



THE ATHENS INSTITUTE FOR EDUCATION AND RESEARCH

# Abstract Book

8<sup>th</sup> Annual International Conference on  
Engineering Education & Teaching  
29-31 May & 1 June 2023 Athens, Greece

Edited by  
Nicholas N. Patricios & Olga Gkounta

2023



Abstracts  
8<sup>th</sup> Annual International  
Conference on Engineering  
Education & Teaching  
29-31 May & 1 June 2023,  
Athens, Greece

Edited by  
Nicholas N. Patricios & Olga Gkounta

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## Preface

This book includes the abstracts of all the papers presented at the 8<sup>th</sup> Annual International Conference on Engineering Education & Teaching (29-31 May & 1 June 2023), organized by the Athens Institute for Education and Research (ATINER).

A full conference program can be found before the relevant abstracts. In accordance with ATINER's Publication Policy, the papers presented during this conference will be considered for inclusion in one of ATINER's many publications only after a blind peer review process.

The purpose of this abstract book is to provide members of ATINER and other academics around the world with a resource through which they can discover colleagues and additional research relevant to their own work. This purpose is in congruence with the overall mission of the association. ATINER was established in 1995 as an independent academic organization with the mission to become a forum where academics and researchers from all over the world can meet to exchange ideas on their research and consider the future developments of their fields of study.

To facilitate the communication, a new references section includes all the abstract books published as part of this conference (Table 1). I invite the readers to access these abstract books –these are available for free– and compare how the themes of the conference have evolved over the years. According to ATINER's mission, the presenters in these conferences are coming from many different countries, presenting various topics.

**Table 1.** *Publication of Books of Abstracts of Proceedings, 2016-2023*

Year	Papers	Countries	References
2023	47	19	Patricios and Gkounta (2023)
2022	42	20	<a href="#">Patricios and Gkounta (2022)</a>
2021	26	13	<a href="#">Papanikos (2021)</a>
2020	24	16	<a href="#">Papanikos (2020)</a>
2019	19	12	<a href="#">Papanikos (2019)</a>
2018	22	15	<a href="#">Papanikos (2018)</a>
2017	31	16	<a href="#">Papanikos (2017)</a>
2016	28	19	<a href="#">Papanikos (2016)</a>

It is our hope that through ATINER's conferences and publications, Athens will become a place where academics and researchers from all over the world can regularly meet to discuss the developments of their disciplines and present their work. Since 1995, ATINER has organized

more than 400 international conferences and has published over 200 books. Academically, the institute is organized into 6 divisions and 37 units. Each unit organizes at least one annual conference and undertakes various small and large research projects.

For each of these events, the involvement of multiple parties is crucial. I would like to thank all the participants, the members of the organizing and academic committees, and most importantly the administration staff of ATINER for putting this conference and its subsequent publications together.

**Gregory T. Papanikos**  
**President**

## **Editors' Note**

These abstracts provide a vital means to the dissemination of scholarly inquiry in the field of Engineering Education & Teaching. The breadth and depth of research approaches and topics represented in this book underscores the diversity of the conference.

ATINER's mission is to bring together academics from all corners of the world in order to engage with each other, brainstorm, exchange ideas, be inspired by one another, and once they are back in their institutions and countries to implement what they have acquired. The 8th Annual International Conference on Engineering Education & Teaching accomplished this goal by bringing together academics and scholars from 19 different countries (Albania, Canada, China, Croatia, Egypt, India, Israel, Italy, Kenya, Lithuania, Palestine, Saudi Arabia, Spain, Sweden, Taiwan, The Netherlands, Turkey, UK, USA), which brought in the conference the perspectives of many different country approaches and realities in the field.

Publishing this book can help that spirit of engaged scholarship continue into the future. With our joint efforts, the next editions of this conference will be even better. We hope that this abstract book as a whole will be both of interest and of value to the reading audience.

**Nicholas N. Patricios & Olga Gkounta**  
**Editors**

**8<sup>th</sup> Annual International Conference on Engineering  
Education & Teaching, 29-31 May & 1 June 2023, Athens,  
Greece**

**Organizing & Scientific Committee**

All ATINER's conferences are organized by the Academic Council. This conference has been organized with the assistance of the following academic members of ATINER, who contributed by reviewing the submitted abstracts and papers.

1. Gregory T. Papanikos, President, ATINER & Honorary Professor, University of Stirling, U.K.
2. Nicholas N. Patricios, Vice President of Strategic Planning & Analysis, ATINER, Dean Emeritus & Professor, School of Architecture, University of Miami, USA.
3. Theodore Trafalis, Head, Industrial Engineering Unit, ATINER, Professor of Industrial & Systems Engineering and Director, Optimization & Intelligent Systems Laboratory, The University of Oklahoma, USA.
4. Mike Mavromihales, Academic Member, ATINER & Senior Lecturer and Course Leader, University of Huddersfield, UK.

## FINAL CONFERENCE PROGRAM

8<sup>th</sup> Annual International Conference on Engineering Education & Teaching,  
29-31 May & 1 June 2023, Athens, Greece

### PROGRAM

Monday 29 May 2023

08.30-09.15  
Registration

09:15-10:00

Opening and Welcoming Remarks:

- Gregory T. Papanikos, President, ATINER.

10:00-11:30 Session 1

Moderator: Giulia Pellegrini, Vice Dean & Associate Professor, Architecture-Polytechnic School, University of Genoa, Italy.

1. **Holly Madill**, Director, Michigan State University, USA.  
*Title: Using CPTED + Placemaking to Help Communities Transition from High Crime.*
2. **Jesus J. Lara**, Associate Professor, The Ohio State University, USA.  
*Title: Service-Learning Education: Transformative Approaches for Declining Urban Communities.*
3. **Tom Wanyama**, Associate Professor, McMaster University, Canada.  
*Title: Potentials and Limits of Learning Factories in Teaching Engineering.*

Discussion

11:30-13:00 Session 2

Moderator: Jesus J. Lara, Associate Professor, The Ohio State University, USA.

1. **Saad AlQuhtani**, Associate Professor, Najran University, Saudi Arabia.  
*Title: Children's School Travel Mode Choice in Sprawled Cities – The Case of Najran City, Saudi Arabia.*
2. **Giulia Pellegrini**, Vice Dean & Associate Professor, Architecture-Polytechnic School, University of Genoa, Italy.  
*Title: Drawing as a Representation of Beauty: Canon, Measure, Symmetry, Eurythmy.*
3. **Michela Scaglione**, Research Fellow, University of Genoa, Italy.  
*Title: From Smart City to Artificial Intelligence City: How AI is Changing Urban Perception Please.*
4. **Martina Castaldi**, PhD Student, University of Genoa, Italy.  
**Agostina Maria Giusto**, PhD Student, University of Rome "La Sapienza", Italy.  
*Title: The Drawn Garden: Historical, Iconographical and Representative Analysis through Time of the "Villa di Livia" in Rome".*

Discussion

13:00-14:30 Session 3

Moderator: Carlos Gonzalez, Senior Lecturer, London South Bank University, UK.

1. **Evangelos Kaiser**, Professor, Florida Atlantic University, USA.  
*Title: Improving the Last Mile Delivery by Integrating Autonomous Delivery Vehicle.*
2. **Giovanni Righini**, Professor, University of Milan, Italy.  
**Alberto Ceselli**, Professor, University of Milan, Italy.

**Cristina Ondei**, PhD Student, University of Milan, Italy.

**Emanuele Tresoldi**, Scientific Consultant, Italy.

*Title: The Electric Traveling Salesman Problem.*

3. **Dimitra Michalaka**, Associate Professor, The Citadel, USA.

**William J. Davis**, Head, The Citadel, USA.

**Graham Copeland**, Professor, The Citadel, USA.

**Kari Watkins**, Associate Professor, UC Davis, USA.

**Kweku Brown**, Associate Professor, The Citadel, USA.

**Morgan Hughey**, Assistant Professor, College of Charleston, USA.

*Title: Evaluation of Transportation Network Infrastructure, Safety, and Travel Route Characteristics of Bike Share, Electric-Powered Pedal-Assist Bike Share, and Electric Scooter System Operation*

4. **Eleni Bardaka**, Assistant Professor, North Carolina State University, USA.

**Subid Ghimire**, PhD Student, North Carolina State University, USA.

*Title: Spatiotemporal Analysis of Car and Active Travel Use between Lower and Higher-Income Households in the US.*

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#### Discussion

**14:30-15:30 Discussion + Lunch**

#### 15:30-17:30 Session 4

**Moderator: Agostina Maria Giusto**, PhD Student, University of Rome "La Sapienza", Italy.

1. **Luca Lazzarini**, Assistant Professor, DASTU, Politecnico di Milano, Italy.

**Ezio Micelli**, Full Professor, University IUAV of Venice, Italy.

**Elena Ostanel**, Assistant Professor, University IUAV of Venice, Italy.

*Title: Networks Cultivating Values: Insights from Five Culture-based Regeneration Projects in Italy.*

2. **Merit Zimmermann**, Researcher, Erasmus University Rotterdam, The Netherlands.

*Title: Beauty and Aesthetic Emotion: A New Paradigm for Urban Development?*

3. **Carlos Gonzalez**, Senior Lecturer, London South Bank University, UK.

*Title: Vertical Ghettos – Re-Urbanising the City – First Steps... Urban Regeneration.*

4. **Danai Papathanasiou**, Teaching Fellow & Junior Lecturer, Maastricht University, The Netherlands.

*Title: Scandi-Kitsch: Shifting from Loft Living to Green New Built-Gentrification of the Eco-Friendly Home.*

5. **Jing Liang**, PhD Student, Southeast University, China.

*Title: Post-Winter Olympics Era: Ice- Snow Tourism and Urban Revival in Old Industrial Areas of Northeast China.*

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#### Discussion

#### 17:30-19:30 Session 5

**Moderator: Mr Kostas Spyropoulos** (ATINER Administrator).

1. **Firzana Shuja**, Post Graduate Student, School of Planning and Architecture Vijayawada, India.

**Adinarayanane R.**, Associate Professor, School of Planning and Architecture Vijayawada, India.

*Title: Planning For Compact and Low-Carbon Transit-Oriented Development: A Case of Kochi City, Kerala, India.*

2. **Asa Wikberg Nilsson**, Professor, Luleå University of Technology, Sweden.

**Minna Eronen**, PhD Candidate, Luleå University of Technology, Sweden.

*Title: Dreamcatching: Introducing a Reflexive Tool to Facilitate Situated Complexity in Urban Co-Design Practices.*

3. **Daniela Pittaluga**, Associate Professor, University of Genoa, Italy.  
*Title: Signs of Memory: Le Corbusier's Drawings at Villa E1027.*
4. **Francesca Salvetti**, Adjunct Professor, University of Genoa, Italy.  
*Title: The Color of the City, Identity Beauty.*
5. **Galvan Desvaux Noelia**, Associate Professor, University of Valladolid, Spain.  
**Alonso Rodríguez Marta**, Associate Professor, University of Valladolid, Spain.  
**Alvarez Arce Raquel**, Associate Professor, University of Valladolid, Spain.  
**Fernandez Valer Cristina**, Associate Professor, University of Valladolid, Spain.  
*Title: Photography as the Architectural Context's Reflection: Graphic Analyses in Four Instants.*
6. **Brice Hanberry**, Research Ecologist, USDA Forest Service - Rocky Mountain Research Station, USA.  
*Title: Applying Population Density Models to Define Urban Populations and Identify Response to Prolonged Heat.*

### Discussion

20:00-22:00

**Athenian Early Evening Symposium (includes in order of appearance: continuous academic discussions, dinner, wine/water, music and dance)**

**Tuesday 30 May 2023**

<p><b>09:30-11:30 Session 6</b> <b>Moderator: Mr Kostas Spyropoulos</b> (ATINER Administrator).</p>	<p><b>08:00-11:30</b> <b>Old and New-An Educational Urban Walk</b></p>
<ol style="list-style-type: none"> <li>1. <b>Lap-I Kuok</b>, PhD Student, National Cheung Kung University, Taiwan. <b>Ping-Sheng Wu</b>, Professor, National Cheung Kung University, Taiwan. <i>Title: Pre-Urbanization: Informal Housing and Urban Development Policy in Twenty-Century Macau.</i></li> <li>2. <b>Min Wang</b>, PhD Student, Southeast University, China. <i>Title: Identification of Optimal Types of Land Development Intensity in Historical Urban Areas based on Adaptability Evaluation of Traffic Capacity and Travel Demand.</i></li> <li>3. <b>Manlio Michieletto</b>, Associate Professor, German University in Cairo, Egypt. <i>Title: Building the Future Urban Structure: Kigali's Green City Project.</i></li> <li>4. <b>Mi Zhou</b>, PhD Student, Southeast University, China. <i>Title: Capacity Calculation and Layout Optimization of Public Space in Suzhou Ancient City.</i></li> <li>5. <b>Antara Sablok</b>, Master Student, National Institute of Technology Calicut, India. <i>Title: Transmogrifying Banes to Boons: Reviving the interstitial spaces of Kozhikode City Neighborhood.</i></li> <li>6. <b>Erick Manga</b>, Researcher, Socially Just Public Transport Working Group (SJPTWG), Kenya. <i>Title: Can the Ongoing Nairobi BRT Project Guarantee a Just Transition? Signposts from Labour Impact Assessment Report and Other Studies.</i></li> </ol>	<p>The urban walk ticket is not included as part of your registration fee. It includes transportation costs and the cost to enter the Parthenon and the other monuments on the Acropolis Hill. The urban walk tour includes the broader area of Athens. Among other sites, it includes: Zappion, Syntagma Square, Temple of Olympian Zeus, Ancient Roman Agora and on Acropolis Hill: the Propylaea, the Temple of Athena Nike, the Erechtheion, and the Parthenon. The program of the tour may be adjusted, if there is a need beyond our control. This is a private event organized by ATINER exclusively for the conference participants.</p>

**11:30-13:00 Session 7**

**Moderator: Virginia Sisiopiku**, Head, Transportation Engineering Unit, ATINER, & Professor, The University of Alabama at Birmingham, USA.

