissipate excess urban heat. Advanced materials, high performance systems, and updated knowledge and skills on the design and application of urban mitigation strategies have been developed. Application of these techniques and technologies in large scale projects has shown that it is possible to decrease the average ambient temperature by 1–2 K, while the potential decrease of the peak ambient temperature may be considerably higher. Although recent advances in science and design for the mitigation of urban heat have been significant, more intensive research and applications are necessary in order to enhance knowledge on the topic and improve the performance of the mitigation technologies.
Note: This essay is composed using material from the following published papers and report:

References:


Further references:


Value Creation with Spatial Networks

Message from Academics and Scholars:

John Zerby

Information and communication networks began with the early hunter-gathers who developed symbolling systems using speech, gestures, smoke signals and mimetic materials (Mithen 1990, p.70). The social hierarchy within these settlements formed the basis for interpersonal networks to ensure that the information exchange was reliable and contributed to the survival of the settlement (Apicella 2012). Although the original objectives and functions continue to apply, the characteristics of these networks changed considerably during the second half of the 20th century when repairs by humans could no longer subdue the new forms of network failure. More specifically, replacement was superior to repair and this, in turn, allowed networks to be larger in size, with increased complexity.

The organisation of human intervention changed further with cyberspace networks and control systems designed to be self-correcting. But the spectre of a crash in the increasingly larger systems became much greater and accessibility and resilience were needed to minimise the potential losses arising from system failures. This provides a direct connection to urban planning and design since accessibility and resilience are important characteristics of urban growth and development. This should not be surprising, since a city can be depicted as a set of overlapping and interconnecting social and economic networks. This notion has been further extended to include the concept of social capital, which is defined by the OECD as ‘networks together with shared norms, values and understandings that facilitate co-operation within or among groups’ (Keeley 2007, p.102).

The main objective of the following paragraphs is to show that social capital is a principal enabler of value creation in spatial networks.

The first electrical power network, using alternating current, was built in Barrington, Massachusetts in 1886 and demonstrated the importance of accessibility to the network. This network was configured with transformers to change the voltage from low to high so that electricity could be transmitted over longer distances with minimal loss of power. Step-down transformers were then needed to lower the voltage to safer levels for households and businesses (Whelan 2014). A larger scale for the electric power network was required to offset
the added costs of transformers, and this meant that greater accessibility would lead to larger networks, which would allow further increases in scale and even greater accessibility. So, an appropriately configured system would be self-reinforcing up to the technical limit of power transmission. Accessibility is therefore more than technical openness; it can be elevated to an essential ingredient for successful growth of spatial networks.

Accessibility has been extended to include the possibility of opportunities for human interaction, to the ease with which land-use activities can be reached for a given location and the freedom of individuals to decide whether or not to participate in available opportunities (Geurs 2014). Higher levels of accessibility are generally viewed as a boost to the quality of life in urban areas, but a case study of employment accessibility in the Boston Metropolitan Area indicated that it could 'generate the dual effect of locational equalisation and socio-spatial polarisation' (Shen 1998, p.462). That is, with increasing accessibility, lower income workers could find themselves in a disadvantaged position since the wealthy suburban communities may receive a disproportionately large amount of the benefit from the technologically reduced distance in the urban space. Similar results were obtained by Sable (2007) in relation to the impact of the biotechnology industry on local economic development in the Boston and San Diego metropolitan areas. These studies show that applications of technology in urban development do not necessarily distribute the benefits equally. Awareness of this is relevant to the work of urban planners and designers since compensating features could be built into urban design projects at relatively low costs if introduced at an early stage of planning and construction.

The other important attribute of networks is known as resilience, which originally focused on the technical reliability of the system, but, as with accessibility, it has been extended to include other factors such as the capacity to recover peak performance after being subjected to periodic arrivals of external shocks, or to internal (self-generated) disturbances. As a result of this, Martin (2012, Table 1) proposed three interpretations: (1) engineering resilience – the ability of a system to return to its assumed stable equilibrium following a shock or disturbance, (2) ecological resilience – the scale of a shock or disturbance that a system can observe before it is de-stabilised and changed to another configuration, and (3) adaptive resilience – the ability of a system to undergo anticipatory or reactionary reorganisation of form so as to minimise the impact of the destabilising shock. Despite a substantial amount of research on these three forms of resilience, including a wide variety of algorithms to simulate outcomes based on an even wider variety of assumed destabilising influences, the potential for practical applications of the research work remains uncertain.

A third attribute of spatial networks is their capacity to be linked to social capital, which is said to be the glue that holds all social institutions together (World Bank 1998), and simultaneously to facilitate continued investment in social capital. A recent study by John Östh, et al. (2018) confirmed the notion that there is a close association between accessibility and social capital, with increasing shares of higher levels of education having a positive correlation with social capital. Edward Glaeser, et al. (2002), found evidence that the accumulation of social capital is correlated with human capital, but no conclusions could be drawn about causality, so both may be influenced by another factor or factors. We add to this the conclusion reached by Glaeser (2005) in his inquiry into the capacity of Boston to ‘reinvent’ itself during the 60 years of economic decline from 1920 to 1980. It was attributed principally to the city’s strong base of skilled workers, with the additional willingness of the people to innovate, rather than to flee, plus a capacity to build upon financial and technological know-how when the manufacturing sector began to decline, mainly as a result of changes in technology that created a comparative disadvantage for Boston.

The ‘reinvention’ was a post-war transition toward finance and professional services. The transition began in the 1960s and proceeded at a relative steady pace through the 1970s, 1980s, and 1990s (see Fig. 1). In the chart, FIRE is an abbreviation for finance, insurance and real estate. TCPU denotes transport, commerce and public utilities. Within FIRE, securities displayed by highest rate of employment growth (Fig. 2). More recent data for employment in the services sub-sectors indicate that professional, science and technical services and healthcare plus social assistance have become the fastest growing sub-sectors (Boston Planning & Development Agency Research Division 2018). The transition to service activities was therefore broadly based with sub-sector clusters consisting of private sector enterprises with either direct or indirect linkages to universities within the area, as well as with other enterprises.

Figure 1: Employment by Services Sub-Sectors in the City of Boston 1970-1998.
Source: Boston Redevelopment Authority (1999)

Figure 2: Employment Growth within FIRE.
Source: Boston Redevelopment Authority (1999)
Fukuoka is also reinventing itself, but in a different way compared to Boston. It is generally recognised that Japan's rebirth after the war as an economic powerhouse was based upon the strategy of export-led industrialisation and was guided by the national bureaucracy and major business conglomerates (Eason 2012). But Fukuoka retained much of its previous strategy, as stated by Eason (2012, p. 4):

"The pre-war city was largely run by a cabal of self-interested businessmen-turned-politicians, who were tight-fisted with their money and cooperated with initiatives from the centre primarily when it served their economic interests. Fukuoka was, and still is, all about consumption and services, producing exceedingly little in the way of manufactured goods and lacking an industrial base. Despite all these apparent failings, it has remained the fastest-growing big city in Japan - after Tokyo itself - for most of the period since 1945."

Based on census data for 2015, and projections made by Japan's National Institute of Population and Social Security Research, Fukuoka is the only major metropolitan area that is expanding its population (Fig. 3). Moreover, population growth rates have been higher than birth rates for the metropolitan area, indicating that Fukuoka is benefitting from net migration, especially with younger-age cohorts (Fig. 4). This resulted largely from a confluence of events and trends over which Fukuoka's municipal administrators had little control, but they can be credited with recognising the potential gains that were being offered. The Fukuoka-Pacific Exposition in 1989 is said to be the turning point in the decision to embrace foreign markets, but also to retain the city's previous focus on the production of services rather than expanding Japan's more traditional pursuit of making things.

Both Boston and Fukuoka are: 1) well endowed with institutions of higher learning, 2) have an educated workforce committed to working in the knowledge industries and 3) already have spatial networks that have a sufficient amount of accessibility and resilience to create a satisfactory level of confidence in the sustainability of those networks. It remains to show that social capital is the enabling element that allows value to be created by those networks. Unlike other forms of capital, social capital resides essentially in the structure of relations between and among persons. It is lodged neither in individuals nor in the physical implements of production (Álvarez & Romani, 2017). Knowledge is often defined as a justified true belief and that alone would give it value, but if it dwells only within an individual it cannot be part of the structure of relations between people. Thus, to have value in the social setting, knowledge must be shared. It can be shared through the communication networks of hunter-gathers or through social networks in cyberspace. Accessibility and resilience are facilitators to help in bringing about an outcome. Social capital makes an outcome possible and thus in appearance, if not also in fact, it holds the other elements together. The design objective that is consistent with this scheme should be to design cities for accessibility and resilience that they are in synch with local spatial networks and enhance the capacity of both public and private sector participants to join external digital networks. This is a form of investment in both social and human capital that could yield substantial returns in knowledge and experience to be diffused widely within a city or region. Examples of this process can be examined in the design projects for Boston and Fukuoka that are to be found in this yearbook.
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Gateway | Node in the Network | Mish-mash

How to Create and Capture Public Value: Current Debates in North Sydney

Jeremy Dawkins

The decision by the NSW Government to construct a Metro line from Rouse Hill in the north west of the Sydney region to Bankstown in the south west has raised many critical issues for regional planning, urban design and the funding of infrastructure.

Canterbury, on the Bankstown line, has been the focus of vigorous debates about dramatic increases in urban density and the validity of funding the Metro through a form of ‘value capture’ – a question explored in one of the studio projects presented in this Yearbook.

At another critical node on the network, the North Sydney city centre has become a laboratory for urban development and design, as battles are fought over the value and impacts of development.

This is happening, in part, because the North Sydney city centre is a ‘pretty appalling CBD.’ It ‘hasn’t had anything remotely like the level of planning and care and attention over the decades that it should have had’ (Jeremy Bingham in Park 2001, p.15).

Nevertheless, the North Sydney city centre grew in the final decades of the last century to be the fifth largest CBD in Australia after Sydney, Melbourne, Brisbane and Perth. While it has not kept pace with other cities, it is now catching up. This is the middle of a decade that will see well over 200,000 m2 of high-quality office space added to the city centre. Within a few years, North Sydney, Parramatta and Macquarie Park-North Ryde will each have well over one million square metres of office floor space (by then the Sydney CBD will have between six and seven million square metres of office floor space).

It is widely agreed that these city centres are growing at the expense of suburban business parks, office campuses and other distributed locations, because organisations are competing for knowledge workers who prefer to work where the action is (or at least where the coffee shops and bars are) in a lively urban centre with good public transport. One could say that for these workers, concentration (even congestion) – of tall buildings, people and activity – is a positive externality. This externality has a real monetary value, even if it is hard to quantify. Employers have to increase salaries or add other benefits...
to attract workers to less interesting locations. but it is not a city centre. As described by the Committee for North Sydney, it is an ‘office park with through traffic’ (Committee for North Sydney 2018).

Urban change and ‘value capture’
Claiming that they can give the city centre a heart and bring public life to the streets, the North Sydney Council is promoting the redevelopment of a peripheral site within the Ward Street block in the northern sector of the CBD. Sydney Metro, on the other hand, claims that a massive commercial tower built over a new underground Metro station on a key central site will ‘transform’ the city centre, shaping North Sydney’s future and ‘adding to the vibrancy of the area’. The third voice in this debate is that of the Committee for North Sydney which aims to ‘facilitate public and expert contributions to the progressive improvement of North Sydney through visionary strategic planning, good public policy and imaginative urban design’ (Committee for North Sydney 2019).

These three entities have different understandings of ‘value capture’. Value capture is a mechanism in urban management that planners have been advocating for two or three decades, with not much take-up by governments in Australia.

The concept of value capture is based on a simple fact that has shaped land use and land management from antiquity, and has driven the emergence of cities, even though it is a fact that is extraordinarily difficult for most people to hold onto – perhaps because an internalisation of this fact requires a dynamic spatial imagination. Any activity (including doing nothing) on every piece of land has impacts on each piece of land in the vicinity. These impacts are experienced as positive and negative effects, which in turn affect the value of land for different purposes, and thus increase or decrease its market price. An investment that strengthens an urban area in some way – for instance, bringing more people to the area, increasing local services, enlivening public life, increasing accessibility, creating an image – will generate positive impacts for most if not all pieces of land nearby, the geographic extent of the impact being a function of the scale and nature of the investment.

These numberless impacts, from all land parcels to all land parcels, drives the urban property market. A creative and effective developer sees the world as a turbulent sea of positive and negative forces on property values, but it seems that most participants in urban development and management have a flatter, more static, less spatial sense of the city and allow their plans, ideas and accounting to be confined within the boundaries of their site. Unfortunately, this describes the aspatial mindset of most economists and certainly of the NSW Treasury officials who have the most influence over executive government in the State of NSW.

Under strong private property rights, the increases in the market prices of affected land parcels belong to the land owners.

Nobody has ever cared much about the North Sydney CBD and it’s always been a very deficient CBD in terms of public amenities and open space, public facilities, out-of-hours activities... It has no heart. It has no central point. It has no civic spaces. It has no style. It’s a mish-mash (Jeremy Bingham in Park 2001, p.15).

A 2016 study found that the weaknesses of the North Sydney city centre included ‘lack of higher order retailing, limited entertainment options, poor pedestrian amenity and lack of night time economy’ (SGS 2016, p.27). In short, it might be a ‘Central Business District’.
A similar form of value capture operated when railways and tram services were private investments. The investor first bought land along the route, then built the infrastructure to make the land attractive, and invariably made their biggest (or only) returns from land, not from operating a transport service. To facilitate this process as railroads were built across the US by the ‘robber barons’, governments enabled land to be compulsorily taken by the investor, who thereby owned the increase in land value due to the railroad.

Public investments in infrastructure and other urban improvements have used these kinds of mechanisms only intermittently, until recently relying on central tax revenues for funding. For most people owning urban land, paying taxes is largely a lottery. There is seldom a direct connection between taxes paid and benefits derived. Taxes are consolidated into a single fund and spent according to a government’s priorities (of course influenced by their constituencies). Typically, the positive externalities from these investments will be distributed unevenly, with some taxpayers funding windfall gains for others.

In the provision of infrastructure, value capture is a mechanism to recover some of these windfall gains, by attempting to match increases in land values on the one hand, and some kind of impost on the other.

Suddenly it is a term that the NSW Government and North Sydney Council have embraced. Unfortunately, the kind of ‘value capture’ they refer to is a minimal version of the real thing. This will become clear from an examination of the current proposals and policies of the North Sydney Council and Sydney Metro.

**Effective and ineffective ‘value capture’**

**Example 1: The Ward Street Precinct master plan**

In Figure 2, below, Ward Street is the cul de sac at the top of the map, between Miller Street and Walker Street. Its only significance is that the council owns two sites at the end of Ward Street. The sites are used for multi-storey car parks, operated by a tenant, whose lease ends in 2020.

The Council could use these two sites to benefit the city centre in many ways, by selling them to acquire land (or property rights) in a better location, for instance, or by transferring the development entitlements to a more valuable location. Instead the Council appears to have decided to leverage this land exactly where it is, even though the block is somewhat peripheral to the centre of the city, as clearly shown by the pedestrian flows (Figure 2). The block has thus been given a higher significance, reflected in an optimistic description as a ‘precinct’. It is also called upon to be the vehicle to transform the city centre, through the implementation of a master plan to deliver a public space of about 500 m2 and a branch of the city library. The consultants on the project advise that the Council:

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Will be able to deliver the proposed community facilities and public open space through a variety of mechanisms including land sales, planning agreements and value capture (Hassell 2018, p.100).
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It turns out, however, that in this case ‘value capture’ is achieved by granting a participating land owner a large increase in development potential in return for a proportion of the resulting increase in land value, referred to as the uplift, being contributed by the owner towards the costs of the public components. The consultants illustrate the proposal in the following manner.

In Figure 3, the blue bar is the market value of the building, or the completed project. With good luck and good management, there is an amount of profit, after all the usual outlays. The difference between the two bars is the land value, as shown in Figure 4. It’s called ‘residual’, because (in this approach) it is the amount that remains when the other amounts are accounted for.

The consultants then consider the amount of ‘uplift’ that will be needed to fund the public components of the Ward Street precinct master plan.
Figure 5 (left) & Figure 6 (right): Value components. (Redrawn from Hassell 2018, p100)

Figure 5 shows a much bigger project. In the case of the Ward Street precinct master plan, the consultant is contemplating an office tower of up to 57 storeys!

The costs are all higher: the final value is higher, and the residual land value is increased.

Figure 6 compares the various amounts, hypothetically. Again with good luck and good management, the land value has increased significantly.

It is this increase that can be attributed to the project, and allows the council to achieve some measure of ‘value capture’.

There are some serious problems with this approach, or at least with applying the term ‘value capture’ to the scheme.

- Fundamentally, the scheme is misplaced, in that the council should be considering the whole city centre, not just the unimpressive block where it owns land, and employing every mechanism available to it – levies, charges, partnerships, agreements, swaps, transfers, etc – to trigger and sustain a transformation in the quality of public spaces and public life in the city centre.

- Focusing, however, on the Ward Street proposal, it is a perfect example of the condition described above in which, in the absence of a ‘dynamic spatial imagination’, plans, ideas and accounting are confined within the boundaries of a site.

- The impacts, to and from all buildings in the block and far beyond, are significant, and cannot be ignored in this way. To give two examples: (1) the ‘proposed community facilities and public open space’ envisaged in the scheme will themselves generate positive externalities such that all land values in the area will increase as a result; (2) equally, the measures used to raise capital – massively larger buildings built up the hill and to the north of the area with already the highest pedestrian flows – will impose significant shadows and winds on the area and thus will reduce both amenity and land values to some degree.

- In other words, the ‘uplift’ and its opposite (downdrop?) arising from the positive and negative impacts of investment in dense city centres are many, varied and geographically extensive. Any attempt to recover the unearned property value increases that neighbours receive – that is, to capture some of this value – requires a much more sophisticated analysis.

- Trying to account for these and other positive and negative impacts must be an essential element in assessing the merit of the Ward Street proposal, and suggesting there will be a narrow form of ‘value capture’ without considering these impacts could be highly misleading.

- Finally, the Ward Street proposal demonstrates the enormous incentives that are required to encourage an owner to demolish a building and replace it with something bigger: the margins for profit and increased land value are only two components among many, and they need to be significant, even excessive, to offset the obvious risks in committing very large fixed capital sums into new projects.

Example 2: Sydney Metro’s over station development

The simplistic view of value capture confined to one site, as represented by the Ward Street proposal, is exactly the approach being taken by Sydney Metro.

Sydney Metro compulsorily acquired four sites on Miller Street at or near Berry Street, amounting to 4800 sqm, for construction of the underground Metro station serving North Sydney. There is an important item of Australian urban planning history involved in this acquisition. One of the four sites was occupied by Tower Square at 155 Miller Street. It was a two-storey complex of small businesses of the kind that enrich a city centre – in a modest building of courtyards and balconies and stairs in a vaguely Spanish style – operating within favourable economic circumstances since the development rights had been transferred to 65 Berry Street in the 1980s to enable a larger office building to be built there. In other words, the Tower Square site was undercapitalised, which enabled many modest businesses to operate to the benefit of the city centre, in a pleasant ‘people place’ with a polite built form maximising patterns of sunlight and shade.

Purchase of the strata titles and compensation of the owners and tenants of the Tower Square site might have cost Sydney Metro $50-60 million. The site has now been sold on by Sydney Metro for significantly more than that (maybe double the cost of acquisition), since past planning commitments have been administratively swept aside and the Floor Space Ratio has been effectively increased from 1 to 12.5. The difference is wrongly claimed to be value capture. A better description would be site exploitation.

Two of the other three properties on the amalgamated 4800 sqm site were modern multi-storey office buildings, requiring
significant purchase prices, compensation to owners and tenants, and costly demolitions.

To meet their business plan imposed by NSW Treasury, the NSW entity Sydney Metro has been given planning approval by the NSW Department of Planning for the maximum building envelope on the site - 60,000 sqm and 42 storeys high - constrained only by avoiding significant shadows on Brett Whiteley Place, Greenwood Plaza and nearby dwelling units.

Sydney Metro announced on 21 December 2018 that the site had been sold to a developer for $200 million. This was claimed to be an exercise in value capture, helping to off-set the $19 billion cost of the Metro project. In fact, it appears to be the market value of this large site in a critical location in the North Sydney city centre. An element in the contract requires the developer to pay more if the valuation of the site increases significantly once the Metro is operational. This reflects an obvious truth: the site is being sold at less than the value it will have once the significant positive externalities from the Metro are realised.

This is actually a property play by a new kind of entity that enjoys the prerogatives of a government agency with property-resumption powers while exercising the ‘commercial in confidence’ protections of a private business. Sydney Metro is maximising the return on the compulsorily acquired site, using the State Significant Development process to gain approval for a private office tower.

While claiming to be capturing value, Sydney Metro is actually imposing significant negative effects on the rest of the city centre, (1) through the demolition of Tower Square and the expulsion of a valuable cluster of businesses; (2) by imposing negative environmental effects that will arise from a commercial tower that will be the largest and tallest in North Sydney: and (3) by refusing to allow any of this large site to be used either as a public place or for civic activities. This feels more like value destruction than value capture.

**Example 3: Possible alternatives**

‘Value capture’ is no more than a debating trick - like ‘clean coal’ and ‘vibrant centre’ - in the absence of two essential elements.

- Attempts to implement a policy of value capture must be based on an understanding of the pervasive impacts of every urban investment, and how that investment generates what was described above as a ‘sea of positive and negative forces on property values’. If the policy is not informed by a ‘dynamic spatial imagination’ it cannot begin to assess what values can and should be captured.
- The second precondition for implementing a policy of value capture is that significant unearned increases in property values are enjoyed by identifiable property owners as the consequence of the large and positive externalities generated by a specific investment.

Interestingly, Canterbury and North Sydney are very different cases in relation to the second precondition. A new metro station that connects North Sydney to Crow’s Nest and a new catchment to the north west, as well as connecting to new locations in the Sydney CBD, will clearly have strong positive impacts. The same is not true of the Metro in Canterbury, since a rail service, fully integrated into Sydney’s regional rail system, is being replaced by a single, smaller (if more frequent) Metro line. At peak times, passengers may be able to stand in a Metro car every four minutes rather than sit in a train every seven-and-a-half minutes. What value is there to capture in that?

In the North Sydney case, where the effects on property values can be assessed and quantified, it would be possible to recover some of the ‘uplift’ directly attributable to the new Metro station through a business district levy of the kind widely used in the US, or the type of charges being used by the high speed rail authority in the UK, or an increment on land tax and/or local rates, or a betterment charge on land sales or redevelopment, or as many other mechanisms as imaginative policy makers can come up with.

A real understanding of value capture would lead to a policy of maximising the increase in property values caused by the new Metro station, and thus the amount of the investment recovered. For example, using the compulsorily acquired Metro site in North Sydney to reproduce some of the excellent ‘people’ qualities of Tower Square, to add a central public space as a heart for North Sydney on the Miller Street axis (on what would be the only level, sheltered, sunny site in the city centre) and to include around that heart some spaces for civic and civil-society functions would have begun the transformation of the CBD into a city centre, and generated meaningful and appropriate increases in (taxable) property values.

In other words, if a real value capture policy were being implemented, the incentives would be very different. It is characteristic of the curious urban dynamic in Sydney that NSW Treasury should require Sydney Metro to ignore the real mechanisms for value capture, and instead exploit their North Sydney site through property deals, while imposing significant negative impacts on the entire city centre and actually suppressing the ‘uplift’ that should accompany their investment.
References


Canterbury lies within the centre of the Sydenham to Bankstown Urban Renewal Corridor, and has been identified by the state government as a Priority Precinct, which will be up-zoned and reinvigorated into a thriving local centre that supports the wider productivity of the Greater Sydney Commission's South District.
The New Priority Precincts provide a planned approach to growth in Sydney, with new homes and jobs located close to public transport, shops and services, while retaining and enhancing a community’s character.
—NSW Department of Planning and Environment
Canterbury lies within the centre of the Sydenham to Bankstown Urban Renewal Corridor and has been identified by the state government as a Priority Precinct, which will be rezoned and reinvigorated into a thriving local centre that supports the wider productivity of the Greater Sydney Commissions South District. The identification of a drastic increase in density within the Canterbury Station Precinct (the largest within the corridor) is based upon classic Transit Oriented Development principles and facilitated by the prospect of developing the existing Canterbury Racecourse.
It is estimated that Sydney's population will grow by approximately 1.7 million people over the next 20 years. To meet the needs of a bigger population, 725,000 new homes and 817,000 new jobs need to be provided within the Sydney metropolitan area (NSW Government 2016). Increasing the capacity of the public transport network to assist in accommodating this growth is a key priority for the NSW Government. As such, the Sydney Metro is a major piece of infrastructure investment that has facilitated the preparation of the Sydenham to Bankstown Urban Renewal Corridor Strategy, which is a framework that provides principles for the future cohesive redevelopment of this urban renewal corridor to provide 35,400 new homes and 8,700 jobs over the next 20 years or 5% of NSW’s required total for the same period.
The Studies in Urban Form Studio helps students to develop a capacity to 'read' cities as an expression of human values, human activity and deep currents of culture. Investigations carried out within the UDES0001 Urban Design Studio consisted of studying the urban morphology of the following urban projects:

- Hansaviertel - Berlin, Germany
- Savigny Platz - Berlin, Germany
- Foshan Lingnan Tiandi - Foshan, China
- Hammarby Sjöstad - Stockholm, Sweden
- Gratte Ciel - Lyon, France

Within an analysis of the built environment typologies of each urban project, progression through spaces iterative of Cullen's (1977) work were produced, and in conjunction with figure ground diagrams, these analytical tools were utilised to extract urban design principles, to later influence urban design frameworks for the renewed Canterbury Station Precinct. By obtaining a larger knowledge of urban design paradigms, these precedents helped to shed new light upon urban design principles and exemplars that represent a critical contribution to the growing knowledge of sustainable city making.
“The cinematic arts have a natural kinship with urban design. Film’s immediacy in relating characters to urban space makes it undoubtedly an urban design-related media.”
— Pizarro, R.E., 2011.

For the students, this studio engaged with the on-screen stories and cinematic worlds, which facilitated a greater awareness of city’s history, identity and lived experiences, thereby rendering the design proposals to be more reflective of specific contexts. Each film provided a unique and new understanding of the city through the directors’ specific lens. As an accessible cultural form of art, the films enabled an amended perception of viewing and translated to transformative and provocative designs.