1. **Lily Elefteriadou**, Professor, University of Florida, USA.  
*Title: Congestion Mitigation Strategies in the US: From Theory to Practice.*
2. **Noreen McDonald**, Senior Associate Dean, University of North Carolina, USA.  
*Title: Urban Freight, Congestion, and Planning.*
3. **Ruth Steiner**, Professor, University of Florida, USA.  
**Kai Monast**, Associate Director, Technical Services; Director, Public Transportation, School Planning and Transportation Groups, North Carolina State University, Institute for Transportation Research and Education (ITRE), USA.  
**Waugh Wright**, Bicycle & Pedestrian Program Manager, North Carolina State University, USA.  
**Jeremy Scott**, Program Manager, Public Transportation Group, North Carolina State University, Institute for Transportation Research and Education (ITRE), USA.  
**Juan Suarez**, Transportation Planner/Engineer, Alfred Benesch & Company, USA.  
**Andre Soucy**, Graduate Student, University of California, Berkeley, City and Regional Planning, USA.  
*Title: The Congestion Costs for School Buses and Public Transportation.*
4. **Jamie Furlong**, Research Fellow, Westminster University, UK.  
*Title: Reallocating Urban Space: The Effects of Low Traffic Neighborhoods on Active Travel and Traffic Congestion in London.*

**Discussion**

**13:00-15:00 Session 8**

**Moderator: Evangelos Kaisar**, Professor, Florida Atlantic University, USA.

1. **Dimitrios Goulias**, Head, Civil Engineering Unit, ATINER and Associate Professor & Director of Undergraduate Studies Civil & Environmental Engineering Department, University of Maryland, USA.  
*Title: Condition Prediction Modeling of Critical is Transport Infrastructure.*
2. **Boris Svilicic**, Professor, University of Rijeka, Croatia.  
*Title: Safe Maritime Transportation: Security Challenges of Shipboard Cyber Physical Systems.*
3. **Abdulaziz Alshehri**, Assistant Professor, Najran University, Saudi Arabia.  
*Title: Comparison of Risk Factors in Fatal Vehicle Crashes Based on Driver Age and Crash Type.*
4. **Mali Sher**, Lecturer, HIT, Israel.  
*Title: Automatic vs. Manual Traffic Enforcement.*
5. **Colin Macarthur**, Senior Scientist, Hospital for Sick Children Research Institute, Canada.  
**Naomi Schwartz**, PhD Student, Hospital for Sick Children Research Institute, Canada.  
**Linda Rothman**, Assistant Professor, Ryerson University, Canada.  
**Teresa To**, Senior Scientist, Hospital for Sick Children Research Institute, Canada.  
**Andrew Howard**, Senior Scientist, Hospital for Sick Children Research Institute, Canada.  
*Title: Trends in Child Pedestrian Motor Vehicle Injury Rates by Neighbourhood Deprivation Score in Toronto, Canada.*
6. **Rita Viliuviene**, PhD Student, Vilnius University, Lithuania.  
*Title: Towards the Creation of a Functional Cartographic Style System.*
7. **Samer Radad**, Assistant Professor, Al-Quds University, Palestine.  
*Title: Palestinian Universities and their Cities: What we Need to Know about the Al-Quds University Research Outputs toward Jerusalem City?*

**Discussion**

**15:00-16:00 Discussion + Lunch**



**16:00-17:30 Session 9**

**Moderator: Mr Kostas Spyropoulos** (ATINER Administrator).

1. **José Manuel Castillo López**, Professor, University of Granada, Spain.  
*Title: Low Emission Areas vs. Urban Congestion Taxes.*
2. **Betül Orbey**, Assistant Professor, İstanbul University, Turkey.  
**Ece Altınbaşak Haklıdır**, Assistant Professor, Doğu University, Turkey.  
**Pinar Şahin**, Assistant Professor, Bahçeşehir University, Turkey.  
*Title: A Comparative Research on Child Participation in Urban Design.*
3. **Ilda Rusi**, Lecturer, Polis University, Albania.  
*Title: Generative Urban Design in the Field of Infrastructure. An Optimize Solution for Connecting Fier and Vlora County by a 600 M Bridge over Selenica River, Albania.*

**17:30-19:00 Session 10**

**Moderator: Mr Kostas Spyropoulos** (ATINER Administrator).

1. **Magda Saura**, Professor, Technical University of Catalonia, Spain.  
*Title: Centuriated Plots of Land for Sustainable Politics of Park Design: A Study Case in Barcelona.*
2. **Alma Afezolli**, Head, Department of Civil Engineering, Polytechnic University of Tirana, Albania.  
*Title: Park-and-Ride Facility along Public Transport Corridor – A Planning Case for Tirana City, Albania.*
3. **Mukta Mukherjee**, Assistant Professor, Alliance University, India.  
**Arunesh Ray**, Post-Graduate, Associate Consultant at EY LLP, Global Risk Management, India.  
*Title: Catching Cab an Act of Fear or Compulsion? Empirical Study based on Online APP Cabs in India during COVID-19.*
4. **Salwa Alawneh**, PhD Candidate, The University of Kansas, USA.  
*Title: Resilience of Spatial Structure in Refugee Settlements of Jordanian Cities.*
5. **Ifeloju Olusanya**, PhD Student, University of Kansas, USA.  
*Title: Understanding Heritage-Led Development Based on Community Perspectives in the Badagry Historic Area, Lagos State, Nigeria.*

**19:00-20:30**

**Ancient Athenian Dinner** (includes in order of appearance: continuous academic discussions, dinner with recipes from ancient Athens, wine/water)

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**Wednesday 31 May 2023**  
**An Educational Visit to Selected Islands**  
**or**  
**Mycenae Visit**

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**Thursday 1 June 2023**  
**Visiting the Oracle of Delphi**

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**Friday 2 June 2023**  
**Visiting the Ancient Corinth and Cape Sounio**

**Alma Afezolli**

Head, Department of Civil Engineering, Polytechnic University of  
Tirana, Albania

## **Park-and-Ride Facility along Public Transport Corridor – A Planning Case for Tirana City, Albania**

The rapid economic development and urbanization has brought to a higher rate of increase in private vehicle ownership than road supply. This has led to an increase in traffic and parking demand. There is an uneven distribution of private vehicles in Albania, mainly in Tirana Capital. Tirana being a major Metropole of Albania, as well as other cities like Durres, Vlora, Korca, etc. have the highest percentage of the population with registered vehicles. The National Urban Transport Policy, 2006 mentions park-and-ride activity as a parking management initiative to be adopted to reduce traffic congestion on urban roads. Tirana is very well known for its well-knit public transport system, however, there has been an increase in the private vehicle usage for work trips in the city. The study aimed to plan for park-and-ride facility as a part of travel demand management along public transport corridors in the city. The first part of the study analyzed the public transport accessibility of the city and identified peripheral locations with demand for park-and-ride facility. Apart from the corridors identified for having a demand for park-and-ride, one of the corridors was selected and identified for further planning and implementation of the facility. There have been prepared several questionnaire surveys, which aimed to state the most preference method using the concept of generalized cost for the study.

**Salwa Alawneh**

PhD Candidate, The University of Kansas, USA

## **Resilience of Spatial Structure in Refugee Settlements of Jordanian Cities**

The ongoing humanitarian crises spur rapid and unpredicted refugee influxes resulting in a demographic change in cities. With different vulnerable urban systems and the consequent social, economic, and spatial challenges, cities must respond with a more robust solution based on urban resilience. The paper studies the approach and assessment of resilient urban forms in refugee settlements with sudden demographic changes and how contribute to refugee spaces by reflecting on their overall urban systems. The paper validates the metric-based assessment tool of Alawneh & Rashid, 2022, in comparing the refugee settlements in Jordanian cities that focus on urban forms. The assessment tool is a collective of metric-based methods that measure the resilient capacity as well as define the vulnerability of urban forms at meso and micro scales. The assessment methods are metric measures with both quantitative values and qualitative descriptions. In addition, the paper facilitates different geospatial technologies using the tool. The measurements are operational representations of quality, property, and characteristics through five essential indicators **connectivity, diversity, efficiency, redundancy, and modularity**. The application focuses on a set of resilient design criteria and the spatial characteristics to co-creating urban resilience for cities and communities. The methods incorporate attributes to understand the basic features of human behaviors and activities in refugee settlements (units of analysis). As illustrative examples, the paper will apply the assessment tool to four cases of Syrian and Palestinian refugee settlements in Jordan and compare the findings. The research demonstrates a road map towards practice through a developmental pattern in design and planning by informing decision-makers and humanitarian practitioners about a standardized tool that evaluates the resiliency of refugee spatial structure beyond the essential needs. In conclusion, the paper will look for the advantage of refugee populations and objectively link the indicators toward the quality of life of their residents to enhance and enforce the functioning of communities in their urban spaces. The research also aims to provide vulnerability reduction and improve adaptation capacity.

**Saad AlQuhtani**

Associate Professor, Najran University, Saudi Arabia

## **Children's School Travel Mode Choice in Sprawled Cities - The Case of Najran City, Saudi Arabia**

In recent years, a higher increase in children commuting to schools by motorized modes can be noticed, while there is a major decline in active commuting to school (i.e., walking and biking). Dependency on the automobile for commuting to school has many negative impacts. Major dependency on motorized modes for commuting to schools results in higher rates of childhood obesity and overweight among students. This paper examines factors influencing children's commuting to schools for boys and girls in all school stages in Najran City. Data on commuting to schools in the morning was analyzed using a multinomial logit model (MLM). The results show that around 37% of students live more than 2 km away from their schools, and only 16% live within 500 meters of schools. Around 50% of the students' families own more than one car. Only 19% of students walk to school, while the rest use motorized modes. The MLM results show that boys are more likely to walk to school than girls. Also, age and unemployed family members have a positive relationship with students' odds of walking, while owning cars, income, employed parents, parent education, and distance to school have a negative association with children's likelihood of walking to school. Shortage and uneven distribution of schools, lack of pedestrian infrastructure, and the higher dependency on private drivers can be considered the most important barriers to walking to schools. Thus, responsible agencies need to add more schools to reduce the distance between homes and schools, implement safe, paved, and shaded pedestrian sidewalks, and educate students about walking benefits and safety principles.

**Abdulaziz Alshehri**

Assistant Professor, Najran University, Saudi Arabia

## **Comparison of Risk Factors in Fatal Vehicle Crashes Based on Driver Age and Crash Type**

Motor vehicles are the primary source of transportation in the United States. While this is true for any age group, the older population tend to rely more heavily on automobiles because of easy access and availability, compared to public transportation even when it is available. Older drivers aged 65 years and older are more vulnerable to fatal crashes due to cognitive impairments and frailty. When older drivers are involved in crashes, they sustain higher injury severities compared to younger drivers. One location where older driver experience higher crash risk is intersection, due to the complexity of the situation involving multiple tasks and movements. The objectives of this study were to determine risk factors associated with older and younger drivers at intersection with different crash types in the United States. Furthermore, providing countermeasures to improve safety for all drivers were the main goal of conducting this study. The data were obtained from Fatality Analysis Reporting System (FARS) from 2014 to 2018. The five years of data were focused on only fatal single-vehicle crashes that occurred at intersections on Midwestern States. Two separate binary logistic regression models were developed to identify statistically significant predictor variables. The two models were related to older and younger drivers who were involved in fatal single-vehicle crashes at intersections. Comparisons were made between the two-age group with the intention of identifying suitable countermeasures. The study results showed that controlled intersections, two-way undivided highways, and roads with posted speed limits less than 55 mph increased the risk of fatal single-vehicle for older drivers while factors such as straight and level roadways, impaired driving, driver obesity, and the operation of recreation vehicles, buses, or motorcycles increased the risk of single-vehicle fatal intersection crashes for drivers in other age categories. Based on model results, countermeasure ideas to improve the safety of older drivers at intersections as well as other road users were identified. Among suggested ideas, improving intersections designs to accommodate older driver needs is recommended, such as implementing roundabouts when it is appropriate, reach minimum of 75-degree skew angel at intersection, providing protected left turn signals, flashing yellow arrow, restricted crossing U-turn, median U-turn, using rumble stripes along the side of

roadway and median, providing transverse rumble strips (TRS) at intersections, improving roadway lighting, signs and markings at intersections and interchanges, implementing roadway diet, enhancing roadway signs and retroreflective delineation, providing cable, guardrail, or concrete barriers, implementing continuous raised-curb medians, enhancing lane drop marking on interchanges, providing acceleration and deceleration lane for merging and diverging locations, providing fixed or portable changeable message signs, enhancing high friction surface treatments on risk prone locations, increasing contrast markings on concrete pavement. Therefore, the results and suggested countermeasures can provide guidance to improve safety of older drivers and other road users.