The City and Cinematic Space studio facilitates a study of urban life, urban culture and urban form. This investigation is carried out by critiquing films shot in the cities under review by the UDES0001 urban design studio students, and drawing upon historical analysis undertaken by students from the previous semester’s UDES0001 design studio. Through the assessment of mise en scène and cinematography, the students come to understand the director’s interpretation and recreation of the cities in which the stories take place. This interpretation provides enlightenment and deep understanding of the lived experiences of the cities, facilitating more responsive and cultural specific design projects.

The films reviewed in UDES0002 - Semester 2, 2018 included:
- Run Lola Run (1998) - Berlin, Germany
  Director: Tom Tykwer
- A Question of Taste (2000) - Lyon, France
  Director: Bernard Rapp France
- The Passenger (1975) - Barcelona, Spain
  Director: Michelangelo Antonioni
- Stockholm My Love (2016) - Stockholm, Sweden
  Director: Mark Cousins UK
- Ip Man (2008) - Foshan, China
  Director: Wilson Yip Hong Kong

CONVENORS:
Professor James Weirick
Dean Utian
The 1992 Olympic Village in Barcelona was examined for its intriguing mix of urban structures, parks and typologies that inherited the traditional and well-recognised Barcelona urban characteristics of Cerda's 1859 Barcelona Plan. The structural pattern of Barcelona is a regular grid network overlaid with a diagonal axis cutting through to link key destinations and capture major pedestrian flows. The highlight of Barcelona's typology character is the perimeter block, shaped as a 110m x110m square and a 90m x90m square. Within these squares are combinations of units, towers in the park, villas, and a mix of elevated and ground-level courtyards. Spacious road reserves create opportunities for wider streets with screening/buffering and activating abilities. These spacious road reserves are paired with an overall height restriction of seven storeys to create a 'building height to road reserve' ratio of less than 1:1. This ratio opens up the street spaces and reduces the bulkiness of buildings. Courtyards provide semi or full public access, extending the public domain from the street edge into an interconnected node-path network and creating spaces for a variety of activities and landscaped areas.
**Synopsis:** The Passenger is a drama film based upon the life and death of a journalist, David Locke, who assumes the identity of a dead businessman while working on a documentary about the Civil War in Chad. The movie discusses the ultimate value of Locke's life by illustrating how his new identity ultimately leads to his untimely death.

**Mise-en-scène:** The protagonist (Antonioni) uses time and space as method to emphasize the emptiness of Locke's life and his sense of spiritual longing. Street props like birdcages, street corner cafés and mirrors suggest a complex and active urban environment. Yellow is used to symbolize the character played by the various actors. The movie scenes are well represented spatially to show the restrictions between Jack and his love interest, Maria.

**Cinematography:** Improvisation through high and low camera angles, time-lapses and the golden aspect ratio create a visual description of the urban environment. High angle shots explore the relationship of human and urban environments while the low angle shots help understand the relationship between the characters.
Sourcing inspiration from and analysis of Barcelona's urban form, order and activation the team sought to create an environmentally resilient, socio-economically viable and structurally ordered town centre. This is supported by high quality open spaces and sports fields, street/laneway activation and extensive pedestrian and cycling networks. The proposal also restores the authentic and heritage-infused retailing and commercial spaces and promotes sports, health and agricultural education industries.

Axes, public squares and laneways are included to connect the site's key economic precinct to key transit nodes, overlaid with four types of grid structures with different angles that respond to the existing complex network and grain of Canterbury, creating one unified layout exactly like Barcelona’s that is on a flat plane is not feasible. Nevertheless, the team proposes various public open spaces and landmark elements on the ‘left-over’ spaces where the four grid structures converge. Various mixed land use zones and Barcelona typologies are proposed to leverage on the logical order, hierarchy and connections of the precinct. While it
is usual to provide private communal spaces within high-density residential development, the key to this framework being successful is to inherit Barcelona's true urban design spirit and bring life onto the street by providing wider street reserves and activating open space.

Identifying the role of key economic drivers in attracting investments, anchoring industries and high street markets will be placed throughout the precinct in key areas to leverage on geographical and economic advantages. Proposed features such as the Metro station plaza, high street markets, sports academy, medical school, ecological wetland and agriculture school provide a complete live/work/play solution that is an antidote to a growing trend in Sydney where residential areas are disconnected from work and production, causing increases in traffic volumes, increased travel time and a lowering of the quality of life.
This urban design framework focuses on optimising the road network, pedestrian links, building typologies, land zoning, green network and city infrastructure to achieve a sustainable, liveable, harmonious, vital and highly-efficient Canterbury. This future functional city will be the place where people feel connected and integrated with each component of the city.

Integral to the design strategy is improving the riverbank with various design elements based on the existing soil and land use conditions. This will promote a more successful cycling network by providing designated cycling paths and attracts tourists with better waterfront design. Proposed uses close to the train station and La Rambla are the retail and the commercial core, aiming to bring vitality back to the centre of the precinct. The "High-line Park" as a design reference integrates buildings within the slope as an urban alley to link the riverbanks, metro station and "La Rambla". Significantly, the use of towers in Barcelona has also been used in this framework to present Canterbury as a city gateway and to increase local identity.
Street cafes and restaurants act as a tool to create social cohesion for communities, providing a rich urban experience. The walkways and the use of furniture at these locations adds to the vibe of social interactions.

Tree-lined pedestrian thoroughfare
Tree-lined pedestrian thoroughfares such as La Rambla are an extraordinary example of an ideal public space that includes shopping, food and entertainment, creating vibrancy within the local community.

Landscaped terraces and belvedere
Landscaped terraces and belvederes provide people with a better green urban experience and enable a bird’s eye view and a sightseeing experience.

Street regulation
Traffic control is an essential part of the street network as it promotes a smooth movement of traffic flow and ensures the safety of all people in the urban area.

Inferences
The patterns of connected buildings and chamfered space are used in Canterbury with the introduction of Barcelona’s block typology. With the integration of Barcelona’s La Rambla and Urban Alley to link the station from the north to south a pedestrian thoroughfare is created, augmented by a landscaped terraced community garden. Through a mixture of uses on the ground floors of the courtyard buildings, food, drink and retail premises will be able to thrive near the station, ultimately creating a more inviting and consistent streetscape.

Food, drinks and community
Street cafes and restaurants act as a tool to create social cohesion for communities, providing a rich urban experience. The walkways and the use of furniture at these locations adds to the vibe of social interactions.
Berlin is the capital and largest city in Germany and a world-class city in terms of culture, politics, media and science. Charlottenburg is located in Berlin's inner city, which is served by the Berlin Savignyplatz Railway Station. James Friedrich Ludolf Hobrecht was a Prussian director for urban planning. His development plan of 1862 for Berlin was called the Hobrecht Plan. This plan developed a spatial and structural framework using three different urban design elements: the ring boulevard, the harbour square and the neighbourhood square.

One of the significant characteristics of the Charlottenburg district is the diagonal connection between the urban square and the Savignyplatz. Savignyplatz by its appearance as a city square provides recreational green space and a pleasant gathering place for the surrounding area. In addition, the small-scale inner courtyards of the residential blocks can be seen as a private space that compliments this larger public space. There is a pragmatic accommodation of existing structures and the incorporation of elements from earlier city plans, together with a repeated neighbourhood structure with local squares that function as a spatial framework for growth.
City and Cinematic Space

Berlin | Run Lola Run (1998)
Director: Tom Tyker

Chen Yuqiang
Harshitha Giriyapura
Xiao Yue
Wang Kun

Synopsis: The movie is an intense, fast-paced film that features Lola sprinting through the streets of Berlin, trying to obtain 100,000 Deutsche Marks in twenty minutes in order to save her boyfriend Manni's life. The theme of the movie is about time, money, love, fate, choice and consequence. Three alternative plot possibilities are presented within the movie.

Mise-en-scène: The locations used in the movie revolve around the supermarket, a bank and a casino represented in an opulent manner through the historical architecture, materials and scale of the buildings. From the three runs, Lola's movement is orchestrated around moving vehicles like trains, ambulances and bicycles. Costume colours such as red, yellow and green symbolise the traffic signals in a street.

Cinematography: Emotions and themes are represented carefully using different camera angles. Close up shots express the intimate relationship between Lola and Manni while long shots express the feelings of helplessness and power. High key lighting expresses the openness of the city as the movie is shot mostly during the day. Compositional balance is observed within the characters to keep the audience focused on them.
The Canterbury precinct is located approximately 10 kilometres south-east of the Sydney CBD, on the Sydneym to Bankstown Metro Corridor. The key features of the precinct are the Cooks River and the 35 ha Canterbury Park Racecourse. The Cooks River and rail corridor divide the centre from the predominately residential areas to the south. Based on the urban pattern from Charlottenburg, the vision is to create an education-based precinct anchored by a new university of biological studies and to strengthen the connections of the precinct via two new boulevards that connect to the parklands and Cooks River foreshore. A connected and distributed street network will be achieved as well as a more extensive range of squares and parks that offers a variety of outdoor activities and amenity at the street level. The existing native tree canopy will be enhanced and mangrove settings along the foreshore of the river and existing shrubland will be protected.

To achieve the vision for the Canterbury Station precinct, the proposed built form consists of medium-high rise residential buildings of up to seven storeys in height that include open...
inner courtyards. The key design element is to incorporate more open spaces such as a formal park with a multi-purpose playing field adjacent to the new university and to provide two new boulevards to activate the current streetscape and provide a connection to the Cooks River. In addition, the railway precinct is to be comprised of five slender towers of up to eighteen storeys in height, elevated above a plaza and linking to the underground station entry. Along the Cooks River continuous pedestrian and cycle paths follow both the north bank and south bank connecting the neighbourhoods and local squares to the riverfront. On-street car parking areas are provided on the boulevard, local roads and secondary roads. New rowing facilities are provided on the north bank of the river to further activate the riverfront. Seven hectares is set aside for a biological university to provide a learning environment and to transform the current racecourse into an ecological park.
Our vision is to create an education-based precinct and increase the vitality of streets by incorporating urban patterns from Savignyplatz in Berlin. A better-connected street network can decrease the congestion on Canterbury Road. Enhancing riverside development by creating public spaces will increase the vitality of the local environment and promote interaction between residents.

The large green open space and incorporating courtyards within the building blocks makes the built environment more sustainable, open and porous. A radiating road network links every main attraction or important node. The station platform is more centrally located, providing better access from all sides. This is also assisted by adding another entrance to the station and creating more permeability of linkages, decreasing the distance between the station and plaza. More community facilities are incorporated in the landscaped belt alongside the Cooks River. Movement on the streets is promoted and the walking experience is enhanced by changes in street furniture, differences in paving material and differentiation of the various uses along the streets.
The street corner with substantial setback creates a pleasant street space and offers the opportunity for commercial and retail. Cafes and convenient stores dominate the street corners, attracting pedestrians from all directions.

Inferences
A building typology that places a courtyard in the centre of the block and the dwellings around it forms the framework for the buildings in Canterbury. The entrances to these blocks are designed in such a way to create a more porous pattern in the movement of people. The introduction of the large open green space adds an important recreational space within a congested urban area. Differentiation of the various uses along the streets and in the materials of the paving is used.

Block with ground floor retailing
Retail stores on the ground floor are clearly visible and provide comfortable environments and attract movement flows. This increases the utilization rate of retail stores, reducing traffic congestion with safer movements for pedestrians.

The courtyard for relaxation
Typical Berlin blocks have courtyards in the centre of buildings. These buildings are generally five to seven storeys tall. The building scale to the immediate landscape provides an urban pattern to be experimented in the framework.

Accessibility of block
The entrance space of each block acts as a special transition zone between the street and the block and can be treated differently to allow a smooth transition between each.

Street corner
The street corner with substantial setback creates a pleasant street space and offers the opportunity for commercial and retail. Cafes and convenient stores dominate the street corners, attracting pedestrians from all directions.
Foshan, the third largest city in Guangdong province is famous for its historic buildings. A great number of typical Lingnan-style residential buildings built during the Qing Dynasty are clustered together in the Donghua Li Old Town part of the city. Due to the poor physical condition of some of the old buildings and inadequate infrastructure in this historic area, there is a necessity to conserve and redevelop portions of this district. Donghua Li Old Town will be transformed into a sustainable, cultural and modern mixed-use district named Foshan Lingnan Tiandi. The built form of Foshan is based upon the "hill and valley" concept in which the historic district is retained as a low cluster of buildings and the height of buildings around the perimeter of the historic district is increased gradually to the distance. The transformation of historic buildings is complimented by new construction that incorporates special architectural elements that represent Lingnan style. Streets and alleys in the historic block are long and narrow, which are only accessible for pedestrians and emergency vehicles. The area surrounding the ancestral temple is redeveloped to provide open green space for the residents.
**Synopsis:** Set in 1930's Foshan, the movie is based on the story of Ip Man a legendary Kungfu master. Centred on the events of the Sino-Japanese War, Ip Man vividly brings to life the brutality of the infamous Japanese occupation. Grandmaster Ip Man (Donnie Yen), rises to fight for the honour of his country in a series of battles that culminates in a showdown with General Miura (Hiroyuki Ikeuchi), Japan's greatest fighter.

**Mise-en-scène:** The scenes in the movie show a marked transition of the city's built environment and the costume style of the characters and their surroundings. We see that before the Sino-Japanese War, the protagonist and his surroundings are grand, displaying a certain class and wealth. After the war, the scenes generally depict the ruggedness of the environment and a predominance of shades of grey reflecting the unease and sadness evident in the movie.

**Cinematography:** The camera shots and angles comprise rise-up shots in between crowds and close-up shots of the impact of the war. The protagonist plays the most important role in the movie, so his composition is documented with the rule of third. The fight sequences describe a sense of symmetry which plays a dominant part.
The Canterbury Station Precinct is located within the City of Canterbury-Bankstown and is approximately ten kilometres from the Sydney CBD. The draft South District Plan identifies Canterbury as a local centre with an important role in the overall productivity of the district. The precinct is within the Sydenham to Bankstown corridor with Hurlstone Park to the east and Campsie to the west. However, Canterbury retains the traditional bungalow character which results in conflicts between the redevelopment and conservation of the traditional character of Canterbury. The precinct will be given diverse functions to benefit the local community. We will conserve as much heritage as we can to protect traditional and cultural features. We also aim to create a reinvigorated town centre with cultural and commercial functions to attract tourists and create more employment opportunities. At the same time, open space will be enlarged and additional public amenities will be delivered. Specifically, the objectives of this plan are conserving heritage and cultural features as well as increasing housing density and diversity.
Learning from the ideas developed for Foshan, the redeveloped precinct follows the "hill and valley" concept. Housing in the central area will be of a low density and scale to protect historic blocks; high density buildings will be located along the two sides of the central area to accommodate the increased population. Heritage housing will be conserved and the traditional pattern will be kept. Some functions of historic blocks will be transformed from residential to commercial. Retail uses such as shops, restaurants and cafés will be arranged in the central blocks to serve tourists and residents. Pedestrian-friendly alleys will be offered within the historic blocks. Entrances for new bungalows will be provided at the two sides to enhance the vitality of the interior of the block. The conditions of Canterbury Road will be improved by providing more options between Canterbury and Campsie. Three bridges are planned to reduce traffic volume. Canterbury Racecourse will be redeveloped as public open space. There will be a temple and sports fields in this park. Additional education amenities such as a library and TAFE are proposed for the local community.
Our vision is to enliven the urban environment and enrich urban vitality and residential intensification while conserving the inter-war heritage character and cultural identity surrounding the new Canterbury Metro Station Precinct.

The design strategies involved in the framework were to create an efficient set of land use principles that integrated the street and land use initiatives in order to achieve an appropriate balance between streets as character destinations and streets as thoroughfares. Diverse transport modes and pedestrian oriented development were developed to create a fine grain network that is well connected to public transport. Economic vitality was given priority through active public space that contributes consistently via social and cultural activities. The concept of mat architecture is used, working as an efficient method of promoting adaptive-reuse of the bungalows into a commercial area with new structures amalgamating in between the old to create a balance in urban form. In order to create public spaces that are easily accessible important streets within the precinct are connected to pedestrian-only or low speed shared streets.
Patterns in Movie

Patterns in Foshan

Designed patterns in Canterbury

Intermediate gateway
The movie in many scenes depicts the use of gateways as an identity for the shops or houses and this expression has been incorporated as an urban pattern that can address a lack of identity in Canterbury.

Transitional space within retail
The commercial areas in the city of Foshan explore the use of transitional spaces that allows activation of various streets. These spaces have been used in Canterbury to make it unique and communicable.

Communal courtyard
In Foshan, social connectivity is given importance through the inclusion of courtyards and these are used extensively in the framework for the redevelopment in Canterbury.

Interior reflective garden
Interesting movements within the houses and streets and the use of landscaped spaces are evident in Foshan. These gardens are used as urban patterns to create a good ratio of built to open space.

Inferences
The movie with its distinctive urban characteristics has provided ideas of how a city can facilitate communication through urban forms. Via analysis of the movie and the various angles and the mise en scène, this has helped in understanding the city through a cinematic interpretation. This study has eventually given direction in better assessing the urban precinct of Canterbury with clearer goals and objectives.

Patterns in Canterbury

Master of Urban Development & Design 2018-2019
Villeurbanne is located near the north-east of Lyon, the second largest metropolitan area in France. Villeurbanne's population increased dramatically between 1928 and 1931 and the Quartier de Gratte-Ciel was designed as a residential building for the low-income immigrant population. In 1924, the new mayor Lazare Goujon started a major redevelopment of Villeurbanne's urban fabric. Major initiatives included modernizing the municipal government's facilities, erecting the Palace of Labour and constructing huge new housing estates that encircled the city. Villeurbanne emerged as an independent and distinctive centre and ended its attachment to the geopolitical environment of Lyon. Villeurbanne's diversity of urban and architectural forms highlights the homogeneity and consistency of an entire skyscraper. The continuity and the size of the leading edge of the alignment ensures the continuity of the composition and the uniformity of the fabric along the public space. Moreover, there are two main blocks in Villeurbanne: the Gratte-Ciel block with a strong axis and wide walkways; and the courtyard block with its smaller scale and green courtyard spaces.
City and Cinematic Space
Lyon | 
A Question of Taste (2000) 
Director: Bernard Rapp

Dai Xuepeng 
Jin Yuxiang 
Lily Leprovaux 
Zhao Ziteng

Synopsis: Nicolas the protagonist is hired as a taster by Frédéric, a wealthy businessman and is consumed by his desire to succeed. Breaking conventions of chronological storytelling, the film is experienced through flash forwards that take the audience through suspense and tragedy. It is an approach that distorts time and memory.

Mise-en-scène: The movie shows a contrast between characters food, lighting and colour. The colours blue and orange (opposites in the colour wheel) are omnipresent throughout the movie and in the clothes worn by each character. Blue is synonymous with freedom, self-expression and joy. It is used to inspire trust and is often seen in Frédéric's and Nicolas' clothes. The colour orange depicts optimism and a strong link to freedom which is the antithesis of the character's trajectory in the movie.

Cinematography: The film uses a variety of lens angle switches to achieve the atmosphere of the scene, including circling, closeness, and high camera angle. Symmetry is used to reflect changes in Nicolas.
The vision is to encourage commercial development of high-density, mixed-use buildings along Canterbury Road and the surrounding streets with a concentrated core adjacent to the new station. The Cooks River bicycle track is enhanced and it follows the river on its northern bank, connecting the suburb with Homebush and Botany Bay. The urban design framework focuses on creating a reinvigorated and mixed-use town centre that supports the Canterbury Station Precinct as a local centre within metropolitan Sydney. The proposal integrates new streets and links that reduce traffic impacts and congestion, improves the current streetscapes and builds more infrastructure and facilities that provides for shopping and eating. As “great streets makes great cities” (Jane Jacobs), a variety of activities are encouraged at street level. Open spaces, community facilities and civic services are intertwined with the existing green open spaces along the Cooks River.

Learning from Gratte-Ciel, an axis with skyscrapers on both sides is proposed which provides a strong visual impact. These mixed-use buildings encourage shopping, eating and other...
activities on the street level. Setbacks are included in the new development to ensure that there is access to sunlight for every apartment. Courtyard blocks with green and open spaces are proposed as a way to increase landscaping and vegetation within the Canterbury precinct. The connection between blocks is enhanced with new pedestrian routes. To mitigate the traffic pressure on Canterbury Road, a new main road is added that crosses the Cooks River. In addition, the green system is improved with existing green spaces and courts preserved and using about one-third of the racecourse as two parks and adding some small open spaces with vegetation. Moreover, on-street parking and underground parking are adopted to meet parking needs. Temporary parking at street level during daytime hours is provided to the mixed-use developments. Within commercial areas, residential areas and civic areas, there is underground parking. Taking advantage of the existing and upgraded train line, we propose a mixed-use town centre with residential buildings, commercial office buildings, civic buildings and retail buildings.
Our Vision is to provide a grand, mixed-use space with new vitality and cohesion, facilitating the growth of a major urban community as well as optimising the social, historical, environmental, cultural, symbolic and economic development of the neighbourhood.

The continuity of the framework starts from two rows of medium-height buildings with the higher towers framing the theatre and town hall on the river bank, representing a grandiose street structure. Between and besides the main street structure, pedestrian, plazas and squares are ubiquitous. Roof Gardens and setbacks provide flexible apartment layouts and access to sunshine. The podium is used to accommodate height differences in the terrain. A more rational and ordered street network is provided and a new station will be built inside the podium to accommodate the expected increase in passenger numbers. Adaptive reuse of heritage buildings is promoted with the heritage-listed hotel retained and transformed with a beer garden open to the public spaces.
The streets in Lyon magnify the use of mixed-use activities that activate the city's vital nodes. This brings in more pedestrians attracted to the social cultures, enriching their mundane daily life.

The use of waterfront landscapes is important to understand the relationship between water and the city and how it can be used in improving the urban culture of the precinct. The transport system seen in the movie, shows how important such infrastructure is in a city.

**Inferences**

The movie is a good example to study various street mechanisms that improve the social character that enriches life in the street.

**Mixed used street**
The streets in Lyon magnify the use of mixed-use activities that activate the city's vital nodes. This brings in more pedestrians attracted to the social cultures, enriching their mundane daily life.

**Market on pedestrian plaza**
The use of a market in the pedestrian walkway is an interesting feature that sustains life in the streets. This functional leisure venue brings people together in search of products to buy.

**Stairs to reach new heights**
To cope with changes in terrain in Canterbury, an interesting example is the inter-building staircases from Lyon.

**Vertical transport**
The escalator is one solution to the complexity of public space. It is often used in different transportation interchanges and is an important facility for the elderly and disabled.

**Patterns in Movie**

**Patterns in Lyon**

**Designed patterns in Canterbury**
Although Stockholm's historic district of Gamla Stan was developed in the 1400s, the majority of Stockholm's urban development came to fruition in the 19th century, driven by the Lindhagen Plan of 1866. Hammarby Sjostad had become an industrial, derelict site in the south east of Stockholm, located on the manmade Hammarby Lake. Concept plans were drafted for the development of Hammarby Sjostad, as part of later unsuccessful Olympic bids for Stockholm in 2000 and 2004. After these setbacks, the city government proposed creating a pioneering ecologically sustainable development and an archetypal model of the eco-city. By integrating water sensitive urban design solutions, constructed wetlands, and automated vacuum waste recycling systems, this project provides a benchmark for innovative ESD solutions. In conjunction with the principles of transit orientated development, an integrated mix of public and private permeable and walkable green spaces with distinctive urban block forms, Hammarby Sjostad reflects Stockholm's historic past, as well as amalgamating innovative, technological driven environmentally sensitive solutions of the 21st century.
**City and Cinematic Space**

**Stockholm | Stockholm, My Love (2016)**
*Director: Mark Cousins*

**Li Dan**
**Ratikant Samal**
**Zhong Yuan**

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**Synopsis:** Stockholm My Love (2016) is a poetic ramble through Stockholm, a gilded city-symphony that helps to describe and explain the depth of remorse, memory and grief of architect Alva Diop. It is an elegant dissection of the emotional and spiritual life of the city. Alva’s dialogue with Stockholm is also the process of her search for redemption.

**Mise-en-scène:** Alva’s emotional transition from death-life-redemption is portrayed through colours. Dark colours such as black and red are used to represent guilt, anger, depression and death. Brighter colours depict positive emotions and happiness. Low key lighting predominantly contains dark colours and tones whereas high key lighting contains brighter colours and tones in order convey differing emotions.

**Cinematography:** The dolly zoom shots that separate the audience from the subject are used to compare the subject with the landscape of streets and buildings. Extreme wide shots are used to highlight the unique skyline of the city. The “rule of third” has been applied, revealing important elements that are positioned along the sight-lines and at the intersections.
The vision is to create a lively Canterbury Town Centre, with a range of high quality public green open spaces along the Cooks River, that will be highly accessible to the local and wider locality through the introduction of the metro and light rail systems. Developing upon the principles derived from Hammarby Sjöstad, the revitalisation of Canterbury's Town Centre will be based upon the introduction of the new Metro station and integrated light rail system which will aid connectivity through the locality on a north-south axis. The proposed light rail system will aid wider accessibility and productivity of the Greater Sydney Commission's South District. Along this new boulevard street typology, a mixture of uses will be proposed along the ground levels of the podiums of towers, engendering activity along this corridor linking the new racecourse precinct to the station. By activating this new grand avenue, this will create a new high street of Canterbury, and focus activity away from the traffic sewer that is Canterbury Road.
The public green open space network of the new precinct will grow from patches within the new predominant courtyard building typology transposed from Hammarby Sjöstad and will connect into street lined corridors that will effectively interface with the Cooks River green open space matrix. Access to the river and its associated parkland is unlocked through a new integrated pedestrian and cycling network, acting like fingers intersecting with the river. This facilitates greater connectivity not only within the immediate station precinct, but also to the potential high amenity of the river. Due to the Cooks River’s new-found importance within this urban design framework, its water quality and amenity must be reassessed. As such, through an introduction of constructed wetlands, sponge city principles and classic WSUD mechanisms, the racecourse precinct aims to echo the five-star ESD principles of Hammarby Sjöstad.
To create a vibrant, ecologically sustainable and aesthetically appealing precinct along the Cooks River and to introduce an integrated transportation system for the community is the vision for this design. Through these interventions, the community will be provided with better mobility and a revitalization of public spaces which results in the enhancing of the quality of the street life. The revitalisation of the Canterbury Station Precinct is achieved by promoting high quality public and green spaces that are attractive and support a wide range of public events. An integrated light rail system has been proposed to enhance connectivity from the north-south axis through to the southern districts of Sydney. New pathways integrated into the existing road network facilitate the improvement of traffic flows in the area. Circulation is segregated, with Robert Street converted into a pedestrian street that acts as a main connecting route for the people coming out of the metro and light rail, while Broughton Street is promoted as a hub for bus routes. The incorporation of bio-basins and WSUD principles enhances the Cooks River and transforms it as the anchor for this new ecologically sustainable town centre.
Inferences

'Stockholm My Love' visualizes the use of public space and its relationship with human interactions. The landmarks like the library and the statues provide a sense of identity. The public transport system also plays a vital role in defining the street character.

The movie shows how to integrate these public interfaces into the urban design framework for Canterbury.

Living street: space designed for all
Shared space is a concept that integrates pedestrians, vehicles and other road users through the removal of traditional street elements such as signs, traffic lights, pedestrian barriers, road markings and kerbs.

Community library
The space in a library is usually quiet and static. The movie shows how people can find a spiritual shelter in a modern city. A new library fulfils this role in Canterbury.

Theatre
The theatre is a space of collaborative modes of production and a collective form of reception that brings people together through different events, contributes to the economy and also creates vibrancy to the street.

Recreational river park
The river park improves the urban landscapes and promotes connectivity. The protagonist stands in a riverside park, implicating a close relationship between local residents and nature.

Master of Urban Development & Design 2018-2019
Hansaviertel, hidden near the north-west corner of Berlin's Tiergarten Park is one of the city's bustling oases. Before World War II, Hansviertel consisted of approximately one hundred and forty buildings in a typical bourgeois Wilhelminia style of low-scaled, crowded, enclosed residences. Most of this was destroyed in the war. Hansaviertel was one of the exhibition districts in which it was proposed to develop high-rise, flat-top and modernist buildings.

By adopting the concept of "towers in a park," Hansaviertel broke completely from existing building typologies and planning principles to realise a model of the residential city structured by function. The Hansaviertel masterplan also takes advantage of Berlin's Tiergarten, with the result that most dwellings have views and access to several large portions of green open spaces. The programmatic orientation for the Hansaviertel project was provided by the Athens Charter and developed by Le Corbusier. The Hansaviertel masterplan contains prefabricated and identical high-density skyscrapers, spread across a vast green area and arranged in a Cartesian grid, allowing the city to function as a living machine.
By learning from the Hansaviertel International Architecture Exhibition "Interbau" and German landscape exhibition design, our design proposal brings together all the best characteristics of the precinct: water, natural environment and heritage. This transforms the Canterbury Town Centre as a new destination, where the landscape, water and district centre link together to create a distinct urban experience. The racecourse is redesigned as a new urban exhibition district, establishing different built forms within a new landscaped framework. Based on our objectives and design response, Canterbury Town Centre will become a vibrant and attractive destination with a new exhibition centre and with an enhanced green grid system. In addition, the international exhibition centre will form the civic heart and abundant green open space will be provided, together with an innovative urban response and appealing landscape design. Nine new precincts, each with a different theme are proposed. Learning from the Functional City principles of the Athen's Charter but in conjunction with advanced planning principles, Canterbury evolves with more community focused urban functions and programs.
By reflecting on the design principles and urban patterns from the Hansaviertel case study, our design has reimagined typical modernist building forms and integrated them into the existing urban landscape, resulting in a physical denotation of new thinking. The precinct will change from low density to medium-high density with significant increases in building height to maximize the development opportunity. The modernist style towers, slabs and town houses are regrouped into mixed-use clusters with vibrant streets and neighbourhoods.

In addition, the urban framework has also adopted the principle of the "tower in the park," to preserve and enhance existing open spaces and natural ecosystems, improving the quality of the parks along the Cooks River. The sports fields, community garden and esplanade separate each precinct, creating active and passive spaces as well as linking together as a green corridor. This contributes to the overall amenity of the neighbourhood. By reintroducing a built form based on modernist architecture in conjunction with ecologically inspired landscape design, Canterbury will be reimagined as a unique urban destination in Sydney.
The new Western City will be established on the strength of the new international Western Sydney Airport and Badgerys Creek Aerotropolis. It will be a polycentric city capitalising on the established centres of Liverpool, Greater Penrith and Campbelltown-Macathur.

— Greater Sydney Commission
In a Western Sydney context, the issue of climate change and its ever-increasing negative impacts in the region has been identified and organisations such as the Western Sydney Organisation of Councils (WSROC) (which represents eight Western Sydney Councils) has been established to coherently tackle climate change impacts in Western Sydney – most notably the urban heat island effect.

However, it is clear even at this broad level, there are conflicts between local councils’ advocacy for climate based sensitive design or measures to alleviate climate change, compared to the state government’s policy to move another million residents into Western Sydney in the next 20 years.
Global Networks and Urban Climate Innovation: challenging business as usual in Sydney’s West

Introduction: Innovative Networks

‘Innovation’ and ‘networks’ are frequently used words that attempt to make sense of messy processes and realities. When used well such concepts help society to focus in the face of complexity, uncertainty and massive change. When reduced to marketing catchphrases they deny genuine transformation and lock society into conventional ways of operating. This article presents a brief discussion on two types of innovative infrastructural networks that engage with such open-ended messy realities and reject the ‘neat’ studio project typified by polished renderings and superficial plans. The two networks are linked and by necessity contrast with each other. The first is predominantly social and global in nature– and has been named the international geodesign collaboration. This initiative seeks to establish new knowledge networks and methods of global collaboration and understanding. The second is predominantly physical and local - and has been branded ‘Western Sydney Aerotropolis’ – a new urban centre that seeks to fundamentally change the physical connections within western Sydney and reimagine the area as a gateway to Australia and the world. Current plans envision achieving this through the establishment of new connections and a rebalancing of Sydney’s current transport and communications network.

The International Geodesign Collaboration

The first of these networks involves a global collaboration between leading universities to address the most pressing issues of our age. A range of wicked problems may be addressed in the future but the first on the agenda is climate change and its impacts on diverse landscapes and social contexts. Named the ‘international geodesign collaboration’ after the geodesign method which participants must follow, the initiative aims to bring together the combined intellect of a large number of people, who are broadly educated about the state of the world and specifically about the analytic and synthetic methods required for the betterment of society and the environment in the face of likely global change’ (IGC 2019). The collaboration adopts the viewpoint that the most effective way to do this is to educate the university students of today, about climate change and other wicked problem. The educational approach involves techniques that fosters knowledge and capacity to collaborate and work cooperatively at different scales from the studio to professional and peer groups and between universities globally. For such a large-scale project to succeed a common methodology and communication standard is necessary and has been progressively established throughout 2018. Such an approach highlights, the tension between the need for common standard in planning and design and the need for creative expression and individual experience to generate diversity and alternative ideas.

All global participants, including UNSW Sydney, adopted a common geodesign framework. Geodesign is a method developed over many years by various geographic, spatial and information systems experts including the leading academic Prof Carl Steinitz (2012). The geodesign approach is unique in that it provides the opportunity for participants using the method to generate rapid, continuous, model-based feedback on various aspects of performance to advance designs. The global collaboration adopted a geodesign workflow that mandated the production of three related scenarios. Each participating institution was to select an area at a specified scale and develop three scenarios for that area, at three points in time. Each scenario was to engage with the challenge of climate and innovative approaches to spatial and environmental planning.
The first of these scenarios was to be the most innovative adopting an ‘act now’ approach to climate sensitive design. A range of planning and urban design innovations could be developed and applied to the selected area. This scenario was defined as the ‘early adopter scenario’. The second of the scenarios involves a ‘wait and see’ approach to climate innovation where society pauses until a hypothetical critical-mass or event convinces them of the advantages of implementing climate innovations. Although this cautious approach may avoid early adopter ‘mistakes’ it also jeopardises the ability of the society in question to set up important developmental pathways necessary for long term change. The approach therefore risks locking society out of certain innovations that require forward planning commitments such as large-scale infrastructure and incremental, positive ecological growth (Yu, 2012). The final approach known as ‘the business as usual’ approach builds on current trends and neglects to adopt any climate adaptation innovations beyond what standard business practices currently allow.

Although the three scenarios share a current spatial area and a common historical starting point, they diverge in time and this divergence is captured in three temporal snapshots. The approach can therefore demonstrate the opportunities and risks to different climate adaptation and maladaptation globally. Around 80 participating universities signed up for the challenge include University College London, Peking University, Addis Ababa University, Amity University Mumbai, Beijing Forestry University, University College Dublin, Technion - Israel Institute of Technology, University of Tokyo, Politecnico di Milano, Universidade de São Paulo (USP), Arizona State University and Pennsylvanian State University. The enterprise was therefore truly global in nature capturing the impacts of climate action and inaction across diverse societies. UNSW Sydney was the only Australian university to participate demonstrating UNSW’s unique expertise in this teaching-research nexus bringing together city analytics with planning and urban development and design.

The project is a good example of geodesign as both a noun and a verb. As a noun, geodesign produces explicit knowledge in the form of deliberate plans set forth with the intention of changing present conditions. As a very, geodesign conveys the process of integrating data with design in rapid iterative feedback loops. In 2018 geodesign as a verb and a process, was also apparent through the simultaneous efforts of many global teams working in parallel to produce the three scenarios. Now in 2019 the results are being published on the international geodesign collaboration website (IGC, 2019).

Urban Climate Innovation in Sydney
There is perhaps nowhere more fitting for climate challenges to be address in urban Australia than in Western Sydney which in 2018 and 2019 was at times the hottest place in Australia. The site of the proposed Western Sydney Aerotropolis was therefore selected as a case study for the UNSW Sydney Studio. Currently proposals for western Sydney seek to build the new ‘Western Sydney Airport’ in a strategic move to address social and economic inequality. It is a long-awaited ‘chess piece’ in realigning, development in Sydney. Sydney, like many cities, has always been divided according to concentrations of advantage, jobs, housing and opportunity. Roughly the line of division runs from the southeast to the northwest with the Southeast Sydney and the proposed airport site being on the ‘wrong side of the tracks’.
Like many large Australian cities, Sydney is facing a dramatic growth in its population. 1.6 million new residents are expected over the next 15 years with the majority of this being proposed for peripheral areas including Western Sydney. One of Sydney's major planning challenges is to balance the concentration of employment in the east with new economic development in the west, where most of the population now live. The federal, state and local governments have struck a city deal whereby a novel model of urban development to address this "network imbalance". The airport has been situated as part of an 'infrastructure alliance' or 'city deal' to address this network imbalance.

In Khanna's words 'the material and the diplomatic are two sides of the same coin' bringing together all levels of government and private industry along for the same development ride. (Khanna, 2016). This vision has been described in infrastructural terms as an Aerotropolis' which was coined by the entrepreneurial academic John Kasarda (2011). Western Sydney Aerotropolis' represents a new economic model and vision for the urban development of Western Sydney.

However, lost amongst this deal making and investment in grey infrastructure and government-business relationships is a clear vision of climate leadership. Rather, approaches to climate mitigation and climate sensitive development are fragmented and isolated limited to local council alliances and policies. The same network thinking being applied to conventional infrastructure needs to be applied to climate innovation. In short Western Sydney must be re-invented as an "urban climate innovation laboratory" in the way Plastrik & Cleveland argue for (2018).

The transformation of Western Sydney's degraded ecological and agricultural systems into a new urban centre with Western Sydney Airport (WSA) at its centre will contribute disproportionally to climate change and the urban heat island effect. Airports and their associated infrastructure have a major impact on urban microclimates due to their extensive impermeable and climate 'in-sensitive' surfaces. In neoliberal Australia airports are consumerist destinations in themselves. In many respects they have been forgotten as urban gateways in the sense that the magnificent 19th century train stations were. The best infrastructural stations and airports declare to the citizen, tourist and home-comer that they have arrived in the urban heart of the city.

Two UNSW studio's in 2019 promoted the re-consideration of the airport and its associated urban centre as a strategic figure in a global negation of climate change and urban heat island challenges. The power of the geodesign approach was developed in two specific ways at UNSW in semester 1 and 2 of 2018. The standard workflow was applied at two scales with investigations carried out at a 20 x 20km area and at a 1 x 1km area. Different combinations of software were used at each scale with experimental software first used with the Greater Sydney Commission within the standard workflow.

**Climate Analytic Techniques - Two Scales and Two Analytic Techniques**

Students studied and worked at two scales the urban meso scale and urban micro scale. The first a 20 x 20km area centred on the proposed airport – this is the 'meso-scale'. The second 1 x 1 km area focused on, Bringelly, a new mixed-use urban centre supporting the Aerotropolis district – this is the scale of 'urban microclimate'. The two scales where developed according to the parameters of each of the three scenarios that were given as part of the International Geodesign Collaboration: Early Adopter Scenario (EAS), Late Adopter Scenario (LAS) and Non-Adopter Scenario (NAS).

The 20 x 20 km featured various urban patterns across the three scenarios. This scale was analysed using a method known as 'climatope' analysis (L. Katzschner, Burghardt, Kupski, & Campe, 2016). In this analysis land-use systems were re-classified in terms of their impact on urban microclimate and coded according to the intensity of their impact. For example, Grey infrastructure (coded red) such as the airport has a much higher impact than Green infrastructure (coded green) such as the parklands. This simple but powerful technique reveals the climatic consequences of various urban patterns and highlights hot areas which require access to cool air production zones for temperature relief. This method is effective in assessing scenarios in terms of their varying spatial configuration. For the submission to the international geodesign collaboration further work was completed on the the 1 x 1 km scale analysis. A hypothetical Bringelly town centre developed
in studio classes was investigated using various climate analyses. In contrast to the meso-scale which varied in its spatial configuration across all three scenarios, the Bringelly town centre adopted different material configurations. Rather than changing the pattern, variation occurred through altering materials, such as canopy and vegetation and cool materials versus standard materials. The micro-climatic impacts of the different urban materials were then modelled in Revit software. This approach reveals the considerable modifications and climate mitigation possible working with existing urban forms and patterns and is important for cities ‘locked-in’ to existing built spatial configurations. Further shadow analysis demonstrates which areas are sheltered by the sun during the summer. The importance of street trees to provide continuous shaded passages for active transport are paramount. Finally, wind analyses show which areas are open to cooling north-easterly winds or exposed to heating south-westerly winds. Such analysis can help provide data for urban modifications to mitigate climate and urban radiation.

**Conclusion: Networks of Pioneering Climate Sensitive Cities**

Pioneering cities around the world are forging ahead with catalytic interventions that designate them as “early adopters” or “urban climate innovation laboratories”: The Carbon Neutral Cities Alliance, Low Carbon Cities, C40, the Compact of Mayors, Climate Mayors, Energy Cities and other forums demonstrate the potential for innovative networks, outside of conventional alliances, to advance global climate policy for cities. Some local councils in metropolitan Sydney are already participating in this global network and promoting change in a localized way. These knowledge innovation networks demonstrate that in the space of a few decades, it is possible to eliminate fossil fuels from the embedded material networks that make up their urban systems. Such cities are leading the way by rapidly rethinking their material make up and their spatial configurations through implementing cool material policies, green networks and other cooling strategies. They show that the extremely complex systems of transportation, utilities, buildings, and waste management can be de-carbonize and future proofed for climatic shocks. Extreme storms, heatwaves, drought, and rising seas are already a lived reality for Sydney and other Australian cities. Metropolitan Sydney is a laggard in this respect with an overly complex governance structure and a lack of coherent policy approaches to envisage the consequences of climate action, inaction and compromise. Plastrik & Cleveland, (2018) write that: “A city innovation lab isn’t a facility with highly controlled conditions, high-tech equipment, and scientists in white coats.” “The laboratory is the entire city, the complex, real urban world with its messy swarms of businesses, governments, and organizations; urban systems; ideas, interests, and politics; built infrastructure, natural ecosystems, economic sectors; and, of course, all manner of people and groupings” By joining this global conversation initiated by the International Geodesign Collaboration, UNSW demonstrates the experimental educational design approach necessary for Sydney to confront inaction and to promote cooperative action. UNSW Sydney’s urban development and design program demonstrates the thought leadership necessary to become an innovation exporter rather than a business as usual backwater focused on outsourced 20th century economics.

More than fifty years after it was first promised in 1946 Sydney’s second airport will be built. By 2026 the first stage of Western Sydney Airport will be complete, and residents will be able to fly into and out of a major airport at Badgerys Creek. However, this will be a moot point unless Western Sydney’s increasingly hostile climate is addressed.

**References**


As summer rolls into the Sydney basin every year, media headlines signify the start of a sweltering summer period. Western Sydney faces five straight days of 40-plus degree temperatures. It is a relatively standard narrative for Sydneysiders, but is compounded for those who live further away from the reprieve of the coastline and sea breezes. Whilst those who live closer to the coastline can flock to beaches on hotter days, little reprieve from the heat is available for those living further out west, and current alternatives remain increasingly unsustainable and expensive. Rising temperatures due to global warming are a scientific fact, but are the designs of cities reflecting this new norm of climate change?
The issue of climate change is an ever changing cauldron of doom for policy makers, and as evident in the recent Wentworth by-election and Victorian state government election, climate and emissions policy dominated voter sentiment. The major parties have switched between tormentor and tormented on the issue, with each side unable to make a striking blow, while Greens and smaller independents fail to do more than spoil attempts to wrangle the climate dilemma. The cross-polination of lacklustre policies exists horizontally across the political spectrum, as well as vertically across the different hierarchical levels of government. The denial of some policy makers, who purport that the science behind climate change and extreme natural disasters and climatic events is irrelevant, is unconscionable. The latest report in 2018 from the Intergovernmental Panel on Climate Change (IPCC) has repeatedly stated that ‘anomalous seasonal conditions and changes in the frequency and intensity of extreme weather events are only likely to increase in the future as climate change intensifies’.

The state’s strategy is anchored by the Western Sydney Aerotropolis (WSA) and based upon current existing greenfield subdivision patterns. The government’s vision for the Aerotropolis reads as a savvy piece of real estate marketing that highlights the catalytic effect a new airport would have on jobs, homes, infrastructure and services. The vision is strengthened by being intertwined with the notion of realising the Greater Sydney Commission’s (GSC) 30-minute Parkland City ideal.

According to the state government, Western Sydney will become Australia’s third largest economy and in its own right Australia’s fourth most populous city. This is predominantly driven by the delivering large pieces of road infrastructure (M9 & M12), and redeveloping existing agricultural and pastoral land as ‘grey infrastructure’, as stated in the Stage 1 Land Use and Infrastructure Implementation Plan for the Aerotropolis.
The studio began with systems evaluation modelling, whereby a series of ten systems were produced based upon the available GIS information. This phase also examined the system interactions at play within the landscape.
Early Adapter Scenario - The early adapter looks ahead and then changes the rules.

Late Adapter Scenario - The late adapter waits, then assesses what has worked, and then changes the rules.

Non Adapter Scenario - The non-adapter continues upon the current set of policies and rules.

Based upon the ten systems mapped, students developed a range of scenarios using what Steinitz (2012) labels ‘change models’. A change model provokes questions such as, “how might an area be alerted?” or “how might it systematically change?” This process was informed by a range of current government policy documents and professional best practices.

Different scenarios were outlined, for example where mixed-use development was within a certain proximity to transit nodes, and riparian corridors were widened along creek corridors testing the implication of these decisions upon the urban microclimate of the locality, the climatic performance of the city and the overall ecological footprint. As such, three scenarios were developed in relation to questions surrounding climate change: Early Adapter, Late Adapter and Non Adapter.

Subsequently at a 20km x 20km scale, students engaged with a top-down approach to environmental strategic planning in order to understand how cities are shaped at large metropolitan scales. Working imaginatively at such a broad scale is challenging, but to be innovative at smaller scales it is important to have experience working and linking to this larger regional scale.
From the 20km x 20km scale, change models were examined at a 1km x 1km scale near the location of the government’s proposed Bringelly Town Centre. Teams were given five adjoining sites surrounding the new train station to mimic the inherent differing interests that emulsify during real development negotiations in urban development.

Eventually the integration of different projects occurred, evoking one clear strong narrative for a climate sensitive design for the future of Bringelly.

Climatic performance undertaken within the urban design framework was based upon climatope analysis and solar irradiation modelling as well as general percentages of green open space within schemes. The challenge of transitioning between software, scales, and design principles was a formidable task for students, but what has resulted is a systematic representation of different scenarios, in which the diagrams alone have the power to shape vital environmental planning policies and strategies.
Non Adapter Scenario

Conventional materials:
Concrete, Red Brick, Red Sand Stone, Black and Grey roof, Dark colour Facades.

Late Adapter Scenario

Reflective materials:
Light colour Facades, Light colour reflective tiles on roof

Early Adapter Scenario

Green roofs

Reflective materials:
Light colour Facades

Vegetation

Green infrastructure

Urban design framework

Rendered urban design precinct

Solar radiation study modal

Master of Urban Development & Design 2018-2019
The vision is to create a balance between urban development and the natural environment through the application of strict density, water and green targets. Urban growth is accommodated in a way that catalyses, builds and assists in future resilience to achieve the cooling outcomes for Western Sydney. More importantly, understanding that the mandate of this scheme extends beyond the realm of being a simply aesthetic driven outcome, the vision covers climate-sensitive and climate-oriented intentions developing a qualitative response from a quantitative approach. This framework will embed existing natural elements and ecologies into the development to achieve the following targets: conserving a large area of original bushland with 80% tree canopy; maintaining farmland that feeds 120% of the resident population (allowing excess production to be exported via the trade opportunities that arise from the site's proximity to the new Western Sydney Airport); delivering a 100% decentralised water supply and improving rainwater storage and water reuse.
A central boulevard anchored by main corridors that extend from the centre forms the main frame of the interconnected green system. Blue infrastructure systems are prioritised by proposing a flood retention lake that assists in cooling the precinct and provides improvements in water quality. This lake can also be used as a fire fighting reservoir by Western Sydney Airport. At least 15% of potable water used in the development will be supplied by two dams built along South Creek. The population will be accommodated in a mixed-use setting with only a minimal commitment given to low density detached housing. Industrial functions will be spatially co-located to support Western Sydney Airport, creating an economically resilient development. A new science park, logistics hub and aerospace industries will be encouraged to gravitate towards the new airport.
The vision is to create a ‘smart transit city’ that incorporates multiple modes of transportation including the metro, light rail and driver-less vehicles and which places the grey infrastructure and deployment of new transportation technology as the backbone of the scheme. Furthermore, we leverage the transport efficiency and density consolidation brought by our unique infrastructure focus to provide a set of urban land uses and environmental precincts that results in a ‘30 minute city’ that encapsulates all the live, work and play needs of its residents.

A large proportion of employment generation is accommodated in a chain of high-tech industrial parks that are integrated into the transport system. This highly efficient and automated transport system helps in reducing the emissions impacts that are the norm in other car dependent precincts. Urban farming is also proposed and together with the accessibility of the interconnected transportation systems, keeps agricultural production in close proximity to the population clusters for better food availability, public awareness of organic farming and a reduction in ‘food miles’.
At the micro-scale, the street network assists with urban cooling through the alignment of streets to funnel and harness the predominant local breezes that flow from the south-east during summer. One street is designated as the main green axis, visually linking the site to the airport and employment precinct. In order to reduce flooding impacts, this scheme expands intake capacity of the creek and a new Badgerys Lake contributes to urban cooling and provides recreational opportunities. Green patches connect the creeks and dense urban settlements to enhance the environmental quality of the residential areas and alleviate the impacts of climate change.
The vision is to create decentralised energy generation instead of a conventional centralised approach, based on the underlying intent to shape this area as a producer of excess energy to expend and trade instead of being simply a gigantic consumer. The scheme proposes a development that represents a new era of sustainability, designed with holistic consideration of the human experience and climate sensitive ecology. Decentralisation is a key theme that enables different centres to act as relatively independent and robust units, each of which reduces the need for excessive transmission infrastructure and eliminating waste of energy and non-renewable resources. The proposal addresses climate-sensitive mandates via a set of quantitative targets to achieve at least 75% medium density, 10% high density and 15% low density housing. The scheme also generates 150% on-site energy generation and outsources the excess to adjacent industrial consumers.
All urban units whether residential or mixed-use, are mandated to be energy positive with enough production to self sustain and with a capacity to transfer and trade the unused generation. Solar panel and power box technology is incorporated into buildings and organised at the precinct and block micro grid system to manage the electricity cycle. Generating windmills are located in the agricultural lands and farms are designed for intensive, high-tech and vertical farming, producing food as another form of local energy. By eliminating the need for conventional macro power grids, the environmental, visual and economic shortcomings of these traditional grids are avoided. The merits of the energy-centric nature of the scheme are also manifest in the employment generated (high-tech, clean energy and cost saving) that grows in tandem with incubators of energy related ideas and innovation.

A network of pocket parks and vast green open spaces is proposed, along with a new lake that connects into the existing water networks. These work together to cool the precinct, enhance the ecosystem and create recreational opportunities.
The vision is to create a dynamic and self-sustaining Western Sydney through an integrated climate-sensitive response that promotes local agriculture, respects the existing heritage and preserves the ecology of the site. From a thorough study of the existing assets, characteristics, profiles and issues, three key drivers have been developed. These are to interlock and integrate agricultural and ecological corridors with all future urban density zones; to preserve and promote cultural and conservation assets and to provide systems to naturally cool down the city. When fully implemented, these principles will transform the site into a highly desirable, interconnected urban environment.

Recognising that most new dense urban centres lack organisation and quality in their green spaces, this scheme identifies the opportunity to extend the existing patches of green space into the main economic corridor of the precinct. These ‘natural fingers’ extend all the way up to the highest density nodes of the development. Some of the ‘green fingers’ incorporate innovative urban farming, others are reserved for recreation and some are preserved as

ECO-Cultural Urban Field

Liu Liujia
Xie Xiaoli
Cao Jing
Chen Yujing

MUDD 24 - Urban Gateway & Urban Network - Sydney
natural habitats. Additional agricultural land is retained on the western edges of the site, to act as a buffer to future urban sprawl and to encourage food production close to the city. The existing riparian zones are preserved and strengthened with water sensitive design, rainwater storage and water recycling incorporated into the proposals. Together with the abundant tree canopy and large areas of green infrastructure, these water elements help to cool the precinct during the summer months. Cultural development is divided between the five different urban clusters with each different cluster celebrating a different cultural or historic aspect. A dedicated science park is included to promote research into climate change.

Exploration of how to integrate local heritage, density, agriculture, ecology and climate into an urban design is reflected in the outcome of this scheme. By preventing the over expansion of urban development and retaining inlaid green spaces within a higher density model, sustainable coexistence is achieved.
The vision is to improve the future connectivity in a variety of topics. Having appreciated the site in the vast context of the 20 km by 20 km of footprint, the team recognises the key to future sustainability and efficiency of development lie with how resources are grouped and connected, which is always emphasised as an key ecological principle. Whilst the technology is continually evolving, the connectivity issue remains amongst urban and environmental assets, which lays the foundation of how a current urban design framework can guide development into the future. Topics including transport, green, water, employment and residential functions are key aspects of consideration in establishing integrated connectivity and vital networks to work towards climate sustainable future. The scope is envisioned to be a clean and high-tech industry area with mixed-use function linking towards key planned infrastructural assets, underpinned by integrated transport networks, walking catchment considerations and integrated green and blue belt networks.