**Eleni Bardaka**

Assistant Professor, North Carolina State University, USA

## **Spatiotemporal Analysis of Car and Active Travel Use between Lower and Higher-Income Households in the US**

In a car-dependent society, access to opportunities and participation in civic life would depend on the availability of cars in the households. The unavailability of personal vehicles is tantamount to disadvantage in the U.S, which is one of the most car-dependent societies in the world. Despite the high costs, people in low-income households would invest in car-ownership to participate in daily life. Expenditure on ownership and maintenance of cars in many circumstances would require low-income households to compromise other household necessities, thereby facing disadvantage as compared to their higher-income counterparts. The travel outcomes of people in low-income and carless households and low-income and car-owning households that potentially experience disadvantage in a car-dependent society would differ from their counterparts in higher-income households. Our study examines the experience of transportation disadvantage among low-income populations by comparing and analyzing the spatial and temporal differences in their trip characteristics relative to that of higher-income households. Using data from U.S. National Household Travel Survey-2001, 2009, and 2017, we examine how the overall trip rate (trips per day), trip lengths, car use, and the use of cycling and walking varies among people in the three household categories. Further, since the travel needs and the experience of transportation disadvantage among people from different socioeconomic backgrounds would also depend on their geographical location of residence, we examine the differences in trip characteristics across three geographical locations: urban, suburban, and rural areas. Further, we also study how the trip characteristics vary over time for the three household categories in the aforementioned geographical locations. We find that over time, there has been an average decrease in the overall trips per day in the U.S. However, the trip making behavior in terms of both likelihood and number of trips per day has increased among people in both low-income carless and low-income car-owning households. We also find that people in low-income car-owning households travel shorter per trip and drive less miles annually as compared to people in higher-income households. Mode share analysis reveals that cars are still the primary mode of travel among people in low-income households primarily in suburban and rural areas, albeit

we see a decrease in the proportion of trips made by cars among people in low-income and carless households with a simultaneous increase in the use of walking and cycling. After controlling for observed and unobserved factors, we find that the amount of cycling and walking in 2017 were (12-15)% and (35-40)% greater than that in 2001. We see substantial increase in the use of cycling among people in suburban low-income carless households over time. Interestingly, we find that while people in higher-income households walk and cycle more frequently in urban areas where land-use and density facilitates shorter trips, people in low-income households rely more on active travel in low-density suburban and rural areas where traveling by walking and cycling is relatively challenging. Our analysis of spatio-temporal differences in trip characteristics suggests that people in low-income households could be experiencing transportation disadvantages in the U.S.



**Martina Castaldi**

PhD Student, University of Genoa, Italy

&

**Agostina Maria Giusto**

PhD Student, University of Rome "La Sapienza", Rome

## **The Drawn Garden: Historical, Iconographical and Representative Analysis through Time of the "Villa di Livia" in Rome"**

"Villa di Livia" at Prima Porta is an archaeological complex located in the suburban area of Rome. This villa was built in 39-38 A.D. at the behest of Livia Drusilla Claudia, the wife of Gaius Julius Caesar Augustus.

The building, like many at the time, was conceived as a place of *otium* and rest. It covers approximately an area of 5000 m<sup>2</sup> in a number of rooms that can be ascribed to different construction-temporal phases. Each of these rooms was richly decorated according to the tastes and fashions of the 1st century A.D.: there are frescoes with bright colours, geometric motifs and perspective illusions that contribute to creating a feeling of depth and three-dimensionality to the villa's space. Of particular aesthetic value among these are the frescoes with naturalistic motifs, of controversial temporal attribution due to the different modifications that the villa itself underwent in the late Julio-Claudian period, and the decorations of the triclinium hall and the underground nymphaeum of the villa. The attention to detail, the pictorial technique and the variety of flora and fauna make these decorations one of the most famous examples of Roman garden motif painting. The discovery of this magnificent complex took place in 1863 and brought to light not only the wall and floor structures richly decorated, but also archaeological finds such as the Statue of "Augusto loricato"; these remained within the archaeological site until after World War II, when it was decided to transfer the statue to the Vatican Museums, and the frescoes to the Museo Nazionale Romano in the Palazzo Massimo alle Terme.

The aim of this research is to analyse the wall fresco decoration of the "Villa di Livia". The investigation carried out is historical, iconographic-representational and symbolic, in order to understand -on the one hand- the origin of these frescoes and the motivations that led to the choice of this particular type of representation and -on the other hand- to study the decorative, perspective and colouring techniques. Furthermore, the work will try not to exclude the analysis of the fact

that the architecture and the decorative apparatus are -currently- in different locations. In fact, it is considered that the separation between the archaeological remains of the villa and the decorative apparatus is certainly a benefit from the point of view of the restoration and conservation of the assets themselves, but on the other hand, it may have an impact on the perception of the relationship that the frescoes had with the space for which they were made.

**José Manuel Castillo López**  
Professor, University of Granada, Spain

## **Low Emission Areas vs. Urban Congestion Taxes**

In most European cities, urban transport is the main responsible for energy consumption, the emission of pollutants into the air, traffic congestion and noise, and in the last century we have faced an increase in urban mobility and a growing tendency to use private transport, as opposed to public, and an increase in the number of vehicles.

The strictly private economic rationality of citizens explains this trend and the market will regulate it, albeit with largely avoidable social costs of congestion.

The supply policies, that is, more and more extensive routes, are the ones that have been carried out almost exclusively traditionally, but these have been insufficient and, paradoxically, have even caused effects contrary to those intended, in light of the state of the issue, without bordering on the waste of public resources that can have other more socially profitable alternative uses.

As a consequence, where there is the greatest room for maneuver for urban transport policy is found in the demand, that is, in the use of the available means of urban transport.

In recent decades, a good number of partial demand measures have been tried in European cities, such as subsidies for buses and subways, ecological fuels, car - sharing , smart cards, road-pricing , park-pricing , one day without a car, distribution of departure times at the end of the working day, and use of shared cars, etc.

In this paper we will focus on the Road Pricing, pointing out the experiences of the cities in which they have been put into practice but, mainly, examining their economic foundation and the design that should inspire them to collaborate in achieving a more efficient and socially equitable urban mobility model.

**Lily Elefteriadou**

Professor, University of Florida, USA

## **Traffic Congestion**

This presentation will provide an overview of congestion mitigation strategies and a broader context for bedrocks of congestion in the USA. It will discuss opportunities for alleviating it, obstacles to implementation, and it will provide suggestions for changing the state-of-the-practice to improve outcomes.

Congestion mitigation strategies are those that seek to reduce congestion typically through increasing capacity or reducing demand. Capacity-related strategies include traffic management tools such as ramp metering and adaptive signal control, as well as improvements in highway design, and addition of lanes. Demand management strategies include shifts in mode (such as transit, micro mobility, etc.), shifts in time-of-day travel, and land use policies that affect the origin and destinations of travel. In the USA, three important mainstays to congestion are: a) land use structure that encourages sprawl and makes traditional transit options very costly, b) the importance of the automobile as a symbol of freedom, and b) perception (often correct) of transit as being the mode for people with no other choice, inflexible and with very long travel times.

Opportunities for alleviating congestion from a capacity perspective include advanced technologies (such as connected and autonomous vehicles) and options that allow for flexible use of existing pavement (such as reversible lanes). From a demand management perspective, work from home (which was extensively used through the pandemic) and flexible hours also present important opportunities to reduce peak period demand. However, both options encourage further sprawl, as they make it easier for commuters to move further away from city and town centers. Small shuttle services and microtransit (which allows for increasing flexibility for transportation on-demand) may present important opportunities to reduce congestion by taking advantage of smartphone applications to accomplish a mode shift with a relatively minor inconvenience compared to driving in stop-and-go traffic. Such options also increase mobility and access for those not able or willing to drive or own a vehicle.

But, how can transportation engineers change perceptions and make this shift given the importance of the automobile and reputation of transit? Changing the performance measurement framework may provide the necessary tools for city managers to facilitate such a change.

Current metrics for the assessment of the transportation network include delay per vehicle, vehicle throughput, and vehicle miles travelled. Modifying or supplementing these metrics such that mobility- and accessibility-related metrics are used as requirements for new development (for example, using the percent of jobs that can be reached by microtransit/transit/bicycle within 30 min) would go a long way toward a shift in available options. Requiring new developments to work with cities and major employers in a region to provide suitable transportation options for new residents may help increase mobility for all, and reduce congestion.

**Jamie Furlong**

Research Fellow, Westminster University, UK

## **Reallocating Urban Space: The Effects of Low Traffic Neighborhoods on Active Travel and Traffic Congestion in London**

As more people took to walking and cycling during the Covid-19 pandemic, the unequal allocation of space in Britain's towns and cities became more exposed. From main roads to residential streets, private automobiles were seen to dominate spaces, with limited space for walking, cycling and playing. As in other countries, the UK government created an Active Travel Fund to support local authorities to produce cycling and walking facilities. Schemes built have included Low Traffic Neighbourhoods (LTNs), which restrict through-traffic of motor vehicles on a contiguous set of residential streets through the implementation of modal filters (physical planters or camera-enforced restrictions). LTNs have been inspired by similar schemes in Dutch cities, including Groningen, Utrecht and Amsterdam, and they stand alongside post-2020 approaches in Barcelona ("Superblocks") and Paris, where through traffic is set to be banned from the city centre in 2024.

A key aim of LTNs is to redefine urban space so that residential streets are for residents to walk, cycle, socialise or play, whilst avoiding the harms associated with car traffic. Due to the novelty of such schemes, existing evidence is largely limited to a very small number of Outer London boroughs, but research has found lower traffic volumes on residential streets (Walham Forest Council, 2015), fewer road injuries (Laverty et al., 2021), less street crime (Goodman and Aldred, 2021) and decreased car ownership (Aldred and Goodman, 2020). Similarly, Barcelona's 'superblocks' have been estimated to have significant, positive health and wellbeing impacts (Mueller et al., 2020). LTNs have, however, received vocal criticism for their potential to displace traffic onto boundary roads (main roads surrounding LTNs), encourage longer, convoluted and more polluting car journeys and negatively impact on car-dependent groups such as disabled people.

This research, funded by the National Institute for Health Research (NIHR) until 2025, is the first of its kind to assess the positive and negative impacts of multiple LTNs across London. After collecting baseline and post-intervention sensor data on volumes of walking, cycling and motor vehicles within LTNs and matched control areas, we are using controlled interrupted time series analysis to measure the effects of LTNs on active travel and traffic. In addition, using Google

API data, we are assessing the extent to which these schemes displace traffic and cause congestion on other boundary roads. This analysis will be uniquely placed to generate robust and timely evidence that can inform the future of LTN-type interventions not just in London but in other cities around the world.

**Carlos Gonzalez**

Senior Lecturer, London South Bank University, UK

## **Vertical Ghettos - Re-Urbanising the City - First Steps... Urban Regeneration**

This is a qualitative and qualitative study of the current context of urban development in the peri-zone of the city of Santiago - Chile.

This presentation pretends to give new insights into the possibilities of re-urbanization, sustainability principles and practices in the fabric of the "Vertical Ghettos", a collection of tall towers built in the district of **Estacion Central** (Central Station district). In the Capital of this South American country.

This work has the character of exploratory research in the study of the relationship between the productive transformation (economy) of the last 50 years and the urban development policies that have been implemented, the legal instruments and changes in the territory during this same time. With this context, the study on "Vertical Ghettos" itself will be developed.

It will seek a rational explanation of the phenomenon of "Vertical Ghettos" in the city of Santiago, which occurred between the years 2013 and 2018. The illegal construction of 90+ high-rise buildings (by corrupt developers, with the connivance of Local Authorities), for speculative purposes in the sector of Central Station needs to be studied. Modern urban tissue and neighbourhood recovery solutions within an ecological framework reduce congestion, improve housing, and around a circular economy policy for greater productivity, improve business opportunities, skill development and more local job sources.

In particular, for this presentation, the first steps towards a more profound investigation of the high densities and building's lack of amenities and social infrastructure and propose a new strategy towards energy efficiency within the building, possible new rationalisation of spaces and reuse of lower floors for social and community infrastructure, so in that manner resolve mayor conflict zones, extreme high densities, corruption, crime and segregation.

Careful investigation of the temporal context, the character of the local inhabitants and physical obstructions and lack of green areas, created over the years, could permit the evaluation of a new proposition on recovery and re-urbanisation of buildings (old and new). This could be a significant advance of technical and aesthetic aspects towards urban space quality and creating new public spaces and links with the city. New parks and play areas, cycling routes,



gardens and local green allotments can provide a new paradigm for the city.

The active use of local township participation will force a rethinking of the use of centralised bureaucratic planning, replacing it with a more democratic re-ordering of the lives and work of local new and old neighbourhoods.

This presentation pretends to give new insights into the possibilities of sustainability principles and practices in analysing the fabric of the Vertical Ghettos of Central Station. In particular, for this first presentation, the study is setting the first parameters of a more extensive investigation by delineating some key areas such as local participation, the legal framework, pinpointing what the lack of social infrastructure is, and amenities for the many thousands of inhabitants of the area.

**Dimitrios Goulias**

Associate Professor, University of Maryland, USA

## **Condition Prediction Modeling of Critical Transport Infrastructure**

Bridge decks represent critical transport components that need to be regularly assessed for condition. The National Bridge Inventory system includes condition data from all bridges in the US. It requires regular periodic monitoring which very often is based on subjective ratings. Non-destructive testing, such as Ground Penetrating Radar (GPR), provides the capability for obtaining subjective, accurate and quick assessment of bridge decks. Such data and analysis can be used for either “project” and/or “network” level analysis in order to time specific maintenance and rehabilitation activities, and/or optimal allocation of resources for the entire highway network. Objective of this study was to assess alternative approaches for defining bridge deck condition ratings using fuzzy sets or machine learning models. The modeling results indicated that fuzzy sets can provide good quantitative interpretation of bridge deck condition data. In terms of Machine Learning, both Long Short Term Memory and Convolutional Neural Networks were explored providing superior prediction accuracy from past studies. Sequence-to-sequence outperformed sequence-to-one models, with the confusion matrix providing a good assessment of model prediction accuracy. The proposed methodology can be adapted and implemented elsewhere for the prediction of bridge deck condition.