The first connectivity is to form 5 main mixed-use centres along the proposed train station,
which radiate out into smaller and low-density community centres that are integrated into the green belt. Within each community precinct embedded the local trackless train connection to achieve the walkable city objective. Employment connectivity strikes the second highlight, the high-tech eco industrial park model, which integrates local networks of ecological services and assets as part of the sustainable resourcing, recycling and environmental conservations, will be deployed for all settings of industrial precincts, which will also be anchored and supported by the energy centre in the Sydney Science Park. Collectively, this integrated nature-industrial tandem of connectivity will improve energy and climate performance. A further connectivity from establishing a strong alliance of education and health industry leveraging on the ecological assets is also reflected in the scheme. For the Green and blue system, the aim is to create a network based on the South Creek flooding area extending into new green belts connected with the branches of the Creek, which forms the green-blue connectivity tandem feeding back into the urban settlements for various forms of ecological services that eventually will reflect on the energy and climate performances.
To create a climate sensitive and amenity driven research institute and residential built environment that seamlessly links into and complements the larger Bringelly Station Precinct. The primary design philosophy is to develop a sub-precinct with a smart economy anchor that compliments a holistic economic development, demonstrates best-practice climate performance and also builds up and enhances ecological assets such as water reservation, sustainable agriculture and connected green habitats.

Despite currently having a creek that runs through the site together with intermittent patches of forest, the site is subjected to extreme heat in its elevated location in Western Sydney and water provision from the shallow creek is minimal. Consequently, this poses two major climate problems; water vulnerability in terms of drought and floods and habitat fragmentation. The team translated climate performance and energy sensitive visions into four design elements consisting of lighting, cooling, ventilation and harvesting. Providing separation between buildings and strictly north facing apartment layouts ensures equitable solar access and
cross ventilation to facilitate passive cooling. The environmentally resilient network binds green and blue infrastructure to reduce hard surface coverage and increase water and heat intake. Urban agricultural farming and harvesting is incorporated to create a largely self-sustained ecological village.

The ecological and agricultural science research institute underpins the industrial development within the precinct, taking advantage of the natural waterways and green patches to establish a climate-sensitive and environment-resilient 'green and blue heart' of the precinct. The ‘green and blue heart’ is extended out through green grids inserted in finger-like increments into the residential parts of the design, with the intention to establish an organic connection between private properties, public spaces and nature. Additional sports and active uses are proposed along the surface of the underground metro corridor.
To create a liveable neighbourhood of pedestrian orientated green streets, parks and a mixture of housing, based on a new paradigm for sustainable higher-density integrated housing that accesses all the services and opportunities available in traditional terraced built-form typologies in Sydney's established inner-urban areas.

To harness the large portions of existing green infrastructure that exist around the site, existing green edges will be integrated throughout the site by a series of green linear streets that also provide clear sight lines and access to the creek. These green open spaces are linked to a differing hierarchy of streets that contain more intrinsic and organic pocket parks and courtyards within the fabric of the new urban form.

By focussing higher densities closer to the proposed heavy rail station, classic transit oriented development will be facilitated through a mixture of uses on grounds floors and podia on the marquee tower. The tower has been situated on the southern portion of the site to limit overshadowing onto other dwellings.
The traditional terraced housing typology is carried out on the northern boundary of the site and this illustrates a gradient of density across the site. This has been informed by complying with solar access regulations as well as harnessing the prevailing wind direction through the geometry of street blocks and urban wind canyons.

Within the urban design framework, climatic performance of the scheme underpinned the decisions and choices made throughout the design process. From larger macro scale interventions such as the geometry of street blocks and the height of buildings, to micro interventions such as the materiality of buildings and inclusion of green roofs, the scheme has achieved a climate sensitive urban design framework, rooted in the fundamental principles of transit orientated development that harnesses great amenity from the existing green and blue infrastructure systems.
To integrate the new train station and a cluster of new public amenities within a new precinct that will become the civic centre of Bringelly. Wide ranging sustainable approaches to improve urban microclimates and mitigate urban heat island effect are employed to ensure that the precinct will be an ecological and climate sensitive urban centre. The precinct will be liveable and environmental neighbourhood with green streets, well-designed riverfront open space as well as easy walkable access to major activities.

The majority of urban design principles utilised within this precinct, are based upon the fundamental principle of creating a walkable, green environment, thereby rendering the precinct with a level of sustainability. By utilising the prevailing wind direction as a geometric reference point, the configuration of buildings is designed to create space that allows fresh air to pass between buildings, as well as within them as a circulation tool. Two green corridors are arranged between the built corridors, providing equitable access to vital new green open space. The cooling benefits of green infrastructure are well documented, and in this instance,
will not only provide adequate setbacks for buildings, but can provide recreational uses as well. Generous street canopies of large native trees are also provided, in addition to green roofs, which will expand the potential pervious surfaces area and help mitigate storm water runoff. As such, this illustrates how patches of green spaces between buildings, will intertwine with the tree lined street corridors and culminate with the amalgamation of the wider green grid. Water sensitive urban design is similarly considered through the provision of swales along streets to collect storm water. Greenhouses are also proposed as another element of sustainability and provide more opportunities for people to interact with nature.
To create a climate sensitive community that provides equitable access to the waterfront, green open space and a wide range of public amenities.

The community is divided into two parts from northeast to southwest. A high density residential area is located along the eastern edge of the site, with low density residential areas located north west of the existing creek and integrated with a large portion of green open space. The first key urban design principle is to create an abundant green space. This has been provided to help absorb heat and cool the air temperature. There are various types of green spaces in the design, including the community centre park, linear park, riverside park and private yards. These green spaces help alleviate the urban heat island effect while connecting different areas of the community through a pedestrian friendly landscaped network.
By introducing water sensitive design and landscaped elements that incorporate water into the landscape, the prominence of the creek is highlighted and a greater level of amenity is created. Blue and green infrastructure systems intertwined are a fundamental basis of the design, and their value is maintained by situating higher densities away from the creek so that views are maximised. This allows the prevailing winds to be distributed throughout the precinct, thus highlighting how good urban design can contribute to cooling the environment, providing a sustainable microclimate. Materiality of the urban environment can also aid as a cooling mechanism and by using heat reflective materials and lighter colours for paving instead of dark asphalt, this helps create a more walkable environment. Retail shops, cafes and other community facilities are also distributed throughout the precinct.
The vision is to create a resilient, sustainable, natural and climate-friendly, liveable and vibrant precinct, integrated with the train station and local environmental and cultural character to contribute to the new Aerotropolis area of Western Sydney.

The resilient city model acts as a key benchmark for reducing the vulnerabilities of cities to climate change. This precinct supports natural hydrology and creates vital connections by enhancing the current creek system and floodplain. The preservation of a diversity of indigenous plants and animals contributes to the quality of life for city dwellers, providing a valuable ecosystem that works to clean the air and improve the climate. The urban design principles are as follows: to create dense mixed-use neighbourhoods that also allow for the effective functioning of all types of business, social and cultural activities with very low inputs of energy for transportation and logistics, thus increasing the resilience of these neighbourhoods. The reduction of impervious road surfaces minimises the impact of transport infrastructure upon the natural environment.
Using water sensitive urban design to improve the environmental performance of the precinct and mitigate urban heat island issues in Western Sydney. Wetlands for rainwater collection and treatment are proposed as well as a swale system along the proposed boulevard to improve the performance of the existing green open space network and provide treated rainwater for use by industry and for irrigation. The orientation of the buildings is determined to maximise solar access, while vertical green facades create shading for the western side of the buildings. Carefully considered gaps between structures improves ventilation and the proposed wetland and landscaped courtyards cools the whole area via water evaporation. Activating the street frontages of commercial and residential buildings facilitates activity around the core area of the new train station and along the boulevard.
INTERNATIONAL STUDIO
BOSTON & FUKUOKA STUDIO, 2018 - 2019
Message from the Program Director:

Urban Networks & Urban Gateways
Sydney | Boston | Fukuoka

In our 24th year, the Urban Networks | Urban Gateways theme integrates studio projects undertaken in Sydney, Boston and Fukuoka with a series of critical essays exploring the complex challenge of city-making in the 21st century. Focussing on entry points to the three cities – urban development around the new airport in Western Sydney, transit oriented development associated with the Sydney Metro project, the potential of a reconstructed western entry to Boston, and the remaking of Hakata Port, Fukuoka, Japan - the MUDD24 projects have engaged with the central concerns of the UNSW Master of Urban Development & Design Program:

• Spatial political economy, the manifestation in urban form of global patterns of capital formation, investment and disinvestment;
• Urban design principles and paradigms, normative models of 'good city form' grounded in aesthetic, social and environmental concerns; and,
• 'Urban design as public policy', the intersection of public policy, design principles, the deal-making of the property sector and defence of the public realm.

The decision to build the long-delayed Western Sydney Airport at Badgery's Creek, announced by the Federal Government in 2017, has unleashed the last phase of urbanisation across the Cumberland Plain - an urban expansion that will pave over the last remnants of green in the 'green wedges' between the growth corridors of the 1968 Sydney Region Outline Plan. These patches of rural land, slated to become an Airport City or Aerotropolis, are themselves remnants of the heroic greenbelt proposal of the 1940s Cumberland County Plan. Confronting this reality, MUDD Studio 2 convened by Dr Scott Hawken undertook a year-long study of urban growth and change around Western Sydney Airport as part of the International Geodesign Collaboration organised by Emeritus Professor Carl Steinitz of Harvard Graduate School of Design, which has enlisted universities worldwide to model and measure alternative responses to climate change. The results, presented in the MUDD24 Yearbook, are complemented by the 2019 Reid Lecture, 'Cooling the Cities,' to be given by Scientia Professor James Weirick.
In November 2019 MUDD students were hosted for a three week intensive studio workshop in the offices of world renowned urban planners Sasaki Associates in Boston, USA. Working alongside experienced practitioners and with real clients and stakeholders, students were immersed in an invaluable learning experience that also allowed them to showcase their skills to an enthusiastic audience. While Boston undoubtedly left an indelible mark on the memories of each student, the work produced during this three week period is sure to have triggered much discussion amongst those tasked with the redevelopment of Beacon Yards.
Beacon Yards

Boston

Boston has changed dramatically in the 50 years since its last citywide plan of 1965. In that year, industrial job loss had shaken the economic bedrock of the city, a race-relations crisis was mounting and Boston was in the middle of a precipitous decline that would shrink the city’s population by more than a third. After Boston’s population reached a low point in 1980, the city leveraged its hosting of world-class hospitals and universities to instigate a rebirth of the region as a knowledge-based economy.

Between 2010 and 2014, Boston added almost as many residents in four years as the city had in the prior twenty. Today, Boston’s workers are 30 percent more productive than the average and the city’s renowned educational institutions make Boston a magnet for young people. This has brought with it remarkable opportunities, though growth has also intensified some existing challenges, including affordability and inequality.

While other mid-sized east coast cities have struggled to rebound from industrial decline, Boston has established itself as a peer to other knowledge economy, high growth cities such as San Francisco, Seattle, and Washington D.C.
Today, the Massachusetts Turnpike viaduct and Allston / Brighton Interchange occupy a large amount of land and act as a barrier between surrounding neighbourhoods and institutions. The Allston I-90 Interchange Improvement Project will realign and redesign the viaduct and the interchange, unlocking the potential for the creation of a new mixed-use office and residential neighbourhood. Future dense development through the use of the air-rights above the redesigned transport network is also a possibility. Significant investment in infrastructure, including an open-space network that provides connectivity to the Charles River, the proposed development of West Station, coordinated and sustainable stormwater management, and stronger transit connections to surrounding neighbourhoods will be critical to supporting residential growth and creating a mixed-use research and innovation hub and serve nearby neighbourhoods such as Allston and Brighton.

Imagine Boston 2030, prepared by the City of Boston in 2017 is the first metropolitan strategic plan for Boston in fifty years. It identifies three types of places for growth and enhancement: enhancing existing neighbourhoods; encouraging a mixed-used core; and expanding neighbourhoods. Beacon Yards, falls under the remit of expanding neighbourhoods, which entails significant new mixed-use housing and job growth in transit-accessible areas at the edges of neighbourhoods that help reduce housing price pressure, expand access to opportunity and stitch together the physical fabric of the city.

Beacon Yards’ position at the crossroads of Harvard University and Boston University, along with its access to health and innovation clusters in the Longwood Medical Area and Kendall Square, creates potential for the area to become a centre for research and innovation.
Beacon Trotting Park opened east of Cambridge Street in 1864 on land just north of the Boston and Worcester (B&W) Railroad tracks. In 1890, the Boston and Albany Railroad (B&A), successor to the B&W, bought the land for use as a rail yard and named Beacon Yards after the trotting park. In 1958 the Massachusetts Turnpike Authority bought the rail line east of Route 128, including the rail yard and freight sidings, for construction of the Massachusetts Turnpike. The Turnpike was routed along the northern edge of the yard and a toll plaza and an interchange to Cambridge Street and Soldiers Field Road was constructed.

In the late 1990s, Harvard University began planning a major expansion southward in Lower Allston, where substantial parcels of marginal and derelict industrial land could be redeveloped for academic, research and commercial use. In 2000 the university purchased 19 hectares of "Allston Landing North"; land north of Cambridge Street, and between Cambridge Street and the Turnpike. In April 2003, the university purchased 37 hectares of "Allston Landing South", including Beacon Park Yard, the Worcester mainline tracks, the toll plaza and interchange, and CSX's engine yard - from the Turnpike Authority for $75 million.
The catalytic force behind the renewal of Beacon Yards is the proposed construction of West Station, forecast by MassDOT for completion in 2040. This would enable the site to be redeveloped as a classic transit-orientated development scheme with higher densities surrounding the station. West Station is expected to contribute to the continued growth of Boston if it becomes a stop on the planned north-east high-speed rail corridor. Once complete, this high-speed link would reduce the travel time between Boston and New York from the current four hours to ninety-four minutes. There are also proposals for a new freight line between South Boston’s Conley Container Terminal and the intermodal depot in Worcester, that would pass through West Station.

City of Cambridge / MIT, Grand Junction Greenway Project, 2006 to date
Upon close examination of the Beacon Yards site, it is evident that the 'throat' area of the I-90 is fundamental to facilitating orderly development of the site. The 'throat' area is east of the Allston interchange, where a viaduct of the I-90 proceeds through a narrow strip of land south of the Charles River and Soldiers Field, and north of Boston University. Below the viaduct, rail lines extend east of the rail yard to South Station or to Cambridge via bridges spanning Soldiers Field Drive and the river. MassDOT has developed three alternatives to replace the viaduct and these are:

**At-grade variation:** The design does not include any viaducts and all rail lines and roadways are at same grade. I-90 is located north of the Grand Junction Railway tracks. Travel lanes on I-90 and Soldiers Field Drive are reduced in width and minimal shoulders provided.

**Rail viaduct variation:** The design reconstructs I-90 at-grade with a viaduct carrying two Grand Junction Railway tracks and a shared-use path over the eastbound lanes of I-90. Travel lanes on I-90 and Soldiers Field Drive are reduced in width and minimal shoulders provided. The mainline tracks are relocated to the south.

**Highway viaduct variation:** This design resembles existing conditions, with a new wider viaduct carrying I-90, with railroad tracks located below. I-90 is improved with wider travel lanes and shoulders.
Key Stakeholders

Harvard University
City of Boston
Allston Community
Boston University
Amazon HQ2

MUDD students in this international studio were split into five different consultant teams to highlight the various stakeholder views at play in this complex project, and were tasked with highlighting the different implications resulting from each differing scenario.

The City of Boston team continued with the rationale and design principles set out in Imagine Boston 2030, whilst the Harvard team (as the major landowner of the site), proposed a design based upon current proposals set out by the Harvard Planning Office. The Boston University team imagined a scenario whereby a joint venture is carried out between the universities, whilst the Allston Community team advocated for a lower density scenario with a focus on connectivity to the waterfront. Finally, after Amazon revealed its intentions to locate and build an HQ2, a consultant team took the opportunity to theorise locating a new Amazon HQ2 at Beacon Yards, instead of the more remote Suffolk Downs site proposed by the City of Boston in its unsuccessful bid.
**Vision:** To create a vital gateway to Boston and networks of the broader region in the northeastern United States. Similar to North and South Stations in Boston, a new West Station proposed for this site will be a new transit hub to enhance mobility and connectivity between critical nodes within and beyond the city of Boston. It will also become a compact mixed-use, vibrant and distinctive district. This new district will be interactive, flexible, technologically advanced, inspired by academic activities and events, and inclusive of many constituents (residents in the Allston neighbourhood, students, employees and tourists). It also distributes more than 20% of the site as public green open space in a well-connected and integrated green system.

**Objective:** Improve the connectivity to the Charles River and improve the active transport network in a highly transit oriented scheme. Significantly increase green open space in the area, by enhancing the riverfront parkland. Create a vibrant and distinctive neighbourhood by collating a mixture of uses and functions within the development.
**Design Response:** The transport infrastructure is replanned to create highly efficient public transport networks. West Station as the multi-transit hub, is located undergrounded. Two light rail lines link critical academic activities. I-90 is to be elevated and Soldiers Field Road is relocated undergrounded to provide easy walkable access to West Station and the riverfront. Moreover, the space along the Charles River is expanded to generate a continuous riverfront promenade. "The Green Ring" along Seattle Street, Cambridge Street and North Harvard Street becomes the main green corridor. This proposal also integrates water sensitive urban design to mitigate some of the impacts of climate change upon the site.

In addition, Beacon Yards is designed as a TOD mixed-use neighbourhood that provides jobs for the innovation economy. Commercial and incubator spaces are planned under the I-90 viaduct and the Seattle Street light rail system will compliment a distinctive and attractive active street frontage and local environment.
Vision: To evolve an invigorated Allston community into a more liveable place, one that offers a range of services, housing options, job prospects, education and cultural opportunities and recreation; based upon the expansion of Harvard University in the Allston neighbourhood that is made possible by the reconstruction of the I-90 interchange.

Objective: To preserve the essential character of Allston's residential areas and heritage buildings; to increase provision of open spaces and accessibility to the Charles River; to enhance the pedestrian, cycleway and public transit networks; and to consider connections to the new West Station and wider Beacon Yards precinct.

Design Response: In order to create a safer environment that encourages walking and cycling, upgrades are proposed along Everett Street, Cambridge Street and North Harvard Street that create treelined boulevards with separated cycle paths. Preservation of the existing fine grained local character of Allston is also of primary importance. The introduction of new activity nodes such as a new civic plaza next to the Boston Landing Station and a new Allston Community consultant team.

Bai Ziyi
Huang Lixuan
Jiang Shenqin
Nguyen Thao Tien
Square and a wellbeing centre will stimulate activity throughout the neighbourhood. There is also a diverse mix of housing typologies, with lower densities proposed along Cambridge Street, slightly larger medium density dwellings in close proximity to the new station and student dorms located near Barry's Corner. Improving connections to the Charles River is achieved by an elevated bridge over Soldiers Field Road as well as the addition of a linear park along Everett Street that connects Allston Library via Harvard University to the riverfront. In addition, the alignment of Soldiers Field Road will be minutely realigned to facilitate a wider corridor for active transport adjacent to the Charles River esplanade. Traffic density will also be managed through strategically located one way and two way streets.
**Vision:** To introduce a campus innovation district in conjunction with a transit orientated development scheme centred around the construction of West Station. The creation of West Station in this context, will generate a gateway to one of the region's leading urban interdisciplinary educational institutions, Boston University (BU). By doing so, this will catalyse the growth of this urban campus that will also take advantage of the high amenity of the Charles River waterfront. The vision allows for the existing urban form and networks to be augmented to create new and enhanced elevated public green open spaces.

**Objective:** A key objective is to provide additional student dorm housing for BU students through the site, which will be managed by an increase of density surrounding the new station. By focusing on connectivity north towards Harvard, this provides an opportunity for future collaboration, knowledge sharing and leveraging of the agglomeration economic principle. Connections will also be made towards the Charles River and an internal breakdown of educational silos is proposed by diversifying the locations of various faculties.
**Design Response:** The proposed urban design framework envisions an elevated structure built above West Station that will facilitate connectivity over the I-90 and existing railroad line. This will engender a range of activities and act as a gateway to BU within a mixed-use transit node. By relocating the proposed Data Science Center adjacent to West Station, this will anchor the new, smart city cluster concept to support innovation and research. The elevated platform over West Station continues east, over the existing I-90 structure as a viaduct on top of a viaduct. As a significant intervention in the landscape, it will be a scenic, oasis like green open space and an extension of the Charles River basin. The design respects BU’s indispensable spiritual culture by maintaining vital existing sporting structures and fields, whilst relocating those in the way of West Station to a new precinct north of the railroad line. Additionally, the frameworks suggest that BU discuss a joint venture between that largest land owner south of the new West Station, the Hamilton Development Company, to provide a larger land holding and a more prudent way forward for extensive redevelopment of the site.
 Vision: To create a dynamic campus based on the 21st century campus model that embraces a new mix of pedagogy and spatial planning and supporting disciplinary academic work, innovation, collaboration and allowing the students, faculty and campus to respond to continually changing times.

Objective: The key objectives are connectivity, continuity and collaboration. Stronger connections will be made from Harvard's Allston campus to its Cambridge Campus, as well as embedding itself within the Allston neighbourhood rather than dominating the landscape without integration. Funnelling the Charles River parkland and augmenting it within the site with new, wider green open spaces that infiltrate deep into the campus, as well as providing new green and blue infrastructure links for the wider community. Align new development of Harvard's faculties that are to be relocated south of the Charles River with the historic campus in Cambridge and encourage an urban form that will engender a collaboration of disciplines in distinctive new learning spaces that promote a breaking down of educational silos.
**Design Response:** One of the primary design principles is to increase permeability and connections for pedestrians from Harvard’s new campus to West Station by changing the current two-way traffic network and separating it into two separate one-way traffic flows along Western Avenue and Cambridge Street. This increases safety and accessibility. In addition, a bold proposal of two linear green open spaces is fundamental to creating connections for students and the wider community towards the Charles River. The Harvard in Allston Campus Exchange Hub will facilitate collaboration, aided by moving the Graduate School of Education, Harvard Department of Music and the existing Harvard Business School to Allston. The plan emphasizes networks and gateways in the form of new active streets, open flexible spaces, connected pathways and a revitalised public realm, which creates a critical link between the Harvard campus, the local Allston community, West Station and the Charles River. Spaces for integration, exchange and innovative allow for a continuous expansion of Harvard University over time.
Vision: To create a landmark Amazon HQ2 on the Allston bend of the Charles River, catalysed by the activation of West Station as a transit-orientated high density development scheme; the creation of an integrated pedestrianised park system revitalising the waterfront; and establishing wider connectivity to the educational, economic and innovative hubs within greater Boston.

Objective: The primary objective is to underground the I-90 through the site. By doing so, this will engender on-ground connections to the Charles River, as well as facilitating an entirely new street network that intertwines with Harvard to the north, and Boston University to the south. Establishing a patch & corridor network of public green open space within the site will amalgamate these spaces into the wider matrix of the Charles River, enabling the urban fabric to harness the proven values of green and blue infrastructure. The new elevated West Station will facilitate through-site connections by eliminating connectivity barriers to the site, and will be anchored by a mixture of uses within higher density areas of the site.
**Design Response:** The chief strategy is to underground the I-90, which will facilitate the elimination of current barriers of site connectivity and optimise the site's connection to the Charles River. This will unlock public access to the river's edge through pedestrian connections to the reinstated esplanade. A series of patches of green open spaces within building courtyards will intertwine within corridors of deciduous street trees along street corridors, and will culminate in a larger more pronounced and reinvigorated riverfront. This is made more accessible by an elevated pedestrian pathway over Soldiers Field Road. By providing distributed green open spaces, the varied needs and desires of the future Amazon workforce and the resident population in this new high density environment are catered for. Passive green open spaces and active recreational and sporting green areas are proposed. The new West Station is supported by commercial and residential development with a range and mixture of uses along the ground floors of buildings and podia of towers.
The Fukuoka International Studio in 2019 saw MUDD students join forces with students from the Graduate School of Design at Kyushu University to explore design possibilities for the city's main waterfront redevelopment site. Presenting their analyses and urban design frameworks to unfamiliar academics, newly acquainted classmates and the real-world client of the Hakata Port Authority was a daunting experience but one that enabled MUDD students to refine their designs, polish their presentation skills and defend their proposals to great acclaim.
Hakata Harbour re-development was proposed by the City of Fukuoka for its unsuccessful bid for the 2016 Olympics Games and is being re-considered in relation to a bid for the 2026 Asian Games.
Fukuoka: Networks, Gateways and Global Cities

Brendan Randles

For the urban designer, transition is everything. The juxtaposition of land and sea, topography and settlement, the meeting of different spaces, objects, public and private domains - the transition between built form, materials and ground plane defines urban space and gives each city its distinctive character. Transition also refers to movement - to arrival, between precincts, across town - to transport systems and the alignment of portals to the city's constantly changing form. From 'urban gateways' to 'urban networks,' great cities extol the positive tensions between built form, the city dweller and her collective journeys through urban space. With the theme, 'Urban Networks | Urban Gateways,' Fukuoka's Hakata Port area was a fortuitous choice for the 50th international studio of the UNSW MUDD Program, undertaken in association with the Graduate School of Design, Kyushu University. Not only does the metropolitan area of Fukuoka comprise a complex array of infrastructural and ecological (urban) 'networks,' its outward looking and evolving port presents a veritable 'urban gateway' to an expansive regional context. Moreover, Fukuoka's status as arguably Japan's most vigorous global city provides a unique background for the urban design proposal, as a gateway to the world.