**Brice Hanberry**

Research Ecologist, USDA Forest Service - Rocky Mountain Research  
Station, USA

## **Applying Population Density Models to Define Urban Populations and Identify Response to Prolonged Heat**

Gridded population models permit provisional classification of urban and rural population density classes, resulting in additional applications. I calibrated 2015 population density models to the United Nations 2015 global urban population estimate of 53.9% and then balanced among the population models to reach approximately the same population percentages for rural, exurban, suburban, and urban thresholds. Because the three population models varied in population distribution, different density thresholds were necessary for each population model. As an extension, then I examined patterns of population density classes and exposure to maximum monthly temperature to identify if heat may have influenced high urban population densities during the recent past (1970–2000) and implications for long-range future (2081–2100, under fossil fuel-driven ssp5-8.5). The three population models with adjusted thresholds agreed on a divergent reported urbanized or rural status for 32 countries, representing about 30% of the global population, and greatly reduced urban percentages for another 13 countries. Reconsideration of the urban status of these countries, and the surrounding regions, may change the narrative of urban condition trajectories, prospects, and related applications for research, planning, and management. For response to temperature in the hypertropical zone, population densities decreased with increasing maximum monthly temperature, indicating that concentrated populations generally did not develop at high maximum monthly temperatures  $\geq 36$  °C. The 36 °C maximum monthly temperature threshold corresponds to heat wave warnings, which typically consist of a few consecutive days. Therefore, 36 °C maximum monthly temperature may indicate the start of an inhospitable tipping point beyond which human civilization may not flourish. Most land area will exceed 36 °C maximum monthly temperature under the CanESM5 ssp5-8.5 scenario by 2081–2100. While population models and adjustments to population density thresholds are not perfect, they do create a pathway for comparison of urban status across countries and a variety of applications, such as response to climate change.

**Evangelos Kaisar**

Professor, Florida Atlantic University, USA

&

**Dan Liu**

Research Associate, University of Shanghai for Science and Technology,  
China

## **Improving the Last Mile Delivery by Integrating Autonomous Delivery Vehicle**

In an effort to provide more cost-efficient and environmental-friendly delivery of goods ordered online, companies are looking for new technologies to bridge the last mile to their customers. To improve the sustainability (cost-efficient and environmental-friendly) of E-grocery delivery network in congested metropolitan cities, one technology-enabled opportunity that recently has received much attention is the use of Autonomous Delivery Vehicle (ADV), which could make the last-mile delivery cheaper and environmentally-friendly. An innovative last-mile delivery concept is proposed that a van collaborates with an ADV to make deliveries, which gives rise to a new layer of the Vehicle Routing Problem (TSP) that we call it Two echelon Vehicle Routing Problem with mixed vehicles (*2E-VRP-MV*). This paper presents a mathematical formulation for the van-ADV two-echelon vehicle routing problem. The primary objective of this study is to develop a mixed-integer program model in terms of minimizing the logistics operating cost and emission using van-ADV. The formulation captures the van-ADV characteristics during the ADV dispatching and accounts for operation constraints related to capacity limitations. Also, we would like to apply it to an experiment considering the impact of customer density. The results show that the total cost is not increased when the number of satellites increased when depot located in the internal of the customer's area considering packages consolidation cost and emission cost. There is a break-even of satellites when the number of customers becomes larger. Future research is required to test more data instance and other factors, like the capacity of the ADV, the speed of ADV, et al.

**Lap-I Kuok**

PhD Student, National Cheung Kung University, Taiwan  
&

**Ping-Sheng Wu**

Professor, National Cheung Kung University, Taiwan

## **Pre-Urbanization: Informal Housing and Urban Development Policy in Twenty-Century Macau**

Urban informality has been interpreted as an epistemology of planning during the last two decades. It offers a framework to indicate the natural responses of urban reality. This research aims at exploring the nexus of social circumstance and urban development policy by introducing informal housing in twenty-century Macau. By analyzing government publications, news articles, and interview records of the informal housing residents to depict the interaction between urban reality and government policies. As the very first European settlement in China, and yet, Macau started experiencing its modernization and urban expansion under the reign of the Portugal colonial government in the mid-twenty century. The informality of urban development emerged during the process. Macau's urban informality can be justified by three institutional issues, unstable population structure, ambiguous property rights, and limited housing provision. At the time, there are three types of informal housing in Macau, which are ship houses, shanty settlements, and sub-division rental units, have responded to those issues. Furthermore, those informal housing has presented in different phases along the alteration of the urban development policy and the formation of the real estate market, slowly integrated into the "formal" urbanization process. This finding shows that informal housing is not just a self-helped tactic of the urban poor, it also performs as a potential primal tissue of urbanization and could evolve along the ever-changing social circumstance.

**Jesus J. Lara**

Associate Professor, The Ohio State University, USA

## **Service-Learning Education: Transformative Approaches for Declining Urban Communities**

Strategic partnerships between universities and declining urban neighborhoods with limited resources have resulted in some innovative and forward-thinking approaches to land use and planning that respond to the impacts of boom-and-bust through the implementation of problem-based solutions, and have spurred development to make communities more resilient. The university-community partnerships and engagements have multiple goals. They include increasing university responsiveness to local needs, stimulating real-world change, and preparing students to effectively address complex social challenges (Dorado, 2004). However, such approaches are complicated by a variety of factors, including stakeholder expectations, power imbalances, and the conflicting goals of educators and community members (Mansuri and Rao, 2004). While the benefits of service-learning programs to universities are well documented, the benefits of such higher education partnerships to community participants are not as well known (Netshandama, 2010). Successful engagements seem to require community involvement and decision-making authority at every phase, mutual accountability, and trust (Winkler, 2013). This presentation refers to a series of case studies of community engagement and neighborhood empowerment in the development of a collective sustainable plan/vision for declining inner-city neighborhoods with limited resources. These neighborhoods, located in Columbus, Ohio, have seen tremendous declines in population and economy over the past years due to significant loss of manufacturing jobs. The case studies demonstrate that service-learning has the potential to provide communities with place-specific guidelines and recommendations that improve the quality of life for residents, but their implementation requires a collective effort that goes beyond the classroom.

**Luca Lazzarini**

Researcher, University IUAV of Venice, Italy

**Ezio Micelli**

Full Professor, University IUAV of Venice, Italy

&

**Elena Ostanel**

Assistant Professor, University IUAV of Venice, Italy

## **Are Cities Earning Enough from Culture-Based Regeneration Projects? Insights from two Case Studies in Italy**

The contribution aims at improving the understanding of the impacts created by culture-based urban regeneration projects in vulnerable urban neighborhoods by focusing on an in-depth investigation of two projects - Z.I.P. (Barletta) and Palombellissima (Ancona) - dealing with the reuse and regeneration of urban spaces *via* practices of social innovation, cultural promotion, participation, and active citizenship. Drawing on the outcomes of a survey on a dataset of project applications for national funding programs on culture-led urban regeneration (editions 2018 and 2019 of the Call 'Creative Living Lab' promoted by the Italian Ministry of Culture MiC) carried out by the authors in 2021, the contribution analyses comparatively the two projects through an operational framework that takes into consideration several aspects such as: the size and ownership of the real estate assets involved in the project, the scale of the regeneration process (building or area-based), the typologies of users and networks activated, their thematic focus, the main activities developed and the presence of synergies with welfare services.

As far as the methodology is considered, the research conducted a documentary analysis of the projects' applications and an impact assessment oriented to investigate the projects' impacts and outcomes. Four macro-objectives were identified (culture and creativity, collaborative regeneration, innovative entrepreneurship, and partnerships and networks), and several structured interviews targeted to the project promoters were carried on for investigating if and how the projects tackle the four objectives. Interviews allowed to collect both quantitative and qualitative data that were then investigated through Kiviat diagrams and a convergence/divergence analysis to investigate the opinions of different stakeholders on project outcomes.

Findings highlight that the two projects have generated positive socio-spatial impacts in the neighborhoods where they took place,

especially regarding local community's levels of trust, sense of place and collective efficacy. Nevertheless, the project activities were concentrated just in few specific places and the involvement of socially vulnerable or marginal individuals was somehow limited. Another weakness concerns the scarce capacity of the projects to activate new job opportunities for local inhabitants, though the creation of positive follow-ups in terms of new cultural initiatives and multi-actor networks is highlighted. For what concerns the level of involvement of public institutions in the projects, this is characterized by uncertainty and intermittent commitment. Conclusions argue that a stronger support of local institutions and the creation of stable multi-actor relationships as part of a strategic planning process are key to ensure that projects generate durable outcomes and effectively tackle socio-spatial inequalities.



**Jing Liang**

PhD Student, Southeast University, China

## **Post-Winter Olympics Era: Ice- Snow Tourism and Urban Revival in Old Industrial Areas of Northeast China**

Since the implementation of the reform and opening-up policy, China has embarked on a path of economic transformation and initial network development, but the old industrial bases of the Northeast (including Jilin, Heilongjiang and Liaoning provinces) have turned from prosperity to decline overnight, accompanied by the “Northeast Revival” on the internet as a kind of “nostalgic” dream. However, since the successful hosting of the Winter Olympics in Beijing in 2022, China has achieved its goal of "driving 300 million people to participate in ice and snow sports". Because of its excellent natural snow quality, the areas, located at 40-50 degrees north latitude in the “Golden Latitude Snow Belt”, have been re-recognised and have therefore become the most rapid and effective source of motivation for regional revival at the moment. Crucially, the process was driven by the strong impetus of national policies.

The city of Jilin is the most central and representative city for ice-snow tourism in the Northeast region that is surfacing at the moment. This paper takes the Jilin “SongHua Lake Ski Resort” and its co-built “Vanke SongHua Lake Ski Town” as the object of study, and compares the process of Jilin’s transformation from an industrial city to an ice and snow tourism city. The research will pay attention to the most central player in this transformative urban renaissance - aspiring local governments - and focus on the process of co-creation and collaboration between the state and capital (Vanke Real Estate). Especially in the current networked era, it is important to pay attention to the active role of online skiers, enthusiasts and netizens in the promotion of cities and the creation of discourse, so as to be able to recognise the heterogeneous re-creation of space that is taking place at the moment.

The research methodology will be a combination of contemporary historical research and comparative studies. The theory of this study will build on Manuel Castell’s work on the network era and national policy, as well as other theories on urban regeneration. The main materials include policy documents, economic development data and consumption data of Jilin City within the last five years; as well as, construction documents, drawings and designer surveys of the Songhua Lake Ski Resort and town.

The conclusions of the study may include three aspects: firstly, to sort out the history of the investment and construction of the Songhua Lake Ski Resort and Ski Town. Secondly, the study will analyse the way in which the government and property capital collaborate in the process of cooperation, in terms of roles, funding, operations and so on. Finally, through a comparative analysis, the article attempts to alert the potential impact of ice tourism on the urban fringe and make strategic recommendations from the perspective of sustainable development.

**Colin Macarthur**

Senior Scientist, Hospital for Sick Children Research Institute, Canada

**Naomi Schwartz**

PhD Student, Hospital for Sick Children Research Institute, Canada

**Linda Rothman**

Assistant Professor, Ryerson University, Canada

**Teresa To**

Senior Scientist, Hospital for Sick Children Research Institute, Canada

&

**Andrew Howard**

Senior Scientist, Hospital for Sick Children Research Institute, Canada

**Trends in Child Pedestrian Motor Vehicle Injury Rates by  
Neighbourhood Deprivation Score in Toronto, Canada**

**BACKGROUND:** In Canada, unintentional injury is the leading cause of death and disability among children (1-19 years), with traffic injury making up the largest portion (45%) of injury fatalities.

**OBJECTIVE:** The objective of this study was to examine trends in child pedestrian motor vehicle collision (PMVC) injury rates, by neighbourhood deprivation score, over the period 2000-2019 in Toronto, Canada. **METHODS:** Police-reported data on child pedestrians (1-19 years) killed or seriously injured (KSI) in motor vehicle collisions in Toronto, over the period 2000-2019, were mapped onto Toronto's 140 neighbourhoods. Population data were derived from Canadian census data. Toronto neighbourhoods have an average population of 19,500 (range 6,500-65,000) and size of 4.5km<sup>2</sup> (range 0.4-36.9km<sup>2</sup>). Area-level deprivation was measured using the Ontario Marginalization Index material deprivation score, calculated using six indicators of marginalization collected by the Canadian Census (population below the low-income cut-off, lone-parent families, unemployed, receiving government transfer payments, without a high-school diploma, living in a dwelling needing major repair). Tertiles were used to designate low, medium, and highly deprived neighbourhoods.

**ANALYSIS:** The rate of child pedestrian KSI collisions by neighbourhood deprivation tertile was calculated for each 5-year time interval. A Generalized Linear Mixed Model Poisson Regression Analysis measured child KSI rates by neighbourhood deprivation and time interval with neighbourhood included as a random effect to account for repeated measures across time periods. Models controlled for location (urban core versus inner suburbs).

**RESULTS:** There were 523 child pedestrian KSI collisions from 2000-2019. Over this period, KSI rates in Toronto decreased by more than 50% across all neighbourhood deprivation levels. Steep declines in KSI rates from 2000-2010 were followed by level or increasing child pedestrian KSI rates from 2010-2019. Higher deprivation was associated with slightly elevated KSI rates; although not statistically significant. Toronto's urban core showed higher rates of child pedestrian KSI, however, with faster rates of decline over the study period.

**CONCLUSIONS:** The decline in child pedestrian KSI rates in Toronto, over the period of study were significant and seen uniformly across neighbourhood deprivation tertiles. Reduced KSI rates may be related to declining trends in walking to school in the Greater Toronto Area. In addition, several traffic calming strategies were implemented in 2002 in Toronto, including a city-wide lowering of speed limits, that could, in part, explain the dramatic decreases in child KSI collision rates from 2000-2010. Higher rates in the "inner suburbs" of Toronto (particularly from 2015 onwards) indicate that road design may also play an important role.

**Noreen McDonald**

Senior Associate Dean, University of North Carolina, USA

## **Urban Freight, Congestion, and Planning**

Small parcel delivery has exploded across the globe. In the United States, 20.2 billion packages were delivered in 2020. Moving these goods has contributed to congestion and safety concerns on roadways. This presentation will describe trends in package delivery and examine urban planning responses in four domains: freight demand management, curb management, safety, and development approval processes. Freight demand strategies aim to change trip patterns and reduce the need for motorized trips. Strategies include urban consolidation centers and microhubs. Curb management addresses how cities allocate space for loading and unloading for parcel delivery but also for other newer travel modes including ridesharing. The road safety impacts of inadequate parcel delivery space are significant with cities employing strategies related to road and vehicle design to minimize risk. Finally, the rise in small parcel delivery has created needs for more distribution centers. The approval processes for these facilities are often controlled locally and highly controversial. The talk will explore how different communities are reviewing and approving such facilities.

Taken together, we are experiencing an intensification of congestion concerns related to small package delivery as well as experimentation with many policy solutions. This talk will provide an overview of the state of the practice and explore areas needing more research.

**Holly Madill**

Director, Michigan State University, USA

**Linda Nubani**

Assistant Professor, Michigan State University, USA

&

**Harmony Fierke-Gmazel**

Government and Community Vitality Educator, Michigan State  
University, USA

## **Using CPTED + Placemaking to Help Communities Transition from High Crime**

There is an innovative combination of strategies to transform communities that are based on CPTED, Crime Prevention Through Environmental Design that was originally founded around the principles of achieving defensible space and sense of community, and Placemaking. The authors use participatory, community-based, applied research that couples CPTED and placemaking to restore quality of life to residents in a high-crime neighborhood in Lansing, Michigan. First, using crime data from the Lansing Police Department, four different crime mapping and forecasting methods (Risk Terrain Modeling, Getis-ord GI\*, Kernel Density Estimation and Space Syntax) were used to identify 3 criminal hotspots and 3 coldspots in the same neighborhood. Second, the researchers layered placemaking assets and crime predictors in GIS to understand the potential correlations and identify opportunities to address criminal activity through CPTED and placemaking. Third, the research team engaged residents and stakeholders from the neighborhood along with the City and law enforcement in a multi-day design charrette to identify CPTED and placemaking strategies that fit the neighborhood context to reduce crime. They participated in shared learning about crime, and CPTED and placemaking principles before co-developing an action and implementation plan through proposed design solutions prepared during the charrette. This robust engagement strategy built the social capital of the neighborhoods to work alongside government to achieve community transformation, supported ongoing community work and investments, and empowered community partners to implement the strategies they co-develop. The processes, findings, and results represent a solution that can be applicable to blocks or neighborhoods of different scales and different sociodemographic and physical conditions.

**Erick Manga**

Researcher, Socially Just Public Transport Working Group (SJPTWG),  
Kenya

## **Can the Ongoing Nairobi BRT Project Guarantee a Just Transition? Signposts from Labour Impact Assessment Report and Other Studies**

Like other African metropolis, Kenya's main cities, Nairobi and Mombasa, have experienced a rapid increase in motor vehicle use over recent years, resulting in traffic congestion, air pollution, a deteriorating urban environment and loss of valuable man-hours which eventually undermine both social and economic well-being. Nairobi, for instance, is estimated to be fourth most congested city in the world with about 57 minutes as the average travel time. To address these issues, the government is planning for bus rapid transit (BRT), which can accommodate large passenger volumes without an exponential increase in road space requirements, and at a fraction of the cost of metro and rail systems. Five corridors have been identified and work has already begun in one of them. Apart from addressing traffic congestion, pedigree BRT system is viewed in principle as one of the pathways to a just transition in the public transport sector which is in tandem with the on-going climate change discourses. But the nagging question is: at what cost?

Even though there is proliferation of literature on this system of public transport, little is documented on its impacts or effects on informal workforce in the public transport sector especially paratransit system which is the main feature of public transport in these metropolis and how best this should be mitigated. This paper addresses this gap using data from Nairobi BRT labour impact assessment and other on-going research. The main argument herein is that whereas this system of public transport has potential to create new jobs and formalise existing precarious ones in this industry, majority of informal *matatu* workforce operating along the designated routes namely vehicle owners, stage workers, crew members and service providers stand to lose jobs due to relocation unless adequate compensatory measures are introduced. Moreover, whereas there are on-going initiatives by the implementing authority to engage various stakeholders to address these challenges, available evidence shows that informal workforce who are the majority and stands to be more affected along the designated routes are not adequately represented mainly because of two reasons. One, adoption of the term 'vehicle operators' as

representatives of the sector yet they term simply implies public transport vehicle owners at the exclusion of informal workers who fall under different categories besides a complex work relationship. Two, the failure by public transport workers' union to organise better to make adequate claims within such policy and planning spaces. These observations imply that whereas the on-going BRT project may eventually realise its overall objective of reducing traffic congestion within the city and its environs, it may do so at the expense of both social and economic inclusion hence undermining the key principles of just transition. The study further opines that addressing these challenges will require three critical factors: adopting a BRT design which is inclusive hence mitigating potential job losses; empowering transport union workers to amplify their voices within policy and planning spaces; and lastly securing the necessary political good will at the highest level besides continuously reaching out the implementing agency for trade-offs.



**Dimitra Michalaka**

Associate Professor, The Citadel, USA

**William J. Davis**

Head, The Citadel, USA

**Graham Copeland**

Professor, The Citadel, USA

**Kari Watkins**

Associate Professor, UC Davis, USA

**Kweku Brown**

Associate Professor, The Citadel, USA

&

**Morgan Hughey**

Assistant Professor, College of Charleston, USA

### **Evaluation of Transportation Network Infrastructure, Safety, and Travel Route Characteristics of Bike Share, Electric-Powered Pedal-Assist Bike Share, and Electric Scooter System Operation**

This research investigated differences in trip characteristics between bike share, e-pedal-assist bike share, and e-scooter for these urban micromobility travel modes. Through use of GPS tracking, user demographics, transportation network conditions, traffic operations data, and Geographic Information System (GIS) analysis, differences in the aforementioned mobility as a service (MaaS) travel modes were compared to explore 1) potential for meeting short distance (1-3 miles) travel demand, 2) dissimilarities in operational trip patterns, 3) use of existing roadway network, and 4) variation in levels of physical activity. Micromobility systems were evaluated in Birmingham and Mobile, Alabama and an array of factors describing short-distance MaaS trip-making characteristics were identified through this research study.

**Manlio Michieletto**

Associate Professor, German University in Cairo, Egypt

### **Building the Future Urban Structure: Kigali's Green City Project**

In the last decades, Africa's rapid urbanisation rate and growing metropolises have attracted the attention of urban studies pointing to the need of preventing the cities' collapse by (re)thinking about their urban future. Kigali - the capital city of Rwanda, reacted first in 2008 with the adoption of a Masterplan recently revised and approved in 2020. Nonetheless, the core aim of the Kigali City Masterplan is the transition to a sustainable satellite city composed of green settlements. The purpose of the paper is to examine the response to address the issues raised by the 11th SDGs (Sustainable Development Goals) entitled "Sustainable Cities and Communities", launching over the time a series of new settlements' projects: Kigali 2020, Kigali Vision and Green City Kigali. The paper explored the building typologies embedded in the two Gacuriro Satellite projects, Kigali 2020 and Kigali Vision, pointing the analysis to the twin houses and the apartments' buildings as quintessential cases to demonstrate that in order to pave the future there is a need to study the past understanding of their impact on the next urban evolution with a special regard on the private and public spatial quality. Moreover, it studied the use of a well-known urban development plan, the satellite city in the East African Region combined with the needs of "making cities inclusive, safe, resilient and sustainable", in a specific built and unbuilt context where tradition and modernity have to find the way to establish an architectural dialogue. Therefore, the paper explores the three case studies through a comparative method and concludes recommendations for correcting approaches to reach the vision of Kigali as a sustainable city.

**Mukta Mukherjee**

Assistant Professor, Alliance University, India

## **Catching Cab an Act of Fear or Compulsion? Empirical Study Based on Online APP Cabs in India during COVID-19**

COVID-19 created a major transformation in our daily commuting from public transport to either personal transport or private cabs. The economic status of the commuters determines whether switching from public to private mode of transport is feasible. This study aimed to analyze the impact of COVID-19 and public transport shortage on online cab fares. The study uses panel data of online cab fares on daily basis in Kolkata for before and after lockdown removal in 2020. In this study explores the reasons behind surge in online cab fare using fixed effect panel methodology in Kolkata. Two probable reasons are COVID-19 active cases and public transport shortage. The effects of weekends, dual shifts of government jobs and infrastructure blockage were additionally controlled. The results indicate that the surge in cab fares is caused by the shortage of adequate public transport compared to the number of commuters. The dual shifts of jobs are effective in transferring transport demand from peak to slack period. Infrastructure blockage reduces the effectiveness of dual shifts of jobs in transferring transport demands. The findings contribute to the previous literature by highlighting the role of public transport importance for lower income section in developing countries.

**Galvan Desvaux Noelia**

Associate Professor, University of Valladolid, Spain

**Alonso Rodríguez Marta**

Associate Professor, University of Valladolid, Spain

**Alvarez Arce Raquel**

Associate Professor, University of Valladolid, Spain

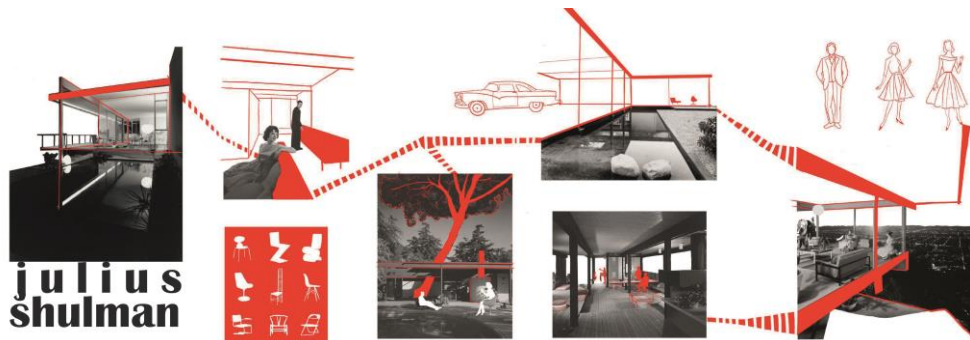
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**Fernandez Valer Cristina**

Associate Professor, University of Valladolid, Spain

## **Photography as the Architectural Context's Reflection: Graphic Analyses in Four Instants**

**Figure 1.** *Graphic Analysis of the Stahl House's Night Photography Taken by Julius Shulman in 1960. Work of the Authors.*



By alluding to the idea of context, we are not only referring to the architecture's nature or interest in adapting to a place in which it is located, but we can also understand it as a specificity of human activity. This includes the historical vision, by understanding how architecture has often been a reflection of the time in which it is developed, and has established a dialogue with society and culture. The research that we present addresses this question of the architectural context from the point of view of photography, investigating its ability to show the buildings as a figure or background for advertising campaigns, historical events, exhibitions or films.

We will approach the study through a series of images in which referent works appear, to establish links between architecture and context, and thus be able to show the relationships between the two that gave rise to the images that we present. To do this, we will analyze various image strategies through a graphic study based mainly on the concept of background and figure.

We will analyze four paradigmatic case studies where these relationships occur. The first two refer to architecture as a figure, such is the case of Julius Shulman's night photograph of the Stahl house in 1960, or the image of the Smithsons' house of the future in 1956 for the London exhibition. The other two deal with the work of architecture as a background, such as the photograph of the reception of King Alfonso XII together with Mies van der Rohe in the Barcelona Pavilion in 1929, as well as various frames from the film *Le Mepris* shot by Jean-Luc Godard in 1963 at Villa Malaparte.

The study includes several guidelines linked to the proposed graphic analysis methodology, that has to do with the historical, but also with the morphological elements (contour, scale, color, visual impact...), composition (point of view, tension, distribution of weights...) and even interpretation (staging, time, sequence, attitude...). Thus, we will be able to analyse these four images in terms of the impact they had in their context, as well as in the evolution of the architectural space.

The conclusion obtained from the analysis of the study models is intended to allow us to assess the subsequent influence in other contexts. We will also be able to establish the criteria that refer to the invariant actions given in them and could, consequently, serve as a methodology for other future analyses.

**Ifeloju Olusanya**

PhD Student, University of Kansas, USA

## **Understanding Heritage-Led Development Based on Community Perspectives in the Badagry Historic Area, Lagos State, Nigeria**

In contemporary times, cultural heritage is recognized as a partner in the development agenda of developed countries. Nevertheless, this is not the case in many developing countries in Africa. Cultural heritage resources possess the potential to create social, economic, environmental, and cultural benefits in host communities. Historic towns around the world possess unique cultural and natural characteristics which can foster local development, especially in the face of struggling economic conditions. This study investigated the understanding of heritage and its associated values through the viewpoint of the community of residents and experts of the Badagry area of Lagos state, intending to elicit the community's comprehension of heritage-led development and the factors that drive heritage-led community development in the Badagry area of Lagos State. The study area has a wealth of tangible and intangible cultural heritage resources that have not been utilized for community development, leaving it in a state of despair. Data collection was conducted using interviews, observation document reviews, and focus groups to understand the undercurrents of heritage-led development based on the perspectives of the residents and heritage expert communities in the study area. The relevance of the study lies in its addition to the knowledge base on heritage as a driver vehicle for sustainable community development in historic towns by presenting case-specific evidence from the study. This study conceptualized heritage-led community development based on social, economic, psychological, and cultural dimensions. The study found a clear contrast in the heritage value attributed by residents and experts due to the difference in contact and relationship to the heritage area by both sides, with residents attributing cultural and religious underpinnings to heritage, while experts held a western-centric position. In addition, the study identifies three prime action areas for successful heritage-led development: development, implementation, and enforcement of heritage masterplan and policy framework; the provision of supportive infrastructure and amenities; and stakeholders' collaboration; synchronization, agreement, and development.