Located on the northern side of Kyushu Island, Fukuoka faces north across the relatively stable Genkai Sea to South Korea, a mere 200km away. With such proximity to the Asian continent, Fukuoka is distinctively multicultural, its history shaped by trading partners and
periodic Mongol invasion. Occupying the low-lying plains between the Naka and Mikasa Rivers, early maps of the original merchant town reveal a tight grain of orthogonal streets stretching from Hakata Bay towards the mountain ranges to the south. While numerous 'kofun' (ancient Sino-Japanese graves) suggest that the Hakata settlement could have been established as early as the fourth century AD, its oldest shrine, Hakozaki-gu dates from 923AD. The moated samurai town of Fukuoka on the other hand, was established west of the Naka River during the Edo period, almost seven centuries later. With an elevated new castle located high on Fukasi Hill, the surrounding street layout comprised defensive L and T shaped streets, still evident in Chuo-ku today. With a single bridge linking Fukuoka to Hakata, the control and separation of its distinctive merchant, samurai and feudal classes was assured. Reflecting a civility and order evident even in its early stages, Fukuoka attracted glowing endorsement from John Saris (1580-1646), captain of the first English voyage to Japan in 1613:

I did land there and dine in the Towne, the tyde and wind so strong against vs as that we could not passe. The Towne seemed to be as great as London is withine the wals, very wel built, and even so as you may see from the one end of the streete to the other. The place exceedingly peopled, very ciuill and courteous (Satow 1900, pp.121-122).

Contemporary Fukuoka is Japan’s sixth largest city, enjoys the country’s highest population growth and receives in excess of two million tourists annually - mostly from China, Taiwan and Korea. The city has a high rating for liveability (Wilson 2008) and records consistently rising investment. As a testament to its global presence, Fukuoka facilitates Japan’s second highest annual number of international conferences and hosts an increasing number of cruise ships at its Hakata Port. While its texture of generic concrete structures aligns with all Japanese cities, it is the fusion of inward and outward impulses - its interlaced networks and gateways - that make Fukuoka most distinctive. On arrival for the international housing venture Nexus World (completed 1991), architect and urbanist Rem Koolhaas commented:

Fukuoka: young pink Chicago around a blue bay. (But all colours are blue in Japan). Eastern extremity of an axis that runs via Seoul and Moscow to Lille, and eventually even to London, maybe. Like almost everywhere, the south considered essence of attractiveness: better climate, less history, more freedom. Atlanta, Munich, Marseille: people, activities, programs - disconnected from specifics of place - gravitate toward a zone of maximum niceness. In J apan, that is Fukuoka. Stacked highways, stainless steel ‘blinders,’ smell of oysters. Site: flat; distant mountains; residential area of almost East German neatness near invisible sea; could be anywhere (Koolhaas 1995a, p.92).

Reflecting a cosmopolitan global presence, Fukuoka has been conspicuously open to international architectural and urban design trends for many decades, with substantial projects by Emilio Ambasz, Rem Koolhaas, Steven Holl, Aldo Rossi and other prominent design practitioners completed throughout the city since the mid-1980s. With varying degrees of abstraction, these buildings are emblematic of the global city: visually arresting, somewhat detached from context, yet clearly making an impact on the city’s image of itself and its perception on the global stage. Described in striking terms by Koolhaas (1995b, p.364) as a ‘gene splice . . . stripped of ideology, then boosted by J apanese ingenuity, Fukuoka’s engagement with global architecture and urbanism casts fascinating light on J apan and its relationship with the world.

Driven mainly by Kyushū’s most prominent architect, Arata Isozaki (b.1931 in Oita, on the east coast of the island) these international
commissions reflect a desire for Japan to engage with - rather than retreat from - global urban discourse, a belief that Isozaki established soon after the completion of his 'Demonstration Robot', a three storey metabolist structure designed for Expo 70 in Osaka. With metabolism in decline and with it, the influence of Kenzo Tange - his former mentor and the most famous Japanese architect - Isozaki looked beyond Japan for authentic models of design and discourse. Notably, he contributed an article on Frank Lloyd Wright's Johnson Wax Building to the first edition of Global Architecture - a magazine founded by the photographer Yukio Futagawa. Featuring seminal works of international modernist architecture for Japanese and international readers alike, its launch in 1970 is reputedly the first time the word 'global' was aligned with architectural discourse (Jarzombek 2018, p.572). In contrast to Tange's Japanese-focussed proposals, Isozaki's article rejected nationalism in favour of Wright's 'cosmopolitan fluency' and apparent cultural freedom. Amidst an economic downturn, with the memory of WW2 and Hiroshima still prevalent and a geopolitical order largely determined by the United States, Isozaki's plea for openness was remarkable, no less so for its impact on Fukuoka. In response to the tensions between nationalism and cosmopolitanism, he remarked at the time:

This dichotomy that appears as the only choice is, however, a false one . . . I believe I have to expand the peculiar sense of beauty and manner my island nation has produced into the global dimension; to the extent sometimes, that may even cause a conflict. I do this not only as a stranger to the West but also as a stranger to Japan (Jarzombek, 2018b, p.510).

Isozaki's influence, from his promotion of global dialogue, to his international profile and prolific architectural legacy - including major projects throughout Fukuoka - cannot be understated. Remarkably, his recent Hakata Port project - designed as part of Fukuoka's failed bid for the 2016 Olympics - argues that the accumulative impacts of a truly visionary urban design scheme can transform not only its urban context but the nation's relationship with the broader region.

While the cities of Hakata and Fukuoka were officially merged in 1889, this has not extended to the re-naming of its major urban gateways - its ferry wharf, passenger terminal, airport and main rail station - which still retain the name Hakata up to the present. Although severely bombed in WW2, Hakata retains its intense grid of orthogonal streets, now housing randomly scaled residential towers, low scale dwellings, stunningly themed retail malls, narrow shops, shrines, substations, karaoke bars, strip clubs, ramen outlets, government agencies, vertical advertising structures, symbolic towers, traditional torii gates and parking structures.

Containing Fukuoka's most essential infrastructure, bounded by water and ringed by multi-level freeways, Hakata and its port - isolated from the main city centres - is perhaps best described as an 'urban periphery'. In terms defined by Manuel de Sola Morales, it is a place marked by 'an absence of determinations in the classical sense . . . a vertiginous terrain for images, and cinema and photography' where 'neither repetition nor difference (in Gilles Deleuze sense) have occupied it' - conditions that transcend its physical reality:

Leaving aside the irrelevance and dirt of the peripheral areas, its functional problems, and the aesthetic difficulties of dealing with emptiness, there is a strong suggestion, for the eyes of those who look at it positively of a field of free thoughts oriented towards the future and the present, not enriched by any past (de Sola-Morales 2008, p.192).

Given Japan's relatively recent 'reconstruction', the contrast between the centre's ordered space and the entropy of the fringe is markedly less clear. In their Made in Tokyo study of unique building types, Atelier Bow Wow documented Tokyo's astonishing models of hybridity and adaption: 'shameless compositions and functional combinations, unthinkable in the European city. In this sense, the port area of Hakata and its expansive shoreline, its various structures, off ramps, existing facilities, logistics buildings and tentative relationship with adjacent urban networks reflects a condition that is not only contextual but also representational:

Where cultural interest is low interest in practical issues is high . . . engineering structures, rooftops, walls or gaps between buildings, utilise whatever is at hand. What is important is the discovery of how to establish a second role to each environmental element. With this doubling up, it becomes possible to re-use spatial by products. The material is not given, but is discovered through our own proposition of how to use it. It might be termed 'affordance' of the urban environment. (Kajima & others 2006, p.12)

So within such a fascinating site - a truly 'global gateway' - how did the joint MUDD/Kyushu University Studio fare? Remarkably well, especially given the workshop's tight deadlines, the scale of the context, its relative remoteness from the activity centres of Fukuoka and the openness of the brief. Each of the five teams proposed a third urban centre to complement Hakata and Tenjin - Fukuoka's main retail centre - and it was very satisfying to observe that each
group was able to define distinctive conceptual objectives in response to hastily gathered local research, and use this material to present diverse and compelling urban proposals to our Japanese hosts.

The adaption of existing ‘urban networks’ generated the most interest amongst our critics. Either through the transposition of adjacent street networks, the extension of existing transport modes, adaption of large-scale infrastructure to suspend trams, transformation of the water’s built edge or taking advantage of its port morphology, those groups were able to positively exploit the ‘affordance’ of the site made the strongest impressions. Hence, the integration of canals and fractured water precincts reduced the apparent scale of proposals and evoked a unique character akin to the site's potential. Though not fully resolved, a strategic relocation of logistics on site was highly commended, not only for freeing up the development potential of the port edge, but also allowing the grittiness of port operations to continue to determine its urban character.

The creation of large urban networks was less embraced by our hosts, who expressed concern for the feasibility, scale - and ironically, given the heroic ‘cinematic qualities’ of the site - the limited urban character of the proposals. The students were able to demonstrate that to truly capitalise on the site’s ‘gateway’ location, access potential, and capacity to transform existing conference facilities, a far-reaching examination of the waterfront is required with forward planning, complex partnerships, procurement models and spatial interventions extending well into the 21st century. In this ‘global’ vision, not only will the city be transformed but also the dynamics of Kyushu Island, Japan and the trans-border economic region.

In addressing the challenges posed by redesigning the passenger terminal and conference facilities some groups relocated the terminal - thereby transforming the site’s spatial dynamics - others combined it with complementary functions to activate an otherwise lifeless facility. Some new locations for conference facilities were quite brilliantly proposed – schematically perhaps in terms of scale, prominence, ground-floor interface etc but demonstrating opportunities to align the movement of international visitors with orchestrated public space networks and new patterns of everyday life in a new, hybrid centre of Fukuoka. Given the intensity of movement evident throughout Fukuoka’s existing retail networks, hybridity and congestion were seized upon as definite positives.

Conceptualising the site as a series of transitional ‘gateways’ - between sea and land, ships and streets, performance and presentation, from one culture and another – was the key to proposing positive transformations. One only has to think of great railway stations, airports and indeed, conference halls – the Sydney Opera House no less - to recognise their transformative place in metropolitan life.

The five schemes resolved back in Sydney and presented in this yearbook were informed and energised by the contributions of the following Kyushu University students during the intense, highly-charged workshop in Fukuoka: Shun Arima, Gao Shenglan (Group 1), Suzano Kawamoto, Fu Yuxin (Group 2), Yuhei Kashima, Ei Thandar Kyaw, Masaki Okura (Group 3), Naoya Kubo, Kazuki Fukuda, Huda Mohammed Faisal (Group 4), Takayuki Nakashima, Minami Omura and Li Jiaxin (Group 5).

We truly thank the KU students for the creativity and insights of their cross-cultural and cross-disciplinary collaborations.

There is no doubt that Hakata Port could become a truly dynamic and distinctive urban precinct. The students as ever inspired our hosts with their respective site observations, proposals and visionary ideas. From the generic urban framework - functionalist, flexible and truly international; to a series of discrete interventions inspired by the port’s existing permutations; a network of ‘villages’; a public waterfront; and finally, a hybrid environment combining water living, port facilities and logistics, the MUDD/KU Studio has opened the window. Now let’s see what eventuates!

References:
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The joint MUDD/Kyushu University Studio commenced with a lecture by Mr. Takahisa Nakamura, the Director of the Port and Airport Authority of Fukuoka City. Mr. Nakamura presented three questions to the studio: how does Sydney compare with Fukuoka?; how can an understanding of Fukuoka’s geographic and economic background contribute to the studio?; and, what are the next steps for the waterfront?

After comparing the geographical location and population of both cities, Mr. Nakamura pointed out that while Sydney has a population of 36 million people within a 3,000km radius, Fukuoka has 1.6 billion! The number of visitors coming to Fukuoka is increasing; over the past five years, foreign visitors have increased threefold and the number of cruise ships visiting the port has increased tenfold. Yet Mr. Nakamura noted that in 2017, the number of Sydney’s incoming tourists was 3.41 million while Fukuoka’s incoming tourists numbered 2.98 million. To this he asked, why does Sydney (attracting 9.5% of the population within a 3,000km radius), have more international tourists than Fukuoka (attracting 0.002% of the population within a 3,000km radius) despite having a far smaller population in the catchment area?

Mr. Nakamura went on to explain local trends that will have significant influence on the future of Fukuoka as well as its port. First, he pointed out the proximity of Fukuoka to China, Taiwan and Korea - three areas
of tourism growth and the source of most of Fukuoka’s visitors. Next he revealed that although Japan’s population has decreased by 1.1% over the last ten years, Fukuoka continues to grow at a rate of over 1% each year. Fukuoka is popular with Japanese people, who are attracted by its culture, its weather and more relaxed character. It rates highly on quality of life surveys, with 97.1% responding positively to the most recent surveys. In comparing Sydney and Fukuoka, Mr Nakamura praised Sydney’s waterfront development, in particular Circular Quay, as being a more dramatic and welcoming place of arrival. He also noted, that while Fukuoka concentrates its airport, passenger terminal and two key retail centres (Tenjin and Hakata) into a radius of just 2.5km, its port is an unattractive place of arrival, unable to meet the growing demand for cruise ship visits and seemingly disconnected from the city.

With such growth and attraction in the area, the city’s waterfront must change. Hakata Port requires more facilities for Meetings, Incentives, Conferences and Exhibitions (MICE), more accommodation, more high-quality open space and a better connection to Tenjin, Fukuoka’s main retail centre. After showing a number of images of desirable port waterfronts, including Circular Quay, Miami Port, Vancouver and Marina Bay in Singapore, Mr Nakamura concluded with the dream of Fukuoka’s young Mayor Soichiro Takashima, to construct a new urban ‘rope-way’ (sky tram) to connect the port and Tenjin. As its major developments of recent decades attest - Island City, Momochi and Nexus World - Fukuoka and its mayor are highly ambitious. Accordingly, Mr Nakamura urged the students to be inspirational in their visions to match the city’s aspirations.

The most significant aspect of the workshop was its inclusion of housing, which did not form part of the Port Authority’s brief. While one group attempted to impose Ginza’s urban structure onto the wharf, another group used Manhattan type residential towers at great scale. Other groups were more restrained in their approach and sensibly tried to configure mixed-use precincts based on existing urban patterns in the vicinity of the site. An interesting proposal included the reconfiguration of canals and bays in a manner that was innovative while learning from the port’s existing context. At the final presentation, Mr Nakamura expressed surprise at the scale and density proposed, but enjoyed the variety of approaches taken, which resulted in very different urban proposals.

A few weeks after the final presentation, Mayor Takashima was re-elected and officially launched his ambitious ‘rope way’ project soon after that. With its increasing population growth - against the diminishing national population - Fukuoka welcomes new ideas on how to grow and prosper. The collaboration between the two universities and the Port Authority has only just commenced; we do hope that this relationship will continue well into the future.

Reference:

Masaaki Iwamoto is Assistant Professor in the Graduate School of Design, Kyushu University. He assisted Professor Magakuzu Tani, Dean of the Faculty of Design, Kyushu University and Associate Professor Tetsuya Ukai in hosting the 2018 Joint KU/UNSW Urban Design Studio.
Located on the northern shore of the Japanese island Kyushu, Fukuoka is one of the fastest growing cities of Japan. It is bordered on three sides by mountains, surrounds Hakata Bay and opens on the north to the Genkai Sea. The proximity to South Korea and China has been a beacon of trade and opportunity, attracting local migration away from other cities. Fukuoka’s strong economy based on cross-border trade with South Korea, China, and beyond and includes logistic operations, financial services, education, creative clustering, tourism etc (Hoshino 2010; Lin 2008).

The city has a long commitment to master plans. In 1968 it was the first city in Japan to adopt this planning approach (Takashima 2018). The large land holdings on the waterfront, currently in public ownership, provide the basis for a compelling exploration of 21st century Japanese urbanism in theory and practice.
The MUDD 24 International Studio in Fukuoka, hosted by Professor Masaki Iwamoto from the Graduate School of Design Kyushu University, invited MUDD students and Japanese students to study, analyse and propose design solutions for a waterfront site between the city and its main port (Hakata Bay) during a two-week highly intensive workshop. Teams of students explored the site and considered what various interventions might be required and where the potential for innovative solutions could be explored.

The site chosen for the studio is one that the Port of Hakata Authority has already identified as a future redevelopment opportunity. Acting as the client for the workshop, the port authorities welcomed solutions of an urban scale and design that would promote a new image of Fukuoka and which would clearly articulate a transformation from a regional city to one of Japan’s most important and connected gateways.

The design site houses key structures of vital importance in bringing people to the city. These include the MICE facilities (Meetings, Incentive tours, Conventions and Exhibitions/Events) that are all grouped together and run at near capacity to enable Fukuoka to function as the second largest convention destination in Japan. The waterfront area in which the MICE facilities are located however, lacks dining and entertainment, is lacking in a maritime character, does not have enough hotel rooms and is seen as remote by residents and visitors. Poor accessibility to public transport, the main railway station and the airport as well as traffic congestion have also been identified as major problems. This sense of isolation is further exacerbated by the presence of a major highway, raised on a viaduct that runs across the site, severing the waterfront from the rest of the city.

The port activities that on the design site include a domestic ferry terminal and a major logistics terminal that is important to the city’s economy but is a major contributor to the traffic congestion. The existing cruise ship terminal is projected to grow with an increase in passenger numbers as well as ship size. At present however, the same lack of attractions and vibrancy greets visitors from the cruise ships as they step ashore.

The resulting proposals recognised the many shortcomings of the existing urban environment and in particular, the way in which a city that is connected to the rest of the world by its port, Fukuoka has failed to embrace its waterfront. They challenge this lack of connectivity with new urban strategies to strengthen the city’s networks of connections and enhance Fukuoka’s role as a 21st century gateway to Japan.
Over time, the port of Fukuoka has created numerous intimate waterside environments that enrich and activate its harbour edge. Our intention is to extend this pattern through the creation of targeted interventions. Episodic and limited in scale, each project will progressively connect the city to its port in an organic and distinctive manner.

The first stage is planned around an expansion of the fish market with other activities integrated throughout this small precinct. A second stage is proposed on the northern banks of the site that allows for the expansion of the existing residential neighbourhood. Through subsequent phases the changing nature of port activity is allowed for, with logistics and freight uses on the main pier gradually being replaced by a mixture of residential, commercial and cultural buildings as well as an expansion of the international cruise terminal that caters for projected future growth in passenger numbers. Finally, a science precinct is proposed, representing a forecast change in the nature and type of commerce that occurs within the port.
Although this urban design allows for growth and change, there are some core design solutions that are applied across the entire project. Waterways are cut through the site, increasing the opportunities for development to directly address the water. This also enables the pedestrian and landscaped spaces to link to water-based activities and makes the waterfront accessible to the public. Another strategy is to create distinct nodes of greater commercial density that act as catalysts for other development around them. The disconnection between the existing city centre and port is resolved by providing an express train connection between Hakata Station and the international cruise terminal. More public activities and an improvement to the landscaped spaces around the conference halls attracts people to the harbour edge. Green open spaces increase the opportunities for residents and visitors to explore the precinct and street activation is encouraged through the introduction of traditional Japanese shops and cafes that specialise in the local cuisine. Through this design, Fukuoka retains its current functions while gradually transforming into an inviting, contextual and futuristic city.
The establishment of a new urban centre at the Hakata Port creates a new dynamism with the existing Tenjin and Hakata centres, bringing the city to its most exciting arrival point. Connected by rail and flanked by high density urban precincts, the centre is intensified by a new network of mixed-use neighbourhoods with specific open space and waterfront qualities. To optimise the site's gateway potential, all boat arrivals are centralised and aligned with Hakata's main boulevard with new cultural facilities relocated to more prominent and iconic locations. High density residential development is proposed to cater for a city with a growing population. The integrated network of parkland planned to respond to contemporary issues of sustainability and provides new outdoor spaces for the people of Fukuoka. The geometry of the existing land is broken via a series of projections and indents that reinforce the maritime nature of the locale and provide opportunity for variations in built form and view corridors. A new metro station is proposed, functioning as a catalyst for commercial activity around it. This will help bring the centre of the city towards the harbour's edge and provide employment.
shopping and entertainment. The importance that the existing convention and meeting facilities have to Fukuoka are respected. Further improvements are proposed by creating landmark and highly sculptural buildings that house concert halls, film schools, hotels and museums. These buildings populate prominent locations around the port and add to a sense of arrival and destination. Large areas of green landscaping are complimented by large expanses of landscaped plazas and courts that enable the many outdoor events that are staged in Fukuoka to be presented in an attractive and high quality urban space. The opening up of the traditional axis towards Hakata Station further enhances the connection between the port and the city centre and ensures that this new urban centre is seamlessly integrated with the surrounding neighbourhoods. Catering for the expected increase in passenger numbers and ship size, the existing cruise terminal is expanded and improved and forms a strategic part of this development. Together with the considered development of the areas around it and the creation of a unique cultural ribbon of new and existing facilities around the port, Harbour Gateway represents a dynamic and exciting gateway to Japan.
In response to the port’s isolation and poor public domain quality, we propose a clear urban framework, integrating new streets, transport links, open space systems and public facilities. As an international gateway, the proposed network will enhance movement throughout the site, integrating arrival with new and existing cultural and mixed-use environments. The new framework is highly flexible, allowing for staging, variation in scale and type, innovation and sustainability in the creation of Fukuoka’s most distinctive and international urban precincts.

Our objective is to develop the port as a gateway to Fukuoka, enhancing its conference facilities and increasing its resident population. By increasing the connection between the port and the city, this will become the third major centre of Fukuoka.

The existing cruise ship terminal is relocated to the east, allowing the western edge of the site to be opened up to the city while retaining the experience of docking in the heart of Fukuoka.
Further connections are made by expanding the existing street and roadway network and through the introduction of a light rail system linking the site to Hakata Station.

The existing conference facilities are expanded and reoriented to the waterfront where high quality landscaped spaces provide a pedestrian pathway around maritime themed attractions. Mixed-use development ensures that a variety of land uses occur and allows for projected growth in population and economic activity to be staged over time. A landmark water feature is proposed for the northern most end of the port and a new stadium and major park brings people to the area.

Traditional Japanese architectural and landscaped elements form the basis of the public spaces and the scale and character of the built form respects the predominant scale of central Fukuoka. This will ensure that Fukuoka remains an important and identifiable gateway to Japan, and a growing city that celebrates its waterfront and the contribution it makes to connecting Fukuoka with the rest of the world.
We are attracted to the port environment and value its dramatic changes of scale, activities and arrival. Rather than move its functional operations elsewhere, we aim to create a truly heterogeneous port environment; a place to live and work within the city’s most vital place of exchange.

Our strategy is to create diverse water edges for living and activation within three inter-modal transit and activation centres. Each of these will be anchored by a sequence of public spaces linked to a new light-rail and public bus network.

The centre of the peninsular is retained as a logistics hub where the industrial impacts of this usage are mitigated through landscaped buffering and the grouping of complimentary land zonings. This part of the site is capable of further transformation into the future without the need for major redevelopment of the surrounding streets. Berths for cruise ships and freighters are retained on the eastern and northern parts of the peninsular, freeing up the western edges for medium density mixed-use redevelopment.
The domestic ferry terminal is redeveloped and relocated to the inner basin, where a new cultural gateway is located that showcases traditional culture and architecture and retains the existing shrine and port tower. A new pedestrian link is proposed across the inner basin to connect the two sides of the site.

A new axis is created that aligns Hakata Station with the convention facilities. Upgraded public spaces around the convention facilities and a network of pedestrian friendly parkland spaces helps to reduce the impact that the existing elevated freeway has upon the site.

This urban design framework influences and improves the current public perception of waterfront living and waterfront activation. In doing so, it caters to the Fukuoka Port Authority’s agenda of maintaining the logistics functions in situ, while still allowing for the development of new urban clusters. Combined with a new world-class cruise terminal and the enhancement of cultural and tourist attractions, this will elevate Fukuoka’s status as a gateway to Japan.
Our aim is to fully integrate the city and Hakata Port through the introduction of new public spaces, cultural facilities and transport networks. Activated by mixed-use precincts, the new public waterfront will extend Fukuoka to the harbour edge. A new city centre that compliments the existing business centres is created beside the raised freeway and on reclaimed land that extends the city further into the harbour. This fronts a new domestic ferry terminal and acts as a catalyst for other development around it. The raised roadway is retained and harnessed as the viaduct for a new suspended train system that connects this new precinct to the rest of Fukuoka. Some existing large buildings that act as a barrier between the city and the harbour are removed, and a landscaped axis is created that visually and spatially connects the existing central city to the water. The space below this viaduct is landscaped as a quiet and open space and is part of an expanded green network that adds to the limited amount of public outdoor space that is currently available in the city. Additional parkland is provided as a small headland park and as a large cultural park on the western edge of the peninsular.
Book-ending the cultural park are a landmark cultural building and a new maritime museum which celebrates and reinforces Fukuoka’s traditional links to the sea. The convention and meeting facilities that are an integral part of the city’s economy are expanded and refurbished, ensuring that they are season-proof and activated throughout the year. Public spaces around these buildings are improved to promote connectivity and walkability and to enhance the visitor experience of these buildings. A new hotel/retail precinct is proposed that is supported by a variety of retail and commercial activities and is of a scale and character that is typical of Fukuoka’s central business district or Tokyo’s Ginza. Recognising the forecast sustained growth in passenger ship arrivals for the next thirty years, the existing logistics functions are concentrated on a smaller site on the eastern side of the precinct and the current cruise ship terminal is relocated to an expanded pier at the tip of the peninsular. This new facility allows passengers to disembark and immediately experience a harbour-front environment that is active and inviting. Once completed this framework will transform Fukuoka, turning the city back towards the water and redefining the waterfront as a public space for all to enjoy.
To place the waterfront development strategies pursued in Fukuoka in international perspective, this essay directs a spotlight on the example of Hamburg’s HafenCity. In the age of containerization and globalized information flows, both cities have been able to learn from the mistakes of early harbour transformation projects such as London Docklands.

In HafenCity, the creation of large mono-functional districts and the allocation of land en globo to a small number of developers has been avoided through the development of sophisticated procurement principles and an elaborate mixed-use approach.

The HafenCity strategies can be seen in the context of new windows upon urban development and design as an activity in the interest of the public good, which were opened in Europe in the 1990s. This led to a re-definition of the role of public and private actors and to the growth of strategies which combine design competitions with innovative forms of land release and tendering processes. Aiming for raised standards of design, improved social outcomes, liveable and lively communities and higher degrees of sustainability, these strategies have added new fields of action. They have also demonstrated that the surplus value generated by applying these strategies – which are essentially mechanisms not primarily geared towards generating maximum turnover – could not only be seen in superior urban design outcomes; many have been
delivering major economic returns as well on the ‘design dividend’ principle.

HafenCity is the largest urban redevelopment project in Hamburg. The district is essentially an extension of the city centre, which it enlarges by about 40%. It covers a land area of 127 hectares and envisages the construction of 7,500 homes for 15,000 residents, offices for 45,000 jobs, several universities, schools and a wide range of commercial and cultural buildings including the iconic Elbphilharmonie concert hall (opened 2017) by 2025. Around 100,000 visitors per day are expected to be accommodated.