**Betül Orbey**

Assistant Professor, İstanbul University, Turkey

**Ece Altınbaşak Haklıdır**

Assistant Professor, Doğuş University, Turkey

&

**Pınar Şahin**

Assistant Professor, Bahçeşehir University, Turkey

## **A Comparative Research on Child Participation in Urban Design**

Literature suggests that participation cannot be taught as a concept but can only be learned over time through practice. Among multiple scales where children can experience participatory practices, the city represents a more inclusive position as an aspect belonging to everyone. Therefore, participation gains more importance in the creation of urban spaces. The urban space, which is a symbol of communal living, is a place where every member of society has equal rights. It is the natural right of individuals to participate in decision-making processes that affect their lives. However, it is observed that children, who are not just future citizens but present-day citizens, are limited in terms of expressing opinions in the creation of urban spaces. It is necessary to discuss not only the limited quantity of practices that involve children's participation in spatial production but also the scope and nature of participation allowed by the implemented practices.

The aim of this study is to categorize theoretical approaches that differentiate the roles and degrees of participation of children in participation processes. Furthermore, it aims to create a model that enables children's participation in urban space production by discussing the degree, different meanings, and scope of participation provided by local government, academic, and civil initiatives targeting children's participation. In order to achieve these goals, thematic analysis method through an inductive approach was employed to reveal patterns across four cases involving child participation.

The analysis of the multiple case study revealed that the notion of participation, the diversity of its tasks and definitions, has a complex and profound nature that cannot be provided from a single source. The task of raising children as adult citizens who care for their cities can only be the product of collective and systematic work. Although it is a positive development to see participatory design practices being implemented through qualified but individual initiatives, it has been found that in projects developed under the leadership of local

governments, large-scale problem determinations and shallow solution proposals are developed. With the qualitative and concrete applications of individual initiatives reaching the inclusiveness level of local governments, it will be possible to reach numerous applicable and local solutions while ensuring true child participation. This study proposes a system consisting of four allies that need to work together: (i) local governments to regulate the limits of participation through determining the needs of the city, budget planning and delegation of authority; (ii) academics to design the framework of the problem by developing a vision with the support of examples from the world; (iii) non-governmental organizations to carry out the practice as employing the role as moderators.



**Danai Papathanasiou**

Teaching Fellow, Maastricht University, The Netherlands

## **Scandi-Kitsch: Shifting from Loft Living to Green New Built-Gentrification of the Eco-Friendly Home**

In her 1982 monumental work on gentrification aesthetics, Zukin established the loft – an expression of the ‘industrial chic’ aesthetic – as a visual signifier of gentrification. This aesthetic remains the ‘norm’ of gentrification aesthetics, having been popularized and normalised through interior design magazines to popular television series. The loft crosses the ocean and emerges in post-industrial European cities (Hamnett & Whiteleg, 2007), being established as the modern and luxurious means of urban living. More recently, and through Lees’ (2005) lens of “new-build gentrification”, lofts do not only appear in cities and neighbourhoods with industrial heritage, but their pastiche appears in previously uninhabited locations, creating intrinsically exclusive living blocks. Almost twenty years later, newly built neighbourhoods have adopted a different kind of identity than mere industrial: eco-friendly. This new environmentally sustainable branding of newly built neighbourhoods calls for an examination of gentrification’s appropriation of ecology. This paper seeks to reevaluate the loft as the primary signifier of gentrification and suggests the eco-friendly, minimalistic house as an additional visual signifier of gentrification. To explore this, a walking method and visual thematic analysis was conducted on the circular-branded Buiksloterham neighbourhood’s corporate and residential buildings, in the Oud-Noord district of Amsterdam. The paper claims that, in the Dutch context, gentrification aesthetics turn from loft-industrial chic to Scandinavian minimalism, to signify a superficial reconnection with nature, as the sustainable and ecological home remains exclusive to the urban elite.

**Giulia Pellegrini**

Vice Dean & Associate Professor, Architecture-Polytechnic School,  
University of Genoa, Italy

## **Drawing as a Representation of Beauty: Canon, Measure, Symmetry, Eurythmy**

Architecture is a complex system made up of parts and elements that interact in terms of composition. The researcher's objective is to recognize what leads the system back to unity, identifying the system of relationships that exist between the parts, i.e., going back to the geometric matrices, the orthogonal grids, the proportional relationships and the golden ratios underlying the overall composition, making explicit the modularity that defines the design.

The number can be considered a fundamental parameter in terms of architectural harmony, in an attempt to have a criterion above any subjective arbitrariness in identifying the rules of architectural composition.

The maximum reference in this sense, in the classical age, is Vitruvius who combines the Greek *symmetria* (sun = with, metron = measure) with the *commensuratio*, i.e., the possibility of circumscribing the commensurability of a work by reducing it to a modular structure, structured in multiples and submultiples represented by whole numbers. A fundamental aspect of symmetry itself is *eurythmia*, i.e., the harmonious combination of the constituent parts of the whole. This implicit agreement is placed at the basis of human proportions as well as of the architectural organism based on the latter.

Still very interesting are the possible combinations that the famous figure of the Vitruvian man generates, deriving from the ratios measured on the golden section, discovered by Pythagoras and defined primarily by Euclid; this ratio establishes a system of relations based on definable irrational numbers of a dynamic type, given the infinity, and therefore, the incommensurability of these numbers.

**Daniela Pittaluga**

Associate Professor, University of Genoa, Italy

## **Signs of Memory: Le Corbusier's Drawings at Villa E1027**

Design, beauty, the ethical question, aesthetics: all these terms are present in the story of Le Corbusier's drawings on the walls of Eileen Gray's villa E1027.

The drawings in question, seven in number, were painted by Le Corbusier on the interior and exterior walls of Eileen Gray's villa without her knowledge. They are drawings of considerable size and in very vivid colours, in themselves they are of quality and the author is undoubtedly one of the people who changed the culture of the 20th century.

On the other hand, Eileen Gray's villa E1017 is also considered today one of the masterpieces of modern architecture: it is essential in its lines and colours and every detail has been carefully thought out and designed. This attention to detail is not limited to the architectural layout but invests all the details, the furniture, the carpets, the curtains, the linen, the paintings.

The situation that arose with the inclusion of Le Corbusier's wall paintings poses many questions for those involved in Restoration.

According to some lines of thought, which I agree with, every intervention is a trace and as such has its own meaning, tells a piece of history and as such deserves to be preserved. In this specific case, however, Le Corbusier's brightly coloured drawings completely change the perception of the villa's spaces. The preservation of a trace, no matter how significant it may be, has in this case, the power to change and cause the loss of the basic idea of this villa: preservation causes loss. This story therefore brings an important reflection on the role of conservation, on the ethics of restoration and also on the power that a drawing on a wall can have.

In the article, starting from the famous example illustrated, we want to reflect on the implications that can be created between different signs on and in architecture and how they can be safeguarded, preserved and transmitted.

**Samer Raddad**

Assistant Professor, Al-Quds University, Palestine

## **Palestinian Universities and their Cities: What we need to Know about the Al-Quds University Research Outputs toward Jerusalem City**

Researchers and policymakers around the world view universities as essential components of urban areas, but the critical inquiry is whether these universities are merely located in the city or actively participating in its sustainable development. Scientific research is a major part of research-intensive universities' multiple objectives. Most Palestinian universities are located in urban areas such as Al-Quds university located in Jerusalem city. The relationship between the Palestinian universities and their cities is still not clear yet especially, in the scientific research context. Therefore, this study aims to explore the Al-Quds university research outputs toward Jerusalem city and the localization of the SDGs in the city especially, Goal 11 relevant to "sustainable cities and communities". This study used qualitative research methods for collecting, processing, and analysis of primary and secondary data such as content analysis of the university research reports and interviews with the research policymakers at Al-Quds University. The study found that the percentage of scientific research outputs at Al-Quds University that is directly related to the city of Jerusalem was less than 1% of the total research outputs at the university. Of this research effort, 47% was done in the university environment and 53% was related to the city of Jerusalem. Generally, the scientific research outputs at Al-Quds University focused on issues of education, climate, urban planning, political situation, and legal aspects in Jerusalem. Regarding localizing the SDGs, 57% of the research outputs addressed education issues (Goal 4), 19% addressed politics, peace, and justice issues (Goal 16), 9% addressed climate issues (Goal 13), 5% addressed governance issues (Goal 17), 5% addressed inequality issues (Goal 10), and 5% addressed urban development issues (Goal 11).

In this study, we are not assessing the content of the scientific research outputs but we can conclude there are weaknesses in the quantity and the research interests towards Jerusalem city as a home of the university. Also, we note random efforts towards localizing the SDGs because we note absent more than ten SDGs goals in the research efforts context at Al-Quds University. Although, there is a clear research strategy in the university towards Jerusalem city. But, there is

no mechanism for implementation, monitoring, and evaluation of the research outputs towards the city. So, we highly recommend Al-Quds university researchers pay more research efforts towards the Jerusalem city challenges and localizing the SDGs at the local level. Also, we recommend conducting future research efforts about the suitability of the university research outputs and the city where it is located in order to enhance the relationship between the universities and their cities towards localizing the SDGs especially, Goal 11, and making the city more sustainable for future generations.

**Giovanni Righini**

Professor, University of Milan, Italy

**Alberto Ceselli**

Professor, University of Milan, Italy

**Cristina Ondei**

PhD Student, University of Milan, Italy

&

**Emanuele Tresoldi**

Scientific Consultant, Italy

## **The Electric Traveling Salesman Problem**

The Traveling Salesman Problem (TSP, or ATSP in its asymmetric version) is a fundamental problem in vehicle routing and it has been deeply studied and solved with many mathematical optimization techniques. The widespread adoption of electric vehicles (EVs) requires now to reformulate the TSP taking into account some specific feature of electric mobility, such as the need for recharge while traveling along the route, the possibility of recharging when traveling downhill, the trade-off between recharge speed and energy price due to different recharge technologies.

We have developed branch-and-cut and branch-and-price algorithms for the exact solution of the (A)TSP and we have tested them on benchmark instances, some of them adapted from the TSP literature and others suitably designed to be difficult.

In the design of branch-and-cut algorithms, what makes the (A)TSP difficult is the need of reformulating the subtour elimination constraints, that are an essential part of the linear relaxation of the mathematical model. The optimal solution of the (A)TSP is not necessarily acyclic: it may be required to achieve feasibility or profitable to achieve optimality to visit a same recharge station more than once as well as to traverse an edge/arc more than once.

In the design of branch-and-price algorithms, a specific source of difficulty is that energy consumption is non-monotone. We designed and tested two branch-and-price algorithms: in one of them each column corresponds to a complete route of the vehicle, while in the other each column corresponds to a path between two consecutive visits to recharge stations. In spite of a less tight linear relaxation, the latter technique works better, because the pricing algorithm has to solve a sub-problem in which there are no recharges. Notably, in the asymmetric version of the problem, that may contain negative

consumption arcs (downhill roads), energy constraints must be suitably reformulated.

**Ilda Rusi**

Lecturer, Polis University, Albania

## **Generative Urban Design in the Field of Infrastructure: An Optimize Solution for Connecting Fier and Vlora County by a 600 M Bridge over Selenica River, Albania**

The way we think about infrastructure is being completely changed by parametric and generative design. Meanwhile the contemporary urban planning process is often viewed as a complicated and fragmented workflow. Optimize solutions with tens of thousands of variations while concurrently taking into consideration various limits.

This Paper will discuss and demonstrate the use of a generative urban design framework at the local scale. Although relevant to infrastructure, generative design is not limited to architecture. The construction sector is becoming more specialized and complex. The close cooperation between structural engineers, architects, urban planners and other stakeholders is a major driving force behind modern projects. The building site is cut off from architects and engineers, particularly in the digital age. To ensure a three-dimensional grasp of the scope of work, digital models are therefore necessary. The difficulty is that the structural model and architectural model do not match up exactly.

Bridges are effective structures that provide a variety of topologies, materials, and geometries. This paper examines how the geometry and topology of a 600 meters long bridge can bring an optimal solution for connecting two nearby counties, Fieri and Vlora. The performance of the bridge can be examined by altering the geometrical parameters in addition to the topology. By adding more design factors and offering a fresh method for bridge optimization, the study was successful in further developing the initial parametric model. Since the process of changing the design is quite quick and the analysis is displayed instantly, using parametric design to study alternative options for bridges could be highly helpful to designers.



**Antara Sablok**

Master Student, National Institute of Technology Calicut, India

&

**Bimal P.**

Assistant Professor, National Institute of Technology Calicut, India

## **Transmogrifying Banes to Boons: Reviving the Interstitial Spaces of Kozhikode City Neighborhood**

Over the years, Indian cities have grown at a tremendous growth rate of 140%, as per an NSSO study. As new physical and social infrastructures are developed to manage the growing population of the city, vacant spaces get created. The derelict, unmaintained spaces, termed as the interstitial spaces are woven into the very fabric of the city. These spaces act as a bane in the city as they are used for unconstitutional activities, and as dumping areas. This raises social, environmental, and security concerns for the population.

The research paper focuses on the revival of interstitial spaces in Kozhikode City, Kerala. The paper defines the interstitial spaces in the planned city domain and classifies them on the basis of the typology and value associated with them. The methodology followed for the study includes the identification of spaces with the use of remote sensing data and primary survey data with GIS as a tool application. The solutions to the spaces are taken up by the community itself through one-on-one interviews with the concerned population. The social and economic evaluation of the spaces is done to determine the value that the space holds for the community. The classification of the spaces helps to determine the best possible solutions for the space. These solutions are categorized as strategic, creative, and tactical based on the level of involvement of the community and the finances needed for the same. The management of the spaces is planned to incorporate the changing aspirations of the community with the help of ICT application.

This transmogrification of spaces from being a bane to a boon to society ensures that the voids are accepted and appreciated by the community. The solutions enrich the liveability factor of the area. This also ensures that there is efficient management of the space resource, which is a limited resource within the concrete fabric of the city. The study has centered on and highlights the importance of local area-level planning for efficient and effective management of city resources.

**Francesca Salvetti**

Adjunct Professor, University of Genoa, Italy

## **The Color of the City, Identity Beauty**

The colours of urban fronts have always followed historical, social and artistic evolutions and highlight the different traditions, cultures and habits of a population. Colour, as a perceptive and material aspect, of painted surfaces and building materials, is considered not only in the variety of colours and types of workmanship, but also as an expression of its ancient use with a strong cultural value, which recalls the importance of contextualisation in the analysis of urban contexts. In this sense, the identity beauty of colour refers to that set of knowledge and practical applications that over the centuries have led to a harmonious connection of the designed and chromatic material with the façade in the first place and with the surrounding environment then.

Never as in recent years has the chromatic aspect in the urban context, particularly in the peripheral areas of cities or in those small abandoned centres, signalled the profound socio-cultural transformations brought about by globalisation.

Perceptually, urban art, characterised by the strong graphic-chromatic impact it generates with the urban context, differs profoundly from the traditional historical pictorial art of façades, in which, on the contrary, harmonisation is sought. Works as a performative act aimed at describing contemporaneity in its meanings, not only artistic and cultural, but also political and social, evoked through a reinterpretation of the sign gesture and figuration.

The undifferentiated use of modern saturated products and colours as places change makes explicit the homogenisation and globalisation of this art. The colours that are culturally recognised as the identity of a place because they are derived from local materials, are repeated identically from place to place, what stands out is the uniqueness of the work itself.

He does not seek a philology to the drawing and chromatic arts of the past, but rather accentuates their detachment, in order to devote himself to contemporary themes and a figurative art more akin to the artistic taste of the new generations, emphasising the extemporaneousness and temporariness of these artefacts. Urban art that, in its generation of new perspectives and points of view, enters everyday life and is characterised as a new identity image.

The study deals with the theme of drawing and colour applied to facades whose technical and cultural identity of a place is being lost and

how important the identification and cataloguing of these pictorial representations is.

**Magda Saura**

Professor, Technical University of Catalonia, Spain

## **Centuriated Plots of Land for Sustainable Politics of Park Design: A Study Case in Barcelona**

Centuriated dry-stone walls allow tradition to persist despite rupture. Before *ad hoc* planning disruption, urban leftover spaces around Barcelona were built with centuriated “traditional” dry-stone wall vineyards. The metropolitan park of Collserola aims at reshaping tradition by environmental upgrading. Plots are reused in the Collserola Park again for agricultural, urban gardens. Barcelona is at the center of an ancient territory located in northeast of the Iberian Peninsula, a centuriated grid that Julius Cesar, governor of the Narbonne’s province, developed in 59 BC between Marseille (Massalia), Fraga (Gallia Flavia) and Tarragona (Tarraco). Vineyards and olive orchards are self-managed for produce, for open-space leisure; maintenance is done by the community. Architects argue that plots of land should urgently be listed as landmarks. Opposing views from the municipal administration question their heritage inventory validity since traditional, vernacular architecture lacks precise dating. In an on-line database catalogue ((Nogué i Font 2013) most of geolocated vineyard sites are still not protected. After a candidature put forward by Spain, Greece, Cyprus, France, Croatia, Slovenia, Italy and Switzerland, the art of dry-stone walling was declared in December 1<sup>st</sup>, 2018 as an “International expression of culture” and was included in the UNESCO Representative List of Intangible Cultural Heritage at the 13th Session of the Intergovernmental Committee for the Safeguarding of the Intangible Cultural Heritage. The dating debate should consider the protection of material culture as well, to protect walls built not only to retain plots of land, but also pathways, huts to store tools, and ditches and hydraulic structures. They were all consciously designed and timely set in centuriated forms. The bibliography lacks any reference to theories of architecture (e.g., treatises of Vitruvius or Alberti) for understanding tradition. It pays scant attention to major writers who revived the *Corpus Agrimensorum Romanorum* by Siculus Flaccus, Frontinus, Agennius Urbicus, and Hyginus Gromaticus. On the dating debate, authors question how reliable is to study centuriation through Landsat data (Chouquer 2009). Yet interdisciplinary research of archaeologists working with architects use urban morphology to diachronically study centuriated grids (Saura 2021; Orengo and Palet 2009). Epigraphy studies (Mayer and Olesti 2001; Guillaumin 2002;

Mayer, Baratta, Guzmán, Almagro 2007) corroborate the hypothesis of continuity of centuriated grids into disrupted, contemporary landscapes (González Villaescusa 2008; Olesti 2021). To put an end to dating debates, in this paper I will present evidence through interviews of users and decision-makers, through mapping field surveys and observation of geometric, property boundaries seen in Landsat/Copernicus imagery, and with other multiyear remote sensing-satellite images. Conflicting perceptions on dating tradition are discussed through the wicked problem (Chan and Xiang 2022) and parametric, environmental design methodology (Protzen and Teitz 2013). A wall may be very ancient, even if all its stones have been repositioned. Barcelona's adaptive reuse of centuriated dry-stone walls for park design provides a framework for tradition to emerge.

**Michela Scaglione**

Research Fellow, University of Genoa, Italy

## **From Smart City to Artificial Intelligence City: How AI is Changing Urban Perception Please**

In recent years, the concept of smart cities has gained significant attention to improve urban areas' efficiency, sustainability, and livability. Smart cities use technology to engage citizens efficiently and meet their needs, and they are designed to be livable, workable, and sustainable. However, the concept of intelligent cities is evolving, and the focus is shifting towards using artificial intelligence (AI) to enhance the efficiency and effectiveness of smart cities. Therefore, the term "Artificial Intelligence City" is emerging as a new concept that involves using AI to improve the quality of life for citizens and make cities more efficient and sustainable.

The transition from smart cities to Artificial Intelligence cities involves using AI to optimize urban life, such as transportation, energy consumption, waste management, and public safety. AI can help urban planners make decisions that improve traffic management, public transportation, and utilities with better efficiency. In addition, it can assist urban designers in designing responsive and efficient urban environments that benefit the inhabitants. AI can also help create better cities by optimizing transportation systems, such as highways, streets, and town squares, and improving the overall design and outcomes of urban planning.

One of the main benefits of using AI in urban planning is its ability to design and optimize transportation systems. AI can help cities become more human and more optimized for humans. AI can also track waste in real-time and send notifications to users to sort their waste, improving waste management correctly. AI can also enhance public safety by analysing data from sensors and cameras to detect potential threats and alert authorities.

The emerging role of AI in smart cities is defined as the study of the relationship between AI systems and urban contexts, including the perception of the inhabitants. Using AI in urban planning can lead to more efficient, sustainable, and livable cities. However, there are concerns about AI's ethical and responsible use in urban planning and the need to ensure that AI benefits all citizens and does not exacerbate existing inequalities.

This article aims to analyse state of the art on AI research and urban perception from the perspective of innovation and efficiency and an ethical point of view.

**Mali Sher**

Lecturer, HIT, Israel

## **Automatic vs. Manual Traffic Enforcement**

Many production and service systems are transitioning from manual to automatic methods. These changes come with some advantages and disadvantages. The Israel Police is working to increase deterrence and prevent road traffic crashes using enforcement, among other things. We analyzed the advantages and disadvantages of semi-automatic and manual traffic enforcement methods employed by the Israel Traffic Police, according to the road safety goals. The traffic enforcement system is a supply chain manufacturing plant of traffic tickets on one hand, and a service system to reduce offences and road accidents on the other hand. Therefore, the efficiency of the production and service is important.

Since the police has limited resources, enforcement is research based, therefore it emphasizes enforcement of several higher risk population groups: young drivers, non-Jewish drivers, truck drivers, and motorized two-wheeled riders. In addition, enforcement, as deterrence, is focused on offences that affect road traffic crashes, such as speeding.

This study compared between manual enforcement and semi-automatic enforcement of speeding and running red light offences among the various populations, in order to examine the enforcement distribution vis-a-vis different characteristics of the population of drivers. We analyzed three distinct types of databases that we merged: (1) All the traffic tickets that were given for speeding and running red light offences in the period between January 2020 and June 2021. The data in each ticket included the following variables: gender, age group, religion, time, location, and vehicle type; (2) Historical data on those drivers with regard to being ticketed for traffic offences and involvement in road traffic crashes (years 2016-2020); (3) The supply chain process data pertaining to conversion of the semi-automatic tickets (January 2021).

The findings indicate that truck, motorized two-wheeled vehicle, and female drivers receive relatively more manual tickets compared to automatic tickets. Moreover, young drivers receive relatively more manual tickets than older drivers, and among non-Jewish drivers there are no differences in the relative percentage of tickets issued by manual or automatic enforcement.



As applied and operative conclusions, the emphasis should be placed on manual enforcement of truck drivers and motorized two-wheel riders and to continue examining the causes of manual under-enforcement for women and for older drivers.

**Firzana Shuja**

Post Graduate Student, School of Planning and Architecture  
Vijayawada, India

&

**Adinarayanane R.**

Associate Professor, School of Planning and Architecture Vijayawada,  
India

## **Planning for Compact and Low-Carbon Transit-Oriented Development: A Case of Kochi City, Kerala, India**

Throughout the last twenty years the environmental debate was deeply marked by the concept of sustainable development. More recently, with the mounting concern over the extent of the earth's climate change, new paradigms have been emerging and rapidly moving from the academia to the political arena. Among these, the low carbon cities paradigm is standing out as a serious and coherent attempt to introduce in the global environmental debate a more pragmatic approach, based on measurable targets. Low carbon cities emphasize, in the first instance, the importance of our cities and metropolitan areas as key producers of carbon dioxide in an increasingly urban world. Non-motorized transport (NMT) has gained a lot of importance over the past few decades since it is a mode of transportation which is safe, comfortable, and sustainable in terms of cost and energy use and is a healthy alternative to the fast lives of people these days. Hence it is an upcoming need of the hour but is always underrated due to the unavailability of proper and safe infrastructure which includes footpaths, bicycle tracks and comfortability for pedestrians and cyclists.

Nevertheless, to achieve efficient NMT usage, there should be a well-planned strategy to lessen the usage of private vehicles and provide an efficient development plan making cities NMT friendly. However, most of the cities in India has undergone urban sprawl i.e., low density development in a linear growth manner and hence providing fully walkable cities is greatly challenged for the urban planners/city administrators. Smart Growth Principles, such as compact development and Transit Oriented Development along with efficient feeder system is required to bring about high density-mixed land-use development. It encourages mixed-use development with a diversity of housing alternatives that is compact and transit-oriented so that it can promote walkability and cyclability. Keeping the aforesaid knowledge in mind, authors have chosen Kochi city as study region for

further detailed investigation. In this research study, authors have made an attempt to explore the current state of non-motorized transport network in the study region, by mapping the accessibility to NMT infrastructure employing ArcGIS. Finally, based on the findings, the study concludes design strategies through principles of Transit Oriented Development (TOD) which can pave the way to build compact city and navigating towards achieving Low-Carbon Development in the Kochi city.

**Ruth Steiner**

Professor, University of Florida, USA

**Kai Monast**

Associate Director, Technical Services; Director, Public Transportation,  
School Planning and Transportation Groups, North Carolina State  
University, Institute for Transportation Research and Education (ITRE),  
USA

**Waugh Wright**

Bicycle & Pedestrian Program Manager, North Carolina State  
University, USA

**Jeremy Scott**

Program Manager, Public Transportation Group, North Carolina State  
University, Institute for Transportation Research and Education (ITRE),  
USA

**Juan Suarez**

Transportation Planner/Engineer, Alfred Benesch & Company, USA  
&

**Andre Soucy**

Graduate Student, University of California, Berkeley, City and Regional  
Planning, USA

## **The Congestion Costs for School Buses and Public Transportation**

Roadway congestion creates delays and increases costs for all roadway users, including buses. School and public transportation buses subjected to recurring congestion delays result in these modes becoming both more expensive to operate and often less competitive as mobility options. Maintaining existing coverage and frequency requires increases in operating and capital expenses. Failing to maintain coverage and frequency encourages mode shifts that may exacerbate congestion in these corridors. Two sites - Pinellas County, Florida, a populous urban county with multiple distinct municipalities, and Durham County, North Carolina, a less populous county with a central core that draws passengers from suburban and rural areas surrounding it. This project combines three large datasets, 1) EDULOG school transportation routes, 2) Google transit feed specification (GTFS) public transportation routes, and 3) Regional Integrated Transportation Information System (RITIS) congestion data. Combined, these three datasets inform when and where publicly funded transportation vehicles are operating and allow the estimation of the delay experienced by each vehicle. The delay costs are then calculated both

temporally and spatially, allowing for identification of locations and times where mitigation strategies may be most appropriate. Strategies may include route diversion, lane dedication, signal prioritization, queue jumping and many others. We found that Durham County's transit system, Goexperienced 75 hours of delay on major roadways on average weekdays totaling to \$7,200 in costs per day and \$1.8 million per year. Pinellas County encountered recurring daily delays of 120 hours for a daily cost of \$11,500 and yearly cost of \$2.875 million.