The Gateway City context

Hamburg is a city state with today about 1.8 million inhabitants situated on the River Elbe some 110 km upstream from the North Sea. The city has traditionally been known and branded as Germany’s ‘Gateway to the World’ (‘das Tor zur Welt’). During the years of Germany’s political separation into the Federal Republic of Germany and the German Democratic Republic 1949-1989/1990, the loss the city’s hinterland and its connection to the east meant that its traditional gateway functions had been severely impaired. Germany’s reunification and more broadly the collapse of the communist bloc revived a broad discussion on the concept of ‘gateway cities’ such as ‘Sea Ports as Gateways in a Coalescing Europe’ (Nuhn 1996) and ‘European Cities in the World City Network’ (Taylor 2002). Oriented towards large-scale, global connections, the Gateway City concept takes a perspective that is diametrically opposite to those formulated by Christaller and von Thünen, which focus on the local and regional supply situation (Heintel & others 2008). In academic discourse, these complementary perspectives have far-reaching ramifications including the understanding of space as ‘relational’ rather than ‘container’ space (Amin 2004, Lefebvre 1991, Malpas 2012).

New arrangements

In practical terms, Hamburg’s new situation in the Gateway City context resulted in immediate activities by the Hamburg Senate, which were carried out under the cloak of secrecy in order to avoid speculation. By 1991, the Senate had initiated a new strategic harbour development plan and soon after, the municipal agency for harbour and location development - Gesellschaft für Hafen- und Standortentwicklung GmbH (GHS) - began buying back crucial parts of the derelict harbour areas south of the central city from the long-term leaseholders. By 1997, GHS had succeeded in secretly taking control of all required plots, and on 7 May 1997, the Mayor of Hamburg, Henning Voscherau revealed a new strategic harbour development plan to the public.

The dimensions of the project and the planning culture of the period in which it materialised, alongside other ‘Urban Renaissance’ projects, meant that traditional institutional arrangements and planning instruments were recognised as unsuitable tools. At the institutional level, the City State of Hamburg created a development agency, the HafenCity Hamburg GmbH (HCH). This ‘quasi autonomous non-governmental organization’ is a 100% subsidiary acting as a trustee of the state-owned lands, from the sale of which it finances its activities including those of development planner and entrepreneurial master developer. Until 2013 this budget also served to finance construction of the new container
The terminal at Altenwerder (about 10 km downstream from the old docks of the HafenCity site). Cross-financing Altenwerder was a trade-off deal between the urban development ambitions of the municipality and the imperatives of the harbour economy. The almost fully automated terminal opened in 2002 - 100 ha in extent with an annual throughput of 3 million TEU, it is rated the world’s most innovative and powerful container terminal (Lieber 2018).

As a government entity HCH has to prioritize public benefit alongside strong investment returns. A set of institutional arrangements of checks and balances involving government representatives’ bodies and groups at City and district levels is designed to achieve a high degree of public accountability.

Urban design
For the envisaged 25-year development period, a combination of fixed basic principles and operationally manageable rules took shape in a new form of a ‘flexible and open’ masterplan at the level of the entire district. This masterplan emerged from a competition won by a Dutch/German team (Kees Christiaanse/ASTOC/Hamburgplan) in 2000.

As ASTOC principal, Markus Neppl pointed out ‘the economic and architectural tendencies in today’s society lead to fragmentation, resulting in wild new patchwork cities.’ ASTOC further stated: ‘Therefore, urban development’s most urgent task would be to transcend all the egoisms that exist, and to design and develop a sustainable and coherent vision which, for all its positive qualities, avoids the folly of becoming a stale corset’ (Meyer 2011, p.123).

The plan projects a fine grain horizontal and vertical mix of uses and outlines the development of 10 city quarters in strict sequential order, each with an individual identity. At the same time, it allows for integration with existing harbourfront development - including a 19th century warehouse district - and for connection with the inner city through visual axes and sequences of public spaces. The spatial and visual impact of the built form generated by a relatively high-density floor space ratio of more than 3.0 is generally offset by the expanse of the water areas and the scale of the surrounding warehouse district. The height of residential buildings is limited to 25 metres, in line with the gable springing points of the traditional warehouses. The height of commercial buildings is limited to 30 metres, set by the ridgelines of the warehouses. Occasional exceptions to these height limits are allowed, up to a maximum 70 metres, if the urban silhouette is deemed to be enriched by the proposal.
Special-use buildings include the cruise ship terminal that provides facilities for two large cruise ships (the terminal has the capacity to dock the 92,000-ton Queen Elizabeth built in the Hamburg shipyard of Blohm & Voss, and the 150,000-ton Queen Mary 2).

As a counterpoint to the ‘Elbphilharmonie’ concert hall designed by Herzog de Meuron in the west, a 233m high skyscraper - termed the ‘Elbtower’ - has been planned for the eastern edge of the district. This mixed-use commercial development will be the highest building in the city, 100m taller than the traditional highpoint on the Hamburg skyline, the spire of St Michael's Church. David Chipperfield was selected as the ‘Elbtower’ architect in 2018 following an international design competition.

Competitions and tendering

At the scale of the urban block, urban design competitions are held for each parcel with 10-12 participants. Landscape competitions are held for groups of one to three parcels with 30 participants. At individual site level, a combination of approaches applies. For the architectural design of public buildings, competitions with up to 100 participants are held; with four to 12 participants for private buildings (depending on the size, plus landscape architects). The ‘Elbphilharmonie’ was an exception, for which no competition was held.

Within the multi-functional structure of HafenCity, blocks scheduled for residential use are allocated by a tendering process that has come a long way from the system of awarding land to the highest bidder. This ‘concept bidding procedure’ is based on an elaborate system of allocating points to a set of criteria including the quality of design, environmental sustainability and social considerations. These factors account for 70% of the weighting of factors in the application process versus 30% for the offer price. This socially-responsive ‘concept-based tendering process’ is a distinctive characteristic of contemporary German Baukultur applied in many German cities since it was introduced in the early1990s in the conversion of the military barracks in the town of Tübingen.

Special concessions are awarded to innovative, ecologically sustainable and socially inclusive projects, new enterprises and in particular to housing cooperatives, ‘Baugruppen’ and other joint building ventures. Such institutional forms have been promoted not only in an effort to mitigate the emergence of exclusive high-end quarters, but also because their value for generating social capital supports district-related processes of self-organization that have been recognised as an important catalyst in the formation of a neighbourly culture.

Figure 2. HafenCity Hamburg - view north with the Elbphilharmonie by Herzog de Meuron in the foreground.
Image source: HafenCity Hamburg GmbH/Robofyz, courtesy of ASTOC Architects & Planners GmbH.
Since 2011, the proportion of building plots in HafenCity for subsidised housing has been increased from 20% to one third in an effort to increase the fine-grain mixture of uses and users to create an active, diverse community shaped by parameters of urbanity, social mix, ecological sustainability and innovative development strategies. Introduction of an ecological certification system, the ‘HafenCity Ecolabel’, has triggered a considerable sustainability drive.

Development control does not stop at the point of land allocation, land uses and design standards. Following ratification by the Hamburg Senate, the city retains its ability of intervening in the development process over a period of 18-24 months of intense cooperation designed to optimize risks, costs, quality and time scales for both city and developer. As the ASTOC office believes, ‘Good process management is more effective than a design handbook’ (ASTOC webpage).

The development process has not gone uncontested, however, indeed this has been very much the case. Currently, for example, a community-based legal challenge is underway against the increase of retail space in the central city quarter of HafenCity, the Übersee-Quartier. There, the collapse of projects in the Global Financial Crisis in 2009 led to a change in the development strategy and eventually to the involvement of the French retail consortium Unibail-Rodamco-Westfield with a proposal for 80,000 square metres of retail space, a huge increase on the 30,000 square metres originally planned – almost a quarter of the retail space of Hamburg’s entire CBD. While the developers argue that spreading the shops over 14 differently styled buildings is not producing a shopping mall, it appears to many that ‘the planners have sold their convictions’ (Kähler 2017).

HafenCity has come a long way to arrive at today’s development principles, and the processes are subject to constant review in intense public interaction, creative debate and political controversy. The very special development path that has emerged is the product of a distinctive building culture, somewhere between the strategies likely to be ascribed to the hard-nosed money-making elite of bankers and the ‘pepper sacks’ of the old merchant city on the one side and a broad spectrum of actors, discusssants and protesters on the other. Lines of conflict include the ‘competition between port economy and urban development’ (Lieber 2018) and between social groups debating ‘the right to the city’ (Sonntag 2018). Public discussion of the complex processes of planning and development guarantees a lively and often controversial discussion in media, bodies, conferences, exhibitions and civic initiatives. Every single principle and aim of the development process and achievements can be and has been challenged. While this may be unsettling, the productive coexistence and public interaction of positive appraisal with critical views is a forte of the German approach to ‘building culture’ and demonstrates the value of embracing a plurality of views through different windows.

References


Inventing the 21st Century Campus

Dennis Pieprz & Romil Sheth

These words belong to Karl Fisch, an American K12 teacher who made a big splash with ‘Did You Know?’ a 2006 video analyzing the impacts of globalization on education. A few years ago, directors from the Instituto Tecnológico de Monterrey shared this quote with us in a kick-off meeting for the Tec 21 Educational Model – a brand new mix of pedagogy and spatial planning that will cultivate well-rounded students ready for today’s challenges.

The Tec 21 model, explored in detail below, is a bold statement in a critical and prescient dialogue. The rate at which new products and processes shake up the market is quickly outpacing the ability of educators to prepare students for the professional world. The integration of technology is so complete that nearly everybody entering the job market needs working knowledge of the tech platforms impacting and redefining workflows. Collaborative work is often the norm, and barriers to international business continued to shrink – demanding employees to be increasingly nimble, responsive, and connected. It has left many asking how schools can best respond.

We are currently preparing students for jobs that don’t yet exist, using technologies that haven’t been invented, in order to solve problems we don’t even know are problems yet.

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Schools now need to focus on teaching their students how to learn - how to respond to continually changing times. It's not about training them to excel in a specific career or industry, but training them to excel in 21st century economies and cultures, of which the most central and predictable component is change.

A growing group of innovators is embracing the uncertainty of 'not yets' as an opportunity to create pedagogical models that shake up the basic experiences of student, faculty, and campus. In times of uncertainty, these schools are not waiting for direction; they're forging their own.

Measuring the Unmeasurable
Laszlo Bock, Google's Senior Vice President of People Operations, shared insight into the tech giant's hiring process in the 2013 New York Times article, 'In head-hunting, big data may not be such a big deal: “One of the things we've seen from all our data crunching is that G.P.A.'s are worthless as criteria for hiring, and test scores are worth less no correlation at all except for brand-new college grads, where there's a slight correlation. Google famously used to ask everyone for a transcript and G.P.A.'s and test scores, but we don't anymore . . . we found that they don't predict anything. (Laszlo Bock, quoted in Bryant 2013)”

These standards, such as G.P.A. and transcripts, emphasize that which can be measured, letting core (though harder to quantify) skills - such as problem-solving, emotional intelligence, being a team player - fall through the cracks. Like Google, many companies have been placing more stock in interpersonal skills and personality traits, like curiosity and empathy, than traditional academic measurements when it comes to hiring. Increasingly, employers know what attributes benefit their organizations best, and how to spot it in prospective employees. The problem is, they often can't find enough fresh graduates with the right balance of these traits.

Regional Variations on a Global Shortage
The shortage of adequate applicants is not limited to one country, but each country's context is unique. The United States, for instance, continually boasts high college attendance rates and 90% of millennials will attend at least some college within eight years of graduating from high school - and specialized and research-based degrees from the U.S. are often unparalleled (Kovacs 2016).

Yet, while its populace becomes increasingly educated, the United States is suffering from a growing shortage of skilled laborers. A July 2015 report found that 35% of surveyed economists had seen shortages of skilled labor in the previous quarter - a 12% increase over the previous year (National Association of Business Economics 2015). An article in The Atlantic juxtaposed an optimistic statistic - 5.8 million job postings in July 2015 (at the time, the highest ever) – with the fact that 17 million Americans are either unemployed or underemployed (Fuller 2015). These statistics signal a mismatch between employers' needs and applicants' skills.
In response, the efficacy of core aspects of the undergraduate experience – lecture-based classes and department-specific buildings - are being re-evaluated. Many universities have begun to shift their programs to respond to the market-driven needs of their current and prospective students. Stanford, for instance, is piloting a provocative attendance model, dubbed ‘@Stanford’, that splits one’s undergraduate experience into six years spread over the student’s lifetime and focuses on ‘missions’ rather than ‘majors’ (Hayward 2014).

In South and Latin America as well as Southeast Asia, tech and manufacturing booms have created fertile economies and robust job markets, creating opportunities from basic manufacturing, to software development, to top-level management and CEO positions. In these markets, the need for high-performing graduates has never been higher. These regions, however, often do not have the robust higher education systems of their global neighbours in the U.S. or Europe.

The relative youth of these education systems, however, represents a significant advantage and opportunity over institutions with more codified bureaucratic processes. Below, we explore the specific pedagogical and spatial planning solutions at two schools that are pioneering new directions in education.

**Singapore Tech School Dismantles Majors**

The Singapore University of Technology and Design (SUTD) was incorporated in 2009, and developed in partnership with the Massachusetts Institute of Technology (MIT). The university strives to integrate technology and design education in the fields of engineering, product development, architecture and sustainable design, and information systems. These aspirations promote research and learning, industry partnership, and integration with global, knowledge-based economies.

The university has dismantled the idea of majors, creating
instead a curriculum focused on four branches of design, described as ‘pillars’ – Engineering Systems & Systems Design, Engineering & Product Design, Architecture & Sustainable Design, and Information Engineering & Design. Groups of 50 students are organized into learning communities for a stretch year termed ‘freshmore’ – consisting of freshman year and one half of sophomore year. The curriculum is structured to be highly interdisciplinary and project-based, with students completing at least 20 projects before graduating.

This new structure has direct impacts on faculty collaborations as well. Lawrence Sass, an architecture professor who spent six months at the university noted ‘what I really got from SUTD is relationships – it’s an environment where you can get to know people and “date” other faculty that you’d never have a chance to “date” (at MIT)’ (Durant 2015). Sass developed a collaborative partnership with an SUTD professor that led to the development of new thinking in visualizing and prototyping large objects.

The partnership between MIT and SUTD has also changed MIT’s ways of teaching. John Fernandez, Professor of Architecture observed that, ‘many elements of [the Introduction to Design class] are coming back to MIT. One of the main things we kept in mind from the beginning, how is what we do there, or what we’re doing in service of [SUTD], reflected back at MIT?’

Sasaki developed the master plan in close collaboration with representatives from MIT and SUTD to put forth a visionary road map for the campus environment. A key concept is the east-west spine that showcases the university’s interdisciplinary and collaborative mission with interconnected academic buildings anchored by the International Design Centre and woven together by a pedestrian network.

The spine also creates a public face for the university. Student life facilities, housing, and recreational buildings comprise mixed-use precincts, connected through a range of public spaces and pedestrian links. Sustainable design strategies are integrated through building systems, green roofs, pedestrian ways, transit access, and storm-water management. The new campus will accommodate up to 7,000 students on an area of 22 hectares.

Figure 2. High-activity program spaces at SUTD are located on lower levels to encourage visibility and interaction; offices and heads-down study spaces are placed in more secluded areas.
The success of SUTD's vision of academic pillars requires flexible learning and student life spaces that facilitate exchange and collaboration. The Design Centre - located at the physical and metaphorical heart of campus - features a variety of spaces for congregation, including conference and exhibition space, studios, workshops, office and support space, and two auditoriums. The clusters of academic buildings surrounding the Design Centre also have exhibition and assembly space, as well as classroom, laboratory, and office space.

Rather than grouping the pillars in distinct areas, the programs are distributed across the building clusters to promote interdisciplinary conversation and innovation. Academic spaces are placed on the lower levels of the buildings, student life space in the middle, and faculty offices at the top, with a goal of putting the most active uses closest to the spine. Each of the buildings have courtyards, green roofs, and terrace gardens to access nature, fresh air, and light.

SUTD is open and permeable, inviting community engagement. The proposed transit connections serve a critical link with the Singapore’s Central Business District (CBD), establishing a strong campus-city relationship. Research and development facilities in a nearby business park may provide space for collaboration and innovation, while the EXPO Centre can provide overflow space for large university events.
TEC 21 Shakes Up Premiere Mexican University’s Approach

In 2015, Instituto Tecnológico de Monterrey, Mexico’s largest private university, rolled out the Tec 21 Educational Model. This program rethinks the entire university system, impacting the type of students the university accepts, the way that students learn, and the professionals those students will need to become to compete in the digital age. Tec 21 assimilates the university’s current context with aspirational goals to reimagine pedagogical methods for the entire system of 29 campuses. The instructional aspects of the model will be rolled out system-wide in August of 2019.

Tec 21 develops a pedagogical structure that contributes to the formation of extraordinary professionals who have a deep commitment to society, are rooted in a humanitarian worldview, and have an appreciation of interdisciplinary and collaborative learning.

The model’s structure develops ‘T’ shaped individuals – those that have a depth of knowledge and skills in core disciplines but also possess well-rounded knowledge of related fields. Research showed that current degree programs focused heavily on the ‘I’ – the vertical part of the ‘T’ – representing depth of knowledge. Traditionally, students were expected to take roughly 75% degree-specific classes, leaving only a year’s equivalent of general classes. Tec 21 equalizes a student’s time invested in the ‘I’ and the crossbar of the ‘T’, which represents breadth of knowledge. While depth of knowledge is still highly valued, breadth of knowledge and the ability to solve problems in interdisciplinary, team-based settings is central to preparing students for today’s workplace and society.
A project-based approach is central to the model, wherein instruction is paired with multi-disciplinary challenges that test knowledge with peer collaboration. Each semester is broken into three parts and balanced with a series of instructional modules and applied challenges. As students progress through a semester, the focus shifts from core instruction to greater engagement with challenges. Breaks within a semester are structured as ‘Innovation Week,’ where all Tec campuses engage in an organized, week-long ‘challenge.’

The physical structure of the Tec 21 model relies on three primary organizing elements:

**Modules:** comprise next-generation instructional and research spaces primarily consisting of versatile active learning classrooms that facilitate focused study in a structured environment. Designed to accommodate 20-25 students, the modules are located adjacent to collaborative and informal spaces, and equipped with technology and infrastructure to support the development of specific competencies.

**Challenge spaces:** facilitate collaboration, project work, and brainstorming, in spaces ranging from rooms for 2-4 students to a multi-purpose shed for larger experiments and hands-on learning. The campus landscape is also treated as a challenge space and structured to facilitate testing and research of water planting, and agriculture systems.

**Assessment spaces:** are devised to enable peer-to-peer feedback, faculty critiques, student displays, and exhibits. Assessment spaces are located in public settings to foster a culture of active engagement and are equipped with movable panels, screens, and flexible infrastructure that enables re-organization of the space to accommodate various scales of activities.

Figure 8. New spaces for new pedagogy: Tec 21’s curriculum creates a cycle of core education, challenge-based learning, and public presentation of solutions.

These Tec 21 academic spaces encourage organic interactions with the campus and peers.

Figure 9. No more Silos: a deliberate shuffling of department spaces encourages intuitive and serendipitous student and faculty encounters across disciplines.
A new paradigm is imagined, in which all buildings operate as shared resources without singular ownership of a specific department. Scheduling is re-structured to provide opportunities for collaboration and serendipitous encounters between peers and faculty, while spaces are developed for student collaboration and engagement with allied industry and the community.

**Integrated Planning and Implementation**

We worked with the Instituto Tec to translate these ideas into practice by developing a robust toolkit of space types and principles that reflect the new pedagogical structure as well as related impacts on the campus environment and adjacent communities. Queretaro – a campus in West Mexico with 5,000 students – was selected as a pilot to integrate this new thinking at the campus level.

Sasaki, paired with the university’s advisory committee and the leadership at the Queretaro campus, articulated a clear campus framework for integrating the Tec 21 pedagogical structure.
The framework developed a series of campus-wide principles that would foster the transformation of current insular campus conditions to create engaging and active campus edges and to foster positive interaction with surrounding communities.

The plan for Queretaro responds to its site context through a variety of conservation and development strategies, among which are transforming valuable land currently used for surface parking into a structured pedestrian-friendly public realm, increasing connectivity among different parts of campus, engaging with allied industry, and integrating new pedagogical thinking.

Key Drivers of Spatial Realization:

1. Re-imagining Student Life
   Tec 21 creates a holistic framework for student development. The library becomes a support hub for academic life on campus, providing a diverse array of learning environments and academic support programs. The central dining facility is reimagined as a learning and experimentation space. Smaller hubs include a cafe, digital library, and recreation facilities, creating an accessible and vibrant public realm with opportunities for gathering, socializing, learning, and campus events.

2. Creating a Mixed-Use, Collaborative Environment
   The campus currently has a series of programs that operate as isolated enclaves, disconnected from the overall academic life of the campus. The proposed framework breaks down this insular structure and integrates allied industry, student entrepreneurship, and research spaces within academic and student life buildings. This conscious restructuring creates an unprecedented experience for students and faculty and helps the campus transition into the new pedagogical model. The high school is supplemented by a centre for adult education, and is integrated into the campus spine to foster engagement with the external community. West campus, currently a traditional model of buildings surrounded by surface parking lots, is transformed into a mixed-use precinct that integrates graduate housing, research, and academics with existing allied industry spaces and the high school.

3. Creating a Culture of Knowledge Exchange
   A central tenet of the Tec 21 structure is the open exchange of ideas and information within the campus and across the entire university system. The ‘Encuentro’ or ‘Place of Encounter’ is a pavilion located in the heart of the campus, forming a common ground for the entire community of students, faculty, and visitors. The Encuentro supports a variety of formal and informal events and connects the Tec 21 community to the outside world – physically and technologically.

4. New Spatial Typologies
   The Tec 21 structure relies on spatial typologies that consist of flexible instructional spaces (modules) tied to a larger multi-purpose space. The modules are equipped with technology, writable surfaces, and movable walls to allow both active learning and collaborative student work.

   The central multi-purpose space is designed with bleachers and movable furniture that allow for varied activities – lectures, student presentations, end-of-semester exhibits, and group activities. Storage areas, small group collaboration rooms, faculty offices, and an open learning hallway that overlooks the multi-purpose space provide support and foster a collaborative learning environment.

   The ‘challenge shed’ is a new typology for multi-disciplinary collaborative space, akin to a large shed, that houses a fabrication lab, prototyping facilities and brainstorming lounges. This space facilitates experimentation within academic departments on campus and engagement with allied industry and the external community. The challenge shed is ‘plugged in’ to existing buildings and also attaches to new buildings forming a collaborative interface between the two.

At Queretaro, the Tec 21 toolkit and principles are harnessed to re-imagine existing buildings and organize new building and public realm interventions within the campus. Building on the structure of the historic core, the campus is re-organized to form new clusters for academic, research, and student life, and creating a vibrant public realm that facilitates outdoor learning, social engagement, and experimentation. A pedestrian spine forms a collaborative armature that ties the academic core together, creates a clear heart of campus, and blurs boundaries between academics and allied industry partners.
Conclusion

Advances in technology and the impact they have on our world is as old a theme as humanity itself. Contemplating what comes next is central to furthering any dialogue, but making specific investments based on these forecasts too often miss the mark or lead to early obsolescence. Today, forward-looking schools are embracing the one thing that they can guarantee: that change is certain. The best way to prepare students for their lives after graduation is to show them that change not as an unwelcome challenge to their skills, but as an opportunity for them to apply themselves in new and surprising ways.

Schools like SUTD and the Instituto Tec are doing exactly that by restructuring their concept of higher education. SUTD's academic pillars and the infusion of campus life spaces throughout create an immersive experience that celebrates discipline-blurring encounters and increases student and faculty interactions. Instituto Tec's challenge-based curriculum lets students work together to solve real-world problems – fostering intrinsic curiosity and a team-player mentality, all while showing the positive impact they can have on the world. These new pedagogies and spatial realizations promote the cross-pollination of ideas and give students the edge they need in today's world. That edge goes far beyond the outmoded values of G.P.A. and transcripts. It's not just the edge to land that first job after college, but the well-rounded, noble, and nimble mindset that will guide them through their entire lives and careers.

Notes:
[3] Singapore-based MKPL Architects served as local architects on the project.

References:
Fulcher, J. B. 2015, ‘Whose responsibility is it to erase America’s shortage of skilled workers?’ The Atlantic, 22 September 2015.
URBAN DESIGN RESEARCH STUDIO
Urban Design Research - 2018

MUDD 24 Research Supervisors & Advisors
Professor James Weirick, Andrew Sweeney, Dr. Scott Hawkins, Dr. Anne Warr

The urban design research project provides students the opportunity to research a critical aspect of urban development and design, as either a written dissertation or design thesis. Students may return to a topic area introduced previously in their studies and explore this in more depth and with a more critical approach. Alternatively, students might choose to research ideas and interests inspired by current advances in practice.

This year, fourteen students presented their urban design research projects for assessment. The topics covered demonstrate once again, the multi-disciplinary and cross-cultural backgrounds of our students, with research projects that explored many different subject matters across locations both familiar and exotic. The impact of rapid urbanisation upon China’s cities was the focus for several students, with research undertaken on improving living conditions in Xiamen, appropriate redevelopment for historic parts of Chongqing and a comparison of different international conservation techniques that might apply to conserving traditional districts in Nanjing. This same pursuit of an appropriate conservation model also extended into China’s regional centres and case studies of Shanhгаiquan Ancient Town and of Hui-style architecture in Anhui Province asked us to reconsider the very notion of conservation and contextual urban development.

The street, as a pivotal part of any urban design was studied in various forms. An evaluation of pedestrian space in Shanghai’s streets was undertaken to provide recommendations for improvement. A mapping of the space syntax of central Sydney provided recommendations for improving walkability and guidelines for future block developments, while a sound map was produced for Martin Place that identified the aural markers that urban designers need to consider when proposing changes to a major pedestrian space. In Singapore, research suggested that in the 21st century, networked transit hubs have subsumed the activities that were once the domain of the street.

Recognising that urban designers now have powerful new analytical tools, two students embraced new technology in their research. Using crowd-sourced data that tracks running and cycling activity, the street network and built morphology of Sydney’s CBD was given a new perspective. The micro-climatic performance of one of the world’s most prominent urban redevelopments, Stuttgart 21, was evaluated using digital modelling that allowed alternative designs to be tested against the current proposals in an attempt to provide an optimal design solution. Sustainable development was examined through a comparison of the use, recycling and water management at mega-project sites in Sydney and Shanghai. The sustainable policies of three Sydney local councils were also assessed to determine if the climate change initiatives adopted by these councils were achieving their desired outcomes.