**Boris Svilicic**

Professor, University of Rijeka, Croatia

## **Safe Maritime Transportation: Security Challenges of Shipboard Cyber Physical Systems**

Maritime transportation has been the basis for the global trade and supply chain for hundreds of years. At present, about 80% of world merchandise trade by volume is transported by ships. Ship navigation and transportation have been progressively relying on cyber technologies to improve the effectiveness and safety. The shipboard cyber physical systems have strongly improved the safety of the navigation by the paper charts workload reduction and real-time information provision, so the ship's navigational officers can focus on the actual traffic situation.

The International Maritime Organization has recognized the need for securing the maritime transportation from cyber threats and has imposed improvement of the approved safety management system of ships by incorporating the cyber risk management. Therefore, no later than the first annual verification of a shipping company's document of compliance following 1<sup>st</sup> of January 2021, the ship-owners and managers must incorporate cyber risk management into safety management system of all ships engaged in international trade.

In this work, the security resilience estimation of shipboard cyber physical systems ECDIS, radar and integrated navigational system will be presented. The experimental estimation is based on the computational testing with a vulnerability scanning software tool. Technical specification of the shipboard cyber physical systems and details of the experiment will be presented. The identified risks of shipboard navigational systems along with possible solving resolution will be presented.

**Rita Viliuviene**

PhD Student, Vilnius University, Lithuania

## **Towards the Creation of a Functional Cartographic Style System**

The problem of cartographic stylistics belongs to the field of cartosemiotics, specifically – cartographic language, and is still little researched. The studies of the functional styles of the cartographic language and related context of communication are named among the current fundamental directions of cartographic research by cartosemioticians A. Liutyj and H. Schlichtmann. A stylistic approach is the selection of appropriate language means, taking into account the function of the language and the area of use of the language. Knowing the functional cartographic styles allows one to recognize the varieties of cartographic language on the map, to determine the appropriateness of the graphic means of expression used for a specific situation, to notice the elements of subjectivity on the map and to evaluate them critically. Cartographic language as a mean of communication has a structure, a set of characteristic elements and connections, and is a system. The ongoing research aims to create a system of functional cartographic styles.

When studying the map symbols, the ways of connecting them and the peculiarities of communicated information, it was noticed that it makes sense to derive a parallel between cartographic language and the natural language (Neytchev, 2008). As in natural language research, stylistic rules for cartographic language can be extracted by analyzing examples of mapping activity, that is, existing maps. Analogously to linguistics, functional styles in cartography depend on the function of the language and the area of language use. According to H. Schlichtmann, the function of cartographic language is signification, clarification and emphasis (Schlichtmann, 2002). The modelling of the communication context of geographic information used for maps is standardized at an international level (ISO 19117:2012).

When creating a system of functional styles of maps, existing examples of maps are examined. The style of the mentioned maps is evaluated according to the developed methodology. In this methodology, the elements of the functional map styles are distinguished, the properties of cartographic language (figurativeness, exactness, etc.) are identified and their possible values (concrete – abstract, accurate – stylized, respectively) are evaluated, style means (conveying similarity, highlighting, stylization, etc.) are listed, focusing

on the function performed by the cartographic language and the area of use. A general structure diagram of the system of functional map styles is given.

Findings in the research process of functional map styles allow to clarify more about the system of functional map styles. The differences in the functional map styles become apparent when comparing the maps with each other. After conducting research with different groups of maps, the system of functional styles can be refined.



**Min Wang**

PhD Student, Southeast University, China

## **Identification of Optimal Types of Land Development Intensity in Historical Urban Areas Based on Adaptability Evaluation of Traffic Capacity and Travel Demand**

The road network in historical urban areas is an important part of the overall traditional landscape. Under the constraint of historical protection priority, the traffic capacity is limited and the renewal difficulty is high, which leads to the traffic supply and demand cannot reach a stable balance. There is an interactive relationship between traffic capacity and surrounding land use. The optimization of land development can alleviate the imbalance between traffic supply and demand, improve the value of land development, and regulate the space capacity. Evaluate the adaptability of traffic capacity and travel demand scientifically and accurately, identify the optimization type of land development intensity, focus on solving the matching problem of traffic and land development, and realize the coordinated development of urban regeneration location selection, development intensity, and traffic. This will also help to explore the viability of progressive and organic regeneration, prevent the aimless and unorganized demolition in previous urban renewal projects, and facilitate the balancing of the preservation and sustainable development of historical urban areas. In previous studies, the interactive relationship model between land development intensity and traffic capacity has been discussed less. Most of them carry out traffic flow forecasts separately or carry out intensity zoning according to the location. Therefore, based on the ArcGIS platform, this study developed a framework to identify the optimal type of land development intensity in historical urban areas. This framework integrated the macro location matching and micro traffic capacity to study whether the traffic of a certain location can bear certain development intensity. Firstly, the road network density, traffic accessibility, and facility service rate indicators were comprehensively evaluated to measure the traffic supply level. Secondly, based on the land use function, development intensity, and big data of traffic travel, traffic demand was measured. Finally, the coupling coordination degree model of traffic supply and demand was constructed to form the matching matrix of traffic location and land use type, identified the optimal type of land use, and proposed the adjustment and control plan of land use development intensity. The historical urban area of Suzhou was selected as the study site. With a history of more than 2500 years,

the city of Suzhou is a model for the protection of national historical and cultural cities in China. According to the results of optimization type identification, regeneration models with high referential value can be developed by urban regeneration planners, which facilitates the optimization of resource allocation. The developed framework provides novel theoretical and practical insights regarding regeneration assessment in historical urban areas.

**Tom Wanyama**

Associate Professor, McMaster University, Canada

## **Potentials and Limits of Learning Factories in Teaching Engineering**

Historically, undergraduate engineering education has created divisions between theoretical lectures, and laboratory and project work, preventing students from making clear connections among these modes of teaching. Furthermore, engineering programs are usually divided into courses, which are not taught in a collaborative manner that enables students to integrate knowledge from multiple courses to develop solutions to real-life problems. Design, implementation, and operation of industrial automation systems requires individual personnel to apply skills in a multiplicity of areas including Programmable Logic Controllers (PLC) and PLC programming, process control and instrumentation, power electronics and robotics, Supervisory Control and Data Acquisition (SCADA), manufacturing software applications, industrial networking, communication protocols, Human Machine Interfaces (HMI), as well as electrical and machine installation and commissioning. Therefore, curriculum should be designed and delivered such that the classroom experience encourages students to apply an integrated set of skills to craft solutions to industrial automation projects. Of the many possible pedagogical approaches which might be used to achieve such an outcome, this paper primarily focuses on practice-based learning, and curriculum and curriculum-delivery integration. We believe that deploying varying and integrated curriculum delivery methods is a basis to achieve classroom success.

In this paper, we present a practice-based learning approach that is supported by an integrated curriculum. We believe that this is in line with the general educational principle of integrating academic theory, engineering practice, and understanding how to leverage technology to create solutions and produce value for society. In our teaching model, we use word “practice” as both a noun and a verb. As a noun, we take it to mean the actual application or use of an idea, skill, or method, as opposed to theories relating to it; and as a verb we take it to mean performing an exercising a skill repeatedly to improve or maintain proficiency. Therefore, with respect to our pedagogical approaches, we develop and deliver curriculum that trains each student the actual application of engineering and technology in systems automation by exercising their engineering and technology integration skills regularly.

Practice-based learning requires a fully integrated curriculum delivery method (integration of theoretical lectures, laboratories, and projects), because the various modes of teaching and learning are most effective at different levels of the Blooms Taxonomy. In addition, it requires an integrated curriculum (integration across courses) because real-life project usually require skills taught in multiple traditional courses. An integrated curriculum has added value. It helps students to realise that different courses are simply building blocks of the engineering and technology integration skills required of them in industry; and helps them to identify transferable skills while still in school; hence, inspiring them to become lifelong learners.

**Asa Wikberg Nilsson**

Professor, Luleå University of Technology, Sweden

&

**Minna Eronen**

PhD Candidate, Luleå University of Technology, Sweden

## **Dreamcatching: Introducing a Reflexive Tool to Facilitate Situated Complexity in Urban Co-Design Practices**

### *Purpose*

To capture people's dreams and needs related to attractiveness of their living environments, the role of professional urban designers entails facilitating multidimensional co-design processes. However, many urban designers tend to focus on the material and technical factors rather than the social and cultural ones (Larsson & Jalakas, 2013). The lack of holistic thinking and transdisciplinary practices, risk resulting in one-sided urban design practice emphasizing technology, materials, and other physical/material entities and forgetting the human being (ibid). Therefore, considering complexity, as a real and practical problem as well as an asset with endless possibilities, is necessary to provide meaningful means and solutions (Stolterman, 2008). This requires reflective design approaches. Consequently, we explored what situated urban co-design complexity entails and how it may be utilized to serve the reflective co-design processes.

### *Methods*

The method of this study is based on a conceptual framework analysis, as proposed by Jabareen (2009). It aims to formulate new ideas and frameworks within a specific topic by utilizing variety of information drawn from various literatures, interviews, and practices within the explored field. In addition to literature studies on situated systemic design and situated complexity in urban co-design, findings from a three-year case study were included to deepen the analysis and understanding of how these perspectives can be addressed in the urban realm and practices. Various professionals in the broader field of urban design, such as architects, landscape architects, planning engineers, traffic engineers, experts in accessibility, city communication office practitioners, social workers, community building practitioners, and people knowledgeable in art in public spaces, participated in interviews and a series of now-wow-how workshops inspired by Jungk &

Müllert's (1987) future workshop concept. In these activities, tools that aim to support the practitioners to reflect on place development were developed and tested.

### *Findings*

Situated complexity in urban co-design can be viewed from four interconnected perspectives: people and participation (who); vision and scope (what); place and setting (where); and tools and methods (how). These main categories are organized in the Dreamcatcher model to visualize the synergies between them. The set of questions, that were identified and formed during the project activities as well as inspired by the literature studies, are connected to each area help to make sense of situated complexity in various types of co-design projects.

### *Originality/Value*

The Dreamcatcher tool offers nuanced insights and inspiration to guide attentiveness of multiple aspects of urban futures:

- Holistic perspectives: embracing people's experiences, everyday aesthetics, and collaboration as important factors in the creation of attractive and inclusive living environments.
- Inclusive and democratic perspectives: to achieve an inclusive and democratic society that provides good living environments, based on both individual and shared needs.
- Knowledge development: enhances situated learning among co-design participants and other actors.

**Mi Zhou**

PhD Student, Southeast University, China

## **Capacity Calculation and Layout Optimization of Public Space in Suzhou Ancient City**

Suzhou was one of the first state-listed famous historical and cultural cities in China. Several Suzhou gardens, representing the city, have been listed as UNESCO World Heritage sites. The cultural heritage value of Suzhou is recognized globally. The public space of Suzhou's ancient city is an important spatial carrier for the continuation and inheritance of history and culture, and it is also the main part of the urban space. Due to protection requirements, the construction capacity of public space in Suzhou's ancient city is strictly limited. Water lanes, river banks, and historic streets are maintained and repaired only from a protection perspective. The total capacity and spatial layout of public space need to be improved, as there is a lack of overall planning.

Against this background, this study aims to improve the overall quality of public space in Suzhou Ancient City by calculating its capacity and optimizing its layout. Four factors, namely construction control, building quality, architectural style, and building age, were used to evaluate the renewal potential of each plot in the ancient city. The ancient city was then divided into four types of communities: historical, commercial-oriented, office-oriented, and residence-oriented, representative communities of each type were used to define the ideal range of the overall proportion of green space, square, sidewalk, and public space, representative communities of each type were used to define the ideal range of the overall proportion of green space, square, sidewalk, and public space. International ancient cities were also used as reference for understanding public space capacity. The overall planning capacity of public space was obtained by combining the current and ideal proportions of the public space. Finally, the public space capacity was allocated to each community according to the current conditions and renewal potential, and specific implementation suggestions for optimizing the layout of public space were proposed. The study highlights the importance of balancing the preservation of historical and cultural heritage with the need for public space to improve the quality of life in urban areas.

**Merit Zimmermann**

Researcher, Erasmus University Rotterdam, The Netherlands

### **Beauty and Aesthetic Emotion: A New Paradigm for Urban Development?**

The question of what makes a ‘good’ city has fascinated humankind for decades. But, in the wake of climate change and rapid urbanization, the search for good city form has gained renewed interest and fresh attention. Various labels have been attached to cities as paradigms for urban development, such as zero waste, smart, and compact. What many of these paradigms miss is a concern for beauty, which is still dismissed as a ‘matter of taste’. This is unfortunate because research shows that beauty in cities has economic, social, and health benefits that the people of a place want to reap. As such, this study aimed to open out an ideas bank on beautiful city-making to embrace new models of reflection on urban development. 15 ‘expert’ interviews were conducted with architects, designers, planners, investors, curators, and futurists from an American-European context. Results suggest that urban beauty is best thought of as a set of (aesthetic) emotions that encompass feelings, such as comfort in and enjoyment of participation. As such, city-building professionals can create more beautiful and well-loved cities by working to induce certain sensations or feelings through their projects and practices. The value of such an emotion-driven approach lies in its ability to integrate a number of paradigms under a common pluralist umbrella, supporting the systematic endeavor to make cities more reflective of our ideas of a good life.



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