Finally, in the only design thesis this year, Yang Huei-Han presented a sophisticated analysis of Walsh Bay and an eloquent vision for its revitalisation. Using public transport as a catalyst, precise incisions and targeted interventions were proposed to the existing urban fabric to reconnect this isolated site to the rest of the city, demonstrating the power of well-reasoned and sensitively realised urban design.
CITIES ARE OFTEN DEVELOPED IMBALANCED DUE TO POLITICAL, ECONOMIC AND SOCIAL FACTORS. WALSH BAY IS LOCATED IN THE HEART OF SYDNEY WITH PANORAMIC HARBOUR VIEWS AND IS ADJACENT TO BARANGAROO RESERVE AND THE ROCKS. THEORETICALLY, THIS PRECINCT SHOULD BE AN EXCITING AND VIBRANT URBAN DISTRICT, HOWEVER SINCE THE LAUNCH OF THE BARANGAROO REDEVELOPMENT URBAN VITALITY HAS BEEN DRAWN AWAY FROM WALSH BAY LEAVING IT SOMEWHAT ISOLATED.

The precinct is a largely intact heritage port from the early 20th century and a fine example of port infrastructure before containerisation. This precinct is characterised by finger wharves with regular gridded facades and evident timber construction. This thesis asks what tools are available to enhance the vitality of the Walsh Bay Wharves precinct and explores the contribution that urban design and development can make to rejuvenate an isolated and idle heritage site. It also identifies the potential for new infill development and the extension of the proposed light rail system to create better connectivity with the adjacent Rocks and Barangaroo developments.
Revitalisation Strategy Overview

Urban vitality is a qualitative concept. It refers to the sense that a city or precinct feels alive or animated. According to literature reviews and previous studies, urban vitality can be evaluated as people (resident and visitor populations), place (small scale business undertaken in the area) and program (the mixture of activities on the streets and in public spaces).

The issues currently facing Walsh Bay include isolated and unidentifiable routes for pedestrians, the disabled and for public transport; uninviting and under-utilised public spaces with a lack of spatial definition along street edges and streetscapes dominated by car parking, as well as a loss of activity to surrounding tourist and business precincts.

The vision of this research project is to revitalize the Walsh Bay Wharves and reconnect this precinct to the city. Walsh Bay Wharves will be overlaid with contemporary expression and arts to create an inclusive and inviting destination, fully integrated into the Sydney Harbour Foreshore Cultural Ribbon and accessible to all, day and night.

Revitalized Strategy Overview
The objectives proposed to achieve this vision are as follows:

**RE-CONNECT**
*Improve, Connectivity and Wayfinding*
- Improve public transportation and wayfinding
- Enhance the fine grain urban form
- Overcome the ‘barriers’ such as the Harbour Bridge approaches to reconnect surrounding precincts
- Provide clear and identifiable pedestrian routes and create a human-scaled environment.

**RE-VITALIZE**
*Injection of Urban Vitality*
- Utilize the ground floor of new development for commercial and retail uses.
- Upgrade current open space for multifunctional events
- Support activities day and night
- Improved pedestrian linkages and visual connections
- Improve entry and frontage to Hickson Road

**RE-IDENTIFY**
*Create More Reason to Visit*
- Adaptive reuse for heritage wharves and their shore sheds
- Redefine the character of different areas
- Celebrate distinctive landform and harbour views
- Create new outdoor performance and interaction spaces
- Incorporate heritage and arts interpretation overlays
14 Hickson Road, is a rare parcel of land on Sydney harbour, which offers a last opportunity for development in this heritage area as a new gateway building as well as to improve wayfinding and vertical fine grain.

The strategies proposed are:

1. **PUBLIC TRANSPORT CONNECTIVITY**
   Extend the CBD light rail to Walsh Bay via Hickson Road, along a landscaped boulevard.

2. **THE GATEWAY**
   Define a new gateway building that incorporates a light rail stop to invite visitors and improve wayfinding.

3. **ARTS PRECINCT**
   Propose more cultural facilities to create an inclusive and vibrant cultural and arts precinct and reinforce links within and surrounding cultural precincts.

4. **PEDESTRIAN CONNECTIVITY**
   Connect to the foreshore walk from The Rocks to King Street Wharf as an opportunity to activate Walsh Bay and provide a further experience of Sydney Harbour.

5. **BARRANGAROO CUTAWAY**
   Propose an attached corridor building to create a new entrance towards Walsh Bay that also provides an outdoor performance space for contemporary and indigenous arts.

6. **POTTINGER STREET**
   Install an elevator at Parbury street to provide a vertical connection and transform this underutilised street into a multifunctional open space.

7. **HICKSON ROAD**
   Transform Hickson Road from a space dominated by car parking into a green boulevard with a dedicated cycleway and multiple pedestrian crossings.

8. **CULTURAL RIBBON**
   Enhance the Cultural Ribbon that joins Sydney’s leading cultural landmarks and attractions along the harbour foreshore.

9. **GREEN CONNECTIVITY**
   Better connect pedestrian and cycle networks via green spaces to promote active transport and reduce the reliance of private vehicles.
IMPROVE ACCESSIBILITY, CONNECTIVITY AND WAYFINDING
Improving wayfinding will help to connect Circular Quay to King Street Wharf through Walsh Bay and encourage more people to walk the route. The key east-west connections (Argyle Street) between the city and the harbour will be improved including amenity and legibility.

SUPPORT WALSH BAY CULTURAL PRECINCT AND ENHANCE CULTURAL RIBBON CONNECTIONS
Improving connections between The Rocks, Walsh Bay and Barangaroo by providing wayfinding and improving public transport is critical to supporting cultural life and the many bars, cafes and restaurants that have been established in the Walsh Bay Precinct.

CREATE A NETWORK OF LINKED PARKS AND OPEN SPACES TO PROMOTE ACTIVE TRANSPORT
Improving connections, such as between Argyle Street and Barangaroo Headland Park creates a strong green network between new and existing spaces, while upgrading the landscaping along Hickson Road promotes the use of cycling and walking.

This research by design proposal draws together the fragmented developments and policy that exists along the Sydney Harbour Foreshore and identifies the value of Walsh Bay and how to integrate this heritage area into the rest of the city. Through introducing a well-connected light rail line, improved wayfinding and connections and injecting urban vitality with an arts overlay, the Walsh Bay Wharves precinct can emerge as a new contemporary arts destination that is a vibrant and inviting art and cultural hub.
Research by Thesis

Research Supervisors & Advisors
Professor James Weirick, Andrew Sweeney, Dr. Scott Hawkins, Dr. Anne Warr

The redevelopment of historic district in Chongqing, China: a case study of Shibati urban design project

Behavioural Urbanism: methods for mapping active transport in streets of Central Sydney

Stuttgart 21 urban development and its impact on climatic conditions - using ENVI-MET as simulation tool

Evaluating street networks in central Sydney using space syntax

Increasing vitality of contemporary streets in Shanghai – learnings from world experiences and local streets

“SOUNDMARKS” - Defining the urban soundscapes of Martin Place

Street space and historic conservation in Nanjing - a case study of Nanbuting district in Nanjing, China

Megaprojects, Urban Design and Water: the Sydney Olympics and Shanghai Expo

Shanhaiguan Ancient Town, integrating heritage conservation with urban development

Human experience and transit hubs in a global city: Singapore as a case study

The management of traditional architecture in Anhui Province China

Significance of urban design to improve living conditions—a case study of Wutong urban village in Xiamen

Climate change and local councils: an evaluation of three councils

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Sivasubramanian Muthusamy
Zhang Xiaodong
Zhang Hongyi
Zhang Jinxin
Sabari Girish
Chen Yujing
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The redevelopment of historic district in Chongqing, China: a case study of Shibati urban design project

In the last few decades and due to the fast growth of China's major cities coupled with revised planning controls mandated by the central government, a great number of conservation and redevelopment projects in historical districts have been undertaken. These have been acknowledged as providing economic benefits and tourism potential. However, many historical districts are at risk of losing their identity as large-scale conservation has become a homogenised product. This thesis examines the Shibati Historical District in Chongqing, where a redevelopment project is currently being constructed with the stated aims of addressing safety issues of crowded and narrow streets and to boost the local economy and tourism. This study reviews existing regulations and guidelines and then critiques other successful historic districts in Chongqing to provide comparisons between the various projects. Recommendations resulting from this analysis are produced that could be used to guide a more successful and considered future development of the Shibati Historical District.
Great streets make great cities and great streets make great cities with great data. This research explores how to read the streets of a city in terms of a methodological process using crowdsourced user data. The users of a street always leave evidence for a designer and this constitutes the core value of Behavioural Urbanism. This research employs an empirical analysis of user movement data to read the activities involved in a street and people’s behavioural patterns that occur through time. The temporal aspects of streets that are not visible explicitly are the essence that repeats in patterns through systems interwoven in the complex tissue of everyday urban life. Active transport in the streets of Central Sydney has been examined, using crowdsourced data from STRAVA (2016), a website and mobile app used to track running and cycling activities. The field data was analysed for the intensity of an activity that is impacted by the morphology of a street itself as well as for the limitations of accuracy that may appear. The study took cycling activity as its primary specimen of active transport and examined the dynamics of this activity in relation to the built environment of the street. The research is built on a multidisciplinary field of study called Environmental Behaviour Studies (Moudon, 1992). The research also undertook a very detailed and granular observation of cycling behaviour in the street via continuous mapping of a space across time that yielded patterns of the space that can be used for deriving parameters and principles for the design of streets.
Stuttgart 21 urban development and its impact on climatic conditions - using ENVI-MET as simulation tool

Zhang Xiaodong

Micro climatic conditions were simulated as a key parameter in this research to describe the quality of environmental well-being at Stuttgart 21, a major urban development being planned for the centre of Stuttgart, Germany. Founded by literature review about the Stuttgart 21 project and of the local weather, microclimate and smart city strategies, this information was then used in a computer program called ENVI-met to simulate climate. Virtual models of the existing built environment and the proposed urban design were constructed, and extensive and intensive tests were run to collect the results in relation to air temperature, wind flow and relative humidity. The simulations covered representative days in each season and tests were run for morning, afternoon and mid-night. Comparisons between the micro climatic data of the existing built environment and proposed conditions were made and alternative tests in which the built morphology was modified were also run to determine to what extent would the construction of the Stuttgart 21 project affect the local climate. Assessments were then made as to whether Stuttgart 21 as proposed represents the best possible micro-climatic outcome and how similar computer modeled simulations can be used as a vital tool for urban designers.
The research aims to figure out the important street structure of Central Eveleigh area and tries to provide recommendations for improving the walkability around the Central Eveleigh area. Walkability as a significant and popular urban design concept is focused on and its relationships between sustainability and individual health are highly emphasised. By using the Space Syntax, not only the features of five districts, including Surry Hills, Chippendale, Darlington, Redfern and North Alexandria, around Central Eveleigh area are found, but also the negative relationship between road hierarchy and pedestrian movement is proved. Moreover, the influences of street pattern, especially for grid pattern and super block development are discussed. By integrating all the results of analysis, the outcome of this research is a pedestrian movement priority map showing the important street structure of the Central Eveleigh area and the potential for improving walkability. The outcome of this research supports future development of the Central Eveleigh area. Moreover, the methodology of Space Syntax is tested in the research and its limitations are discussed at the end of the research.
Increasing vitality of contemporary streets in Shanghai: learnings from world experiences and local streets

The street is one of the most important public open spaces for people and their daily life. However, the pedestrian space neglected during the high-speed urbanization of Shanghai. Since 2016, the central government has established that future urban development should be people-orientated and so this thesis argues that the street needs to be considered as a public open space instead of simple transportation infrastructure. It examines the important aspects for the design of people-orientated streets.

This paper starts with a study of street classification and a literature review of Great Streets to understand how urban streets are defined and what makes a ‘great street’. A street transformation study is then carried out to show the process of improving pedestrian experience. Streets in Shanghai, including streets in heritage conservation areas, are evaluated and compared. This research defines the principles for good streets in Shanghai and compiles a database of 28 relevant heritage streets. Principles established for future street design in Shanghai include:

- keeping a reasonable H/W ratio (suggested as between 1:1.1 to 1:3.0);
- encouraging a mixed-traffic mode to help to control traffic speed and increase pedestrian space;
- supporting mixed-use development that respects established local shops where non-residential uses can help the formation of public activities;
- increasing the physical diversity and details in streets; and,
- providing as much landscaped greenery as possible.

Master of Urban Development & Design 2018-2019
'SOUNDMARKS' - Defining the urban soundscapes of Martin Place

Cities are often considered noisy places where the urban form and dense activity means that they will remain noisy even if the environment within and around them changes. The sounds of a city can be a unique and a readily identifiable part of a city's character and attraction. Sound, as an integral part of the urban design process however, is often neglected and ignored. Soundscape should be an integral part of any urban design study. It provides detail of the urban sounds with respect to ecology, built form, density and societal aspects of a space. Within a soundscape exists a 'soundmark', the aural equivalent of a landmark. It can be defined as a community sound which is unique or possesses qualities which make it specially regarded or noticed by the people in that community. As such, soundmarks could be considered worthy of the same preservation and protection as other cultural and historical icons. This paper discusses the major issues related to soundscapes that impact on the urban context then develops a theoretical framework to study the soundscape of Martin place in Sydney. Soundscapes and soundmarks within Martin Place are then identified and analysed. As part of a quantitative analysis, a soundscape questionnaire was prepared which asked people's perception of the sounds that they readily identify with in key parts of Martin Place. Then as a qualitative analysis, sound recordings were undertaken at the same time as the respondents gave their answers and then these recordings were later analysed to determine if there was a correlation between what people identified as the key sounds and what is heard in the recordings. From this, a sound map of Martin Place has been produced that identifies the key soundmarks of the space and identifies how sound can be used to navigate Martin Place from one end to the other. This sound map serves as a template for other urban designers and researchers to produce similar sound maps for other parts of the city.
Street space and historic conservation in Nanjing - a case study of Nanbuting district in Nanjing, China

Historic conservation has become a hot topic in recent years. Facing ever increasing and rapid development, the city is facing urban renewal pressures where population growth, an aging population and conflicts between modern building and historic conservation are apparent. The revitalisation of street space is one of the most important historic conservation processes. It provides an active public area for transportation, entertainment, exercise, and communication. However, not all the methods that are used to revitalise street space are appropriate with much of the current agenda in China's cities centred around demolition coupled with static and single planning or simple replication.

In this essay, the following questions are asked: What are the international principles that provide for historic conservation? What has already been studied about historic conservation in China? How to activate old streets? How to maintain the authenticity of the historic street space? Is self-referentiality a capable way to protect street space?

The first part of this thesis illustrates the theory and principle of historic conservation in western countries and compares these to those of China. Then, three case studies from China are analysed and compared. Finally, the Nanbuting district in Nanjing, China is examined with particular reference to how to apply the following theories and principles: Authenticity of Conservation, Ease of Movement, Complete Neighbourhoods and Active Community.
Megaprojects, Urban Design and Water: the Sydney Olympics and Shanghai Expo

The problems of water scarcity and sustainable development have received considerable attention, particularly with rapid urbanisation and the construction of recent high profile megaprojects. Serious environmental problems and pollution that result from these large scale projects have been reported widely. As a result, sustainable development and the environmental legacy left for future generations by megaprojects are now being considered as integral to the planning processes that drive these massive developments. This quest for sustainability has also focussed on post-event redevelopment. This thesis uses two case studies: the Sydney Olympic Park and the Shanghai Expo site, to investigate the relationship between megaprojects, urban design and water. Using historical records, descriptive research and comparative evaluation research, an exploration was made of the different water management approaches used at the two sites. Data was sourced from field research, interviews, newspaper articles, books, journals and published reports. Water sensitive urban design practices from different locations were also reviewed. The thesis demonstrates that the Olympic site and the Expo site have dramatic differences in their approach to water. This difference extended to water catchment, water treatment, water surface and water experience and recreation. In considering best-practice that exists for water sustainability, the thesis concludes with a recommendation that future megaprojects should include a clear emphasis on sustainable design early in their design and planning stages. This focus on sustainability should include water as a central element for consideration. By understanding the manner in which the two megaprojects dealt with issues of water provides urban designers with a greater understanding of how megaprojects impact the environment.
Shanhaiguan Ancient Town, integrating heritage conservation with urban development

Shanhaiguan, located at the eastern end of the Great Wall where it meets the sea, has historically been known as the unique pass between Beijing and Shenyang, the first pass on the Great Wall; a reflection of its critical military significance throughout history. Today Shanhaiguan Ancient Town is part of the Great Wall UNESCO World Heritage Site and a tourist destination. It is renowned for its magnificent and mighty First Pass under Heaven gate tower and associated monuments such as the Bell and Drum Tower, Wangyang Tower, Yingien Tower, Muying Tower and City Walls. Since the 1990's it has experienced rapid development of tourism and the real estate industries resulting in a huge upsurge of construction, transforming it into a major tourist destination. Scholars now recognise that this extent of building has caused great damage to the historical and cultural environment of the Shanhaiguan Ancient Town (LiuGuo 2012; Qu 2014). In the process, the traditional residential districts flanking the main axis of the town have either been commercialised and 'Disneyfied' or neglected and depopulated. Strengthening protection of these districts through the integration of urban design and heritage conservation in the face of uneven, inappropriate urban development has thus become an urgent task. Given the pace and style of commercial development to date, the question is how to retain the historical cultural features of the residential districts of the Ancient Town, while at the same time protecting and enhancing the residents’ quality of life to avoid further neglect and population loss (Zhang 2017). The thesis focuses on what went wrong for the current reconstruction and how to correct it. In addition, it explores through case studies, some policies to help better manage the town while at the same time conserving the traditional local style dwelling houses and streets of the residential districts.
Today's global cities that are at the forefront of rapid urbanization and ever increasing technology have begun to shift from the urban theories propagated by Kevin Lynch and Gordon Cullen. It is an indication of a genuinely 21-century way of thinking. It has led many urban designers to rethink the notion of a city's imageability and whether the classic theories of urban design remain relevant for designing a city today. The literature available on transit interchanges and transit-oriented development (TOD) is mostly planning based and not urban design based. Similarly, the concept of urban spaces in theory has always been related to streets, squares, plazas and parks. In recent decades, new types of urban spaces have undergone transformation particularly in high density cities like Singapore, Hong Kong, Tokyo, Seoul or Beijing with one new hybrid public space emerging as the transport interchange or transit node. These spaces are used daily by a large number of people and are celebrated as the central feature of many exemplary TOD designs. As well as providing citizens with access to transport services, these transit nodes have become an important recreational urban place for people to meet, eat and shop. In Singapore, where more than 65% of the population commutes by public transportation, the transit nodes are not merely a technical lubrication into the public transportation and pedestrian circulation systems, they are the new hybrid spaces shaping the city. This paper looks at the social role of these new urban spaces and studies the historical development of transit interchanges to better understand the urban spatial character of these nodes and the opportunities for place making and better user experiences within these hubs and how to successfully integrate them to a city's public realm.
The management of traditional architecture in Anhui Province China

This thesis uses Hui-style Architecture and its setting in the southern part of Anhui Province as research objects, exploring the appropriate conservation and management approaches for traditional Chinese architecture in conservation areas. Three case studies from Huangshan are investigated and analysed to demonstrate the different management approaches for protecting Hui-style urban areas and the different outcomes that result. Three key questions are asked:

1. How does the ex-situ conservation model affect the authenticity of traditional places in China?
2. How do the impacts of the tourism industry affect the economic development of traditional places in China?
3. What is the best management approach for ensuring the sustainability of traditional places in China?

Management approaches for the conservation of traditional architecture in China were compared with international principles from the west. This thesis concludes that despite differences in building structure, culture and customs the three key management approaches for preserving traditional buildings in China should be based on authenticity, economic development and sustainability.
Significance of urban design to improve living conditions—a case study of Wutong urban village in Xiamen

Beginning in the 1990s, there has been an urban form developed with unique characteristics throughout China: the Urban Village. It is the result of urban expansion and unaccomplished urbanization in rural areas.

Wutong Village as a typical urban village in Xiamen, Fujian Province, has many issues such as high density and illegal buildings, fire control problems and a poor environment lacking adequate management. This makes the village an eye-catching contrast to the modern urban morphology around it. However, Wutong Village has a rich cultural ancestry and is full of historic materials and as such, it preserves the intangible heritage and tradition of Southern Fujian and Overseas Chinese style architecture. To date, Wutong Village has been repositioned as part of the Cross-Strait Financial Centre, which mainly provides office, retail, residential and hotel uses. Now there is a risk of the village being demolished and rebuilt. This may undermine the original culture and customs and create a monotonous urban form. However, the urban village might potentially be retained if effective urban design can be used to alleviate existing problems and improve the living conditions. This research reviews the planning documents of Xiamen City, studying the advantages and disadvantages of existing urban design, and evaluates the possible impacts of existing policies and plans on urban villages. Wutong Village is used as an example to explore the importance of the historical, social and aesthetic significance of urban villages. Sustainable strategies including retaining the organic urban context, providing pedestrian friendly and safe traffic movement and expanding green connections emerge from this research as an alternative redevelopment pathway that can improve living conditions without damaging cultural and historical values.
Significance of urban design to improve living conditions—a case study of Wutong urban village in Xiamen

RESEARCH THESIS
Jin Tian

Beginning in the 1990s, there has been an urban form developed with unique characteristics throughout China: the Urban Village. It is the result of urban expansion and unaccomplished urbanization in rural areas.

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Climate change and local councils: an evaluation of three councils

Kusum Lata

An evaluation of the climate initiatives of three Sydney local councils is an attempt at a collective representation of existing data on climate change. The paper presents a thorough discussion and explanation of the threats posed by climate change and also the processes of greenhouse effect that lead to climate change and global warming. The paper discusses the impact of climate change on humans and how the micro climate of Sydney is similarly impacted.

The climate change initiatives of three councils; Penrith, Parramatta and Randwick are evaluated to assess what are the climate change threats and vulnerabilities for each council area based on their geographical location and the usual natural climatic conditions. A detailed discussion is presented that compares and evaluates the policies and strategies proposed by each council.

The research then discusses in detail the features and opportunities of a selected urban fabric of similar size from each council. A critique of these existing developments in each council area is made and opportunities to make the urban fabric more climate sensitive are identified. The research also discusses why these councils fail to include climate change initiatives as an integral part of the planning and design process.

Master of Urban Development & Design 2018-2019
Communication in Urban Design

Within the UNSW Master of Urban Design and Development Program exists a somewhat unique and at times demanding course that equips students with skills that push the boundaries of what urban design can teach and challenges students to rise beyond what others might consider adequate as a student project, presenting their work in the form of a published folio, major exhibition and recognised industry event.

The Communication in Urban Design course recognises the adaptability and transferability of many of the skills the students have already acquired during the MUDD Program; reflection, critical analysis, design language and graphics, time-management, negotiation, delegation, budgeting and an ability to confidently present to a wider audience. Student teams are responsible for designing the graphic representation of the entire year of work or for the design and construction of the exhibition itself. One team is responsible for the production and graphics of the folio while another is tasked with compiling and editing each piece of text. Some students will be asked to look at the catering brief for the evening, some will be required to work on a video presentation or a web design or even take on a role as the event manager. Work is never done in isolation and the agreement and support of the entire class is necessary for success.

The Communication in Urban Design course structure has been developed and refined for over 16 years. Undertaken under the supervision of Professor James Weirick, Communication in Urban Design is run by two leading staff members of the Graduate Program in Urban Development & Design, UNSW. Jodi Lawton (Principal, Lawton Design) is a professionally accomplished, multi-award winning designer, Andrew Sweeney (Director, Palfreeman Sweeney Architects), began assisting in 2017 and is a Sydney based architect with experience across a broad range of developments and with major projects in Australia and abroad. Together, these two industry professionals run the studio much like they would run a project through their own offices, defining deliverables, setting deadlines, allocating resources and reviewing progress. For some students this initial release into an unfamiliar brief is unsettling, but over time the camaraderie, enthusiasm and unrelenting drive of their fellow students catches them and a common sense of wanting to show the world just what they are capable of becomes infectious. Confidence grows as the students realise that they possess the skills and experience that are required and satisfaction is gained by supporting and encouraging each other Communication skills within the studio as well as communication skills to be presented to the outside world develop in equal measure.

The structure of the MUDD Program produces each year a student cohort that is already close and cooperative, however the Communication in Urban Design course builds further upon these established connections. Culminating in an industry recognised event that is supported by Australian and International sponsors, Communication in Urban Design proudly presents MUDD graduates to the world, sure of their abilities to communicate their talents and ideas to the profession and ready to take on any challenge with responsibility, respect and confidence. We wish them well.

Jodi Lawton
Designer & Principal, Lawton Design and Lecturer School of Architecture & Design, UNSW

Andrew Sweeney
Registered Architect, Director, Palfreeman Sweeney Architects and Sessional Staff member, School of Architecture & Design, UNSW.
MUDD 24 Class
Master of Urban Development & Design 2018-2019
STUDENTS EXPERIENCE

- Boston city walking tour — Boston downtown
- Boston city walking tour — Boston Planning & Development Agency
- Boston city walking tour — MIT
- Final presentation in Sasaki
- Brainstorming presentation in Sasaki
Fukuoka city walking tour

Brief presentation in Kyushu University

Japanese students introduced their previous design work on the Hakata Port

Jury session at Kyushu University

Walking tour around the Hakata Port.
I know there are many people who never get the chance to study abroad or have even been to another country or foreign city when they study urban design. Therefore as an international student, it is an honor to become a member of the MUDD Program. I appreciated all the things around; the Faculty of the Built Environment at UNSW, the campus life, the responsible and thoughtful professor and assistants, the unique international studio in Boston and the lovely classmates. Success and failure as well. All those elements were composed in one complete year, full of both happiness and sadness, to create a wonderful experience in life!

Even though I was just in Sydney for a short while, I witnessed all the tremendous changes and improvements within this time. The Program is constantly changing based on feedback from the teachers and students and lessons learnt from previous assignments. These are always an attempt to make things better. It's the same as a design; nothing can be perfect all the time. We became expert at amending and improving our ideas according to changing requirements and the demands of always doing things to the highest standard. Both faculty and students, all devoted to create better things, growing and improving together.

Despite this suffering, the results always ended up motivating me. Gradually I started enjoying this harvest of knowledge after each piece of research that I did. Each bit of study allowed me to explore a world that was new to me. Through each case study that I examined, I started to really understand the city in depth. I began to understand the significance of theoretical knowledge and of history in city making. I realised that without a knowledge of the history of a place, or an understanding of the character of a location, it is not possible to produce a mature and spirited design. This knowledge was like a treasure-box that was there just for me to find.

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Fan Baiwei  
MUDD (2018-2019)  
China

After two terms, I’ve really developed my experience and knowledge in the field of urban design, including the way of thinking, design process and design skills.

My first urban design studio was to further analyse and refine senior classmates’ previous designs for Canterbury, a typical suburb in south-west Sydney. In this project, we transplanted several global paradigms, which are completely different from the those found in Australia, into the site. Our team’s paradigm was an urban renewal project influenced by refurbishing the historical buildings to create a typically Canterbury, though higher-density, urban form. Through this project, I’ve thought about the possibility of transplanting urban design paradigms from a very different cultural and geographical backgrounds.

For our international studio, I was so surprised that I would have an opportunity to visit one of the most well-known design studios in the world, Sasaki Associates in Boston. The United States is home to many famous urban designers and architects, and visiting Boston and New York City is such a wonderful experience to learn from famous urban design examples such as Battery Park City, Highline Park, the Big Dig and so on. After nineteen days of working in Sasaki’s office, this experience really impressed me a lot.

The MUDD 24 Exhibition is a major academic and industry event in Sydney that showcases all the student works from the MUDD 24 Program. During the preparation for the exhibition, I joined the team responsible for producing a video that highlights our experience of the international studios in Boston and Fukuoka. Film-making was a whole new skill set for me to learn, and the finished product is something I am very proud of. All students in the MUDD Program work together, chasing the same goal, in an intensive but unforgettable experience.

As a student of the MUDD Program, I really appreciated these opportunities to think globally, learn globally and work globally.
Urban design has always been a subject of interest to me since my undergraduate days in architecture. I started taking an interest in cities and people. Mumbai was an example of a city that inspired me. Even with its chaotic outburst of energy, the city functions in a very systematic manner. I was intrigued to know more about this field. How do you enable a city to be citizen friendly? If infrastructure is constructed, where does one bring in street life between these developments and how can we maintain a public realm that encourages interaction?

The MUDD Program at UNSW answered these questions. The Program is internationally recognised for its excellence and innovation. The courses I have taken have given me access to various topics that I had never previously thought about. The City and Cinematic Space Studio was fantastic. It gave me a new perspective of understanding cinema’s role in finding urban patterns that define the city’s qualities. Urban Landscape and Heritage was very engaging, learning how we need to respond to not just development needs but to also include our landscape for a more sustainable approach and to protect the historical context of a city.

The most exciting part of this course has been the International Studio in Boston and Fukuoka. I was among the students that visited Fukuoka with Architect Brendan Randles and Architect Jun Sakaguchi. Fukuoka was an overwhelming experience where students developed proposals for a real site at the waterfront of the city. This exercise gave me an opportunity to work with a wonderful team of students from various backgrounds on real problems and to explore potential of the site and find the most apt solutions. This also allowed me to interact with many Japanese students, which helped me to understand their city and improve my skills.

Overall, this course has enriching subjects and exercises that help you evolve your ideas on urban design and development. It teaches you about projects from various cities, emphasising how we should be responsible in creating an environment that works for the city and the people.
Ratikant Samal  
MUDD (2018-2019)  
Indian

Urban design had grown to be an area of interest while pursuing my bachelor’s degree in urban planning. The concepts and ideas of urban design which were introduced fascinated me and helped me understand that urban design is the future for shaping cities. Urban development and design is a field of creative solutions, an integration of people with urban spaces and a collaboration of various built environment professions. The MUDD Program serves as a perfect medium to educate and develop paradigms of urban design. It forms a platform to interact with a wide range of ideas, techniques and designs by collaborating with students and professionals from diverse backgrounds.

The MUDD Program with its field projects and international design studio opens gates to progressive learning of theoretical as well as practical attributes. The course structure convinced me that this is what could fulfil my passion to contribute to better urban spaces. The experience of design studios was very enlightening in terms of working with groups and multidisciplinary professionals. Also, the design studio with its unique cinematic space exercise was very instructive in its relationship between film, architecture and the city. It taught me to be more observant of the often unnoticed features of urban space and their impact on every aspect of life.

The Program focusses on all round development of the students; be it learning from mistakes or gathering the confidence to interact with the geniuses of the field. It is an integral part of the Program to provide students with the exposure to become efficient professionals. The international studio is one of the best examples. I travelled to Fukuoka, Japan and collaborated with students from Kyushu University for three weeks to work on a redevelopment of the Hakata Port. It gave me an opportunity to experience a new work environment and exposure to the concepts and ideas of another city with regards to urban design. I learned to understand how sensitive a port area is to development and how complex the processes of planning, designing and decision making are, and how the contribution of stakeholders helps make a successful project. During this process, I also got the opportunity to interact and learn from the Japanese students.

I believe the MUDD Program and its ambitious aspirations helps everyone grow, not just professionally but with personal capabilities to overcome every challenge. It teaches how to grasp better opportunities to sustainably develop this planet and its cities. Its experimental nature and subjection of students to different environments provides an adventurous journey for every student wishing to become an urban designer.
In preparing to return to work after starting a family, I was keen to develop new skills. Studying urban design seemed a good fit with my strategic and statutory planning background and offered a more creative focus to my career. I chose the MUDD Program for its strong mix of theory and design studios.

MUDD 16 turned out to be a fabulous year working with some incredibly talented people. I learnt a great deal about historic and contemporary urban design from a wide range of guest lecturers and developed much needed drawing and graphic skills from the students around me. I even picked up the habit of being generous with a well-stocked library from Professor Weirwick.

Two experiences however, stand out. The international design studio, always a highlight, but how brilliant to work with Italian architecture students in Venice! The butter paper, red wine, the damp grandeur of a medieval town and the intense creativity of the Italians brought a kind of joy to the design process, the spirit of which I have since taken on in my professional career.

The other was a tutorial series from leading Sydney urbanists, Philip Thalis and Peter John Cantrill. They changed the way I saw cities.

Today, I head the urban design team at North Sydney Council. I oversee the preparation and implementation of urban renewal strategies that deliver dwellings and jobs growth across the local government area, particularly in response to the metro stations being built in the North Sydney CBD and at Crows Nest. The team is currently working on a masterplan for the block adjoining the Victoria Cross metro station, planning studies for the CBD and Military Road corridor and a CBD public domain strategy. I’m also responding to developer and state government proposals for St Leonards and Crows Nest and negotiating new employment, open space and community facilities to support the future population.

A key element of my job is to build a strong relationship with the community, because a good design is nothing without their support. I regularly present to local resident groups, respond to submissions, and hotfoot it down to customer service to discuss proposals one on one. To be effective, I’ve learnt that building relationships requires a ‘beginners mind’ and a genuine enthusiasm for collaboration. It also requires clear written, verbal and graphic communication skills in equal measure.

Having gained so much from that one, intense year of study at UNSW, it is important to give back. I now present our work at conferences across Australia, participate in various discussion panels and recently had an article published in New Planner (December 2018). I particularly enjoy giving guest lectures at local high schools and being on the ‘other side’ of studio reviews.

I would like to take this opportunity to extend my sincerest thanks to the dedicated UNSW staff for running the MUDD Program and wish the very best of luck to future students and to those just about to put their new-found skills into practice.
Ma Xinzheng
MUDD (2012)

After graduating from the MUDD Program, I worked as an urban designer for Skidmore, Owings & Merrill (SOM). Much of the experience from the MUDD Program could be used directly in the real projects and I always adhere to the project’s site constrains and will suggest to our team to do the same. By working on different project types such as large-scale new districts, historical districts and urban design guidelines, I have gained a deeper understanding of the importance of urban design and am really proud to set up strategies for different projects.

In 2017, I started to work for SRE (a Shanghai oriented real estate developer) as design manager. The focus of my work shifts from design to design management, which needs more attention to schedules, budgets and communication. This experience has helped me gain a better understanding of the entire industry chain from another prospective.

The MUDD Program started my professional practice. I feel grateful to share my experience with all MUDD alumni, and hope our career paths cross one day in the future.

After I gained my bachelor degree in Landscape and Architecture Design from Renmin University of China, I found that solving urban spatial problems with a bigger vision is more interesting, so I decided to have urban design as my future direction. After a series of school comparisons, the academic atmosphere of UNSW and the reputation of the previous international studios made me decide to join the MUDD Program.

The three-semester course allowed me to quickly establish an initial knowledge for urban design. Through different studios, academic research and real project practice were introduced to students. For example, the Redfern-Waterloo Area Redevelopment was based in Sydney and neighbourhood stakeholders were involved as part of the presentation jury. In a project with such public participation, we quickly understood the significance of a good space to the neighbourhood and to the city.

It is very important to respect the existing site conditions and history. This is what I learnt from the international studio in Berlin. In cooperation with the professors and students from the Technical University of Berlin, the intense two-week course soon ended. Our team proposed a sustainable urban regeneration strategy for the Emst-Reuter-Platz area to stimulate the local vitality, to improve walkability and to create a better sense of place. During the design process, we went to the site to get inspired and we respected and leveraged the huge and shocking impact brought to the site by World War II. After this international studio, I was very lucky to be chosen for the Planning Workshop International Award 2012. I think of this award as an encouragement for respecting the existing site conditions and history.
MUDD Alumni
Updates since 2018

Rohit Lunawat (MUDD 2017)
Urban Designer, a+ Design Group, NSW, Australia

Li Yilun (MUDD 2018)
Graduate Landscape Architect, Thompson Berill Landscape Design (TBLD), NSW, Australia

Ghani Hourani (MUDD 2018)
Urban Designer, Scott Carne, NSW, Australia

Darshini Rajeshwaran (MUDD 2017)
Urban Designer, GM Urban Design & Architecture, NSW, Australia

Felipe Romero (MUDD 2017)
Senior Urban Designer at Urbis, NSW, Australia

Andrew Giannasca (MUDD 2017)
Senior Project Manager, Urban Development at APP Corporation Pty Ltd, NSW, Australia

Waqas Jamil Afridi (MUDD 2007)
Architect, Westmead Hospital, NSW, Australia

Duan Jinyi (MUDD 2018)
Graduate Landscape Architect, Environmental Partnership, NSW, Australia

William Robertson (MUDD 2012)
Urban Design Specialist, Willoughby City Council, NSW, Australia

Alison Phillips (MUDD 2017)
Architect, Westmead Hospital, NSW, Australia

Xing Yan (MUDD 2002)
Associate Urban Designer, Tact Consultants, NSW, Australia

Mathew Egan (MUDD 2011)
Principal Planner, Willoughby City Council, NSW, Australia

Siva Muthusamy (MUDD 2018)
Urban Designer/ City Analyst, Cities and Places, Jacobs, NSW, Australia

Du Qin (MUDD 2018)
Urban Designer/ Graphic Presenter, Design + Planning, NSW, Australia

Mayuri Sodani (MUDD 2018)
Architectural designer/urban designer, ae design partnership, NSW, Australia

Carla Mamari (MUDD 2007)
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Will Wang (MUDD 2014)
Urban Designer, Conybeare Morrison International (CM+), NSW, Australia
Master of Urban Development & Design 2018-2019

Di Wu (MUDD 2017)
Urban Designer, Conibear Morrison International (CM+), NSW, Australia

Agnes Tiong (MUDD 2017)
Consultant, Urban Design + Property Economics, NSW, Australia

Max Stember/Young (MUDD 2012)
Environmental Planner, VHB, New York, USA

Erica Tinio (MUDD 2010)
Assistant Transportation Planner, SIMCO Engineering, Inc., New York, USA

Christian Vitulli (MUDD 2016)
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Ashley Bakelman (MUDD 2016)
Associate at RW Ventures, LLC, Chicago, USA

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Yue Yushan (MUDD 2018)
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Li Weide (MUDD 2012)
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Architect, Shanghai Sunyat Architecture Design Company, Shanghai, China

Feng Shengting (MUDD 2018)
Design Manager, Sinc Technology Co., Ltd., Huizhou, China

Yu Huan Lin (MUDD 2015)
Senior Urban Designer, AECOM, Taipei City, Taiwan

Vianne Huang (MUDD 2007)
Planning Manager, J. J. Pan and Partners, Taipei City, Taiwan

Felicia Gunawan (MUDD 2012)
Associate Director at ARKdesign Architects, Jakarta, Indonesia

Rohan Londhe (MUDD 2012)
Urban Designer/Assistant Manager, Smart Highway & Smart City, Ashoka Buildcon Limited, Maharashtra, India
MUDD 24 staff and students thank our many friends and supporters for the time and effort they have provided in continuing to make our program an outstanding success. The list below includes key intellectuals, administrators, designers and developers who have contributed to the program throughout the course of the past year in Sydney, Boston and Fukuoka.

For contributions to the UDES0001 Studies in Urban Form Studios (Semesters 1 & 2, 2018), Professor James Weirick thanks Amy Bendall (Urban Designer; City of Sydney) for her special tutoring; Michael Gheorghiu (Consultant Planner & Urban Designer) for his outstanding commitment and expert guidance; Brendan Randles (Senior Architect & Urban Designer; Archicad) for his advice and creative ideation during desk crits; Oliver Ju (MUD 2015 - Landscape Architect, Johnson Pilton Walker) for the introductory workshop on mapping techniques; Jesse McNicoll (Urban Design Coordinator; City of Sydney) for his guest lecture on urban densities; and Dean Uton from the FBE Teaching & Learning Team for his enthusiasm and special knowledge of film for the ‘City & Cinematic Space’ studies.

For the UDES0002 Geodesign Studio (Semesters 1 & 2, 2018), Dr Scott Hawken thanks Emeritus Professor Carl Steinitz, Harvard Graduate School of Design for inviting us to join the International Geodesign Collaboration, and for his wise counsel through the year; Hirshi Ballal (Managing Director; Geodesignhub) for his special expertise and technical support; Dr Matthias Irger (Senior Associate, Architectus) and Dr Carlos Bartesaghi Koc (FBE) for their research-based knowledge of development impacts on climate change in Western Sydney, and their enthusiastic tutoring; Professor Robert Freestone (FBE) for his guest lectures on Australian aerotropolis development; guest lecturers Jonathan Knapp (Director; Urban Design, SJD Sydney) and Glyn Richards (Director; Ampersand Property) for their presentations on development feasibility; Michael Gheorghiu for his Western Sydney knowledge and organisation of the Badgery’s Creek field trips; Joe Catania, Managing Director; Direct Freight Express, Warwick Farm for the special tour of his logistics facility during the ‘aerotropolis’ field trips to Western Sydney; and Professor Rod Simpson (Environment Commissioner; Greater Sydney Commission) for his expert critique at the end-of-year Design Jury.

For the highly informative, stimulating lectures on the political and economic contexts necessary for our understanding before undertaking the UDES0003 International Studios in Fukuoka and Boston, we thank urban economist and long-standing friend of the MUDD Program John Zerby.

For our Boston Experience, Professor Weirick and Michael Gheorghiu express deep appreciation to our hosts at Sasaki Associates for their generosity in granting us the opportunity to work in their Watertown office for the second year in a row. In particular we thank Urban Design Principal Martin Zogran and Chair of Design Dennis Piepz for the formal invitation to Boston – and in addition, Dennis Piepz for his inspirational lecture on the 21st Century University Campus, Martin Zogran for his expert guidance at our Interim Presentations, and his generous critique at the Final Presentation; and Associate Lachlan Hunter Hicks for his practical support throughout our stay.

In Boston we were privileged to receive background briefings of the highest calibre: first from Harris S. Band, Director of Physical Planning, Harvard Planning Office and his colleague Joseph Breggan, Senior Manager for Transport on the ‘Harvard in Allston’ Project. At the Boston Planning & Development Agency, Boston City Hall we received a comprehensive briefing on the Imagine Boston 2030 plan, Beacon Yards redevelopment and the I-90 Relocation Project from John Read, Senior Deputy Director for Transportation & Infrastructure Planning. At Boston University we were welcomed to the 26th floor common room of the Hancock Village tower with its a dramatic view over the Beacon Yards site by Elizabeth Leary (Director of Community Relations), Paul Rinaldi (Assistant Vice President for Planning & Design), and Cecilia Nardi (Director of Government Policy) for another comprehensive briefing on the Beacon Yards project, this time from the BU perspective. For a searching, inspirational presentation on the Allston community’s engagement with the ‘Harvard in Allston’ and Beacon Yards projects, we thank community activist Harry Mattison for a memorable Saturday morning.

At Harvard Graduate School of Design we were hosted with great generosity by Professor Rahul Mehrotra, Professor of Urban Design & Planning, whose presentation on urban design at Harvard and introduction to the spatial drama of Gund Hall were exceptional. We were also delighted to meet up once again with our 2018 Reid Lecturer, Professor Peter Rowe.

We were also delighted to meet up once again with MUD 1998 alumnus Geoffrey Morrison-Logan (Principal, Planning, Design & Landscape Architecture, Vanasse Hangkink Brustlin, Watertown, MA), who joined us for the Interim and Final Presentations at Sasaki Associates, and Dennis De Witt (Consultant Architect & Architectural Historian) who joined us for the Final Presentation as in 2017. Also in the Design Jury that afternoon, it was great to have Elizabeth Leary and Cecilia Nardi from Boston University; David Gamble, Convenor of a Fall Semester Beacon Yards Studio at Harvard GSD and Principal of Gamble Associates, Cambridge, MA; together with Associate Eunat Rosenkranz and Senior Associate Charwoo Kim from the Sasaki urban design team.

Professor James Weirick extends sincere appreciation to Brendan Randles (Senior Architect & Urban Designer; Archicad) for once again taking on the challenge of convening and leading the UDES0003 International Studio, this year in Fukuoka, Japan; and also Jun Sakaguchi (Studio Director; Jackson Teece), who facilitated the MUD 2007 Studio in Tokyo and 2009 Studio in Nagoya, who joined us this year to provide design assistance, professional contacts and cultural reference points in Fukuoka, and to support development design back in Sydney.

The Fukuoka Studio would not have been possible without the outstanding generosity and support of our friends at Kyushu University; in particular our host, Professor Magakuzu Tani (Dean of the School of Design) and co-convenors of the joint KU/UNSW Urban Design Studio, Associate Professor Tetsuya Uki and Assistant Professor Masaaki Iwamoto. We especially thank Professor Iwamoto for his organisational assistance, walking tours in Fukuoka, Hakata Port, Nexus World and Island City, and invaluable tutorial advice; Professor Uki for his thoughtful commentary and critique in design reviews; and fellow academics from the KU Graduate School of Design: Dr Yoshitake Doi (Professor; History of Western
Architecture); Dr Kazuo Asahiho (Associate Professor Landscape Conservation & Restoration); and Yasushi Togo (Professor of Social System Design) for their great contributions to the reviews.

For their overwhelming generosity throughout the workshop, we thank the Fukuoka Port Authority, in particular Mr Takahisa Nakamura (Chief Executive Officer) for his intriguing and informative lecture comparing the ports of Sydney and Fukuoka, Mr Aramakai (Director of Redevelopment), Mr Shibata (Director of General Affairs) and all of those involved in organising our extensive boat trip and attending our initial and final presentations. For his excellent lecture on the history of the port, we would like to thank Keisuke Sakurai (Tokanet). For organising a fascinating evening tour to Fukuoka’s most important shrines during the Light Up Festival, we thank Miki Matsushita (Lighting Designer Miki Matsushita Lighting Design). We are especially grateful to Makato Sabo (Principal, Aoki Shigeru Architects) for providing such generous and informed advice. Above all, we thank the KU students for making the Joint KU/UNSW Urban Design Studio a truly special experience.

For UDES0004 History & Theory of Urban Development & Design, Professor James Weirick thanks Professor Karl Fischer for his lecture on the European city, and Emeritus Professor Alexander Guthbert (FBE) for his in-depth and brilliantly challenging lectures on spatial political economy and urban design. For valuable assistance and knowledgeable guidance throughout the weekly tutorials, we thank Dr Fatemeh Aminpour (FBE), Carla Mamaril (Mudd 2007) and Vanessa Trowell (Mudd 2009).

Professor Weirick thanks the following professionals and FBE colleagues for their Urban Development & Design Case Study Presentations in our UDES0006 Summer Term course: Phillip Bartlett (Directbc P & J Projects); Professor Karl Fischer (FBE); Graham John AM (Director of City Planning, Development & Transport, City of Sydney); Emeritus Professor Bruce Judd (FBE); Emeritus Professor John Lang (FBE), Arlene Segal (Adjunct Senior Lecturer in Urban Design, FBE), Adjunct Professor Philip Thalis (Principal, Hill Thalis Urban Projects, FBE), Michael Zanardo (Principal, Zanardo Studio). Professor Weirick also expresses sincere appreciation to Arlene Segal for reviewing and assessing the Case Study presentations.

For their contributions to UDES0008 Planning & Urban Development we thank Jeremy Dawkins as convenor; tutors Carla Mamaril (Mudd 2007) and Vanessa Trowell (Mudd 2009); and Guest Lecturer Kevin Alker (Corporate Advisor Hill, PDA & formerly General Manager, Urban Development, Landcom) for his in-depth lecture series on development feasibility.

For contributions to UDES0009 Urban Landscape & Heritage, Dr Scott Hawken gratefully thanks Co-convenor Dr Anne Warren (Director, Anne Warren Heritage Consulting) for her specialist lectures on urban heritage and conducting tutorials together with tutors Carla Mamaril (Mudd 2007) and Sarbeswar Praharaj (FBE Ph.D student).

For convening the BE module of BENV7020 Research Seminar and reviewing the presentations of the Mudd (Extended) students, we thank Professor Robert Freestone (FBE). In addition, we thank Andrew Sweeney (Principal, Palframan Sweeney Architects) and Dr Anne Warr for their expert supervision of the Mudd24 Urban Design Research Projects, and Arlene Segal for her commentaries on the students’ research presentations.

For their contributions to the Design Jury presentations of the 2018-2019 studios in Sydney, we thank our guests who provided comments and critique on the Mudd24 design submissions: Amy Bendall; Greg Burgon (Urban Development Principal, Architecatus); Professor Robert Freestone; Jonathan Knapp; Jan McCredie (Urban Design Manager, Parramatta City Council); Glyn Richards; Deena Ridener (Senior Lecturer, Urban Design Program, University of Sydney); Tim Schwager (Architect & Principal, Schwager Australia); Arlene Segal; Andrew Sweeney; Dajan Veldman (Principal, Urban Design, Scott Carver); and John Zerby.

An important thank you to Professor Helen Lochhead (Dean, Faculty of Built Environment) for her continuing support and goodwill towards the Mudd Program and for her contributions during the jury presentations of our students. Thank you also to Acting Deputy Dean Bruce Watson and our colleagues in the FBE Student Centre; Built Environment TEL Team; and FBE Discipline Directors Unit, together with the FBE Business Partners in Finance, Computing and Marketing who work to ensure the Mudd Program runs successfully each semester Professor Weirick extends special thanks to Monica McNamara (Education Support Manager, FBE); Anjaliika Wijesurendra (Academic Programs Coordinator); and Vanessa Towell (Mudd2009) for exceptional assistance in transitioning the Mudd degrees to the UNSW 3+ Academic Calendar.

For co-convening UDES0010 Communications in Urban Design, a special thank you to Andrew Sweeney for his editing, English-language support for our international students and overall enthusiasm for the Mudd Program. Finally, for her critical assistance during UDES0010, inDesign workshops throughout the year, oversight of the final studio deliverables, and for her unwavering commitment to always seeing the Mudd24 Folio completed and successful staging of the Mudd24 exhibition, a sincere thank you to Jodi Lawton, Principal of Lawton Design. Her dedication to the Mudd Program and the countless hours of professional and personal time that she dedicates each year is inspirational.
EXHIBITION LAYOUT

• **Fukuoka International Studio**
  A reimagining of the role and function of a key waterfront site in one of Japan’s most dynamic cities was the theme for this three-week studio hosted by the Graduate School of Design at Kyushu University. Students proposed solutions to reflect and enhance Fukuoka’s connections and role as a true gateway city.

• **Boston International Studio**
  The three-week studio hosted by Sasaki examined the various scenarios eventuating from the repurposing of redundant transport infrastructure at Beacon Yards. The final designs represent the different approaches that resulted from five key stakeholders: Harvard University, the City of Boston, the Allston Community, Amazon HQ2 and Boston University.
• Canterbury Precinct
Through Studies in Urban Form, students develop a capacity to read cities as an expression of human values, activity and culture, while the City and Cinematic Space studio facilitates a greater understanding of a city's history, identity and lived experiences. These skills have been applied to an urban design proposal centred on the Canterbury Station of Sydney's new Metro Southwest.

• Urban Design Research
Students research a critical aspect of urban development and design as either a written dissertation or design thesis. They may return to a topic introduced previously and explore this in more depth or students may choose to research ideas and interests inspired by current advances in practice.

• International Geodesign Collaboration
UNSW was the only Australian university invited to participate in this global collaboration that uses geographic, spatial and information systems to generate rapid, continuous, model-based feedback that can be used to advance performance and designs in urban climate innovation.

• Western Sydney Airport
The studio began with systems evaluation modelling, then based upon the systems mapped, students in this studio developed change models that were evaluated at various scales and subsequently applied to different 1km x 1km sites near the location of the government's proposed Bringelly Town Centre.
The Master of Urban Development & Design 2018-2019 would like to thank our sponsors and donors for their generous support and contributions.

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Master of Urban Development & Design

Program Outline

The intensive one calendar year program involves two academic semesters plus a summer term, which includes a compulsory field project and design studio in a major international city.

The program seeks the synthesis of three bodies of knowledge about the city - spatial political economy, theories of good city form and urban design as public policy. Coursework is progressive, stressing theoretical knowledge of economic, social, environment and physical design determinants in the first semester, moving to applied skills and implementation techniques toward the end of the year.

The program comprises eight core course and one elective course. The compulsory core includes five lecture/seminar courses, three project based studios, and a case study course. Students are encouraged to select an elective from a list of recommended courses offered by the Faculty of Built Environment. Students may be permitted, with the approval of the Program Director, to select electives from course offered by other faculties of the University.

The summer term is devoted to the international urban design studio, case study investigations of major urban projects, and critical reflection on the year's work through preparation of the annual exhibition and publication of the MUDD Folio.

Program of Study for full-time Candidates:

For further information about the Program of study and key information go to: https://www.handbook.unsw.edu.au/postgraduate/programs/2019/8131 or contact the Faculty of Built Environment, UNSW.
This core course extends students' capabilities for graphic, written and verbal communication through the production of the annual MUDD Folio, Exhibition and associated public lecture — the Paul Reid Lecture in Urban Design. The aim is to critically reflect upon and re-present the year's work of the MUDD Program in a creative, compelling format which contributes to the design culture of Sydney.

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